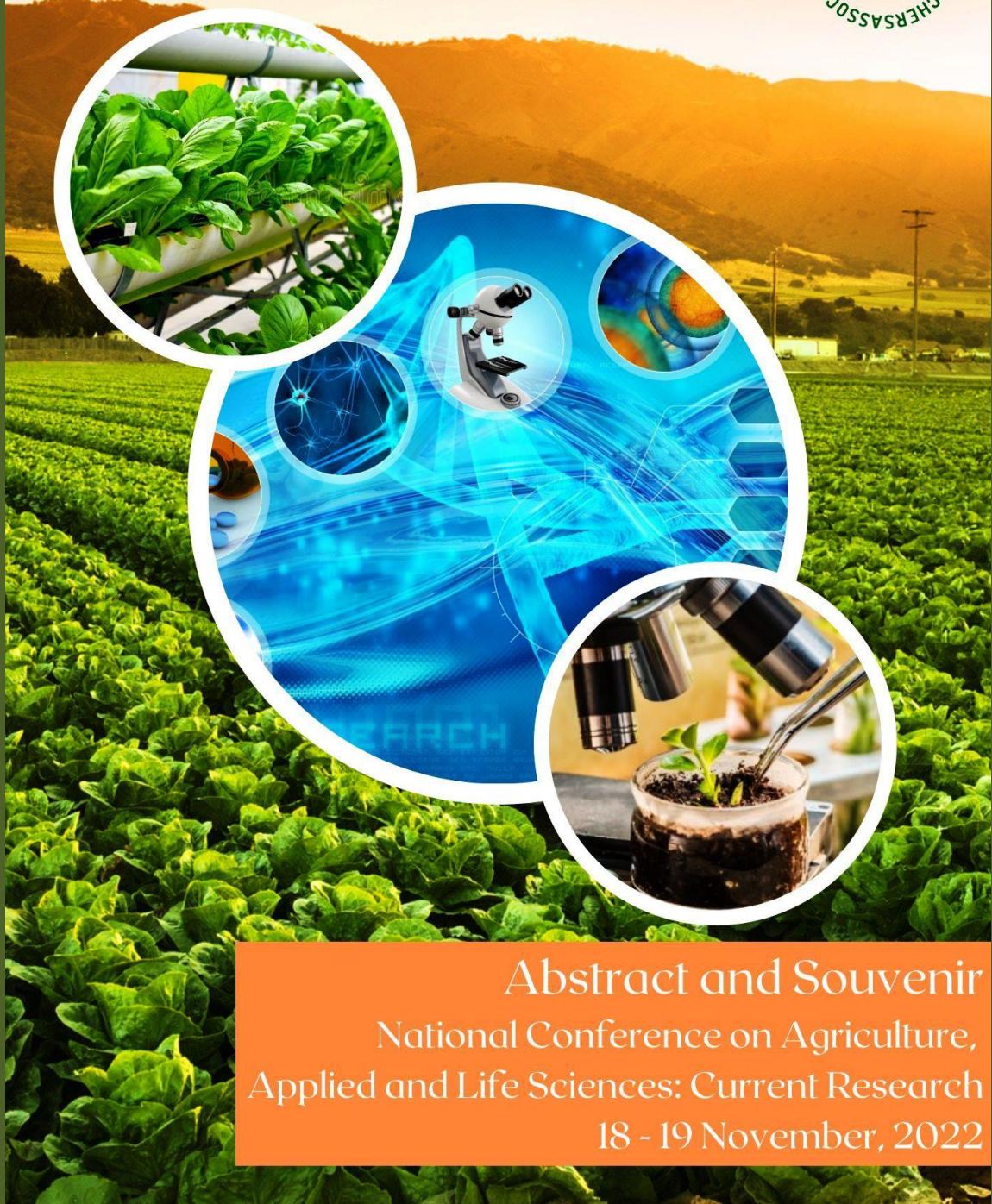


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2022 5th PSRM



Abstract and Souvenir  
National Conference on Agriculture,  
Applied and Life Sciences: Current Research  
18 - 19 November, 2022

# Abstract and Souvenir

## 5<sup>th</sup> Plant Science Researchers Meet – 2022

National Conference  
On  
Agriculture Applied and Life Sciences: Current Research

18 & 19 November, 2022



*Organized by*

**PLANTICA**

Association of Plant Science Researchers (APSR)

Dehradun, Uttarakhand, India

[www.pgrindias.in](http://www.pgrindias.in) and [www.plantica.in](http://www.plantica.in)

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**Uttarakhand Open University (OUU), Haldwani**



**H. N. B. Garhwal University (A Central University), Srinagar**



**Sri Dev Suman Uttarakhand University Campus, Rishikesh**



**NAHEP- SKUAST, Kashmir**

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पंतनगर – 263145, जिला – ऊधमसिंह नगर (उत्तराखण्ड) भारत  
G.B. Pant University of Agriculture & Technology  
Pantnagar - 263145 (Uttarakhand) India

**डॉ. एम.एस. चौहान**

एफ.एच.ए, एफ.एल.ए.एससी, एफ.ए.ए.ए.एस, एफ.ए.ए.डी.एस

कुलपति

**Dr. M. S. Chauhan**

FNA, FNASc, FNAAS, FNADS

Vice-Chancellor

## MESSAGE

I am delighted to learn that PLANTICA - Association of Plant Science Researchers (APSR), Dehradun, Uttarakhand in collaboration with Uttarakhand Open University, Haldwani, Nainital, Uttarakhand and in Association with H.N.B. Garhwal University, Srinagar, Sri Dev Suman Uttarakhand University, Rishikesh and NAHEP- SKUAST-Kashmir is organizing National Conference on Agriculture, Applied and Life Sciences : Current Research under 5th Plant Science Researchers Meet (PSRM), 2022 from 18 to 19 November, 2022 at Uttarakhand Open University Campus, Haldwani, Nainital, Uttarakhand, India.



Global food security threatened by climate change is one of the most challenges in the 21st century to ensure food and nutritional security for the ever increasing population while sustaining the already stressed environment. The theme chosen by the organizers is topical and relevant in the context of present day's requirement for equitable and sustainable agricultural development. While India has made tremendous strides in all spheres of agricultural research and development thus paving the way for the great Indian green, white and blue revolutions, ensuring food and nutritional security to the nation, yet the degrading trend of rural resources and adverse climate change scenario have emerged as serious problems. The conservation and management of rural resources is essential to ensure sustainable development of future agriculture. This involves integration of social trade, environmental and ecological issues with efficient agricultural production.

I hope, the deliberations and discussion during the conference would help to bring out meaningful suggestions and recommendations pertaining to the key area of information and communication management towards the development of smart agriculture.

I convey my best wishes to the organizers for the grand success of the National Seminar.

  
( M.S. Chauhan )

Pantnagar

November 7, 2022



डॉ. अजीत कुमार कर्नाटक  
कुलपति

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विश्वविद्यालय परिसर, उदयपुर - 313 001 (राजस्थान), भारत  
No. PS/VC/MPUAT/2022/805  
Date: 5<sup>th</sup> Nov., 2022

### Message

I am pleased to learn that PLANTICA – Association of Plant Science Researchers (APSR), Dehradun, Uttarakhand in collaboration with Uttarakhand Open University, Haldwani is organizing a National Conference on Agriculture, Applied and Life Sciences: Current Research under 5<sup>th</sup> Plant Science Researchers Meet (PSRM), 2022 from November, 18 to 19 2022 at Uttarakhand Open University Campus, Haldwani, India.

India has come a long way from 'Ship to Mouth' situation to Food Security. However, the national yield of various commodities is far low from international averages. The pattern of growth is also uneven across the regions and the growth is not sufficient enough to make a dent on rural poverty and inequality. The emergence of biotic and abiotic stresses, rampant degradation and depletion of natural resources put a question mark in the sustainability of the agriculture. At the present juncture, when we are facing the curse of climate change, sustainable farming is a ferment issue. Having made significant advancements to achieve food security, we still need to address the productivity and quality issues to provide sufficient and safe food to the ever rising population underneath this curse. Modern agriculture should move ahead with innovations in farming practices that can help in increasing agricultural efficiency and reduce the loss of natural resources. By applying modern technologies, farmers will gain more profits and able to increase their productivity.

In this milieu organization of this National Conference is very timely and it will have enormous impact in catalyzing our commitment to reach the peasant for ensuring food and nutritional security for the ever increasing population in tandem with natural resources conservation. I applaud efforts of the organizers for making this kind of academic interface possible on the subject of great contemporary importance and wish that the event is solemnized befittingly.

  
05.11.2022  
(Dr. A. K. Karnatak)

प्रो० ओम प्रकाश सिंह नेगी  
कुलपति  
Prof. Om Prakash Singh Negi  
Vice Chancellor



उत्तराखण्ड मुक्त विश्वविद्यालय  
Uttarakhand Open University

Ref. –UOU/VCO/03

Dated-09/11/2022



#### Message

It gives me immense pleasure to know that PLANTICA- Association of Plant Science Researchers (APSR), Dehradun, Uttarakhand in Collaboration with Uttarakhand Open University, Haldwani is going to organize the National Conference on Agriculture, Applied and Life Sciences: Current Research under 5<sup>th</sup> Plant Science Researchers Meet 2022 in association with H.N.B.Garhwal University Srinagar, Sri Dev Suman Uttarakhand University, Rishikesh and NAHEP-SKUAST- Kashmir as on 18 – 19 Nov. 2022 at UOU Campus, Haldwani, Uttarakhand.

The theme of this conference is global priority today. During the last couple of years due to the COVID-19, the world has experienced and realized how whimsical the nature could be at times and how badly the consequences could affect the entire mankind for food, treatment and shelters.

I am sure that this dual mode (offline and virtual) National Conference will focus on the various scientific tracks covering major areas of research on agriculture, biological and applied sciences and would become a platform for bringing together administrators, business bodies, policy makers and the members of global scientific community including scientists, researchers and distinguished professors to find out the key problems, challenges and pragmatic solutions which will help in in-depth understanding of the global food security and environmental safety issues in a long-lasting way.

I would like to appreciate the organizers of this conference and thank the people whose dedicated efforts and creative plans will make the conference successful. I wish comfortable stay of all participants and delegates in the University Campus during the conference. Finally, I wish a grand success of the conference.

  
(Prof. O. P. S. Negi)

उत्तराखण्ड मुक्त विश्वविद्यालय



## उत्तराखण्ड मुक्त विश्वविद्यालय Uttarakhand Open University

Ref. No. UOU /R/Mess/2022/01  
Date 09/11/2022



### Message

It is matter of immense pleasure for me that PLANTICA – Association of Plant Science Researchers (APSR), Dehradun, Uttarakhand in collaboration with Uttarakhand Open University, Haldwani, Nainital, Uttarakhand and in Association with H.N. B. Garhwal University, Srinagar, Sri Dev Suman Uttarakhand University, Rishkesh and NAHEP-SKUAST-Kashmir is organizing National Conference on Agriculture, Applied and Life Sciences: Current Research under 5<sup>th</sup> Plant Science Researchers Meet (PSRM), 2022 from 18 to 19 November, 2022 at Uttarakhand Open University Campus, Haldwani, Nainital, Uttarakhand, India.

It is my great pleasure to welcome all the participants in the 5<sup>th</sup> PSRM- 2022 at UOU Campus, Haldwani, Uttarakhand, India. The conference offers a broad platform for the students, academicians and researchers to share their thoughts, knowledge, ideas and experiences in the diverse fields of Agriculture Applied and Life Sciences. It is venture of joining hands towards the recent discoveries in the field of plant science.

I feel great to receive the participation of the distinguished speakers, professors, researchers who will be delivering keynote speech and invited talks. I also wish to extend my sincere appreciation to the organizers for putting in their unfeigned efforts in organizing this conference.

I firmly believe that the deliberation and interaction during conference will be beneficial, stimulating, productive and encouraging to the researchers and participants. I would like to wish for a very successful conference, which hopefully besides the hard work will be a fiesta of science, celebration of knowledge and a cheerful forum of wisdom.

*Rashmi Pant*  
(Dr. Rashmi Pant)  
Registrar



## उत्तराखण्ड मुक्त विश्वविद्यालय Uttarakhand Open University



### Massage

With immense pleasure and pride, I heartily congratulate the PLANTICA- Association of Plant Science Researchers (APSR), Dehradun, Uttarakhand and School of Sciences, Uttarakhand Open University, Haldwani for organizing the two days National Conference on Agriculture, Applied and Life Sciences: Current Research under 5<sup>th</sup> Plant Science Researchers Meet 2022 in association with H.N.B.Garhwal University Srinagar, Sri Dev Suman - Uttarakhand University, Rishilesh and NAHEP-SKUAST- Kashmir as on 18 – 19 Nov. 2022 at UOU Campus, Haldwani, Uttarakhand.

In view of the global climate change, the theme of the conference chosen by the organizers is need of the hour and highly appreciable. Participation from several institutions around the nation meets here to share their research work. The conference shall help the policy makers to shape the policies in the interest of common people and other stakeholders that eventually positively shape our nation and make the citizens future-ready. This conference will also inspire the entire team of the University to persistently undertake such ventures which work for knowledge enhancement of the society and researchers as well at large.

I congratulate the "PLANTICA- APSR" for their excellent efforts.

I wish the event a grand success.

(Prof. P. D. Pant)  
Director  
School of Sciences  
Uttarakhand Open University



**H. N. B. Garhwal University (A Central University) Srinagar Garhwal 246174,  
Uttarakhand, India**

***School of Agriculture & Allied Science***

**Prof. J. S. Chauhan**  
**Dean**

Tel: 01370-297127 (off)  
Mobile: +919412079499  
Email: js99chauhan@gmail.com



I am delighted to know that Association of Plant Science Researchers (APSR), Plantica Foundation, Dehradun is organizing 5<sup>th</sup> Plant Science Researchers Meet on November 18 – 19, 2022.

I am confident that National Conference on Agriculture, Applied and Life Sciences: Current Research will serve an excellent forum to congregate large number of delegates including researchers, policy planners, agro industries, marketing agencies, and progressive farmers to brainstorm and conceptualize a meaningful strategy for investigation in plants particularly in agricultural crops. This will promote awareness, advancement and disseminate knowledge on commercial and scientific aspects to project the importance of conservation and propagation of plants and further to strengthen the plant science fraternity.

I am sure the deliberations during this conference will help in preparing a roadmap for the quality agricultural produce for the food security to meet the challenges of climate change and resource crunch in agriculture.

On this occasion, I extend my greetings and felicitations to our honored guests, all invitees, participants and members of the Association. I congratulate the Plantica Foundation and Association of Plant Science Researchers for their sincere efforts to take-up the noble task for organizing such an important conference and wish the Conference a great success.

I wish the conference a great success.

Dated: November 01, 2021  
Place: Srinagar Garhwal

**(Dr. J. S. Chauhan)**  
Dean  
School of Agriculture and Allied



**Dr. Anoop Badoni**

*Ph. D, FAPSR, FIBTCA*

Founder President (APSR)

Scientist & Director (IARD)

Association of Plant Science Researchers (APSR)

Indian Academy of Rural Development (IARD)

Plantica Foundation, Dehradun, Uttarakhand

[www.pgrindias.in](http://www.pgrindias.in) and [www.plantica.in](http://www.plantica.in)

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It is a matter of great privilege for me to organize the 5<sup>th</sup> Plant Science Researchers Meet (PSRM), 2022 - National Conference on Agriculture, Applied and Life Sciences: Current Research in collaboration with Uttarakhand Open University, Haldwani, Nainital, Uttarakhand and in Association with H.N. B. Garhwal University, Srinagar, Sri Dev Suman Uttarakhand University, Rishkesh and NAHEP- SKUAST-Kashmir from 18 to 19 November, 2022 at Uttarakhand Open University Campus, Haldwani, Nainital, Uttarakhand, India.

On behalf of the organizing committee, I warmly welcome all participants, delegates, researchers, scientists, students from different institutions, colleges, and universities from all over India. 5<sup>th</sup> PSRM National Conference has been designed to focus on various scientific tracks covering major areas of research on agriculture, applied and life sciences. This conference will bring together the scientific community, policymakers, administrators, industry representatives, and other stakeholders to exchange and share their experiences and new ideas. The conference is aimed to provide a common platform to scientists, researchers, academicians, professionals, social workers, policymakers and expertise corporate to exchange their new ideas and recent research findings with colleagues, which will boost their knowledge and experience. In this global event scientists across the India are participating. I appeal to the research community to extend their continued support and cooperation to the future activities of PLANTICA.

I wish that PSRM will keep on growing in coming years with more impact on the National as well as International research community. On behalf of Organizing Committee of 5<sup>th</sup> PSRM -2022 and on my personal behalf I would like to welcome all distinguished scientists, researchers and students and thank them for participation in the conference.

Thanks to all members of APSR, Editorial and Advisory Board of PLANTICA, all organizing committee members, all collaborative partners specially UOU to accept our invitation to host the conference and all participants to support us by your valuable suggestions, research and time for making the conference a success.

**(Dr. Anoop Badoni)**

Chief Convener

5<sup>th</sup> PSRM, 2022



## UTTARAKHAND OPEN UNIVERSITY

### उत्तराखण्ड मुक्त विश्वविद्यालय

Established in 2005 by an act of Uttarakhand Legislative Assembly

Recognized by UGC, DEB, listed in AIU

#### **Dr Pravesh Kumar Sehgal**

Associate Professor ,  
Dept of Zoology, School of Science  
Uttarakhand Open University,  
Haldwani ,Nainital ,Uttarakhand .India



#### **Dear Students, Research scholars ,Faculty, Scientist and Professors,**

On behalf of Uttarakhand Open University and convener ,it is my proud pleasure to extend a warm welcom to all dignitaries ,guest and delegates in this National Conference On "Agriculture, Applied and Life Sciences: Current Research " (5<sup>th</sup> Plant Science Researchers Meet- 2022) on 18 – 19 November -2022.Theme of the conference is based on Research and advances in plant Science Field. As Uttarakhand State is having rich diversity in different variety of plant and this is need to discuss current advances to make is useful for all researcher in plant sciences ,Life science and allied field: In view of the global climate change, the theme of the conference chosen by the organizers is need of the hour and highly appreciable. Participation from several institutions around the nation meets here to share their research work. The conference shall help the policy makers to shape the policies in the interest of common people and other stakeholders that eventually positively shape our nation and make the citizens future-ready. This conference will also inspire the entire team of the University to persistently undertake such ventures which work for knowledge enhancement of the society and researchers as well at large. Our Technical programs are rich and varied with the talks of distinguished experts of plant science ,Agricultural sciences, pharmceutical science ,chemical science ,life science and allied fields. Hopefully they will be useful for all participants.

As a convener ,I thanks to Prof. O. P. S, Negi ji , Vice Chancellor of the Uttarakhand Open University ,Hldwani for providing full support along with infrastructure to organize the event smooth .I thankful to Prof .P. D. Pant ( Director, School of Science ). I thankful to Dr .Anoop Badoni, founder of the Plantica, President- APSR Dehradun.

Thanks to all members of APSR ,Editorial and Advisory Board member and all organizing committee members of PLANTICA.

I wish comfortable stay of all participants and delegates in the University Campus during the conference.

**(Dr Pravesh Kumar Sehgal)**  
Convener-5<sup>th</sup> PSRM,2022

# National Conference On Agriculture, Applied and Life Sciences: Current Research

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# 5<sup>th</sup> Plant Science Researchers Meet (PSRM) – 2022

## National Conference on Agriculture, Applied and Life Sciences

### 18 & 19 November, 2022



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5th PSRM- 2022

### National Conference on Agriculture, Applied & Life Sciences: Current Research

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## Key Note Address – 1

### CHALLENGES AND OPPORTUNITIES IN AGRICULTURE OF BUNDELKHAND

**A.C. Mishra<sup>1</sup> and N.P. Singh<sup>2</sup>**

<sup>1</sup>Director Research and <sup>2</sup>Vice Chancellor

Banda University of Agriculture & Technology, Banda-210 001

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The Bundelkhand region of Uttar Pradesh, comprising of seven districts of Jhansi, Lalitpur, Banda, Mahoba, Hamirpur, Chitrakoot, Jalaun, has unique agro-climatic conditions falling under Central plateau and hillsagro-climatic zone of the country. The geographical area of the U.P. Bundelkhand is 2.94 million hectares which is about 12.21 per cent of the state. The feature of agriculture in this region is almost mono-cropped rainfedhowever, this region is agriculturally very important area in U.P. with almost 25.50 lakh hectares of agricultural lands. About 69 per cent during *rabi* and 31 per cent of total cultivated area during *kharif*is covered under different crops. This region contributes almost 70 percent to total pulse production of U.P. and therefore, it is regarded as 'Bowl of Pulses' of U.P. Major emphasis is given on *rabi* pulses namely gram, lentil and fieldpea. Other crops grown during *rabi* are wheat, barley, mustard and linseed. During *kharif*, sesame,black gram, green gram, pigeon pea, groundnut, soybean, paddy, maize, jowar and bajra, are important crops. The agricultural production of this region consists of more than 56.0 percent of cereals, 32.0 percent of pulses, 8.0 per cent of oilseeds and 4.0 per cent of other crops. The scenario of cereals and millets cultivation has changed since 1984-85 with drastically decline of jowar,bajra and barley crops. As a consequence of crop diversification, aAn extensive area ofkharif pulses and sesame has been replaced by groundnut, Tulsi and Mentha in recent years. Similarly, lentil is being replaced by pea, chickpea and mustard. Such type of diversification in agriculture is a result of market demand, remunerative price and ease in cultivation. The horticultural crops could not have occupied significant area in Bundelkhand region as compared to other parts of Uttar Pradesh. However, more or less all the horticultural crops including fruits, vegetables, flowers, spices and plantation crops are grown in this region.

## Key Note Address – 2

### **ZERO BUDGET NATURAL FARMING-A WAY FORWARD FOR SMALL AND MARGINAL FARMERS**

**Sanjay Sachan**

Head, Krishi Vigyan Kendra (G.B. Pant University of Agriculture & Technology)  
Jakhidhar, Rudraprayag, Uttarakhand

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A new concept in farming has been launched with the motto to ensure food security by reviving Indian agriculture in environmentally safe way as well as to release farmers from debt cycle and suicides, zero budget natural farming (ZBNF) has come in the picture, which promotes use of all available farm inputs and discards uses of all the chemical farming inputs and relies on natural way of farming i.e. rejuvenating soil and crop health through its own practices. The practices of using traditional farming inputs like Jivamrita, Bijamrita, mulching, soil aeration, intercropping, crop diversification, bunds, bio-pesticides etc. to ensure soil and crop health are followed in natural farming. The concept of ZBNF mainly relies on a fermented admixture of urine and dung of cows, which supplements the growth of soil microorganisms, boosting crop health and doing away with the need for chemicals. India had increased food production in the 1970s through the Green Revolution, which promoted high-yielding seeds and massive subsidies for fertilisers. But due to lack of knowledge and climate change, the overuse of chemicals has now substantially degraded soil and crop health. Overuse of certain chemicals (pesticides) especially in vegetables have made the crops unhealthy for consumption. Declining soil fertility potentially cuts farm incomes by two-thirds, a recent study by the think-tank Indian Council for Research on International Economic Relations found. The ZBNF is attaining wide scale adoption in India among more and more farm families-initially as a farmer-led social movement, and more recently with the adoption of a significant public policy in the state of Andhra Pradesh. Other state governments like Himachal Pradesh and Kerala are also initiating pilot programs in line with Andhra's experience. Successful outcomes from farmers' fields of south Indian states like Andhra Pradesh, Karnataka and Himachal Pradesh etc. are encouraging and grabbing attention of farmers, public and private organisations towards ZBNF in recent times. The ICAR committee has recommended an integrated and sustainable agricultural system using manure, intercropping and crop diversification for improving soil health quality and increasing farm incomes. Adequate scientific evaluation or monitoring of ZBNF's successes or failures through multilocal trials is now therefore the needful before allowing or restraining its run in Indian agriculture, so that the small and marginal farmers are benefitted to the core.

## Key Note Address – 3

### AGRI-TECH STARTUPS: A NEW MODEL FOR RURAL ENTREPRENEURSHIP

**Prashant Joshi**

Senior Scientist(Horticulture),

Dr. Panjabrao Deshmukh Krishi Vidhyapeeth, Akola (M.S)-444104

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India, with 118.7 million farmers, which accounts for more than half of its population, depends on agriculture as its primary source of income. However, the use of technology in the agricultural industry has been limited in India. As a result, the agriculture industry in India contributes merely 17-18% to its GDP. However, in the last couple of years, India has seen a rise in the number of agritech startups that are not only making technology more accessible but also helping these farmers to improve their lives. Today, we will take a look at top 10 agritech startups helping Indian farmers. Agritech startups or Agricultural technology involves environmentally sound and sustainable farming methods, implemented widely in agriculture industry in order to attain profitability and efficiency, both. Argtech is a value innovation as Agriculture and India has a unique bond. Since Indian agriculture has been the backbone of the economy for several years, it determines the standard of living for nearly 60% of the population apart from contributing significantly in the GDP of India. Agritech startups are required to improve rural incomes, safeguard farmers interests and promote economic turnover, alongside securing India's nutritional and food needs. This calls for consistent attention, rigorous investments, wide awareness and continuous promotion of the Agritech startups in India. Before moving to the decade of Agritech startups and present innovative strides in the industry, it is necessary to discuss the fallouts of current agriculture system in India and its impact: The tradition in natural agriculture farming has been to maximize production and minimize the cost of food with little regard to impacts on the environment and the services it provides to society. As the world enters an era in which global food production is likely to double, it is critical that agricultural practices be modified to minimize environmental impacts even though many such practices are likely to increase the costs of production

## Key Note Address – 4

### YARTSA GUNBU OR CATERPILLAR MUSHROOM- ISSUES RELATED TO ITS SUSTAINABILITY

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Any resource of high value and relevance to rural livelihoods remains at risk of overexploitation. The anthropogenic pressure on the caterpillar fungus, *Ophiocordyceps sinensis* (Berk.) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora 2007, commonly referred to as Yartsa Gunbu, is intense, especially given the absence of traditional sustainable collection techniques, or regulatory mechanisms. Stable harvests, as reflected in the present study are the result of 2 factors: more people searching more intensely and extensively, and second, the discovery of new areas for harvest every year. Increasing international demand and prices (presently around US\$20,000 per kg) have resulted not just in overexploitation but also in the degradation of the fungus's habitat, thus endangering its future viability. These two factors apart, does livestock grazing too impact the yield of Yartsa Gunbu, thereby accentuating the problem? This presentation thus reports on (i) a rapid vulnerability assessment involving 2511 harvesters in 9 broad study sites and 110 villages in the Pithoragarh district in Uttarakhand state, to ascertain the precise status of the prized specimen in the wild; (ii) reflects upon yet another factor, the livestock grazing upon the declining yield of Yartsa Gunbu vis-à-vis the changes brought about in the above-ground vegetation profile- palatable (and mostly the host plant species of *Thitarodes* larva) being replaced by the unpalatable (mostly the non-host plants). Results arrived through RVA convincingly renders the specimen the Vulnerable status, while the declining population size of the host *Thitarodes* larva along the magnitude of the grazing pressure, lends credence to the fact that livestock grazing intensity as exhibited across the two sites experiencing the grazing pressure does bear upon the yield of Yartsa Gunbu. What should then be the sustainable grazing pressure (apart from the sustainable harvesting methods) would necessitate further such studies across other similar habitat sites.

## Key Note Address – 5

### AEROPONICS: AN APPROACH TOWARDS PRECISION AND SUSTAINABLE AGRICULTURE IN POTATO SEED TUBER PRODUCTION

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Aeroponic culture is one of the hi-tech approaches which is based on artificial intelligence and is perfect application of Internet of Things (IoT) in agriculture. It provides growth-controlled atmosphere where root system remains suspended in air and mist of nutrient solution. Aeroponics results in lowering of water requirement per unit of area and provides eco-friendly conditions for plant growth. This technique ensures: the proper exploitation of the vertical space of the green house with optimized root, tubers, and foliage growth in plants; keep precise control over root zone nutrient or rhizosphere, water regimes and environmental condition around the root system; greater water and nutrient use efficiency; and better cropping due to well managed nutrient availability and pH of growing media. One of the foremost barriers in the achievement of optimum yield in potato is the lack of quality seed potato tubers with cost effectiveness. Seed potatoes are having low multiplication rate (1:6) so is expensive, take longer years to produce many seed potatoes and results in accumulation of diseases at each generation. The advance potato tuber seeds production technique includes a) *in vivo* production of pre-basic potato mini-tubers directly from the micro-propagated plants under greenhouses or insect proof net houses, or b) indirectly through *in vitro* micro-tuber production followed by growing micro-tubers under greenhouses or insect proof net houses to produce pre-basic mini-tubers. These pre-basic mini-tubers can further be grown for production of basic seed tubers under open field. These conventional and substrate-based methods usually produce 10-12 mini-tubers per plant of size more than 5mm depending on cultivar. The substrate-based system is quite effective, but it has certain limitations of low multiplication rate and higher field exposure due to use of substrate made of soil and mixture of various components.

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052	Abstract-5 PSRM2022/052 Sunil Kumar <sup>1*</sup> , Dr. Pawan K. Amrate <sup>2</sup> , Mantun K. Roy <sup>3</sup> , Dr. R. S. Marabi <u>sunilkumarsolu@gmail.com</u>	1- Department of Plant Pathology, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh – 482004 (India). 2 - Department of Plant Breeding and Genetics, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh – 482004 (India) 3 - Department of plant pathology, Indra Gandhi Krishi vishwa Vidyalaya, Raipur, C.G.- 492012 4 - Department of Entomology, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh – 482004 (India)	EFFECT OF WEATHER PARAMETER AND DATE OF SOWING ON SEVERITY OF YELLOW MOSAIC OF SOYBEAN AND ITS VECTOR (WHITEFLY) POPULATION AND ITS RELATION	46 – 47

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053	Abstract-5 PSRM2022/053 Archana Mahida* Ph.D. Scholar <a href="mailto:*mahidaarchana24@gmail.com">*mahidaarchana24@gmail.com</a>	Department of Horticulture, Central University of Tamil Nadu, Thiruvarur-610005	THEMATIC AREA: FOOD SECURITY EFFECT OF AGRONOMIC BIO- FORTIFICATION OF IRON AND ZINC FERTILIZATION ON QUALITY PARAMETERS OF MANGO CV. KESAR	47 – 48
054	Abstract-5 PSRM2022/054 Archana Mahida <sup>1</sup> ; M. Chithra <sup>2</sup> and G. Indian <sup>3</sup> Ph.D. Scholars <a href="mailto:*mahidaarchana24@gmail.com">*mahidaarchana24@gmail.com</a>	Department of Horticulture, Central University of Tamil Nadu, Thiruvarur-610005	THEMATIC AREA: AGRICULTURE WASTE MANAGEMENT VALUE ADDITION OF FRUIT WASTE: WASTE TO WORTH	48 – 49
055	Abstract-5 PSRM2022/055 Rohit Kumar <sup>1</sup> and Priyanka Bhatt <sup>2*</sup> <sup>1</sup> <a href="mailto:bhattriyanka18j@gmail.com">bhattriyanka18j@gmail.com</a>	Rallis India Ltd, 4 <sup>th</sup> Milestone, Sirsa Road, Hisar- 125004, Haryana <sup>2</sup> Faculty of Agriculture and Agroforestry, Krishnapur, Kumaun University, Nainital 263001 Uttarakhand	TEN YEARS (2012- 2022): 10 INSECT DISCOVERIES	49 – 50
056	Abstract-5 PSRM2022/056 Alok Singh Jayara <sup>1</sup> , Rajeev Kumar <sup>2</sup> and Priyanka Pandey <sup>3</sup> ( <sup>1</sup> PhD student, <sup>2</sup> Senior Research Officer, Corresponding author: <a href="mailto:aloksingh.jayara@gmail.com">aloksingh.jayara@gmail.com</a> Email of other authors: <a href="mailto:shuklarajeev@gmail.com">shuklarajeev@gmail.com</a> <a href="mailto:shuklapriyanka5@gmail.com">shuklapriyanka5@gmail.com</a>	Department of Agronomy, <sup>3</sup> Assistant Professor Department of Molecular Biology and Genetic Engineering, G B Pant University of Agriculture & Technology)	EVALUATION OF FOLIAR SPRAY OF POTASSIUM NANOPARTICLES AT DIFFERENT DOSES ON VERY LATESOWN WHEAT CROP	50 – 50
057	Abstract-5 PSRM2022/057 Ashish Tewari <sup>1</sup> , Shruti Shah <sup>1</sup> & Krishna Kumar Tamta <sup>2</sup> E-mail <a href="mailto:atewari69@gmail.com">atewari69@gmail.com</a>	<sup>1</sup> Department of Forestry and Environmental Science D.S.B. Campus, Kumaun University, Nainital – 263001 <sup>2</sup> Department of Forestry and environmental Science, School of Earth and Environmental Science, Uttarakhand Open University, Haldwani	CARBON SEQUESTRATION POTENTIAL OF FORESTS OF UTTARAKHAND	51 – 51
058	Abstract-5 PSRM2022/058 Shruti Shah, Ashish Tewari and Nandan Singh E-mail <a href="mailto:shruti.sah23@gmail.com">shruti.sah23@gmail.com</a>	Department of Forestry and Environmental Science D.S.B. Campus, Kumaun University, Nainital – 263001, Uttarakhand, India	CONE MATURATION TIMING AND SEED GERMINATION IN <i>A. SPECTABILIS</i> NEAR THE TREELINE AREAS OF WESTERN HIMALAYA	51 – 52

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059	Abstract-5 PSRM2022/059 Gavande Sharda Shivaji, PhD Scholar, E-mail id: <a href="mailto:sharda.gavande26@gmail.com">sharda.gavande26@gmail.com</a>	Lovely professional University, Phagwara, 144001, Punjab, India,	EFFECT OF PROMISING LIQUID MICROBIAL CULTURES ON GROWTH ATTRIBUTES OF MAIZE	52 – 53
060	Abstract-5 PSRM2022/060 Neeta Arya Email: <a href="mailto:neetaaryadr@gmail.com">neetaaryadr@gmail.com</a>	Department of forestry ad Environmental Science D. S. B. Campus, Kumaun University, Nainital	VARIATION IN SPECIES RICHNESS AND DIVERSITY IN DIFFERENT CANOPY COVER IN CHIR-PINE FOREST OF KUMAUN HIMALAYA	53 – 54
061	Abstract-5 PSRM2022/061 Shahbaz Ali* and Ashish Tewari <a href="mailto:ali701480@gmail.com">*ali701480@gmail.com</a>	Department of Forestry & Environmental Science, DSB Campus, Kumaun University, Nainital	TREE VEGETATION ANALYSIS OF <i>CEDRUS DEODARA</i> (ROXB.) G. DON DOMINATED FOREST IN NAINITAL FOREST DIVISION OF UTTARAKHAND	54 – 55
062	Abstract-5 PSRM2022/062 Shahbaz Ali* and Ashish Tewari <a href="mailto:ali701480@gmail.com">*ali701480@gmail.com</a>	Department of Forestry & Environmental Science, DSB Campus, Kumaun University, Nainital	REGENERATION STATUS AND VEGETATION ANALYSIS OF <i>QUERCUS LANUGINOSA</i> FRANCH. DOMINATED FOREST IN NAINITAL FOREST DIVISION	55 – 55
063	Abstract-5 PSRM2022/063 Bhumika Bisht, Nandan Singh*, Maitreyie Narayan, Arti and Mukesh Chand E-mail: <a href="mailto:nandanforestry@gmail.com">nandanforestry@gmail.com</a>	Department of Forestry and Environmental Science, Kumaun University, Nainital – 263001, Uttarakhand, India	UNDER CONFERENCE THEME FORESTRY (FOREST PRODUCTION & UTILIZATION/ SILVICULTURE & AGROFORESTRY / TREE PHYSIOLOGY & BREEDING / TREE IMPROVEMENT / WOOD SCIENCE) <i>STRUCTURE, REGENERATION STATUS AND SEEDLING DYNAMICS OF FOREST TREE SPECIES OF NAINITAL CATCHMENT IN KUMAUN HIMALAYA</i>	55 – 56

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065	Abstract-5 PSRM2022/065 DivyaPangtey and Himanshu Pande E-mail: <a href="mailto:divyapangtey810@gmail.com">divyapangtey810@gmail.com</a>	Department of Zoology, Kumaun University, Nainital – 263001, Uttarakhand, India	UNDER CONFERENCE THEME BIODIVERSITY CONSERVATION A PRELIMINARY STUDY OF SPIDER DIVERSITY IN A MIXED ORCHARD SYSTEM OF RAMGARH AREA OF DISTRICT NAINITAL, UTTARAKHAND, INDIA	57 – 58
066	Abstract-5 PSRM2022/066 SHIVANI SAHU *, Vidya Sagar Singh#, StutiVatsya®, Rakesh Nautiyal <sup>1</sup> , Deepti Arora <sup>2</sup> *Presenting Author: Ph. D. student, Uttarakhand. E mail: <a href="mailto:shivanisahu010@gmail.com">shivanisahu010@gmail.com</a>	Department of Veterinary Parasitology, College of Veterinary & Animal Sciences, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar (U. S. N# Assistant Professor, ® Professor & Head, Department of Veterinary Parasitology, G.B.P.U.A.&T., Pantnagar <sup>1</sup> Veterinary Officer, Rajaji Tiger Reserve, Dehradun, <sup>2</sup> Veterinary Officer, Dehradun. -263145,	ANTHELMINTIC EFFICACY STUDIES IN DEERS OF DEHRADUN ZOO	58 – 59
067	Abstract-5 PSRM2022/067 Neelam Bisht and L.S.Lodhiyal ( <a href="mailto:bneelam97@gmail.com">bneelam97@gmail.com</a> <a href="mailto:lodhiyal@yahoo.com">lodhiyal@yahoo.com</a> )	Department of Forestry and Environmental Science D.S.B. Campus, Kumaun University, Nainital	VEGETATION STRUCTURE AND COMPOSITION OF SPECIES IN VAN PANCHAYAT FOREST OF ALMORA DISTRICT OF KUMAUN HIMALAYA	59 – 60
068	Abstract-5 PSRM2022/068 Aditi Sharma* and Shilpa Rani	Department of Social Sciences, College of Forestry, Dr Yashwant Singh University of Horticulture and Forestry, Nauni, Solan (HP)	A REVIEW ON DAIRY PROCESSING INDUSTRY AND ITS ROLE AND CHALLENGES IN HIMACHAL PRADESH SOCIO-ECONOMIC DEVELOPMENT	60 – 60

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070	Abstract-5 PSRM2022/070 Amreena Akhter and Humaira Jan	1-Division of Silviculture and Agroforestry, Faculty of Forestry, Sher e Kashmir University of Agricultural Sciences and Technology, Benhama, Ganderbal 2- Division of Genetics and Plant breeding, Sher e Kashmir University of Agricultural Sciences and Technology, Wadura, Sopore	ROLE OF AGROFORESTRY IN ENVIRONMENTAL AMELIORATION	61 – 62
071	Abstract-5 PSRM2022/071 Akanksha Klate <sup>1</sup> , Shilpa <sup>2</sup> , Prixit <sup>3</sup> Niyati Thakur <sup>4*</sup> , Anshuman <sup>5</sup> and Karuna Gusain <sup>6</sup> <i>Corresponding email:</i> <a href="mailto:thakniyati18ur@gmail.com">thakniyati18ur@gmail.com</a>  1. Akanksha Klate MSc Student, <a href="mailto:akankshaklate.7@gmail.com">akankshaklate.7@gmail.com</a>  2. Shilpa Assistant Professor <a href="mailto:dhhatwaliashilpi@gmail.com">dhhatwaliashilpi@gmail.com</a>  3. Prixit MSc Student, <a href="mailto:prixitchauhan22291@gmail.com">prixitchauhan22291@gmail.com</a>  4. Niyati Thakur Ph.D Scholar, <a href="mailto:thakniyati18ur@gmail.com">thakniyati18ur@gmail.com</a>  5. Anshuman Klate ABM Student, <a href="mailto:anshumanklate85@gmail.com">anshumanklate85@gmail.com</a>  6. Karuna Gusain Ph.D Student, Department of Agroforestry, GB Pant National Institute of Himalayan Ecology, Almora, 263145, Uttarakhand, India	1. Department of Social Sciences, Dr. YSPUHF, Nauni, Solan, 173230, Himachal Pradesh, India  2. Department of Social Sciences, Dr. YSPUHF, Nauni, Solan, 173230, Himachal Pradesh, India 3. Department of Soil Science and Water Management, Dr. YSPUHF, Nauni, Solan, 173230, Himachal Pradesh, India  3. Department of Social Sciences, Dr. YSPUHF, Nauni, Solan, 173230, Himachal Pradesh, India  4. Department of Business Management, Dr. YSPUHF, Nauni, Solan, 173230, Himachal Pradesh, India  6. Department of Agroforestry, GB Pant National Institute of Himalayan Ecology, Almora, 263145, Uttarakhand, India	ROLE OF NON-TIMBER FOREST PRODUCTS (NTFPs) IN INCOME AND EMPLOYMENT IN KINNAUR DISTRICT OF HIMACHAL PRADESH	62 – 63

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072	Abstract-5 PSRM2022/072 Nikesh Chandra and SatishChandra <sup>2</sup> <sup>1</sup> Ph.D Scholar in Fruit Science, Senior Research Officer in Horticulture( Email:nikesh2chandra@gmail.com	1&2 Department of Fruit Science (G.B. Pant University of Agriculture and Technology, District - Udhampur Singh Nagar, Pantnagar, Uttarakhand 263145	EFFECT OF GAMMA RADIATION AND SURFACE EDIBLE COATING ON LITCHI FRUIT CV. ROSE SCENTED TO ENHANCE THE SELF-LIFE AND QUALITY OF THE FRUIT	63 – 64
073	Abstract-5 PSRM2022/073 Neelam Bisht and L.S. Lodhiyal (bneelam97@gmail.com and lslodhiyal@yahoo.com)	Department of Forestry and Environmental Science D.S.B. Campus, Kumaun University, Nainital	VEGETATION STRUCTURE AND COMPOSITION OF SPECIES IN VAN PANCHAYAT FOREST OF ALMORA DISTRICT OF KUMAUN HIMALAYA	64 – 65
074	Abstract-5 PSRM2022/074 Saundarya Prakash saundarya19@iiserb.ac.in saundarya8954@gmail.com	Organization - Indian Institute of Science Education and Research City - Bhopal Pin - 462030 State - Madhya Pradesh Country - India	PLANTS THAT HEAL	65 – 66
075	Abstract-5 PSRM2022/075 Natalya Krishnambika <sup>1</sup> , Dr. Girish Chandra <sup>2</sup> and Dr. Brij Mohan Dimri <sup>3</sup>	<sup>1</sup> PhD Scholar, Silviculture and Forest Management Division, Forest Research Institute, Dehradun (Uttarakhand), India. <sup>2</sup> Associate Professor, Department of Statistics, University of Allahabad, Prayagraj <sup>3</sup> Scientist E (Retd.), Ecology & Climate Change Division, Forest Research Institute, Dehradun (Uttarakhand), India.	IMPACT OF FOREST FIRE ON GROUND FLORA IN <i>PINUS ROXBURGHII</i> SARG. (CHIR PINE) FOREST OF MUSSOORIE FOREST DIVISION	67 – 68
076	Abstract-5 PSRM2022/076 Mohammad Ashaq Kuchay <sup>a,1,*</sup> , D P Sharma <sup>a,1</sup> , Bhawna Kaushal <sup>a</sup> , Corresponding author E-mail address: aashiqpomologist@gmail.com (M.A. Kuchay)	<sup>a</sup> Department of Fruit Science, Dr. YSP University of Horticulture & Forestry, Nauni, Solan, H.P, India	IMPACT OF DIFFERENT SOURCES OF NITROGEN ON SOIL PROPERTIES AND APRICOT YIELD UNDER SANDY LOAM SOIL TEXTURE	68 – 68

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078	Abstract-5 PSRM2022/078 Gawas, I. G., Dongare, S. V., Chavan, B. R	<sup>1</sup> Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture Dapoli, Dr. BSKKV, Dapoli <sup>2</sup> Department of Livestock Production Management, College of Veterinary & Animal Science Panthagar <sup>3</sup> Department of Agricultural Botany, College of Agriculture, Dapoli	THEME: CLIMATE CHANGE IMPACT OF CLIMATE CHANGE ON SPICES CULTIVATION	70 – 71
079	Abstract-5 PSRM2022/079 Sampurna Nand Singh <sup>1</sup> , Navin Singh <sup>2</sup> , Kumari Kusum <sup>1</sup> , Nikesh Chandra <sup>1</sup> , Vinay Kumar <sup>1</sup> Email id- <a href="mailto:sampurnanandsingh2014ss@gmail.com">sampurnanandsingh2014ss@gmail.com</a>	G.B. Pant University of Agriculture and Technology, Pantnagar Uttrakhand <sup>1</sup> Odisha University of Agriculture & Technology University Bhubaneswar, Odisha <sup>2</sup>	EFFECT OF NANO-ZN ONQUALITATIVE PROPERTIES AND YIELD OF GUAVA ( <i>PSIDIUM GUAJAVA L.</i> )CVNR BIHI	71 – 71
080	Abstract-5 PSRM2022/080 Km Kusum <sup>1</sup> , Mandeep Rawat <sup>1</sup> , Sampurna Nand Singh <sup>1</sup> , Nikesh Chandra <sup>1</sup> , Email id- <a href="mailto:ky825587@gmail.com">ky825587@gmail.com</a>	G.B. Pant University of Agriculture and Technology, Pantnagar Uttrakhand <sup>1</sup>	ROLE OF OLIVE OIL AND ALOE VERA GEL IN ENHANCING QUALITY AND SHELF LIFE OF BER FRUITS	72 – 72
081	Abstract-5 PSRM2022/081 Pawankumar S. Kharate, Rahul K. Zote and Vishal K. Sultane E-mail: <a href="mailto:pawankumar.1113@yahoo.co.in">pawankumar.1113@yahoo.co.in</a>	SDMVM's College of Agricultural Biotechnology, Aurangabad, Maharashtra (M.S.)	MAIZE ( <i>ZEA MAYS L.</i> ) GENOTYPES DIVERSITY STUDY BY USING INTER SIMPLE SEQUENCE REPEAT (ISSR) MARKERS	72 – 73
082	Abstract-5 PSRM2022/082 KamalMishra <sup>1</sup> and S. S. Bisht <sup>2</sup>	1.Wood Properties and Uses Division, Institute of Wood Science and Technology, Bangalore, Karnataka, India 2.Chemistry and Bio-prospecting Division, Forest Research Institute, Dehradun-248006, Uttarakhand, India	VARIABILITY IN PHYSICAL AND CHEMICAL PROPERTIES OF PALMYRA PALM ( <i>BORASSUS FLABELLIFER.</i> )WOOD	73 – 74

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084	Abstract-5 PSRM2022/084 Mohd. Arif and Ashish Tewari <a href="mailto:Mdansarif07@gmail.com">Mdansarif07@gmail.com</a>	Department of Forestry and Environmental Science, D.S.B campus, Kumaun University Nainital	RESOURCE UTILIZATION PATTERN AND DEPENDENCY OF VAN GUJJARSON THE FORESTS OF TARAI REGION OF UTTARAKHAND	76 – 76
085	Abstract-5 PSRM2022/085 Beena Joshi Bhatt	Department of Zoology, Dolphin (PG) Institute of Biomedical & Natural Sciences, Dehradun-248007	COMPARATIVE STUDY OF LARVICIDAL ACTIVITY OF ESSENTIAL OILS OF <i>CYMBOPOGON</i> <i>FLEXEOUS</i> (LEMON GRASS) AND <i>TAGETES</i> <i>ERECTA</i> (MARIGOLD) AGAINST THIRD INSTAR LARVAE OF <i>AEDES AEGYPTI</i> (LINNAEUS, 1762) LARVAE	77 – 77
086	Abstract-5 PSRM2022/086 Manisha <sup>1</sup> ; Bas Kaur <sup>2</sup> ; Sahil Boora <sup>3</sup> ; Shikha Bhukal <sup>4</sup> Email ID: <a href="mailto:mnishakadian@gmail.com">mnishakadian@gmail.com</a>	<sup>1,3</sup> PhD Scholar, Department of Sociology, CCSHAU, Hisar <sup>2</sup> Assistant Professor, Department of Sociology, CCSHAU, Hisar <sup>4</sup> PhD Scholar, Department of Extension Education and Communication Management, CCSHAU, Hisar	SUSTAINABLE AGRICULTURE	78 – 78
087	Abstract-5 PSRM2022/087 Bhawna Kaushal and M AKuchay *Email: <a href="mailto:bhawna2919@gmail.com">bhawna2919@gmail.com</a>	<i>Department of Fruit Science, Dr</i> <i>YS Parmar University of</i> <i>Horticulture and Forestry</i> <i>Nauni, Solan (H.P)-173 230,</i> <i>India.</i>	THEME: HORTICULTURE (FRUIT SCIENCE)  IMPACT OF INORGANIC AND ORGANIC MULCHES ON WEED GROWTH AND SOIL PROPERTIES IN POMEGRANATES	79 – 79
088	Abstract-5 PSRM2022/088 Nirmala, L.S. Lodhiyal and Jeet Ram <a href="mailto:nirmalagauni189@gmail.com">nirmalagauni189@gmail.com</a>	Department of forestry and Environmental Science D.S.B. Campus, Kumaun University, Nainital	SPECIES COMPOSITION OF VAN PANCHAYAT FOREST IN NAINITAL OF KUMAUN HIMALAYA	79 – 80

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090	Abstract-5 PSRM2022/090 Goswami, G. <sup>1*</sup> , Kukshal, D. <sup>2</sup> ., Manju <sup>3</sup> , Singh, K.C. <sup>1</sup> , Bhosale, T.A. <sup>1</sup> and Chauhan, R. S. <sup>2</sup>  <i>*Corresponding author</i> email: <a href="mailto:Gargi.goswami1423@gmail.com">Gargi.goswami1423@gmail.com</a>	<sup>1</sup> Department of Natural Resource Management <sup>2</sup> Department of Plantation Crops, Spices, Medicinal and Aromatic Plants <sup>3</sup> Department of Fruit Sciences College of Horticulture, VCSG Uttarakhand University of Horticulture and forestry, Bharsar, Pauri-246 123 Uttarakhand, India	EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON YIELD ATTRIBUTES AND YIELD OF FENUGREEK ( <i>TRIGONELLA FOENUMGRAECUM L.</i> )	81 – 81
091	Abstract-5 PSRM2022/091 Inder Singh Rautela and L. S. Lodhiyal	Department of Forestry and Environmental Science, D.S.B. Campus, Kumaun University, Nainital, Uttarakhand, India	FODDER AND FUELWOOD USE PATTERN OF VAN PANCHAYAT FORESTS IN BAGESHWAR REGION OF KUMAUN HIMALAYA	82 – 82
092	Abstract-5 PSRM2022/092 Shaik Munnysha <sup>1*</sup> , Ramavath Abhi <sup>2</sup> , Nitisha Gahlot <sup>1</sup> and Kinjal Mondal <sup>3</sup>  Corresponding author mail id- <a href="mailto:munnysha118@gmail.com">munnysha118@gmail.com</a>	<sup>1</sup> Department of Plant Pathology, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur <sup>2</sup> Department of Nematology, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur <sup>3</sup> Department of Molecular Biology and Biotechnology, Maharana Pratap University of Agriculture and Technology, Udaipur	“CRISPR/CAS9 TECHNOLOGY AND ITS POTENTIAL ROLE IN PLANT DISEASE RESISTANCE”	83 – 83
093	Abstract-5 PSRM2022/093 <sup>1</sup> Ramavath Abhi, <sup>2</sup> Shaik Munnysha and <sup>3</sup> Manisha	<sup>18</sup> <sup>3</sup> Ph.D. Scholar, Dept of Nematology, Maharana Pratap University of Agriculture & Technology, Udaipur-313001 <sup>2</sup> Ph.D. Scholar, Dept of Plant Pathology, Maharana Pratap University of Agriculture & Technology, Udaipur-313001	ADVANCES IN NEMATODE IDENTIFICATION	84 – 84

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094	Abstract-5 PSRM2022/094 KunjikaDurgapal* and NeeluLodhiyal ( <a href="mailto:kdurgapal232@gmail.com">kdurgapal232@gmail.com</a> and <a href="mailto:neelulodhiyal@gmail.com">neelulodhiyal@gmail.com</a> )	Department of Botany, D.S.B. Campus, Kumaun University, Nainital	POPULATION STRUCTURE AND REGENERATION OF VAN PANCHAYAT FORESTS AT DIFFERENT ELEVATIONS IN NAINITAL DISTRICT	85 – 85
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129	Abstract- 5PSRM2022/129 Awasthi, Neha, Dr.MS Jangra <a href="mailto:awasthineha888@gmail.com">awasthineha888@gmail.com</a>	College of Forestry, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan 173223 Himachal Pradesh	IMPACT OF NATURAL FARMING ON YIELD AND QUALITY OF SOYBEAN (GLYCINE MAX. L) UNDER MOUNTAINOUS CONDITIONS OF HIMACHAL PRADESH	114 –115
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148	Abstract- 5PSRM2022/148 Dr. Hridayesh Arya and Dr. B. R. Singh* <a href="mailto:drhridayesharya@gmail.com">drhridayesharya@gmail.com</a> <a href="mailto:drbrsingh99@gmail.com">drbrsingh99@gmail.com</a>	Head, department of Zoology, N. R. E. C. College, Khurja *Department of Zoology, D. S. College, Aligarh	BIO-EFFICACY OF <i>OCIMUM SANCTUM</i> LEAVES AGAINST MUSTARD APHID <i>LIPAPHIS SERYSIMIKALT</i> ENBACH AND ITS NATURAL PREDATOR <i>COCCINELLA SEPTEMUNCUTATA LINN.</i>	132 –133
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152	Abstract- 5PSRM2022/152 Geeta Potshangbam, Neha Saini, Sandeep Kumar <a href="mailto:maypotshangbam16@gmail.com">maypotshangbam16@gmail.com</a>	School of Agriculture, Uttarakhand University, Dehradun-248007 (Uttarakhand)	DISEASE MANAGEMENT IN ORGANIC FARMING	136 –137
153	Abstract- 5PSRM2022/153 Deepali Singhal <a href="mailto:deepalisinghal32@gmail.com">deepalisinghal32@gmail.com</a>	Associate Professor, Dept of Chemistry SGRR(PG) College, Dehradun	B-CAROTENECONTEN TOFSOMECOMMON LYCONSUMEDVEGETABLESANDFRUITS AVAILABLE IN DEHRADUN, INDIA	137 –138
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162	Abstract ID- 5PSRM2022/162 INDU dr.indusingh37@gmail.com	Deptt.of Zoology Govt. Degree College NanautaSaharanpur	GLOBAL WARMING AND CLIMATE CHANGE	145 –146
163	Abstract ID- 5PSRM2022/163 Priyadarsini, L., <sup>2</sup> Subbiah, A., <sup>1</sup> Srivignesh, S., <sup>1</sup> Rama Krishna, K., <sup>3</sup> Kaushik Rajaram, <sup>4</sup> Kathireshan, S and <sup>1</sup> A. Ramesh Kumar# rameshort@gmail.com, rameshort@cutn.ac.in.	<sup>1</sup> Department of Horticulture, School of Life Sciences, Central University of Tamil Nadu, Thiruvarur-610 005. <sup>2</sup> Grapes Research Station, Tamil Nadu Agricultural University, Anaimalayanpatti, Theni- 625526, Tamil Nadu. <sup>3</sup> Department of Microbiology, School of Life Sciences, Central University of Tamil Nadu, Thiruvarur-610 005. <sup>4</sup> Department of Biotechnology, School of Life Sciences, Central University of Tamil Nadu, Thiruvarur-610 005.	STUDIES ON YIELD AND QUALITY ANALYSIS OF GRAPE VAR. MUSCAT HAMBURG GRAFTED ON DOG RIDGE ROOTSTOCK AND OWN ROOTED	146 –147
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176	Abstract ID- 5PSRM2022/176 Sunita Choudhary, Dr.DeepatiParbha 08sunitachoudhary@gmail.com	Department of Seed Science and Technology HNB Garhwal University (A Central University) Srinagar, Uttarakhand –246174	A COMPARATIVE STUDY ON THE EFFECT OF ORGANIC AND INORGANIC FERTILIZER ON GROWTH AND YIELD OF FENUGREEK (TRIGONELLA FOENUM-GRAECUM L.)VAR. MAHER-1	157 –158
177	Abstract ID- 5PSRM2022/177 Anil Choudhary <sup>1</sup> , Sunita Choudhary <sup>2</sup> anilchoudhary871@gmail.com	Department of Horticulture Department of Seed Science and Technology HNB Garhwal University (A Central University) Srinagar, Uttarakhand –246174	GENETIC VARIABILITY, CHARACTER ASSOCIATION AND DIVERGENCE ANALYSIS OF FENUGREEK GENOTYPE (TRIGONELLA FOENUM-GRAECUM L.) UNDER VALLEY CONDITION OF GARHWAL HILLS	158 –160
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181	Abstract ID- 5PSRM2022/181 Jhanvi Bajpai <sup>1</sup> , Archana Prasad <sup>2</sup> , Alisha Vivian Paul <sup>3</sup> jhanvibajpai@gmail.com	<sup>1,2,3</sup> Department of Agriculture, Uttaranchal P.G. College of Biomedical Sciences and Hospital, Dehradun, Uttarakhand	UNMANNED ARIAL VEHICLES BOON TO AGRICULTURE	163 –163

