3rd Plant Science Researchers Meet

Abstract and Souvenir

PLANTICA

Association of Plant Science Researchers – (APSR)

3rd Plant Science Researchers Meet (PSRM)- 2020

National Conference
On Natural and Agricultural Sciences
Issues Challenges and Opportunities

26th & 27th September, 2020

Organized by

Association of Plant Science Researchers (APSR)
Official Organization of Plantica Foundation
(Regt. Under The Indian Trust Act 1882 and Ministry of MSME, Govt. of India, ISO 9001:2015)
Dehradun, Uttarakhand
www.pgrindias.in and www.plantica.in

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Prof. A.K. Karnatak
प्रो० ए०के० कर्नाटक
Vice Chancellor/ कुलपति

दून विश्वविद्यालय
DOON UNIVERSITY
मोथरोवाला रोड, केदारपुर, पो०ऑ० डिफेन्स कालोनी,
देहरादून–248001 (उत्तराखण्ड) भारत
Mothrowala Road Kedarpur, P.O. Defence Colony,
Dehradun-248001 (Uttarakhand) INDIA.

No ...../VC-DU/20
Date :

Message

It is a matter of great pleasure to know that Association of Plant Science Researchers (APSR), Plantica Foundation, Dehradun is organizing the 3rd Plant Science Researchers Meet (PSRM) - 2020 with the theme National Conference on Natural and Agricultural Sciences: Issues, Challenges and Opportunities. Such an active initiative will help in growing and nurturing research in India. Natural and Agricultural Science deals with the explanation, perceptive and prediction of natural phenomenon, based on experimentation and observation, it is inspiring to note that the conference is being held at a National level, with many dignitaries, speakers and participants from all over India. I wish that research scholars, faculty members and industry experts will have an interactive and learning experience as part of this conference. I congratulate organizing team for their initiative and efforts.

(A. K. Karnatak)
Vice Chancellor

Tel.: +91-135-2533102,Fax : 0135-2533110, 2533115, E-mail : vcdoon@gmail.com, doonvc@gmail.com

Dr Kapil Joshi
IFS

Additional Principal Chief Conservator of Forest
Uttarakhand Forest Department

Massage

It gives me immense pleasure to know that "PLANTICA foundation" is organizing it's 3rd Plant Science Researcher's Meet with 2 days National Conference on Natural and Agricultural Sciences: Issues Challenges and Opportunity. It's indeed a great effort being done by the organizers to highlight some real issues in the form of a national conference. Hundreds of researchers participating in this conference will certainly come out with many important findings of everybody's interest. Works being taken up by this trust are really challenging because of their highly restricted access to the natural resources especially the forests. Instead of the various limitations, Plantica has come up with some of the trend setting research findings, which is indeed highly appreciable. Though much progress has already been made in the agricultural sector but there is an ample scope to do research works for faunal species growing in the wild. More precisely artificial propagation techniques for high altitude medicinal plants needs appropriate research because there are many species about which we are still in dark as far as their conservation and developmental issues are concerned.

Plantica foundation may help forest department of Uttarakhand by taking up some new researches for generating livelihood opportunities for communities from the existing various natural resources. Quantification of Eco system services, Carbon footprints of various agricultural and forestry practices, mitigation of man animal conflicts through introduction of non conventional agricultural crops, soil and water conservation, eradication of weeds and increasing land productivity are some of the issues which really needs immediate attention in this state. I wish that in times to come researchers associated with Plantica will certainly focus on such issues and will proved a well accepted workable solutions for these problems.

Once again I wish all success and my best wishes to the foundations, it,s esteem researchers, organizers of the national conference and all the participants of the event.

Dr Kapil Joshi
APCCF

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A Central University)
Srinagar Garhwal- 246174, Uttarakhand, India
(School of Agriculture & Allied Science)

Prof. J. S. Chauhan
Dean

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Message

I am delighted and gratified to know that Association of Plant Science Researchers (APSR), Plantica Foundation, Dehradun is organizing a two days National Conference on Natural and Agricultural Sciences: Issues, Challenges and Opportunities under 3rd Plant Science Researchers Meet (PSRM- 2020) on 26 and 27 September, 2020.