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198	Abstract- 5PSRM2022/198 Dr. Rakesh Dhoundiyal <a href="mailto:rakesh 21171@gmail.com">rakesh 21171@gmail.com</a>	S.G.R.R. (P.G) College Dehra-Dun	EXTENDED DELIGNIFICATION : A STEP TOWARDS REDUCTION OF CHLORINATED ORGANICS IN PULP AND PAPER MANUFACTURING	177 –178
199	Abstract- 5PSRM2022/199 S. N. Ojha*, K. S. Negi** and Puran S. Mehta**	* Uttarakhand Open University, Haldwani, 263 139, Uttarakhand, India **ICAR-National Bureau of Plant Genetic Resources, Regional Station Bhowali – 263 132 (Niglat), District Nainital, Uttarakhand, India	CULTURAL SIGNIFICANCE OF UNDER-UTILIZED PLANT: <i>ALLIUM</i> spp. FROM UTTARAKHAND, CENTRAL HIMALAYAN REGION (CHR)	178 –180
200	Abstract- 5PSRM2022/200 LEIMAPOKPAM MARTINA, Dr. NEHA SAINI, Dr. SANDEEP KUMAR <a href="mailto:leimapokpammary12345@gmail.com">leimapokpammary12345@gmail.com</a>	Uttaranchal University, School of Agriculture, Dehradun – 248007(Uttarakhand)	AGRO-TOURISM IN AGRICULTURE	180 –180
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206	Abstract- 5PSRM2022/206 IromBijubala Devi, Dr. Neeha Saini, Dr. Sandeep Kumar <a href="mailto:bijubala.irom@gmail.com">bijubala.irom@gmail.com</a>	School of Agriculture, Uttaranchal University, Dehradun- 248007(Uttarakhand)	AGRICULTURE WASTE MANAGEMENT	185 –185
207	Abstract- 5PSRM2022/207 M. S. Rana <sup>1</sup> and Urmila Rana <sup>2</sup>	1. Principal, DIET, Deptt. Of Education, U. P. 2- Assistant Professor, Deptt.Of Botany, PDBH PG College, Kotdwara(Garhwal) Uttarakhand).246149.	STUDY OF SOME NEW SPECIES OF CERCOSPORA IN GARHWAL HIMALAYA, INDIA.	185 –186
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210	Abstract- 5PSRM2022/210 Pooja Kumaripoojakumaripk120@gmail.com	PhD Research Scholar, Department of Horticulture,RCA, MPUAT, Udaipur, Rajasthan	PHYSIO-CHEMICAL ATTRIBUTES OF BER [ <i>ZIZIPHUS MAURITIANA</i> LAMK.] GENOTYPE	188 –189
211	Abstract- 5PSRM2022/211 Ajay Kumar Yadav <a href="mailto:ajayyadavbohra@gmail.com">ajayyadavbohra@gmail.com</a>	Department of Entomology Rajasthan College of Agriculture Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan-313001	BIO-EFFICACY OF VOLIAM FLEXI 300 W/V SC (CHLORANTRANILIPROLE 8.8% W/W + THIAMETHOXAM 17.5% W/W) AGAINST PESTS COMPLEX IN OKRA	189 –189

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213	Abstract- 5PSRM2022/213 Anita Saini <a href="mailto:mypri4@gmail.com">mypri4@gmail.com</a>	*Department of Horticulture, College of Agriculture, SKRAU, Bikaner (Rajasthan) India- 334006	EFFECT OF DIFFERENT SHADE NET COLOUR AND INTENSITY ON GROWTH OF TOMATO ( <i>LYCOPERSICON ESculentum</i> L.) IN WESTERN RAJASTHAN	190 –191
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218	<i>Raja Ram Bunker</i> Email id- <a href="mailto:bunkerrajaram133@gmail.com">bunkerrajaram133@gmail.com</a>	Department of Horticulture, RCA, MPUAT-Udaipur, Rajasthan	CHARACTERIZATION OF ACCESSIONS OF TUBEROSE	194 –195
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239	Abstract ID- 5PSRM2022/239 VivekThapliyal* 1 , Dhirendra Kumar Singh1, D.K Singh 1 , Pushpendra Rajput 2 thapliyalvicky005@gmail.com	1 Department of Vegetable Science, G. B. Pant University of Agricultural and Technology, Pantnagar, Uttarakhand 263145 2 Department of Horticulture, G. B. Pant University of Agricultural and Technology, Pantnagar, Uttarakhand 263145	HETEROSIS, COMBINING ABILITY AND GENE ACTION STUDIES IN CAULIFLOWER ( <i>BRASSICA OLERACEAVAR. BOTRYTIS</i> )	212 –213
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241	Abstract ID- 5PSRM2022/241 *D. P. Patel 1 , K. G. Modha 2 and Saryu Trivedi 3 dhrumilpatel5292@gmail.com	1&3 Research scholars, 2 Associate Professor 1&2 Dept. of Genetics and Plant breeding, N. M. College of Agriculture 3 Dept. of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat 396 450.	GENETIC VARIABILITY ANALYSIS FOR YIELD AND YIELD ATTRIBUTES AMONG DETERMINATE "WAL" TYPE INDIAN BEAN [LABLAB PURPUREUS (L.)SWEET] GENOTYPES	214 –215
242	Abstract ID- 5PSRM2022/242 *D. P. Patel 1 and Saryu Trivedi 2 1&2 Research scholars dhrumilpatel5292@gmail.com	1 Dept. of Genetics and Plant breeding, N. M. College of Agriculture, 2 Dept. of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat 396 450.	SPEED BREEDING: A SILVER LINING FOR FOOD SECURITY THEME: PLANT BREEDING AND GENETICS(POSTER PRESENTATION)	215 –216
243	Abstract ID- 5PSRM2022/243 *Saryu Trivedi 1 , D. P. Patel 2 ,Tejal Patel 1 and MallikaSindha 1 saryutrivedi17@gmail.com	1&2 Research scholars 1 Dept. of Floriculture and Landscape Architecture, ASPEE College of Horticulture, 2 Dept. of Genetics and Plant breeding, N. M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat 396 450.	EFFECT OF DIFFERENT GROWING MEDIA ON GROWTH, FLOWER YIELD AND QUALITY ONFLOWER CROPS – A REVIEW	216 –217
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246	Abstract ID- 5PSRM2022/246 Sheetal Mehta1 , Upendra Kumar 1 sheetal081995@gmail.com	1 Department of Molecular Biology, biotechnology and Bioinformatics, College of Biotechnology, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana, India	ENGINEERING SALT-TOLERANT PIGEON PEA PLANTS: CHARACTERIZATION OF PHYSIO-CHEMICAL AND YIELD RELATED ATTRIBUTES IN TRANSGENIC PLANT WITH HIGHER K/NA +	219 –220

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247	Abstract ID- 5PSRM2022/247 *Shailesh Chaudhary 1 , Mallika Sindha 1 and VaideheeNinama 1 shaileshflori317@gmail.com	1 Research scholar 1 Department of Floriculture and Landscape Architecture ASPEE College of Horticulture, Navsari Agricultural University,	PHYTOREMEDIATION – RESTORING SOIL HEALTH ALONG WITH BEAUTIFICATION NAVSARI, GUJARAT 396 450.	220 –221
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249	Abstract ID- 5PSRM2022/249 Anjali Gairola and Dr. Deepa Vinay anj.10.gairola@gmail.com	Department of FRM, College of Home Science, GBPUA&TPantnagar, Uttarakhand(India)	SOCIO-ECONOMIC CONDITIONS OF WORKERS IN FOOTWEAR INDUSTRY: A STUDY OF ORGANIZED SECTOR OF AGRA DISTRICT	222 –224
250	Abstract ID- 5PSRM2022/250 Tejal Patel pateltejal3692@gmail.com	Ph. D. (Horticulture) Floriculture and Landscape Architecture Research Scholar, ACHF,NAU, Navsari, Gujarat- 396450	POLYAMINES: VERSATILE BIO STIMULANTS FOR CLIMATE RESILIENT FLOWER PRODUCTION	224 –225
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252	Abstract ID- 5PSRM2022/252 Ajay kumar and Vandana Garg	Zoology Department, D.N. College Meerut, C.C.S. University Meerut	ACUTE GENOTOXIC EFFECTS OF ARSENIC AND CHROMIUM TREATED TWO EDITABLE FISH L. ROHITA AND C. PUNCTATUS WITH SPECIAL TO ITS WATER QUALITY	225 –226
253	Abstract ID- 5PSRM2022/253 Gaurav Chand Ramola gauravramola@doonbusinesschool.com	Assistant Professor, Department of Forestry Doon Business School Group, Selaqui, Dehradun	INSECT'S PESTS OF QUERCUS SEMECARPIFOLIA SM. (FAGACEAE) OF WESTERN HIMALAYAN REGION, INDIA.	226 –227

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255	Abstract ID- 5PSRM2022/255 <i>Balaji.S and N.Murugalatha</i>	Department of Food Processing Technology and Management, Hindustan College of Arts and Science, Coimbatore, India.	FORMULATION OF PULSE NOODLES	229 –229
256	Abstract ID- 5PSRM2022/256 <i>Abdul Kadar Shilani.J, A.T.Agilandeswari, N.Murugalatha</i>	Department of Food Processing Technology and Management, Hindustan College of Arts and Science, Coimbatore, India.	FORMULATION OF NUTRITIOUS CHOCOLATE USING FIG	230 –230
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258	Abstract ID- 5PSRM2022/258 <i>H. Niyaz Deen Rahman, Poovizhi, N. Murugalatha</i>	Department of Food Processing Technology and Management, Hindustan College of Arts and Science, Coimbatore, India	FORMULATION OF PULSE BISCUITS	232 –232

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*Abstracts*

**Abstract ID- 5PSRM2022/001**

**WOODLOTS FARMING AND SUSTAINABILITY IN KASHMIR (DISTRICT-GANDERBAL)**

*Azeem Raja\*, M.A. Islam, Akhlaq A. wani, Asif A. Gattoo and Shaista Khan.*

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Woodlot farming on farms has been established as a potential option to increase forest resources from agricultural landscapes and remove human pressure from forest. The livelihoods among rural communities in Republic of India is complicated, dynamic and multidimensional development. Forest woodlot farming forms a key link in enhancing the economic and social way of life of rural communities. Forest resources from woodlots are the source of revenue, employment, shelter, housing materials, cloth, ornament, fuel, fodder/ grazing, timber, food, vegetables, medicines, fertilizer, fibre, floss, oilseed, cottage industries and handicrafts and other Non-Timber Forest Products (NTFPs). The study investigated the woodlots types, species preference, growing stock and the livelihood contribution of woodlots in the Ganderbal district of Kashmir. So far, no study was conducted on woodlots in Kashmir. Multistage random sampling technique was employed to select 155 farm woodlots from 12 sample villages. The prevalent woodlots established were plantations of *Populus*, *Salix*, *Robinia* or mixed species. The average growing stocks of woodlots were estimated to be 204.05 m<sup>3</sup>/ha for *Populus*, 191.77 m<sup>3</sup>/ha for *Salix*, 109.51 m<sup>3</sup>/ha for *Robinia* and 62.31 m<sup>3</sup>/ha for Mixed. Of the total household woodlot income, Poplar woodlot contributed highest share (59.86%), followed *Salix* woodlot (24.29%), *Robinia* woodlot (9.80%) and mixed woodlot (6.05%). The findings suggested that woodlot farming in the Ganderbal district is the key alternative for forest resource production, livelihood resilience and socioeconomic improvement, hence, the policy must be implicated towards the promotion of woodlot farming through farmer's motivation, technical, financial and farming input assistance.

**Keywords:** Farming, Forests, Livelihoods, Resources, Socio-economic and Woodlots,

## Abstract- 5PSRM2022/002

### **COW PAT PIT- A BIODYNAMIC AGRICULTURE**

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Imbalance and excessive use of agro chemicals results in the pollution of environment, soil and ground water resources. Excessive use of chemicals degraded the soil and this will result in loss of quality and quantity of produce. During last few years many farmers show lack interest in agriculture and they migrate to cities. Now a day's biodynamic Agriculture is practiced across 60 above countries of the world. CPP and BD preparation is the key of biodynamic Agriculture. CPP is a type of compost which enhances the humus formation and increment in soil activity. It is also known as soil shampoo and is prepared by fresh cow dung of lactating and pasture going cows. It is a mixture of cowdung, egg shells, basalt and BD 502-507 preparations. It is a very effective method of soil health management, compost production, which ultimately increases yield and quality of crops. Many studies revealed that CPP is having maximum actinomycetes, P solubilising microorganisms, gram +ve and gram -ve bacteria. Keywords- CPP, Biodynamic preparation, Actinomycetes, gram posive and gram negative bacteria.

## Abstract- 5PSRM2022/003

### **OPTIMIZATION OF A PROCESS FOR PREPARATION AND STORAGE OF APPLE POMACE FIBRE ENRICHED MANGO NECTAR**

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Suitability of preparing fibre enriched mango nectar and its storage was evaluated by incorporating apple pomace fibre in different proportions like 0, 2.5, 5, 7.5 and 10% in the mango nectar prepared by using standard FSSA specifications (i.e. 20% mango pulp, 15o B TSS and 0.3% citric acid) and analysed at periodic intervals of 0, 3 and 6 months at ambient and low temperature for physico-chemical and sensory attributes. Out of different concentrations of fibre, fibre enriched mango nectar prepared by using 5% apple pomace

fibre was adjudged the best with respect to optimum physico-chemical and sensory properties and was comparable to the product which did not contain any fibre. The level of titratable acidity, reducing sugars, total sugars, relative viscosity and ascorbic acid content was recorded to be 0.30%, 9.15%, 14.57%, 1.282 and 9.85 mg/100g respectively. Storage of the product for six months at low temperature was found appropriate with no adverse changes on the quality of prepared products. Fibres are known to act as hypocholesterolemic agent. Dietary fibre binds and removes the bile acids from the system and thereby causes cholesterol to be converted into bile acids. In vitro adsorption of cholic and deoxycholic acid to apple fibre ranged between 19.63% to 30.24% as compared to 17.20% to 22.20% in isabgol fibre. The bile acid adsorption was observed to be 14.47% and 19.99% in cholic acid and deoxycholic acid respectively in 1g of isabgol fibre. The bile acid adsorption of cholic acid and deoxycholic acid was recorded to be 19.71% and 23.80% respectively in 3g of isabgol fibre.

#### **Abstract- 5PSRM2022/004**

#### **COLD PLASMA PRIMING (NON- THERMAL PLASMA ) AND NANO PARTICLE PRIMING :- A KEY OF REVOLUTION IN SEED ENHANCEMENT**

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Seed is an integral part of farming. Hence maintaining its quality becomes more important. There are various techniques which is used to enhance the quality of seeds and their ability to germinate well in the field and produce qualitative higher yield. There are different kinds of chemical and biological treatments and coatings are available to manage the harmful effects of different stresses and has been marketed for management of different diseases and pests. Innovation and research are always an integrated part of seed enhancements. It has been very crucial to combat the issue of poor seed quality . Seed Industry is very well determined towards the resolution of this. Hence they are developing and introducing various new techniques to overcome this issue. One of them is NTP ( Non thermal plasma) or Cold plasma Technique. Cold plasma in a new emerging eco

friendly technique which is used to enhance seed vigour and eliminate few seed borne pathogens from the surface of seed. It could be an alternative of chemical treatment. This technique is very useful in the improvement of seed longevity, which results in the enhancements of the seed quality and resistance of the crop towards to the different abiotic and biotic stresses. Improving these crucial factors results in the enhancements in the yield. Significantly, Nano particle priming is another emerging seed enhancement technique which has the potential to bring another agriculture revolution. Seed Nano priming has a potential to the rate of change metabolism in the germination process. It is observed that it triggers the pathways of transfer of different components of metabolism process in the germination. It is significantly responsible for enhancing the germination rate, plant growth, yield and quality of the crop production. Major nano particle which are being used in seed industry are silver nano particle (AgNP), gold nanoparticle (AuNPs), Iron oxide Nanoparticle, Silicon nanoparticles etc. These nano particles can be used the plant extract based solution too. Nanopriming can be used during the storage of seed. It helps in the seed protection from different stresses and diseases.

**Keywords :-** Cold plasma, Nanno particle, Non thermal Plasma.

### **Abstract- 5PSRM2022/005**

#### **AGRICULTURAL WASTE MANAGEMENT**

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Agricultural wastes are non-product outputs of production and processing of agricultural products that may contain material that can benefit man but whose economic values are less than the cost of collection, transportation, and processing for beneficial use. Estimates of agricultural waste arising are rare, but they are generally thought of as contributing a significant proportion of the total waste matter in the developed world. Agricultural development is usually accompanied by wastes from the irrational application of intensive farming methods and the abuse of chemicals used in cultivation, remarkably affecting rural environments in particular and the global environment in general. Generally, agricultural wastes are generated from a number of sources notably from cultivation, livestock and

aquaculture. These wastes are currently used for a number of applications through the '3R'strategy(i.e., reduce, reuse and recycle,) of waste management. Agricultural waste management system (AWMS) was discussed and a typical waste management options for a poultry farm was also described using the six agricultural waste management functions. Agricultural waste has a toxicity potential to plant, animals and human through many direct and indirect channels. The effects of these toxic agricultural wastes on the environment were discussed as well as their management.

**Keywords:** Agricultural waste, generation, management, utilization, environment, health.

### **Abstract- 5PSRM2022/006**

#### **ICT AS EMERGING SECTOR IN AGRICULTURE**

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Information and communication technology (ICT) plays an important role in agricultural development by allowing farmers to employ a variety of devices to achieve economic sustainability and self-sufficiency. In terms of opportunities and difficulties, the report looked at the impact of ICT in agriculture. Improvement of market activities, sharing of essential Information, economic gain, global agriculture sector networking, and research and development have all been found to be advantageous. One of the potential benefits of ICT in the agriculture industry is the ability to strategize economic growth for self-sufficiency. Inadequate ICT facilities, a lack of manpower, insufficient infrastructure, harmonisation of knowledge and language, power supply, and farmers' perceptions are among the problems and issues that limit successful ICT implementation in agricultural expansion, according to the review. More research is needed to generate appropriate ideas and proposals that will aid in the successful deployment of ICT to develop agriculture, according to the findings.

**Key words:** ICT, Agricultural, Growth, Development, Challenges and Benefits.

**Abstract- 5PSRM2022/007**

**OPTIMIZATION OF CELLULASE PRODUCTION BY THE BACTERIA ISOLATED FROM COTTON CROP SOIL**

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Microbes with the potential of cellulase activity convert the cellulose into the valuable products. Soil of Main Cotton Research Station (MCRS) farm, Surat, Gujarat is continuously exposed to cotton residues due to cultivation of cotton crop for a long time and might be rich in cellulase producing microbes. Thus, an attempt was made to isolate the cellulase producing bacteria from the soil of MCRS, Surat. A total of 15 bacteria (MCDB-1 to MCDB-15) were isolated from the soil of farm. Amongst, three bacterial isolates MCDB-2 (1.35), MCDB-5 (1.25) and MCDB-7 (1.13) showed  $> 1.0$  Cellulolytic Index (CI) on carboxymethyl cellulose (CMC) agar plate at 72 hrs at room temperature ( $30 \pm 0.2$  °C). To determine the cellulase activity CMCase and FPase activity was performed along with the cell biomass of the isolates. Data revealed that isolate MCDB-2 (CMCase – 0.52 U/ml, FPase – 0.37 U/ml and cell biomass – 0.51 (O.D.<sub>660</sub>: 0.50)) showed maximum enzyme activity followed by the MCDB-3 (CMCase – 0.39 U/ml, FPase – 0.21 U/ml and cell biomass – 0.51 (O.D.<sub>660</sub>: 0.45)) and MCDB-7 (CMCase – 0.39 U/ml, FPase – 0.17 U/ml and cell biomass – 0.47 (O.D.<sub>660</sub>: 0.45)) at 96 hrs. Optimization of cellulase production of all three isolates with varied physiochemical parameters *viz.*, pH (5,6,7,8,9); incubation period (24,48,72,96); temperatures (25°C, 35°C, 45°C, 55°C); effect of addition of 0.1 %, 0.5% and 1.0% of co-substrates like nitrogen sources (ammonium sulphate and urea) and carbon sources (starch and cellulose) were studied. Data revealed that MCDB-2, MCDB-3 and MCDB-7 showed significant enzyme activities and biomass at pH 7.0 and 8.0 with 0.1 % addition of ammonium sulfate; 0.1 % of cellulose and starch at 35°C temperature at 96 hrs.

**Key words:** Cotton crop, Cellulolytic Index, Cellulase, CMCase and FPase

## Abstract- 5PSRM2022/008

### REACTION OF THE RICE GROWERS OF BHADRAK DISTRICT OF ODISHA TOWARDS HYBRID RICE CULTIVATION

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The available scientific information on rice production and productivity in the world scenario projected that a future increase in food production is to be achieved from less land with less labor, limited availability of water, and reducing the use of fertilizer. Since rice occupies a pivotal position in the food production of the world, major emphasis is always attached to rice production to meet the demands of the growing population. All these have tempted researchers, scientists, planners, and executors to develop hybrid rice with high productivity. Though the technology was developed in the recent past, it has not been accepted in larger areas. The Government of Orissa has also made an intensive effort to popularize hybrid rice among the farming community, but fruitful results have not been achieved. It is natural that unless the farmers perceive the need, they cannot develop an interest to accept and grow hybrid rice. Therefore, perceptions of the individual played a significant role in the diffusion of hybrid rice cultivation. So, an attempt was made to make an analysis of the reaction of the rice growers towards hybrid rice cultivation. The respondents believed that their soil, climate, fertility level, and temperature were appropriate for growing hybrid rice. The respondents' perceptions of government policy systems and advisory services were generally negative, while perceptions of input supply and ecological conditions were only marginally better.

**Keywords:** Rice growers, Hybrid rice, Cultivation, Reaction, Adoption.

## Abstract- 5PSRM2022/009

### ECONOMICS ANALYSIS COST AND RETURN OF MILK PRODUCTION OF THE FARMER'S

#### ORGANIZED DAIRY IN MEERUT REGION OF UTTAR PRADESH

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Indian dairy industry emerged as an important sector for income and employment generation, and is contributing as well in the country's economy besides improving the health standards. The output from dairy sector has increased at more than 4.0 % per annum since 2016-17. The changing economic scenario an entrepreneur has to be very alert and should always keep an eye on the cost and returns of the scarce resources of an entrepreneur in order to keep him profitable. Dairying in our country dominated by the small holders, now the producers are scaling up their capacity by incorporating newer technology. One hundred and sixty milk pourer farmers were selected randomly using probability proportional to size from the list of producers who were supplying milk to organized dairy (cooperative or private) purely & exclusively from eight village level milk chilling units of selected from Meerut region. Average variable cost varies from 88.72 small, 88.95 medium, and 92.38 large farmers and rest 11.28, 11.05 and 7.62 were the fixed cost for small medium and large category farmers respectively. The cost of milk production was higher for Rs 18.02, Rs 16.30 and Rs 15.85 per liter for small medium and large farmers respectively. The average milk selling price was found to be almost at par for small Rs 27.77, Rs. 27.31 and Rs. 27.11 for small, medium and large category farmers. Whereas, the average income generated by investing one rupee was found lowest for small Rs. 1.56 followed by medium Rs. 1.71 and large Rs. 1.75 farmers respectively. However, the farmers have generated average annual income of Rs 70334.21, Rs. 128671.1 and Rs. 230510.8 by small medium and large category farmers respectively.

**Keywords:** Milk, Milk Farmers, Indian Milk and Dairy Industry etc.

## Abstract- 5PSRM2022/010

### **AGROBACTERIUM MEDIATED TRANSFORMATION TO DISCOVER PATHOGENICITY GENES IN *THYROSTROMA CARPOPHILUM***

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The present investigation on "Agrobacterium mediated transformation to discover pathogenicity genes in *Thyrostroma carpophilum*" was carried out to understand its pathogenesis at molecular level with an aid to devise a better management strategy. In this study, five *T. carpophilum* isolates (TC-1, TC-2, TC-3, TC-4 and TC-5) were isolated from five different hosts *viz.*, peach, plum, apricot, cherry and almond. The TC- 1 isolate was the most virulent and was selected for Agrobacterium mediated transformation of *T. carpophilum*. Optimization of Agrobacterium tumefaciens mediated transformation (ATMT) conditions for *T. carpophilum* using PBIF2-EGFP construct was carried out. All the parameters in the protocol were optimized and resulted in high transformation efficiency. Sensitivity of TC-1 isolate to hygromycin B was evaluated. It was found that the isolate completely failed to grow at 60 $\mu$ g/ml hygromycin B and this concentration was used as a marker to select resistant transformants in the ATMT experiments. The acetosyringone played significant role in transforming the TC-1 isolate. The highest transformants (117.66) were obtained at 200 $\mu$ M acetosyringone concentration. Several types of membranes such as Whatman, N + nitrocellulose, Cellophane, and Hybond N+ were used during the co-cultivation of fungal spores and Agrobacterium tumefaciens. It was found that, among the three filters used, highest number of transformants (91.40) were obtained from plates with N + nitrocellulose membrane disc. The transformation efficiency was further improved by spreading co-cultivate directly on thin layer of media (without using any disc). The optimum temperature for the transformation of *T. carpophilum* was found to be 24°C and the duration time for co cultivation was 96h. Fungal spore concentration greatly affected transformation efficiency. The 8 transformation efficiency could reach a high yield of  $109.00 \pm 16.80$  per  $1 \times 10^4$  spores. Apart from spore concentration, bacterial concentration also played an important role in transformation efficiency. The OD600 at 0.4 resulted in

highest number of transformants (127.66) and the lowest transformants were obtained at OD600 1.0 (23.33). The effect of the ratio of fungal and bacterial cell concentration also played an important role in transformation. Number of transformants increased significantly when the fungal concentration was doubled, 2:1 ratio of fungal and bacterial cell concentration resulted in highest number of transformant development (average=67.60). Using optimized parameters, 328 positive transformants per 1×10<sup>4</sup> spores and subsequent sub-culturing of transformants on selective and non-selective media resulted in stable T-DNA integration. Southern blot analysis revealed that most of the transformants embodied single T-DNA integration. Using this method, a small-scale transformant library (2050 transformants) was developed. Among this pool, 1005 transformants were individually tested for their pathogenicity; out of which 185 showed complete pathogenicity loss, 35 displayed reduced virulence and 785 were pathogenically similar to wild type. Out of this experimental stock, three transformants from each category were randomly selected to dissect the infection assay. The findings deciphered that transformants with complete pathogenicity loss failed to penetrate the host tissue and a few transformants failed to sporulate in laboratory. Transformants from reduced category could not form appressorium and occasionally sporulated. Transformants similar to wild type were morphologically and pathogenically similar to wild type because of un-alteration in their modus operandi. For identification of tagged genes, Thermal Asymmetrical InterlacedPCR (TAIL-PCR) was successfully performed in three transformants. All the left border (LB) or right border (RB) flanking sequences were different from each other but none of them had homologies with known sequences present in databases. The sequences found were unique because the genome of *T. carpophilum* has not yet been documented. Our work provided a new platform to understand the pathogenicity mechanism of *T. carpophilum*. To verify that the mutations in these genes are indeed responsible for the observed pathogenicity phenotypes, complementation with the wild-type gene and/or targeted gene disruption are required.

**Key words:** *Agrobacterium*, co-cultivate, flanking, gene, pathogenicity, sensitivity, *Thyrostroma carpophilum*, transformatio

## Abstract- 5PSRM2022/011

### PHYTOPATHOGENS CROSSING THE BORDER LINE: HUMAN DISEASE CAUSED BY PLANT PATHOGENS

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Pathogen host shifts represent a major source of new infectious diseases. There are several examples of cross-genus host jumps that have caused catastrophic epidemics in animal and plant species worldwide. Cross-kingdom jumps are rare, and are often associated with nosocomial infection. Several pathogenic microbes are capable of infecting a variety of organisms, belonging to different species, genera, families or even kingdoms. There are many well-known cases of cross-species, genus or family host jumps, some of which have caused widespread and catastrophic epidemics not only in humans but also in animal and plant species worldwide. Host jumps occurring at a cross-kingdom level are very rare, but can occur when a microbe normally colonizing a species from one taxonomic kingdom has the capacity to colonize a species belonging to another kingdom under special circumstances. A number of requirements need to be met to enable a microorganism to cross such kingdom barriers. Potential cross-kingdom pathogenic microorganisms must be able to come into close and frequent contact with potential hosts, and must be able to overcome or evade host defenses. Reproduction on, in, or near the new host will ensure the transmission or release of successful genotypes. Examples of cross-kingdom jumps are those of the plant pathogenic bacterium *Burkholderiacepacia* and *pseudomonas syringae* to humans, causing cystic fibrosis, Keratitis and other diseases to animals and humans, and fungal plant pathogens such as *Alternaria alternata*, *Aspergillus fumigatus*, *Fusarium proliferatum*, *Collectotrichum truncatum* and *Bipolaris specifera* to humans, causing invasive fungal infections, frequently with lethal outcomes. Many plant pathogens can be opportunistic human pathogens but not as frequently as typical animal and human pathogens. These opportunistic pathogens primarily affect immune-deficient patients, for example *Aspergillus* spp. causing aspergillosis and aspergilloma, *Fusarium* spp. (*F.graninaerum*) causing fusariosis and *Coccidioides* sp.,

which is frequently associated with agricultural soils and causes valley fever or coccidiomycosis even in healthy persons. It is now being recognized that many diseases are the result of multispecies synergistic interactions. This increases the complexity of the disease and has to be taken into consideration in the development of more effective control measures. Further knowledge regarding the molecular interactions between plant pathogens and human and animal hosts is needed to understand the extent of disease incidence and determine mechanisms for disease prevention.

**Keywords:** Pathogen, cross-kingdom jumps, fungal, bacterial, disease

#### **Abstract- 5PSRM2022/012**

#### **GROWTH PERFORMANCE AND HAZEL'S DECOMPOSITION ANALYSIS OF APPLE: A DISTRICT-WISE STUDY OF HIMACHAL PRADESH**

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The present study has been conducted on apple, a majorly grown fruit in hilly areas of north India including Himachal Pradesh and it is also a one of the largest contributors of our state's economy. The main objectives of the study were to find out the trends in growth, instability and decomposition analysis in apple production in lastfew years. The secondary data were collected on area, production and CAGR were used to obtain various growth patterns. Coppock instability indices were used to obtain instability in various districts and these districts were arranged accordingly. Hazel's decomposition analysis model was used to obtain change in mean yield, change in mean area, interaction effect and change in residuals which were impacting the apple's production in Himachal Pradesh. The trends in apple production revealed significant growth in selected periods. On the other hand, productivity of apple had followed a different trend. The Hazel's decomposition analysis of apple's production also led us to the conclusion that above parameters were showing their significant impact in the respective selected periods. So, the important steps need to be taken to increase the productivity of apple like using those varieties which are better adaptable to surrounding environment, high yielding, and use of modern

technologies to deal with the harmful impact of climate change like use of anti-hail nets should be done to maintain the tempo of apple production in our state.

**Keywords:** Growth, Production, Instability, Decomposition, Climate Change

### **Abstract- 5PSRM2022/013**

#### **IDENTIFICATION AND CHARACTERIZATION OF TRIPLE ACTION BIOAGENTS (TAB) AND THEIR POTENCY AGAINST FUSARIUM WILT OF LENTIL**

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Fusarium wilt is a severe disease that plays a significant role in reducing the yield of lentil. Under favorable conditions for disease growth, the disease can cause complete crop failure and can be a crucial limiting issue for lentil cultivation in specific geographical zones. The current work focused on isolating potential bio-agents exhibiting copper oxychloride resistance and evaluating their efficacy in seed treatment for ecologically sustainable management of Fusarium wilt of lentil. Seventy biocontrol agent isolates were isolated and tested for resistance by growing them on Potato Dextrose Agar medium (PDA) amended with copper oxychloride at the rate of 2500 ppm. Isolate-H10 and isolate-C9 showed more excellent compatibility with copper oxychloride fungicide with 69 mm and 65 mm radial growths, respectively. The isolates H10 and C9 had the highest inhibitory percentages of 84.30% and 83.94% against *Fusarium oxysporum* f. sp. *lentis*, respectively, and the highest phosphorus solubilization index (PSI). Primers (ITS 1 and ITS 4) identified these putative bioagents as *Trichoderma harzianum* isolate skua-tab-1 and *Penicillium crysogenum* strain Tab2. Sequences were submitted to the NCBI and assigned the accession numbers MK414603 and MK418066. In pot culture, these isolates also demonstrated their superiority in reducing the disease incidence and severity if seeds were treated with H10 and C9 alone or in combination with copper oxychloride fungicide. The two isolated bioagents exhibit three fundamental properties: compatibility with

copper oxychloride, antagonistic activity toward the pathogen fall armyworm, and the ability to dissolve phosphorus minerals.

### **Abstract- 5PSRM2022/014**

#### **STUDY OF SOME MEDICINAL PLANTS USED IN DIGESTION RELATED PROBLEMS**

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Digestion refers to the breakdown of food into smaller components that can be absorbed into the bloodstream. The digestive tract together with the associated glands constitute the digestive system. digestive system includes oesophagus, stomach, Liver, gallbladder, pancreas and intestines. Many factor negatively affect digestion process which causes digestion related problems. Digestion problems may lead to several symptoms that interfere with daily activities. Some common symptoms are nausea, bloating, vomiting, gas, diarrhea, headache, constipation etc. There are many reasons of digestion problems, including lifestyle, autoimmune diseases, mental health issues, genetics, family history etc. There are several ways to manage digestion problems. The primary method is to maintain a healthy lifestyle. It includes eating a well-balanced diet with more dietary fiber, physical and mental exercise etc. The use of Allopathic or synthetic medicine is another way to control digestive diseases but Allopathic or synthetic medicines have unwanted side effects and are also expensive. Therefore, the best way to treat digestive problem is to use herbal medicine as they are inexpensive and have little or no side effects. Plants provide a variety of phytochemicals that may aid in the treatment and prevention of a number of digestive problems. Adarak (*Zingiber officinale*), Saunf (*Foeniculum vulgare*), Angelica (*Angelica archangelica*), Ajwain, (*Trachyspermum ammi*), Baheda (*Terminalia belerica*), Harad (*Terminalia chebula*), Amla (*Emblica officinalis*), Hing (*Ferula asafoetida*), licorice (*Glycyrrhiza glabra*) etc. are strongly suggested for digestion care. This paper provides information on uses of Ayurvedic medicinal plants for cure of digestion related problems.

**Key Words:** Digestion Problems, Medicinal Plants, Herbal Medicines.

### **Abstract- 5PSRM2022/015**

#### **ETHNOBOTANICAL USES OF SOME MEDICINAL PLANTS USED BY TRIBAL COMMUNITY OF UTTARKASHI DISTRICT**

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The ethnobotany is the study of dynamic relationship between plants and peoples. In the present investigation we have given the information about twelve medicinal plant species have important medicinal value against different human diseases. The ethnobotanical enquiry focussed on the valuable medicinal plant products such as medicines, but the field is increasingly conceptual and problem oriented. The workers explore the process of domesticated the indigenous system of the medicinal plants, because these plants has the important role against different human diseases such as antidiabetic, headache, ulcers, hair growth etc. In this study we have concluded that old age tribal people and women use these traditionally available plants for health and believe that these are easily available, less expensive and have no side effects but traditional knowledge is gradually declining and disappearing from the country by deforestation, impact of tourism on natural vegetation, heavy construction of government projects and also by climate change. Farmers and local people/youth should be involved in conservation & cultivation of medicinal plants at least on their infertile land and can enhance their socioeconomic status by this livelihood of cultivation of these medicinal plants at the market level.

**Key words:** Ethnobotany, Antibiotic, Indigenous knowledge & Livelihood.

### **Abstract- 5PSRM2022/016**

#### **TREE CROP INTERACTION UNDER TEAK BASED AGROFORESTRY SYSTEM**

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Agroforestry is the most successful kind of sustainable agriculture since it not only meets our basic needs for food, fuel, fodder, and fruit but it also helps to improve living

ecosystems. Agroforestry is a low-input strategy that entails growing trees alongside crops in a variety of combinations and sequences. Because vegetal components growing on the same piece of land must share available resources for growth and development as their interaction has resulted in Tree Crop Interaction (TCI). TCI in Teak-based agroforestry systems has positive interaction namely Agrisilviculture (*Tectona grandis* + *Abelmoschus esculentus*), Silvimedical (Tectona grandis + *Ocimum spp.*), Silvihorticulture (*Tectona grandis* + *Cucumis sativus*), Silvihorticulture (*Tectona grandis* + *Cucumis sativus*), Silvihorticulture (*Tectona grandis* + *Mangifera indica*), Silvihorticulture (*Tectona grandis* + *Carica papaya*) and negative interaction namely Agrisilviculture (wheat + teak, Rice + teak), Silvimedical (teak + aloe + coleus + stevia + kalmegh + lemongrass + citronella + palmarosa + patchouli), Agrisilviculture (teak + soybean + greengram + frenchbean + blackgram), Agrisilvihortipastoral (teak + papaya + sorghum + groundnut + chilli + ragi + grass + subabul), Agrisilvipastoral (teak + subabul + groundnut). The usage of appropriate spatial and temporal layouts would complement each other.

**Key words:** Ecosystem, Teak, Agroforestry system, Agrisilviculture

#### **Abstract- 5PSRM2022/017**

#### **IMPACT OF NUTRIENTS AND GROWTH REGULATORS ON YIELD AND QUALITY IN WINTER PINEAPPLE CV. KEW**

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The efficacy of plant nutrients and growth regulators were investigated in the field of winter pineapple (*Ananas comosus*) cv. Kew to improve the post harvest quality and shelf life of fruit in a subtropical, subhumid and acidic soil of Nagaland during 2018-19 at SASRD, Nagaland University. Calcium chloride (0.5% and 1.0%), borax (0.5% and 1.0%), 100 ppm GA<sub>3</sub> and 200 ppm NAA were taken to carry out an experiment following randomized block design with nine treatments and three replications. Plant nutrients and growth regulators were sprayed separately two times in plant population at 15 days interval right after fruit set and the integrated approach showed a positive and significant response in fruit growth, yield and quality. The plants treated with 1.0% Borax + 200 ppm NAA showed a quite better

result in physiological matrix of fruit volume (725.67 cc), fruit weight (1.32kg) and juice content (66.66 ml 100g <sup>-1</sup> pulp) while the highest yield (52.63 t/ha) and pulp recovery percentage (71.41%) was noticed in 1.0% CaCl<sub>2</sub> + 200 ppm NAA. The maximum TSS (14.63<sup>0</sup>Brix),TSS:acid ratio (21.50), less acidity (0.70%) and maximum shelf life (21 days) was observed in pineapple treated with 0.5% CaCl<sub>2</sub> + 100 ppm GA<sub>3</sub> while the highest total sugar (8.95%) was noticed in 1.0% borax + 100 ppm GA<sub>3</sub>.

**Keywords:** Pineapple, kew, nutrient, growth regulator, yield, quality

### Abstract- 5PSRM2022/018

#### **PHYTOCHEMICAL EXTRACTION OF *NYCTANTHES ARBOR-TRISTIS* PLANT AND ITS ACTIVITY AGAINST BACTERIA'S CAUSING UTI**

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*Nyctanthes arbor-tristis* (Oleaceae), a mythical plant, is highly prized in Ayurveda for its medicinal properties. Along with its usage as a laxative, for rheumatism, skin conditions, and as a sedative, this plant is commonly used as a medicine because of its anti-helminthic and anti-pyretic properties. The present work based on the anti-bacterial activity of *Nyctanthes arbor-tristis* by agar well diffusion method. The activity was observed against the UTI causing bacteria (*Escherichia coli*, *Proteus mirabilis*, *Staphylococcus aureus* and *Klebsiella pneumoniae*). Phytochemicals were extracted using different solvents such as methanol, ethanol and acetone from the leaves of *Nyctanthes arbor-tristis*. Extracted phytochemicals were used in different concentrations i.e., 20µL, 40µL, 60µL on UTI causing bacteria. The study revealed that few concentration gradients showed anti-bacterial activity against these bacteria. Thus, it is suggested that leaves of the following plant can be used for the treatment of UTI. This hypothesis needs to be further evaluated using vast variety of bacteria and updated technology for the benefit of human kind.

**Keyword:** Anti-bacterial activity, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, UTI (Urinary Tract Infection)

## Abstract- 5PSRM2022/020

### **IMPACT OF CLIMATE CHANGE ON DAIRY FARMERS: A CASE STUDY OF KANGRA DISTRICT OF HIMACHAL PRADESH**

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This study was designed to investigate how dairy farmers of Kangra district are impacted by climate change, what are the adaptation strategies adopted by farmers to cope with the impact of climate change and the barriers to the adoption of these strategies. A selected sample of dairy farmers responded to a designed questionnaire that was developed to collect data and covered farmers perception, adaptation strategies, and the barriers facing them towards adopting the strategies. The results obtained from the study revealed that most of dairy farmers were aware of the climate change impact on dairy cattle performance and health. Furthermore, the adaptation strategies that were suggested have limiting factors according to farmers as a result of governmental and agricultural institutions restriction polices. Therefore, recommendations regarding new polices were suggested to facilitate the way of getting benefit from grants and financial support for improving dairy farms and to mitigate the effect of climate change on dairy cattle.

**Keywords:** Climate change, Dairy farmers, Perception, Adaptation strategies, Barriers

## Abstract- 5PSRM2022/021

### **EFFECT OF DIFFERENT LEVEL OF SULPHUR AND BORON ON PRODUCTION POTENTIAL OF VEGETABLE PEA (*PISUM SATIVUM* L.) IN CALCAREOUS SOIL OF NORTH BIHAR**

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Vegetable pea (*Pisum sativum*L.) is a most important vegetable crop which grown in winter season all over the India. Sulphur deficiency is most prevalent in Bihar due to use of less quantity boron and sulphur -containing fertilizers in calcareous soil and consequent decrease sulphur and boron nutrients. In the other hand organic manures are utilized in

small quantity which are source of different macro as well as micro nutrients like sulphur and boron. Soil has deficient in sulphur and boron which result reduced crop production. When the sulphur is critically present (<10 ppm) in soil then plant development, quality and output are severely affected. Legume crop such as vegetable pea suffer from growth, nodule formation and yield due to absence of these sulphur and boron nutrients in soil. The use of sulphur in vegetable pea, it improves qualitative characters like protein and vitamins. Boron plays important in properly growth, differentiation of tissue and is also useful in decreasing reproductive organ sterility and abnormality. The combined application of sulphur and boron increased germination of seeds, seedling development and yield related attributes. Field experiment conducted during 2020 – 2022 in FRBD fashion with fifteen different combinations of sulphur and boron doses in Azad Pea-3 variety of vegetable pea in three replications and different pod and seed yield attributing traits were studied. The treatment combination S<sub>4</sub>B<sub>2</sub> (40 kg S ha<sup>-1</sup> + 2 kg B ha<sup>-1</sup>) exhibited superiority overrest of the treatment combination with respect to pod and seed yield parameters of vegetable pea.

**Key words:** Sulphur, Boron, Nutrients, Pod, Seed, Yield

#### **Abstract- 5PSRM2022/022**

#### **MORPHOLOGICAL AND PHYTOCHEMICAL CHARACTERIZATION OF *ACONITUM HETEROPHYLLUM* WALL. EX ROYLE., A CRITICALLY ENDANGERED MEDICINAL PLANT OF KASHMIR HIMALAYAS**

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The research was carried out in three forest divisions of north Kashmir, namely Kamraj, Langate, and Jehlum Valley Forest Division which are located in the districts of Kupwara and Baramulla. *Aconitum heterophyllum* wild populations from each forest division were investigated for morphological characteristics. Rhizospheric soil was obtained from five randomly selected plants for physicochemical property assessment, whilst roots of *Aconitum heterophyllum* plants were harvested from each location for extraction and phytochemical characterization. *Aconitum heterophyllum* recurring populations were

determined to be growing between 3200 and 3700 metres elevation across all locations in three forest divisions of North Kashmir. The findings of this study demonstrated that there is substantial intra-population variation in morphological traits of this species such as plant height, leaf, flower, and tuber characteristics. The plant height was determined to be greatest (94.60 cm) at the Haril site of Langate Forest Division (LFD) has the most leaf area (78.02) cm<sup>2</sup>, followed by JVFD (18.4) cm<sup>2</sup>. Floral axis length was greatest at LFD (20.96) cm. Rhizospheric soil investigation revealed that the KFD has the highest electrical conductivity (0.45 ds/m) and phosphorus (21.8 kg/ha), but the LFD has the most organic carbon (2.3%), nitrogen (473.81 Kg/ha), and potassium (487.46 kg/ha) with pH value (5.8). The petroleum ether extract included alkaloids and flavonoids, but the aqueous and methanol extracts of specimens obtained from all sites contained carbohydrates and saponins. The GC-MS chromatogram of a petroleum ether extract of *Aconitum heterophyllum* tubers (LFD) revealed ten peaks, suggesting the presence of a significant number of chemicals. Ethoxyisoxazol-4-carboxylic acid (19.24%) was shown to be a significant chemical. The GC-MS chromatogram of JVFD methanol extract revealed 5 peaks indicating the presence of significant chemicals. The results indicated that the most important molecule was 9,12-octadecadienoic acid (Z, Z) (alpha-linoleic acid) (28.81%). The GC-MS chromatogram of methanolic extract of *Aconitum heterophyllum* tubers (LFD) revealed four peaks. A prominent chemical was 1,2-Benzene dicarboxylic acid, bis (2-methyl propyl)ester, and the GC-MS chromatogram of methanolic extract of *Aconitum heterophyllum* tubers (KFD) showed just one peak. The main component was bis (2-methyl propyl) ester of 1,2-benzenedicarboxylic acid.

**Keywords:** *Aconitum heterophyllum*, morphology, phytochemistry, GC-MS, Kashmir Himalayas

## Abstract- 5PSRM2022/023

### NANO PARTICLES: A MODERN APPROACH OF SEED PRIMING

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An emerging, innovative and modern agricultural revolution is required to improve the crop yield and production with ensuring high food quality and safety in a sustainable manner which should be environment friendly. Today the multidisciplinary nanotechnology an interesting science is getting more whilst in agriculture adding long-term viability. The agriculture nanotechnology involves manipulation or change of matter with at least one dimension sized ranges from 1 to 100 nm. The production can be increase through up gradation of food quality, plant protection, detection of plant diseases, monitoring plant growth, and improving seed quality nanotechnology is effective technique. The plus point of nanotechnology is improvement in seed quality. Treating seeds with nano particles germination speed up, increases seedling strength enhances vigour and improve seed quality. The alternation in seed metabolism and signalling pathways, leads to alter germination and seedling establishment, and whole plant life cycle is key factor of nano seed priming. Sometime it has been reported that seed nano-priming boost plant growth and development, increase production, and improve the nutritional value of food. Nano-priming affects biochemical pathways along with the balance of reactive oxygen species and plant growth hormones, promoting stress and disease resistance and have an advantage to reduce pesticide and fertiliser use. During seed storage, reduction in germination occurs subsequent to physiological changes. The biochemical changes mainly observed during storage are lipid peroxidation mediated by free radicals, inactivation of enzymes, disintegration of cell membranes and genetic damage. The researchers has been carrying the study on effect or impact or influence of super dispersive metal powder such as Zn, Ag, Ti nano particles on the different parameters of seed quality. The current overview gives an idea of recent developments in the sector, highlighting the challenges

and opportunities for using nanotechnology in seed nano-priming as a contribution towards sustainable agriculture practices.

**Keyword:** Germination, Nano-priming, Nanotechnology, Seed quality, Seed storage, Sustainable Agriculture

### **Abstract- 5PSRM2022/024**

#### **RECENT ADVANCES IN SEED TECHNOLOGY: SEED PELLETING TO ENHANCE SEED QUALITY**

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The major objective of recent technologies of seed coating is to enhance or improve the sowing and crop performance through applying uniformly active ingredient on seed at appropriate dose. The seed coating includes various methods such as dry coating, seed dressing, film coating, encrusting and seed pelleting. The seed pelleting changes the original shape and size of the seed through the process of continues encrusting coating or coated with inert material. The inert matter includes vermiculite, kaolin, calcium peroxide, perlite, talc and diatomeous earth. The binder material can be liquid or dry formulation. This technology can be used to sow multiple seeds of the same seed lot, different varieties of the same crop or multiple seed species and helps to cultivate very small seed having low vigour seeds. The pelleting material should have the various factors includes particles size distribution, porosity, water absorbing and holding capacity and lack of toxicity for successful pelleting. To achieve precise seed spacing for reducing the need of thinning and for small seeded horticultural crops the demand of pelleting is high today. The major drawback of pelleting requires much time and expert handling in comparison to other coating technologies due to extensive application of active components, liquid and solid particulates. The integrity of pelleting depends on the selection of material and correct technology such as in rice, calcium peroxide used as seed pellet to improve emergence and crop establishment. For pelleting different agents are used for coating such as

protectant, micronutrient and micro-organism including bacteria and fungi to create an impact on improving seed germination rate, establishment and increasing the yield of crop. Somehow, the modern technology leads to better for germination and prevent the diseases to ultimate increase in yield which is the major demand to worldwide to feed large population.

**Keywords:** - Binder material, Seed pelleting, Seed coating, Protectant, Vigour

#### **Abstract- 5PSRM2022/025**

### **NANOFERTILIZERS: A GREAT DEAL FOR MULTIPLE ENVIRONMENTAL STRESSES AND HIGHER CROP PRODUCTIVITY**

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The present review paper has made an attempt to explore the nanomaterials which are appropriate for crop productivity and its role in reducing environmental stresses. Rapid development of nanotechnology has been promoting the transformation of traditional agriculture, more precisely the invention of nanopesticides, and nanofertilizers. Numerous methods and nanomaterials have been developed for agricultural sector such as proper crop growths, crop protection, taking care of seasonal crops, and monitoring the environmental conditions. Utilization of nanomaterials can prompt fine cultivation, which fundamentally improves crop efficiency. The overall review has led to the conclusion that nanotechnology has wide opportunities, by providing a sustainable alternative in the agriculture. Also, an alternative mechanism can be developed to enhance farm production and environmental sustainability. A nanohybrid construct like nanofertilizers (NFs) is an excellent alternative to overcome the negative impact of traditional chemical fertilizers.

**Keywords:** Nanoparticles, Nanomaterials, Nanofertilizer, Agriculture, Sustainability

## Abstract- 5PSRM2022/026

### PRICE BEHAVIOUR AND ASSESSMENT OF SPATIAL PRICE LINKAGE IN MAJOR POTATO MARKETS IN INDIA: A CO-INTEGRATION APPROACH

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Potato (*Solanum tuberosum*) popularly known as 'King of Vegetables', is one of the most important food crop after maize and rice, contributing to food and nutritional security of the world. During 2019-20, potato production in India was around 50 million tonnes from an area of 20.51 lakh ha with a productivity of 24 tonnes per ha (GOI 2021). The marketable surplus of potato crop is higher than other food crops, but due to perishability and seasonality, price fluctuations are more pronounced. The present study analyzes the spatial integration through cointegration analysis on the wholesale monthly prices of potato in major six selected markets of India (Agra, Burdwan, Patna, Mumbai, Delhi and Bangalore) for the period January 2010 to December 2020. Maximum Likelihood method of co-integration tests (Trace and Maximum Eigen value) indicated that potato prices in major markets were having long run equilibrium relationship. Granger Causality test found that Burdwan and were the key markets that influence the other markets: standard deviation shock given to the Delhi market stimulates an immediate, high response in all the other markets. Vector Error Correction Model is employed to analyse speed of adjustment in long run equilibrium of selected markets .The speed of adjustment is highest in the Mumbai (88%) and Agra (25%) markets, which means that in these markets the chances of correction of any disequilibrium are high. The efficiency of marketing has not yet reached an optimal level as the selected markets are not spatially well integrated with one another in all the cases. The reasons for this might be poor market intelligence, slow transition of the information between the markets and poor physical infrastructure. The policy intervention calls for strengthening in physical infrastructures well as market intelligence wing in all markets with the establishing of proper marketing channels and online marketing system through computerization and networking. More farmers should be

encouraged to participate in future trading and contract farming so as to reduce the variation in arrivals and prices.

**Keywords:** Market, Co- Integration, Potato, Wholesale Price, Granger Causality.

### **Abstract- 5PSRM2022/027**

#### **STUDIES ON GENETIC DIVERSITY IN BLACKGRAM (*VIGNA MUNGO* L. HEPPER) GENOTYPES**

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The present Experiment was conducted at Field Experimentation Centre, Department of Genetics and Plant Breeding, Apex School of Agriculture, Achrole during *kharif*, 2021 in Randomized Block Design with three replications. The present investigation was conducted to examine the 51 blackgram genotypes along with one check (SHEKHAR-2) to study the genetic diversity. Analysis of variance showed highly significant differences among 51 blackgram genotypes for 13 quantitative characters studied. Maximum genotypic and phenotypic variance was recorded for biological yield/plant, plant height and harvest index. Maximum GCV and PCV were recorded for biological yield, number of clusters per plant, Seed yield /plant, harvest index, number of pods per plant. High heritability was recorded for biological yield per plant, plant height, seed yield per plant, number of clusters per plant, days to 50% pod setting, pod length, number of pods per plant, harvest index, days to maturity. High heritability coupled with high genetic advance as percent of mean was recorded for biological yield/plant. Genetic diversity estimated in 51 blackgram genotypes using Mahalanobis's D2 statistic. Fifty-one genotypes were grouped into nine clusters by tocher method (Mahalanobis Euclidean Distance) cluster analysis. The maximum inter-cluster distance was observed between cluster IV and cluster IX. The maximum intra-cluster distance was observed in cluster VII. Cluster IV showed maximum cluster mean value for seed yield per plant among all the characters, Days to 50 % Flowering, Days to 50 % Pod Setting, Pod Length, Days to Maturity, Harvest index and seed yield/plant contributes maximum.

## Abstract- 5PSRM2022/027

### **MUTATION BREEDING: AN APPROACH FOR INDUCED VARIABILITY IN MEDICINAL AND AROMATIC PLANTS FOR ITS GENETIC IMPROVEMENT**

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Exploiting natural or induced genetic diversity is a proven strategy in the improvement of all major crops, and the use of certain techniques *viz.*, combination breeding, mutagenesis, somaclonal variation and molecular gene transfer to create variation is valuable in medicinal and aromatic plants. Mutation induction is an important complementary method of breeding of plants and efficient method to produce heritable changes particularly in case of quantitative traits such as yield and yield related attributes. Our endeavor through this study to assess the morphological, cytological and yield contents in medicinal and aromatic plants developed through mutagenesis in India and identify the promising genotypes which will be directly used as new variants. The material for the present study consists of elite genotype of medicinal plants has been used in mutation breeding program. Seeds of the suitable germplasm like *Catharanthus*, *Mentha* and *Ocimum* will be procured from the institutions working on medicinal and aromatic plants. Pretreatment and determination of Lethal Dose 50 of physical and chemical mutagens. Sowing of treated seeds along with control to raise M1 generation. Screening and collection of data on selected M1 plants on morphological and bio-physiological parameters for its identification, documentation of suitable variants. Mutations have been induced for the genetic diversity with physical and chemical mutagens for enhancing plant productivity in both seed and vegetative propagated crops. Various mutants with a wide range of traits have been isolated and utilized for breeding programs, which are high yield, flower color, disease resistance, and early maturity in crop, vegetables, medicinal herbs, fruit and ornamental plants. In the present study, distinct plants with morphological, cytological, and essential oil yield and alkaloid have been identified in M1 generation of medicinal plants like *Catharanthus roseus*, *Ocimum* and *Mentha*. Maximum variants have been identified in EMS treatments. Induction of mutation can be used for generation of variability and selection for desirable traits

resulted in identification of new variants in association with modern technology of genetic engineering which can be directly used as germplasm for improvement of medicinal and aromatic plants.

#### **Abstract- 5PSRM2022/029**

#### **EFFECT OF SHOOT BENDING ANGLES ON PRODUCTION AND QUALITY OF HYBRID TEA ROSE CULTIVAR MINU PEARLE**

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An experiment was taken up from September to March for two consecutive years (2020 and 2021) to explore the best angle of shoot bending at different for Hybrid Tea rose cultivar Minu Pearle. From the investigation, a positive effect was observed in terms of vegetative traits as well as flowering characteristics. The cultivar performed superior with less degree of bending angles as compare to higher bending angles in terms of vegetative traits as well as flower quality parameters (shoot length, stalk length, flower diameter, self-life and vase life of flowers). Similar trend was also followed in terms of flowering traits (days to flower bud emergence, sepal reflex and days to attain cup shape from the date of bending). Higher number of harvested cut flowers were also reported from less degree of bending angles.

#### **Abstract- 5PSRM2022/030**

#### **EFFECT OF GIBBERELLIC ACID AND OUTDOOR STRATIFICATION ON GERMINATION OF EXCISE HAZELNUT (*CORYLUS JACQUEMONTII DECNE.*) SEEDS**

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The present investigation was carried out under polyhouse at Fruit Nursery, College of Horticulture, VCSG UUHF, Bharsar, Pauri Garhwal during the year 2019-20 to evaluate the combined effect of gibberellic acid concentrations *viz.*, 50, 100, 150, 200 and 250 ppm and

outdoor stratification periods viz., 30, 60 and 90 days on hazelnut germination. The experiment was laid out in Factorial RCBD with three replications and fifteen treatment combinations. The result showed that seeds treated with 150 ppm GA<sub>3</sub> along with 60 days stratification (G<sub>3</sub>S<sub>2</sub>) was found best for days taken for initial germination, shoot height, shoot diameter, leaf area, shoot fresh weight, shoot dry weight, root length, root fresh weight, root dry weight, total fresh weight and total dry weight. While, 200 ppm GA<sub>3</sub> with 60 days stratification (G<sub>4</sub>S<sub>2</sub>) was found best for germination per cent, number of leaves per plant, root diameter, total number of roots per plant and found at par with G<sub>3</sub>S<sub>2</sub> (150 ppm GA<sub>3</sub> along with 60 days stratification). However, minimum results for almost all above parameters were recorded when seeds were treated with 50 ppm @GA<sub>3</sub> and stratified for 30 days (G<sub>1</sub>S<sub>1</sub>) except leaf area which is recorded lowest in G<sub>5</sub>S<sub>3</sub> (250 ppm GA<sub>3</sub> × 90 days stratification).