This era of technology is in high demand of innovation in the field of Natural and Agricultural Sciences, therefore, widening the scope of approach of the subject. We are in need of ideas that would sync and keep composure and intact character intact with nature. Optimistically, this conference is going to provide a plan of action for bright minds, Scholars and Students to come up with their ideas/ project and spirit of work to the world for better days ahead and in return learn something different and novel equally.

I extend my sincerer regards to the students, scholars and fellow participants of the conference and also hearty congratulations to the organizing team members of Plantica Foundation, for organizing this event in the National interest.

I wish the conference a great success.

Dated: 5- September, 2020
Place: Srinagar Garhwal

(Dr. J. S. Chauhan)
Dean

Dr. R. K. Arora
M.Sc., Ph.D., ARS
Ex- Principal Scientist
CPRI – Indian Council of Agricultural Research

Message

It is my pleasure to know that Plantica Foundation is organizing 3rd Plant Science Researchers Meet (PSRM) – 2020 along with two days National Conference on Natural and Agricultural Sciences: Issues, Challenges and Opportunity.

The topic is very relevant especially in the backdrop of the ongoing Covid-19 pandemic which has exposed many challenges before the plant researchers, to grow and provide the society with high quality and a large variety of food crops grown locally, in the wake of restricted movement of men and materials. This has also highlighted the importance of agriculture as a meaningful profession. There is a great opportunity to attract the local youth to agri-entrepreneurship, to identify and introduce new agro- techniques and to enrich our country in development of climate resilient and sustainable production of food and forest crops based on local resources.

Participation of a wide array of researchers in plant sciences in this conference is an opportunity to deliberate and identify suitable inputs necessary to develop models for sustainable cultivation of food and forest crops much needed for prosperity of Uttrakhand and elsewhere.

I wish the meeting and the conference a big success.

Jalandhar : September 2020

T R K. Arora

Ravinder Kumar Arora

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

Dr.Prashant Joshi
Senior Scientist (Horticulture) **Cell No: 8830907723**
E mail: psjoshi@pdkv.ac.in

Message

The practice of organic or natural farming, said to the best known alternative to the conventional method, also originated in the west, which suffered from the ill effects of chemical agriculture. However, natural farming is based on the similar principles underlying our traditional agriculture. Natural agriculture farming aims at the human welfare without any harm to the environment which is the foundation of human life itself. The conventional farming had helped India not only to produce enough food for own consumption but also generated surpluses for exports. However, the increasing population and income will lead to further increases in demand for food and also for raw materials for industry. The modern system of farming, it is increasingly felt, is becoming unsustainable as evidenced by declining crop productivities, damage to environment, chemical contaminations, etc. The necessity of having an alternative agriculture method which can function in a friendly eco-system while sustaining and increasing the crop productivity is realized now. Organic farming or natural farming is recognized as the best known alternative to the conventional agriculture in the 21st century.

I will express my sincere gratitude towards organizers for organizing on very revalent topic under present scenario and best wishes to all Plantica Team

(Prashant Joshi)

Dr. Abhishek Mathur

Scientist, Consultant & Techno-Commercial Expert [Director, International Biotech Technocrats & Consultants Association (IBTCA INDIA), Dehradun, Uttarakhand; Executive Director (R&D), NCS Green Earth Pvt Ltd., Nagpur, Maharashtra] M.Sc. (Applied Biochemistry), Ph.D. (Biochemistry), FAPSR, FSPR, Life Member- Asian PGPR Society (USA), Life Member - European Federation of Biotechnology (Europe), Life Member - IESKI-Food Association (Austria)

E-mail: abhishekmthr@gmail.com

Date: Sep., 23rd, 2020

Message

Dear Organizers

3rd PSRM-2020

My heartfelt wishes to the team of organizing committee of National Conference On Natural & Agricultural Sciences, Issues, Challenges & Opportunities (3rd PSRM'2020) for organizing such a great platform for presenting their research and innovations. My heartiest best wishes to my dear friend, Dr Anoop Badoni and Associated Team of The Association of Plant Science Researchers (APSR) for keep doing the great work. This E-conference will definitely prove its worth as one of the premier event for researchers, academicians, educators of field of Agricultural Sciences, Biological Sciences & Plant Sciences. Heartiest welcome to all Eminent Speakers, Colleagues, dear students/scholars for being the prominent part of this National Conference and Plant Science Researchers Meet. Thank you all the stake holders and contributors who are directly or in directly involved in this venture. Lots of best wishes for the grand success of this event!!

Abhishek

(Dr. Abhishek Mathur)

Dr. Anoop Badoni
(Ph.D., M.Sc.-Ag, FAPSR, FIBTCA, MSFSN)
Director- Plantica Institute of Agricultural Studies
Founder Chairman – Plantica Foundation
Convener: 3rd PSRM – 2020

This year PSRM completed three years making it all the more compelling and exuberating. I am delighted to welcome you to this 3rd PSRM, 2020.

We are elated to inform that the Krishak Prashikshan Kendra (KPK) has been started on February, 2020 under Plantica Foundation with an aim to develop the hill agriculture and to provide technical support and trainings to the hilly farmers and young youth.

This year around 200 submissions of research papers from all over India, the papers included in this abstract book cover all aspects of scientific research occurring in the Nation. The information presented hereon should help them to improve and open up new avenues for research and provide new idea to young scientists.

On behalf of Organizing Committee of 3rd PSRM -2020 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, and all participants to support us by your valuable suggestions, research and time.

(Dr. Anoop Badoni)

National Conference
On
Natural and Agricultural Sciences
Issues, Challenges and Opportunities

Abstract and Souvenir

3rd Plant Science Researchers Meet (PSRM) – 2020
National Conference on Natural and Agricultural Sciences
Issues, Challenges and Opportunities
26th & 27th September, 2020

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Content:

Key Note Address – 1

Technological intervention to convert harmful forest bio residues in a usable form of energy thereby saving the forest from disastrous fires and providing livelihood opportunities to the communities

Dr. Kapil Joshi, IFS
Additional Chief Conservator of Forest
Govt. of Uttarakhand

Abstract

Uttarakhand state is blessed with over 70% of the total geographical area as forests with over 45% of the country's floral diversity found in this state. State has about 7,869 floral species. The plant diversity is so high that it spreads from valleys to the alpine meadows. This region supports about 45% of the total flowering plants of India of which 30% are endemics among natives, 10.2% trees, 8.44% wild edibles, and over 15% medicinal. Chir pine is a major tree species found in this area which spreads over half a million hectare. This species has a tendency of shedding its leaves annually in the months of March to June. These dry and fallen pine needles are highly inflammable and work as a major cause of forest fires. These devastating forest fires pose a real challenge to conserve the mega biodiversity of this state. This presentation highlights an important appropriate technological intervention to convert these harmful forest bio residues in a usable form of energy thereby saving the forest from disastrous fires and providing livelihood opportunities to the communities.

Key Note Address – 2

Current Issues, Challenges and Opportunities in Agriculture and Forestry in Uttrakhand

Dr. R. K. Arora, ARS
Ex-Principal Scientist, ICAR – CPRI
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Abstract

Uttrakhand being a predominately hilly state poses several issues and challenges for the development of Agriculture and Forestry. Difficult terrains with remoteness to access, small land holdings, degraded soils in many regions, inadequate network of irrigation facilities especially in the hilly regions, low per unit productivity of different crops, difficult transportation system to fetch the produce from field to market, poor access to good marketing network and low level of available agri- entrepreneurship in local youth are some of the issues and challenges faced by the state towards the development of Agriculture and Forestry. On the other hand the state has several advantages and opportunities such as availability of land with both the subtropical and temperate climate which is suitable for growing a wide range of agricultural, horticultural, medicinal and forest crops, abundant availability of perennial sources of water, rich biodiversity, ample scope to develop organic agriculture, huge potential for agri-tourism, a large scope to increase area under protected cultivation to achieve high productivity per unit land and sufficient availability of young population to train for agri- entrepreneurship. These opportunities can be harnessed to increase per unit income of families associated directly or indirectly with different aspects of agriculture and thereby bring prosperity to the state.