**Keywords:** Hazelnut, stratification, germination, growth regulators, polyhouse

#### **Abstract- 5PSRM2022/031**

#### **PHYTOCHEMICAL PROFILING OF RIPE AND UNRIPE FRUITS OF *NEOLAMARCKIA CADAMBA* USING GC- MS**

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Phytochemicals are the natural chemical compound occurs in plant and its parts such as leaves, fruits, roots and bark. These phytochemicals have been found useful in both health and medicine due to their nutraceutical properties. The objective of this present study is to comparatively analyse the phytochemicals present in ripe and unripe fruits of *Neolamarckia cadamba*, commonly known as 'Kadam' in Hindi. Dried powders of both ripe and unripe fruits were extracted with methanol as solvent. Methanolic extracts of *Neolamarckia cadamba* fruits (ripe and unripe) were phytochemically analysed using Gas chromatography- mass spectrometry (GC-MS). Identification of examined phytochemicals was performed using NIST library. Phytochemical profiles of ripe and unripe fruits were determined by peaks and its area %, height % and retention time. GC-MS showed 26

major phytochemicals in ripe fruits and 21 major phytochemicals were found in unripe fruits. 5-Hydroxymethylfurfural (22.13 %) was found to be highest followed by gamma.-Sitosterol (11.01 %) and Tetradecanoic acid (10.36 %) in ripe fruits whereas in unripe fruits n-Hexadecanoic acid (11.18 %) was found to be highest followed by Tetradecanoic acid (8.84 %) and gamma.-Sitosterol (8.73 %). Other phytochemical compounds such as 2H-Pyran-2, 6(3H)-dione, Octadecanoic acid, Squalene and Vitamin E were present in both ripe and unripe fruits in moderate amount. These identified phytochemical compounds present in ripe and unripe fruits is known for having various biological activities like antibacterial, anti- inflammatory, antidiabetic, anticancerous, antioxidant. Overall phytochemical analysis shows that fruits of *Neolamarckia cadamba* could serve as good source diet and medicinal supplements as well.

**Keywords:** Fruits, *Neolamarckia cadamba*, Methanolic, Phytochemical, GC- MS

#### Abstract- 5PSRM2022/032

#### **STUDY OF PHYTOCHEMICAL SCREENING OF AQUATIC FERN *AZOLLA FILICULOIDES***

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Azolla is an aquatic, world's smallest fast growing, nutritious, green fern belonging to the family salviniaeae and it grows in stagnant and slow moving waters like ponds, lakes. It fixes nitrogen from the atmosphere and it is used as a green fertilizer and generally cultivated for its agricultural utility and it is also used as a fodder for domestic animals like cow, goats, cattle, buffaloes e.t.c. The present study was done to inspect the qualitative phytochemical constituents of the world's smallest aquatic fern *Azolla* in five different solvents that is Acetone, Benzene, Distilled water, Methanol, Petroleum ether.

The present investigation revealed the presence of Carbohydrate in all the four solvents except benzene, sterols were present in acetone and petroleum ether but absent in the rest three solvents, Alkaloids were present in all the four solvents except petroleum ether, Coumarin was present in acetone and distilled water only but absent in the rest solvents,

Anthocyanin was present in distilled water only but absent in all the four solvents, Quinones were present in three solvents but absent in Acetone and petroleum ether, Flavonoids were present in all the four solvents but absent in Benzene, Tannins were present in all the three solvents but absent in acetone and benzene, Phenol, Amino acids and Cardiac glycosides were present in all the five solvents, Proteins were present in benzene and distilled water but absent in rest three solvents, Saponins were present in methanol and distilled water but absent in rest three solvents.

**Keywords:** *Azolla*, Phytochemical, Aquatic fern, Solvents, Plant extract, Methanol, Benzene

#### **Abstract- 5PSRM2022/033**

#### **ASSESSMENT OF GROUNDWATER POTENTIAL USING GIS AND AHP TECHNIQUES: A CASE STUDY OF EASTERN NAYAR WATERSHED IN GARHWAL DISTRICT, UTTARAKHAND**

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The Himalayan region has substantial obstacles in groundwater resource management due to relief, slope, and rocky surface, resulting in decreased infiltration into surface groundwater. Groundwater is not uniformly distributed all over and is limited in hard rock terrains. A case study was made to find out the groundwater potential zones in Eastern Nayar watershed, in Uttarakhand. Thematic maps of geology, geomorphology, lineament, soil, precipitation, land-use/land-cover and drainage density were prepared for study area. Ground water potential zones were obtained by overlaying all thematic maps in terms of the weighted index overlay method. The Analytic Hierarchy Process (AHP) and geospatial techniques were adopted to identify groundwater potential zones. Groundwater potential zones map of the study area revealed that the plain areas are prospective zones in the catchment and can be helpful in better planning and management of ground resources.

**Keywords:** Groundwater potential, Watershed, AHP, Thematic map.

## Abstract- 5PSRM2022/034

### SELECTIVE GENOTYPING OF F<sub>3</sub> POPULATION FOR BPH RESISTANCE IN RICE

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Genotyping of F<sub>3</sub> population using polymorphic markers obtained in the parental polymorphism study is one of the approaches for locating the genes on the chromosomes. Twenty nine markers are identified as polymorphic between parents which were used for genotypic analysis of 32 F<sub>3</sub> lines and 2 parents (IR64 and CG Zn Rice I) to identify genes/ QTLs responsible for BPH resistance. Genotyping was done with sixty eight polymorphic markers with 32 F<sub>3</sub> lines and 2 parents using PCR analysis to obtain the information on segregation at allelic level. Out of sixty eight SSR markers twenty nine SSR markers were polymorphic. For selective genotyping we used only thirteen polymorphic SSR markers.

**Keywords:** rice, SSR, molecular markers, selective genotyping, BPH, F<sub>3</sub> population, resistance.

## Abstract- 5PSRM2022/035

### STUDIES ON GENERATION MEAN ANALYSIS FOR POD YIELD IN OKRA [*ABELMOSCHUS ESCULENTUS(L.) MOENCH*]

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A generation-average analysis involving six generations (P<sub>1</sub>, P<sub>2</sub>, F<sub>1</sub>, F<sub>2</sub>, BC<sub>1</sub> and BC<sub>2</sub>) was performed to investigate the nature and extent of gene influence on 15 okra traits. The studies were carried out at the Vegetable Research Center, Department of Vegetable Science, College of Agricultural, GBPUA&T Pantnagar, GBPUA & T Pantnagar, during the rainy season 2021. Characteristics of day to first flowering, first flowering node, plant height, number of branches per plant, number of pod per plant, pod length and pod yield per plant. The analysis revealed the presence of additive and dominant genetic effects and

electrostatic interactions in most cases, indicating the importance of additive and non-additive genetic effects in expression trait. For the majority of traits, a pattern of gene duplication was observed. Thus, reciprocal repeat selection would be useful for the efficient use of additive and non-additive gene effects.

Key words: Generation Mean Analysis, Additive, Reciprocal, Recurrent Selection, Gene effects,

#### **Abstract- 5PSRM2022/036**

#### **MOLECULAR MAPPING OF QTLS CONFERRING ROOT TRAITS IN SORGHUM RECOMBINANT INBRED POPULATION**

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Sorghum is considered as a drought tolerant crop known to have well-known developed deep roots, which are expected to play a key role in drought adaptation. Surprisingly there has been limited work on roots in sorghum. Thus, our study focused on mapping genomic regions governing root traits. Recombinant Inbred Populations (RIPs) of 226 F<sub>9</sub> lines of E36-1/Basavanapada developed and evaluated for root traits such as root length (cm) (RL), root volume (cm<sup>3</sup>) (RV), number of roots per plant (RN), root fresh weight (g) (RF), root dry weight (g) (RD) and to shoot ratio (RS); along with days to 50 per cent flowering and seed yield per plant in a rhizotron. Analysis of variance revealed significant difference among the RILs. A total of 113 (55/530 EST-SSRs, 40/275 SSRs, 18/138 SNPs) polymorphic markers were genotyped to construct a genetic linkage map spanning 1633 cM. A total of 12 putative QTLs were mapped for root traits. A maximum of three QTLs for number of roots per plant followed by two QTLs each for root length, root volume, root fresh weight and root dry weight and single QTL for root to shoot ratio. Further, two QTLs for days to 50 per cent flowering, and one QTL for seed yield per plant. The lack of overlap between the QTLs of component traits of root and yield, suggested that these two

parameters are independent and the possibility of combining these two traits, favorably to enhance productivity of sorghum under receding moisture condition.

### Abstract- 5PSRM2022/037

#### **AGRONOMIC AND HYDRO-DISTILLATION STUDIES ON ROSEMARY (*SALVIA ROSMARINUS SPENN.*) IN A TEMPERATE ENVIRONMENT UNDER MARGINAL LAND CONDITIONS**

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The present study was conducted at Faculty of Forestry, SKUAST-K Benhama Ganderbal under marginal land conditions to determine the effect of plant spacing and fertilizer levels on herbage and oil yield of rosemary. Four levels of spacing viz. 30×20 cm, 30×30 cm, 45×40 cm and 60×50 cm along with nitrogen viz. control, 175 kg N/ha, 225 kg N/ha and 275 kg N/ha were used to assess their effect on growth, yield and essential oil content of rosemary. The results indicated that widest spacing of 60×50 cm was the most favourable for growth, yield and quality attributes per plant except plant height. Whereas, on hectare basis, the growth, yield and quality attributes were found maximum at closest spacing of 30×20 cm. Among nitrogen levels, rosemary plants nourished with moderate amount of nitrogen (225 kg N/ha) attained maximum growth, yield and quality attributes. However dry leaf to stem ratio and essential oil content was not significantly influenced by plant spacing and nitrogen levels. GC-MS analysis of *Salvia rosmarinus* Spenn. volatile oil resulted in the identification of 36 constituents, representing 99.06% of the oil. The oil was composed of monoterpene hydrocarbons, oxygenated monoterpenes, sesquiterpene hydrocarbons and oxygenated sesquiterpenes.  $\alpha$ -pinene (16.39), 1, 8-cineole (14.30), camphor (22.04), camphene (9.16),  $\beta$ -pinene (5.92),  $\beta$ -phellandrene (5.17), bornyl acetate (4.57), myrcene (4.31), borneol (3.33), (E)- $\beta$ -caryophyllene (2.86), verbenone (1.37), linalool (1.18), terpinen-4-ol (1.12),  $\alpha$ -terpineol (1.03) and  $\gamma$ -terpinene (1.03%) were the major constituents of the oil.

## Abstract- 5PSRM2022/038

### DAIRY FARMERS' KNOWLEDGE OF IMPROVED DAIRY FARMING PRACTICES: A STUDY IN KUMAON DIVISION OF UTTARAKHAND

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Dairy farming has been an integral component of farming in India as it plays a critical role in sustainability of rural livelihoods and provides insurance to farmers in case of crop failure. However, the updated knowledge of dairy farmers about improved dairy farming practices is very important for getting good economic returns. The knowledge of dairy farmers about four major areas of dairy farming such as feeding practices, breeding practices, healthcare, general management and clean milk production were determined. The study was carried out in two districts (Nainital and Udham Singh Nagar) of Kumaon division of Uttarakhand which were selected purposively. Two blocks from each district were selected purposively on the basis of maximum number of milk societies/ cooperatives. Two villages from each block were selected following random sampling without replacement. Thus, total eight villages were selected respectively. The study sample comprised of thirty dairy farmers selected from each village through snowball sampling method irrespective of the gender. Thus, total sample size for the present study was two hundred forty (240). The data were collected through interview schedule. Then collected data were tabulated, analyzed and interpreted with the help of appropriate statistical tools. The study findings revealed that dairy farmers' knowledge about improved management practices revealed that 65 per cent of the respondents were having medium level of knowledge whereas remaining 32.08 per cent and 2.92 per cent of them were having low and high level of knowledge, respectively. Thus, the study concluded that dairy farmers' knowledge about improved dairy farming practices needs to be improved so that milk productivity as well as income from dairying can be improved. Widespread publicity through focused mass media campaigns, trainings, exhibitions, fairs, field days, and other means can be used to enhance dairy farmers' knowledge about scientific dairy farming practices.

**Key words:** Dairy Animals, Farmers, Improved Dairy Farming Practices and Knowledge

### **Abstract- 5PSRM2022/039**

#### **PERFORMANCE BASED ON VARYING DATES OF SOWING AND STAGE OF HARVESTING ON ROOT YIELD AND QUALITY OF ASHWAGANDHA (*WITHANIA SOMNIFERA L.*) CONDUCTED IN UTTARAKHAND.**

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Variety Jawahar 20 of Ashwagandha under the subtropical Himalayan region in Uttarakhand ,was used in field experiment that was conducted during the Zaid season of February to July 2022. The find out an optimum date of sowing and stage of harvesting and to maximize productivity and enhance the quality of Ashwagandha under favourable conditions at Quantum University,Agricultural Research block. There were twelve treatments consisting of three dates of sowing(13February, 01March and 15 March) and three stages of harvesting (120, 135 and 150 DAS). The outcome indicated that the crop sown on 13thFebruary that was harvested at 120 DAS recorded significantly higher dry root yield of Ashwagandha .The two other consecutive sowings (01 March and 15 March) produced comparatively moderate yield .

**Key words:** Ashwagandha. Date of sowing, dry root yield, and stage of harvesting.

### **Abstract- 5PSRM2022/040**

#### **ALTERNATE BEARING IN FRUIT CROPS: FUTURE PERSPECTIVE TOWARDS ENHANCING THE PRODUCTIVITY**

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Fruit are very important for human health which provides all essential nutrients at plenty level. While cultivating some fruit crops, Alternate Bearing (AB) or biennial bearing (BB) is the major challenge to growers and traders. It is typically initiated by an abnormally heavy crop in trees (on year), followed by a light or no subsequent crop (off year). The fact that different types of fruit trees show alternate bearing notwithstanding wide differences in dormancy, time of flower formation, flowering habits, set-abscission relationships, length

of fruit development stages as compared with vegetative activities, and many other aspects-indicates that alternation is somehow inherent to the nature of the polycarpic plant and calls for a unified theory or at least a logical set of alternative hypotheses explaining the alternating behaviour in a unified way. When on and off year sequence does not follow a systemic pattern it is called periodicity of cropping or irregular bearing. Alternate bearing is assigned due to genetic factor while irregular bearing may be due to lack of good orchard management practices, External biotic and abiotic factors. This phenomenon of alternation is more prominent in the perennial fruit crops particularly in Mango, Citrus, Avocado, Apple, Plum, Pear Apricot, Tamarind and Jamun. Alternate bearing (AB) phenomenon is a concern for realizing steady incomes from mango orchards to the growers. Selection of suitable variety and regulating fruit load by various agronomic practices like Training and pruning, De-blossoming, Fruit thinning, Use of growth retardants and Proper orchard management practices are the some important recommendations for its management. This may pave way for better regulation of flowering shoots towards enhanced fruit productivity.

**Keywords:** Alternate bearing, Internal and External factors, Orchard management practices and Productivity.

#### **Abstract- 5PSRM2022/041**

#### **IMPORTANCE IN CONSERVATION OF UNDER-UTILIZED FRUIT CROPS: PRESENT AND FUTURE PERSPECTIVE**

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India contains 2.4% of the world's surface area and 11.8% of the world's recorded plant species, making it the country with the most biodiversity. For the preservation of the genetic resources of various plant genotypes, India possesses roughly four mega-diversities. In Indian bio diversity, the commercial growth of underutilized fruits is very low. The underutilized fruits, such as Ber, Jamun, Karonda, wood apple, manila tamarind, custard apple, Phalsa, Kiwi fruit, Bread fruit, Bael, Passion fruit, West Indian cherry, Rose apple, Mulberry, and Bilimbi play a crucial role in enhancing the nutrients in the human

diet. Every portion of the fruit plant has powerful medicinal qualities. These fruit crops are unusual in that they are resilient to both biotic and abiotic influences, easy to grow, sturdy, and possess a high root to shoot ratio. In addition to their therapeutic and dietary benefits, underutilized fruit crops are also grown for their ornamental, avenue tree, rootstocks, bio-fencing, windbreak/shelter tree, furniture, screening in backyard gardening, forest restoration, and social and economic benefits. The fruits aren't abandoned to commercial cultivation or trading, though. Fruit plants are becoming more and more scarce as a result of farmers' ignorance of how to grow, purchase, and exchange them. Due to reasons including population growth, urbanisation, rapid industrialization, and climatic changes, the bio diversity of these fruit features has now significantly decreased. Therefore, there is an urgent need to protect the genetic resources of these underutilised fruits and to improve research and development for gathering, conserving efficiently using of preserved genetic resources and developing policies by the government agencies for their potential utilisation. The National Bureau of Plant Genetic Resources (NBPGR), Mission on Integrated Development on Horticulture (MIDH) and National Horticulture Mission (NHM) are centrally supported programmes within the Government of India that can aid in the conservation of underutilised genotypes effectively.

**Key words:** Bio-diversity, under-utilized fruits, conservation, schemes

#### **Abstract- 5PSRM2022/042**

#### **COMBINING ABILITY EFFECTS AND GENE ACTION IN BREAD WHEAT (TRITICUM AESTIVUM L.) USING LXT DESIGN**

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To identify superior parents in terms of yield and associated traits in bread wheat (*Triticum aestivum* L.), the combining ability, nature of gene actions and magnitude of heterosis in 21 F<sub>1</sub>s obtained in a line x tester fashion (with 7 lines and 3 testers) was carried out. The experiment was carried out using Randomized Block Design in three replications. Variance ratio between general and specific combining ability was found to be less than unity which

indicated the prevalence of non-additive gene actions involved in the inheritance of these characters. Parental lines HP-25 and tester HD-3086 exhibited significant GCA for grain yield, while lines HP-24, HP-22 and HP-06 were observed to be better general combiners for most other traits including maturity. Among the hybrids, cross combinations HP-22 x JAUW-683, HP-44 x HD-3086 and HP-45 x RSP-561 showed significantly higher positive SCA for grain yield per plant. The best cross combination- HP-06 x RSP-561 was also the best combiner with heterotic effects for grain yield, yield contributing and morphophysiological traits and can be further used for the selection of stable elite lines in advanced segregating generations for improving yield.

**Keywords:** combining ability, GCA, gene actions, heterosis, line x tester, SCAX tester, SCA

#### **Abstract- 5PSRM2022/043**

#### **BIOPROSPECTING THE ROLE OF UNDERUTILIZED FRUITS AS A SOURCE OF NATURAL ANTIOXIDANTS**

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Worldwide, health concerns have led to a substantial increase in the demand for edible plants that endow health benefits over synthetic antioxidants. Therefore, the demand for wild fruits with nutraceutical properties has also increased. India is rich in diversity of fruits, but due to lack of awareness and the challenging trend of artificial supplements, the consumption of underutilized fruits is underrated. Keeping in mind the current necessity and demand for natural antioxidants, this study evaluates the antioxidant parameters (total antioxidant activity (TAA), and ferric ion reducing antioxidant power (FRAP) assays) and radical (i.e, DPPH (1,1-diphenyl-2-picryl hydrazyl) and hydroxyl radical) scavenging activity of the aqueous extracts of two underutilized fruit species, *Annona squamosa* L. and *Dillenia indica* L.. The study observed that the TAA and FRAP and radical scavenging activity of both the fruits were high in comparison to the positive control (*Syzygium cumini*). Compared to *Syzygium cumini* the amount of total phenolic (TPC) and total

flavonoid content (TFC) were also high in both the species (i.e., *Annona squamosa* L. and *Dillenia indica*). Furthermore, nutritional analysis through X-ray fluorescence (X-RF) revealed the high content of macro and micro-nutrients for both the study species. The results of the study indicate that both the underutilized fruit species are rich in natural antioxidants and dietary supplements; therefore, these fruits could serve as a promising source of natural antioxidants/ nutraceutical compounds in future.

**Keywords:** Natural antioxidants, Phytochemicals, Radical scavenging activity, Total antioxidant potential (TAA), Ferric ion reducing antioxidant power (FRAP), *Annona squamosa* L. and *Dillenia indica* L.

#### **Abstract- 5PSRM2022/044**

#### **MATURITY INDICES AND GERMINATION BEHAVIOR OF *INDIGOPHERA HETERANTHAWALL* AN IMPORTANT SHRUB OF UTTARANCHAL HIMALAYAS**

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The Central Himalaya of India lies between latitudes 28°, 5' - 31°, 25' N and 77° 45' – 81° E longitudes. It forms a phyto-geographical transition between two distinct Himalayan realms, the wet eastern and dry western Himalaya. The poor village communities of Himalayan region predominantly maintain a subsistence living. The relationship between man and forest is quite intimate. However, with increasing population and decreasing forest resources this relationship is leading to forest degradation and is becoming unsustainable. In the Himalayan region there is the scarcity of green fodder during winter and dry summer and demand of fodder is maximum in these seasons. In these regions the fodder species are damaged by incessant grazing/lopping/erosion etc. The demand of fodder can be met to some extent by planting fodder shrub. *Indigophera heterantha* is one such important fodder species. *I. heterantha*, commonly known as sakina is a deciduous shrub belonging to the family Fabaceae. The species occurs between 3000 – 8000 feet above sea level. It is considered as a good quality fodder, soil binder and important to obtain blue dye. It can yield 1 – 2.5 t/ha leaf biomass. The main aim of the study is to assess the exact maturity stage and germination behavior of the selected species. The

study area lies between 1950 -2100m on the Southern extremity of the lesser Himalayan zone in Kumaun. The seeds were collected at one week interval from the selected sites. The color of pod was initially green and finally turned into brown across all the sites. The germination occurred maximum ( $51.33\pm0.66\%$ ) at  $32.42\pm2.21\%$  moisture content. The nursery of this important species can be instrumental for raising the planting stock and further their plantation in the wastelands and village commons to meet out the fodder demand of the local communities.

### **Abstract- 5PSRM2022/045**

#### **SMART AGRICULTURE**

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Agriculture has become more industrialized and intensive due to the rising demand for food in quality and quantity. Agricultural products will be in high demand by 2050 due to a 30% increase in the global population, so there is a need to devise new mechanisms for agriculture, and smart agriculture is one of those mechanisms. Smart agriculture is a rising area bringing the benefits of digitalization through big data, artificial intelligence and linked data into the agricultural domain. Smart agriculture is not only about bringing information technology in agriculture, but rather more about creating and using knowledge through technology. Agricultural machines and devices should be enabled by information technology to process and analyze data—and finally, make some decisions, or prepare them semi-automatically. It is based upon the rise of big data technologies the Internet of Things, satellite observation, linked data, and artificial intelligence in all the agriculture supply chain stages. The forecasted market value of smart farming worldwide is 23.1 billion dollars (including precision farming). The importance of smart farming in terms of agricultural productivity, environmental impact, food security, and sustainability, with applications in the areas of crops, soil, biodiversity, farmer's decision-making, and many more—in line with works like . This data-driven experimental study identifies smart agriculture research trends by implementing a topic modeling technique previously used in smart agriculture.

## Abstract- 5PSRM2022/046

### SUSTAINABLE AGRICULTURE

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Agriculture has changed dramatically, especially since the end of World War II. Food and fibre productivity raised due to new technologies, mechanization, increased chemical use, specialization and government policies that favored maximizing production. Sustainable agriculture is a subject of great interest and lively debate in many parts of the world. Most agriculturalists agree that the concept of sustainable agriculture is of paramount importance to the sustainability of our biosphere and its ever increasing human population. The study was to analyse and evaluate farmers' knowledge of the fertilizing process and its aspects, as well as applying sustainable agricultural activities on farms. A scientific project focused on limiting nutrient losses from farms by introducing measures to apply fertilizers in a more sustainable way. The importance of nutrient management, as very important for sustainable farming. Many farmers still demonstrated a poor grasp of nutrient flows and nutrient balances on farms. The farmers demonstrated a realization that there were some new, or low-cost measures that could be introduced to make management more sustainable and pro-environmental, but there was still a need for wider adoption of sustainable agricultural practices.

## Abstract- 5PSRM2022/047

### SEED MATURITY INDICES OF *FICUS NEMORALIS* VERN. IN NAINITAL DISTRICT OF KUMAUN HIMALAYA

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*Ficus nemoralis* Vern. locally termed as Dudhila is a small sub-deciduous glabrous tree upto 4.5 feet girth and 35 feet high. Occurs throughout the hills between 4000 and 6500 feet. Fairly common usually in oak forest, often cultivated for its fodder. Fruits ripen April and again in October-November. Dudhila is a good fodder for lactating cows. Stem bark juice is given in conjunctivitis and boils. The study was undertaken at the Kumaun

Himalaya region to evaluate the regeneration and seed/fruit characters of *Ficus nemoralis* at different altitudes viz. 1124, 1468 and 1706m in Nainital district of Kumaun Himalaya across three sites. The study area lies between 29°00' N latitude and 79°41' E longitude. Seedlings were present at site 1 and absent in the other studied sites. The sapling were totally absent across all the sites. The young age classes trees were present. The absences of seedlings at two sites and sapling at all sites indicates poor regeneration status. Fruits of *F. nemoralis* were collected from five average sized healthy trees. During the study period colour of fruits changed from green to pinkish yellow. The mean fruit size ranged between  $27.10 \pm 1.40$  and  $225.21 \pm 2.90$  mm<sup>2</sup> and seed size between  $0.64 \pm 0.02$  and  $2.23 \pm 0.07$  mm<sup>2</sup> across all the sites and years. The maximum germination ranged between  $0.02 \pm 0.01$  and  $44.67 \pm 1.28\%$  when seed moisture content was  $74.33 \pm 2.19$  and  $37.24 \pm 1.54\%$ . The best time of fruit collection for multiplication of the species is between in the month of August to October. Seed germination and seed moisture content was negatively correlated. Maturity and germination of seed of *Ficus nemoralis* is closely related to changes in fruit colour and moisture content of seeds, which indicate appropriate timing of collection to avoid large scale losses in collecting non-viable seeds for multiplication of species on a large scale.

**Keywords:** Germination, Fruit, Regeneration, Seed.

#### **Abstract- 5PSRM2022/048**

#### **CAPSULE MATURATION TIMING AND SEED GERMINATION IN RHODODENDRON ARBOREUM SMITH AT SUB-ALPINE REGION OF WESTERN HIMALAYA, UTTARAKHAND**

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The genera of Rhododendron belong to the Ericaceae family and are found at an altitudinal range of 1500–3500 m in the Himalayan region. *Rhododendrons* are the ecologically and economically important group of plants of Himalayan ecosystems. Due to human interference and natural calamities, the natural populations of *Rhododendrons* are

gradually diminishing. *Rhododendrons* are one of the most exploited species due to its multifarious nature. The regeneration of various such multifarious species is very poor in nature due to their over exploitation and other climatic causes. The present study reports the capsule maturation time and seed germination status of *R. arboreum* in the high altitudes areas. The study site was located at 30°11'N and 79°39'E between 3233 and 3446m elevation in the western Himalaya. Physical parameters, capsule size, number of capsules, weight and mass of capsule were taken and germination was carried out in a dual chamber seed germinator for each collection date in laboratory. The tree density of *R. arboreum* was 80 ha<sup>-1</sup>. The mean capsule size during collection ranged from 76.81 to 236.82 mm<sup>2</sup>, the mass per 100 capsules during study varied between 21.23 and 33.43g. The weight, number and mass of 100 capsules was 36.33 g, 288.33 and 33.43 g at the time of maximum germination. Maximum germination 40.00% occurred at 25.90% moisture content. Capsule colour change, decline moisture content and change physical parameter is a reliable indicator of maturity. The capsule maturation timing of treeline *R. arboreum* was two or three weeks delayed as compare to those grow at sub-tropical and temperate region.

**Keywords:** *R. arboreum*, Maturity, Moisture Content, Germination, Treeline

#### Abstract- 5PSRM2022/049

#### ANALYSIS OF VARIATIONS IN WOOD MICROSTRUCTURE OF *JUGLANSREGIA* L. *Laqshika Patiyal, Dr.Sangeeta Gupta*

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*Juglansregia*.L (English walnut) is a tree species with a wide range of distribution. It is found in parts of Europe and Asia. It is well known for its commercial production of walnuts as well as quality timber. However, little is known about the anatomical variation in this species. There is a need to conserve this species as it comes under the threatened list of species of IUCN which can be brought about by carrying out extensive research in all the fields be it genetic, morphological or anatomical. Such studies will help in the better conservation of the species. This study presents the data on the anatomical variations of

this tree both qualitatively and quantitatively. Samples belonging to different localities were studied under the compound microscope. The study was carried out in all three directions of the wood samples i.e. transverse section, tangential section and radial section. Nine parameters (vessel diameter, number of vessels per mm<sup>2</sup>, intervessel pit size (IVP), Vessel ray pit size (VRPs), ray height, ray number of cells, ray width, ray seriations and number of rays per mm) were studied from the above three sections and five parameters (fibre length, fibre diameter, fibre lumen, fibre wall thickness and vessel length) were studied after macerating the samples. Analysis of variance (ANOVA) and Tukey's post hoc was applied on the quantitative data which produced significant result. This study revealed significant amount of variation in anatomical parameters which was linked with latitude of the localities to which the samples belonged and other environmental factors such as water availability in the area.

### **Abstract- 5PSRM2022/050**

### **WOOD PRESERVATIVES: CURRENT STATUS AND FUTURE PROSPECTIVES**

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Wood is one of the most valuable natural resource, used by mankind since ages. Major constituents of wood includes cellulose, hemicellulose and lignin, along with several other components such as extractives and inorganic content. Wood being lingo-cellulosic material is easily liable to degrade by termite and microbial agents, which leads to significant losses. Therefore in order to protect the wood from biodegradation, they are treated with different types of preservative chemicals. Wood preservation refers to increasing durability of wood by treating them with certain chemicals that are toxic to decaying agents. The first generation preservatives includes creosote, oil borne pentacholorophenol and the water borne arsenicals, principally chromated copper arsenate. In 1990s, concerns increased over CCA treated wood as they contain arsenic and chromium which are toxic to both human beings and environment. The second generation preservatives are based on water borne copper rich system which includes complexed

copper(II) and an organic co-biocide in order to control copper-tolerant fungi. These includes alkaline copperquat (ACQ), copper azole (CA), copperxyligen (CX). The third-generation preservatives includes organic type of wood preservatives. These organic biocides belong to family of biocides called as triazoles such as tebuconazole propiconazole and cyproconazole. Azoles have got broad spectrum anti-fungal activity, effective against basidiomycetes fungi, exhibits good stability and leach resistance in wood. The mode of action of azole compounds implies a potential to affect the endocrine system of the different organisms. They inhibits the C-14 alpha demethylation of the lanosterol present in the fungi. Therefore, future studies can be carried out using azoles along with different chemicals and they can be effective against various wood degrading agents also less toxic to the environment.

#### **Abstract- 5PSRM2022/051**

#### **FLORISTIC COMPOSITION AND DIVERSITY OF WEEDS INFESTING PADDY AND WHEAT CROPS OF MANDAKINI VALLEY (RUDRAPRAYAG, UTTARAKHAND, INDIA)**

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Weeds are biotic barriers that co-exist with agroecosystems. Consequently, they affect crop quality and production, posing a global threat to agricultural productivity and food security. The present study examined the weed diversity associated with paddy and wheat crops in the Mandakini valley (Rudraprayag, Uttarakhand) through field surveys executed during 2017–2018. The phytosociological parameters (Density, Frequency, and Importance Value Index), diversity indices (Shannon-Weiner, Simpson, and Evenness), and the Sorenson similarity index were calculated. A total of 57 weed species (45 genera and 19 families) and 51 weed species (42 genera and 19 families) were reported from the paddy and wheat fields of the Mandakini valley (Rudraprayag, Uttarakhand), respectively. The significant dominating weeds growing in the paddy fields of the area are *Echinochloa*

*colona, Cyperus iria, Ageratum conyzoides, Cyperus difformis, Lindernia ciliata, Commelina benghalensis, Digitaria ciliaris, Eriocaulon cinereum, Galinsoga parviflora, Eleocharis atropurpurea, Mazus pumilus, Eclipta prostrata, Drymaria cordata, Echinochloa crus-galli, and Eleusine indica.* On the other hand, *Avena fatua, Phalaris minor, Vicia sativa, Vicia hirsuta, Anagallis arvensis, Ageratum conyzoides, Chenopodium album, Lathyrus aphaca, Stellaria media, Medicago polymorpha, Melilotus indica, Poa annua, and Lathyrus sphaericus* are the dominant weeds infesting wheat fields. Therefore, weed management strategies require a detailed understanding of weed biology and diversity. An integrated weed management approach has proven beneficial in controlling noxious weeds.

**Keywords:** Crop, Mandakini, Paddy, Uttarakhand, Weeds, Wheat.

#### **Abstract- 5PSRM2022/052**

#### **EFFECT OF WEATHER PARAMETER AND DATE OF SOWING ON SEVERITY OF YELLOW MOSAIC OF SOYBEAN AND ITS VECTOR (WHITEFLY) POPULATION AND ITS RELATION**

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Soybean (*Glycine max* (L.) Merrill) is one the most useful and widely distributed legume crop. Soybean ranks first in production among oil seed crops across the world. Yellow mosaic disease is the major disease which are observed in the Central Asia. It is exclusively transmitted by whitefly (*Bemisia tabaci* Genn.) in persistent manner. A field Experiment was undertaken to record the influence of prevailing weather and vector (Whitefly) on yellow mosaic disease severity in soybean. Four varieties were sown on two dates, first date of sowing was 25<sup>th</sup> June 2021 and second date of sown was 10<sup>th</sup> July 2021. Yellow mosaic disease was first noticed in second fortnight of July. It was characterized by the presence of green yellow mosaic pattern. Whitefly i.e. the vector of

disease was present all over the season in timely and late sown conditions. The maximum whitefly population 7.73 per plant (by cage) and 3.29 per plant (by visual) observed at 29<sup>th</sup> SMW in timely sown condition. Whitefly was comparatively higher in timely sown condition than late sown conditions. It was recorded that YMD Progression and severity (36.71 %) was very higher in comparison to progression and severity (14.33 %) in late sown condition. YMD severity was rapidly increased between 30<sup>th</sup> SMW (2.52 %) to 33<sup>th</sup> SMW (33.73 %) was recorded in timely sown conditions. It was revealed that most sensitive age of crop for YMD infection was 30-50 during that period rapid progression of YMD was favored by maximum temperature of 27.7-32.6 °C, mean temperature of 25.1-28.6°C, mean RH of 80-90 % with moderate to high rainfall and presence of sufficient whitefly population. Study revealed that whitefly population positively correlated with mean temperature and sunshine hours and negatively correlated with rainfall, mean RH, rainy day and wind speed. Whereas disease progression was negatively correlated with max temp, mean temp and sunshine hours in timely sown and positively correlated with max temp, mean temp, sunshine hours and whitefly population in late sown condition.

#### **Abstract- 5PSRM2022/053**

#### **EFFECT OF AGRONOMIC BIO-FORTIFICATION OF IRON AND ZINC FERTILIZATION ON QUALITY PARAMETERS OF MANGO CV. KESAR**

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The mango is delicious fruit of tropical countries and holds a premier position amongst the commercial fruit grown in India. It is national fruit of India belong to family annacardiaceae. In Western India, several mango varieties *viz.*, Alphonso, Kesar, Rajapuri, Pari, Mankurad, Fernandin, Jamadar, Dadmiyo, *etc.* are commercially grown and accepted by the consumers. Out of which Kesar has been found with good yield potential, almost regular bearer, mid-season variety, having good consumers' acceptance, attractive shape, size with saffron coloured pulp and very good keeping quality. Mango play important role in balancing diet of human being by providing about 64-66 calories per 100 grams of ripe

fruits. The king of fruit is nutritionally very rich, unique in flavour. From last few years, some physiological stresses and quality related issues has been raised in mango orchard. It was observed that unbalanced fertilization, micronutrient deficiencies, poor tree management and inadequate cultural practices are mainly responsible for orchard related quality issue. Therefore, food supplements and mineral supplements are necessary for healthy crops. The present research was accomplished on mango cv. Kesar to investigate the effect of foliar spray of iron and zinc fertilization on quality parameter of mango. The experiment was conducted in completely randomized design and replicated 3 times with 9 treatments. The significant increase in TSS and ascorbic acid content were recorded with the foliar application of 0.5 % FeSO<sub>4</sub> and 0.5 % ZnSO<sub>4</sub> which was at par with treatment T<sub>7</sub> (0.25 % FeSO<sub>4</sub> + 0.50 % ZnSO<sub>4</sub>).

**Key words:** Mango, Kesar, iron, zinc, foliar spray, TSS and ascorbic acid content

#### **Abstract- 5PSRM2022/054**

#### **VALUE ADDITION OF FRUIT WASTE: WASTE TO WORTH**

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Food and Agriculture Organization of United Nations revealed that around 1.3 billion tons of food are wasted or lost globally in a year. Food availability and accessibility can be augmented by increasing production and reducing the losses. Thus, reduction of post-harvest food losses is a critical component of ensuring future global food security. India has achieved the average annual growth rate of 3.7% of GDP in agriculture and allied sectors during the eleventh five year plan, against the target of 4%. The loss in GDP due to Wastage of fruits. Fruits have a crucial role in our diet and human life, and therefore the demand for such important food commodities has increased very significantly. The United Nations and FAO has estimated that losses and waste in fruits and vegetables are the highest among all types of foods, and may reach up to 60%. The waste is composed mainly of seed, skin, rind, and pomace, containing good sources of potentially valuable bioactive compounds, such as carotenoids, polyphenols, dietary fibers, vitamins, enzymes,

and oils. The processed fruits waste can be reused and lead to novel pharmaceuticals, food supplements or functional foods. Pomace of fruits contains larger amounts of bioactive substances compared to the juices. Fruits waste can be considered as a valuable source of phytoconstituents for medicinal applications. Avocado peel and seed extracts having Anti-inflammatory potential. Waste materials obtained from fruits can be utilized for composting and landfill by aerobic or anaerobic treatment, biogas production, animal feed and production of value added products. In recent times, there has been huge environmental pressure for the efficient reutilization of fruits and vegetables residues due to the global intensification of food production. Value-added products utilization gives another source of income to industries, so it helps to increase economic productivity.

**Key words:** Fruit Waste, Bioactive Compounds, Anti-inflammatory and Value Addition

### Abstract- 5PSRM2022/055

#### TEN YEARS (2012-2022): 10 INSECT DISCOVERIES

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Insects are very vast, diverse and the largest class of the animal kingdom and still continue to dominate earth. Insects belong to the kingdom Animalia, phylum Arthropoda, and class Insecta. Class Insecta is further divided into 29 orders though 81% belong to one of the following four orders: Coleoptera (beetles and weevils), Diptera (flies, mosquitoes), Hymenoptera (ants, wasps, bees) and Lepidoptera (butterflies, moths). There are about 5.5 million species of insects comprising of 1.5 million species of beetles, and 7 million species of terrestrial arthropods, yet 80% of insects still wait for their discovery. Insects gain recognition as essential members of ecosystems, a concern has arisen that their diversity and abundance may be in global decline, due to habitat degradation, climate change, pollution, and other causes. The International Union for Conservation of Nature has assessed a total of 77,435 species of insects between 1996

and 2020, of which 18,180 (23.47%) species are reported to be threatened. Biological diversity is being lost as species go extinct, and it is only by understanding species that humans can shape the social, political, and financial forces that affect conservation efforts. Insect discoveries relate to insect abundance, their ecological roles, conservation strategies, environment sustainability, economic importance and preventive measures to be taken before the insect species become extinct. In this paper an effort has been made to list some of the insects discovered in the world between the years 2012 and 2022.

### **Abstract- 5PSRM2022/056**

#### **EVALUATION OF FOLIAR SPRAY OF POTASSIUM NANOPARTICLES AT DIFFERENT DOSES ON VERY LATESOWN WHEAT CROP**

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A field experiment on wheat (*cv* HD3086) was conducted during Rabi 2021-22 at N. E. Borlaug Crop Research Centre, GB Pant University of Agriculture & Technology, Pantnagar, Uttarakhand to study the effect of potassium nanoparticles (K NPs) with different doses. The experiment was laid out in split plot design with three K NPs (K1, K2 and K3) as main plot factor and their five doses (D1: 100 ppm; D2: 200 ppm; D3: 300 ppm; D4: 400 ppm; D5: Control) as sub-plot factors. K NPs were synthesized at nano-technology lab, Department of Agronomy, Pantnagar. The size range (166.5-385.2 nm) was confirmed through Dynamic Light Scattering. The crop was sown on 13-01-2022. K NPs were sprayed at crown root initiation (20-25 DAS) and tillering stage (45 DAS). It was observed that there was not any significant difference between the yield obtained with different K NPs, however, highest yield was reported with K3 (14.3 q/ha). Among sub-plot treatments, all doses of potassium reported significant performance over control, however, highest yield was reported with K NP @ 300 ppm (15.77 q/ha).

**Key words:** Wheat, potassium, nanoparticles, split plot, doses, yield.

## Abstract- 5PSRM2022/057

### CARBON SEQUESTRATION POTENTIAL OF FORESTS OF UTTARAKHAND

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Climate change induced by increasing greenhouse gases (GHGs) emission is real and has started to affect us. Human activities have increased CO<sub>2</sub> concentration from 280 to 373 ppm in less than 200 years and world temperature by 0.6°C in the past 100 years. Carbon sequestration is useful as it controls the carbon addition in the atmosphere. The carbon sequestration potential of different forests was estimated over a three years period. All forests types between an elevations ranging between 400 m to 3500 m (treeline areas) were studied. The low lying sal had a carbon sequestration potential varying between 4.3 to 5.9 t ha<sup>-1</sup> yr<sup>-1</sup> whereas in chir-pine dominated forest the carbon sequestration was lower and ranged between 2.8 to 4.4 t ha<sup>-1</sup> yr<sup>-1</sup>. *Quercus leucotrichophora* dominated forests had a carbon sequestration potential close to sal forest and varied between 3.6 to 4.8 t ha<sup>-1</sup> yr<sup>-1</sup>. The higher altitude forests dominated by *Quercus semecarpifolia* and *Abies spectabilis* had marginally lower carbon sequestration rates than *Q. leucotrichophora* dominated forests. The soil organic carbon in the treeline forests was highest in the top soil layer (30cm) across all forest types (5.1-6.3%).

## Abstract- 5PSRM2022/058

### CONE MATURATION TIMING AND SEED GERMINATION IN *A. SPECTABILIS* NEAR THE TREELINE AREAS OF WESTERN HIMALAYA

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*A. spectabilis* D. Don commonly known as Himalayan silver fir which is found at an elevational range between 2800 and 4000 msl in the Himalayan region has a wide

distribution, but the forest has suffered severe depletion like logging and deforestation and is classified as 'Near Threatened' in the IUCN Red List. Lack of sufficient regeneration is a major problem in *A. spectabilis* in mountain forests. The aim of the present study to assess the seed maturity time and seed germination status of *A. spectabilis* in treeline areas. The study site was located at 30°49'22"N and 79°21'47"E between 3340 and 3560m elevation in the western Himalayan region of Uttarakhand. Physical parameters, cone/seed size, number of cone/seed, weight of cone/seed and mass of cone/seed were taken and germination was carried out in a dual chamber seed germinator for each collection date in laboratory. The tree density of *A. spectabilis* was 170 ind ha<sup>-1</sup>. The mean cone size between first and last collection varied from 1955.50±38.24 to 7267.74±12.50mm<sup>2</sup>, and mean seed size varied between 47.44±6.11 and 54.50±2.10mm<sup>2</sup>. The mass per 100 seed during maturity time was 6.22±0.33g. Maximum germination 46.33±2.67% occurred when the seed moisture content was 30.90±3.11%. At the treeline areas *A. spectabilis* is struggling for survival, growth and regeneration due to harsh climatic conditions and excessive anthropogenic pressure in the form of heavy grazing. The species requires proper conservation and management strategy, so that the seedlings and saplings could survive and replace adult trees in future. The present study is useful for assessing the exact maturation time of the species for future multiplication or the species in nurseries.

### **Abstract- 5PSRM2022/059**

#### **EFFECT OF PROMISING LIQUID MICROBIAL CULTURES ON GROWTH ATTRIBUTES OF MAIZE**

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Worldwide, many agricultural soils lack essential plant nutrients. Therefore, a big obstacle to producing food sustainably is the need for a lot of fertiliser. Until recently, the only way to supply these plant nutrients was through synthetic chemical fertilisers. Such chemical fertilisers raise the cost of crop production and are highly expensive. Chemical fertilisers also degrade soil and endanger the health of both people and agricultural animals. This study aims to evaluate the effect of microbial cultures on various growth parameters of

Maize and to compare the performance of different microbial cultures. The present study was conducted at college of Agriculture Biotechnology, Aurangabad, using randomized block design (RBD) with ten treatments. The seeds were collected from green gold seeds Pvt. Ltd. and used for experimentation. Maize seeds were treated with Compost, Vermicompost, Compost+Vermicompost, *Bacillus megaterium*, Biomix solid, *Azatobacter*, *Pseudomonas fluorescens*, *Pseudomonas striata*, control and Biomix liquid as per recommended doses. The sowing / dibbling was done immediately after treatments. Plant height, fresh weight and dry weight were recorded. Pot experiment showed that all the treatments significantly stimulated the growth of maize shoot length, stem girth, leaf length, root length and root weight. The observation recorded on germination revealed that seed treatment with ***P. fluorescens*** followed by seed treatment with ***Biomix liquid*** has recorded higher germination over control. ***P. fluorescens*** was found to be the best over other treatments viz, Compost, Vermicompost, Compost + Vermicompost, *Bacillus megaterium*, Biomix solid, *Azatobacter*, *Pseudomonas striata*, Biomix liquid.

**Key words:** Biomix, Biofertilizers, PGPR.

#### Abstract- 5PSRM2022/060

#### VARIATION IN SPECIES RICHNESS AND DIVERSITY IN DIFFERENT CANOPY COVER IN CHIR-PINE FOREST OF KUMAUN HIMALAYA

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The present study was carried out in the three canopy cover in Uttarakhand, Himalaya (India) to assess species richness and regeneration status of tree species. The study area was located between 29° 20' and 29° 30' N latitude and 79° 23' and 79° 42' E longitude between 13500-2000 m elevation in Uttarakhand, Himalaya. Species richness, diversity and distribution pattern of tree species were studied across different canopy cover in *Pinus roxburghii* forest. The forests were categorized into close canopy (>60%), moderate canopy (30-60%) and open canopy forest (<30%). A total of 32 tree species were found across all the canopy cover. Both tree species richness and diversity markedly across the

canopy, from open canopy to close canopy forest. Maximum species richness (28) was found from moderate canopy while minimum (24) from close canopy forest, Shannon Wiener index (2.06-2.23) were maximum close canopy and minimum in moderate canopy and concentration of dominance (0.38-0.43) were maximum in moderate canopy and minimum in close canopy forest. More than 90% of tree species showed regular distribution that is the most common distribution pattern in nature but it did not show any definite trend along the disturbance gradient. The present study revels that the anthropogenic disturbance causes disruption of forest structure and changes species composition which ultimately leads to reduction of tree species richness and diversity which is a major forest components.

#### **Abstract- 5PSRM2022/061**

#### **TREE VEGETATION ANALYSIS OF *CEDRUS DEODARA* (ROXB.) G. DON DOMINATED FOREST IN NAINITAL FOREST DIVISION OF UTTARAKHAND**

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*Cedrus deodara* (Roxb.) G. Don is a very large evergreen tree with dark green sometimes silvery foliage. The deodar is the most important timber tree of the western Himalaya. It is found throughout of western Himalaya from Afghanistan to Nepal at elevations varying from 1750masl to 2500masl generally associated with *Abies pindrow*, *Picea smithiana*, and *Pinus wallichiana*. The present phytosociology of *C. deodara* dominated forest stand deals with the species composition and distribution pattern of the different tree species with reference to density, frequency, TBA, IVI, diversity index and the concentration of dominance of tree in the forest of Kunjakhadak (2351masl, 29°29'19.9"N 79°21'01.2"E). Vegetation analysis was carried out by using systematic quadrat method. The total species richness in the forest was 5 species. The total density of trees was 633.33 ind ha<sup>-1</sup> out of which the density of *C. deodara* was 593.33 ind ha<sup>-1</sup> in the forest. The mean basal area and total basal area of *C. deodara* was 0.16 m<sup>2</sup>ha<sup>-1</sup> and 96.01m<sup>2</sup>ha<sup>-1</sup>, respectively. The distribution pattern of the forest was contagious. *C. deodara* had the maximum IVI

(262.79) in the forest among all species. The total species diversity of trees was 0.46 and the concentration of dominance which was 0.88.

**Key words:** *Cedrus deodara*; Vegetation; IVI and Diversity

**Abstract- 5PSRM2022/062**

**REGENERATION STATUS AND VEGETATION ANALYSIS OF *QUERCUS LANUGINOSA* FRANCH. DOMINATED FOREST IN NAINITAL FOREST DIVISION**

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*Quercus lanuginosa* Franch. family fagaceae is native to Southern and Southeastern Asia and Southwest China. It is an evergreen broad leaved tree species with concentrated summer leaf drop. It generally occurs in patches, usually associated with *Quercus leucotrichophora*, *Quercus floribunda*, *Rhododendron arboreum* and *Pinus roxburghii*. To study the regeneration status of *Q. lanuginosa* a study was been carried out in the forests of Nainital in two sites. The sites were located at Kilbury at an elevation of 2054masl (29°25'33"N 79°26'05"E) and 2235masl (29°25'18"N 79°26'23"E). Density, frequency, IVI, diversity index and the concentration of dominance for tree layer and density, frequency, PV, diversity index and the concentration of dominance for shrub layer and herb layer were calculated. The total tree density of both sites varied between 800ind ha<sup>-1</sup> and 1000ind ha<sup>-1</sup>. The individual tree density of *Q. lanuginosa* at both sites were 620ind ha<sup>-1</sup> and 670ind ha<sup>-1</sup>, respectively. The sapling density of *Q. lanuginosa* range between 30ind ha<sup>-1</sup> and 50ind ha<sup>-1</sup> and the seedling density was 2800ind ha<sup>-1</sup> and 3100ind ha<sup>-1</sup>. The shrubs density was higher at site01 whereas the herb density was higher at site02. The tree diversity varied between 1.33 and 1.60. It is apparent from the data that *Q. lanuginosa* is regenerating at seedling stage, however, there is a poor conversion of seedlings into saplings. The forest of *Q. lanuginosa* may be at risk in future if the present trend continues.

**Key words:** *Quercus lanuginosa*; Vegetation; IVI; Diversity and Regeneration

## Abstract- 5PSRM2022/063

### STRUCTURE, REGENERATION STATUS AND SEEDLING DYNAMICS OF FOREST TREE SPECIES OF NAINITAL CATCHMENT IN KUMAUN HIMALAYA

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The Himalayan forests are rich in biodiversity and distributed over a large extent from lower to higher elevation. The tree vegetation is the dominant components of Himalayan forests. These forests are crucial not only for the people living in the Himalayan region but also for many more living in the adjoining plains. Disturbance is a key component of all ecosystems which affects biodiversity in the region, species composition and other ecosystem activities. The regeneration dynamics, which transformation from seedling to adults is a major thrust area of the study. The aim of the present study was to assess the structure and regeneration status of tree and shrubs species in the Nainital catchment of Uttarakhand Himalayan region between 2044 to 2334m, asl. Vegetational analysis was carried out by placing quadrats and regeneration status was assessed based on number of seedlings, sapling and adults. For seedling dynamics study newly recruited seedling were tagged individually in 1 m<sup>2</sup> quadrat and the growth and survival of the tagged seedling subsequently monitored. Along the altitudinal gradient the total tree density varied between 490-690 ind. ha<sup>-1</sup> the individual density was maximum for *Cupressus torulosa* and also the dominant tree species in terms of IVI. Seedling density were recorded very low across all the sites while shrub's density varied from 520-780 ind. ha<sup>-1</sup>. Across the sites only 33.3% tree species showed good to fair regeneration status while 66.7% species showed poor to absent of regeneration. The moisture content percentage of soil across the sites and depths varied between 8.91-41.49%. The maximum seedling mortality were observed during winter season. *Q. floribunda* appeared to be surviving better than other species in the study sites.

**Keywords:** Density, Mortality, Regeneration, Seedling dynamics, Himalaya

### Abstract- 5PSRM2022/064

#### **PHYTOCHEMICAL SCREENING, *IN VITRO*ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITY OF *OSBECKIA STELLATA* BUCH.-HAM. EX D. DON**

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*Osbeckia Stellata* (traditionally known as "Sacred Forests") belonging to the family Melastomataceae has long been used traditionally by local herbal medicine practitioners as a remedy for a wide variety of diseases that included asthma, arthritis, diabetes, diarrhea, cancer, dysentery, hypertension, jaundice, leucoderma, malaria, rheumatism, skin disease, spondylitis, and tuberculosis. and as a toothache remedy. The present work was aimed to evaluate the antimicrobial and *in vitro* anti-inflammatory activity of crude extract of *Osbeckia stellata* and their phytochemical analysis. The crude extracts of *O. Stellata* aerial parts were phytochemically investigate using standard methods. Phytochemical screening showed the presence of various components. The antimicrobial activity was evaluated against six pathogenic microorganisms, four bacteria (two Gram-positive; *Bacillus subtilis* and *Staphylococcus aureus*, two Gram-negative; *Escherichia coli*, and *Pseudomonas aeruginosa*), and two fungi (*Aspergillus niger* and *Candida albicans*) using disc diffusion method. The anti-inflammatory activity was determined using egg albumin membrane denaturation assays. The antimicrobial and anti-inflammatory activity may be due to the presence of these phytochemical constituents.

**Keywords:** *Osbeckia Stellata*, Phytochemical screening, antimicrobial, anti-inflammatory

### Abstract- 5PSRM2022/065

#### **A PRELIMINARY STUDY OF SPIDER DIVERSITY IN A MIXED ORCHARD SYSTEM OF RAMGARH AREA OF DISTRICT NAINITAL, UTTARAKHAND, INDIA**

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Spiders play a very important role in ecology because of their exclusively predatory nature to regulate insect populations, as the availability of spiders in any place depends on the

incident of the number of insects in an area. Spiders are commonly found in almost every terrestrial habitat. They can be easily found on plants and trees, under stones or woods, in underground burrows, running on the ground, hanging from the spider silk, or just sitting on the webs. Most of the spiders remain camouflaged with their immediate environment. The present biodiversity study of spiders was carried out in a mixed Orchard system of Ramgarh area which lies in Kumaun region of Nainital district, Uttarakhand, India from May 2022 to August 2022. The investigation divulged the presence of 31 individuals, belonging to 9 genera, from 4 families which were identified on the basis of their distinguishing morphological characters and structure of the genitalia from the study site. The most dominating family of spiders was Araneidae that comprised a total of 19 individuals from 4 genera. The spider sampling was carried out by using visual searching and handpicking, ground hand collection, aerial hand collection, kerchief method, pitfall trap, beating and sweep netting method. These collected spiders were also classified into 4 ecological guilds on the basis of feeding behavior as observed from the study site namely diurnal space web weavers, diurnal aerial ambushers, nocturnal aerial ambushers, orb weavers in which majority of collected spiders were found to be orb weavers. This preliminary study gives base line information about the spider's diversity from unexplored Kumaun region of Uttarakhand.

**Keywords:** Spider, Orchard, Guild structure, Orb Weavers

#### **Abstract- 5PSRM2022/066**

#### **ANTHELMINTIC EFFICACY STUDIES IN DEERS OF DEHRADUN ZOO**

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Maintenance of wildlife population is an inevitable task; there are many managemental practices which need to be followed like balanced nutrition, adequate housing, proper sanitization practices along with timely treatment and control of parasitic diseases.

Indiscriminate use of anthelmintics for deworming of animals against gastrointestinal parasites has lead to development of anthelmintic resistance. Therefore prompt decision on usage of right drug based on its efficacy is essential. The study to compare the efficacies of drugs Ivermectin and Fenbendazole was conducted in the deers of Dehradun Zoo. As per the routine Zoo regime, Ivermectin was administered @0.2mg/kg body weight, orally mixed with concentrate and Fenbendazole was administered @7.5mg/kg body weight, orally mixed with concentrate. Faecal egg count was employed on the faecal samples collected from the animals using the modified McMaster method to quantify nematode egg burdens. The percent efficacy was recorded on days 7, 14 and 21 post treatment. A greater than 95% reduction in faecal egg counts, 14<sup>th</sup> day onwards in both the anthelmintic groups indicated that anthelmintic used is still beneficial. Both the anthelmintics can be used in a control program to maintain productivity.

### **Abstract- 5PSRM2022/067**

### **VEGETATION STRUCTURE AND COMPOSITION OF SPECIES IN VAN PANCHAYAT FOREST OF ALMORA DISTRICT OF KUMAUN HIMALAYA**

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This study deals with vegetation analysis of van panchayat forests of dominated by Pine (*Pinus roxburghii* Roxb.). The forest sites were located between 1100m to 1400m elevation in Tallimirai van panchayat village of Dwarahat block and Soangaon van panchayat village of Chaukhutia block in Almora district. Vegetation analysis of forest was carried out by using quadrat method. Tree, shrub and herb species were analyzed by using quadrat of size 10mX10m, 5mX5m and 1mX1m respectively. The van panchayat forest was divided into three sub-sites i.e. hill top, hill slope and hill base. The total 30 quadrats were placed randomly in each site (10 quadrats in each sub-site). The density of tree, sapling and seedling was 700, 50 and 157 ind/ ha, respectively in Tallimirai van panchayat while tree, sapling and seedling density was 373, 50 and 503 ind/ha, respectively in Soangaon van panchayat. The total basal area of all trees was 31.7m<sup>2</sup> /ha in Tallimirai and 35.6m<sup>2</sup>

/ha in Soangaon van panchayat has been recorded. Based on the finding, it has been concluded that van panchayat of Soangaon had been managed by the villagers in better way than Tallimirai van panchayat . So more care is needed to manage Tallimirai van panchayat from the factors like forest fire and encroachment from other villages.

**Key words:** Van Panchayat, *Pinus roxburghii*, Density, Basal area, Quadrat

**Abstract- 5PSRM2022/068**

**A REVIEW ON DAIRY PROCESSING INDUSTRY AND ITS ROLE AND CHALLENGES IN HIMACHAL PRADESH SOCIO-ECONOMIC DEVELOPMENT**

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The present paper deals with the dairy processing industry, role, scope and challenges in the dairy industry. India is the world's largest milk producer with 22 percent of global product. The dairy sector plays a crucial role within the socio-economic development of the country, and forms a crucial segment of the agricultural economy. Dairy is the single largest agricultural commodity with 4 percent share in the economy. The Indian Dairy market is amongst the largest and fastest growing markets in the world. India exports products like skimmed milk powder, casein milk, cream etc. However challenges faced by the dairy farmers are sourcing and logistics. The dairy industry provides livelihood to many households in rural areas, ensuring the availability of quality milk and dairy products to the people of both urban and rural areas. The industry is growing rapidly in line with the growing demand for milk and dairy products within the State. However State like Himachal Pradesh faces many challenges due to non availability of feed and fodder and veterinary problem. So there is great need of government interventions and improved technologies.

**Keywords:** Dairy products, Socio-economic development, rural economy

## Abstract- 5PSRM2022/069

### TO STUDY STANDARDIZED SUITABLE PROPAGATION METHODS OF *FICUS NERIIFOLIA*

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Propagation methods of *Ficus neriifolia*: There are different methods of propagation for *Ficus* spp. i.e., branch cutting, air layering and seed. For standardized of the propagation methods, we will be used branch cutting method. Fewer people have done research work in *Ficus neriifolia* spp. in Garhwal Himalaya (Uttarakhand). This is one of the most important spp. among all the rest spp. of *Ficus neriifolia* for fodder purpose. The foliage of *Ficus neriifolia* is used as fodder and its wood used as fuel. The juice of the stem bark is used as a folk remedy for conjunctivitis boils. Propagation by branch cutting: Fresh, suitable size and seasonal branch cutting will be collected from natural habitat at selected site. Collected branch cutting will be sowing in the experimental site in department under open/controlled condition. Branch cutting will be planted in suitable size of polybag. Number of treatments i.e. growth hormones (IAA, IBA etc.), soil medium, season and position of branch cutting etc. will be used of the species. In mist chamber we put different cutting of different site and also gave them different hormones. Every week we note down its readings. In which we saw that the best result has come in the cutting of the control.

## Abstract- 5PSRM2022/070

### ROLE OF AGROFORESTRY IN ENVIRONMENTAL AMELIORATION

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The increased pressure on world natural resources which arises from population growth as well as economic pressure has lead to unsustainable use of natural resources and environmental instability. This fluctuating nature of the world climate has caused lot of

environmental problems. These negative effect on world ecosystem requires a pivotal attention. Carbon management is a serious concern confronting the world today. A number of summits have been organized regarding this subject. The current level of carbon in the atmosphere is about 416 ppm. It is estimated that if the carbon increases in the atmosphere at the present rate and no constructive efforts are pursued to lessen the same, the level of carbon in the atmosphere would go upto 800-1000 ppm by the end of year 2100 which may create havoc for all living creatures on earth. The issues related to environment management have been given requisite importance in the overall policy and planning for balanced development of the country. Article-48 A of the constitution under part IV- Directive principles of state policy prescribes for protection and improvement of environment and safeguarding of forests and wildlife. Agroforestry plays an important role in reducing level of greenhouse gas emissions vis-à-vis atmospheric CO<sub>2</sub> via carbon sequestration. Carbon sequestration potential of agroforestry systems has attracted worldwide attention following the recognition of agroforestry as a greenhouse gas mitigation strategy under the Kyoto Protocol. Agroforestry can play a remarkable role in the adaptation to climate change because it improves microclimate, protect the soil loss, improve soil fertility, reduce carbon emission and increase carbon sequestration. Hence Agroforestry systems are highly recommended as solution to environmental problem and to promote the mitigation and adaptation synergy in addressing climate change.

**Keywords:** Sustainability, Environment, Role, Agroforestry, carbon sequestration.

#### **Abstract- 5PSRM2022/071**

#### **ROLE OF NON-TIMBER FOREST PRODUCTS (NTFPS) IN INCOME AND EMPLOYMENT IN KINNAUR DISTRICT OF HIMACHAL PRADESH**

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Non-Timber Forest Products (NTFP) can fulfill community needs and improve rural livelihood in Kinnaur forest division although its importance has not been fully introduced

within government frameworks and rural development policies and programs. Therefore this study deals with the role of NTFPs in income and employment in the study area. A multistage random sampling technique was employed for the study area; where four beats were taken randomly, 25 samples from each block viz. a sample of 100 households were taken in the study area. Results revealed that the average family size of examined area comprised of 5.21, out of whom 48 percent were males and 52 per cent were females. Literacy situation revealed that nearly 82.74 percent family members were literate at overall level with a literacy index of 3.91, indicating good quality of education in the study area. However in the occupational structure of sampled households agriculture (72.08%) was found to be the primary activity done by the sampled households followed by services (20.74%) and business activity (7.18%). NTFPs' contributed about 13.24 percent to the total farm income. On an overall level average land holding of the study area was found to be 1.81 hectare where orchard land were sharing maximum area (1.20 ha) in the study area. NTFPs collection generated on an average 44.83 mandays of employment to sampled households. Moreover, inclusion of NTFPs' income in the farm income resulted in reducing the income inequalities as Gini coefficient with NTFPs income was 0.20 and without NTFPs income was 0.41.

**Keywords:** NTFPs, Income, Employment, Gini coefficient, Kinnaur

#### **Abstract- 5PSRM2022/072**

#### **EFFECT OF GAMMA RADIATION AND SURFACE EDIBLE COATING ON LITCHI FRUIT CV. ROSE SCENTED TO ENHANCE THE SELF-LIFE AND QUALITY OF THE FRUIT**

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Litchi is the most vital sub-tropical evergreen tree and most famed fit for human consumption fruits of the soapberry family, Sapindaceae. It is botanically known as *Litchi chinensis* Sonn. (Nephelium litchi Cambess) (Menzel, 1985). The increasing demand for fresh fruits challenges researchers and industry to develop advanced methods for maintaining

fruit quality and extending shelf life. Consumers around the world demand chemical-free fresh fruits with high quality and nutritional value(Mahajan *et al.*, 2018). Irradiation technology has been used extensively in fruits and vegetables for enhancing shelf life and retaining quality parameters during storage. The joint expert committee of FAO, IAEA and WHO has approved the permissible dose of up to 10 kGy in foodprocessing asit hasno hazardous effecton nutrition andmicrobes (Khalil *et al.*, 2009). Aloe vera commonly referred to as a "medicinal plant", is known for its wide range of therapeutic properties. The most common species are *Aloe barbadensis* and *Aloe arborescence*. (Eshun and He, 2005). The present investigation was an attempt to enhance the shelf life of litchi fruit var. rose scented with integrated gamma radiation and *aloe vera* gel treatments. Out of all, 1 kGy irradiated samples, proved to be the best with an enhanced shelf life of 24 days at 4°C followed by 50 % *aloe vera* gel (shelf life at ambient temperature without any treatment being 3–4 days). Various biochemical parameters were testedandorganoleptic evaluation was done to judge the acceptability of the stored litchi samples. The radiation dose of 1 kGy and 50 % *aloe vera* gel was found to be the effective dose in which enhanced shelf life was achieved without any deterioration of various quality attributes.

**Keywords:** post-harvest, gamma radiation, quality, organolaptic

#### **Abstract- 5PSRM2022/073**

#### **VEGETATION STRUCTURE AND COMPOSITION OF SPECIES IN VAN PANCHAYAT FOREST OF ALMORA DISTRICT OF KUMAUN HIMALAYA**

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This study deals with vegetation analysis of van panchayat forests of dominated by Pine (*Pinus roxburghii* Roxb.). The forest sites were located between 1100m to 1400m elevation in Tallimirai van panchayat village of Dwarahat block and Soangaon van panchayat village of Chaukhutia block in Almora district. Vegetation analysis of forest was carried out by using quadrat method. Tree, shrub and herb species were analyzed by using quadrat of size 10mX10m, 5mX5m and 1mX1m respectively. The van panchayat forest was divided

into three sub-sites i.e., hill top, hill slope and hill base. The total 30 quadrats were placed randomly in each site (10 quadrats in each sub-site). The density of tree, sapling and seedling was 700, 50 and 157 ind/ ha, respectively in Tallimirai van panchayat while tree, sapling and seedling density was 373, 50 and 503 ind/ha, respectively in Soangaon van panchayat. The total basal area of all trees was 31.7m<sup>2</sup> /ha in Tallimirai and 35.6m<sup>2</sup> /ha in Soangaon van panchayat has been recorded. Based on the finding, it has been concluded that van panchayat of Soangaon had been managed by the villagers in better way than Tallimirai van panchayat. So, more care is needed to manage Tallimirai van panchayat from the factors like forest fire and encroachment from other villages. Key words: Van Panchayat, *Pinus roxburghii*, Density, Basal area, Quadrat

#### **Abstract- 5PSRM2022/074**

#### **PLANTS THAT HEAL**

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Depression is a leading cause of disability around the world and contributes greatly to the global burden of disease. The effects of depression can be long-lasting or recurrent and can dramatically affect a person's ability to function and live a rewarding life. Engaging in a green environment has significantly higher positive effects as its restorative characteristics could mitigate stress and aid in psychological and physiological health, resulting in a positive influence on mental health and even cognitive functions. Greenspaces are often used for structured therapeutic interventions for vulnerable groups of individuals living with mental illness. Interventions include wilderness therapy, social and therapeutic horticulture, facilitated environmental conservation, care farming, ecotherapy, nature-based arts and crafts. A significant amount of research shows uses of medicinal plants in the management of various mental illnesses. Here are some psychotropic herbal medicines for treating MDD. *Curcuma longa* (turmeric) It halts neuroprogression of neuropsychiatric disorders via reducing inflammation, oxidative stress, mitochondrial dysfunction, and restoring depleted levels of BDNF. It reduces general inflammation via modulation of pro-

inflammatory cytokines, perhaps one pivotal mechanism of treating depression. Data shows increased BDNF levels and modulation of the HPA axis, eliciting a cascade of secondary therapeutic effects throughout the cortex, leading to an improvement in symptoms. Its administration reverses abnormal neurotransmission and deficits in serotonin, norepinephrine, and dopamine, decreasing the elevated concentrations of 5-HIAA and DOPAC. Elicits neurorestorative effect by maintaining homeostasis of neurotransmitters, regional activation, and metabolism. Administered appears to ameliorate cognitive deficits. Restoration of neurocognitive function is by altering the signaling of tumor necrosis factor  $\alpha$  receptor 2 (TNFR2). It appears to act as an antioxidant by lowering and modulating the functionality of oxidative and nitrosative stress, thereby reducing free radical damage and improving mood. *Hypericum perforatum* (st john's wort) Affects are on the nervous system by calming and restoring the natural functioning of the brain. It's an inducer of CYP 3A4 and possibly the P-glycoprotein transporter. Data indicates that St John's wort decreased the blood concentrations of amitriptyline, cyclosporine, digoxin, fexofenadine, indinavir, methadone, midazolam, nevirapine, phenprocoumon, simvastatin, tacrolimus, theophylline, and warfarin. *Crocus sativus* (saffron) It's a gentle but powerful option having serotonergic and antioxidant properties as it acts as an SSRI and helps in the production of serotonin and dopamine. Direct effects are seen for creating glutathione and other powerful antioxidants, reducing oxidative stress, and increasing the production of important neurotransmitters. Stigmas contain vitamin B2, carotenoids,  $\alpha$ -crocetin, glycoside crocin, picrocrocin, aglyconesafranal, the antioxidant carotenoids lycopene, and zeaxanthin. Antidepressant effects are because of crocin and ethanolic extracts. Keywords - Mental health, psychopharmacology, herbal antidepressant, anxiolytic and hypnotic psychopharmacology, psychotropic herbal medicines, stress, anxiety, depression, depressive symptoms, mood disorder. References.

**Abstract- 5PSRM2022/075**

**IMPACT OF FOREST FIRE ON GROUND FLORA IN *PINUS ROXBURGHII*SARG. (CHIR PINE) FOREST OF MUSSOORIE FOREST DIVISION**

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Seasonal studies were conducted on the ground flora consisting of herbs and shrubs in *Pinus roxburghii*(chir pine) dominated forests at Ringalgarh area of Mussoorie Forest Division, Uttarakhand. Phytosociological parameters and diversity of herbs and shrubs and regeneration status of trees were studied on areas that face the problem of forest fire and areas that were not burnt in the past one decade. Observations were made pre fire and post fire season in May 2018, August 2018, November 2018 and February 2019, February and May being the worst fire affected month. It was found that Simpson's Diversity Index for herbs was lower in burnt area throughout the year that varied between 0.39 in February and 0.49 in the month of August. Herb density reached a maximum of 84000 individuals/ha in August and remained lowest 14000/ha in May. On the other hand, Simpson's Diversity Index for herbs in the unburnt area reached the highest at 0.77 and density of 96000 individuals/ha in the month of August. The lowest diversity of 0.41 and density of 38000 for herbs individuals/ha was recorded in February for unburnt areas which is higher compared to burnt area. Similar trends were recorded with respect to Shannon-Weiner's Index also. Dominant species in both burnt and unburnt areas across different seasons comprised of *Chrysopogon fulvus*. Simpson's Diversity index for shrubs in burnt areas were found to be lower varying between 0.59 in May to 0.72 in August. On the other hand shrub diversity was recorded to be higher in the unburnt chir pine forests across all the four seasons with Simpson's Diversity Index varying from 0.78 in February to 0.85 in August. Similarly shrub density in the month of May was lower at 1120 individuals/ha in May for burnt areas while it stood at 3520 individuals/ha in the same period in the unburnt areas. The most dominant shrub species in unburnt are comprised of *Rubus ellipticus* and *Berberis aristata* while the burnt areas were mostly dominated by

*Eupatorium adenophorum* an invasive alien species. Forest fire was also found to have impact on the regeneration status of the major tree species chir pine. It was seen that there were no seedlings at all in the burnt areas during peak fire season as they were burnt down. The regeneration status of chir pine trees was found to be better in the unburnt areas in comparison to the burnt areas. Thus, it is evident that forest fire in chir pine forests have profound impact on herb and shrub population and also the regeneration of chir pine.

**Key words:** Forest fire, herbs and shrubs diversity, regeneration status, Simpson's Diversity Index, chir pine forest

#### Abstract- 5PSRM2022/076

#### IMPACT OF DIFFERENT SOURCES OF NITROGEN ON SOIL PROPERTIES AND APRICOT YIELD UNDER SANDY LOAM SOIL TEXTURE

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Low crop productivity in sandy loam soils may be caused by nitrogen losses. For this region, maintaining nitrogen levels is crucial. The findings demonstrated that by reducing 20% of the nitrogen from chemical fertilizers and replacing it with the equivalent amount of nitrogen from vermicompost enhanced soil characteristics and crop production. Correlation studies revealed that a negative association between soil pH and available nitrogen. Soil enzymes including urease, dehydrogenase, alkaline phosphatase, and microorganisms like *Azotobacter*, phosphorus-solubilizing bacteria, and Actinomycetes, were observed to positively correlate with organic carbon. A moderate to high association between soil microorganisms and enzymes was also anticipated, with the exception of *Azotobacter*, acid phosphatase, and alkaline phosphatase. Yield predictions have less variability with organic carbon than available nitrogen. The principal components analysis explained 88.5% of soil data variation in first three principal components. Phosphate solubilizing bacteria, organic carbon, available potassium, available nitrogen, acid and alkaline phosphatase are essential for evaluating soil characteristics and fruit productivity.

**Keywords:** Nitrogen sources; soil properties; vermicompost; productivity

## Abstract- 5PSRM2022/077

### GROWTH AND PRODUCTION OF CHAMOMILE (*MATRICARIACHAMOMILLA L.*) UNDER THE INFLUENCE OF CERTAIN TYPES AND DOSES OF ORGANIC MANURES

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An utmost attempt was made to investigate the response of Chamomile (*Matricaria chamomilla L.*) to certain types and doses of organic manures at under open condition at Medicinal and Aromatic Plants Research Block, College of Horticulture, VCSG Uttarakhand University of Horticulture and Forestry, Bharsar, Pauri Garhwal, Uttarakhand during the year 2019-2020. The study comprised of ten different treatment levels constituted by varying doses of three different organic manures viz., T<sub>2</sub> (FYM @ 15 t/ha), T<sub>3</sub> (FYM @ 20 t/ha), T<sub>4</sub> (FYM @ 25 t/ha), T<sub>5</sub> (compost @ 10 t/ha), T<sub>6</sub> (compost @ 15 t/ha), T<sub>7</sub> (compost @ 20 t/ha), T<sub>8</sub> (vermicompost @ 2 t/ha), T<sub>9</sub> (vermicompost @ 3 t/ha) and T<sub>10</sub> (vermicompost @ 4 t/ha) and T<sub>1</sub> as kept as check treatment (control). The treatments were replicated thrice in a plot having dimensions 1 m × 1 m and a spacing of 20 cm × 20 cm was followed. The experiment was laid out in a randomized complete block design (RCBD). Chamomile seeds were sown during the first week of September, 2019 in the nursery beds and 45 days old seedlings were transplanted when the seedling attained about 10-15 cm in length during October, 2019 under open field condition. The soils of the experimental site were tested optimum with respect to some of the basic physical and chemical properties viz., bulk density, porosity, water holding capacity, moisture content, pH, EC and oxidizable organic carbon. The results revealed that maximum plant height (48.26 cm), number of branches per plant (35.40) and plant spread (33.09 cm) were significantly higher under T<sub>4</sub> (FYM @ 25 t/ha) application at 180 days after transplanting. Application of T<sub>10</sub> (VC @ 4 t/ha) produced early flowering (119.73 days). At bud initiation stage the highest total fresh (33.12 q/ha) and dry (7.59 q/ha) biomass yield were found in T<sub>4</sub> (FYM @ 25 t/ha). At flowering stage maximum value of total fresh (60.02

q/ha) and dry (12.70 q/ha) biomass yield were found in T<sub>10</sub> (VC @ 4 t/ha). The results, further revealed that T<sub>10</sub> provided the fastest crop growth rate (0.86 g/m<sup>2</sup>/day). The greatest fresh flower yield (67.35 q/ha), dry flower yield (13.95 q/ha) and maximum cost :benefit (1:3.56) were obtained in plots which received FYM @ 25 t/ha. All the organic input treatments performed better over control and the treatment T<sub>4</sub> shall be recommended for better chamomile production with maximum benefit derived per unit cost invested, especially under organic growing condition.

**Keywords:** Chamomile (*Matricaria chamomilla* L.), FYM, compost, vermicompost, cropgrowth rate, flower yield, cost :benefit

#### **Abstract- 5PSRM2022/078**

#### **IMPACT OF CLIMATE CHANGE ON SPICES CULTIVATION**

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Agriculture is always vulnerable to unfavourable weather and climate conditions. The changing climate is having its effects in many parts of the India causing serious problems from the last few years. Like many agricultural and horticultural crops,, spice crops are also facing the brunt of climate change. India has a well-known reputation as a Land of Spices from time immemorial explorers and foreign Invaders from European countries for attractive mainly by the spices of India. Spices are cultivated in varied agro-climatic regions from tropical to temperate. India is blessed with different climatic situations and every state in India promotes one or the other spices. Black pepper, cardamom, nutmeg, ginger, turmeric and clove were the major spice crops of India. The unprecedented heavy rains, storms and floods affect to the agriculture sector. Directly or indirectly affect different physiological growth stages like flowering, fruit setting, fruit development, seed setting and yield of spice crops. High temperature causes spike shedding in pepper, dry season may cause reduced pollination and abortion of cardamom flowers also dangerous to plant growth. High rainfall and humidity invite pests like aphid and diseases like

powdery mildew in most of the seed spices viz., coriander, fenugreek, cumin, etc. The stress effect of environment also influences the seed production and storage life of the spice crops. The global demand for a variability of spices has sustained to rise in the past few years due to the vast increase in the consumption. Crop management aspects such as water conservation, irrigation, organic management, mulching, situation specific cropping system etc. have to be followed to modulate the weather effects. Proper maintenance of shade trees can minimize the impact of frost and act as safeguard against wind erosion or landslides to protect the spices crops.

#### **Abstract- 5PSRM2022/079**

#### **EFFECT OF NANO-ZN ONQUALITATIVE PROPERTIES AND YIELD OF GUAVA (*PSIDIUM GUAJAVA L.*) CV VNR BIHI**

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The comparative performance of nano-enabled Zn fertilization against control was carried out in Guava (*Psidium guajava L.*) cv VNR bihi between late august to December 2021. Four foliar ZnO nanoparticles doses were included in the trial procedure. The treatments were laid out in Randomized Block Design and replicated thrice. The treatments were comprised of T1: control, T2: ZnO Nanoparticles at 50ppm, T3: ZnO Nanoparticles at 100 ppm, T4: ZnO Nanoparticles at 150 ppm, T5: ZnO Nanoparticles at 200 ppm. Observations fruit yield and quality attributes were recordedNanotechnology has a wide range of applications. The results indicated that foliar application of ZnO Nanoparticles at 100 ppm improved qualitative traits and yieldofGuava fruit. This higher dose of ZnO Nanoparticles also registered significant increase in fruit set, yield and metabolic content of strawberry fruits compared to control and lower dose of Zn nutrient analogues. The study also inferred that use of nano-Zn have shown promising effects to improve cropping behavior of Guava cv. VNR bihi which could be an alternative to conventional Zn nutrient sources.Zn nano particles also increase photosynthetic rate and enhance tryptophane synthesis which is precursor of auxin ultimately increase the productivityand quality of guava fruit.

**Keyword:** Nanotechnology, photosynthetic rate, Tryptophane,metabolic,productivity

## Abstract- 5PSRM2022/080

### ROLE OF OLIVE OIL AND ALOE VERA GEL IN ENHANCING QUALITY AND SHELF LIFE OF BER FRUITS

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Ber (*Ziziphus mauritiana* Lamk.) is an indigenous and economically important tropical fruit which is also known as Indian jujube, belonging to the family Rhamnaceae. More than 300 varieties of Ber have been listed in India, but only few of them are commercially important. This work was planned to evaluate Aloe vera gel and olive oil edible coating to enhance its shelf life and minimize post-harvest losses. Physico-chemical parameters of fruits were analyzed and recorded at 7th day interval. The study revealed that both olive oil and Aloe vera gel coatings were effective in maintaining quality of Ber fruit during storage period of 35 days. Minimum physiological weight loss, lesser loss in acid contents were observed in olive oil treated fruits along with maximum color retention compared to uncoated fruits. Coatings delayed ripening. Ascorbic acid loss and decay percentage were reduced by using different concentrations of olive oil and Aloe vera gel. Based on results deduced from the present study, it is concluded that application of Aloe vera gel and olive oil is better coating material but olive oil 100% and Aloe vera 75% along with ascorbic acid proved best so, these coatings could be applied to enhance fruit shelf life and quality.

**Keywords:** Coatings; Fruit quality; Physico-chemical analysis

## Abstract- 5PSRM2022/081

### MAIZE (ZEA MAYS L.) GENOTYPES DIVERSITY STUDY BY USING INTER SIMPLE SEQUENCE REPEAT (ISSR) MARKERS

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In maize the evaluation of genetic diversity is a pre-requisite for the production of diverse inbred lines and has a pivotal importance for the development of transgressive hybrids. The study of genetic diversity can be performed by using different methods such as

phenotypic and molecular characterization of various genotypes. Among them the phenotypic marker based analysis is time consuming and influenced by environmental factors but molecular approach has greater genome coverage and generally considered to be independent of environmental influences. The ISSR system is the most efficient and reproducible among different molecular marker system and useful for identifying diverse genotypes from a group. The present study was conducted to estimate genetic variation at the molecular level among maize genotypes using a set of ISSR markers. The ISSR marker UBC-803 was found most reliable and discriminating for diversity analysis of maize genotypes. On the basis of UPGMA cluster analysis the genotype Asian-1232 and Rashi-3496 were found more diverse pair among the group of maize genotypes. Hence, the most diverse pair of genotype can be used for crossing programme lead to development of a novel variety. These results can be helpful regarding genetic similarity of the various maize genotypes and genetic variation data would be very useful for improvement of the maize through conventional breeding programs as well as modern molecular breeding approaches.

### **Abstract- 5PSRM2022/082**

#### **VARIABILITY IN PHYSICAL AND CHEMICAL PROPERTIES OF PALMYRA PALM (*BORASSUS FLABELLIFERL.*)WOOD**

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The present study investigated the axial and radial variation in physical properties (specific gravity and colour) and chemical composition (holocellulose, alpha-cellulose, lignin, extractives and ash content) of *Borassus flabellifer* L. (Palmyra palm) wood. Two trees having approximate height of 31 feet were felled down and the trunk of each tree was divided into three parts along its length and marked as bottom, middle and top, and from each part, a 2-inch-thick disc was taken out. From each disk, radial strips of 2 cm width were taken out and samples from different positions i.e. position near centre (NC),

intermediate position (I) and position near bark (NB) were prepared for different analysis. An increasing trend in specific gravity from centre to periphery has been observed at all tree height levels. The highest specific gravity (0.80) was observed for middle position whereas lowest specific gravity (0.57) was obtained for samples from bottom position. Result of colour analysis has shown a decreasing trend in lightness and yellowness of the wood samples from centre to periphery position at all tree height levels. Estimated holocellulose, alpha-cellulose and lignin content ranged from 67.10-71.1%, 45.15-48.5% and 25.38-26.43% respectively. Highest holocellulose and alpha cellulose was observed for bottom position of the tree whereas minimum content of holocellulose and alpha-cellulose was observed in top and middle portion respectively. Estimated lignin content was found maximum for middle portion of tree (~26.02%) followed by top (~25.91%) and bottom portion (~25.24%). Extractive content in samples from top (3.17 %) and bottom (3.16 %) position was found almost similar whereas the middle portion was having the lowest extractive content (3.02%). Total ash content was found maximum in middle position (1.35 %), followed by top (1.29 %) and bottom position (1.24 %). Palmyra palm wood, particularly from middle position of tree having high specific gravity could be efficiently utilised for different end uses like for furniture, constructional purposes etc. Also, presence of significant amount of holocellulose and cellulose, provides multiple avenues for utilising the wood for pulp and paper production. Overall, it can be concluded that the palmyra palm wood can be effectively utilised for mitigating the gap between demand and supply of wood and wood products.

**Keywords:** Palmyra palm, colour, specific gravity, holocellulose, alpha-cellulose, lignin, ash content, extractive content

## Abstract- 5PSRM2022/083

### PROTECTED FLOWER CULTIVATION IS A BOON: AN ECONOMICAL ANALYSIS IN THE SIRMOUR DISTRICT OF HIMACHAL PRADESH

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India is one of the key players in the global floriculture scene, according to research (Gcharge et al., 2011). There is an obligation to use modern crop production methods like protected cultivation as a result of factors like population growth, climate change, increased demand for high-quality produce, shrinking land holdings and increased pressure on resources. The objective of this study is to discuss the socio economics status of flower growers, economics of protected cultivation technology of flower crops and problems faced by the growers in Sirmour District of Himachal Pradesh. In the study area, the average family size, sex ratio and literacy rate were found to be 5.14 persons, 761 and 92.45 per cent respectively. The Costs A<sub>1</sub>, B<sub>2</sub>, D, gross income, net income and output input ratio in case of carnation cultivation under protected conditions were ₹242.87, ₹255.67 and ₹302.75 per square metre, ₹898.45, ₹595.70 and 2.96 respectively, whereas, in case of lilies, Cost A<sub>1</sub>, B<sub>2</sub>, D, gross income, net income and output input ratio were ₹756.98, ₹853.86 and ₹954.34 per square meter respectively, ₹2675.88, ₹1721.54 and 2.80 respectively. The main problems faced in the study area were lack of availability of healthy planting material, Lack of availability of regulated market, Lack of availability of chemicals and irrigation and shortage of skilled labour.

**Keywords:** Flower crops, economics, returns, CACP concepts, profitability, problems.

## Abstract- 5PSRM2022/084

### RESOURCE UTILIZATION PATTERN AND DEPENDENCY OF VAN GUJJARSON THE FORESTS OF TARAI REGION OF UTTARAKHAND

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Van Gujjars are the nomadic pastoral community and mostly live in Northern part of the India. The present study was conducted on the Van Gujjars inhabiting the tarai region of Uttarakhand, India. Three different settlements of Van Gujjars were selected for the assessment of forest resource utilization pattern by using pre-structured questionnaire. A total of 81 households were interviewed all across the study area. The average household size was  $12.57 \pm 7$  in the study area. The literacy rate was 69.22% among all three settlements of Gujjars. The major source of income was dairy production (91.36%) followed by private jobs (5.56%) and employment as labour (4.94%). The average adult cattle unit was  $24.19 \pm 6.6$  per household. More than 90% of their fuel wood and fodder is obtained from the surrounding forests. The average fuelwood and fodder consumption per household was  $25.86 \pm 3.8$  kg/day and  $186.27 \pm 50.82$  kg/day, respectively. A total of 25 tree species were being used by the Van Gujjars for fodder, fuelwood, household articles, medicine, fibre and other products. Lack of energy sources and enormous fodder demand of Gujjar community for livelihood are the major factors of high dependency on the forest resources.

**Keywords-** Van Gujjars, Pastoral community, Forest resource, Fodder, Fuelwood

## Abstract- 5PSRM2022/085

### **COMPARATIVE STUDY OF LARVICIDAL ACTIVITY OF ESSENTIAL OILS OF *CYMBOPOGON FLEXEOUS* (LEMON GRASS) AND *TAGETES ERECTA* (MARIGOLD) AGAINST THIRD INSTAR LARVAE OF *AEDES AEGYPTI* (LINNAEUS, 1762) LARVAE**

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In view of the recently increased interest in developing plant origin insecticides as an alternative to chemical insecticide, this study was undertaken to assess the larvicidal potential of the essential oil *Cymbopogon flexeou*s (lemongrass) and *Tagetes erecta* (marigold) against medically important mosquito vector, *Aedes aegypti*. Essential oil was hydro distilled in the laboratory from the plants obtained from the CAP. Bioefficacy of the essential oil was evaluated under laboratory conditions using third instar mosquito larvae. The LC<sub>50</sub> values of *Cymbopogon flexeou*s are 136.8, 52.736 and 24.056 ppm after 12, 24 and 48 h of exposure respectively. The LC<sub>50</sub> values of *Tagetes erecta* are 81.765, 48.951 and 17.729 ppm after 12, 24 and 48 hours of exposure respectively. Chi-square values were significant at p<0.05 level. The essential oil of *Cymbopogon flexeou*s found effective to control the larvae. Such findings would be useful in promoting research aiming at the development of new agent for mosquito control based on bioactive chemical compounds from indigenous plant sources as an alternative to chemical larvicides.

**Key words:** Essential oils, *Aedes aegypti*, Lethal concentration, Probit analysis, Relative potency

## Abstract- 5PSRM2022/086

### SUSTAINABLE AGRICULTURE

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Agriculture is the world's largest industry. It employs more than one billion people and generates over \$1.3 trillion dollars' worth of food annually. Pasture and cropland occupy around 50 percent of the Earth's habitable land and provide habitat and food for a multitude of species. When agricultural operations are sustainably managed, they can preserve and restore critical habitats, help protect watersheds, and improve soil health and water quality. Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Making the transition to sustainable agriculture is a process. For farmers, the transition to sustainable agriculture normally requires a series of small and realistic steps. Sustainable agriculture frequently encompasses a wide range of production practices, including conventional and organic. A regionally integrated system of plant and animal production practices is intended to yield long-term effects like production of enough human food, feed, fiber, and fuel to meet the needs of a rapidly increasing population, protection of the environment and expansion of the supply of natural resources and maintenance of agricultural systems' ability to generate income. Agriculture often places significant pressure on natural resources and the environment. Sustainable agricultural practices are intended to protect the environment, expand the Earth's natural resource base, and maintain and improve soil fertility. But unsustainable practices have serious impacts on people and the environment. The need for sustainable resource management is increasingly urgent. Demand for agricultural commodities is rising rapidly as the world's population grows. Agriculture's deep connections to the world economy, human societies and biodiversity make it one of the most important frontiers for conservation around the globe.

## Abstract- 5PSRM2022/087

### **IMPACT OF INORGANIC AND ORGANIC MULCHES ON WEED GROWTH AND SOIL PROPERTIES IN POMEGRANATES**

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The current research was carried out between 2017 and 2018 at the experimental farm of HR&TS and KVK Kandaghat in Jadari, Dr. YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh. Mulches, like grass mulch, coir mulch mat, silver polyethylene mulch, black polyethylene mulch, and red polyethylene mulch, were used in this study. Results showed that black polyethylene mulch had the highest soil moisture and temperature readings. The most successful weed control method was nylon mulch mat, which was followed by silver and black plastic mulch. The soil properties were recorded greater under grass mulch. Under the black polyethylene mulch, the soil hydrothermal regimes were substantially higher. This provides better prevention of soil water evaporation and retaining soil moisture under rainfed farming.

**Keywords:** Mulches, soil temperature, soil moisture, weed growth, hydrothermal

## Abstract- 5PSRM2022/088

### **SPECIES COMPOSITION OF VAN PANCHAYAT FOREST IN NAINITAL OF KUMAUN HIMALAYA**

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Present study aims to assess vegetation structure and regeneration status of Van panchayat forest of Kumaun Himalaya. The study was conducted between 900- 1200 masl in Nainital district of Kumaun Himalaya. The van panchayat forest site was divided into three sub parts- hill top, hill slope and hill base. Vegetation was analyzed by using quadrat method. The size of quadrat was 10X10m for tress, 5X5m for shrub, and 1X1m for herb. In

each site, total 30 quadrats were randomly placed for the analysis of various parameters i.e., density, frequency, abundance, Important value Index and diversity index. The density was 517 Ind.ha-1 for trees, 43 Ind.ha-1 for saplings and 32 Ind.ha-1 for seedlings. *Pinus roxburghii* was recorded as dominant tree species at the study site. Shannon – Weaver diversity index ( $H'$ ) was 3. 1. However, shrubs and herbs were completely absent in summer season. It is assumed that forest fire was the major reason of absence of under canopy species. Therefore, forest required judicious management and proper control measures of forest fire particularly in summer season. **Keywords:** Van Panchayat, *Pinus roxburghii*, Species composition, Density of species, Shannon – Weaver diversity index

#### **Abstract- 5PSRM2022/089**

#### **ANTIFEEEDANT AND GROWTH INHIBITORY ACTIVITY OF SOME BOTANICALS AGAINST *SPODOPTERA FRUGIPERDA***

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FAW has been identified as a notorious polyphagous pest with high migration ability, a wide range of hosts, voracious larval feeding, and high fecundity. This pest is known to cause heavy economic damage to crops. Botanicals have proved to be an important tool in the IPM system. It appears to be very promising because of its abundance, biodegradable nature and much safer for mammals and higher animals due to its lower or no mammalian toxicity. In the present study, the crude aqueous extract of six indigenous plants (neem seed kernel extract, nirgundi, lantana, datura, arusha and madar) and two plant oils (neem and karanj) were investigated for their larvicidal, antifeedant and growth inhibitory activities against the third instar larvae of *Spodoptera frugiperda* under laboratory conditions. The experiment was designed in a Completely Randomized Design with nine treatments and three replications. One replication consists of fifteen larvae. Among all the treatments, maximum antifeedant activity and larval mortality was recorded in neem oil (54.41 and 93.33 %), while minimum in madar (7.01 and 41.11 %). Larval and pupal period significantly prolonged in neem oil (13.99 and 10.62 days) treatment compared to

other treatments. Overall result revealed that neem oil has good potential to control *S. frugiperda*.

**Keyword:** Antifeedant, Crude, Biodegradable, Growth inhibitory, *Spodoptera frugiperda*.

### **Abstract- 5PSRM2022/090**

#### **EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON YIELD ATTRIBUTES AND YIELD OF FENUGREEK (*TRIGONELLA FOENUMGRAECUM L.*)**

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A field experiment was carried out at the Medicinal and Aromatic Plant Block of Department of Plantation crop, Spices, Medicinal and Aromatic Crop at College of Horticulture, VCSG Uttarakhand University of Horticulture and Forestry, Bharsar Pauri Garhwal in the year 2019-20 to evaluate the effect of integrated nutrient management on yield attributes and yield of Fenugreek (*Trigonella foenumgraecum L.*) at high altitudes of Uttarakhand. The experiment was laid out in randomized block design with three replications and eleven treatment viz., T<sub>1</sub>(control), T<sub>2</sub> (100% RDF), T<sub>3</sub> (75% RDF + 25% FYM), T<sub>4</sub> (75% RDF + 25% compost), T<sub>5</sub> (75% RDF + 25% neem cake), T<sub>6</sub> (50% RDF + 50% FYM), T<sub>7</sub> (50% RDF + 50% compost), T<sub>8</sub> (50% RDF + 50% neem cake), T<sub>9</sub> (75% RDF + 25% FYM + PSB), T<sub>10</sub>(75% RDF + compost + PSB), T<sub>11</sub>(75% RDF + 25% neem cake + PSB). The result revealed that the performance of fenugreek was better under recommended doses of fertilizer (NPK), with FYM and biofertilizer. Application of 75% RDF + 25% FYM + PSB recorded maximum leaf yield per plot, seed yield per plot and economic yield. The highest seed yield 275.50 kg/ha and maximum economic yield 20.16 q/ha was obtained with the application 75% RDF + 25% FYM + PSB which signifies that the use of integrated nutrient management is important for sustaining and increasing production of fenugreek in garhwal region of Uttarakhand

**Keywords:** Integrated nutrient management, fenugreek, yield

## Abstract- 5PSRM2022/091

### **FODDER AND FUELWOOD USE PATTERN OF VAN PANCHAYAT FORESTS IN BAGESHWAR REGION OF KUMAUN HIMALAYA**

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Fodder and Fuelwood are important forest sources for hill communities in Himalayan region. Van panchayats (VPs) are the major alternatives of these resources for village community in this region. This study analysed the fuelwood and fodder consumption pattern by the rural households in three Van panchayat villages in Bageshwar region. Total 63 households (21 household in each village) for the survey in all three villages. The average household size was  $5.41 \pm 2.49$  and the education level was 79.4% all across the study area. The average adult cattle unit was  $3.96 \pm 2.13$  per household. All the sampled households depend on fuelwood as a primary source for cooking, boiling water, preparing animal feed and burning to protect cattle against insects. The fuelwood and fodder consumption per household was  $7.07 \pm 2.33$  kg/day and  $49.58 \pm 26.64$  kg/day respectively. The most preferred species for fuelwood and fodder were *Pinus roxburghii*, *Myrica esculenta*, *Quercus glauca*, *Quercus leucotrichophora*, *Celtis australis* and *Bauhinia variegata*. This study revealed that Van panchayat forests are playing an important role in the fulfilment of fodder and fuelwood requirements of nearby villagers. Additionally, this is also minimizing the pressure on reserved forest of the study area.

**KEYWORDS:** Van panchayats, Fuelwood, Fodder consumption,

## Abstract- 5PSRM2022/092

### CRISPR/CAS9 TECHNOLOGY AND ITS POTENTIAL ROLE IN PLANT DISEASE RESISTANCE

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The most potent biotechnological tool for increasing plant resistance to common phytopathogens is targeted genome editing, which targets genomic sequences in a site-specific way. Since its discovery in 2013, CRISPR-Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats), one of several gene editing approaches, has especially sparked excitement among agricultural scientists. The prokaryotic immune system, which also occurs in nature, is a cheap, simple, effective, and quickly spreading method for conferring resistance to foreign genetic invaders like plasmids and bacterial viruses by preventing suitable host pathogen contact. The main benefit of this technique over previous gene editing techniques is that it makes it simple and effective to make precise genomic adjustments, which lowers off target effects and can also be capable of editing multiple genome site simultaneously. Using the CRISPR/Cas9 technique, it is possible to change the effector-target sequence in order to prevent effector-target molecular communication. It is also possible to change the effector-target promoters in order to increase the expression of the target genes and thereby facilitate the development of resistance. In addition to its vast function in bacterial and viral disease resistance, its promise for managing fungal diseases has also recently been discovered. By influencing the immune system components, the strategy dramatically increased plant resilience and established itself as an excellent and crucial method for sustainable agriculture. The CRISPR/Cas9 is rapidly evolving technique and its application is constantly expanding year by year.

**Keywords:** CRISPR-Cas9, Genome modifications, Disease resistance, Sustainable agriculture

## Abstract- 5PSRM2022/093

### ADVANCES IN NEMATODE IDENTIFICATION

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Nematodes are non-segmented roundworms that are widely dispersed in a variety of settings that reach nearly every ecological extreme. Despite being the most diverse group, these species are the least investigated. The most important elements for maintaining equilibrium are nematodes, which affect both animal and plant welfare as well as plant yield and health. Notwithstanding, little is known about the taxonomy of nematodes. Nematode taxonomy is still a matter of debate due to the absence of exact taxonomic characteristics. Due to a lack of adequate morphological differences, morphology-based identification has proven ineffective in identifying and studying the diversity of nematodes. With different degrees of success, several molecular and novel evolving strategies have been used to supplement morphology-based approaches to get over these obstacles. These identification strategies range from molecular ones that target DNA or amino acid sequences in proteins to image processing techniques. Next-generation sequencing and other high-throughput techniques have been included in this league. These alternative methods have aided in the classification of nematodes and improved the foundation for greater diversity and phylogeny of nematodes, leading to the formulation of an increasing number of nematode bases for use as model organisms to research various pressing issues relating to human wellbeing. As a crucial transition from traditional morphometric research to the most significant contemporary and molecular methodologies for their identification. DNA/protein-based methodologies and new, cutting-edge techniques can both be used for classification. The method's highest priority, however, depends on the standard, scope, and accessibility of nematode resources and downstream uses. This review examines all currently available strategies for the detection of nematodes and known/unknown, cryptic or sibling species, with a focus on contemporary approaches and developing molecular techniques.

**Keywords:** emerging methods; identification; meta-barcoding; morphology; PCR; nematodes

**Abstract- 5PSRM2022/094**

**POPULATION STRUCTURE AND REGENERATION OF VAN PANCHAYAT FORESTS AT DIFFERENT ELEVATIONS IN NAINITAL DISTRICT**

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Van Panchayat forests are the people centric category of forests which are managed by the local communities. Major responsibilities of Van Panchayat are the conservation and protection of forest from fire, anthropogenic interventions, lopping, illegal felling and preventing damage to trees. Present study focuses on the population structure and regeneration of two Van Panchayat (VP) forests that are located at the elevation of 1731masl and 2200masl in Nainital district. The sites were further categorised into three sub-parts for carrying out the detailed study of forest viz. hill top, hill slope and hill base. Population structure was evaluated on the basis of density of seedlings, saplings and trees of different size classes, while regeneration status was determined from the population size of seedling, sapling and trees. Of the two chosen VP, one is dominated by *Pinus roxburghii* (Sarg.) which was showing no regeneration as the species is represented only by old stage. Forest fire and climatic factors can intervene in the regeneration phases (germination, seedling survival and development). The other VP was a mixed forest showing good regeneration pattern because of minimal anthropogenic pressure and less intrusion. Regeneration has a significance in the existence of a species in a community and to maintain the species composition of the forest. Hence, it is evident from the present study that mixed forest will regenerate more profusely if the present scenario persists.

**Key words:** Van Panchayat, Population structure, Regeneration, Ecology, Nainital.

## Abstract- 5PSRM2022/095

### EFFECT OF THE DISTILLATION METHODS ON THE CHEMICAL PROPERTIES OF THE TURMERIC ESSENTIAL OIL

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Essential oils are highly concentrated plant extracts produced from flowers, leaves, stems, roots, seeds, barks, resins, or fruits. These oils are commonly used in a wide range of items, including meals, medications, and cosmetics, for their flavor and medicinal or odoriferous characteristics. The aim of this study is to extract and describe the essential oils found in turmeric cubes. As the extraction was completed, the chemical properties of the obtained essential oil were determined. The chemical properties like the specific gravity, refractive index, ester value, acid value saponification values and color values are 0.0891-0.932, 1.527-1.553, 35.21-38.138 mg KOH/g, 3.594-5.560 mg KOH/g, 32.597 mg KOH/g and color values are L (32.70-38.90), a (-1 to -5.60) and b(10.6-19.40) respectively.

**Keywords:** Turmeric, steam distillation, hydro distillation, essential oil, chemical properties of essential oil.

## Abstract- 5PSRM2022/096

### DESIGN AND DEVELOPMENT OF SOLAR HYBRID DISTILLATION SYSTEM FOR ESSENTIAL OIL EXTRACTION FROM TURMERIC

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The present study was conducted to design and develop the solar hybrid essential oil extraction system from turmeric at Department of Processing and Food Engineering, PAU, Ludhiana, Punjab. The developed system has six solar parabolic trough concentrator, steam generation unit, steam distillation unit, condensing unit and essential oil separator.

A prototype of solar hybrid essential oil extraction system of 10 kg was designed and developed. The volume of steam distillation unit was 0.061m<sup>3</sup> and volume of steam generation was 0.057m<sup>3</sup>. The essential oil was extracted by using three turmeric grates size i.e. 14.50mm, 15.620mm and 17.53mm size. The smallest particle size (14.50mm) having the highest essential oil yield (45ml/kg) obtained from turmeric grates. The developed system was supplied additional 2 kW energy to extract oil from the turmeric grates. The results obtained from the study indicated that smallest grates size (14.50mm) has the highest oil yield as compared to the largest grates size (17.53mm). The steam generation and steam distillation unit has efficiency of 60 and 55.17%, respectively while the condensing unit having the efficiency of the 47.22%. The solar parabolic trough concentrators ensured energy saving of 21.53% and required 6.20 h extraction time. Developed system can be effectively helps in energy saving, reduced time required for oil extraction which makes the system more economical.

**Keywords:** Turmeric, Solar parabolic trough concentrators, Steam generation unit, Steam distillation, Condensing unit, Oil yield

#### **Abstract- 5PSRM2022/097**

#### **INSIGHT INTO YIELD PERFORMANCE OF *PLEUROTUSOSTREATUS* CULTIVATED ON VARIOUS SUBSTRATES**

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The aim of the present investigation is to study the Insight into yield performance of *Pleurotusostreatus* cultivated on various substrates. The experiment was carried out from November to December 2021 at the mushroom production unit, Department of Plant Pathology, College of Agriculture, JNKVV, Jabalpur during 2021-2022. The experiment consisted of 10 treatments combinations comprising of five levels of rice straw [Rice straw 100%, Rice straw 75 % + 25 % Wheat straw, Rice straw 50 % + 50 % Wheat straw, Rice straw 25 % + 75 % Wheat straw and Control (Wheat straw)] and soybean straw [Soybean straw 100%, Soybean straw 75 % + 25 % Wheat straw, Soybean straw 50 % + 50 % Wheat straw, Soybean straw 25 % + 75 % Wheat straw and Control (Wheat straw)].

Experiment was conducted under complete randomized design (CRD) replicated four taking *Pleurotus ostreatus* as test oyster mushroom. The results showed that maximum yield was observed in control (wheat straw) that is 997.28 gm per bag of *P. ostreatus*.

**Keywords:** oyster mushroom, *Pleurotus ostreatus*, rice straw, CRD, soybean straw

#### **Abstract- 5PSRM2022/098**

#### **ASSESSMENT OF SOIL PHYSICAL PROPERTIES FROM DIFFERENT BLOCKS OF JAIPUR DISTRICT, RAJASTHAN, INDIA**

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The year 2021-2022, an analysis experiment was done for identification physical properties from the Rajasthan state at the Jaipur district area. For further study, twenty-seven soil samples were taken from farmer's fields in different three blocks of Jaipur district at depths 0-15 cm, 15-30 cm and 30-45 cm. The soil texture in the examined region was sandy loam. The difference of soil color also noticed in both the Air-dry condition and Moist condition and the color was light yellowish brown (10YR6/4) to brownish yellow (10YR5/8) and bulk density was from 1.24-1.34 Mg m<sup>-3</sup>, The range of particle density was from 2.27-2.34 Mg m<sup>-3</sup> and the pore space 37.77 to 43.65 %. The water retaining capacity % (WRC %) of soil ranged between 43.56 to 57.28 %. The specific gravity of soil ranged between 2.33 to 2.46. The manure and organic fertilizers are suitable for good soil health and maximum crop production at the farmer's field.

**Keywords:** physical Properties, Soil Texture, Soil color, Jaipur, etc.

## Abstract- 5PSRM2022/099

### **ROLE OF FLORICULTURE IN SUSTAINABLE DEVELOPMENT OF INDIAN FARMERS**

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Flowers are highly used in luxurious products with increasing of social and economic value. Flowers improve the quality of life and human feelings. Diversification into high-value agricultural exports has increasingly become a crucial strategy for connecting the world's emerging nations to international product markets. The export of flower products 15,695.31 MT (2020-21) to the world for worth of Rs. 575.98 Crores/77.84 USD Millions. It accommodates 20-25 or even 30 workers per hectare and is more than any other agro-industry offers. Over the last decade, these exports have generated significant amounts of foreign exchange, contributed to upgrade agricultural production skills, and created substantial opportunities for waged employment and self-employment. The floriculture industry is gained in the generation of employment during the last 30 years and taken as a solution for economic development. Floriculture is a means of sustainable livelihood income generation for underprivileged women in urban and rural areas in India. Both professional and amateur specialist growers keep collections of plants for cultivation, which increasingly include native plants. For ecological sustainability, many endemic plants are found in environments that are naturally dispersed, such as mountaintops, cliffs, sand dunes, and islands. These ecosystems can be maintained through eco-tourism. In terms of increasing farmers' income, diversification towards flower cultivation results in higher profit per unit area than most of the field crops and therefore can enhance the livelihood of farmers. Flower based mono or sequence cropping system can be one of the alternative options for increasing income from same piece of land. Integrating Farming System, intercropping, bund plantation and protected cultivation comprising of flower crops have been found to be more profitable and sustainable. Comparison between flower cultivating and non-flower cultivating households reveals that the former earns significantly more per unit of area as compared to the latter both in terms of return and thus floriculture is better off even after incurring a higher cost of cultivation.

**Keyword:** Floriculture, natural sustainability

## Abstract- 5PSRM2022/100

### EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON NUTRIENT CONTENT AND UPTAKE BY CHICKPEA (CICER ARIETINUM L.)

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A field experiment was conducted at Instructional farm, Rajasthan College of Agriculture, MPUAT, Udaipur (Rajasthan) during the rabi season 2021-22 to study the Effect of Integrated Nutrient Management On Nutrient Content And Uptake By Chickpea (Cicer arietinum L.). Application of 75 % RDF + Poultry manure, 2.5t ha<sup>-1</sup> + PSB + Rhizobium. improved inherent nutrient supplying and observed higher content and uptake of macronutrients (N, P and K) and micronutrients (Zn, Fe, Mn and Cu) were also recorded under 75% RDF + poultry manure 2.5t ha<sup>-1</sup> + PSB + Rhizobium (T9) which was higher over control.

**Key words:** Poultry manure, Rhizobium, nutrient content, nutrient uptake, Chickpea

## Abstract- 5PSRM2022/101

### BIOLOGICAL CONTROL OF CROFTON WEED (*EUPATORIUM ADENOPHORUM* SPRENGEL)

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Nowadays, the use of biocontrol agents to eradicate exotic weeds is becoming a more common strategy. For this purpose, gall inducers are considered as effective biocontrol agents to stop invasive weeds by causing metabolic and physical damage to the plant. *Eupatorium adenophorum* Sprengel (Asterales: Asteraceae) is a forest killer weed, widely spread in the Kumaun Himalayan region of Uttarakhand. *Procecidochares utilis* Stone (Diptera: Tephritidae) is a gall-forming fly that forms stem galls on this noxious invasive weed (*E. adenophorum*). The fly's harm to the plant manifests as decreased growth of the

stem, foliage, and seedlings. These gall-inducing insects not only affect the plant's physiology but also create emerging pores from where decay-causing microorganisms can enter.

**Key words:** Weeds, Biocontrol, *Eupatorium adenophorum*, *Procecidochares utilis*

### **Abstract- 5PSRM2022/102**

#### **MODERNIZATION OF AGRICULTURE THROUGH HITECH IRRIGATION SYSTEMS**

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Modernization is the process of adoption something according to the modern needs or habits. Advanced irrigation systems are the methods, in which, a controlled amount of water is supplied to plants at regular interval for agriculture production. It is used to assist the crop production, maintenance of landscapes and re-vegetation of disturbed soil in dry areas and during the period of inadequate rainfall. About 70% of the population in India lives in villages where the core occupation is agriculture. With the sincere efforts of Government Institutions and farmers, now India is not only self-sufficient in producing enough food though exporting surplus farm products to other countries, thus, agriculture is of great importance for the progress of developing country like India. Due to the unavailability of canal for irrigation purposes in the country, most of the farmers in different parts of the country depend on rains. If monsoon fails in the country, agriculture also fails. Without irrigation facilities, agriculture cannot be modernized in the country. Poverty of farmers also makes it difficult to use modern technologies in the field of agriculture. For the modernization of agriculture, scientific methods of irrigation must be adopted by the farmers. Quality seeds, chemical fertilizers and pesticides must also be made available to the farmers. Central and state governments have given top priorities to the modernisation of agriculture. Multipurpose projects are being built up in all the states of India. On an average, irrigation efficiency under Indian conditions is 50% with traditional methods of irrigation, such as flood irrigation, basin and furrow system but it may be increased up to 90% if modern systems of irrigation are adopted by the farmers. Various

irrigation methods have been developed over time to meet the irrigation needs of certain crops in specific areas. The three main methods of irrigation are surface, sprinkler and drip/micro. Water flows over the soil by gravity for surface irrigation. Sprinkler irrigation applies water to soil by sprinkling or spraying water droplets from fixed or moving systems. Micro irrigation applies frequent, small applications by dripping, bubbling or spraying, and usually only wets a portion of the soil surface in the field. A fourth, and minor, irrigation method is sub irrigation where the water table is raised to or held near the plant root zone using ditches or subsurface drains to supply the water. Modern irrigation technique is efficient because crops get correct amount of water. The best example is drip irrigation system.

**Keywords:** Irrigation, micro, drip, sprinkler, furrow

### Abstract- 5PSRM2022/103

#### **RESPONSE OF HERBAL *KUNAPAJALA* ON GROWTH AND FLOWERING OF GLADIOLUS CV. JESSICA UNDER *TARAI* REGION OF UTTARAKHAND**

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The present investigation entitled "Response of herbal *kunapajala*, on growth and flowering of gladiolus cv. Jessica under *Tarai* region of Uttarakhand" was conducted at Model Floriculture Center, G. B. Pant University of Agriculture and Technology, Pantnagar during 2020-21. The *kunapajala*(KJ) which was prepared by fermenting plants remains which comprised of a significant amount of several nutrients which are essential for plant development. The experiment was laid out in RBD with thirteen treatments viz; T<sub>1</sub> (10% dilution of 100 ml/2m<sup>2</sup> dose of KJ1), T<sub>2</sub> (10% dilution of 200 ml/2m<sup>2</sup> dose of KJ1), T<sub>3</sub> (10% dilution of 300 ml/2m<sup>2</sup> dose of KJ1), T<sub>4</sub> (10% dilution of 400 ml/2m<sup>2</sup> dose of KJ1), T<sub>5</sub> (10% dilution of 100 ml/2m<sup>2</sup> dose of KJ2), T<sub>6</sub> (10% dilution of 200 ml/2 m<sup>2</sup> dose of KJ2), T<sub>7</sub> (10% dilution of 300 ml/2m<sup>2</sup> dose of KJ2), T<sub>8</sub> (10% dilution of 400 ml/2 m<sup>2</sup> dose of KJ2), T<sub>9</sub> (10% dilution of 100 ml/2m<sup>2</sup> dose of KJ3), T<sub>10</sub> (10% dilution of 200 ml/2m<sup>2</sup> dose of KJ3), T<sub>11</sub> (10% dilution of 300 ml/2m<sup>2</sup> dose of KJ3), T<sub>12</sub> (10% dilution of 400 ml/2m<sup>2</sup> dose of KJ3), T<sub>13</sub> control (RDF of NPK at 80:40:40 g/2m<sup>2</sup>). The results revealed that T<sub>7</sub>(KJ2 –

50% nettle grass + 50% seasonal weeds), exhibited maximum plant height (72.04 cm), number of leaves (7.93), at 90 days after planting and this treatment also shows early spike emergence (71.60 days), maximum flowering duration (13 days), spike length (69.75 cm) and number of florets per spike (12.33). Keeping in view of present findings, it can be concluded that T<sub>7</sub> was found to be best and it may be recommended for gladiolus cv. Jessica to obtain the maximum flower yield and best quality spikes under *Tarai* region of Uttarakhand.

### **Abstract- 5PSRM2022/104**

#### **A CRITICAL UNDERSTANDING TO AID CONCEPTION OF CRISPR TECHNOLOGY AS A POTENTIAL GENE-EDITING TOOL WITH IMPROVED CROP IMPROVEMENT**

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In the genomes of bacteria and archaea exist CRISPR regions that have potential for crop improvement. Although they may be a naturally occurring component of bacterial genomes that serve as defending against viral infections such as bacteriophages, scientific research has effectively employed them for the advantage of humanity by making them available to advancement in agriculture and crops for the benefit of mankind. The CRISPR system is primarily split into two classes: class I and class II. The class II CRISPR/Cas9 system cleaves DNA at precise locations using the guide RNA Cas12 (Cpf1). By using Cas13, formerly known as C2c2, a protein present in the CRISPR system and capable of curing viruses in plants, it has now been known that CRISPR not just to acts on double-stranded DNA but may also be beneficial to generate any type of site-specific cleavage in RNA. Several plant models with shortened lives, quick repeatability, and less expensive care are accessible to fulfil that goal. CRISPR is employed in the discipline of genome engineering. Numerous effective CRISPR investigations and experiments demonstrate their power and usefulness to bring about a change in fields that were once thought to be outside the purview of agricultural, plant science and scientific research.