Key Note Address – 3

Underutilized Flora of Bundelkhand for Future Vegetable Crops

Dr. A.C. Mishra
Associate Professor, Department of Vegetable Science, Banda University of Agriculture & Technology, Banda-210 001 (U.P.)
e-mail: acm24680@gmail.com

Abstract

There is a vast plant biodiversity in our country which needs thorough exploration regarding their nutraceutical and ethno-medicinal uses. Some annual and perennial herbs have been traditionally used by local peasantry in various ways but these plants have not attained their actual recognition in spite of enormous nutritional merits. Some most commonly plants which are popular in villages of Bundelkhand area have identified and systematic research works have been initiated on these for **Common Indian Purslane (*Portulacaoleracea* L.):**The *kulfa* or *pigweed* or *rigla* or common Indian purslane (*Portulacaoleracea*) is a member of family Potulaceae. It is very commonly found in tropical and sub-tropical regions of India as weed in cultivated lands during warm and wet months (March to October). It is also common in warmer parts of the world *viz*., Japan, Australia, Africa and America. Tender twigs with leaves are cut and cooked as vegetable. The plant is known for its nutritive values like Omega-3- Fatty Acids {especially α-linolenic acid (18:3w3) ~300-400mg/100g fresh weight}, vitamin A (1320 IU/100 g~1.9 mg ß-carotene), vitamins C (26.6 mg/100 g), α-tocopherol (12.4 mg/100g), minerals like magnesium (68 mg/100 g), phosphorus (44 mg/100 g), calcium (65 mg/100 g) and iron (1.99 mg/100 g) and anti-oxidants (ß-cyanins and ß-xanthins) (Simopoulos*et al*., 1992). Owing to high oxalate content in leaves and twigs (910-1679 mg/100 g), raw consumption should be avoided. However, the oxalic acid concentration in leaves vary with stage of harvesting and nitrogen status of growing media. The leaves harvested at 8-true leaf stage contain ~36-45% higher oxalic acid content compared to those harvested at 16-true leaf stage and also the crop grown in soil with high N-content, show 40-50% lower oxalic acid content (Uddin *et al*., 2012). There is wide range of morphological variability in India ranging from green stem and bigger leaves to reddish stem and small leaves. This crop is very famous in Bundelkhand area and is one of the important leafy vegetables. The seeds of unidentified landraces are collected by the farmers of Bundelkhand region and grown for local markets. Evaluation of local genotypes for green yield and high nutraceutical values may lead to evolve improved varieties with systematic seed channel. In spite of high nutritional importance, the *kulfa* (Purslane) is a minor crop which not still under scientific cultivation. By virtue of extremely small seeds (~4000-5000 seeds in a gram), the seed rate is also low (2.0 kg/ha). Seeds are sown directly in well prepared field by mixing in 20 times higher weight of compost or sand in lines spaced at 30 cm. Organically rich sandy loams with good water holding capacity are ideal. Although, it can be grown any time during warmer part of the year, even though, February- March is the most suitable for its cultivation. The crop becomes ready for harvesting in 35-40 days after sowing. The tender shoots are harvested and consumed as cooked vegetable. The tender shoots can be harvested 2-3 times with green yield of 240-250 q/ha. However, the green yield gradually decreases in consecutive cuttings.

Jute Mallow (*Corchorusolitorius*)

Jute Mallow is also known as Jew's mallow, tossa jute, molokhiya and West African sorrel besides many other local names.It is an annual plant belonging to familyMalvaceae. The plant grows well in the lowland tropics, ranging from warm temperate zones through tropical desert to wet forest life zones. The tender green shoots and leaves also young fruits are used as a vegetable, the dried leaves are used for tea and as a soup thickener, and the seeds are edible. Tender greens are good source of protein (12.5%), Vitamin K (94 µg) of, Iron (2.73 mg), vitamin B6 (496 mg), vitamin A (225 µg), copper (0.222 mg) and vitamin C (28.7 mg) in 100 g fresh greens.