**Key Word:** CRISPR, Genome Editing, Crop Improvement

### **Abstract- 5PSRM2022/105**

#### **ROLE OF OLIVE OIL AND ALOE VERA GEL IN ENHANCING QUALITY AND SHELF LIFE OF BER FRUITS**

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Ber (*Ziziphus mauritiana* Lamk.) is an indigenous and economically important tropical fruit which is also known as Indian jujube, belonging to the family Rhamnaceae. More than 300 varieties of Ber have been listed in India, but only few of them are commercially important. This work was planned to evaluate Aloe vera gel and olive oil edible coating to enhance its shelf life and minimize post-harvest losses. Physico-chemical parameters of fruits were analyzed and recorded at 7th day interval. The study revealed that both olive oil and Aloe vera gel coatings were effective in maintaining quality of Ber fruit during storage period of 35 days. Minimum physiological weight loss, lesser loss in acid contents were observed in olive oil treated fruits along with maximum color retention compared to uncoated fruits. Coatings delayed ripening. Ascorbic acid loss and decay percentage were reduced by using different concentrations of olive oil and Aloe vera gel. Based on results deduced from the present study, it is concluded that application of Aloe vera gel and olive oil is better coating material but olive oil 100% and Aloe vera 75% along with ascorbic acid proved best so, these coatings could be applied to enhance fruit shelf life and quality.

**Keywords:** Coatings; Fruit quality; Physico-chemical analysis

### **Abstract- 5PSRM2022/106**

#### **LIFE HISTORY OF THE ASIAN CITRUS PSYLLID *DIAPHORINACITRI* (HEMIPTERA: PSYLLIDAE) ON CURRY LEAF, *MURRAYAKOENIGII***

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Life history of the Asian citrus psyllid *Diaphorinacitri* Kuwayama (Hemiptera: Psyllidae) was evaluated on curry leaf *Murrayakoenigii*. The study revealed that *D. citri* is an important

pest of 'curry leaf' in homestead gardens, farmer's fields and forest areas in Saharanpur, Uttar Pradesh, India. The hatching percentage of the eggs was  $80.25\pm3.47\%$ , while the viability of the nymphal instars was  $65.2\pm2.49\%$ . The total nymphal period was  $13.40\pm1.23$  days. Adults emerged after 4-5 ( $4.4\pm0.50$ ) days from fifth instar nymphs that took 35-40 minutes to emerge. The males lived for  $24.94\pm0.65$  days, with a total developmental period of  $37.058\pm2.20$  days, whereas the females survived for  $39.81\pm0.53$  days, having a total developmental period of  $42.94\pm3.21$  days. Pre-oviposition, oviposition and post-oviposition periods lasted for  $2.75 \pm 0.71$ ,  $22.6 \pm 5.18$  and  $3.35\pm1.03$  days, respectively. Female fecundity was recorded to be 550-800 ( $692.90 \pm 99.34$ ) eggs per female. The biological parameters showed that *D. citri* breed and complete its life cycle successfully for several generations on curry leaf. The fecundity determined the appreciable growth of *D. citri* on curry leaf. The study may be helpful in devising suitable management strategies for *D. citri* and Huanglongbing disease. The curry leaf is widely used in cuisines for flavouring foods as well as in Ayurvedic and Unani prescriptions in India. Looking at the life history of *D. citri* 'curry leaf' will help in finding a suitable control measure.

**Keywords:** *Diaphorinacitri*, female fecundity, host plant, oviposition period

#### Abstract- 5PSRM2022/107

#### **SCREENING OF DIVERSE TOMATO (*SOLANUM LYCOPERSICUM* L.) GENOTYPES UNDER HEAT STRESS FOR SEED YIELD AND SEED QUALITY**

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A study was aimed to evaluate the heat tolerance of 76 diverse genotypes of tomato for seed yield and seed quality. The study was conducted at the Vegetable Research Farm, Department of Vegetable Science, Punjab Agricultural University, Ludhiana. The experiment was conducted using randomized block design for two years 2020 and 2021 during the months of March to June respectively. The evaluation was carried out based on the mean performance of the genotype for both the years. The temperature varied from 23°C to 40°C during the different stages of the experiment. The temperature was more

than 35 °C during the peak fruiting and fruit development stage. The traits like pollen viability, number of fruits per plant, yield per plant, number of seeds per plant, seed yield per plant and germination percentage were recorded to evaluate the genotypes. The genotypes CLN-2679E, EC 971784, LST-17, ISS-663, Satyajit and Shivaji were found to have higher values for all the traits under study along with higher seed yield. Hence, these genotypes are promising for seed yield and can be used either as varieties for seed production under heat stress or can be used as parental lines for breeding to heat stress tolerant varieties.

**Key words :** Tomato, high temperature stress, pollen viability and seed yield.

#### **Abstract- 5PSRM2022/108**

#### **BIOFUELS: A GREEN ALTERNATIVE OF THE FUTURE**

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Currently the global energy demand is met by burning non renewable fossil fuels. Besides, their considerable role in greenhouse effect, they are dangerous to produce, cause water pollution, air pollution, oil spills and detrimental effect on aquatic life and human health. This has put the pressure for searching a sustainable alternative source of energy. Biofuels are combustible fuels like biodiesel and bio-ethanol, that are made from biomass materials. These can either be used alone or blended with petroleum fuels. Biodiesel fuel can be produced from vegetable oils, animal fats or recycled cooking oils by transesterification process and ethanol is produced from sugars in grains, potato, sugarcane or sugar beets by the process of fermentation. Biodiesel is used in engines that burn diesel fuels like trucks and tractors whereas, ethanol can be used in engines that burn gasoline, mostly cars. Biofuels are classified into various generations based on feedstock. First generation are the conventional biofuels produced directly from food crops like corn, wheat and sugarcane. Second generation are advanced biofuels produced from non-food biomass which includes plant materials and animal wastes. Third generation refers to biofuels derived from algae and fourth generation biofuels do not require destruction of biomass and includes electro fuels and photobiological solar fuels. These are cleaner sources of

fuels and produces fewer air pollutants. Furthermore, biofuels are non-toxic, cost effective, have low sulphur content and are biodegradable and alternative source of energy. Therefore, need of the hour is to establish biofuels as an effective and environment-friendly option for the present as well as future energy needs.

### **Abstract- 5PSRM2022/109**

#### **CULTIVATION PRACTICES OF DRAGON FRUIT (*HYLOCEREUS UNDATUS*)**

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Newly immersing cultivated fruit, Dragon fruit (*Hylocereus undatus*) is a member of Cactaceae family, also known as Pithaya, Belle of the night, Strawberry Pear, Jesus in Cradle, Conderella plant and Night blooming Cereus. It is a perennial herbaceous exotic fruit crop originated from Central America, but now is very famous worldwide due to its various nutritive and medicinal values. Its ripe fruits are very soft and delicious from inside and contains good amount of protein (1.1 %), vitamin-C (3 mg), carbohydrate (11.2 %), phosphorous (27.5 mg), calcium (10.2 mg), moisture (85.3 %) and iron (3.37 mg) per 100 g edible portion. Dragon fruit can be grown in various types of soils but loam soils which are rich in organic matter, well drained and slightly acidic (pH 5.5–6.5) are the best for its successful cultivation. Dragon fruit requires warm and humid climate and temperature between 20-30° C is the best for successful dragon fruit cultivation and the optimum annual rainfall requirement is 100-150 cm. Dragon fruit is commercially propagated by cuttings of 20-25 cm. Dragon fruit plants start bearing after the planting of 12-15 months. Flowering and fruiting time in dragon fruit is between from April – November is generally found in India. After flowering of 30-35 days fruits become ready to harvest. 20-25 quintals fruits/year can be obtained after attaining good bearing stage from one acre area. Economic yield of dragon fruit is obtained from the 3rd year after planting. It is now becoming a very good crop for high income to the farmers of India.

**Keywords:** Dragon fruit, Vitamins, Minerals, Flowering and Fruiting

## Abstract- 5PSRM2022/110

### DEVELOPMENT OF HYBRIDS IN CROPS THROUGH ABR AND TWO- LINE SYSTEMS

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The cultivation of hybrid rice is one of the major achievements of modern agricultural science. In 1964, Yuan Longping became the first person to research male sterility in indica rice after observing a strain of natural hybrid rice displaying strong heterosis. In 1966, he was the first to publish a paper on the topic of "Male Infertility of Rice" and proposed the "three-line method" breeding approach to utilize rice heterosis, encompassing a male-sterile line, a maintainer line, and a restorer line. This proposal acted as a prelude to research on hybrid rice in China. The three-line method and the subsequent two-line method of breeding hybrid rice were widely adopted and contributed significantly to food security in China. Hybrid rice can be divided into three categories of strategic development: the three-line method, the two-line method, and the one-line method. As the application method becomes simpler, the efficiency increases. The level of heterosis is increasingly strong, which varies from species to subspecies and even includes distant heterosis. The three-line method utilizes heterosis in the following three lines: the nucleo-cytoplasm interaction male sterility line (i.e., malesterile line), the male sterility maintenance line (i.e., maintainer line), and the male sterility recovery line (i.e., restorer line). The male-sterile line provides a material basis for the production of a large number of hybrid seeds, the maintainer line is used to propagate the sterile line, and the restorer line is used to pollinate the sterile line to produce male-recovered hybrid rice seeds with heterosis. Chinese three-line hybrid rice was first used successfully in 1973, becoming a classic method of utilizing heterosis. The 'three-line indica hybrid rice' won the China National Technical Invention Special Award in 1981. The two-line method requires only sterile lines and restorer lines to utilize heterosis, while the most successful method is to utilize photo-thermo-sensitive genic male-sterile (PTGMS) lines, which display male sterility during long days and high temperatures, and male fertility during short days and low temperatures.

Hybrid seeds are produced during the sterility period and sterile lines are produced by inbreeding during the fertility period, rendering the maintenance line unnecessary.

### **Abstract- 5PSRM2022/111**

#### **PYRAMIDING OF HULLESS AND BLUE ALEURONE TRAITS IN BARLEY (*Hordeum vulgare L.*)**

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Barley (*Hordeum vulgare L.*) is considered one of the top five cereal grains in the world it is mainly used for animal feed, in the last decade an increased interest has been witnessed for naked barley and blue grains as preferred and healthy food for human consumption. The molecular screening was done using six different molecular markers linked with hulless and blue aleurone traits. The hulless trait in barley is controlled by a single recessive *nud* gene located on chromosome 7HL. However, blue aleurone seed colour is due to the accumulation of anthocyanin in the aleurone layer due to the presence of five *B/x* genes located on chromosomes 4HL and 7HL. All the Prenatal Cultivars and their nine (BC<sub>1</sub>F<sub>1</sub>) hybrids were characterized using linked molecular markers *sKT3* for hulless phenotype and *Bmac0187* for blue aleurone phenotype. Molecular marker *sKT3* located on the chromosome 7HL showed polymorphism among IITR-39 hulless and other barley cultivars. However, *Bmac0187* molecular marker located on 7HL also showed polymorphism among IITR-38 blue aleurone and other barley cultivars. The BC<sub>1</sub>F<sub>1</sub> seeds are separated manually on the basis of their morphological characteristics and sown in the research field. The BC<sub>1</sub>F<sub>1</sub> plants were also screened using polymorphic linked molecular markers *sKT3* and *Bmac0187* and found true. All the BC<sub>1</sub>F<sub>1</sub> Plants will be advanced in F<sub>2</sub> generation and the seeds of recombinants for naked barley along with blue aleurone will be screened.

## Abstract- 5PSRM2022/112

### RESPONSE OF FERTILITY LEVELS AND LIQUID BIOFERTILIZERS ON NUTRIENT UPTAKE BY WHEAT (*TRITICUM AESTIVUM* L.) CROP

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The aim of the present investigation is to study the impact of fertility levels and liquid biofertilizers on growth and yield of wheat (*Triticum aestivum* L.). The field experiment was conducted during *Rabi* 2019 at Instructional Farm of Agronomy, Rajasthan College of Agriculture, Udaipur, which is located in Rajasthan's agro-climatic zone IV-a. The experiment consisted of 16 treatments combinations comprising of four levels of fertility (Control, 75%, 100% and 125% RDF) and four levels of liquid biofertilizers (Control, *Azotobacter*, PSB and *Azotobacter* + PSB). Experiment was conducted under factorial randomized block design replicated thrice taking wheat var. Raj.-4238 as test crop. The Recommended dose of fertilizer (RDF) was 100:60:40 kg ha<sup>-1</sup> of N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O. Results showed that significant increase in nutrients (N,P,K and S) uptake by wheat crop was observed with the combine application of 100% RDF and *Azotobacter* + PSB.

**Keywords:** Fertility levels, Biofertilizers, RDF, *Azotobacter*, PSB

## Abstract- 5PSRM2022/113

### UTILIZATION OF WOOD PRODUCTS IN GREEN BUILDING CONSTRUCTION

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From ecological point of view, the construction and building sector has significant impact on the process of climate change. The construction industry is one of the largest contributor to atmospheric emission of gases like CO<sub>2</sub> and resulting climate change, mainly due to production of conventional construction material like masonry, concrete and steel. These developing ecological concerns have constrained us to meaningfully alter the manner in which we work on the planet. It has been proved that the extraction and

manufacturing of these materials generates significant amount of harmful greenhouse gases (GHG) and, therefore, this industry provides a scope for reducing such emissions. Due to higher carbon footprints of these materials, it is wiser to use natural and eco-friendly materials in combination with the modern technologies to address such environmental issues. One possibility is to replace the conventional material (non-renewable and emission intensive) with more ecofriendly alternative which can help in lowering the emission levels and rate of resource depletion. Considerable amount of work has been accomplished by global research communities in order to develop cost effective alternative sustainable building and construction material. Embracing green building material is a phenomenal way to deal with such objective. Wood is one of such material, which can be widely used as building material for any type of construction. Past researches have shown that wood products cause definitely less greenhouse gas emission than other building materials over their lifetime. This article will be focusing on mass timber products and their advantages as a construction material. Several types of mass timber panels have been discussed in the article.

**Keywords:** Mass timber, GHG, Cross Laminated Timber, sustainability, carbon emission

#### **Abstract- 5PSRM2022/114**

#### **STATUS OF MACRO AND MICRO NUTRIENTS PRESENT IN SOIL OF KAPKOT BLOCK OF BAGESHWAR DISTRICT UTTARAKHAND (INDIA)**

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An investigation was carried out to study the soil macro-and micronutrients viz. K, P, S, Fe, Cu, Mn, and Zn including soil color, soil pH, and organic carbon content in soils of Kapkot block of Bageshwar district (Uttarakhand). Surface (0-15cm) soil samples were collected from the different villages of the Kapkot block, using a spade with proper labeling. Soil fertility indicators such as pH using a glass electrode pH meter, Soil Organic Carbon using Walkey & Black method, available Phosphorous using the Olsen method, available Potassium using Flame Photometry, S, micronutrients (Fe, Cu, Mn, Zn) by using Atomic

Absorption Spectroscopy were analyzed. From this study, it may be concluded that the soils of the Kapkot block are mainly sandy loam and grayish-brown. Most of the soil samples are neutral with low levels of Organic matter content and Phosphorous. The Potassium and sulfur are in the medium to high range in almost soil samples. All micronutrients (Fe, Cu, Mn, and Zn) are found to be associated with normal to high levels in all most areas. Therefore manure or compost and some fertilizer could be recommended to enhance the availability of Organic matter content and Phosphorous in the soil of study area.

**Keyword:** Soil analysis, Macro- micronutrients, Kapkot

#### **Abstract- 5PSRM2022/115**

#### **SEED PRODUCTION IN INDIA, THEIR OPPORTUNITIES AND CHALLENGES**

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Seed is necessary for the continuation of life and serves as a bridge of hope between the present and the future. India has a thriving seed industry. The seed business has developed through time in tandem with Indian agriculture. Indian farmers have come a long way from the custom of preserving seeds from the previous crop. With 4.4% of the global seed market, the Indian seed industry is currently the fifth largest seed market in the world. In terms of international trade, India is nearly self-sufficient in terms of flowers, fruits, vegetables, and seeds for field crops. In general, it is anticipated that paddy, maize, and vegetables will propel the growth of the Indian hybrid seed market during the next five years.

## **Abstract- 5PSRM2022/116**

### **BIOCHAR: CHARACTERISTICS AND ITS APPLICATION**

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Biochar is the light weight black residue, made of carbon and ashes, remaining after the pyrolysis ( heating of an organic material, such as biomass, in the absence of oxygen) of biomass. The ideal temperature of biochar creation is at 400 – 500 °C, while temperature above 700 °C favours the yield of liquid and gas fuel components. Biochar has a potential to improve soil fertility. The main properties of biochar are the following: high surface area with many functional groups, high nutrient content, and slow-release fertilizer. Soil mineral depletion is a major issue due mainly to soil erosion and nutrient leaching. The addition of biochar is a solution to prevent it because biochar has been shown to improve soil fertility, to promote plant growth, to increase crop yield, and to reduce contaminations. Biochar can be used as Carbon Sink, Soil Amendment, Water Retention and as a fertilizer.

**Keywords:-** Biochar, Pyrolysis, Soil fertility, Soil erosion.

## **Abstract- 5PSRM2022/117**

### **SUSTAINABLE AGRICULTURE**

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In order to achieve sustainability of agricultural yields and production, this paper offers an overview of key ideas in sustainable agriculture. There are explanations for why contemporary industrialized agriculture may not produce as sustainably as traditional agriculture in terms of yields. Both the likelihood that organic agriculture will be more sustainable than non-organic agriculture and its potential effects on wild biodiversity are considered. Because some environmentalists consider the preservation of wild biodiversity to be a crucial component of sustainable development, the effect of agricultural development on wild biodiversity is evaluated. However, there is a disagreement over

policy between conservationist organizations. While some people reject such production techniques as being detrimental to the preservation of wild biodiversity, others support intensive agriculture (including silviculture). There are explanations for why current industrialized farming methods are used so extensively (and still are), despite the fact that they don't seem to be sustainable. Market structures could have a tendency to confine producers to unsustainable production practices.

### **Abstract- 5PSRM2022/118**

#### **BIOFORTIFICATION IN CEREALS**

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The country's food security has increased as a result of the green revolution and increased cereal production. In India, malnutrition affects 35.8% of youngsters, according to recent polls. Based on prior national and international research initiatives aimed at enhancing nutrients in staple food crops, the Indian Council of Agricultural Research has assumed leadership for the biofortification of cereal crops. This article discusses the important advancements made in the identification of genotypes, creation, evaluation, and release of varieties with high nutrient contents, as well as the bioavailability studies of those varieties, in the crops of rice, wheat, maize, and millets.

### **Abstract- 5PSRM2022/119**

#### **ROLE OF IPR IN THE DEVELOPMENT OF SEED INDUSTRY IN INDIA**

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Seed is the key constituent for prolific agriculture. The growth of seed industry has occurred in parallel with the growth in agricultural productivity. The Indian seed industry

has endured rapid transformation from a public seed system to a branch out industry involving a large number of public, private and other small seed agencies. These institutions marked up the beginning of organized seed production and distribution in the country. Intellectual property right (IPR) is a lawful right of an individual granted by government for a specified period on the possession of the property created through his intelligence. It is for effective use of knowledge for economic growth. Different form of IPR in relevance to agriculture sector are Patents, Trademarks, Industrial designs, Geographical indications, Protection of plant varieties and farmers rights act, Layout and design of ICs, Protection of undisclosed information, National Biological Diversity Act, inventive steps etc. PVP (Plant Variety Protection) is the most common implication for seed industry. This examine the advancement in seed industry in India. Private seed companies mostly used biological protection of parental lines provided by hybrid technology. This mechanism is still used by the many companies by its effectiveness. PPV & FRA (2001) provides protection of novel, EDV, farmers and extant varieties. There is also a provision of benefit sharing in case protected material. ICAR & SAUs have also issued guidelines for benefit sharing while commercialization. A legal protection for gene (Bt-cotton) is implicated under IPR for the benefit of seed industry. The WTO's TRIPS Agreement is an attempt to co-ordinate in the way these rights are protected around the world, and to bring them under common international rules. It establishes minimum levels of protection that each government has to give to the intellectual property. IPR also allow product and process patents in all fields of science and technology, biotechnology and genes and microorganism with human interventions, which has more importance with respect to the seed industries. Major provisions of IPR allows the seed industry to enhance the performance levels, providing recognition and financial benefits to the efforts for the creativity of an industry, creating competition among the researchers and institutions for quality of research. To have return on investment in research and fasten the technology transfer through licensing and other means.

**Keywords:** Seed, Seed industry, IPR, WTO, TRIPS, Protection, Growth

## Abstract- 5PSRM2022/120

### IMPACT OF PPV&FR ACT 2001 ON THE EMERGENCE OF SEED INDUSTRY

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This paper has examined the pattern of protection of plant varieties and the early impact of plant variety protection (PVP) on Indian seed industry. The results have shown a positive response by all the actors involved in seed provision, viz. public research institutes, private seed companies, and farmers in terms of participation in protection of varieties. The PVP applications for crops have also diversified with time, indicating that PVP is important for a large number of crops. The trends in exchange of germplasm, number of varieties released, breeder and quality seeds produced, and number of public private partnerships, indicate the growth of Indian seed industry and its confidence in the PVP mechanism. Those varieties are protected under the UPOV, India implemented the PPV&FR ACT for the protection of new varieties. Therefore, it would be useful to study the progress in implementation of PPVFR Act and the response of seed industry to it. In particular, it would be interesting to know the response of both public and private sectors. This study has examined the initial impact by assessing the changes that occurred in the seed industry based on four quantitative indicators. First, the export and import of germplasm were estimated to capture the international flow of new varieties. Second, the decadal growth in the number of varieties was worked out to reckon the availability of improved varieties in the market. Third, the trend in breeder seed production and distribution of quality seeds was measured to assess the availability of quality seeds to farmers. Further changes in public and private shares in quality seed distribution and improvement in seed replacement rate (SRR) of selected crops for major states were also studied. Fourth, the number of public private partnerships (PPP) was studied to analyze the changes in marketing channel in dissemination of new technology and revenue generation by the public sector through PPP. The private seed companies concentrated more on the cross-pollinated crops than self-pollinated crops. It could be correlated with

the value of seed business, wherein self-pollinated crops have a lower share than of cross-pollinated crops, except rice, because hybrids require seed replacement every year. Further, advances in S&T such as better identification methods, increased availability of genetic materials and provision of incentives for varietal development to the scientists are the other factors which might have played a crucial role in the higher varietal growth in the recent decade.

### **Abstract- 5PSRM2022/121**

#### **INTEGRATED FARMING SYSTEM: ADVANTAGES AND CHALLENGES**

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Integrated farming systems is an approach to farming aimed at meeting the multiple demands. It is a well-accepted sound strategy for harmonizing joint management of land, water, vegetation, livestock and human resources. IFS are carried out by temporal and spatial mixing of crops, livestock, fishery, and allied activities in a single farm. They provide the needs of small and marginal farmers, who are the backbone of agriculture in India. IFS enhance nutrient recycling through composting, mulching, and residue incorporation and, as a consequence, have the capacity to reduce the external purchase of inputs. It helps in sustainable productivity and ensure better livelihood securities to the people. The nutrient recycling in turn helps to increase the soil quality indicators such as soil nutrient availability and also improves soil microbial activity. The IFS play a major role in biodiversity conservation through adoption of diversified cropping system and through integration of indigenous livestock breeds. The major elements of integrated farming system are farm ponds biological pesticides, biogas, bio-fertilizers, solar energy, vermincompost, green manuring, rainwater harvesting, watershed management etc. The integrated farming systems approach introduces changes in farming techniques for maximum productivity in crop samples and maximizes resource utilization. Ensures field waste is recycled in an integrated system for production purposes. A reasonable combination of agribusinesses such as dairy, poultry, pig, fisheries, silk farming, etc., can bring prosperity in agricultural

activities according to the given agro-climatic conditions and socio-economic status of the farmers. Increasing crop production to supply the exploding population of our country. Increase farm income due to proper use and recycling of residues and by-products. Environmental pollution can be reduced by effective recycling of animal waste such as dairy, pig, poultry, etc. Reduction in input costs through recycling of related activities by-products. Integrated farming can generate a steady income through products such as eggs, meat, milk, vegetables, silkworms, and cocoons. Cultivation of fodder crops such as intercropping and border cropping will result in the availability of nutritious fodder for animals. Several challenges associated with adoption of IFS are, it requires skill, knowledge, resources, labor, and capital which are not always available with small and marginal farmers. Lack of awareness about the sustainable farming system. Unavailability of various farming system models and certain marketing facilities, especially for perishable products. Lack of easy and reasonable interest rate credit facilities, storage facilities, timely availability of input, education/knowledge in farming communities especially among rural population.

### **Abstract- 5PSRM2022/122**

#### **ALLEVIACTION OF ABIOTIC STRESSES BY MICRONUTRIENT SEED PRIMING**

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The expanding population of the world is expected to reach about 9-10 billion by the end of year 2050. Due to the fast- increasing population compounded with rapid climate changes, abiotic factors such as drought, salinity, and extreme temperature severely affect the crop yield. Abiotic stresses affect morphology, anatomy, phenology and plant biochemistry at all levels of organization. Damages includes inactivation of enzymes in chloroplast and mitochondria, inhibition of protein synthesis, protein degradation and loss of membrane integrity due to protein denaturation and aggregation and increased membrane lipids fluidity. The effect of stress during reproductive development induces

flower abscission, pollen sterility, pollen tube distortion, ovule abortion, and reduced fruit set, which finally cause decreased yield. Several approaches are developed which alleviate the effect of abiotic stress in crop plants. Among them, seed priming approach has beneficial role in alleviating from these stresses. Especially, priming with micronutrients can effectively boost plant adaptation to these stresses and establish resilient plants. Micronutrients such as zinc, boron, manganese etc has beneficial role in plant adaptation to stresses and increase yield and quality. So, priming with micronutrients could be beneficial in future concern with environmental friendly approaches and sustainability associated with global climate change.

**Keywords:** Seed priming, Micronutrient, Abiotic stresses, Climate change

### **Abstract- 5PSRM2022/123**

#### **ORGANIC FARMING IN INDIAN AGRICULTURE**

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Organic farming is the production system which avoid chemical application in the agricultural land like synthetically compound (Fertilizer, Pesticides, Growth regulators, genetically modified organism, livestock food additives. *It is a new revolution in agriculture.* Organic farming mostly contribute in *sustainable agriculture*. It increases soil fertility through crop rotation, microorganism and leguminous crop (N<sub>2</sub> fixation) by organic substance. Repair environmental damage and balance between ecosystem. *An organic farming in India vision towards the healthy nation.* It is a modern techniques of agriculture which helps to produce healthy vegetables, fruit. The origin of organic farming goes back, in its recent history, to 1940s. During this period, the path breaking fiction on the subject published by J.I. Rodale in the United States, Lady Balfour in England and Sir Albert Howard in India added to the cause of organic farming. Organic farming is one of a number of methodologies found to meet the purposes of sustainable agriculture. Many techniques used in organic farming like inter-cropping, mulching and mixing of crops and livestock are not unknown to various agriculture systems including the traditional agriculture practiced in countries like India. Although India was far behind in the

assumption of organic farming due to several reasons, presently it has achieved rapid growth in organic agriculture and now becomes one of the largest organic makers in the world. In other word says that Organic farming is a method of farming system which primarily aimed at promoting the land and raising crops in a ordinary way. It aims to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution free environment. It increases food safety in vegetable, fruit and cereal crops.

**Key word:** food safety; organic food; biodiversity; sustainable farming; conventional farming.

#### **Abstract- 5PSRM2022/124**

#### **SMART AGRICULTURE**

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Smart agriculture refers to the application of technologies like Internet networking, sensors, location systems, robots, drones and artificial intelligence on agricultural farms. Smart agriculture is a growing approach bringing the benefits of digitalization into the agricultural domain. Some of these technologies used in smart agriculture are precision irrigation and precise plant nutrition, climatic control in greenhouses, sensors for the soil, water, light, moisture and temperature management, software, location systems like GPS, satellite, robots like drones, analytics and optimization platforms. The ultimate goal is increasing the quality and quantity of the crops by reducing the human interferences and efforts. This is a mechanism for connectivity between sensors and machines, resulting in a complex system that manages your farm based on data collected and further made diagnosis, decision making and action as required. Farmers can monitor the processes on their farms lands and take decisions remotely from their mobile phones and PCs mounted

to the system without physically going to the field, greenhouse, orchards, vineyard, croplands etc. Technology is improving the efficiency of agriculture, in terms of production and economic growth. This directly creates an impact on employment and labor opportunities, environmental sustainability, good security and the price of food. The spread of smart technologies in the field of farming has been impressive. Advances in farm management technology have also become popular, in terms of providing accuracy and ease of management and security. Development of supporting set-up, high-tech agronomic practices, increased production and decreased food price, nutrition and food utilization, access to land and other resources and the utilization of all available resources are some of the major advantages of adopting smart technologies in agriculture.

### **Abstract- 5PSRM2022/125**

#### **PROTECTION OF PLANTS FROM PATHOGENS THROUGH BIOCONTROL AGENTS**

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Biological control is considered as a promising alternative to plant resistance to manage plant diseases. The use of biological control agents (BCAs) alters how plants, pathogens, and environmental factors interact, resulting in natural and physical reactions that have an impact on pathogen health, plant health, and environmental function. A wide range of physical and chemical defense mechanisms are used by plants to protect them from diseases. Biological control agents can be fungi, bacteria, or nematodes. These agents destroy the host hyphae by puncturing them and coiling around the pathogen to parasitize it. *Trichoderma* is one of the greatest bioagents for biological control and has reported to be efficient against a variety of soil and foliar diseases. *Trichoderma* species secrete secondary metabolites that have demonstrated their ability to inhibit the growth of harmful bacteria and promote plant growth. Due to its well-known biological control mechanism, *Trichoderma* spp. have been extensively used in agricultural applications. Utilizing genomics, genetic engineering, and recombinant DNA approaches, biological management of plant diseases via BCAs has advanced significantly in recent years.

**Keywords:** Biological control, Biological control agents, plant pathogens, plant disease management, Trichoderma

### **Abstract- 5PSRM2022/126**

#### **EFFECT OF AGROCHEMICALS ON THE SPARROW POPULATION**

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Agriculture is the necessary activity which man does to get his food or fulfill his needs. Agriculture is done all over the world. But India is considered to be the backbone of the country. To increase the agricultural production and to increase the income, today the farmer is using more chemical fertilizers, chemical weedicides, chemical pesticides in his fields. Which cause decline in the population of the predator birds, one of which is a sparrow. Sparrow bird is on the verge of extinction in today's time. This bird prefers to live among the community of humans, and makes its living in agriculture done by man. This sparrow bird has a great contribution in our agriculture. which we have been ignoring, And only we are trying to preserve it as a bird species. Various schemes are being made for its conservation. But it can be conserved only when we can know the real reason for the decline in its population.

**Key Words:-** Conservation, Weedicide, Pesticide, Predator

### **Abstract- 5PSRM2022/127**

#### **INFLUENCE OF MAGNETIC FIELD ON SEED GERMINATION, SEEDLING GROWTH AND YIELD**

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The use of chemically made fertilizers, pesticides leads to manipulation of soil fertility which further directly affect the yield. There are various technologies to enhance the productivity of different crops. The seed treatment is an effective and appropriate method

to somehow upgrade the production. The seed can be treated by different method such as chemical, physical and biological. The physical method is one of the modern innovative and eco friendly approach to deal with the issues in soil fertility. It may reduce the use of chemicals. Magnetic field is one of the attribute related to physical method. Magneto priming is based on the principle of magnetic field. It enhances seed germination, seedling growth and yield. The magneto priming majorly depends on the type and dose rate of magnetic field along with exposure time and plant features such as age, cultivar, species etc. The magnetic field is useful source of energy which effects the metabolism of the cell and create an impact on the cell division of meristem. The magnetic seed treatment of appropriate dose and exposure time increases the seed germination percentage, speed of germination, reactive oxygen species, shoot length, root length, fresh weight and dry weight, number of leaf per plant, number of flower per plant, number of fruit per plant, number of seed per plant, increase in weight, increase the quality of flower and ultimately increases the yield. The stimulation of magnetic field alter the photochemical activities, respiration ratio and enzymatic activities create an positive impact on the quantity and quality of seed germination, seedling growth and yield of different agricultural, horticultural and medicinal plants.

**Keywords:** Magnetic field, Seed germination, Meristem,

#### **Abstract- 5PSRM2022/128**

**COMBINED ACTION OF NEEM AND CASTOR OIL AGAINST MUSTARD APHID *LIPAPHISERYSIMIKALT.* AND ITS NATURAL PREDATOR *COCCINELLASE PTEMPIUNCTATA LINN.***

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Frequent use of synthetic insecticides for protecting the crop from insect pests has resulted in many harmful effects like, insect resistance, effects on the beneficial organisms etc. There is a need to use alternative methods for protecting crops from pests to reduce the frequency of chemical insecticides utilized for pest management. In the present study synergistic activity of neem and castor oil was determined against *LipaphiserysimiKalt.* infesting rapeseed mustard, *Brassica campestris*. The mixture containing both the oils in

the ratio of 1:1. The mixture was sprayed on the potted plants infested with counted number of third instar nymph and adults of apterous viviparous females. A concentration of 2.5% was found to be most effective, as it caused 100% mortality (indicated by non-motility of both the nymph and adults) in 24 hours. Fecundity was also reduced significantly. The lower concentrations viz. 2% and 1.5% were also found to be effective but required longer period to cause complete mortality. The mixture of two oils at a ratio of 1:1 proved to be synergistic in the present investigations and approved to be a useful controlling agent for the mustard aphid while found safer for its natural predator *Coccinellaseptempunctata* Linn.

**Key words:** Combined action, neem oil, castor oil, mustard aphid, *Brassica campestris*, *Lipaphis erysimi*, *Coccinellaseptempunctata*

#### **Abstract- 5PSRM2022/129**

#### **IMPACT OF NATURAL FARMING ON YIELD AND QUALITY OF SOYBEAN (GLYCINE MAX. L) UNDER MOUNTAINOUS CONDITIONS OF HIMACHAL PRADESH**

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An experiment was conducted in field during kharif season of 2019 at Model Organic farm of COA, CSKHPKV, Palampur -176062 (H.P) to study the effect of environmental changes on growth, yield and quality parameters of Soybean (*Glycine max L.*) under organic and zero budget natural farming conditions. The variety of Soybean (Palam soya) was sown with eight different forms of treatment and three replications during the study period. Application of FYM, vermicompost, and natural farming with rhizobium all had a significant impact on growth metrics, yield, and yield contributing qualities. The significantly number of pods per plant and physiological parameters viz, RGR, CGR and NAR were recorded in T<sub>6</sub>-(Vermicompost -10t/ha + vermiwash- 3 Spray). The significantly highest seed yield (825.0 kg ha<sup>-1</sup>), biological yield (2409.09kg ha<sup>-1</sup>) and test weight (173.22 g) were recorded in treatment T<sub>6</sub>. Meteorological parameter showed a positive effect on growth and yield of

soybean. The treatment T<sub>6</sub> (Vermicompost -10t/ha + vermiwash- 3 Spray) proved to be the best treatment for increasing the yield and yield attributes of soybean under mid-hill conditions of Himachal Pradesh.

**Keywords:** Crop growth parameters, Organic farming, Soybean (*Glycine max*), Randomized Block Design (RBD) and Farm Yard Manure (FYM).

### **Abstract- 5PSRM2022/130**

#### **APPLICABILITY OF BLOCKCHAIN TECHNOLOGY IN AGRICULTURAL ENHANCEMENTS**

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According to the studies the Blockchain technology is booming now-a-days and it will also impact the agriculture industry. Blockchain technology can track all sorts of information about plants, such as seed quality, crop growth, and even record plant movements after they leave the farm. This data can increase the transparency of the food supply chain and reduce problems related to illegal and unethical production. It can also facilitate tracking of contamination and other issues in the event of a recall. Sustainability and food security are top priorities for these technologies. When consumers have this level of transparency, they can make informed decisions about their purchases. They often use this information to reward aggressive farmers and producers. Traditional frameworks with core controls are vulnerable to data corruption as the institutions running them are biased and may enter incorrect data to try to achieve specific results as such platforms are often subject to cyberattacks. Entrepreneurs have moved to Blockchain and understand how it works to ensure security and easy transactions. Reliable data on agricultural processes is invaluable for the development of data-driven facilities and insurance solutions to make farming smarter and less vulnerable. Blockchain combined with IoT is transforming the food industry. It aims to make agriculture a sustainable practice through a simplified approach to optimizing agricultural resources such as water, labour and fertilizers. Therefore, Blockchain technology will definitely prove to be an important tool for agriculture industry towards its better enhancements.

**Keywords:** Blockchain, Food Security, Cyberattacks, Internet of Things (IoT)

## Abstract- 5PSRM2022/131

### **IDENTIFYING THE ROLE AND FUTURE OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE**

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Artificial Intelligence (AI) is booming now-a-days in almost every industry. AI also plays very important role in Agriculture. Specially the sub domains of AI: Machine Learning (ML) and Deep Learning. There will be lots of devices coming in the future, which are helpful in improving the quality of crops. And also the machines like tractor and water supply, etc. automatically works with the help of ML. And with help of deep learning the machines detect and give insight about various types of crops, means which time will be best for which type of crops for increased yields. It will be very easy to detect crop-malnutrition much faster than humans. It will be very easy to detect any disease and pests using image analysing technology based on deep learning. And also using Robotic Process Automation (RPA) technology, the farming process will be very easy in the future. ML based devices are used to detect the insect in the crops and soils. The smart spray app can help farmers use pesticides on the bases of the detected insect and soil type identified by the deep learning based image analysing system. Not only in intelligent spraying but AI based smart devices can also help in weeding. And also the advanced AI based bots will be very useful to give the answer of the question in the real-time to the problem of farmers. Therefore, it is visible that Artificial Intelligence surely plays a major role towards agriculture advancements.

**Keywords:** Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Robotic Process Automation (RPA).

## Abstract- 5PSRM2022/132

### EVALUATION OF DIFFERENT PRE PLANT HERBICIDES ON NOXIOUS WEED PURPLE NUTSEDGE UNDER SODIC SOIL ECOSYSTEM

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A field experiment was conducted at Department of Agronomy, Anbil Dharmalingam Agricultural College and Research Institute, Tamil Nadu Agricultural University, Tiruchirappalli during Rabi 2019 to study the effect of different pre plant herbicides on noxious weed purple nutsedge (*Cyperus rotundus*) under sodic soil ecosystem. Pre plant herbicides viz., glyphosate 2.5 kg ha<sup>-1</sup>, glufosinate ammonium 1.0 kg ha<sup>-1</sup> and halosulfuron methyl 67.5 g ha<sup>-1</sup> were compared with control. Pre plant herbicides were sprayed at 15 days before crop planting. Before spraying of pre plant herbicides, sedges (71%) were found to be the predominant category followed by grasses (18%) and broad leaved weeds (11%) in the experimental site. Results revealed that, pre plant application of glufosinate ammonium 1.0 kg ha<sup>-1</sup> registered significantly lower total weed density (5.0 m<sup>-2</sup>), lower total weed dry weight (7.1 g m<sup>-2</sup>) and higher in weed control efficiency (99.3%) than halosulfuron methyl and control at 15 days after application. However, these results were on par with pre plant application of glyphosate 2.5 kg ha<sup>-1</sup>. Also, these consecutive applications of herbicides have no longterm negative effects on the soil microbial population because of the intermediate soil persistence. Hence, it is safe to use the recommended dose under necessary circumstances. From this field study, it could be concluded that, pre plant application of glufosinate ammonium 1.0 kg ha<sup>-1</sup> at 15 days before crop planting is recommended for better control of noxious weed *Cyperus rotundus* under sodic soil ecosystem. Recently, glyphosate has been banned by many states in India includes Kerala, Punjab, Maharashtra and Andhra Pradesh. In this field experiment, glufosinate ammonium was comparable with glyphosate in terms of controlling *Cyperus rotundus*. Hence, it may be an alternative to glyphosate in future.

## Abstract- 5PSRM2022/133

### EFFECTS OF DIFFERENT MAIZE-SOYBEAN INTERCROPPING PATTERNS ON YIELD ATTRIBUTES, YIELD AND B: C RATIO

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A field experiment was carried out to study the "Effects of different Maize-Soybean intercropping patterns on yield attributes, yield and B: C ratio". Treatment consists of sole maize (60×20 cm), Sole Soyabean (30×10 cm), Maize-Soybean (1:1) (60×20 cm), Maize-Soybean (1:1) (75×20 cm), Maize-Soybean (1:1) (90×20 cm), Maize-Soybean (1:2) (90×20 cm) and Maize-Soybean (2:6) (Paired row 45/180 cm). There were four replicated blocks and plot sizes measuring 7 m x 4.5 m laid out in a randomized complete block design (RCBD). Results of the experiment showed that the maize-soybean intercropping patterns had significant effect on maize stover and grain yields. Sole maize recorded significantly higher yield than intercropped maize under varying geometry and row proportion. However, it was at par with maize intercropped with soybean in 1:1 row proportion with 60×20 cm .The intercropping patterns affected significantly the PAR intercepted and the leaf area index. The soybean sole crop intercepted significantly more light and leaf area index (LAI) than all other treatments and/or crop. Further,, the yield of sole soybean was significantly superior over other intercropped treatments. The highest benefit cost ratio revealed that higher return per unit money invested for inputs used for raising crops. The highest B: C ratio was recorded with maize + soybean in 2:6 paired row (3.57) intercropping system. The least B: C ratio was recorded in sole soybean (2.45).

**Keywords:** Leaf area index (LAI); LER; maize-intercropping; soybean

## Abstract- 5PSRM2022/134

### CONSERVATION AND CULTIVATION OF *COMMIPHORA WIGHTII* (ARN.)BHANDARI: AN IUCN RED LISTED CRITICALLY ENDANGERED MEDICINAL PLANTSPECIES

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*Commiphorawightii* (Arnott) Bhandari, also known as Guggal, is a slow growing perennial shrub or small medium sized tree that produces an oleo-gum resin that is significant in Ayurveda treatments. In India, the species is mostly found in Gujarat and Rajasthan, with a tiny presence in neighboring Madhya Pradesh and Maharashtra. Over-exploitation, poor seed production, rare seed germination, slow growth rate, lack of cultivation, excessive and unprofessional tapping method, overgrazing by domestic animals, mining activities, and alien species invasion, among other factors, are some of the key causes of its extinction in natural environments, making this plant an endangered species. The IUCN classified it as critically endangered. The vast majority of female plants generate without fertilization, generating duplicates of the same genotypes, and as a result, the gene pool of this key source of therapeutic herbs will definitely decline. On the one hand, there is a growing need for its oleo-gum-resin, but the population is slowly disappearing, making it impossible to provide the requirement. The only way to ensure the survival of this precious species is to cultivate it in addition to making in-situ and ex-situ conservation efforts. A significant barrier to the commercial cultivation of guggal is the lack of sufficient supply of high-quality planting material. Therefore, a speedy, practical, and financially sound way of growing endangered medicinal plant seedlings for large-scale domestication is needed. There are many claims regarding its regeneration by seeds or stem cuttings as well as biotechnological requirements. ICFRE institutions Tropical Forest Research Institute, Jabalpur, Madhya Pradesh and Arid Forest Research Institute, Jodhpur, Rajasthan are continually working to produce stakeholder guidelines for cultivation and conservation of this critically endangered medicinal plant by investigating population density, diversity, in situ and ex situ conservation measures, flowering, fruiting, and seed germination. These initiatives will surely aid in promoting the cultivation of this rare species.

## Abstract- 5PSRM2022/135

### **GIS BASED MAPPING OF FRUIT CROP DIVERSITY AND PHYSIOGRAPHY OF NADAUN AND BIJHARI BLOCKS OF DISTRICT HAMIRPUR, HIMACHAL PRADESH**

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Fruit crop diversity maps of Nadaun and Bijhari blocks were prepared based on the survey and GPS data collected by visiting the orchards using the Arc GIS 10.6.1 software. The thematic maps of the fruit crop diversity of the orchards visited during the survey of Nadaun and Bijhari blocks of district Hamirpur, HP were prepared by placing point locations in the study area boundaries. The boundaries of individual orchards of different fruit crops were traced in the ArcGIS software on the satellite images of the study area. This helps in representing the area under different fruit crops in a particular orchard. The maximum area of fruit crops in Nadaun block was found to be under mango and citrus cultivation whereas in Bijhari block maximum area was under mango cultivation. Carto Sat satellite DEM data downloaded from the BHUVAN website having a spatial resolution of 30 m were used to prepare the physiographic maps of the study area. The physiographic maps were prepared and presented in the forms of DEM, elevation map, aspect map, slope map, contour map and hillshade map for the areas under study. The generated physiographic maps can act as a valuable tool for policy planners and researchers for decision making. The maps provide complete topographic information of the area under study which can act as a guide to plan various agriculture management practices in the study area. Physiographic maps of the study area revealed that the maximum area lies in elevation range between 450-800 m amsl with gentle slope which is uniformly distributed in different aspect classes.

**Keywords:** Fruit crop diversity, Mapping, Physiographic mapping

## Abstract- 5PSRM2022/136

### EFFICACY OF PROBIOTIC LACTOBACILLUS IN PLANT GROWTH PROMOTION

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A probiotic is a nutritional supplement that comprises live microorganisms in an adequate quantity required to induce a beneficial effect. Curd is the product obtained by naturally souring boiled or pasteurized milk by harmless lactic acid bacteria or other bacterial cultures. It may contain a wide variety of bacteria, which are not defined qualitatively and quantitatively. The number and type of bacteria also vary from home to home. In the current study, *Lactobacillus* isolates from curd are tested for their efficiency in promoting the growth of plants. Okra, tomato, and brinjal plants were selected to test the effectiveness of LAB for growth promotion. The plants were chosen in accordance with the season. The culture broth of LAB was used for the germination of seeds and also for the plant growth analysis. The use of LAB as bioinoculant showed increased emergence % at 40% concentration. The plants treated with LAB isolates were checked for different growth parameters such as shoot length, root length, shoot diameter, number of leaves, and number of secondary roots. The plants treated with both the isolates showed significant growth stimulation compared to the untreated (control) plants, especially in the fresh biomass. The plant growth stimulation rate varied under different concentrations for each plant. For okra and brinjal green round variety, both SL1 and SL2 isolates showed increased growth parameters at 40% concentration; in tomato and brinjal CVK variety, SL1 showed increased growth rate at 40% concentration and SL2 in 60% concentration.

**Key Words:** Probiotic, *Lactobacillus*, Nutritional Supplement, Plant Growth Stimulation

## Abstract- 5PSRM2022/137

### PESTICIDES EFFECT ON HUMAN LIFE AND ENVIRONMENT: AN OVERVIEW

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Now a day, Pesticides are widely used in agriculture to control a variety of harmful organisms that spoil the crops. More than 600 kinds of agrochemicals are used around the world. They provide conclusive benefit for agricultural production, even though, as a result, low amounts of some residues may persist in the food supply, air, water and soil and could constitute a significant exposure pathway for humans. The agricultural industry has been using chemical pesticides since the early 1900's. Chemists developed a new class of pesticides, organophosphorous (OP) compounds, during the Second World War, some of which also proved to be chemical warfare agents. OP pesticides are a group of highly toxic agricultural chemicals extensively used in plant protection. OP pesticides such as parathion, and methamidophos, are widely used around the world despite their high toxicity. OP pesticides are of particular interest since they represent the major proportion of agricultural pesticides utilized today. In last few years various scientists proved that compounds which belong to Ops groups are dangerous on human life, owing to their toxic effects such as, mutagenic, teratogenic and carcinogenic effects. Drastically, it was found that Leukemia, Lymphoma and Parkinson's diseases are linked with OPs exposure. Also, organophosphorous have harmful effects on the nervous system of the affected organisms where they inhibit acetyl cholinesterase. There are some available options to farmers could be used as alternative tools to pesticides and these tools including Integrated pest management, integrated crop management and sustainable agriculture. These tools represent the only solution to human to decrease the usage of pesticides to the minimum limits, which may guarantee a clean environment.

**Keywords:** Pesticides, Organophosphorous Compounds, Toxic Effects, sustainable agriculture

## Abstract- 5PSRM2022/138

### ROLE OF MICRONUTRIENT IN LIVESTOCK PRODUCTION

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Mineral Play very important role in Immunity, Production and Reproduction of animals. Deficiencies of certain mineral elements may cause reproductive disorders as minerals play an important role in health and reproduction of the livestock. Infertility and reproductive disorders have emerged as major problem in Indian livestock farming. Adequate supplementation of minerals depends on age, stage of pregnancy and lactation. For the formation of structural component of body and proper functioning of enzymes, hormones, vitamins and cells, macro and micro minerals are equally important. Area specific Mineral deficiency and toxicity is very common due to variable soil and climatic condition. So now a day's area specific mineral mixture is prepared by various organization.

**Keywords:** Micro Mineral, Reproduction, Infertility.

## Abstract- 5PSRM2022/139

### EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON VEGETATIVE, FLORAL ATTRIBUTES AND CORM YIELD OF GLADIOLUS (*GLADIOLUS GRANDIFLORUS* L.) VAR. ARKA AMAR UNDER HIGH HILL CONDITION OF UTTARAKHAND

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The present investigation was carried out at Floriculture and Landscaping Block, College of Horticulture, VCSG, Uttarakhand University of Horticulture and Forestry, Bharsar, Pauri Garhwal, Uttarakhand, during March to September, 2017 to find out the effect of integrated nutrient management on vegetative, floral attributes and corm yield of gladiolus (*Gladiolus grandiflorus* L.) var. Arka Amar under high hill condition of Uttarakhand. The experiment consisted of eight treatments viz., T<sub>1</sub>: Control, T<sub>2</sub>: 100% RDF, T<sub>3</sub>: 100% FYM, T<sub>4</sub>: 50% RDF + 50% FYM, T<sub>5</sub>: 75% RDF + 25% FYM, T<sub>6</sub>: 25% RDF + 75% FYM +

*Azotobacter* @ 25 g/L + *Trichoderma harzianum* @ 20 g/m<sup>2</sup>, T<sub>7</sub>: 50% RDF + 50% FYM + *Azotobacter* @ 25 g/L + *Trichoderma harzianum* @ 20 g/m<sup>2</sup> and T<sub>8</sub>: 75% RDF + 25% FYM + *Azotobacter* @ 25 g/L + *Trichoderma harzianum* @ 20 g/m<sup>2</sup> which were replicated thrice in Randomized Complete Block Design. The corms were planted at a spacing of 40 cm x 30 cm with twelve plants in each plot. The results of investigation revealed that minimum number of days taken to corm sprouts ( $17.27 \pm 0.70$  days), maximum number of sprouts per corm ( $2.40 \pm 0.12$ ) and number of leaves ( $9.80 \pm 0.70$ ) were recorded in treatment T<sub>7</sub>. Among all treatments, treatment T<sub>7</sub> also showed superiority in different floral attributes *viz.*, earliness in spike emergence and first floret opening ( $87.00 \pm 0.42$  days and  $95.30 \pm 1.19$  days, respectively), maximum days taken to full bloom of spike ( $24.73 \pm 0.13$ ), spike length ( $101.30 \pm 1.19$  cm), rachis length ( $72.34 \pm 0.97$  cm), floret per spike ( $18.60 \pm 1.06$ ), spike weight ( $92.84 \pm 1.82$  g), number of spike per plant and per plot ( $2.77 \pm 0.03$  and  $29.33 \pm 0.33$ , respectively) and vase life ( $10.00 \pm 0.19$  days). In respect to corms yield parameters, maximum number of corms per plant and corms per plot ( $3.00 \pm 0.31$  and  $34.33 \pm 1.45$ , respectively) were found in treatment T<sub>7</sub>. However, maximum number of cormels per plant ( $44.08 \pm 7.97$ ), corm weight and diameter ( $1.24 \pm 0.10$  g and  $5.10 \pm 0.22$  cm, respectively) were recorded in T<sub>6</sub> and found statistically at par with T<sub>7</sub> ( $40.93 \pm 6.28$ ,  $1.10 \pm 0.11$  g and  $4.83 \pm 0.07$  cm, respectively). The treatment T<sub>7</sub> also recorded maximum available organic carbon ( $1.40 \pm 0.04$  %), nitrogen, phosphorus and potassium ( $389.77 \pm 2.03$ ,  $38.42 \pm 2.85$  and  $257.24 \pm 7.85$  kg/ha, respectively) content in soil. The most profitable treatment in terms of economics of cultivation was T<sub>7</sub> with a cost: benefit ratio of (1:3.17). Thus, it can be concluded that treatment T<sub>7</sub> (50% RDF + 50% Farmyard manure + *Azotobacter* @ 25 g/L + *Trichoderma* @ 20 g/m<sup>2</sup>) was the most efficient one in respect to growth, flowering and corms yield attributes, in improving soil health and to get higher returns in gladiolus var. Arka Amar under high hill condition of Uttarakhand.

## Abstract- 5PSRM2022/140

### USEFUL PRODUCTS OF INSECT ORIGIN FROM FORESTS

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The rise in the world's population, associated with decline in food production and the deterioration of the environment, has both direct and indirect impacts upon the ecosystem. Such changes must be evaluated carefully for their short and long term consequences. We as humans tend to view the components of nature and changes within the ecosystems as beneficial or detrimental to ourselves. Insects are an integral part of the ecosystem, constituting 75% of all living organisms. Many insects and products of insect origin are important in our daily lives. In this context, we examine several ways in which insects are directly or indirectly beneficial. The most obvious and tangible of the benefit that come from insect activities are the products that insect make collect or produces such as silk, tasar, beeswax, honey, dyes, medicines. The value of forest to the environment has long been recognized. Forest constitutes one of the richest natural resources of the world. However, the environmental, aesthetic and economic values of forests could not be ignored. Forest contributes to the environment in the moderation of climate, conservation of soil, regulation of water supplies, control of droughts and floods, improvement of landscape, recreation. Economically they help in the production of various kinds of wood and non-timber products. The wood products include mostly timber, fuel wood and charcoal. Besides this, forest contributes the range of non-timber forest produce that includes valuable food, fodder, fibre, oil, paints, shellac, dyes medicinal plants collectively called "Non -Timber Forest Products" (NTFP). This term basically applies to all renewable and tangible products other than timber and firewood. The insects are also the integral part of the ecosystem that constitutes about 75% of the all living organisms. The insects and their products are very useful to us as they provide us with so many tangible benefits directly or indirectly as food, medicine, dyes, paints, gums resins, propolis etc. These useful products from insect origin could provide invaluable contribution to the livelihood of millions of

poor who live in and around the forests. These NTFPs from insects will also provide raw material to support several large scale processing enterprises as well.

**Keywords:** Useful Products, Insect Origin, Forests

#### **Abstract- 5PSRM2022/141**

#### **FLORA OF BINSAR WILDLIFE SANCTUARY, ALMORA UTTARAKHAND**

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Himalayas are globally important biodiversity hotspots and are facing rapid loss in floristic diversity and changing pattern of vegetation due to various biotic and abiotic factors. Floristic diversity of protected areas has been given little attention throughout the Indian Himalayan region (IHR). The paper deals with the enlisting of the flora of Binsar wildlife sanctuary Almora Uttarakhand. Study provides comprehensive information of vascular plants of the Sanctuary, which will form base line data for developing management plans.

**Keywords:** Camp, Indian Himalayan region, Biodiversity, Binsar wildlife sanctuary

#### **Abstract- 5PSRM2022/142**

#### **STATUS OF SOIL ORGANIC CARBON UNDER PREVALENT CROPPING SYSTEMS IN HAMIRPUR DISTRICT OF HIMACHAL PRADESH**

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Cropping systems are important component of a farming system and defined as the order in which the crops are cultivated on a piece of land over a fixed period or the way in which different crops are grown. Soil organic carbon (SOC) has been recognised as the most important indicator of soil quality and agronomic sustainability due to its influence on other physical, chemical and biological indicators of soil quality. It ranged from 8.40 – 14.70, 6.70 – 13.50, 9.50 – 19.20 and 5.10 - 11.70 g kg<sup>-1</sup> with mean values of 11.10, 9.55, 14.05 and 7.96 g kg<sup>-1</sup> under cereal - cereal, cereal - oilseed, vegetable - vegetable and fodder -

fodder cropping systems, respectively. Coefficient of variation was observed as 14.32 for cereal - cereal, 16.44 for cereal - oilseed, 14.80 for vegetable - vegetable and 19.70 per cent for fodder - fodder cropping systems. Percentage distribution of SOC under cereal-cereal and vegetable – vegetable cropping system, hundred per cent of the soil samples were in high category. In cereal – oilseed cropping system, 87.50 per cent of soil samples were reported in high category and 12.50 per cent soil samples were in medium category. In fodder – fodder cropping system, 60.42 and 39.58 per cent soil samples recorded to fall under high and medium category, respectively. Mean organic carbon content of soil was found comparatively higher in vegetable - vegetable cropping system as compare to the other cropping systems. Higher organic carbon content in vegetable – vegetable cropping system may be attributable to more frequent additions of FYM and more biomass addition. Soil organic carbon was positively correlated with all the soil properties except sand content, clay content and bulk density.

**Keywords:** Organic carbon content, Cropping systems, Soil quality

### **Abstract- 5PSRM2022/143**

#### **EFFECT OF DRIP IRRIGATION, MULCHING AND MICRONUTRIENT IN VEGETATIVE, YIELD AND QUALITY OF LITCHI CV. ROSE SCENTED**

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The present study entitled "Effect of drip irrigation, mulching and micronutrient on vegetative, Yield and Quality of Litchi cv. Rose Scented" was carried out at Horticulture Research Centre, Patharchatta, GBPUA&T, Pantnagar during 2018-19 and 2019-2019 on year age treeplanted at a spacing of 5m x 5m. There experiment consist of application of water through drip irrigation at 25%, 50%, 75%, 100% and 125% of estimated water requirement (ER), mulch alongwith foliar spray of borax or copper sulphate. However, the control was given surface irrigation. The experiment was laid out on randomized block design comprising of three replication. The pooled data showed that among the vegetative parameter, tree height (m) was found to be non-significant while stem girth and canopy volume (m<sup>3</sup>) were significant and maximum values were recorded with 125% ER with

Plastic Mulching and Borax spray. While minimum was recorded for 25% ER and copper sulphate spray. Number of fruits and fruit yield for both the years and pooled data was noted significant. The other attributes i.e., total soluble solids (0 Brix), acidity (%), ascorbic acid content (mg/100g), number of fruits/tree and yield (kg/tree) were found to be significantly influenced by drip irrigation, mulching and micronutrient and their interaction. Maximum number of fruits and fruit and yield were found with 75% ER irrigation coupled with Mulch and Borax application. While least were obtained with control and 25% ER irrigation coupled with Mulch and Borax application. Fruit quality parameters such as T.S.S. (°B), acidity (%) and ascorbic acid (%) were found to be maximum in case of 75% ER with Plastic Mulching and Borax spray, while, least were obtained with control.

### **Abstract- 5PSRM2022/144**

### **FRUITING BEHAVIOUR OF SELECTED GUAVA VARIETIES FOR DEVELOPING F1 HYBRID**

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The experiment was conducted at Horticulture Research Centre, Patharchatta, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, during the years 2019-20. Twelve genotypes were selected (7 Line and 5 Taster) and made the cross in Line x Taster design. A total number of 35 cross combinations were made, out of these fruits are harvested from only 29 cross combinations. Among the all 29 cross combinations highest fruit set percent was recorded in Allahabad Safeda x Local Germplasm (88.90 %) and Hisar Safeda x L-49 (85.80%) followed by Allahabad Safeda x Pant Prabhat (78.60%), while lowest in Sanghreddy x Lalit (8.3 %) and Sanghareddy x Arka Kiran and One Kg x Local Germplasm (11.1 %) followed by One Kg x L-49 (13.3%). Fruit drop percent was found highest in Sanghreddy x Lalit (91.7%) and in One Kg x

Local Germplasm and Sanghareddy × Arka Kiran (88.90%) followed by One Kg × L-49 (86.7%) while minimum in Allahabad Safeda × Local Germplasm (12.5%) and HisarSafeda × L-49 (16.7%) followed by Allahabad Safeda × Pant Prabhat (27.2%). In terms of fruit retention percent maximum found in Allahabad Safeda × Local Germplasm (87.5 %) and HisarSafeda × L-49 (83.3%) followed by Allahabad Safeda × Pant Prabhat (72.8%), while lowest in Sanghreddy × Lalit (8.3 %) and Sanghareddy × Arka Kiran and One Kg × Local Germplasm (11.1 %) followed by One Kg × L-49 (13.3%). In case of seed germination percent highest was recorded in HisarSafeda × Local Germplasm (59.9%) and in HisarSafeda × Pant Prabhat (57.9%) followed by Allahabad Safeda × Arka Kiran (56.6%) and least in VNR Bihi × L-49 (5.1%) and in VNR Bihi × Pant Prabhat (11.2%) followed by in HisarSurkha × Arka Kiran (23.4%).

**Keywords:** Hybridization, Fruiting, Germination, Line x Taster cross combination

### Abstract- 5PSRM2022/145

#### ORNAMENTAL PLANTS AS PHYTO REMEDIATION PROPERTY

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Phytoremediation is an eco-friendly and economical technology in which plants are used for the removal of contaminants presents in the urban and rural environment. Ornamental plants grown for decorative purposes in gardens and landscape design projects have been an important source of remediation plants in recent years. Phytoremediation has attracted increasing attention and is a promising technology for addressing soil contamination problems. Unlike other kinds of remediation plants, ornamental plants grown for decorative purposes in gardens and landscape design projects have been an important source of remediation plants in recent years. Accumulation of heavy metals (HMs) by ornamental plants (OPs) from contaminated agriculture soils is a unique technique that can efficiently reduce the metal load in the food chain. Amaranthus tricolor L. has attractive characteristics acquiring a higher growth rate and large biomass when grown at heavy metal contaminated soils. Some of the ornamental plants that have been tested are rather

sensitive to heavy-metal stress, with symptoms of phytotoxicity occurring even in the presence of low heavy-metal concentrations. According to a preliminary screening of 30 types of annual or biennial herbaceous ornamental plants, *Amaranthus hypochondriacus* and *Lupinus polyphyllus* showed extremely poor tolerance to Pb (1000 mg/kg dry weight soil) compared with the controls, and the shoot biomass of these 2 plants decreased by 49% and 88%, respectively. It is a low cost and effective soil treatment option for metal reclamation compared to the conventional method which are very expensive and can cause disturbance to the soil. In addition to beautifying the environment, some ornamental plants can not only grow well but also accumulate or degrade contaminants when growing in soil contaminated with heavy metals or organic pollutants. Especially in contaminated urban areas, it is comparatively rare and commendable when remediation plants with ornamental value are applied.

**Keywords:** contaminated soil, heavy metals, ornamental plants, phytoremediation, organic materials

#### **Abstract- 5PSRM2022/146**

#### **HETEROSESIS BREEDING FOR YIELD AND QUALITY IMPROVEMENT IN BELL PEPPER (*CAPSICUM ANNUUM* L. VAR. *GROSSUM* SENDT.) IN MID HILLS OF UTTARAKHAND**

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The investigation based upon Heterosis for yield and yield attributing traits in Bell pepper (*Capsicum annuum* L. var. *grossum* Sendt.). The research work was conducted at the Vegetable Research and Demonstration Block, Department of Vegetable Science at College of Horticulture, VCSG Uttarakhand University of Horticulture and Forestry, Bharsar. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Five diverse parental lines of capsicum were crossed in a diallel fashion (excluding reciprocals) to obtain ten cross combinations to study heterosis for yield and quality improvement traits. Significant differences were observed among genotypes for all the traits studied. Significant heterobeltiosis and average heterosis was observed in desirable direction for all traits. Eight cross combinations over better parent, nine crosses

over mid parent and five crosses over the commercial check exhibited positive and significant heterosis for yield per plant.

**Keywords:** Heterosis, Bell pepper, RCBD, Diallel, Heterobeltiosis

### **Abstract- 5PSRM2022/147**

#### **REVIEW PAPER: DOUBLING FARMER'S INCOME**

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As we all know that agriculture is the backbone of India, as the population is increasing day by day and availability of land is decreasing so it is important to increase the production for food security. Although from past few years 45 percent of the food production per person has been increased which not only made India self sufficient but also increased the net export. And it is clearly seen that during COVID-19 when every sector's GDP is drastically decreased, agriculture was the only sector that has increased the GDP but the question arises that whether the agriculture provided enough income to the farmers and this gives a reality check that there is a huge difference between the production and inputs given by the farmers *i.e.*, availability of market, technologies, management and so on. Therefore government of India set up a target of doubling farmers' income by 2022-23, and initiated a number of steps, such as providing crop insurance, improving market infrastructure and its efficiency, promoting organic farming, restoring soil health and so on. Doubling of farmer's income has several dimensions from production to management to marketing which include bridging yield gap, crop diversification, improvement in total factor productivity and proper management of irrigation along with the provisions of market and institutional support for efficient post harvest management. Chand *et al.* (2015) carried an experiment which revealed that farm income increased at different rates in different periods depending upon the growth rate in output, increase in wage bill, and changes in prices received by farmers relative to the changes in consumer price index for agricultural labour (CPIAL). Government of India is aiming to reduce middle men, modernize value chain, attract modern private investments

in agri-market and therefore ensure a better deal for the farmers. A joint venture between the Govt. of Karnataka and NCDEX spot exchange limited provided a great platform for a farmer which shows a big benefit at national level. Farmers are using online marketing developed by ReMS which is similar to e-NAM initiative of GOI. After introduction of online trading and Union Market Platform (UMP) modal prices in mandis in Karnataka witnessed much higher increase than the increase in wholesale prices of the same commodity in the country. The increase in real terms varies from 1% to 43%. Some recent development initiatives of the central govt. aiming to raise output and reduce cost include PMKSY, soil health card and PMVY another major initiative that provides insurance against crop and income loss in PMFBY. It encourages investment in farming. Adaptation of new technologies like modern machinery such as laser land leveler, precision seeder and planter and practices like SRI, direct seed rice, zero tillage, raised bed plantation and ridges plantation allow technically highly efficient farming. Therefore the main emphasis should be done to inform a farmer about the new technologies, policies like APMC Act which shows special treatment to fruits and vegetable and application and use of IT and e-commerce in agricultural marketing at the first point by GOI for improving their income. According to ICAR-CIPHET (2013-14) it was estimated that 5.8% of food output get lost during the harvest and transit which directly affected the farmer's income therefore requirement for storage is necessary to prevent such losses. Many progressive policies and initiatives are taken up by the central government and state government for achieving the goal of doubling farmer's income by the year 2022.

**Keywords:** Doubling farmer's income, COVID, Govt. Policies

## Abstract- 5PSRM2022/148

### **BIO-EFFICACY OF OCIMUM SANCTUM LEAVES AGAINST MUSTARD APHID *LIPAPHIS ERYSIMI* KALTENBACH AND ITS NATURAL PREDATOR *COCCINELLA SEPTEMPUNCTATA* LINN.**

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Eco-friendly control of mustard aphid *Lipaphis erysimi* Kaltenbach can be possible with *Ocimum sanctum* L. (Lamiaceae) leaf extract. The plants are known to have synthesized a diverse array of chemicals to prevent their colonization by insects and other herbivores. These chemicals to prevent repel approaching insects deter feeding and oviposition on plants, disrupt behaviour and physiology of insects in various ways and even toxic to different developmental stages of various insect species. In the present study *Ocimum sanctum* leaves has been tested for its aphidicidal and insecticidal properties as plant products are gaining global importance due to their biodegradable and ecologically compatible nature and ill effects of synthetic and chemical pesticides such as pest resistance, pest resurgence, detrimental effects on non target organisms and environment. All the three concentrations (2, 3 and 4%) of *Ocimum sanctum* leaves tested were found effective after different lengths of period, since they caused complete mortality after a maximum period of 96 hours. A concentration of 4% was found to be most effective as it caused complete mortality of both the nymph and adults after 48 hrs. of a single spray. Leaves of *Ocimum* found safe against its natural predator *Coccinella septempunctata* Linn. Thus leaves extract of *Ocimum sanctum* found to be an effective protectant for *Brassica* oil seed crop against *L. erysimi*.

**Key Words:** *Lipaphis erysimi*, *Ocimum sanctum*, eco friendly control, leaf extract, mustard aphid

## Abstract- 5PSRM2022/149

### BIOFUELS: A GREEN ALTERNATIVE OF THE FUTURE

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Currently the global energy demand is met by burning non renewable fossil fuels. Besides, their considerable role in greenhouse effect, they are dangerous to produce, cause water pollution, air pollution, oil spills and detrimental effect on aquatic life and human health. This has put the pressure for searching a sustainable alternative source of energy. Biofuels are combustible fuels like biodiesel and bio-ethanol, that are made from biomass materials. These can either be used alone or blended with petroleum fuels. Biodiesel fuel can be produced from vegetable oils, animal fats or recycled cooking oils by transesterification process and ethanol is produced from sugars in grains, potato, sugarcane or sugar beets by the process of fermentation. Biodiesel is used in engines that burn diesel fuels like trucks and tractors whereas, ethanol can be used in engines that burn gasoline, mostly cars. Biofuels are classified into various generations based on feedstock. First generation are the conventional biofuels produced directly from food crops like corn, wheat and sugarcane. Second generation are advanced biofuels produced from non-food biomass which includes plant materials and animal wastes. Third generation refers to biofuels derived from algae and fourth generation biofuels do not require destruction of biomass and includes electro fuels and photobiological solar fuels. These are cleaner sources of fuels and produces fewer air pollutants. Furthermore, biofuels are non-toxic, cost effective, have low sulphur content and are biodegradable and alternative source of energy. Therefore, need of the hour is to establish biofuels as an effective and environment-friendly option for the present as well as future energy needs.

### **Abstract- 5PSRM2022/150**

## **TO EXPLORE ON THE BASIS OF MORPHOLOGICAL CHARACTERISTICS AND CHEMO-PROFILING LARGE CARDAMOM FARMING AS AN APPROPRIATE LIVELIHOOD OPTION FOR MOUNTAIN INHABITANTS OF UTTARAKHAND**

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Large cardamom (*Amomum subulatum* Roxb) commonly known as a badielaichi, is a tall, perennial, evergreen, herbaceous monocot plant. Large cardamom is well known spice, which has medicinal value. The present study has been designed to explore the base line morphological characteristics, chemo-profile which can explore large cardamom farming as an appropriate livelihood option for mountain inhabitants of Uttarakhand. Therefore, a detail of the morphological characteristics of the cultivars cultivated in Uttarakhand is provided in present investigation. Gas Chromatography Mass Spectrometry (GC-MS) was used for the analysis of essential oil from different agro-climatic zones of Uttarakhand. Maximum percentage of oil yield was found between 2.5% to 3% from the sample of different agro-climatic regions. 1-8 Cineol with 68% to 82.0% was the most dominant compound in all the samples. Other major compounds were 4-trimethyl (1.87% to 4.82%),  $\beta$ -pinene (1.88% to 3.56%),  $\beta$ -Terpineol (1.21% to 3.83%), Nerolidol (0.62% to 2.82%), DL limonene (1.01% to 2.51%) and Limonene (0.98% to 3.82%). Presence of higher concentration of essential oil (%) in all analyzed sample of Uttarakhand indicated that the species grown in Uttarakhand is of higher genotype. The GC-MS analysis of essential oil indicates quantitative variations within intra-specific and may attribute to the micro-climate under which the species grown. FT-IR analysis was used for the identification presence of 1,8 Cineole in *A. subulatum* essential oil and determine the functional group presents, through comparing the vibration frequencies in wave numbers of the different sample. The functional group were observed vinyl, sulfonates, Amines, sulfoxides, aromatic bending and *trans* RCH-CHR, respectively. The economic benefit and presence of preferable habitat in mountain regions of Uttarakhand clearly indicated that large cardamom farming is an appropriate livelihood option.

**Keywords:** morphological characteristics, chemo-profile, 1-8 Cineol, essential oil, livelihood

## Abstract- 5PSRM2022/151

### RIVERINE BIRDS DIVERSITY OF THE AATAGADH VALLEY CHAMOLI, UTTARAKHAND

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Present paper deals with study was carried out in Aatagadh valley (latitude 30° 5' 28"N to 30° 13'45"N and longitude 79° 6'27"E to 79° 15'40"E) including part Adibadri to Simli, Uttarakhand. Aatagadh is an important tributary of river Pinder, which is the parental stream of Alaknanda. The confluence with Pinder of this stream, is at Simli. Study was carried out in riverine habitat in the valley for one year during May 2020 to April 2021. Out of the total 97 bird species belonging to 9 orders, 21 families recorded in study area. Highest diversity of birds (Shannon index-H') was recorded in summer seasons H'= 4.09, lowest diversity of birds (Shannon index-H') was recorded in winter seasons H'= 3.36. The order Passeriformes and family Muscicapidae were dominant on other group of birds. Five species of game birds viz., Red jungle fowl *Gallus gallus*, White crested kaleej pheasant *Lophura leucomelanos hamiltani*, Cheer pheasant *Catreus wallichii*, Chukar partridge *Alectoris chukar*, and Black partridge *Francolinus francolinus* were sighted in the study area.

**Key words:** avian diversity, relative abundance, bird species, Shannon index-H'.

## Abstract- 5PSRM2022/152

### DISEASE MANAGEMENT IN ORGANIC FARMING

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Organic farming stands for fair and responsible land management. Its aim to protect the health and social well-being of present scenario and future generation and the environment pollution. Due to increased awareness about the fallouts of the indiscriminate use of agro-chemicals fertilizers. Nowadays, first focus on safe and healthy food has been

increasing. The major concerns on effects of plant protection chemicals on the flora, fauna, humans, and environment. Though the use of chemical inputs in agriculture is inevitable to contain dreaded pests and meet the growing demand for food in a populous nation like India, there are opportunities in selected high value fruit and vegetable crops where organic production can be encouraged to meet the domestic and export demand for fresh fruit and vegetables. Disease management is a necessary element of the organic farming. There are several organic manure or fertilizers (eco-friendly) environmentally techniques which can be prudently and strategically incorporated in a well-crafted organic production technology module for specific crops. Modification in cultural practices (promotes healthy soils and healthy plants), mechanical destruction of source of inoculum, clean cultivation use of organic amendment and bio-fumigation, developing pesticides of organic origin, encouraging natural biological agents (Trichoderma sp, Pseudomonas sp and Bacillus sp), physical methods like use of cover and trap crops, use of heat treatment, cold temperature, solar energy (anaerobic soil disfestations), botanicals, essential oils, baking soda, butter milk, Panchgavya, etc. can be used to manage disease incidence below economic injury level (EIL). The present study is focus on disease management in organic farming.

**Keywords:** Organic farming, plant protection, management, pesticides, bio-fumigation.

### **Abstract- 5PSRM2022/153**

#### **β-carotene Content of Some Commonly Consumed Vegetables and Fruits Available in Dehradun, India**

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Generally vitamin A in the diet comes from plant food sources in developing countries. This study was designed with an objective of determining β-carotene content of some commonly consumed green leafy vegetables, tubers and fruits obtained from wholesale markets in Dehradun, India using HPLC. There was a wide variation in β-carotene content of green leafy vegetables, with means ranging from 2289 µg/100 g in *Basella rubra* to 7665 µg/100 g in *Amaranthus gangeticus*. A large variation was observed

in  $\beta$ -carotene content of fruits and the mango varieties tested, ranging from undetectable levels in strawberry and 819.60  $\mu\text{g}/100\text{ g}$  in *totapuri* mango up to 11789  $\mu\text{g}/100\text{ g}$  in *alphonso* mango. Approximately 65 g and 100 g of a green leafy vegetable would meet daily requirement of a preschooler and older child/adult respectively. Mango has considerable amount of  $\beta$ -carotene and consuming a medium-sized bowl by preschool children would meet 99% of Recommended Dietary Allowances (RDA). The information generate disuse ful inidentifying types of fruits and vegetables with higher concentration of the provitamin A in low-income economies where fruits and vegetables are expensive. Individuals need to consume only small quantities of these vitamin A rich foods to meet daily requirement.

**Keywords:**  $\beta$ -carotene; Greenleafy vegetables; Tubers; Fruits; provitamin A; HPLC;

#### **Abstract- 5PSRM2022/154**

#### **BIOCONTROL EFFICACY OF ENTOMOPATHOGENIC NEMATODES AGAINST FALL ARMYWORM IN MAIZE**

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The occurrence of *Spodoptera frugiperda* (J.E. Smith) in Asia was reported for the first time from Karnataka in 2018. In India, this pest is very prevalent and seriously harms maize. Chemical management is used to manage this recent invading pest in maize-growing regions. Thus, this study aim edto select virulent entomopathogenic nematodes (EPNs) isolates based on the laboratory assay and further to test the efficacy of virulent isolates in the pot culture experiment. Laboratory results revealed that both *Heterorhabditis indica* 1NBAIIH68 and *Steinernemacarpocapsae* NBAIRS49 caused 100% mortality in third-and fourth-instar larvae of *S. frugiperda*, while these two species caused 85% and 72% mortality in pupae, respectively. When pupae of *S. frugiperda* were exposed to EPNs, pupae died after metamorphosis to malformed adults. All the nematode species were able to penetrate and reproduce within *S. frugiperda* larvae, but the reproduction rate for Heterorhabditids was higher than that of Steinernematids. Pot experiment results revealed that *H. indica* 1NBAIIH68 significantly reduced the number of larvae and leaf damages corescompared to *S. carpocapsae* NBAIRS49.

## Abstract- 5PSRM2022/155

### A REVIEW ON ETHNO-MEDICINAL PROPERTIES OF *SESAMUMINDICUM* (TIL)

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Til (*Sesamumindicum*) is known as the "Queen of Oil Seeds." It is an annual flowering diploid ( $2n = 26$ ) dicotyledon plant of the Pedaleceae family. It is one of the oldest domesticated oil seed crops in Uttarakhand and is cultivated in the Kumaun and Grahwal regions. Til contain some special phytochemicals like protein, fibre, oil, minerals, antioxidants, and seed oil is a rich source of omega-6 fatty acids. These phytochemicals are highly used for ethno-medicinal and therapeutic purposes. The seed oil is used for the treatment of hair, asthma, skin disease, teeth, and bones. The other parts of the plant are also useful, like the leaves, which are used in infant cholera, diarrhea, and dysentery; wound healing, amenorrhea, hemorrhoids, and urinary infections; flowers useful in the treatment of cancer, alopecia; and roots having antifungal activity. This article attempts to present a comprehensive review of the ethnomedicinal uses and health benefits of *Sesamumindicum*.

**Keywords:** Ethno-medicinal, Phytochemicals, *Sesamumindicum*, Therapeutic

## Abstract- 5PSRM2022/156

### ROLE OF FARMER'S FRIENDLY WEBSITES/PORTALS/APPS IN AGRICULTURE

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A website is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. Notable examples are wikipedia.org, google.com, and amazon.com etc. Websites have played a pivotal role and has profoundly changed our agricultural techniques. It has provided the farmers and researchers with adequate data on their doorsteps. It provides comprehensive information

on the Agricultural Universities and Institutional websites. So that people related to agriculture can get latest news and updates of weather, latest varieties, insecticides, pesticides, etc.

### Abstract- 5PSRM2022/157

#### **ANTIMICROBIAL ACTIVITY OF EXTRACT OF MUSHROOMS (AGARICUSBISPORUS) AND (PLEUROTUSOSTREATUS) AGAINST FUSARIUM WILT OF CHICKPEA**

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Chickpea ( *Cicer arietinum*(L.) Is one of the most Important rabi pulse crop grown in India. Chickpea rank 3<sup>rd</sup> in the global production of pulse. Chickpea is the most dominant pulse having a share of around 40 per cent in the total production of pulse in India. The edible mushrooms *A. bisporus* and *P. ostreatus*, have nutrient value, enhance the immune system, potential of host mediated response and may be act as a antimicrobial agent. It is a lignin – degrading fungus that thrive on a variety of lignocellulosic substrate. Fusarium wilt of chickpea is the major soil borne disease of chickpea from the early seedling stage through maturity occur infected plant. The study revealed that mushroom metabolites inhibit growth of the fusarium wilt of chickpea through poison food technique *in* – *Vitro* condition. However, organic solvent mushroom extracts methanol and acetone extracts were used. In this study, dried *P. ostreatus*, and *A. bisporus* were extracted with (5%, 10%, 15%) methanol and acetone separately, were evaluated *in vitro* against *F. oxysporum* f. sp. *cicer* through dual culture technique. The data show that the maximum mycelium growth (90mm) was recorded in control after 168 hrs. The result revealed that the all organic solvent mushrooms extracts *viz*, methanol extract of *P. ostreatus*, acetone extract of *P. ostreatus*, methanol extract of *A. bisporus*, and acetone extract of *A. bisporus* were tested under laboratory condition exhibited the inhibition in growth and colony diameter maximum inhibition 38.83, 47.21 and 56.41 percent were recorded in methanol extract of *A. bisporus* (5%, 10%, 15%) concentrations where the colony diameter was 58.65, 47.51,

39.23 mm respectively as compared to 90mm in control. In methanol extract of *P. ostreatus*(5%, 10%, 15%) concentrations 64.67, 52.62, 45.3 mm radial growth was recorded with 28.14, 41.53, 49.63 per cent inhibition followed by acetone extract of *P. ostreatus*(5%, 10%, 15%) concentration 67.45, 56.35, 49.66 mm growth were recorded with 25.05, 37.38, 44.82 per cent inhibition growth of mycelium respectively, acetone extract of *A. bisporus* found least effective among all the organic solvent of mushroom extracts with the growth inhibition of 19.73,29.47 and 38.2 per cent.

### **Abstract- 5PSRM2022/158**

#### **ESTIMATION OF HEAVY METALS CONTENTS (I.E. CU, PB AND FE) IN BLACK TEA**

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Tea is one of the most common potables in all over the world. Next to water, it's the most consumed libation. During the last decades, there has been an expansive increase in the level of heavy metals in tea and other foods. The impurity of tea by heavy metals may pose a serious trouble to mortal due to their toxin, wide sources ,nonbiodegradable properties and cumulative actions. The aim of this study was to estimate the heavy metal particles i.e. copper, iron and lead content of several commercially available brands of tea in India. Ten of the most extensively consumed brands of black tea were bought from original requests. Copper, Iron and Lead contents in the tea were determined by atomic absorption spectrophotometer after acid digestion. Among the investigated metals, Fe was the highest (197.52 $\mu$ g/g). Copper was the alternate highest (18.15  $\mu$ g/g) essence set up in black tea samples, whereas Pb showed minimum levels (1.85  $\mu$ g/g). The data attained in the present work compared well with the counterpart data reported internationally. Grounded upon the present safety norms, the tea performances named in the present study were set up to be safe for mortal consumption. On the other hand, routine check and frequent analysis of foodstuff is also needed with intention to avoid the threat of exceeding the input beyond the forbearance limits norms

**Keywords:** Black tea; Heavy metals; Atomic absorption spectroscopy (AAS)

## Abstract- 5PSRM2022/159

### ADVANCED TECHNIQUES FOR THE EXTRACTION OF TEA POLYPHENOL

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Tea, a product made from the leaves and buds of the tea plant (*Camellia sinensis L.*), has become most commonly consumed flavoured, functional, and therapeutic beverages in the world next to the water. Fresh green tea leaves contain 30% in dry weight (DW) polyphenols, which mainly include catechins, anthocyanins, flavanones, and phenolic acids and among which catechins are predominant. Recently, tea has become increasingly due to the higher concentration of polyphenols which prevalent owing to its advantageous health-improving effects, such as anti-cancer, antioxidant, anti-obesity, anti-inflammatory, anti-bacterial, and anti-neurodegenerative activities. Various techniques have been used for the extraction of tea polyphenols and have significant influence on the yields and characteristics of tea polyphenols. In general, traditional extraction techniques, such as maceration, percolation and Soxhlet extraction, are most commonly used methods to extract tea polyphenol. However, these traditional methods have some drawbacks such as large consumption of organic solvent, low yield, long extract time and low efficiency. Therefore, some new extraction methods came into being to overcome these problems, including high-pressure, pressurized hot water, cold extraction, supercritical fluid, ultrasound-assisted extraction, pressurized liquid extraction, enzyme-assisted extraction and microwave-assisted extraction (MAE) have been widely used for the extraction of tea polyphenols.

## Abstract- 5PSRM2022/160

### COMMON WEEDS HAVING ANTIFUNGAL ACTIVITY AGAINST PHYTOPATHOGENIC AS WELL AS HUMAN PATHOGENIC FUNGI

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Weeds play a vital role in nature because they are unwanted growth on earth which are beneficial or harmful for human as well as animals. Weeds are rarely harmful. Weeds are responsible to substantial losses and extensive damages to environment. Weeds are natural products and confirmed that contain bioactive compounds which inhibits of many diseases and infections in human and animals. Weeds are major part of agriculture and help to increases yield and quantity of products or also maintain environment threats. Today use of mycoherbicides to control of plants diseases. Mycoherbicides possess benefit to environment, cost effective and help in identify to new herbicide mechanism. Weeds contain rich variety of secondary metabolites such as alkaloids, tannins, flavonoids, which show antimicrobial, antifungal activity against fungi, or bacteria. Common method such like as mechanical, chemical have some draw back toxic in nature and also costly but herbicidal is a natural, cost free and ecofriendly to environment. Weeds are also resistant mostly microbial diseases when we compared to crops, which shows symptoms of diseases. In worldwide medicinal plants held an important role and play a vital role in ecosystem. The present investigation we focused antifungal activity of weeds using solvent methanol, hexane, chloroform and distilled water such weeds like *Achyranthes aspera*, *Chenopodium, album*, *Calotropis procera*, *Ocimum sanctum*, *Boerhavia diffusa*, *Parthenium hysterophorus* and *Colocynthis citrullus* against *Alternariasp. Aspergillus spp. Fusarium spp. Mucor spp.*, *Phytophthora* spp., Mucormycosis, Dermatophytes and Arthroderma are human diseases caused by pathogenic fungi.

**Key Words:** Weed, Fungicide, Herbicide, Ecofriendly, and Environment

## Abstract- 5PSRM2022/161

### HYDROPONIC AND FIELD EVALUATION OF SINGLE AND COMBINED DEFICIENCY OF NITROGEN AND IRON IN WHEAT

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Wheat is the most extensively cultivated food crop worldwide contributing approximately 27% of global grain production. Around 40% of people worldwide are at risk of malnutrition due to deficiency of Iron (Fe), Zn (Zinc) and protein in their diet. Nitrogen (N) and Fe are two important mineral nutrients required for plant growth and development. Crosstalk between different N and Fe and their effects in the changing nutrient environment are very scarce. Genotype HD3298 is reported for its bio-fortified qualities and high Fe (43.1 %) and protein (12.12 %) content. The present investigation was conducted to determine the effect of Fe, N and dual (-N-Fe) starvation on bread wheat variety HD3298 at physiological and biochemical levels. Another aim was to understand the impact on the grain filling and grain morphology. The seeds were sown in the field with adequate moisture at the Division of Plant Physiology, ICAR-IARI, New Delhi, during *rab* 2021–22 cropping season in field and grown in hydroponic conditions, according to Sathee et al., (2018). The field was separated into four blocks: one for control (C), one for nitrogen deficiency (-N), one for iron deficiency (-Fe), and one for combined deficiency (-N, - Fe). The changes in growth, yield parameters, grain phenotyping, and plant biochemical response were examined in response to -N, -Fe, and -N-Fe levels in Hydroponic and field conditions. Total biomass and yield parameters at harvest varied significantly based on the N and Fe levels. The average plant height was lowest in the -N-Fe treatment. Under -N-Fe and -Fe, the mean values of effective tillers decreased. The mean values of total biomass in HD3298 were significantly different between control and -N-Fe. The mean values of the weight of the ear decreased in dual nutrient deficiency. The number of spikelets on the main ear and the number of grains per ear

varied significantly based on nutrient treatments. Under –N-Fe, the mean values of the number of spikelet's on the main ear decreased. The number of grains per ear decreased under dual deficiency. Under –N-Fe, the overall grain yield decreased compared to control. Grain phenotyping showed a general reduction in grain size in –N-Fe condition wheat plants. Grain area, width and length also showed a decreasing trend. Different treatments were found to have a substantial impact on photosynthetic rate compared and control plant had the highest photosynthetic rate of all the treatments. The understanding developed from the current study will further help to engineer the plants to adapt to the changing nutritional environment.

**Keywords;** Bread wheat, Nitrogen, Iron, Photosynthesis, Nutrient deficiency, fluorescence, hydroponic.

### **Abstract- 5PSRM2022/162**

#### **GLOBAL WARMING AND CLIMATE CHANGE**

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Global warming occurs when carbon dioxide and other air pollutants and green house gases collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface. Normally, this radiation would escape into space - but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. That's what's known as greenhouse effect. The earth's ocean temperature are getting warmer, too - which means that tropical storms can pickup more energy. In the United States, the burning of fossil fuels to make electricity is the largest source of heat trapping pollution, producing about two billion tons of CO<sub>2</sub> every year. Coal burning power plants are by far the biggest polluter . In 2005, Hurricane Katrina - the costliest hurricane in U.S. history - struck New Orleans; the second - costliest, Hurricane Sandy, hit the East Coast in 2012. The impact of global warming are being felt across the globe. Extreme heat waves have caused tens of thousands death around the world in recent years. And in an alarming sign of events to come , Antarctica has been

losing about 134 billion metric tons of ice per year since 200. Many people think of global warming and climate change as synonyms , but scientists prefer to use " climate change " when describing the complex shifts now affecting our planet's weather and climate systems. Climate change encompasses not only rising temperature but also extreme weather events, shifting wildlife population and habitats , rising seas and a range of other impacts.All of these changes are emerging as humans continue to add heat trapping greenhouse gases to the atmosphere.

**Keywords:** Global warming and climate change

### **Abstract- 5PSRM2022/163**

#### **STUDIES ON YIELD AND QUALITY ANALYSIS OF GRAPE VAR. MUSCAT HAMBURG GRAFTED ON DOG RIDGE ROOTSTOCK AND OWN ROOTED**

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An experiment was conducted to study the growth, yield, and quality and petiole nutrient content of grape (*Vitisvinifera*) var. Muscat Hamburg grafted on Dog Ridge (*Vitischampini*) and own rooted Muscat Hamburg under Cumbum valley condition, Theni, Tamil Nadu. Randomly, ten vines were chosen each in grafted and own rooted in this study. Awareness of use of rootstocks is not much spread away in Cumbum valley. Use of rootstocks have major advantages on drought, salinity and nematode tolerance than own rooted cuttings. The growth characters viz., trunk diameter(42.46 mm), cane diameter(5.70 mm), shoot length after pruning(42.52 cm), inter-nodal length(3.53 cm), number of leaves per shoot(11.34), leaf length(10.85 cm), leaf breadth(12.51 cm) and leaf area(108.16 cm<sup>2</sup>) were recorded maximum in Muscat Hamburg grafted on Dog Ridge rootstock for the above growth parameter. The grafted Muscat Hamburg recorded the highest berry weight (3.67 g) and pulp weight (2.48 g) than own rooted. The number of clusters per shoot (1.46)

determines the yield of the vine which recorded the maximum in Muscat Hamburg grafted on Dog Ridge rootstock. The fruitfulness characters such as number of fruitful shoots per cane (1.37) and berry diameter (16.94 mm) were recorded better in Muscat Hamburg grafted on Dog Ridge rootstock. The yield characters *viz.*, total number of berries per bunch (87.00), yield per vine (21.87 kg/vine) was recorded as the highest in grafted vines. Obviously when berry weight was the highest in grafted type, it reflected in bunch weight (276.74 g) and bunch volume (231.49 cc) with maximum amount than own rooted. The quality parameters such as total soluble solids (16.89° Brix), reducing sugars (12.19 per cent), non reducing sugars (1.30 per cent) were recorded maximum in grafted vines while anthocyanin (0.42 mg 100 g<sup>-1</sup>) and acidity (0.73 per cent) were maximum in own rooted vines. The petiole nutrient content was analyzed for both macro and micro nutrients and it recorded the highest consumption by grafted vines. Thus, grafted Muscat Hamburg on Dog Ridge rootstock is tolerant to drought, salinity and nematode attack and also fulfill majority of farmers requirements to yield more income. Overall, use of Dog Ridge as rootstock for grape variety Muscat Hamburg was found promising to get enhanced vegetative growth parameter, berry character, yield of bunch and fruit quality, than own rooted material.

**Key words:** Dog Ridge, Muscat Hamburg, yield, quality, rootstocks.

#### **Abstract- 5PSRM2022/164**

#### **A COMPARATIVE STUDY OF DRINKING WATER QUALITY IN TWO MAJOR CITIES OF UTTARAKHAND, INDIA**

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Ground water plays an important role all over the world for the survival of human population. The present study was conducted in Haldwani and Rudrapur, two major cities of Uttarakhand, India. This comparative study involved water quality analysis of 12 water quality variables in both cities. Total 10 ground water samples (5 each city) were collected and analysed for various water quality constituents. The physical, chemical and microbiological parameters were analysed with reference to BIS standards. The physical parameters such as colour, odour and taste were assessed within the desirable limits in

both cities. The pH values were  $7.54\pm0.25$  and  $7.37\pm0.12$  for both sites. The concentration of total dissolved solids was assessed  $236\pm9.6$  and  $224\pm67.21$  in Haldwani and Rudrapur. However, no sample crosses the maximum permissible limit for TDS, alkalinity, hardness, calcium, magnesium and chloride in both cities. The bacteriological analysis of the samples does not show any sign of bacterial contamination in tube-wells water samples in both cities. Present study concludes that the parameters of drinking water quality in both cities are within the permissible limit and safe for drinking and irrigation applications.

**Keywords-** Ground water, Quality, Drinking, Irrigation, Permissible limit

#### **Abstract- 5PSRM2022/165**

#### **NATURAL RESOURCE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT**

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Natural resources is the key factor in human development and its sustainability. It provide fundamental support to life and economic processes. Natural resources refer to the material and substances available naturally and can be exploited for commercial uses. Natural resources management (NRM) is the method by which communities manage the supply and access to the natural resources available. As most of natural resources are non-renewable and depleting in nature, their exploitation and utilization need disciplined functioning. Sustainable development is that the development that meets the necessity of this generation without compromising the power of future generations to satisfy their own needs. It intends the social, economical and environmental well-being of human being for present and future. It helps in natural resources management as natural resources are utilized and saved. Natural resource management is obliged to refer to the concept of sustainable development. Sustainable development is not a constant level of equality, but rather in the form of a process with the utilization of resources, investment, orientation of technology development, and institutional change that is consistent with the needs of the present and the future. Sustainable development can be realized through the right

relationship between nature, socio-economic and culture. Properly managed, natural resources provide the foundation for maintaining and improving the quality of life of the world's population and can make invaluable contributions to sustainable growth. NRM contributes to poverty alleviation and natural resources should be used in a sustainable manner to enhance human welfare. However, the natural resources management must be regulated by the government so that natural resource management can be performed continuously. Certainly, it has implications for the process of natural resource management. All acts in the process of managing natural resources must hold on to sustainable and environmentally sound principles.

**Keywords:** Natural resource management, Sustainable development, Human welfare, Economic, Poverty alleviation.

### **Abstract- 5PSRM2022/166**

#### **IMPACT OF SOCIAL MEDIA ON SOCIETY**

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Social media have provided new opportunities to society to engage in social interaction on the internet. Through social media, anyone online is empowered by an unrestricted flow of information to add to their knowledge bank. In today's world, it is undeniable that social media plays an important role in impacting our culture, our economy and our overall view of the world. Social media is a new forum that brings people to exchange idea, connect with, relate to, and mobilize for a cause, seek advice, and offer guidance. Social media has removed communication barriers and created decentralized communication channel and open the door for all to have a voice and participate in a democratic fashion including people in repressive countries. It fosters creativity and collaboration with a wide range of commentators on a number of issues such as education, the economy, politics, race, health, relationship etc. Although it has brought about many benefits, allowing us to easily connect with friends and family around the globe, allowing us to break down international borders and cultural barriers. Social media has a negative impact on our lives because the

combination of isolation and global reach has eroded our culture. Social media is robbing us of trust and comfort we once placed in one another, replacing the human fellowship, physical and emotional support we once drew from each other with virtual connection. It robs us from self-control and from the ability to think independently and instead makes us gullible to join any group that posts perverse messages that tickle our ear and amuse our senses without evaluating the consequences. Ironically, social media is in effect turning us into one of the most antisocial generations, yet. We prefer texting to phone conversations, online chat to a face-to-face meeting, and many have replaced human interaction with convenient platforms such as Facebook, Twitter, WhatsApp, YouTube and Instagram.

**Keywords:** Social media, Society, Internet, Communication, human interaction

#### **Abstract- 5PSRM2022/167**

#### **SIGNIFICANCE OF BIO-FORTIFICATION IN CEREALS**

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Biofortification through transgenic breeding is an efficient, sustainable, and cost-effective approach to combat malnutrition. Deficiencies of Vitamin-A, Iron (Fe), Zinc (Zn) and other micronutrients affect over half of the world's population. Progress has been made to tackle micro-nutrient deficiencies through dietary supplementation, diversification and food fortification. However, these approaches are not sustainable and beyond the reach of poor consumers and has many social and economic constraints. The concentration of micronutrients/minerals and vitamins consumed through staple food by poor may be increased either through conventional plant breeding or through the use of transgenic techniques, a process known as bio-fortification. The results of efficacy and effectiveness studies, as well as recent successes in delivery system of biofortified food crops to the target consumers, provide evidence that bio-fortification is a promising strategy for combating these micronutrient deficiencies. Targeted breeding for bio-fortified varieties in several cereal crops have been initiated by exploiting available genetic diversity for Zn and Fe from wild relatives of cultivated species. The proof-of-concept results from the

performance of competitive bio-fortified lines showed good adaptation in target environments without compromising the core agronomic traits. Biofortification through biotechnological tools have also proven to be successful as bio-fortified varieties rich in Vitamin-A have been released through use of transgenic technology. It is well established that bio-fortification is a promising agriculturally based strategy for improving the nutritional status of malnourished population throughout the world.

### **Abstract- 5PSRM2022/168**

#### **STUDIES ON DIVERSITY OF ETHNOBOTANICALLY IMPORTANT FERNS AND THEIR CONSERVATION STATUS IN TEHRI DISTRICT OF UTTARAKHAND HIMALAYA**

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The study records 154 species of fern belonging to 55 genera and 28 families from the study area, constituting 12-15% of total fern flora of India. The present communication deals with the 60 ethnobotanically important ferns of district Tehri Garhwal and their conservation status. Ethnic people and locales traditionally utilizes the fern diversity for different purposes *viz.* food, fodder, fuel, medicine, ethnoveterinary uses etc., out of these 30 species are purely medicinal. Some of the species have been exhaustively exploited by the locals and medicinal practitioners for food and medicinal properties, leading to severe threat to their population. Six species are under near threatened category of IUCN. Whereas *Botrychium virginianum* is endangered and facing serious threat of being extinct in near future.

**Key words:** Tehri Garhwal, Ferns, Ethnobotany, Conservation status, IUCN.

## Abstract- 5PSRM2022/169

### **LARVICIDAL ACTION OF *PRUNUS PERSICA* AGAINST THIRD INSTAR LARVAE OF *AEDES AEGYPTI* (DIPTERA: CULICIDAE).**

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*Aedes (Stegomyia) aegypti* is the primary vector of the dengue virus and infects millions of people throughout the world. The dengue vector has become resistant due to the extensive use of synthetic chemical insecticides and has greatly diminished insecticide efficacy to control mosquito vectors. Thus, the search for new alternative control measures is essential, that can prevent insecticide resistance or decrease the utilization of such chemicals. The aim of the present investigation was to evaluate the larvicidal potential of *Prunus persica* (Thunb.) leaf extracts against the third instar of *Aedes aegypti* larvae. The aqueous, ethanolic, and petroleum ether extracts of the leaf were successively tested against the dengue vector. The aqueous extract of the leaf of *Prunus persica* exhibits the highest larvicidal activity at 600 ppm with LC<sub>50</sub> and LC<sub>90</sub> values of 179.78 and 524.80 ppm, respectively. Similarly, the petroleum ether extract of the leaf exhibits the highest larvicidal potential at 150 ppm with LC<sub>50</sub> and LC<sub>90</sub> values of 48.97 and 93.32 ppm, respectively and the ethanolic extract of the leaf showed the highest larvicidal activity at 300 ppm with LC<sub>50</sub> and LC<sub>90</sub> values of 79.43 and 181.97 ppm, respectively within 24h post-exposure. All the treatments showed significant (P<0.05) larvicidal activity. Log probit analysis at 95% confidence level reveals the LC<sub>50</sub> and LC<sub>90</sub>, and the results of regression analysis were shown the mortality rate (Y- dependent variable) was positively correlated with the concentration (X-Independent variable). In conclusion, the plant *Prunus persica* may be a good candidate to be utilized in control programs against the dengue vector, *Aedes aegypti*.

**Keywords:** Aqueous extract, *Prunus persica*, *Aedes aegypti*, Larvicidal action, Ethanolic extract, Petroleum ether extract.

## Abstract- 5PSRM2022/170

### SEASONAL VARIATION OF ZOOPLANKTON COMMUNITY IN THE BAIGUL RESERVOIR

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Zooplankton are widely recognized as being regulated primarily by predators and food availability. The present study was undertaken to know the variation in a different month in response to zooplankton community in Baigul reservoir in District Udam Singh Nagar. The species of zooplankton investigated are copepods, cladocerans, rotifers, ostracoda representing the forms that are found in freshwater reservoir. Rotifers and cladocerans were the most abundant species recorded. The cladoceran and copepod densities were low. Zooplankton diversity was higher in the station 1 than in the remaining station. It is observed that all the zooplanktons are found to be minimum in monsoon months during the study period.

**Key words:** Zooplankton Community, Plankton, Reservoir, Baigul Reservoir, Uttarakhand

## Abstract- 5PSRM2022/171

### D. BUTYRACEA ROXB. AND P. ARMENIACA LINN. THE PROMISING OILSEEDS PRODUCING TREE SPECIES FOR ECONOMIC UPLIFTMENT OF THE LOCAL HILL COMMUNITIES OF UTTARAKHAND

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In Uttarakhand there are several tree species seeds of which contain high level of oil, used for several purposes commonly called tree borne oilseeds (TBO's). These species are severely over exploited for the available fruits and seeds, hence facing serious problem of regeneration. The present study focused on two promising tree species *Diploknema butyracea* (Cheura) and *Prunus armeniaca* (Chullu) seeds of which yield edible oil. For *D. butyracea* 10 sites and for *P. armeniaca* 08 sites were selected for the study in Uttarakhand. Phytosociological analysis was carried out by placing 20 quadrats of 10×10m

size and Population structures were developed to know the regeneration status. Physical parameters of fruits and seeds were studied along with seed maturity indices and germination. Oil was extracted from seed kernel using soxlet apparatus and Hexane used as solvent. Questionnaire based survey, PRA exercises and personal interviews and actual data collection was done for assessing the role of these species in the livelihood of the local communities. Across all the studied sites the density of *D. butyracea* ranged between 40 and 95 indi/ha which was generally low and regeneration was poor and in *P. armeniaca* density ranged between 50 and 120 indi/ha and regeneration was better compared to *D. butyracea*. The change in fruit colour was good indicator of maturity except in *P. armeniaca* where fruit maturation did not coincide with the germination. Seeds germination in all species across all sites increased with decrease in moisture content. The seeds kernel oil content across all the sites ranged between  $46.69 \pm 3.3$  and  $64.24 \pm 1.3\%$  in *D. butyracea* and  $38.75 \pm 2.4$  to  $57.27 \pm 2.4\%$  in *P. armeniaca*. The one hectare plantation of *D. butyracea* can produce about  $1.71 - 4.21 \text{ tha}^{-1}$  kernel,  $0.94 - 2.32 \text{ tha}^{-1}$  oil yield and can generate average net income between Rs.  $61,000/-$  and  $2, 34,000/- \text{ ha}^{-1} \text{ year}^{-1}$  through the sale of oil. *P. armeniaca* can produce about  $1.24 - 2.34 \text{ tha}^{-1}$  kernel,  $0.61 - 1.15 \text{ tha}^{-1}$  oil yield and can generate average net income between Rs.  $71,000/-$  and  $2, 17,000/- \text{ ha}^{-1} \text{ year}^{-1}$ . In the present study *D. butyracea* and *P. armeniaca* appear to be most promising species for the economic upliftment of the local hill communities in the region, as the income from a hectare of plantation is high.

**Key Words:** TBOs, Regeneration, Maturity, Oil Yield, Livelihood,

#### **Abstract- 5PSRM2022/172**

#### **QUALITY PARAMETERS OF CORIANDER AS AFFECTED BY SOWING DATES AND CUTTING MANAGEMENT**

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Coriander (*Coriandrum sativum* L.) is an annual plant from family Apiaceae. India is leading in production, consumption and exportation of coriander in the world. Coriander is used as spice and also have medicinal values. Its leaves are used in preparation of soup,

curry and for garnishing purpose. Essential oil content ranges from 0.03 to 2.6 percent in coriander. Ascorbic acid content reported in coriander is 160mg/100g. The present study was conducted at Vegetable Research Station, College of Agriculture, Jabalpur (JNKVV) in *rabi* season of 2021-22 with the object to find effect of sowing dates and cutting management on quality parameters of Coriander. The experimental design taken for study was FRBD (Factorial Randomized Block Design) with two factors, sowing dates and cutting management. Quality parameters under consideration are Ascorbic acid content (mg/100g of leaves) and Essential oil content (%). Ascorbic acid is determined by Visual titration method. Among factors higher ascorbic acid content found in 30 October sowing (108.96 mg/100g) and one cutting (108.96 mg/100g). Interaction of 9 November sowing with 0 cutting obtained higher value (146.79 mg/100g) for Ascorbic acid content. Essential oil content was estimated from seed by procedure recommended by A.O.A.C. and the oil was extracted with the help of Soxhlet device. Among factors highest value of essential oil (%) recorded in 30 October sowing (0.85 %) and 2 cutting (0.76%). In case of interaction 30 October sowing coupled with 0 cutting obtained highest essential oil content (1.3 %).

**Keyword** - Coriander, sowing dates, Cutting management, quality parameters

### Abstract- 5PSRM2022/173

## ANALYSIS OF TOTAL VITAMIN C CONTENTS IN VARIOUS FRUITS AND VEGETABLES BY UV-SPECTROPHOTOMETRY

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In the present study, a simple UV- spectrophotometric method for the determination of the total vitamin C (ascorbic acid + dehydroascorbic acid) in various fruits and vegetables is described. In this method bromine water is added which oxidizes the ascorbic acid into dehydroascorbic acid. After coupling with 2,4 -dinitrophenyl hydrazine at 37°C temperature for about three hours, the solution is treated with 85% H<sub>2</sub>SO<sub>4</sub> to produce a red color complex. Then, the absorbance was spectrophotometrically measured at 521 nm. The content of vitamin C was 1.868 to 51.74 mg/10g in fruits and 0.841 to 17.416 mg/10g in vegetables. The standard deviation and the possible interfering factors are also discussed.

**Key words:** Ascorbic acid, UV spectrophotometer; total vitamin C, 2,4-dinitrophenylhydrazine, spectrophotometric method, fruit and vegetables.

## Abstract- 5PSRM2022/174

### **EXTRACTION OF PHYTOCHEMICALS AND STUDY OF ITS ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF *BOERHAAVIADIFFUSA***

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Herbal medicines are used for the treatment of many infectious diseases throughout the history of mankind. The increasing antibiotic resistance exhibited by microorganisms has led to the phytochemical screening of medicinal plants for antimicrobial and antioxidant activity. Many infections can be treated by phytochemicals possessing potent antibacterial efficiency. The pharmacological activities of any plant is because of the presence of primary metabolites, secondary metabolites and its secretary products, comprising the phenolic compounds, alkaloids, tannins, saponins, carbohydrates, glycosides, flavanoids, steroids, etc. *Boerhaaviadiffusa* is used as traditional medicine by indigenous people of many countries in the world for its protective role against inflammation, prostatic hyperplasia, diabetes, cancer, gastrointestinal problems, arthritis etc. The whole plant contains numerous bioactive compounds which are responsible for its pharmacological activities. Experiments are being done to evaluate full potential of the plant.

**Key words:** Herbal medicines; antimicrobial and antioxidant activity; phytochemicals; prostatic hyperplasia

## Abstract- 5PSRM2022/175

### **CLIMATE CHANGE**

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Climate is the cumulative and long term effect of weather which is a day-to-day state of the atmosphere and used in short term. Weather and climate are closely related .Change in climate is known as “climate change”, Which is –i) Either natural, has occurred for a long time as the earth has existed ,and has notably manifested itself in natural cycles of cooling and warming or ii) Artificial – or man-made problem resulted due to unplanned and

over-exploitation of natural resources, changes in land uses ,deforestation, use of chemical farming inspire of organic farming ,population increase, modernization ,industrialization, increase in green house gases, hazardous pollutionincrease in air, water, soil etc. All of the above and many other factors are responsible for climate change and hence increase the earth's temperature which results in global warming. Among the cause responsible for global warming and emission of green house gases, causes loss in ozone layer and hence U.V.Rays enters in the earth's surface, results in harmful impaction earth and even in human beings. 1. Shift in seasonal cycle and shift in flower/plants blooming times 2. Rising sea levels 3. Disappearing Glaciers 4. Extreme droughts 5. Wildfires 6. Floods, landslides 7. Heavier rainfalls 8. Heat waves 9. Changes in cropping patterns 10.Origin of new species of flora and fauna, insects, pests etc. Now global warming is a hot and burning topic of present time. The good news is that the countries around the world have formally committed – as a part of 2015 Paris Climate Agreement –to lower their emissions ,but not so good news in that is being concluded, we're not working fast even it is alarming situation i.e Antarctica has nearly lost 4trillion metric tons of ice since 1990 and the water level of the sea has increased up to 15 to 36 cm high and last but not the least that the temperature of our earth has increased between 0.8 to 1.2 degrees celcius . So it is urgent to do remedial practices to check the situation and make the earth safe for our future generation.

**Key words-** Green house gases, Climate change ,Global warming , Glaciers , climate

#### **Abstract- 5PSRM2022/176**

#### **A COMPARATIVE STUDY ON THE EFFECT OF ORGANIC AND INORGANIC FERTILIZER ON GROWTH AND YIELD OF FENUGREEK (*TRIGONELLA FOENUM-GRAECUM L.*) VAR. MAHER-1**

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Fenugreek is a member of the leguminous family and is one of the most traditional and popular vegetables in India. The present evaluation entitled a comparative study on effect

of organic and inorganic fertilizer on plant growth and seed yield of fenugreek (*Trigonella foenum-graecum* L.) var. maher-1" was carried out during *Rabi* season, 2020-2021 at the Experimental Farm of Regional Seed Science Research Centre, Chauras Campus, H.N.B. Garhwal University Srinagar, Garhwal, District Pauri Garhwal, Uttarakhand. The experiment was laid out in Randomized Block Design with three replications. Total of five treatments combination in organic fertilizers with inorganic fertilizer sources i.e., T<sub>1</sub>: FYM + Cow Urine, T<sub>2</sub>: FYM + Ash, T<sub>3</sub>: FYM + Cow urine + Ash, T<sub>4</sub>: FYM + NPK, T<sub>5</sub>: Control. Out of these, treatment T<sub>1</sub>: FYM + Cow Urine was observed as the most excellent treatments in terms of morphological characters (*viz.* germination percentage of 86.50%, seedling length of 13.99 cm, 1210.94 of seedling vigor index, 15.97 of number of root nodules, 1.55 g of fresh weight, 0.191 g dry weight, 45.38 cm of plant height at 60 DAS, 90.39 cm of plant height at 120 DAS and 3.07 of primary branches plant<sup>-1</sup>, 78.03 days to produce 50% flowering), and yield attributes (*viz.* 49.90 number of pods per plant, 17.60 number of seeds per pod, 4.8 mm of seed size, 15.99 g of seed yield per plant, 0.91 kg of seed yield per plot, and 18.12 g seed index (per 1000 seed weight) compared by T<sub>4</sub> (FYM + NPK). However, the minimum values were found under control treatment. However, a significant difference was observed only between T<sub>1</sub> and T<sub>4</sub>. Hence it identifies as the best combination for the growth of fenugreek at Srinagar, Garhwal region of Uttarakhand.

**Key words:** Fenugreek (*Trigonella foenum-graecum* L.), Organic fertilizer, Inorganic fertilizer, Cow urine, Ash.

**Abstract- 5PSRM2022/177**

**GENETIC VARIABILITY, CHARACTER ASSOCIATION AND DIVERGENCE ANALYSIS OF FENUGREEK GENOTYPE (*TRIGONELLA FOENUM-GRAECUM L.*) UNDER VALLEY CONDITION OF GARHWAL HILLS**

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The present investigation entitled "Genetic variability, character association and divergence analysis of fenugreek genotype (*Trigonella foenum-graecum L.*) under valley condition of garhwal hills" was carried out at the Horticultural Research Centre, Department of Horticulture, H.N.B.G.U, Srinagar (Garhwal) Uttarakhand, India during the *rabi* season, 2020-21, to evaluate 19 genotypes *viz.*, Ajmer Local-1, AFG-1, AFG-2, AFG-3, AFG-4, AFG-5, Askar Poot, Bikaner-1, Jaipur-1, Maher-1, Malli Been, Pauri-1, RMT-305, Srinagar-1, Srinagar-2, Srinagar-3, Srinagar-4, Sikar-1, and Sedyakhol-1 with one check cultivar Pusa Early Bunching for different horticultural traits in fenugreek. The experiment was laid out in Randomized Block Design with three replications and the data was taken for growth and yield parameters *viz.*, days taken to first germination, plant height at 30, 60 DAS and harvest time (cm), number of primary branches per plant after first cutting, and at harvest, days taken to appearance of first flowering and 50% flowering, average leaf weight per plant (g), average leaf yield per plot (kg), pod length (cm), number of pods per plant, number of seeds per pod, seed yield per plant (g), per plot (kg), and per hectare (q), total soluble solids (°Brix) and ascorbic acid (mg/100g). Based on mean performance 10 cultivars were found superior over check cultivar Pusa Early bunching in almost all the traits studied. Among them Ajmer Local-1, AFG-1, AFG-3, AFG-5 and Srinagar-4 recorded higher pod yield and also performed better for other yield attributing traits. The phenotypic coefficients of variation and genotypic coefficients of variation were found high for the number of primary branches per plant after first cutting, average leaf weight per plant (g), average leaf yield per plot (kg) and ascorbic acid (mg/100g). High heritability estimates coupled with high genetic gain were observed for plant height at harvest time and number of pods per plant. The correlation and path analysis indicated that yield per hectare had a

positive and direct association with days taken to first germination, plant height at 60 DAS, and at harvest time, number of primary branches per plant after first cutting, days taken to appearance of first flowering, average leaf weight per plant (g), average leaf yield per plot (kg), pod diameter, seed yield per plot, ascorbic acid mg/100g. On the other hand, based on D<sup>2</sup> analysis the 20 genotypes were grouped into 6 divergent clusters and the cluster VI & I, and cluster VI & IV were found more divergent. So, there will be more chances of getting better segregates in F<sub>1</sub> generations from the crossing between the genotypes fall under cluster VI & I, and cluster VI & IV.

**Key words:** Fenugreek (*Trigonella foenum-graecum* L.), Genetic variability, Genotype, Phenotype, Divergence analysis, Heritability, Phenotypic coefficients of variation, Genotypic coefficients of variation.

#### **Abstract- 5PSRM2022/178**

#### **BIOTECHNOLOGY AND ITS APPROACHES IN IMPROVEMENT OF BRINJAL (SOLANUM MELONGENA L.).**

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Eggplant, also known as brinjal or aubergine (*Solanum melongena* L.), is an important vegetable crop grown in various tropical and temperate parts of the world. There is a wide genetic diversity in the cultivated as well as the wild species of eggplant. Due to sexual incompatibility, efforts to cross cultivated eggplant species with their wild relatives lead to minimal outcomes therefore conventional breeding alone cannot bring the desired qualities and quantities from its wild species to the cultivated species. The ability of eggplants to function well in tissue culture, particularly in plant regeneration, has made it possible to introduce biotechnology in eggplant improvement programmes. Biotechnological techniques such as micropropagation, somatic hybridisation, in-vitro grafting, in-vitro androgenesis, marker-assisted breeding and genetic engineering to combat biotic and abiotic stresses such as Agrobacterium mediated genetic transformation for resistance against insects and diseases have been successfully utilised. Somatic hybridization has

been attempted in eggplants to address cross-incompatibility barriers, with the primary goal of adding useful agronomic traits from wild to cultivated species through protoplast fusion. Somaclonal variation was used to achieve lines with enhanced resistance to little leaf disease and salinity. Transgenic plants of brinjal for insect resistance, for the production of parthenocarpic fruits and abiotic stress tolerance have been accomplished. However, transgenics of eggplant are yet to be developed for improvement of other agronomic traits, including disease and pest resistance, and quality and shelf life of fruits. Molecular markers to complement traditional breeding programs are being developed for genome mapping of agronomic traits. Molecular markers like SSR, ISSR, RAPD, AFLP etc. used in brinjal has gained traction over the past few years due to the usage of PCR-based markers.