Key Note Address – 4

Natural Farming in Horticultural Crop Issues, Challenges and Opportunities

Dr. Prashant Joshi
Senior Scientist
Dr.Panjabrao Deshmukh Krishi Vidhyapeeth, Akola (M.S)-444104
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Abstract

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

India is the fruit and vegetable basket of the world. It grows a variety of fruits and vegetables and has huge production of both fruits and vegetables. India is the second largest producer of both fruits and vegetables in the world after China Largest producer of ginger and okra amongst vegetables & ranks second in production of potatoes, onions, cauliflowers, brinjal, cabbages, etc.Amongst fruits, the country ranks first in production of Bananas (25.7%), Papayas (43.6%) and Mangoes (40.4%). Natural Farming, which is a set of farming methods, and also a grassroots peasant movement, has spread to various states in India. It has attained wide success in southern India, especially the southern Indian state of Karnataka where it first evolved. A rough estimation for just Karnataka puts the figure there at around 100,000 farmer's families, health comes foremost in our lives but today the issue regarding general health of humans is far more than terrible. Our daily lifestyle has worked as a fuel for the fire that is burning our body with diseases we could not possibly imagine a century ago. But far from that, the food we intake to fuel our lives has become a slow poison. Latest reports from WHO points that more than 50% of eatables have chemicals which are carcinogenic in nature and fruits and vegetable played important role in human balanced diet and due to improper storage, and use of chemicals for artificial ripening leads too many problems in human health, cancer like diseases are increasing day by day and to counteract these problems the only & only solution is grow fruits and vegetables by means of organically, by using natural inputs for quality and safe for human health nutrition as well as for balanced ecosystem.

Key Words: Fruit, Vegetables, Natural Farming, WHO, Sustainability, Ecosystem

Key Note Address – 5

Problems of Offseason cultivation in Uttarakhand Hills

Dr Sanjay Sachan,
Head, KVK, Jakhdhar, Rudraprayag
(G.B.Pant University of Agriculture & Technology-Pantnagar
E-mail: sachan.soil@gmail.com

The average yield of offseason vegetables in the Uttarakhand hills obtained at the farmers field is distressingly low and totally in commensurate with the additional money they spent in growing it. This means, it is worthwhile to try, understand and investigate the basic factors responsible for the gap in yields between research station and farmer's field. It is very important to know the causes responsible for yield losses, so as to design an effective strategy for higher production and profitability. In the absence of the study of the associated causes it will be impossible to double the farmer's income in the times to come. This study was therefore designed , to pin point the exact causes responsible for identifying gaps in yields between research station and farmer's field and the information thus collected was computed on the basis of information obtained from the off season vegetable farmers. The offseason vegetable farmers of Uttarakhand hills are marginal farmers with a low risk bearing capacity. In district Dehradun, the main off season vegetables according to their area and production (2018-19) are-tomato (1239 ha & 6987 M.tons), pea (1781.5 ha and 10172 M.tons), cabbage (688 ha and 3523 M.tons), cauliflower (900 ha and 16701 M.tons), frenchbean (1096 ha and 6235 M.tons) and radish (346ha and 3894M.tons), respectively. In the district Rudraprayag the main off season vegetables according to their area and production (2018-19) are Pea (190 ha and 251 M.tons), cabbage (134.50 ha and 594 M.tons), tomato (108 ha and 167.5M.tons), frenchbean (88.50 ha and 286 M.tons), radish (88h a and 472 M.tons), cauliflower (35.5 ha and 70 M.tons), respectively. Lack of knowledge about high yielding varieties and technological backstopping, scarcity of human labour, high cost of critical inputs like seed and pesticides, lack of knowledge in seed rate, spacing, method of planting, unawareness on use of INM and IPM practices has resulted in low productivity on farmer's field and lack of marketing and post harvest facilities has resulted in low profitability. The identified problem according to highest matrix ranking is as follows: problem responsible for land preparation- Lack of mechanization in land preparation, problem responsible for adoption of mechanization in off season vegetable cultivation- High cost of mechanized farm machinery, problem responsible for selection of high yielding varieties suitable for off season vegetable cultivation- Lack of Knowledge, problem responsible for nursery raising and spacing in off season vegetable cultivation- Lack of Knowledge, problem responsible for method of planting in off season vegetable cultivation- High cost involved in planting, problem responsible for integrated nutrient management in off season vegetable cultivation- Not aware about INM practices, problem responsible for water management in off season vegetable cultivation- Lack of irrigation facilities, problem responsible for Integrated Pest Management practices in off season vegetable cultivation- Ignorance about the problem, problem responsible at harvesting and marketing - Lack of mandis (sale points) at the block level. Therefore, there is an urgent necessity to act upon the major causes responsible for low productivity and profitability of the off season vegetable cultivation in Uttarakhand hills.