### **Abstract- 5PSRM2022/179**

### **THERAPEUTIC HORTICULTURE: A POTENTIAL SCIENCE OF HEALING MINDS AND HEALTHY PLACES**

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Therapeutic landscapes have gained popularity as non-pharmacological approach in modern healthcare industry. These are considered to be the physical or built environments with conducive social and aesthetic conditions along with optimistic human perceptions by fabricating an atmosphere of healing minds and bodies. This type of structures are built with both horticulture and non-horticultural activities. Among horticultural activities, nature is a natural place for relaxation, which creates some positive effects in humans and serve as a factor supporting a proper mental mood and internal functioning of the body and preventively reducing susceptibility to diseases. The shift towards complementary and alternative medicine (CAM) has renewed interest in the healing benefits of nature particularly anti-stress characteristics. Therefore, therapeutic garden design requires appropriate principles to be used according to the type of garden such as Healing Gardens,

Cancer Gardens, Rehabilitation Gardens, Restorative Gardens, Senior Community Gardens, Alzheimer Gardens and Meditation Gardens. Designing in Therapeutic Gardens is not only done to improve the aesthetic value of the area but also promotes human health physically as well as mentally. The key design principles involved in therapeutic garden designing are sustainability, orientation, accessibility, socialization, meaningful activity, reminiscence, sensory stimulation and safety. Studies have shown that post-surgery patients, when exposed to such gardens have caused less use of painkillers, less calling for nurses and went home sooner.

**Keywords:** Therapeutic landscapes, Non-Pharmacological, Healing Gardens, Sustainability

#### **Abstract- 5PSRM2022/180**

#### **ROLE OF MODERN BREEDING TECHNOLOGY FOR CROP IMPROVEMENTS**

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The conventional breeding methods based on plant selection. Plant selection was based on phenotype of plants but the phenotype is largely impacted by the environmental factors affecting the crop improvement program. Molecular markers are one of the comprehensive inventions in agricultural science. The molecular markers provided a great advantage to breeders for the resourceful selection of better plant progenies. The molecular markers are highly consistent and are not precious by the environment. The technological advances in DNA analysis have expanded the host of molecular markers used for plant genotyping crop improvement. The present circumstances offers to choose from various molecular marker types based on their methodologies, principle, and extent of applications. Additionally, recent progress achieved in genetics, molecular breeding and genomic selection has facilitated an inclusive understanding of the molecular markers and unlocked new insights into marker - assisted breeding. The initiation of new technologies like association mapping (AM) and genome - broad association studies has unveiled the high throughput application of molecular markers. The use of different molecular markers in the identification of tolerant crop genotypes and associated genes / QTLs against major abiotic stresses,

including salinity, drought and temperature has been provided. Recently, the advent of the next - generation sequencing (NGS) technologies has provided to highly liberal and instructive markers like single - nucleotide polymorphisms (SNPs). The development of saturated linkage maps could only be possible with the accessibility of molecular markers. These maps are requirement for gene / QTL mapping, map based cloning of genes, and marker - assisted selection. The application of molecular markers for improve the qualitative and quantitative traits in some important agricultural, horticultural, and plantation crops.

**Key words:** Molecular markers, Association mapping (AM), QTL mapping, Next - generation sequencing (NGS), Qualitative and quantitative traits, Single - nucleotide polymorphisms (SNPs), Crop improvement

### **Abstract- 5PSRM2022/181**

#### **UNMANNED ARIAL VEHICLES BOON TO AGRICULTURE**

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To make a revolution in Indian Agriculture Unmanned Arial Vehicles or Drones are the perfect approach to boost the Agricultural Powerhouse. Precision Quadcopters combines sensor data and imaging with real time data analytics to improve farm productivity by aerial surveillance, scanning soil health, assisting in planning of irrigation schedules, spraying of liquid fertilizers, pesticides and herbicides, monitoring of crop growth and crop production . Some of the Best Drones for Agriculture are DJI Agras MG-1, DJI Mavic 2 Pro , DJI Phantom 4 , DJI Mavic Pro and DJI Mavic Mini . Union Minister of Civil Aviation Jyotiraditya Scindia said "We have the potential to make India a global drone hub by 2030". Government of India has launched programmes such as Drone Shakti and Kisan Drones to outspread Drone literacy as well as it is providing funding support to Startups to manufacture indigenous drones. Drone industry is set on path to change the face of farming.

**Keywords:** Agricultural Powerhouse, Precision Quadcopters, farm productivity, Drone Shakti , Kisan Drones

## Abstract- 5PSRM2022/182

### REGENERATIVE AGRICULTURE

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Rehabilitation approach or healing of our land by farming in harmony with nature through land management framework is regenerative agriculture. It is not a specific practice rather involves as much recycling waste as possible and using the composted materials. This enables soil health to improve, increase in crop yields, resistant to extreme weather conditions, lesser pests and pathogens and much more. Practices such as ploughing and tilling release carbon-dioxide through exposure of nutrient matter to the surface and this results in oxidation of soil known as carbon sequestration. The Five pillars or practices that are widely associated are abandoning tillage, eliminating bare soil, fostering plant diversity, encouraging water percolation into the soil and integrating livestock and cropping operations. Compared with other food production methods, regenerative agriculture practices are commonly viewed as having a more impact over land than on humans, foods grown are viewed as more nutritious by over one-third responds according to IFIC survey on public's opinion on regenerative agriculture practices. This practice do not only focuses on "does no harm" to the land but refines it by using technologies that regenerate and improvise the soil's condition and also our environment.

**Keywords:** Rehabilitation, Sequestration, Regenerative, Five Pillars, IFIC Survey

## Abstract- 5PSRM2022/183

### **INFLUENTIAL ACTIVITY OF FERTILIZERS AND AUXINS ON HERBAGE GROWTH OF *CYMBOPOGON WINTERIANUS* JOWITT AND *CYMBOPOGON FLEXUOSUS* (NEES) WATS.**

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Due to medicinal and aromatic uses, *Cymbopogon winterianus* and *Cymbopogon flexuosus* are in high demand globally. In this context, the impact of exogenous application of different organic fertilizers (OF), inorganic fertilizers (IF) and auxins on growth of *C. winterianus* and *C. flexuosus* were assessed. For this 475 stump cuttings of each species with size 10 cm were taken for experiment. Three replicates of 25 sterilized stump cuttings were used for each treatment i.e. organic fertilizer (manure, organic compost, vermicompost, organic compost + vermicompost); inorganic fertilizer (urea, NPK, DAP, NPK+urea, DAP+urea); and auxins (indole-3-acetic acid, indole-3-butyric acid, naphthalene-3-acetic acid) at 250, 500, 100 ppm concentration. Stump cuttings supplemented with DAP+urea showed maximum tiller bud induction (100%; 100%), number of tillers (84.00±4.71; 107.00±9.74) and fresh herbage yield (1134±47.14; 1027.96±14.31g/clump) in first and second harvest of *C. winterianus* and *C. flexuosus* respectively while auxins application causes reduce in tiller bud induction and tiller number. Highest plant length (115.33±2.87; 121.00±16.44 cm) and leaves/node (7.33±0.27; 7.67±0.27) were exhibited in second harvest of *C. winterianus* and *C. flexuosus* supplemented with urea. The tiller bud induction (sprouting percent) showed positive and significant correlation with respect to other parameters at ( $p < 0.05$ ;  $< 0.01$ ). This study recommends the use of DAP+urea for the propagation of *C. winterianus* and *C. flexuosus* by stump cuttings for increase in yield and commercialization.

## Abstract- 5PSRM2022/184

### GREEN FARM A NEW APPROACH OF FARMING

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Greenhouse agriculture farming in India is gaining popularity fast. The size of structure varies from small sheds to industry-sized buildings according to the purpose. Primarily, a greenhouse is a glass house whose interiors grow warmer when exposed to sunlight as the house blocks the greenhouse gas to exit. Some greenhouses using high-end technology have installed equipment like heating and cooling system, screening installations and even computerized facilities to provide optimal growth conditions for the plants. Apart from controlling temperature other objectives of greenhouse farming are maintaining the right carbon dioxide levels, humidity, water, controlling pests and providing plant nutrients. This is done specially to reduce the risks of crop loss in greenhouse cultivation. Modern techniques of Hydroponic, Aeroponics and Nutrient film techniques are possible only under Greenhouse agriculture cultivation.

Bank provides loans with 12% – 14% interest, for the 5 to 7-year period and mostly many banks offer EMI options quarterly or 6-months. Our Indian government is promoting Greenhouse farming they offered a subsidy for Greenhouse through the horticulture department.

**Keywords:** Greenhouse, Hydroponic, Aeroponics.

## Abstract- 5PSRM2022/185

### **DROSOPHILA AS A RECENTLY EMERGING PEST AGAINST AGRICULTURE CROPS: A CASE STUDY ON-ZAPRIONUS INDIANUS**

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*Drosophila* being ectothermic insect can cope with simultaneous changes in temperature and humidity through phenotypic plasticity. They have recently emerged as insect's pests on variety of host plant range including fig, apple, pear, Mango, Guave. Their impact is negative on fruit orchards as they puncture the skin of fruits and lay eggs inside. Furthermore, the larvae pupate are transported from one location to another that result in indirect losses due to quarantine limitations. Some of the fruit flies that affect crops in India includes: *Zaprionus indianus*, *Bactrocera dorsalis*, *B. correcta*, *B. zonata*, *B. cucurbitae*, *D. melanogaster*, *D. ananassae*, *D. immigrans*. Accordingly, host plant range and their adaptability through saturation deficit (an index of evaporative water loss due to a combined thermal and humidity effect) of *Z. indianus* was studied. Wild and laboratory flies reared under season-specific temperature and humidity conditions from two seasons (summer, rainy) and host plants (tomato, mango, banana) were analyzed. Summer flies were approximately three times higher desiccation resistant and have increased levels of cuticular lipids compared with rainy season Flies. Further flies emerging from fruits were lesser desiccation tolerant than flies from soil. This may aid to their higher penetration in mango and tomato crops in summer season. Furthermore, a threefold difference in saturation deficit between summer (27.5 mB) and rainy (8.5 mB) seasons was associated with twofold differences in the rate of water loss. Higher dehydration stress due to a high saturation deficit in summer is compensated by storage of higher levels of energy metabolite (trehalose) and cuticular lipids. Therefore, wide host plant range and higher desiccation susceptibility is one the major factor contributing to success in tropical country. It may emerge as future pest for fruits in India that needs further investigations.

**KEY WORDS:** *Zaprionus indianus*, Desiccation resistance, phenotypic plasticity, Energy metabolites, Seasonal variation

## Abstract- 5PSRM2022/186

### BIO FORTIFICATION IN VEGETABLE CROPS

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In the past few decades, the major concern on this planet was food security. After making a successful lead in food security now, the developing nations are focusing on nutritional security, which includes food that is enriched in minerals and vitamins. Micronutrients and vitamins are essential for human growth and development. Any deficiency of these components leads to "hidden hunger." Enhancing these components can alleviate malnutrition in women and children in the developing world. Micronutrients like Fe, Zn, Se, Mg, Ca, Iodine, and vitamins like provitamin A and folate are an important component of the biofortification program. Biofortification of vegetable with vitamins and micronutrients is the present need of an hour to fight different health issues faced by the developing countries. For biofortification of vegetable and other staple crops, three major techniques are used, viz. conventional breeding, agronomic approach (use of mineral fertilizer), and genetic engineering. These approaches have enormous potential to address this vitamin and micronutrient malnutrition. Many genes are available for the target traits by which it will be possible to improve micronutrient in vegetables.

**Keywords :-** Bio fortification, hidden hunger, malnutrition

## Abstract- 5PSRM2022/187

### EEFFECT OF VERMICOMPOST BASED ZINC APPLICATION ON GROWTH AND YIELD OF FODDER MAIZE (Pratap Makka Chari-6)

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A field experiment was conducted at PLANTICA- IARD, Dehradun to study "Effect of Vermicompost based Zinc application on growth and yield of fodder maize (*Zea mays*) in Dehradun (Uttarakhand)sandy clay loam soils' 'during kharif 2022. The experiment was laid out in Randomized Block Design (RBD), with three replications. The experiment consist of 17 treatments( Vermicompost -10,20,30 T/hac,Zinc-10,20,30 kg/hac, RDF(NPK) and control )were replicated three times in a Randomized block design keeping plot size 2x3m.The seed sowing was done 1June,2022 manually by hand maintaining a Row to Row distance of 40Cm and Plant to Plant distance of 25Cm). The application of Organic manure (Vermicompost) and zinc significant effect on Growth and Quality Characters as well as Maturity attributes of the fodder maize. The exogenous application of vermicompost 30T/hac+ Zinc30 Kg/hac (T17) recorded maximum plant height(46.23 Cm), and the number of leaf per plant(17.7),Stem girth (7.4Cm). and minimum growth in T0 treatment that is (control) were observed in this treatment. The zinc 10Kg/hac (T6) the treatment shows plant height (32.17Cm) and the number of leaf per plant(10.70),Stem girth (6.50Cm).The vermicompost 30T/hac(T4)Treatment show plant height(37.03Cm) and the number of leaf per plant (12.97),Stem girth(7.23Cm). All over the result shows most effective treatment for increasing Quality characters and yield is vermicompost and zinc combination that is Vermicompost 30 T/hac+ Zinc 30Kg/hac

## Abstract- 5PSRM2022/188

### A REVIEW ON REGENERATION, DISTRIBUTION, AND PHARMACOLOGICAL IMPORTANCE OF SELECTED *BERBERIS* SPECIES OF KUMAON HIMALAYA, UTTARAKHAND

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Throughout the world, plants are the basis for many traditional and modern medical systems. *Berberis* is a genus well known for its high medicinal value. The present study deals with the review of extensive literature related to four selected important species of *Berberis* i.e. *Berberis aristata* DC., *Berberis asiatica* Roxb. ex DC., *Berberis chitria* Buch.-Ham. ex D. Don, and *Berberis lycium* Royle. This review provides a summary regarding the regeneration status, distribution, and pharmacological importance of these selected species in the Kumaon Himalaya. Various pharmacological study shows that the selected *berberis* species contain various alkaloids like Berberine, Palmatine, Protoberberine, tannins, sugar, starch, etc., and are widely used in various traditional and modern medicinal systems. However, these species have potential to survive on various adverse conditions but over-exploitation, biotic pressure and changing weather conditions impact the regeneration which is low in all studied species. The distribution pattern shows the availability of *B. asiatica* and *B. chitria* in various parts of the Kumaon Himalayan region whereas *B. aristata* and *B. lyceum* have restricted distribution in Kumaon.

**Keywords:** *Berberis*, Regeneration, Himalaya, Distribution.

## Abstract- 5PSRM2022/189

### SEASONAL VARIATION IN HOME RANGE OF CHEER PHEASANT *CATREUS WALLICHII* AT POKHARI VALLEY, GARHWAL HIMALAYA, INDIA

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Present study was conducted from December 2020 to November 2021, seasonal variation in Home range of Cheer pheasant *Catreuswallichii* in Pokhari valley, Garhwal Himalaya. During the study period average home range (altitude M) of Cheer was  $1604 \pm 9.23$  and average distance covered from water source  $72.69 \pm 7.98$  (M), maximum range observed in June month ( $1632 \pm 10.27$ ) while minimum range observed in month of December ( $1579 \pm 7.83$ ) respectively. Maximum distance covered from water source observed in August ( $96.60 \pm 11.07$ ) and minimum distance covered recorded in month of June ( $39.83 \pm 5.89$ ). Significant seasonal variation was also observed on home range and distance covered. Maximum range in summer season ( $1627 \pm 10.12$ ) while minimum observed in winter season ( $1582 \pm 8.43$ ). Maximum distance covered was recorded in monsoon and post monsoon season ( $84.53 \pm 10.78$ ) and minimum value was observed in summer season ( $48.24 \pm 5.66$ ) respectively.

## Abstract- 5PSRM2022/190

### CHEMICAL CONSTITUENTS FROM UTTARAKHAND HIMALAYAN PLANTS AND THEIR POSSIBILITY AS BIOPESTICIDES FOR CROP PROTECTION

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The use of chemical pesticides in Indian agriculture has seen a sharp increase in recent years and in some areas has reached alarming levels with grave implications for human health. It is therefore increasingly urgent that environmentally friendly methods for disease control are used. The potential of biopesticides for promoting sustainable agriculture has

been known for crop protection because of chemical pest control agents are regarded as non environment-friendly. This study was conducted to evaluate the potential crop protection value of acetylenic constituents, cylopentenoid lactone and labdane diterpenoid compounds by toxicity and repellent activity against mustard aphid (*Lipaphis erysimi* Kalt.). Both the compounds showed the significant toxic and repellent effect. Labdane diterpene was more active ( $LC_{50} = 1.46$  mg/mL) than the cylopentenoid lactone ( $LC_{50} = 2.18$  mg/mL). However, *L. erysimi* was particularly less sensitive towards compounds revealed lower repellent activity ( $\leq 40\%$ ) with applied concentration. Interesting pesticidal results indicate the potential of some acetylenic constituents very effective in biochemical control in agricultural crops.

**Keywords:** Uttarakhand Himalaya; Nepetalactone; *Lipaphis erysimi*; Biopesticide; Insect pest management; Crop Protection

#### Abstract- 5PSRM2022/191

#### A SURVEY OF MOSQUITOES IN DOON VALLEY (UTTARAKHAND) INDIA

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The Density pattern of 13 *Anopheline* species along with two species of *Aedes* and *Culex* each collected between January 2018 to December 2020 from four resting places viz., human indoor, human outdoor, animal cattle shed and mixed dwelling in forested areas of Doon valley are given.

**Keywords-** *Anopheline*, *Aedes*, *Culex*.

## Abstract- 5PSRM2022/192

### BONSAI PRODUCTION: A POTENTIAL FOR INCREASED DYNAMICS MARKETS

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Bonsai, a word derived from the Chinese language ("bon" meaning tray/vessel (container) and "sai" meaning tree/plant) is the art of dwarfing trees or plants and developing them into an aesthetically appealing shape with the help of growing, pruning and training plants in containers. Over two thousand years ago bonsai was known as 'pun-sai' when it first appeared in China on a very basic scale. Bonsai were brought indoors for display at special times by the 'Japanese elite' and became an important part of Japanese life by being displayed on specially designed shelves. Bonsai has tremendous commercial potential for its ornamental value as well as spiritual value. One of the best spiritual benefits of bonsai trees is connecting with the creative side of humans. Bonsai is as much a practice as a hobby or an art form. Much like yoga or meditation, bonsai helps us cultivate an understanding of our internal reactions to the external world. Bonsai also provides health benefits for humans by purifying air, reducing feelings of psychological stress and maintaining humidity in space. Hence, bonsai production provides a potential market for sustainability in floriculture besides uplifting the living value of humans.

**Keywords:** Bonsai, Japanese elite, health benefits, sustainability

## Abstract- 5PSRM2022/193

### ASSESSMENT OF GROWTH RATE AND PHOTOSYNTHETIC PIGMENTS OF *SACCHARUM OFFICINARUM* L. PLANTLETS UNDER POLLUTED AREA

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*Saccharum officinarum* is a valuable crop that produced high content sugar molecules. As we see, air pollution increased day by day due to anthropogenic activities. In this research report, effect of air pollution on vegetation was investigated. We have chosen polluted and non-polluted sites for the comparative study of plant sample. Plant grow in the polluted area confirmed stunted growth, increase chlorosis and scars on stem and leaves. These were the effect of obnoxious gaseous factors which had been found in multiplied stage within the polluted place. Stem eye viability was decrease in polluted area than that of non-polluted area. This study portrays a clear view of unfavorable results of air-pollutants on vegetation. Physiological and biochemical results were also shows variation in polluted and non-polluted grown vegetation.

**Keywords:** *Saccharum officinarum*, Photosynthetic pigments, Obnoxious, Pollution

## Abstract- 5PSRM2022/194

### UNDERUTILIZED FRUITS OF ARID & SEMI-ARID REGIONS FOR NUTRITIONAL AND LIVELIHOOD SECURITY

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Underutilized fruits are considered as mines of nutrients and antioxidants. Despite being highly nutritive with medicinal attributes and their ability to grow under adverse soil and climatic conditions, they have not received the desired attention. However, these underutilized fruits are integral part of traditional foods, especially in rural areas and among tribal communities. A wealth of flora such as Lasoda (*Cordia myxa*), Ker (*Capparis decidua*), Phalsa (*Grewia subinaequalis*), Pilu (*Salvadora oleoides* and *S. persica*), Karonda

(*Carissa carandus*), Wood apple (*Feronia limonia*), Bael (*Aegle marmelos*), Jamun (*Syzygium cumini*), Khirni (*Manilkara hexandra*), Chironji (*Buchnania lanzan*), Cactus pear (*Opuntia ficus indica*), Mulberry (*Morus spp.*) etc. harbors the arid & semi-arid ecosystem which are to be optimally utilized. The recent awareness regarding the potential of these ecologically fragile lands for production of quality horticultural produce has not only opened up scope for providing economic subsistence for the people of these regions, but also for bringing new areas to increase fruits production. Besides, the underutilized fruits have a wide scope of export for various processed products. In the present article, attempt has been made to present a succinct description of scope, nutritive values, uses, and improved varieties of underutilized fruits of arid & semi-arid regions.

**Keywords:** Minor fruits, biodiversity, nutritional security, value addition

### **Abstract- 5PSRM2022/195**

#### **TRANSGENIC IN VEGETABLE CROPS**

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Vegetables provide a valuable source of income to farmers because they have a shorter maturity period, higher productivity, nutritional richness, and economic viability. To feed the growing population from limited land, water, and other natural resources under changing climatic conditions poses a big challenge to agricultural scientists and policymakers. Thus developing varieties having higher productivity, quality, nutritional value, shelf-life, and tolerance to biotic and abiotic stress is imperative and could be attained using conventional breeding or through transgenic technology. Combining genes from different organisms is known as transgenic technology; the resulting organism is said to be "genetically modified." During the last two and a half decades, transgenic vegetables have been developed that have higher productivity, quality, and improved resistance against insect pests, pathogens, drought, and salinity by modifying, downregulating/overexpressing genes specific proteins, antioxidants, ion homeostasis, and membrane composition. Despite the rapid development and adoption of genetically modified vegetables in many countries, public controversies about the risks and benefits

continue. On the other hand, various supporters have favored transgenic vegetables praising their benefits, e.g., reduced environmental impact from pesticides and insecticides, increased yield, soil conservation, etc.

**Key words:** Transgenic, homeostasis, Genetically modified.

### **Abstract- 5PSRM2022/196**

#### **RESPONSE OF NIGHT INTERRUPTION REGIMES ON VEGETATIVE AND REPRODUCTIVE GROWTH OF *KALANCHOEBLOSSFELDIANAPOELLN.***

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In this new era of climatic change and globalization succulent like *Kalanchoeblossfeldianawill* fulfill the needs of flowering pot plant for interior and outdoor landscaping. It is classified as a qualitative short day plant (SDP) with critical day length of 12 hours. Photoperiod regulates the growth and flowering in photoperiodic crop like kalanchoe.. Influence of combination of days and time of night interruption were examined on growth and flowering of Kalanchoe (*KalanchoeblossfeldianaPoelln.*). The artificial long days were provided by extending day length by exposure of artificial light source from 7 October, 2019 for 20 (7 October - 26 October), 30 (7 October - 5 November) and 40 (7 October - 15 November) days as night interruption (NI) for 30 minutes and 60 minutes from 11:30 to 12:00 AM and 11:30 50 00:30 AM respectively. Various vegetative and floral characteristics were varied among plants exposed to different duration of night interruption. Number of branches and number of flowers per plant were decreased as compared with control i.e. devoid of night interruption. The night interruption had no effect on stem girth and petiole thickness. These results suggest that duration of night interruption affects the morphogenesis and flowering of kalanchoe, and that response is photoperiod dependent. However, results indicated that night interruption was most effective in inhibiting vegetative and reproductive growth in Kalanchoe.

**Key words:** *Kalanchoeblossfeldiana*, night interruption, photoperiod, pot plant, day length

## Abstract- 5PSRM2022/197

### GENETIC DIVERSITY ANALYSIS OF SOME SELECTED BLACK RICE ACCESSIONS USING SEED STORAGE PROTEINS

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Rice is one of the most important staple crops providing nutrition to more than half of the world's population. Rice is rich in seed storage proteins like glutelins and prolamins, glutelins comprising major part of about 80%. Apart from the commonly consumed white rice, there are different varieties of colored rice like red, brown, black or purple. Black rice is now a days gaining importance of being highly nutritious food which benefits human health and fulfills their nutritional requirements as it is loaded with large amounts of vitamins, minerals, proteins, carbohydrates, flavonoids etc. The nutritional value of black rice is far more than that of the routinely consumed white rice. The present study focusses on the total seed storage proteins of black rice extracted from the samples collected from different geographical locations around the world. In this study, we have analyzed the total seed protein profile of some selected black rice accessions, via SDS-PAGE to find out the degree of relatedness or divergence present interspecifically, for studying genetic diversity. Protein band pattern profiles generated shows differences in the protein content found in them. The cluster analysis studies performed by employing DARwin software to make dendrogram based on the dissimilarity present among the black rice accessions. Those which are genetically diverse are separated from the main cluster forming separate subclusters in the dendrogram. As black rice is considered as a superfood, the present findings will contribute to analyze the nutritionally rich varieties which can be further utilized in plant breeding programs and biofortification for human welfare.

**Key words:** Seed storage proteins, genetic diversity, interspecific variation, biofortification.

## Abstract- 5PSRM2022/198

### EXTENDED DELIGNIFICATION: A STEP TOWARDS REDUCTION OF CHLORINATED ORGANICS IN PULP AND PAPER MANUFACTURING

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Today every industry emphasize on environment. Pulp and Paper industry always been associated with pollution. In the recent past stiffer environmental regulations forced the industry to pay more emphasis on effluent discharge. Discharge of Chlorinated Organic matters from bleach plants particularly from chlorination and alkali extraction stage makes the problem more acute as these Chlorinated Organic compounds are slow biodegradable and contribute for suspended solid (SS), biological oxygen demand (BOD), chemical oxygen demand (COD), absorbable organic halides (AOX), toxicity, and colour of effluent. A low molecular weight, fat soluble Chlorinated Organic compounds are even bio-accumulable and genotoxic. Extended delignification by combination of modified Kraft pulping and oxygen bleaching are aimed at reducing the amount of lignin in the wood pulp before it is brightened in the bleach plant. In the present investigation attempt have been made to optimisation the condition of extension digestion i.e., modified time- temperature alkaline cycle, oxygen doses etc to reduce the amount of lignin retained in the brown stock without dissolving the desired components of the wood fiber and reducing the pulp yield. A combination of extended digestion and oxygen delignification has been used to achieves Kappa number between 14 to 20 for unbleached pulp without low of pulp strength. Low Kappa number means less chlorine is needed for bleaching. Present investigation revealed that extended delignification reduced chlorine organic compounds about 55 percentage. Results are discussed at adequate length in the paper.

**Key words:** Extended delignification, oxygen delignification, Kappa number, Chlorinated Organic compounds.

## Abstract- 5PSRM2022/199

### CULTURAL SIGNIFICANCE OF UNDER-UTILIZED PLANT: *ALLIUM* spp. FROM UTTARAKHAND, CENTRAL HIMALAYAN REGION (CHR)

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Present work was carried out by the authors with an aim to document the traditional utilities of different *Allium* spp. grown or grow naturally in wild habitats of Central Himalayan Region (CHR) of Uttarakhand, India. For collection of planting material and documentation of information from 10 districts namely Almora, Bageshwar, Chamoli, Champawat, Nainital, Pauri, Pithoragarh, Rudraprayag, Tehri and Uttarakashi were obtained. The field surveys were conducted during 2011- 2013. For recording and documentation of information an open ended semi- structured interview schedule was used. Participant field observation, rapid rural appraisal and personal interviews with the persons involved in the cultivation, processing and marketing were conducted in the entire hill region of Uttarakhand state. A total of 19 *Allium* species were identified in Uttarakhand hills. Fourteen are found to be endemic of high altitudes areas between 1500m to 5000m asl and five are grown or grow up to 1500m asl. Two species commonly known as onion (*A. cepa*) and garlic (*A. sativa*) are largely cultivated up to 1500m asl. Seven species are found growing in semi-domesticated state in the kitchen gardens for leafy vegetables and flavour blending of cuisines. Another seven species are used as spice, condiments and in garnishing. Three species *A. hookerii*, *A. fasciculatum* and *A. galanthum* were also reported growing in the region, but informed that these are introduced from North – eastern Himalayan region by some service personnel in view of their economic importance. All the nineteen species explored and collected from the various parts of CHR are found very viable in view of their socio-economic and cultural importance for the local communities. The study revealed that there are three types of *Allium* species (cultivated, semi-cultivated and wild) found under use by the local inhabitants. All the species are commercially very

important. Local people are engaged in cultivation, processing and marketing by using traditional methods. There is a very vast scope for improvement of varieties, cultivation, processing and marketing by using scientific methods. There is also a need to conserve these species in order to maintain the sustainability of plant material, environment and nature.

**Keywords:**

*Allium* species, *Allium* diversity, *Allium* Utilization, *Allium* conservation, Uttarakhand Himalaya

**Abstract- 5PSRM2022/200**

**AGRO-TOURISM IN AGRICULTURE**

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Tourism is one of the fastest growing sectors in the world economy. Several countries have transformed their economies by developing their tourism possible. Tourism has great volume to generate large-scale employment and additional income sources to the skilled and unskilled. The most developing direction in the field of tourism in our country is agro-tourism. Agro-tourism gives rural experiences to travellers with goal of creating livelihood and generating revenues for farmers and surrounding communities. Agro-tourism is a way of sustainable tourist development and different activity in rural areas through which the visitor has the chance to get aware with the agricultural areas, agricultural occupations, local products, traditional food and local life of the rural people. The focus is how the agro-tourism is helpful in both farmers and local people.

**Keywords:** Agrotourism, rural people, employment, farmers.

## Abstract- 5PSRM2022/201

### **POLYPLOIDY BREEDING IN FRUITS CROPS**

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Polyplody is a phenomenon, which is formed from meiotic aberrations related to spindle fiber formation. It is mainly of two types i.e., euploidy and aneuploidy. It may occur naturally or can be induced by artificial means. Polyplody breeding is an important tool for widening variability in fruit crops with narrow genetic base like banana. It has really wide implications in obtaining bigger fruit size and disease resistant plant types. However, sterility has been seen as a general problem in most of such cases, which has to be taken care of before commercialization of polyploids.

**Keywords:** Polyplody, autopolyploid, allopolyploid, chromosome, spindle fiber

## Abstract- 5PSRM2022/202

### **MODERN BIOTECHNOLOGICAL TOOLS: AN OPPORTUNITY TO DISCOVER COMPLEX PHYTOBIOMES OF HORTICULTURE CROPS**

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Horticulture crops are an integral part of food, nutritional, and economic securities in India. Horticulture crops phytobiome research explore the importance of native microbial communities that modulate plant growth and health. A very little information is available about the structure, composition, and dynamics of horticulture-associated microbial communities as well as the functional contribution of cultured and uncultured community members who directly involved in the acquisition of nutrients, growth promotion, resilience against pathogens, and tolerance against abiotic stress (heat, drought, and salinity). Due to the increasing demand for crop production, functional mechanisms of microbial communities are need to explore through modern molecular approaches. Recent advances

in molecular approaches such as DNA fingerprinting, sequencing methods, microarrays, DNA barcoding, metagenomics, and, DNA/RNA probe technology have the potential to explore microbial communities and offer the opportunity to understand better and exploit this resource. This chapter reviews the importance and functionalities of the horticulture crops associated with microbial communities through advanced molecular technologies. It discusses the challenges to unravel the complex network of genetic, microbial, and metabolic interactions of microbial community members and horticulture crops.

**Key words:** Pytobiome, horticulture crops, microbial application, microbe–host interactions and molecular techniques

### **Abstract- 5PSRM2022/203**

#### **FERTILIZER PRESCRIPTION THROUGH TARGETED YIELD MODEL FOR GROUNDNUT AND RESIDUAL EFFECT OF NUTRIENTS ON SUCCEEDING WHEAT GROWN IN NORTH WESTERN INDIA**

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Field experiments were conducted as per technical programme of AICRP on STCR at Norman E. Borlaug Crop Research Centre, Pantnagar during 2021-2022. The experimental area was divided into three equal strips and soil fertility gradient created artificially by applying graded doses of nutrients in these strips and oat was grown as an exhaust crop. Test crop of groundnut was grown dividing each strip in 24 plots (21 treatments and 3 controls). Crop response to selected combinations of four levels of nitrogen (0, 10, 20 and 30 kg N ha<sup>-1</sup>), four levels of phosphorus (0, 15, 30 and 45 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>), four levels of potassium (0, 22.5, 45 and 67.5 kg K<sub>2</sub>O ha<sup>-1</sup>) and three levels of FYM (0, 5 and 10 t ha<sup>-1</sup>) in different fertility strips was studied. Chemical analysis was performed to estimate soil pH, OC, available nitrogen, phosphorus and potassium status in the soil. Nutrient requirement to produce one quintal of groundnut pod yield was found to be 4.31 kg, 1.42 kg and 2.15 kg of N, P and K, respectively. Percent contribution of N, P, K was 34.96, 32.93 and 22.71 from soil and 13.68, 6.75 and 12.28 from FYM, 84.27, 68.34 and 53.15

from chemical fertilizer and 111.48, 88.38 and 60.77 from combined use of chemical fertilizer with FYM. Fertilizer prescription equations were developed with and without FYM with help of basic data. Coefficient of determination ( $R^2$ ) was found highly significant (0.7921\*\*) between pod yield, soil test values, added fertilizers and interaction between soil and fertilizer. In residual study with wheat, residual fertility of  $N_3P_3P_3$  treatment shows highest yield followed by  $N_2P_2K_3$  and  $N_1P_1K_2$ . Verification trial of groundnut has been ongoing. These findings for North Western India can be used as a roadmap for optimum fertilizer management by reducing cultivation costs, improving FUE, and controlling pollution in the environment. Therefore, soil test based fertilizer recommendation is a useful tool for balanced fertilization of nutrient.

**Keywords:** Integrated, target yield, pollution

### **Abstract- 5PSRM2022/204**

#### **BIODIVERSITY CONSERVATION**

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Biodiversity refers to the variety of plants and animals found on the earth. It measures the variations at ecosystem, at species and genetic level. Biodiversity conservation refers to the protection, upliftment and management of biodiversity in order to derive sustainable benefits for present and future generations, also biodiversity conservation is the protection and management of biodiversity to obtain resources for sustainable development. Although biodiversity has plenty of objectives but mainly 4 of them are focused. 1- To preserve the diversity of different species, 2- Sustainable utilisation of species and ecosystem, 3- To maintain life-supporting systems and essential processes, 4- To never let the entropy of ecosystem get depleted and utilise it in the best way possible. There are a numerous ways to prevent biodiversity some of them are very common and are made aware since childhood like, 1- Preventing cutting down of trees 2- Putting ban on hunting of animals 3- Efficient utilisation of natural resources 4- Afforestation, 5- Conservation of endangered animals. It is believed that an area with higher species abundance has more stable environment compared to an area with lower species abundance. We depend

directly on various species to full fill our different needs . Biodiversity is being lost due to the loss of habitat, over-exploitation, climatic changes,invasion of human , pollution ,diseases, hunting and etc. Since it provides us with several benefits and adds asthetic value, it is very important to conserve biodiversity. Biodiversity knows no political boundaries and its conservation is therefore a collective responsibility of all nations. The historic Convention on Biological Diversity (The Earth Summit) held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits. In a follow-up, the World Summit on Sustainable Development held in 2002 in Johannesburg, South Africa. 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.

### **Abstract- 5PSRM2022/205**

#### **ROOTSTOCK BREEDING IN FRUIT CROPS**

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Most of the fruit plants are propagated on a rootstock. Scion and stock grow together, although genetically different, but functioning infusion. A fruit tree rootstock is the stump of related species which already has an established, health root system and to which a separate fruit is joined by grafting or budding. Thus, the rootstock is the lower portion of the plant on which scion cultivar is grafted and it is provided root system or support to the plant. The rootstock influences tree size, productivity, fruit quality, pest resistance, stress tolerance, and ultimately profitability. It also reduces juvenility and tree vigor; bring a much-improved degree of uniformity and consistency to an orchard. Therefore, rootstock is very vital component of a grafted tree and determines the success or failure of a commercial orchard. Rootstock selection offers a powerful tool for the sustainable intensification of fruit production because while the scion genotype can be used to select fruit properties, adaptation to water deficit and high salinity, tolerance to alkaline soils and

susceptibility to pathogens (e.g., Fire blight in apple) can be influenced by the choice of rootstock.

**Key words:** Apple, budding, grafting, juvenility, and rootstock.

### **Abstract- 5PSRM2022/206**

#### **AGRICULTURE WASTE MANAGEMENT**

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Agriculture is the backbone of many developing nations and is one of the largest contributors to the resource sector. Millions of people practice agriculture as their occupation in the world. These wastes may constitute a serious threat to human health through environmental pollution and handling them may result in huge economic loss. Improper disposal of waste can cause an environmental impact as well as affect humans and animals alike. There is a need to manage waste disposal as seemingly harmless things can get harmful if not disposed of responsibly. For instance, it can give rise to the problem of landfills and the emission of toxic gases from that area. Moreover, if pesticides end up in rivers instead of fields then they can kill aquatic life. An effective means of managing agriculture solid wastes is to recycle them to produce useful products like Composting/organic manure, Substrates for edible fungi cultivation, Nonconventional feed ingredient etc.

**Keywords:** Management of Agriculture waste, Waste converted into usable form

## Abstract- 5PSRM2022/207

### STUDY OF SOME NEW SPECIES OF CERCOSPORA IN GARHWAL HIMALAYA, INDIA.

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Leaf spot disease caused by the fungi *Cercospora* of family Deuteromycetes was studied for the first time from high hilly regions of Garhwal Himalaya Uttarakhand, India. It attacks the economically important crops namely- *Vicia faba*, *Spinaceaoleracea*, *Ricinuscommunis* and *Beta vulgaris*. The pathogen was *Cercospora canescens*, *Cercospora chenopodii*, *Cercospora ricinellae* and *Cercospora beticola* respectively, which results into heavy losses when found suitable environmental and other conditions and causes heavy losses. All four species of *Cercospora* was reported for the first time from Garhwal region of Uttarakhand. This study reveals the detailed studies of life cycle and infection period of the fungus in Garhwal region of Uttarakhand. An intense activity is detrimental to all aerial parts of the plants. They simultaneously show the presence of various developmental stages and the luxuriance of yielding conditions. It should be stress that most of the plants of this region suffer from serious *Cercospora* diseases, the epidemic character of which has been confirmed by the development and continuous extension. These mostly represent a continuous threat particularly in remote areas. Since last 30 - 40 years' work on this pathogen have been taken jointly by different associations and Institutions. Survey is currently been made mostly in the study of important cereals and more extensively to those crops which are essential on food supply.

**Key Words:** Deuteromycetes fungi, *Cercospora* spp., Heavy losses, Infection Period, Garhwal Himalaya.

## Abstract- 5PSRM2022/208

### **CRISPR/CAS9-MEDIATED GENOME EDITING IS REVOLUTIONIZING THE IMPROVEMENT OF HORTICULTURAL CROPS: RECENT ADVANCES AND FUTURE PROSPECTS**

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In modern agriculture, horticultural crops are an integral component and play a vital role in sustaining human life. Although conventional approaches have contributed to the enhanced agricultural production, innovative breeding technology is required to further increase horticultural and nutritious crop worldwide. Genome editing has revolutionized the plant world by precisely edit the targeted modification of plant genome, including model plants, agricultural and horticultural crops. Recent advances in Clustered regularly interspaced short palindromic repeats (CRISPR)/CRISPR/associated protein 9 (Cas9) genome editing tool have emerged as an efficient targeted modification in most fruit, vegetable and ornamental plants thus promising to accelerate crop improvement due to its high accuracy and efficiency. Several reports of the development of improved fruit, vegetable and ornamental plants using CRISPR/Cas9 tool has been documented. CRISPR/Cas9 genome editing efficiency depends on several factors such as promoter sequence, RNA polymerase specificity, Cas9 expression, types of vectors, guide RNA expression etc. In the present review, we summarize the applications of CRISPR/Cas9 genome editing system in fruit, vegetable and ornamental crops. This article also provides its origin, mechanism, an existing pitfall and future possibilities for bright future in development of horticultural crops.

**Key words:** CRISPR/Cas9, Genome editing, Horticultural crops, Ornamental plant and Precision editing.

## Abstract- 5PSRM2022/209

### BIO FORTIFICATION IN VEGETABLE CROPS

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With the Current global and local economic crisis in the world, diversification is on everyone's mind and even though we are aware of the important role of agriculture sector played in our economy in the past. One of the most recent discoveries is Aeroponics a technology that proves plants do not require soil to grow, not only that but that soil may even inhibit swift and healthy growth of plants. Aeroponics is a promising soil less farming method for solving future food crisis and is relatively a new way of growing plants that is getting increasingly popular with many people because of the speed, cost and novelty. Aeroponic farming is a form of hydroponic technique and a type of vertical farming. This farming system empowered the producer to precisely control root zone nutrients, water regimes, and environmental conditions and have complete access to the roots throughout the life of the crop. This aeroponic farming is superior in terms of excellent aeration, water use efficiency, less time and space requirement, seasonal independence, disease free plant propagation, and large-scale plant production etc. than the conventional methods of propagation.

## Abstract- 5PSRM2022/210

### PHYSIO-CHEMICAL ATTRIBUTES OF BER [ZIZIPHUS MAURITIANA LAMK.] GENOTYPE

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The present investigation entitled "Studies on Physio-chemical attributes of ber [Ziziphus mauritiana Lamk.] genotype" was carried out as surveys followed by collection of fully matured fruits of different genotypes in the campus of BBAU and its adjacent area and Physio-chemical characters were observed in the laboratory of Department of Horticulture

[SASL] during the year 2021-2022 in BBAUniversity, Vidya vihar, Rae Bareli road Lucknow, [UP]. The experiment was set up in Completely Randomized Design [CRD], with 24 treatments in three replication. Among the physical and Bio-chemical characters maximum fruits was greenish yellow in colour, maximum fruits was oval in shape, maximum fruits length [4.14cm], seed length [2.473cm] was recorded in Local genotype-9. Maximum fruit width [2.95cm] and total sugar [9.86%] was recorded in Local genotype-19. Maximum fruits weight [11.353gm] was recorded in Local genotype-16. Maximum seed width [1.503] and acidity [0.416] was recorded on Local genotype-4. Maximum pulp: stone ratio [36.379], total soluble solids [13.92%] and reducing sugar [5.21%] was recorded in Local genotype-8, 23 and 18. Maximum non-reducing sugar [4.947%] and ascorbic acid [79.17mg/100gm] was recorded in Local genotype-13. From the present investigation, it may be concluded that on the basis of taste genotype-23 was superior but overall the best characters was observed among the Local genotype-19.

**Keywords-** Ber, Physio-chemical attributes, genotype etc.

#### **Abstract- 5PSRM2022/211**

#### **BIO-EFFICACY OF VOLIAM FLEXI 300 W/V SC (CHLORANTRANILIPROLE 8.8% W/W + THIAMETHOXAM 17.5% W/W) AGAINST PESTS COMPLEX IN OKRA**

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A field experiment was carried out at Rajasthan College of Agriculture, MPUAT, Udaipur during the two consecutive years 2017 and 2018 in a randomized block design with eight treatments and three replications. Okra variety JKOH-7315 was sown in the plot size of 5.0 m x 3.15m with plant spacing of 50 cm X 35 cm. The results revealed that all treatments were significantly superior over control. Among the treatments Chlorantraniliprole 8.8% w/w + Thiamethoxam 17.5% w/w @ 600 ml/ha were found most effective treatments against all the major insect pests of okra. No significant difference was observed in natural enemies' population in treated plots as compared to the control. Therefore Chlorantraniliprole 8.8% w/w + Thiamethoxam 17.5% w/w can be fit in IPM programme.

**key words-** volim, okra, chlorantraniliprole, bioefficacy etc.

## Abstract- 5PSRM2022/212

### NANOTECHNOLOGY A CONTEMPORARY SCIENCE

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This technological branch manipulates the molecular structure of materials to change their intrinsic properties and obtain others with revolutionary applications. This is the case of graphene modified carbon harder than steel, lighter than aluminium and almost transparent or nanoparticles used in areas such as electronics, energy, biomedicine or defence. In 1959 the American Nobel prize and physicist Richard Feynman was the first to speak about the applications of nanotechnology at the California Institute of Technology (Caltech). With the 21st century, this area consolidated, was marketed and came into its own. It includes other areas such as micro-manufacturing, organic chemistry and molecular biology. In the United States alone, for example, more than 18 billion dollars were invested between 2001 and 2013 through the NNI (National Nanotechnology Initiative) to turn this sector into a driver of economic growth and competitiveness.

**Keywords:** Molecular structure, Nanoparticles, organic chemistry etc.

## Abstract- 5PSRM2022/213

### EFFECT OF DIFFERENT SHADE NET COLOUR AND INTENSITY ON GROWTH OF TOMATO (*LYCOPERSICON ESCULENTUM* L.) IN WESTERN RAJASTHAN

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The investigations on "Effect of Different Shade Net Colour and Intensity on Growth and Quality Attributes of Tomato, (*Lycopersicon esculentum* L.) in Western Rajasthan" was conducted at Precision Farming Development Centre, Agricultural Research Station, SKRAU, Bikaner from November, 2020 to June, 2021. Different colour (Red, Black, White, and Green) shade net with varying shade intensities (35%, 50%) were found to be significantly influenced most of the growth attributes. The maximum plant height

(24.57cm, 64.76 cm, 104.27cm, 125.96cm) was observed under black colour shade net at 50,75,100,125 DAT respectively. Maximum Leaf area index (6.09), minimum days taken for first flowering (27.14), first fruit set (36.51) and first picking (98.56) was observed under red shade net with 50% shade intensity. Maximum number of picking (8.87), maximum dry matter accumulated per plant (211.87g), maximum chlorophyll content (3.75 mg g<sup>-1</sup>) was obtained under red colour shade net.

**Keywords:** Tomato, shadenet colour, shade intensity and leaf area index

#### **Abstract- 5PSRM2022/214**

#### **SCREENING OF LEAF WEBBER, *ANTIGASTRA CATALAUNALIS* DUP. INFESTING SESAME IN FIELD CONDITION**

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The investigation on assessment of sesame genotypes/varieties for their resistance against leaf webber, *Antigastra catalaunalis* based on morphological and damage percentages were conducted under field conditions at Instructional farm, Department of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh during *Kharif*, 2021. A total ten of genotypes/varieties of sesame were assessing for their relative resistance/susceptibility. Morphological character *viz*, number of leaves per plant ( $r = -0.928^{**}$ ) showed a negative highly significant correlation with per cent leaf damage. However, trichomes/cm<sup>2</sup> ( $r = -0.259$ ) showed non-significant negative correlation with per cent leaf damage. The number of capsules per plant ( $r = -0.876^{**}$ ) showed a highly significant negative correlation with the mean per cent of flower and capsule damage. Consideration of leaf, flower and capsule damage, none of the genotypes/varieties were found highly resistant (HS) and highly susceptible (HS). However, variety G. Til-10 and genotype AT-457 were found resistant (R) while varieties G. Til-4 and G. Til-6 were found susceptible (S) against leaf webber, *A. catalaunalis*. Genotype AT-457 (1.97) and variety G. Til-10 (2.02) recorded the lowest damage score than the rest of the genotypes/varieties. The next promising varieties, AT-470 (2.49), AT-482 (2.69), AT-483 (2.71), G. Til-2 (2.80)

and G. Til-3 (3.20) were fallen into the moderately resistant (MR) category. However, AT-467 (4.53) was categorized as moderately susceptible, while G. Til-4 (5.47) and G. Til-6 (5.73) had the highest damage score. Among all genotypes/varieties, the highest yield (520.13 kg/ha) was recorded from G. Til-10 than the rest of the genotypes/varieties followed by AT-457 (514.15 kg/ha) and AT-470 (477.5 kg/ha).

### **Abstract- 5PSRM2022/215**

#### **EFFECT OF ZINC BASED NANOEMULSION ON GROWTH OF TOMATO (*SOLANUM LYCOPERSICUM* L.) UNDER POLYHOUSE CONDITION**

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The experiment was carried out at Hi-tech unit, Department of Horticulture, Rajasthan College of Agriculture, Udaipur (Raj.). The experiment was aimed to assess the possible effect of zinc based nanoemulsion on growth of tomato (*Solanum lycopersicum* L.) under polyhouse condition, in this regard seven treatments were selected *viz.*, control, 100 ppm ZnSO<sub>4</sub>, 1%, 5%, 10%, 15% and 20% concentrations of zinc based nanoemulsion. The result exhibit the significant effect of various zinc based nanoemulsion on growth of tomato. Maximum plant height at 60 DAT, 90 DAT and 120 DAT (114.60 cm, 194.00 cm and 285.13 cm, respectively) and leaf area index (2.374) were recorded in 15% zinc based nanoemulsion, whereas highest number of branches (8.20) and stem girth (5.40 cm) were recorded in 10% zinc based nanoemulsion. Our study revealed that the zinc based nanoemulsion could be potential increase growth of tomato.

**Keywords:** Nanoemulsion, Growth, Plant height, Leaf area index etc.

## Abstract- 5PSRM2022/216

### EFFECT OF DEMONETIZATION ON INDIAN STOCK MARKET

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While the debate is getting stronger and stronger by the day on the issue whether demonetization was a success or a failure, one of the most important questions that popped out was, 'what was the effect of demonetization on Indian stock market?' To be honest, the objectives of demonetization are more or less long-term. We still support it because we needed to start somewhere. However, what's disturbing is that demonetization gave pain to millions of Indians who are struggling with cash shortage. With this recent demonetization 86% of cash in circulation suddenly was destroyed. This led to short term pain for people. Banks were struggling to deal with long queues of people trying to exchange their old high-value currency notes with newly circulated currency notes. ATMs remained closed. However, it is not really easy to understand the total economic impact because of this unexpected policy simply by looking at people and banks and ATMs. A more reliable indicator of economic impact has always been the stock market trends. It is a traditional practice to look at the indices of the stock market to understand the overall economic environment. Persistent and sharp plunges in such indices always indicate that economic activities are deteriorating.

## Abstract- 5PSRM2022/217

### **EFFECT OF VERMICOMPOST AND VERMIWASH ON NUTRIENT UPTAKE BY BROCCOLI (BRASSICA OLERACEA L. VAR. ITALICAPLENCK) VAR. PALAM SAMRIDHI**

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The present investigation entitled with "Effect of vermicompost and vermiwash on growth, yield and quality of broccoli (*Brassica oleracea* L. var. *ItalicaPlenck*) var. Palam Samridhi" was carried out at horticulture farm, Department of Horticulture, Rajasthan College of Agriculture, MPUAT, Udaipur during rabi season of the year 2021-2022. The treatments comprised of three level of vermicompost (V) viz., V1 = Full dose of RDN through vermicompost at basal, V2= 1/2 dose of RDN through vermicompost at basal + 1/2 dose RDN through vermicompost at 30 DAT, V3= 1/3 dose of RDN through vermicompost at basal + 1/3 dose RDN through vermicompost at 30 DAT + 1/3 dose RDN through vermicompost at 45 DAT and three level of vermiwash (F) viz., F1 (5 per cent Foliar application of vermiwash) F2(10 per cent Foliar application of vermiwash) F3 (15 per cent Foliar application of vermiwash) also with control vs rest. The experiment was laid out in Randomized Block Design (RBD) Factorial comprised of ten treatments combination with three replications. The results revealed that the maximum nitrogen (*i.e.* 66.29 kg), phosphorus (*i.e.* 12.96 kg) and potassium (*i.e.* 103.12 kg) were recorded in V3 while, lowest nitrogen (*i.e.* 60.07 kg/ha), phosphorus (*i.e.* 9.41 kg/ha) and potassium (*i.e.* 95.40 kg/ha) were found with V3 while, minimum nitrogen (*i.e.* 60.07 kg/ha), phosphorus (*i.e.* 9.41 kg/ha) and potassium (*i.e.* 95.40 kg/ha) were found with V1.

**Key words:** Vermicompost, vermiwash, broccoli.

## Abstract- 5PSRM2022/218

### CHARACTERIZATION OF ACCESSIONS OF TUBEROSE

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Characterization of accessions of tuberose provides unique opportunity for their identification, conservation, management and its subsequent utilization for crop improvement programmes. Molecular approaches represent a potential tool for effective characterization of germplasm in peanuts, which circumvents the limitations associated with morphological and biochemical characterization reported variation in tuberose collections using Randomly Amplified Polymorphic DNA (RAPD) markers and grouped seven populations into two major groups. analyzed twenty tuberose genotypes comprising both single and double petal types collected from different parts of India using RAPD markers. Studied the genetic relationship of seven tuberose genotypes by ISSR (Inter simple sequence repeats) molecular markers. Characterization of tuberose cultivars through molecular markers is much desired due to prevailing confusion in ascribing unique identity of genotypes exist in different geographical region of India as they are loosely referred as single and/or double petal cultivars. It is expected that all single petal genotypes might have evolved from single type tuberose parent and accordingly, all double petal genotypes from its respective double petal parent. At present only few studies are recorded with regard to diversity and genetic relationship in tuberose using DNA markers.

**Keywords-** Characterization, Polymorphic, Genotypes, Molecular markers etc.

## Abstract- 5PSRM2022/219

### DNA BARCODING AND ITS APPLICATIONS IN ENTOMOLOGY

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DNA barcoding is a technique for identifying organisms based on a short, standardized fragment of genomic DNA. The standardized sequence region is called a DNA barcode because it is like a barcode tag for each taxon. The extreme diversity of insects and their economical, epidemiological and agricultural importance have made this group a major target of DNA barcoding. However, there is some controversy about the utility of DNA barcoding. In this article, we present an overview of DNA barcoding and its application to entomology.

**Key words:** DNA barcode, species identification, taxonomy, invasive species

## Abstract- 5PSRM2022/220

### SOIL POLLUTION AND SOLUTION

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World Soil Day was established in 2002 by the International Union of Soil Sciences (IUSS) to celebrate the importance of soil and its vital contributions to human health and safety. On December 20, 2013, the 68<sup>th</sup> UN General Assembly recognized December 5<sup>th</sup>, 2014 as World Soil Day and 2015 as the International year of soils. Soil Pollution used to be a local issue, mostly associated to unsustainable activities such as uncontrolled waste disposal; but during the last decades, it has received wider attention, having becoming a general environmental problem. Soil pollution may result from both intended and unintended activities, covering direct emissions to soil and complex environmental processes resulting in the indirect contamination of soils following emission to air or water. On-site industrial

pollution and inadequate waste management, mining activities, direct intentional applications of materials to soil, and atmospheric deposition are the main sources of soil pollution. Measures to control soil pollution (Four R's i.e. Refuse, Reuse, Recycle and Reduce), Recycling and Reuse of waste- To minimize soil pollution, the wastes such as paper, plastics, metals, glasses, organics, petroleum products and industrial effluents etc should be recycled and reused. Minimize the manufacture and use of chemical fertilizers; reduce the use of pesticides and proper disposal of industrial and agricultural wastes. Integrated waste management method should be adopted. Eat sustainable foodstuffs, properly recycle batteries, produce homemade compost and dispose of drugs in the places authorised for this purpose. Encourage a more eco-friendly model for industry, farming and stock breeding, among other economic activities.

**Key words:** Soil Pollution, Solution, Sustainable, Eco-friendly, Recycle, Reuse, Reduce, Refuse, Emission, Mining activities, Waste and Integrated waste management.

### **Abstract- 5PSRM2022/221**

#### **IMPORTANCE OF SOIL HEALTH AND QUALITY AND HOW TO IT IMPROVE**

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Soil health and soil quality are defined as the capacity of soil to function as a vital living system within land use boundaries. This function which sustains biological productivity of soil also maintains the quality of surrounding environment and human health. Thus the two terms are used interchangeably although it is important to distinguish that, soil quality is related to soil function, whereas soil health presents the soil as a finite non-renewable and dynamic living resource. The main role of health is soil organisms respond sensitively to land management practices and climate. They are well correlated with beneficial soil and ecosystem functions including water storage, decomposition and nutrient cycling, detoxification of toxicants, and suppression of noxious and pathogenic organisms. Soil organisms also illustrate the chain of cause and effect that links land management

decisions to ultimate productivity and health of plants and animals. Healthy soils should be focused on four complementary themes: (i) mechanisms and assessment of carbon storage potential in soils across regions and systems; (ii) performance evaluation of best farming practices for soil carbon and impact on other greenhouse gases, food security, and other regulation and production services; (iii) innovation and its promotion by appropriate policies; and (iv) monitoring and estimating variations in soil carbon stock, especially at the farmer level.