Key Note Address – 6

Plant Growth Promoting and Soil Detoxifying activities of Rhizobacterial cultures (PGPRs) from Soil samples of High Altitude, Famous Tourist Sites (Solomon's Temple and KV Paradise) of Aizwal, Mizoram, India

Dr. Abhishek Mathur*
Executive Director, R&D Dept., NCS Green Earth Pvt. Ltd., Nagpur, Maharashtra, India;
Director, International Biotech Technocrats & Consultants Association (IBTCA INDIA), Dehradun, Uttarakhand, India

Abstract

With the advances in agriculture, different techniques and solutions are readily available provided by different industries and allied researchers for farmers. Some agrochemicals and usage of conventional chemical pesticides are strictly influencing the soil health and making the imbalances in the soil nutritional levels. Thus, there is a need of microbes and consortia which detoxifies the soil toxicated with chemicals and pesticides and also enabling the sustainable growth of crops. These microbes play an important role in maintaining soil fertility and plant health. They can act as biofertilizers and increase the resistance to biotic and abiotic stress. PGPRs are effective growth modulators for the crop as they secrete novel metabolites and growth molecules that enable the crop to sustain in adverse and stress conditions. These molecules also induce systemic resistance and anti-pathogenic effect against the soil borne infections. These beneficial microbes are thus referred as PGPMs (plant growth promoting microbes) and precisely PGPRs (plant growth promoting rhizobacteria). In the present investigation, we have screened 35 promising potent diverse PGPRs from soil samples of famous tourist sites, Solomon's temple and KV paradise mild sub tropical climate of Aizwal, Mizoram. These microbes were found to have significant growth promotion (root colonization and shoot elongation) activity. These PGPRs were also found to have significant detoxification properties individually. The studies revealed the degradation of pesticide residues in the soil samples, thus leading to detoxification of soil. These strains were dominantly isolated and identified of Bacillus, Actinobacteria, Pseudomonas genera. These pure cultures were maintained and sub cultured, further maintained in stock for further use.

Keywords: PGPRs, plant growth promotion, soil detoxification, fermentation conditions, Aizwal, Mizoram.

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Gandhi's Development Model and Its Future Perspective for Environmental Sustainability

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Environment and human beings are inter-depended and inter-related to each other. Human existence cannot be imagined without the environment. Human being gets food, air, fuel, fertilizers, etc. from the ecosystem. Human social life is directly influenced by the environment. Human culture and civilization also influenced by the environment. Therefore, environmental ethics has been considered as a discipline that studies the moral relationship between human beings and the environment. Gandhi's philosophical elements of sustainable development such as non-violence, truth, Swaraj (self-government), constructive work, conflict resolution techniques and the idea of science and technology, economic concepts, etc. can play an important role for environmental protection. Gandhi was not in favor of heavy industrialization. He was in the favor of village centric economy. Gandhi said, "Village economy cannot be complete without the essential village industries such as hand-grinding, hand-pounding, soap-making, paper-making, match-making, tanning, oil-pressing, etc." He criticized machinery and said, "Machinery is the chief symbol of modern civilization; it represents a great sin". He gave this view because he was of the view that the machines have made human being, slaves. Gandhi made the spinning wheel a tool of village empowerment. This paper distinguishes the Gandhian sustainable development model from a conventional sustainable development model to underscore its relation with sustainability questions. The paper suggests that the Gandhian philosophy of sustainable development is a green future that can play an important role in the solution to contemporary environmental challenges.

Key Words: Climate Change, Pollution, economic concept, sustainable development, constructive work.

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Drip Irrigation Methods for Vegetable and Crop Production

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The basic needs for agriculture are land and water. According to International Water Management Institute (IWMI), 33% of the world's population will face absolute water scarcity by the year 2025. Agricultural sector consumes more than 80% of the country's exploitable water resources. Water conservation is vital to maintain agricultural production in the regions of less rainfall or in the agro climatic zones where rainfall is randomly distributed all over the year. To this upshot, drip irrigation is an efficient method of providing irrigation water directly to the individual plant on a steady and incessant basis. It supplies water into the soil at the root zone of plants so it minimizes the conventional losses viz. deep percolation, run off, soil erosion and also allows the full utilization of water soluble fertilizers and chemicals resulting in higher yield and better quality of produce. It solves problems of dry and irrigated area by improving water use efficiency. There are other advantages of drip irrigation like reduction in labor cost for irrigation, reduced weed growth, extend the shelf life of produce etc. But the limiting factors faced by farmer for adoption of it are non availability of quality material, high initial cost, no follow up services by drip agencies etc. Most of the Indian farmers are small and marginal so the availability of spare parts should be increased and financial institution should sanction loans to farmers and they should beware for proper adoption of drip irrigation.
Keywords: Drip irrigation, Soil erosion, Deep percolation.

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Organic Farming

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As population is increasing day by day at an alarming rate, the demand for food is increasing in the same order. So, to fulfill this demand it is important to increase the food production. But it has been seen that increase in food production is leading to increased use of chemical fertilizers, pesticides, herbicides causing pollution of land, water bodies and an imbalance in the ecosystem. The excessive use of chemicals in the field is also reducing the number of beneficial organisms present in the soil thus decreasing the soil fertility. The quality of produce is also deteriorating because of the chemical residues in it. In order to decrease this pollution and to provide quality food to the consumer, adoption of organic farming can be a better measure. In organic farming, the use of chemical fertilizers, pesticides, weedicides or any kind of synthetic additives are avoided and the use of natural products like organic manures, vermicompost, biofertilizers, biopesticide are preferred. Organic farming reduces pollution, conserves water, reduces soil erosion, improves soil fertility and provides assurance of quality food to customers by organic certification. State having largest area under organic farming in India is Madhya Pradesh and on the other hand Sikkim was declared as India's first 100% organic state in the year 2016. Organic farming has some limitations like organic products are expensive and are either exported or purchased by elites. Marketing of organic products is also a problem because of lack of efficient marketing channels. The conversion period or time required by the conventional farm to attain organic status is three years which leads to hesitation among farmers in adopting it.

Keywords - Organic farming, Organic certification, Conversion period

Abstract ID- 3012020004

Assessment of Higher System Productivity and Economics of Onion Based Cropping System through Organic Farming in Advanced Agronomy

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An experiment was conducted at IFSRP, MPKV, Rahuri to study the evaluation of organic farming package for *kharif* onion based cropping systems during 2015-16 and 2016-17 in split plot design with three replications. Nine combinations of three crop sequences (onion-sorghum, onion-wheat and onion-chickpea) and three combinations of organic nutrient sources *viz.,*50% N through FYM + 50% N through Vermicompost, 50 % N through FYM + 50% N through Neem cake and 50 % N through Vermicompost + 50% N through Neem cake were the main plot treatments in *kharif* season. During *rabi* season each main plot treatments of residual effect of organic nutrient sources was split into three sub plot treatments of organic nutrient levels *viz.,*100, 75 and 50% N through organic (In equal split of N through 50:50% FYM: Vermicompost) to *rabi* season crops) resulting in twenty seven treatment combinations. One additional control treatment of GRDF included for comparison not for analysis. Among cropping system, onion-chickpea cropping system reported significantly higher system productivity 54.34, 49.95 and 52.14 t ha^{-1} during first year, second year and pooled over the years than onion- sorghum (44.23, 44.17 and 44.20 t ha^{-1}) and onion – wheat (43.09, 43.51 and 43.30 t ha^{-1}) cropping systems, respectively. Among the different nutrient sources, residual effect of 50 % N through FYM + 50 % N through VC recorded significantly maximum total system productivity (50.53, 48.64 and 49.58 t ha^{-1}) than that observed with other nutrient sources. The application of 50 % N through VC + 50 % N through NSC (47.05, 45.65 and 46.35 t ha^{-1}) was found second in order with respect to total system productivity. The application of 50 % N through FYM + 50 % N through NSC (44.08, 43.35 and 43.72 t ha^{-1}) treatment registered significantly