**Keywords** - Soil health, Soil quality, Ecosystem functions

### **Abstract- 5PSRM2022/222**

#### **PERFORMANCE OF CLUSTERBEAN (*CYAMOPSIS TETRAGONOLOBA*) UNDER LONG-TERM PRESCRIPTION-BASED FERTILIZER RECOMMENDATION IN WESTERN RAJASTHAN**

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To understand the impact of prescription-based fertilizer application on the performance of clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] crop in loamy sandy soil, we started an experiment in 2018 which consisted of 5 treatments; general recommended dose, prescription-based fertilizer recommendation for 1.5 and 2.0 t/ha without compost, prescription-based fertilizer recommendation for 1.5 and 2.0 t/ha with compost. The results revealed that, prescription-based fertilizer recommendation with compost for target yield 2.0 t/ha produced significantly 28.5 and 10.8% higher seed yield than general recommended dose and prescription-based fertilizer recommendation for target yield 2.0 t/ha without compost respectively. Similarly, growth and yield attributes parameters such as plant height, leaf area/plant, pod length, clusters/plant, pods/cluster, pods/plant, seeds/pod and test weights were also found significantly higher under prescription-based fertilizer recommendation for target yield 2.0 t/ha with compost than the other treatments.

The prescription-based fertilizer recommendation with compost for target yield 2.0 t/ha enhanced significantly macronutrients (N, P and K) content uptake, protein and chlorophyll content.

### **Abstract- 5PSRM2022/223**

#### **SMART AGRICULTURE : FUTURE OF INDIA**

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Smart Agriculture is an approach that helps lead the way to transform agri -food system towards climate favourable practices and using latest technologies like IOT (The Internet OF Things), robotics, drones and artificial intelligence to improve and increase quality and quantity of agricultural products while optimizing the human labor required for production. With the merit of integrating modern tools, farmers can easily supervise in distant mode and take strategic decisions. Smart Agriculture deems it necessary to address the issuer of population growth, climate change and labor that has gained a lot of technological attention from planting to harvesting crops. There are various Components of Smart Agriculture like IoT, Precision Farming, Smart greenhouse automation, 5G Network, Soil moisture sensor, etc. Precision Farming is an important component which is an umbrella concept for IoT based approaches to make Agriculture more accurate and beneficial. IoT, the Internet of Things is a technology which offers unconventional and practical solutions in many areas. Data is the heart of IoT, which can be transmitted over internet. It helps in collecting data for efficient Environment monitoring, fertilizer and irrigation management. Also the farmer can monitor the field conditions from anywhere. 5G Networks, which helps in Communication and Information Technology has also undergone significant development and are important component of Smart Agriculture in parallel with smart systems. The 5G network is faster by nearly 100 times in download and upload speed than 4G network. Soil moisture Sensor is a measure of volumetric water content in soil, helpful in good irrigation management, which ensures to give better crop ultimately leading to more profit. So, from the abstract we can conclude that, the concept of Smart Agriculture proves to be very reliable and helpful to farmer in terms of Easness. The technologies like

AI, IoT, etc. are very supportive to alter traditional way of Farming into smart farming in growing population scenario. Smart Farming is meant for Precise Farming, better crop quality and quantity by optimizing agricultural resources by latest innovations.

**Key Words :** Smart Agriculture, Precision Farming, IoT, Smart greenhouse automation, 5G Network, Soil Moisture Sensor, Communication & Information Technology.

### **Abstract- 5PSRM2022/224**

#### **IMPACT OF INTEGRATED WATERSHED MANAGEMENT PROGRAMME (IWMP) ON SUSTAINABLE RURAL LIVELIHOOD OF BENEFICIARIES IN NORTH KASHMIR**

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Watershed management is a holistic approach to address the problem of land degradation and to maintain ecological balance. The present study entitled "Impact of Integrated Watershed Management Programme (IWMP) on Sustainable Rural Livelihood of Beneficiaries in North Kashmir" with the following objectives: to study the socio-personal attributes of beneficiaries and to evaluate the impact of IWMP on sustainable rural livelihood of beneficiaries was undertaken. A pretested structured survey schedule was administered on 350 randomly selected beneficiaries including 227 from Baramulla, 86 from Kupwara and 37 from Bandipora respectively. Data was collected by personal interviews and appropriate statistical methods were applied for analyzing the data. The result revealed that majority of the beneficiaries (46.00%) belonged to 36-60 years of age group, 62.86 per cent beneficiaries were literate, 53.43 per cent had family size upto 5 members, majority (46.57%) had farming + labour as main occupation, (46.00%) beneficiaries had land holding upto 0.5 ha, (56.00%) beneficiaries had annual income of Rs.1 lakh-2 lakh, (47.14%) beneficiaries had no membership, (48.86%) beneficiaries had medium sources of information, more than half (52.86%) beneficiaries had medium extension contacts, majority (59.14%) beneficiaries had medium scientific orientation and (60.85%) beneficiaries had medium economic motivation. Majority (29.71%) beneficiaries had 20-40 per cent increase in labour opportunity, (29.71%) beneficiaries had 20-40 per cent

increase in fodder availability, majority (79.71%) beneficiaries had no change in fuel availability. Majority (66.28%) beneficiaries had <20 per cent increase in ground water table level, majority (33.42%) beneficiaries had <20 per cent increase in irrigation water, (35.42%) beneficiaries had <20 per cent increase in drinking water availability, majority (36.28%) beneficiaries had no change in soil erosion problems, (41.14%) beneficiaries had <20 per cent increase in cropping pattern with the increased standard of living. Majority of the beneficiaries were found to be satisfied with the increase in income pattern followed by increase in standard of living through various interventions of IWMP.

**Keywords:** Land degradation, Watershed management practices, Impact on sustainable development, Satisfaction level.

#### **Abstract- 5PSRM2022/225**

#### **EMOTIONAL INTELLIGENCE IN PROPORTIONATE TO AGRICULTURAL EXTENSION SERVICES**

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Emotional Intelligence (EI) plays an essential role in facilitating effective and efficient extension services. A relation towards attitude and behaviour in aspect to farmers and stakeholders is much essential and brings fruitful measurements of emotional intelligence in Agricultural Extension. The skills and competing behaviour in the respective domain of an agricultural officer could be utilized in an effective manner and it could be also known that how an agent uses the Emotional Intelligence optimally. The training methods along with individual, groups and mass methods can be easily enhanced through integrating EI in the process. Agricultural extension workers are the most important component of bureaucracy since they interact directly with farmers and are driving agricultural progress. The nature of job of the extensionists demands to be in close proximity with the farmers and other stakeholders involved in the process of Agriculture. Mainly in Krishi Vigyan Kendras (KVKs) an inter-relational concept exists between Emotional Intelligence and Organizational Role. Professionals working in the sector of social work in high degree

aspect like in Veterinary and Agricultural Extension tend to develop a better degree of emotional intelligence. Emotional Intelligence played an important role in the consumer behaviour during the COVID-19 pandemic. Year 2020 was an exceptional year, as it included poverty, job losses, trading in border areas was difficult. It caused a panic situation among the buyers so they switched to online buying which gained huge prosperity. The entrepreneurial skills of the agriculture students were found to be influenced by social and emotional intelligence in a positive and significant manner.

**Key Words:** Emotional Intelligence, attitude, behavior, proximity, social, training

### **Abstract- 5PSRM2022/226**

#### **ASSESSMENT OF SOIL QUALITY INDEX OF ALIRAJPUR DISTRICT USING PRINCIPAL COMPONENT ANALYSIS**

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Information regarding spatial variability and distribution of soil properties is critical for stakeholders attempting to increase nutrients use efficiency and crop productivity. Application of fertilizers on the basis of soil characteristics maps associated with fertilizers recommendation may aid to curtail fertilizers inputs without surrendering the crop yield. The present study was focused on geo-spatial assessment of soil quality index of Alirajpur district of Madhya Pradesh India using geo-statistical approach. 272 GPS based surface (0-15 cm) soil samples were collected from six blocks (Alirajpur, Bhabra, Jobat, Kathiwara, Sondwa, and Udaigarh) of Alirajpur district after harvest of crops during rabi season 2016-17. The samples were processed and analyzed for fertility parameters, spatial variability maps generated using GIS, correlations between nutrient content in soil and were workout and soil quality index was analyzed using PCA. The soils of Alirajpur district having the bulk density, pH, EC, OC and CaCO<sub>3</sub> varied from 4.70 to 8.40, 0.03 to 0.90 dSm<sup>-1</sup>, 0.47 to 12.92 g kg<sup>-1</sup> and 5.0 to 115 g kg<sup>-1</sup> soil, respectively. Available N, P, K and S content in soils of Alirajpur district ranged from 76.0 to 382.0 kg ha<sup>-1</sup>, 1.34 to 62.13 kg ha<sup>-1</sup>, 53.52 to 529.85 kg ha<sup>-1</sup> and 0.55 to 33.90 mg kg<sup>-1</sup> soil, respectively. Zn, Cu, Fe, Mn and B contents in soil varied from 0.03 to 1.98, 0.06 to 3.74, 1.07 to 36.0, 1.34 to 43.0 and 0.03

to 4.76 mg kg<sup>-1</sup> soil, respectively. The categories of the soil fertility status were made with respect to N, P, K and S as medium, high, medium and low (M-H-M-L). The 64.71%, 93.01% and 25.37% soil samples were noticed to be low in S, Zn and Fe, respectively. The results revealed that none of the samples were tested low in Cu and Mn and these are not a major problem in Alirajpur district as a whole. Correlation analyses among the above highly weighted variables were done to remove the redundant variables, accordingly OC and N, Fe and Mn, CaCO<sub>3</sub> and Zn were highly correlated, and finally OC, Fe and Zn were retained owing to their high factor loading. The sensitive indicators (Minimum dataset) under the soils of Alirajpur District in descending order of importance as revealed by factor analysis were as follows: OC > Fe > Zn > B > EC > K > MBC. The sensitive indicators under the soils of Alirajpur district in descending order of importance as revealed by factor analysis were as follows: OC > Fe > Zn > B > EC > K > MBC. This suggests that these indicators may be used in future for characterizing the state of soil conditions of district. Soil quality index rating ranged from 0.22 to 0.31 under the different blocks and 0.22 for district as whole and with including biological parameter soil quality index 0.31 for district as whole.

### **Abstract- 5PSRM2022/227**

#### **BREEDING AND CROP IMPROVEMENT IN PINEAPPLE**

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Pineapple is the most important economic plant in the family Bromeliaceae and the thirdmost economically important tropical fruit in the world. It has become an important tropical fruit in Guangdong, Hainan, and Guangxi, which are suitable areas for its cultivation. However, modern and well-organized breeding systems have not yet been established for pineapple. In this review, we describe the current status of the geographical distribution, industrial development, and breeding of pineapple in China. The current status of pineapple breeding is introduced, including traditional breeding methods, such as crossbreeding, mutagenesis breeding, and biotechnology breeding, combining cell

engineering and gene engineering. In addition, the research progress on assisted breeding technology based on genetic map construction and molecular marker development is presented. New challenges and perspectives for obtaining high fruit quality are discussed in the context of breeding programs for pineapple.

### **Abstract- 5PSRM2022/228**

#### **ROLE OF LEPTIN AND INSULIN IN OBESITY**

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Leptin is a hormone which is secreted by adipose tissues in most of the animals. Its function is to maintain body mass, food intake and reproductive function. Leptin is the product of a gene (*ob*), here *ob* stands for obese. Leptin works in many different ways in controlling various functions of the body. Leptin also functions in the regulation of circadian rhythm of cortisol, thyroid stimulation hormone, follicle stimulating hormone, and leutinizing hormone levels in our body. There is the presence of feedback loop in the body by which leptin plays its significant role in controlling body's food intake process. Leptin shows its effect by binding to its receptor (LepR). These receptors are located in various body cells which respond to leptin. Leptin first binds to its receptor then it mediates various genetic changes in the cell leading to the potential effect of leptin. It has been shown in various studies that more the level of leptin in the body lesser the food intake which means leptin has an anorexic effect on the body. Insulin which is a very important hormone of the body when it comes to managing the levels of sugar in body, it has been found that leptin and insulin work together in obesity. Study of role of leptin in obesity can lead to the treatment of leptin obesity-induced diabetes. The detailed study of leptin role in obesity has lead to the emergence of many leptin based therapies which have proven to be a boon in the field of medical science. These studies have lead to the solution of many life threatening lifestyle health conditions like cardiovascular diseases, thyroid diseases, PCOD/ PCOS (Polycystic Ovarian Disease/ Syndrome), diabetes, which are the result of

obesity. Further leptin based therapies are also very well researched in treating obesity and diseases associated with it.

**Keywords:** Leptin, Obesity, Insulin.

### **Abstract- 5PSRM2022/229**

#### **DRIP IRRIGATION IN VEGETABLE CROPS**

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Drip irrigation is the show, even application of low - pressure water to soil and plants using plastic tubing placed near the plants ' root zone . It is an alternative to sprinkler or furrow methods of irrigating crops . Drip irrigation can be used for crops with high or low water demands . Why consider drip irrigation ? Drip irrigation can help you use water efficiently . A well - designed drip irrigation system booses practically no water to runoff , deep percolation , or evaporation Drip irrigation reduces water contact with crop leaves , stems , and fruit . Thus , conditions may be less favorable for disease development . Imigation scheduling can be managed precisely to meet crop demands , holding the promise of increased yield and quality . Growers and irrigation professionals often refer to " subsurface drip irrigation , " or SDI . When a drip tape or tube is buried below the soil surface , it is less vulnerable to damage during cultivation or weeding . With SDI , water use efficiency is maximized because there is even less evaporation or runoff Agricultural chemicals can be applied more efficiently with drip irrigation Since only the crop root zone is irrigated , nitrogen already in the soil is less subject to leaching losses , and applied fertilizer can be used more efficiently . In the case of insecticides , less product might be needed . Make sure the insecticide is labeled for application through drip irrigation.

**Keywords:** Biofortification, hidden hunger, malnutrition

## Abstract- 5PSRM2022/230

### A COMPARATIVE STUDY ON EFFECT OF ORGANIC AND INORGANIC FARMING ON GROWTH AND YIELD OF MUSTARD [*BRASSICA JUNCEA* (L.)]"

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Mustard is a major oil crop in India. It belongs to cruciferae family. The experiment at liberty "A comparative study on the effect of organic and inorganic farming on growth and yield of mustard (*Brassica juncea* L.)" was conducted in the Seed Science and Technology research farm during Rabi season 2020-21, under field experiment. The experiment was laid out in simple Randomized Block Design with three replications which comprised 3 Treatments + 2 Control viz., T<sub>1</sub> (FYM + Cow urine), T<sub>2</sub> (FYM + Ash), T<sub>3</sub> (FYM + Cow urine + Ash), C<sub>1</sub> (Negative Control), C<sub>2</sub> (Positive Control FYM+ NPK fertilizer). During the experiment, parameters of growth and yield character were studied viz. 85.66% of Standard germination %, 73.13 cm of plant height at 60 DAS, 149.93 cm of plant height at 90 DAS (cm), 171.60 cm of plant height at harvesting stage, 7 and 15.86 number of branches per plant at 30 DAS and 60 DAS, 38.33 g of Fresh weight and 4.86 g of dry weight, 273.60 number of siliqua plant-1, 15.53 number of seeds siliqua-1, 23.46 g seed yield plant-1, 610 g seed yield per plot, 5.46 g of test weight (1000 seed weight). The experimental result revealed that maximum growth and yield attributes were recorded under T<sub>1</sub> (FYM + Cow urine) was significantly and the minimum growth and yield attributes were recorded in the C<sub>1</sub>(negative control). The superior growth and yield observe under organic treatment compared to inorganic treatment.

**Key words:** Mustard [*Brassica juncea* (L.)], NPK, Cow urine, Organic farming

## **Abstract- 5PSRM2022/231**

### **VERTICAL FARMING**

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Recently the application of vertical farming has been increased. Vertical Farming refers to growing crops vertically by using vertically stacked layers in a controlled environment which have objective of optimizing plant growth. According to vertical farming association by the year 2050, it is expected that the world's population will increase to about 10 billion, and 80% of the world's population will be concentrated in and around urban areas and the food demand will increase tremendously. As we know natural resources are limited. Humans are reproducing at a very higher rate than the nature can create the resources. Vertical farming can be a solution to these problems as by using less resources we can produce crops easily, so vertical farming can be a useful tool to fulfil the increasing food demand. In vertical farming there is very little wastage of resources, there is effective and efficient use of resources. Using vertical farming families in urban areas can produce their own food easily and organically. The increasing demand of organic food can also be fulfilled using vertical farming.

## **Abstract- 5PSRM2022/232**

### **FLORAL BIOLOGY OF FRUIT CROPS**

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Floral biology has several practical implications in fruit crops. It includes the morphology, anthesis, and mode of pollination of flowers. The time of anthesis, and dehiscence of anther, time of pollination, structure and size of flowers, inflorescence of flowers are entirely different in each plants. The flower traits which affect the quality and yield of fruits. The structure of flower is produced by angiosperms and its evolution associated with pollinators.

**Keywords:** Anthesis, Dehiscence, Inflorescence

## Abstract- 5PSRM2022/233

### **MORPHOLOGICAL CHARACTERIZATION OF COLOURED GENOTYPES OF GUAVA FOR YIELD AND QUALITY TRAITS**

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The investigations on morphological characterization of coloured genotypes of guava for yield and quality traits was carried out during year 2018-19 and 2019-20 for phenotypic characterization of coloured guava genotypes, The results revealed that highest tree height (5.77 m) was recorded in genotype AC 8-6 whereas lowest tree height was found in CISH G-5 (4.45m), maximum tree spread (2.61m) was recorded in genotype AC 6-2. The minimum tree spread was found in AC 8-6 (2.13 m) and the highest tree volume was recorded (79.21 m<sup>3</sup>) was recorded in genotype AC 5-7. The minimum tree volume was found in AC 1-4 (45.67 m<sup>3</sup>), maximum fruit weight (211.33g) was recorded in genotype AC 8-6, Maximum thickness of outer flesh (1.77mm) was recorded in genotype AC 5-7, minimum thickness of outer flesh whereas AC 6-4 (1.00mm). maximum Core diameter (211.33g) was recorded in genotype AC 8-6 whereas minimum Core diameter was recorded in AC 5-7 (3.93mm), The highest yield (43.17 kg/tree) was recorded in genotype AC 6-2 whereas lowest yield (Kg/tree) was found in AC 5-2 (39.67 kg/tree).The genotypes were grouped into two type based on their shape, they were round and oblong in shape. The highest value of TSS (10.73 %) was recorded in genotype CISH G-5, whereas, the lowest TSS (8.33%) was found AC 5-2, The titrable acidity (0.37 %) was recorded minimum in AC 5-2. Maximum titrable acidity (0.62%) in AC 10-5., The maximum Vitamin C content (123.37 mg/100 g of pulp) was recorded in genotype AC 8-6. And the minimum Vitamin C content was found AC 10-5 (98.45 mg/100 g of pulp, maximum total Sugar (6.94) was recorded in genotype CISH G-5. Minimum total Sugar was found in AC 10-5 (4.163), The number of seeds per fruit varied between 143.67 to 213.00 number of fruits in coloured guava genotypes. 100 seed weight ranged from 0.94 to 1.67 and recorded maximum in AC 8-5 and lowest in AC 10-7. The individual fruit seed weight ranged from 1.91 to 3.41 g and maximum in AC 8-5 and found lowest in AC 10-7, Seed weight per 100

g of pulp varied between 0.50 to 0.89 Seed weight per 100 g of pulp in coloured guava genotypes.

### **Abstract- 5PSRM2022/234**

## **AGROFORESTRY SYSTEMS AND PRACTICES IN THE HILL VILLAGES OF KUMAUN FOR SUSTAINABLE DEVELOPMENT**

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The indigenous knowledge of hills is fast becoming lost as urbanization digs its claws into rural India. The traditional farming methods alongside the modern practices make Agroforestry the most sustainable and economically beneficial system among all the other social forestry programmes. The present study was carried out in the village of Dhanachuli (Dhari block) located amidst the scenic mountains of Uttarakhand at an elevation of 2186 m. The study aims to assess traditional agroforestry practices along with modern techniques. The data was collected through surveys, questionnaires and naturalistic observation. The average family size was  $5.66 \pm 1.52$  persons. The vegetation analysis and assessment of land use patterns was carried out throughout the village by the use of sampling techniques. Traditionally, Apple orchards are the most site-specific characteristic in the region and are the prime source of income. The most popular apple varieties in the region are Brown delicious, Jero mine, Gala and Scarlet. The average production of an apple orchard was between  $27 \text{ t ha}^{-1}$  to  $44 \text{ t ha}^{-1}$ . Multipurpose fruit trees such as plum, peach and apricot were grown in bunds and boundaries. The major agricultural crops cultivated are *Solanum tuberosum* and *Pisum sativum* along with green leafy vegetables and various pulses. Some farmers have adopted modern farming techniques to enhance the quality and quantity of produce. Women play a crucial role in all agricultural activities including the sale of produce and animal keeping. The availability of a variety of crops helps reduce the vulnerability of farmers as well as promote the well-being of society as a whole. Continuation of indigenous Agroforestry practices suitable for the local region along with the insertion of commercially viable scientific methods is crucial for the sustainable development of hill villages.

**KEYWORDS:** Indigenous knowledge, Agroforestry System, Orchard, Hill Village.

## Abstract- 5PSRM2022/235

### DIVERSITY OF BUTTERFLY COMMUNITIES AT DIFFERENT ALTITUDES OF KUMAOUN ZONE, UTTARAKHAND

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The order Lepidoptera is the second largest order of insects, including butterflies, moth, and skippers. Butterflies provide a wide range of environmental benefits, including pollination and natural pest control. The purpose of the study was to describe diversity of butterflies at various altitudes of Kumaon zone, Uttarakhand. Kumaon region is filled with biodiversity due to its suitable environmental condition and humid area. The present study covers altitude between 100-35000msl of Kumaon area. A total of 80 species of butterflies were observed at various altitudinal range. Among them Nymphalidae was the most dominant species. Whereas some other families recorded in study area was Papilionidae, Hesperiidae, Pieridae, Lycaenidae. The significant difference in diversity of butterflies among the altitudes as indicated by the values of Shannon Weiner-index H'.

**Key words:** Diversity, Kumaon, Nymphalidae, Lepidoptera, Uttarakhand.

## Abstract- 5PSRM2022/236

### STUDIES ON GENETIC VARIABILITY FOR POD YIELD AND ITS CONTRIBUTING TRAITS IN PEA (*PISUM SATIVUM L.*) IN LOW HILL CONDITIONS OF HIMACHAL PRADESH (*Allium sativum L.*)

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The study was conducted to evaluate the performance of different genotypes of garden pea during Rabi, 2019-20 at Regional Horticultural Research and Training Station, Dr. Y S. Parmar University of Horticulture and Forestry, Himachal Pradesh. The experiment was layout in the Augmented Block Design (ABD). Examination of the characteristics revealed substantial variability in the genotypes, indicating that sufficient variance was present

throughout the germplasm under study. The maximum plant height was recorded in EC-838238 whereas, the minimum plant height was recorded in EC-838152. The minimum number of node at which the first flower appear was recorded in three genotypes viz. EC-838152, EC- 838161, EC838233, whereas EC-838232 recorded the highest node at which the first flower appear. The lowest days to 50% flowering were reported in EC-838216 while the highest were documented in EC-838206. The EC-838220 showed the lowest number of seeds per pod and the EC-838211 expressed the highest number. In EC-838143 the highest length of the pod were reported whereas, EC- 838229 recorded the lowest pod length. Also, the highest weight of 100-seeds was recorded in EC-838141 while the lowest value was obtained in EC-838188. The minimum number of days to marketable maturity was recorded in EC-838146 whereas, maximum days to marketable maturity was recorded in EC-838192. Further, the maximum shelling percentage was observed in EC-838192 whereas the minimum shelling percentage was observed in EC838156. The highest pod yield (kg/plot) and pod yield (q/ha) were observed in EC-838201 whereas, minimum values for these traits were recorded in EC-838219. The genotype EC838166 recorded the highest total soluble solids and it was lowest in EC-838199. The genotypes EC-838199 and EC-838200 were reported to be moderately susceptible to the incidence of pea leaf miner whereas, DMK-11 was reported to be susceptible. Therefore, further evaluation and growing under the conditions of sub- tropical climate of Himachal Pradesh.

**Keywords:** Garden pea, Pod yield, Mean and genotypes

#### **Abstract- 5PSRM2022/237**

#### **THE SOUL BLOOMING OF BURANSH – STATE TREE OF UTTARAKHAND**

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“Beauty lies in the eyes of the beholder” but in case of Uttarakhand beauty lies in the mountains , rivers , sacred places , traditions and breathtaking flower valleys holding beautiful and medicinal flowers , while talking about flowers a “pahadi” can never forget about “Buransh – State Tree of Uttarakhand”. Botanically known as *Rhododendron*

*arboreum*, belonging to family Ericaceae. The onset of spring brings blooming of buransh, one of the most fantastical wonders that you can witness in Uttarakhand. In the backdrop of shining silvery Himalayas, the dark red Buransh flowers depict a heavenly picture. Along with being an identity of the state, it also reflects the culture of Uttarakhand and is enriched with incredible health benefits and a lot of essential products are manufactured from it.

**Keywords** – State Tree, Buransh, Pahadi, Himalayas, health benefits.

#### **Abstract- 5PSRM2022/238**

#### **Psychological Wellbeing and Happiness of Women Farmers: An Assessment of Organic Vegetable Farming in Chhattisgarh, India**

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Natural farming without chemicals is called organic farming. The Government of Chhattisgarh has implemented the national scheme BPKP and taken the lead in improving organic farming. In organic farming, many farmers use the principles and practices of Natural Farming, such as Jivamrit, Beejamrit, and botanical pesticide, etc. Under PKVY, the area of organic farming is 500 hectare and under Jaivik Kheti Mission, it is 80 hectare.

Last two year available literature and reports were reviewed and analyzed in Indian context. A small survey was conducted in Durg district of Chhattisgarh. Survey result shown that women had less literacy about organic forming in terms of Zero Beget Forming. Psychological Wellbeing of women belonging to Organic Vegetable Farming is better and also Happiness level of women belonging to Organic Vegetable Farming are high in comparison to women belonging to chemical Vegetable Farming

**Keywords:** Organic Forming, Zero Beget Forming, Jaivik Kheti Mission, Psychological Wellbeing and Happiness

#### **Abstract- 5PSRM2022/239**

## HETEROSIS, COMBINING ABILITY AND GENE ACTION STUDIES IN CAULIFLOWER (*BRASSICA OLERACEA* VAR. *BOTRYTIS*)

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The present investigation was carried out at Vegetable Research Centre (VRC), G.B.Pant University of Agriculture and Technology, Pantnagar, Uttarakhand during cropping season of 2019-20. The major objectives of the study were to estimate heterosis, general and specific combining ability effects, the extent of genetic variability, correlation and path analysis. The experiment was laid down in randomized block design with 3 replications; thirty crosses were evolved in line x tester mating design with 10 genotypes as female parents (lines) and 3 genotypes as male parents (testers). The analysis of variance revealed highly significant differences among genotypes for all the attributes under study. High amount of heritability was observed in plant diameter whereas high genetic advance as percentage was found in curd size index. The F<sub>1</sub> cross combination PC-25 x PG-3 was found to be best heterotic combination for number of leaf per plant, lamina length, marketable curd weight, curd size index and curd yield (q/ha) over better parents. Besides it, other combinations showing significant value for all types of heterosis were PCF-120 x PusaMeghna, COMP-3 x PG-3, PCF-65 x PG-3, INB-9-2 X SabourAgrim. For the development of early curd, negative heterosis is desirable for days to curd initiation. For days to curd initiation cross combinations PC-100 x PusaMeghna, PC-77 x SabourAgrim and COMP-3 x PusaMeghna were found most promising. The lines namely PC-25, PC-100, COMP-3 and PCF-120 were found to be good general combiners for yield and yield attributing traits. Among the testers, PG-3 and SabourAgrim were observed to be good general combiner for marketable curd weight and yield. The cross combination PC-25 x PG-3 and DC-54-15 x PG-3 showed maximum sca effects and hence, may be utilized in future breeding programme.

**Keywords:** Heterosis, Combining ability, Gene action, Line x Tester mating design, Hybridization

### Abstract- 5PSRM2022/240

## **DETERMINATION OF CHOLESTEROL USING TLC**

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An exact, delicate, exact, solid, and speedy technique for the assurance of cholesterol content by superior execution dainty layer chromatography is created. In this strategy, aluminum-supported precoated silica gel 60 F254 plates were utilized as the fixed stage and the examples were showered with the assistance of CAMAG test tool Linomat 5. The chromatogram was created with the portable stage comprising of chloroform:methanol (9.5:0.5, v/v). The examples were identified utilizing CAMAG Scanner 4 and assessed utilizing the strategy created on winCATS programming. Densitometric examination of cholesterol was acted in absorbance mode at 200 nm. In this dissolvable framework, cholesterol gave a conservative spot with a *R<sub>f</sub>* worth of  $0.63 \pm 0.03$ . The straight relapse examination of information for the alignment bend showed great linearity over a focus scope of 2-7  $\mu\text{g}/\text{spot}$  with a relapse worth of 0.99933 and standard deviation of 1.44%. The constraint of identification and breaking point of measurement were viewed as 100 ng/spot and 500 ng/spot, individually. Utilizing the created technique, the grouping of cholesterol in the saponified and unsaponified egg yolk not set in stone. This technique was viewed as reproducible and might actually be utilized for tests containing complex frameworks.

### **Abstract- 5PSRM2022/241**

## **GENETIC VARIABILITY ANALYSIS FOR YIELD AND YIELD ATTRIBUTES AMONG DETERMINATE "WAL" TYPE INDIAN BEAN [*LABLAB PURPUREUS* (L.)SWEET] GENOTYPES**

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Fifty-two genotypes of Indian bean were examined for the genetic variability parameters and trait correlation analyses for 11 yield contributing traits in F<sub>5</sub> progenies. Analysis revealed that these genotypes have a considerable level of diversity. The magnitude of GCV and PCV was high for seed yield per plant, which indicated the potential for selection based genetic enhancement. The GCV and PCV values were moderate for pod weight, pods width and pod length. High heritability along with high genetic advance as per cent mean was recorded for pod width, pod length, pod weight and seed yield per plant. The seed yield per plant had significant positive correlation with pod weight, plant height, pod length, pod width and seeds per pod. The overall genotypic path analysis revealed that racemes per plant exhibited highest positive direct effects on seed yield per plant followed by direct effects of pod length, pods per raceme, pod width and pod weight. Therefore, simple selection is advised for pod length, pod width and pod weight to boost the yield of the Indian bean. Based on mean values, the progenies W-19-26, W-19-22 and W-19-25 of GNIB-21 × GP-167 among all crosses had shown significantly higher seed yield over the check varieties GNIB-21 and GNIB-22 and hence identified as elite genotypes.

**Keywords:** PCV, GCV, Heritability, Correlation, Path analysis

### **Abstract- 5PSRM2022/242**

## **SPEED BREEDING: A SILVER LINING FOR FOOD SECURITY**

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Speed breeding has revolutionized the whole of the world in today's era. The first-ever speed breeding procedure was developed through an inspiration from NASA which was adopted by the University of Queensland scientists. Speed breeding is a protocol which enables plant breeders to enhance the crop production changing the temperature and light duration and intensity to enhance the growth of the plant. It is using an artificial source of light that too continuously which triggers the photosynthesis process results in the growth and the process of a reproduction comes very early as compared to normal timing. The researches show that by Speed breeding techniques we can grow approximately 6 generations of wheat, chickpea & barley and around 4 generations of canola plants in a single year. This will help us to meet the demands of the growing population of the future. This can be accomplished through various technologies such as genotyping, MAS, high-throughput phenotyping; gene editing, genomic selection, re-domestication which can be integrated with speed breeding to enable plant breeders to keep up with an evolving climate and ever-increasing human population. The purpose of this review paper is to define the research gap regarding the speed breeding as this is the new and effective procedure by which we will be able to come over the problems related to the scarcity of the food in future.

**Keywords:** Speed breeding, life cycle, crop improvement

### **Abstract- 5PSRM2022/243**

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## **EFFECT OF DIFFERENT GROWING MEDIA ON GROWTH, FLOWER YIELD AND QUALITY ON FLOWER CROPS – A REVIEW**

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Use of organic growing media like as FYM, coco peat and vermiculites showed better for higher production of flower crops, due to their good water holding capacity, aeration and more uptake of nutrients. When various kind of growing media were used in combination with organic substrates, higher net profit for ornamental crops can be obtained because growing media play direct or indirect role in plant growth. Therefore, in this review article we have summarized the literature available on effect of various types of growing media in ornamental crops. Thakur and Grewal (2019) revealed that, vegetative growth with maximum plant height, number of leaves, root suckers per plant with delayed flowering in media containing cocopeat + FYM (2:1). Whereas, media containing vermiculite + FYM (2:1) recorded highest, flower quality parameters like flower diameter and duration of flowering. However, coco peat + vermiculite + FYM (1:1:1) showed the significant vegetative growth with better flowering time and quality in potted Chrysanthemum cv. Kikiobiory (Thakur and Grewal, 2019). In another experiment, in marigold maximum numbers of flowers were produced in the potting media containing 30% of CD (cow dung) vermicompost. The maximum flower diameter were found in the potting media containing 40% of sugar mill wastewater vermicompost (Sangwan *et al.*, 2010). So, it was concluded that vermicompost is an effective media for flower and quality production in ornamental crops.

**Keywords:** Growing media, Pot plant, Flower production, Vermicompost

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## **ERA OF PHOTOVOLTAIC AND SOLAR ENERGY**

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With the growing concerns about greenhouse gas emissions, also the security of Non-renewable energy supplies, and the environmental safety of Non renewable or conventional energy production techniques, All the renewable energy systems are gradually becoming essential and receiving a great deal of political and economic attention. Especially, photovoltaic (PV) and the solar power systems which helps in conversion of solar energy into electricity have been found to be technologically robust, feasible , with effective processing , and holds enormous potential as a sustainable source of energy. Solar panels ,which are the only major liable sources for conversion of solar energy are now in demand amongst all industrial sectors . The instant rise in production of photo voltaic films can be seen in the industrial market . Photo voltaic films which works on the process of "PHOTO ELECTRIC EFFECT" which was discovered by Hertz and explained by our genius einstein using Quantum theory of light couple years back . Photo electric effect(PEE) which is basically a phenomenon of ejecting electrons by falling sunlight of Suitable frequency or wavelength over a piece of metal . Also the solar technologies use electrical or mechanical devices to actively convert solar energy into another form of energy, most often heat or electricity. Devices like Solar cell are used for the conversion part which is processed with the help of semiconductor fitted in it . Moreover, Passive solar technologies do not use any external devices. Whereas, they take advantage of the local climate to heat structures during the winter, and reflect heat during the summer. Solar furnaces is an example of concentrated solar power or CSP we might consider. There are many different types of solar furnaces, including solar power towers, parabolic troughs, and Fresnel reflectors. They use the same general method to capture as well as to convert energy. Which entirely shows that the era of solar power has began !

### **Abstract- 5PSRM2022/245**

## CHITOSAN PROTECTION FROM RICE DISEASES

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In this research, the significant rice illness and their control strategies are depicted. The enlistment of safeguard components of rice interceded by chitosan and their job in plant security from sickness under both controlled and field conditions are referenced. Proof shows that rice security interceded by chitosan is accomplished by an immediate activity of this biopolymer of the microbe and furthermore in a roundabout way by prompted obstruction.

**Keywords:** *Oryza sativa*, antimicrobial activity, resistance induction, defense mechanisms, plant protection

### Abstract- 5PSRM2022/246

## ENGINEERING SALT-TOLERANT PIGEON PEA PLANTS: CHARACTERIZATION OF PHYSIO-CHEMICAL AND YIELD RELATED ATTRIBUTES IN TRANSGENIC PLANT WITH HIGHER K/NA<sup>+</sup>

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Receptor kinases are one of the most potent cell signaling molecules that work against different kinds of stress, however, very few studies are there on the characterization of the *Lectin Receptor-like Kinase* gene in plants for regulating salt stress tolerance. Estimation of various physiological parameters like Relative water content, membrane injury index, chlorophyll content, photosynthetic rate, and ionic balance confirmed its role in providing salt tolerance in transgenic pigeon pea plants. *OsLecRLK* expressing pigeon pea lines were found to perform much better than wild types starting from vegetative till the completion of the reproductive phase. Biochemical analysis of osmolytes and antioxidant enzymes

deciphered the role of *OsLecRLK* in maintaining the osmotic balance, ion homeostasis, and keeping a check on ROS production, The estimation of phenological and yield attributes confirmed that the mechanism that is governed by the *OsLecRLK* gene is ultimately maintaining the vigor of pigeon pea plants conferring completion of pigeon pea life cycle in a normal pattern that too with minimal effect of salt stress. All the transgenic lines were found to perform better than wild type under salt stress but of all the transgenic line RLK #9 was the most tolerant under 7.5 dS/m NaCl stress. There are several studies in transgenic plants regarding physio-biochemical characterization under salt stress, but this is one of the first studies to report the effect of the *OsLecRLK* gene on morphological, physiological, biochemical, and phenological and yield attributes under salt stress in transgenic *OsLecRLK*-pigeon pea plants.

### **Abstract- 5PSRM2022/247**

### **PHYTOREMEDIACTION – RESTORING SOIL HEALTH ALONG WITH BEAUTIFICATION**

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Degradation of natural resources is perhaps one of gravest lapses mankind has ever made in its journey of progress and development. Land, air and water resources are worst affected due to anthropogenic interventions. Due to global industrialization and the increase on human population, contamination of soil, water and air through heavy metals have posed various uncompromising and fatal effects on humans and the stability of the ecosystem. Unlike organic contaminants, heavy metals are non-biodegradable and therefore can remain in environment for a long time. The term 'heavy metal' is mostly used in the context of environmental pollution. The use of plants (including trees and grasses) to remove, destroy or sequester hazardous contaminants from various media such as soil, water and air is termed as Phyto-remediation. It consists of Greek word "Phyto" which refers to plant and the Latin suffix "remedium" which means curing or restoring. It is of four types namely phytoextraction, phytostabilization, phytovolatilization,

rhizofiltration. This natural and environmental friendly technology is cost-effective, aesthetically pleasant, soil organism friendly, able to retain the fertility status of soil even after the removal of heavy metals. Heavy metal uptake by plants is a complex process, influenced by numerous factors that interact with one another and the availability and mobility of metals in the soil, plant species, genotype and soil properties such as, pH, organic matter, clay content etc. However, it poses some disadvantages which have limited its application. These include the necessary demands for nutritional materials, time consuming, specific climatic and soil characteristics to maintain a normal plant growth. With an increase in the contamination of urban areas, more and more attention has been paid to the role of ornamental plants in curing contaminated soil. Thus, cadmium (Cd) tolerance and accumulation characteristics of *Calendula officinalis* and *Althaea rosea*, arsenic accumulator ferns: Chinese brake fern (*Pteris vittata* L.), *Asplenium nidus*, *Ceratopteris richardii*, *Davallia canarensis*, *Nephrolepis exaltata*, silverback fern (*Pityrogramma calomelanos*), *Polypodium aureum*, *Polystichum tsusimense*, *Pteris cretica*, *Pteris ensiformis*, *Pteris longifolia*, *Pteris terminalis*, *Pteris umbrosa* are promising. Some aromatic plants appear to be a good choice for phytoremediation, such as *Hyssopus officinalis* L., *Satureja montana* L., *Hypericum perforatum* L., *Achillea millefolium* L., *Mentha arvensis*, *M. piperita*, in long term they could be used for contaminated soils. The effect of heavy metals on aromatic crops (mint, lavender) in industrial region in which the final product is free from heavy metals is better than edible crops. In addition, some aromatic crops appear to be excellent choice for phytoremediation, such as *Hyssopus officinalis* L. and *Satureja montana* L. studies on soil properties show an advantage in reduced heavy-metal uptake by cultivation of appropriate plants using practical techniques.

**Key words:** Environment, Heavy metals, Organic matter, Ornamental plants, Phytoremediation and Soil health

#### **Abstract- 5PSRM2022/248**

#### **ROLE OF MODERN BREEDING TECHNOLOGY FOR CROP IMPROVEMENTS** *Sunita Choudhary*

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The conventional breeding methods based on plant selection. Plant selection was based on phenotype of plants but the phenotype is largely impacted by the environmental factors affecting the crop improvement program. Molecular markers are one of the comprehensive inventions in agricultural science. The molecular markers provided a great advantage to breeders for the resourceful selection of better plant progenies. The molecular markers are highly consistent and are not precious by the environment. The technological advances in DNA analysis have expanded the host of molecular markers used for plant genotyping crop improvement. The present circumstances offers to choose from various molecular marker types based on their methodologies, principle, and extent of applications. Additionally, recent progress achieved in genetics, molecular breeding and genomic selection has facilitated an inclusive understanding of the molecular markers and unlocked new insights into marker - assisted breeding. The initiation of new technologies like association mapping (AM) and genome - broad association studies has unveiled the high throughput application of molecular markers. The use of different molecular markers in the identification of tolerant crop genotypes and associated genes / QTLs against major abiotic stresses, including salinity, drought and temperature has been provided. Recently, the advent of the next - generation sequencing (NGS) technologies has provided to highly liberal and instructive markers like single - nucleotide polymorphisms (SNPs). The development of saturated linkage maps could only be possible with the accessibility of molecular markers. These maps are requirement for gene / QTL mapping, map based cloning of genes, and marker - assisted selection. The application of molecular markers for improve the qualitative and quantitative traits in some important agricultural, horticultural, and plantation crops.

**Key words:** Molecular markers, Association mapping (AM), QTL mapping, Next - generation sequencing (NGS), Qualitative and quantitative traits, Single - nucleotide polymorphisms (SNPs), Crop improvement

#### Abstract- 5PSRM2022/249

#### **SOCIO-ECONOMIC CONDITIONS OF WORKERS IN FOOTWEAR INDUSTRY: A STUDY OF ORGANIZED SECTOR OF AGRA DISTRICT**

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The Footwear Industry is among one of the significant segments of the Leather Industry as well as non leather industry in India. Next to China, India is the second-highest manufacture of shoes with approximate production of 2 billion pairs- including an equal percentage of leather and non-leather shoes of different categories. And it is expected to rise by 8% by 2030. The organized footwear sector in India makes almost 25% of the overall market. Though manufacturing is heavily concentrated in small and cottage industries but the industrial setup also requires a lot of manual labour. Making shoes involves several steps, including last creation, pattern creation, pattern cutting, clicking, sewing, assembling, and finishing. Numerous chemicals, solvents, and adhesives are used in the manufacture and assembly of footwear, posing numerous health risks to the workforce. The goal of the current study was to understand the socio - economic profile of the employees working in Agra's formal footwear manufacturing units. Employing the snowballing method, two formal/ organized industrial setups in Agra were identified and selected. 75 respondents made up the sample size, which was chosen using methods of systematic random sampling. The study covered 75 subjects with an average age of 36 years and mean duration of work was 12 years. The majority of the workforce was comprised of people of the Jatav/Jatan/Jatia community, a Hindu social group classified as scheduled caste followed by other backward classes of the Muslim community. They received meagre pay and had a low literacy rate. Indulgence of the majority population in various health-risk behaviours, such as alcohol consumption, bidi smoking, and tobacco chewing makes them prone to various health issues. Despite the fact that 50% of them were living in semi-kacha homes, every home had access to latrines. Since majority females were home-based employees, only three female workers employed in the production units for packaging task. Fewer respondents were aware of the occupational hazards/risks associated to their occupations.

**Keywords:** Footwear manufacturing workers, occupational health, socio-economic status, low cost labour, health risk behaviour.

## Abstract- 5PSRM2022/250

### **POLYAMINES: VERSATILE BIO STIMULANTS FOR CLIMATE RESILIENT FLOWER PRODUCTION**

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Bio-stimulants are one of the most promising alternatives to increase crop productivity and cope with yield losses caused by various stresses, exaggerated by climate change. Biostimulants comprise of compounds (excluding pesticides and chemical fertilizers) which effect plant physiology and have positive impact on plant development. Polyamines collectively imply to a group of bio-stimulants which includes polycationic hydrocarbon compounds possessing varying number of amino groups ranging from diamine putrescine (put), triamine spermidine (spd) to tetraamine spermine (spm). Because of multiple positive charge, polyamines posses the ability to react with anionic cellular components like DNA, proteins, phospholipids in the membranes, etc., thereby regulating their biochemical properties. The role of polyamines in alleviating damage caused by abiotic stresses is widely reported because of their anticipated radical scavenging ability, ability to stabilize cellular macromolecules and role in stimulation of anti-oxidant pathways in the plants under stress. Accredited to these properties, they also possess potential to mitigate deleterious effect of environmental pollutants like ozone, acid rain, UV-radiations, heavy metals and herbicides on the plants exposed to them. To escalate flower production even under extreme environment, polyamines can play a key role. Exogenous application of polyamines or increased level of endogenous polyamines using molecular interventions can be implemented to escalate flower production under stress condition by enhancing tolerance against abiotic stresses and ameliorating the pernicious effects of menacing environmental pollutants. This prompts us to consider polyamines as potent organic compounds which can be used to maximise flower production without having adverse effects on environment.

## Abstract- 5PSRM2022/251

## **"WOOD MICROSTRUCTURAL VARIATIONS IN DIFFERENT GROWTH FORMS OF GENUS *FICUS*"**

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The current study examines wood anatomical variation in different growth forms of fig species. While it is easy to find habits variations among various families, within families, or even between genera, it is more interesting to find them within a genus such as *Ficus*. This genus belongs to the Moraceae family and includes shrubs, climbers, free growing plants, and epiphytes. In all growth forms, wood is needed to provide mechanical and hydraulic functions. In climber species, mechanical development is less developed because they grow with the support of other trees but long distance water transport require more hydraulic development. *Ficus* is remarkably homogeneous in their wood microstructure. It is characterized by abundant axial parenchyma in regular apotracheal concentric bands, narrow vasicentric rings, and relatively wide vessels. With the help of these wood anatomical characters it is easy to recognize *Ficus* within the family. However, the wood anatomy of these different growth forms of *Ficus* has not been studied before, so our goal is to find a relationship between habits and wood anatomical attributes.

**Key words:** *Ficus* species, growth forms, habits, wood microstructures, hydraulic, mechanical strength etc.

### **Abstract- 5PSRM2022/252**

## **ACUTE GENOTOXIC EFFECTS OF ARSENIC AND CHROMIUM TREATED TWO EDITABLE FISH *L. ROHITA* AND *C. PUNCTATUS* WITH SPECIAL TO ITS WATER QUALITY**

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Water pollution is a matter of great concern in lentic and lotic ecosystems. Generally water pollutants like heavy metals, organic compounds, etc. generate from industries and domestic activities. All of these pose serious threat to the fish population in freshwater as well as marine water bodies. *Channa punctatus* and *Labiorohita* fishes provide a suitable model for monitoring aquatic genotoxicity and wastewater quality because of their ability to metabolize xenobiotics and accumulate pollutants. Genotoxicity of fish with special reference to micronucleus induction in the erythrocytes of fish is an easy screening of water pollution. Irrespective of the sex, live specimens of *Channa punctatus* and *Labiorohita* which is measuring about 15-20 cm length with an average body weight  $30\pm 5$  g and acclimated to the laboratory conditions for a period of 15 days. During the acclimation period fish were regularly feed a balanced commercial fish food (Hikari Cichlid Gold, KYORIN, Japan) and kept in aquaria ( $30 \times 50 \times 20$  cm) containing dechlorinated tap water (pH: 7.50; salinity 32; DO: 6.70 mg/L; temperature:  $28\pm 2$  °C) before the experiment and oxygen supply was maintained in using an electric aerator pumps. The photoperiod used provided 12/12 h dark/light. Then the fishes were sub-lethal concentration of selective heavy metals to evaluate the genotoxicity of As & Cr. Micronucleus test (MNT) was conducted in treated fish and examined using optical microscopy under 100x objective for the presence of micronuclei. The frequency of micronuclei showed that the number of these cells was higher in both fishes. The frequency of MN and EAs increased almost linearly with increase in concentration. The results revealed significant difference between the control and experimental animals.

### Abstract- 5PSRM2022/253

#### **INSECT'S PESTS OF *QUERCUS SEMECARPIFOLIA* SM. (FAGACEAE) OF WESTERN HIMALAYAN REGION, INDIA.**

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In Indian Himalayan region, over 35 species of Oaks (*Quercus* spp.) are reported among which *Quercus semecarpifolia*, commonly known as kharsu oak which represent the climax community and forms extensive forest in high-altitude zones (2500-3000m) of Western Himalaya. Kharsu oak is attacked by variety of insects either standing or after felling in forest. Mathur & Singh (1959) have listed a total of 23 species of insects pests among which 14 species are Coleoptera and 9 species are Lepidoptera. Amongst the insects, stem and wood boring beetles are capable of causing significant oak mortality. *Rosalia lateritia*, *Xylotrechus basifuliginosus*, *Anaglyptus fasciatus* and *Necydalis indicola*(Cerambycidae) are the wood boring beetles among which first two are mainly responsible for the mortality of kharsu oak in Deoban Reserve forest of Chakrata Forest Division, Dehradun district of Uttarakhand state whereas *Crossotarsus fairmairei*, *Diapus himalayensis*(Platypodidae) and *Scolytoplatypus kunala*(Scolytidae) are the major bark beetles of newly felled or fallen wood of kharsu oak from Garhwal region of Uttarakhand state. In case of Lepidoptera, *Abraxas intermedia*, *Biston porphyria*, *Medasina albidaria* (Geometridae), *Dasychira* sp. (Lymantriidae), *Cosmia ochreimargo* (Noctuidae), *Desmeocraera fasciatus* (Notodontidae), *Ypsolophus* sp. (Plutellidae), *Tinea* sp. (Tineidae), *Tortrix* sp. (Tortricidae) and *Antheraea pernyi* (Bombicidae) are the major defoliators of kharsu oak tree.

**Keywords:** Western Himalaya, Forest, Stem borers, defoliators, mortality.

#### Abstract- 5PSRM2022/254

#### AROMATIC MEDICINAL PLANT RESOURCES IN WEST UTTAR PRADESH AND UTTRAKHAND REGION IN INDIA

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Human beings have always made use of their native flora, not just as a source of nutrition, but also for fuel, medicines, clothing, dwelling, and chemical production. Traditional knowledge of plants and their properties has always been transmitted from generation to generation through the natural course of everyday life. Medicinal plants are common and medicinally important to treat various diseases. A study on the native uses of ethnomedicinal species was carried out in the Shivalik region of Bijnor district of Uttar Pradesh and Himalayan region of Uttrakhand in India with the major objective of identifying different medicinal plant species. Production and productivity of many wild-type plants have increase manifolds but the challenges of malnutrition and threat of climate change continues by the time. The ethnobotanical data were collected through questioners by interviewing local communities and Hakims. The medicinal practitioners were treating the common diseases like cough cold, snake bite, diabetes, wounds, fever, toothache and the antitumor activity. In total 21 species belonging to 18 Genera and 15 Families were recorded which were used by inhabitants of the area.

**Keywords:** Medicinal plants; Wild edible plants; Shivalik region of Bijnor district of Uttar Pradesh and Himalayan region of Uttrakhand

## Abstract- 5PSRM2022/255

### FORMULATION OF PULSE NOODLES

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Pulse noodles is a nutritional supplement which contains calories, protein and fiber in adequate level gives beneficial effects on the health. Red kidney beans and Black turtle beans are the pulses used in the noodles, obtained naturally, rich in protein, iron, fiber, copper which provides huge health benefits. It also contains lectin a toxin which can be deactivate by the soaking, boiling and steaming process. Pulse noodles are cheap, require minimal utilities and time to prepare. this makes an appealing source of nourishment as a snack for people. Generally, noodles are known as high in calories where no nutrient content is present but, Pulse noodles are complete snack and another choice of multi grain noodles which is low in protein content. In additional, pulse noodles are helps in Reducing Cholesterol, Prevents colon cancer, Control Blood Sugar improve , lipids and insulin levels in type 2 diabetics. Instant noodles are dried or precooked fused with oil and often sold with a sachet off flavoring. Pulse noodles have substantial potential as a protein–fiber-rich complementary food to improve the nutrient delivery and satisfying the protein requirement of primary class children. India is one of the leading countries in malnutrition among all age groups. This study is to attract the people by the familiar product which may also fulfil their nutritional requirement. Pulse noodles were prepared by using different ratios of composite flour(wheat flour: Pulse flour-70:30, 50:50). The various compositions of each flour were estimated to find out which composition has gained maximum acceptability level based on the sensory evaluation. From the nutritional analysis, the carbohydrate, protein, fat, fiber, iron and copper of Sample 2 was found to be 50.97g, 21.45g, 1.17g, 15.89g, 29.55mg and 60.35mg respectively. Sample 2 was found to be satisfactory.

**Key Words:** Pulse noodles, Nutritional Supplement, Diabetics, Healthy snack

## Abstract- 5PSRM2022/256

### FORMULATION OF NUTRITIOUS CHOCOLATE USING FIG

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The rheological properties of chocolate, based upon its acceptability by consumers, are determined largely by the ingredients and their proportions used in the formulations. Fig bites, an exotic sweet that prepared using chocolate, dried fig, peanut and sesame seeds. Bites are usually available in many flavors. This is a concentrated food than other bites with high nutritive value, and are rich of vitamins and minerals especially in iron content. It is made up of high calorie ingredients and also contains noncalorie sugars. Figs also have vitamin K, healthy phytochemicals (plant-based nutrients) and antioxidants. But due to their high sugar content, one can eat dried figs in moderation or use them as an occasional home treatment for constipation. The bar was prepared by double boiling the milk cream chocolate and stuff the dried fig, peanut and sesame seed which is mixed by honey and made as ball and mixture of puree was poured in the mold and allow to set them at 5°C. Fig bites was standardized by various treatments with respect to variation in ingredients like A1(C:F:P:S,20:40:10:5), A2(C:F:P:S,30:20:20:5). A1 scored higher in texture (7.9), flavor and taste (7.8), overall acceptability (7.40) was considered as optimized product. From the nutritional analysis, the carbohydrate, protein, fat, calcium, fiber and Iron of A3 treatment was found to be 68.97, 7.45, 11.17, 48mg, 4.2mg and 6.0mg respectively. Sample A1 is satisfactory.

**Key words:** Fig bites, Antioxidant property, high in iron content, F=Fig, C=Chocolate, P=Peanut, S=Sesame.

## Abstract- 5PSRM2022/257

### STUDY ON APPLICATION AND EFFICACY OF MULTISEEDS IN COOKIES PREPARATION FOR NUTRIENT ENHANCEMENT

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Traditional cookies are ready to eat and the most palatable snack product widely available in the market. The present research work was designed to formulate and quality evaluation of multiseed cookies (Refined-wheat flour, Pumpkin seed flour, sunflower seed flour, flax seed flour and chia seed flour). Cookies, among the bakery products, are most significant in the world. These are an important food product used as snacks by children and adults. Cookies differ from other baked products like bread and cakes due to their low moisture content which ensures that they are free from microbial spoilage and confer a long shelf life. This study is an attempt to formulate higher nutritional value of cookies with added health benefit by addition of Pumpkin seed flour, sunflower seed flour, flax seed flour with whole wheat flour which also helps in anti-inflammatory, anti-cancer, hypoglycemic activity and improves digestion, relieve constipation, lower rates of cardiovascular disease, high cholesterol, and high blood pressure. lower total blood cholesterol and low-density lipoprotein. In the present study T1, T2 and T3 were formulated in which multigrain cookies was prepared by using [W:P:S:F:C] in the ratio of (50:20:10:10:10, 50:10:15:15:10, 40:10:10:20:20) respectively. The materials are made into a dough, and then the individual cookies were prepared. Fermented dough is used to bake cookies in smooth texture. It was found that among all variations T1 scored higher in texture (7.9), flavor and taste (7.8), overall acceptability (7.40) was considered as optimized product. From the nutritional analysis, the carbohydrate, protein, fat, Fiber, iron and calcium of T1 was found to be 50.97g, 11.45g, 25.17g, 7.89g, 10.55mg and 60.35mg respectively.

**Key words:** Cookies, Multi seeds, High nutrients, Anti-cancer property. W= Whole Wheat Flour, P=Pumpkin seed flour, F=Flax seed flour, S=Sunflower seed flour.

## Abstract- 5PSRM2022/258

### FORMULATION OF PULSE BISCUITS

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Biscuits are typically a recipe adapted to or inspired by Indian cuisine. It is usually made with plain flour and flavored to be eaten as a snack with other ingredients. Lately, the famous cookie variety has some Indian variants and jeera biscuits recipes are one such basic and easy recipe but it is lack in protein & calcium supplement. As an alternative to plain flour, the recipe is made with wheat flour, pulse flour & egg shell with brown sugar. This makes it an ideal snack for your children in a tiffin jar. It is an excellent snack or coffee snack for munching and is enjoyed by all age groups, including children and adults. In additional pulse biscuits are helps in Supplies Essential Vitamins and Minerals, Easy-to-Digest, Provides Fiber, Offers Concentrated Source of Calories, Offers Quick Source of Energy. The Pulse biscuit is a type of biscuit made using green gram flour and egg shell as a main ingredient. The materials are made into a dough, and then the individual biscuits are prepared. Fermented dough is used to bake biscuits in smooth texture. In the present study S1&S2 were formulated in which pulse cookies was prepared by using Whole Wheat Flour: Eggshell: Green gram flour was in the ratio of (50:20:30, 50:10:40) respectively. S2 scored higher in body and texture (7.9), flavor and taste (7.8), overall acceptability (7.40) was considered as optimized product. Sample S2 is satisfactory. From the nutritional analysis, the carbohydrate, protein, fiber, fat, iron and calcium of T1 was found to be 50.97g, 11.45g, 25.17g, 17.89g, 6.55mg and 60.35mg respectively. Usually, Pulse biscuit is classified as a "high-Protein&calcium snack" because of their higher Calcium content compared to other forms of biscuits. This biscuit is mainly formulated for calcium deficient people.

**Key Words:** Pulse biscuits, Egg shell, Quick energy source, Protein&Calcium rich.

# 5TH PSRM, 2022

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National Conference on Agriculture, Applied and Life Sciences: Current Research

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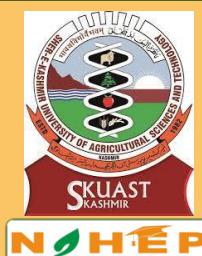
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1<sup>st</sup> PSRM, 2018



2<sup>nd</sup> PSRM, 2019



3<sup>rd</sup> PSRM, 2020



4<sup>th</sup> PSRM, 2021