lowest system productivity during both the years and pooled mean. Among the different nutrient levels application 100 % RDN i.e. 50 % N through FYM + 50 % N through VC to succeeding crop during *rabi* season recorded significantly maximum total system productivity (49.17, 48.06 and 48.61 t ha^{-1}) than application 50 % RDN i.e. 25% N through FYM + 25% N through VC but at par with 75% level of RDN with 37.5% N through FYM + 37.5% N through VC (48.09, 46.15 and 47.12 t ha^{-1}) during both the years and pooled mean. Among the cropping systems, transplanting of onion in *kharif* season followed by chickpea in *rabi* season reported significantly higher gross monetary returns (Rs 4.11 and 3.94 lakh ha^{-1}) and net monetary returns (Rs 2.98 and 2.75 lakh ha^{-1}) than onion-wheat cropping systems first year and on pooled mean and at par with onion – sorghum on pooled mean. However in second year gross monetary returns (Rs 3.89 lakh ha^{-1}) and net monetary returns (Rs 2.57 lakh ha^{-1}) of onion - sorghum crop sequence was recorded significantly maximum and at par with onion-chickpea cropping system. The highest benefit cost ratio was 3.66, 2.97 and 3.32 by onion-chickpea cropping system during first year, second year and on pooled mean than rest of cropping systems. Significantly maximum gross monetary returns (Rs 3.82, 3.75 and 3.79 lakh ha^{-1}) and net monetary returns (Rs 2.69, 2.47 and 2.58 lakh ha^{-1}) of cropping systems were realized by residual effect of 50 % N through FYM + 50 % N through VC to *kharif* season onion than the residual effect of rest of the sources during both the years and on pooled mean. The highest benefit cost ratio of 3.39, 2.94 and 3.17 realized in treatment of 50 % N through FYM + 50 % N through VC during first year, second year and on pooled mean than rest of nutrient sources. Application of 100 % recommended dose of organic nutrients, 50 % N each through FYM and VC to succeeding *rabi* crops recorded significantly higher values of gross monetary returns (Rs 4.09, 3.93 and 4.01 lakh ha^{-1}) and net monetary returns (Rs 2.87, 2.57 and 2.72 ha^{-1}) than rest of the treatments during both the years and on pooled mean. The highest benefit cost ratio of 3.39, 2.90 and 3.14 realized in treatment of 100 % N through organic applied to *rabi* crops during first year, second year and on pooled mean than rest of nutrient sources. The control treatment 100 % GRDF recorded higher gross monetary returns, net monetary returns and benefit cost ratio by the margin of 3.24, 7.35 and 7.96 as compared to direct effect of 100 per cent organic treatment on pooled mean, respectively.

Key Words: FYM, Vermicompost, NSC, Organic, System productivity, Economic

Abstract ID - 3012020005

Effect of Organic and Inorganic Nutrients on Growth, Yield, Quality and Economisc of Soybean (*Glycine max* L.)"

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The field experiment was conducted during Kharif, 2014 at the Agronomy Farm, College of Agriculture, Kolhapur on sandy clay loam soil with the combined application of chemical fertilizers, FYM, vermicompost and biofertilizers in soybean resulted increased growth, yield and quality. The experiment was laid out in a RBD with seven treatments viz., T1 –Absolute control, T2 - 50 % RDF + FYM 5 t ha-1, T3 - 50 % RDF + vermicompost 2.5 t ha-1, T4 -75 % RDF + FYM 5 t ha-1, T5 -75 % RDF + vermicompost 2.5 t ha-1, T6 - FYM 5 t ha-1 + vermicompost 2.5 t ha-1 and T7 -100 % GRDF. Each experimental unit was replicated thrice with plot size of 5.4 x 3.6 m2 and 5.0 x 3.0 m2 as the gross and net plot, respectively. Application of 100 per cent GRDF recorded significantly higher plant height (30.68, 55.63, 64.98, 73.90 cm), trifoliate leaves (4.06, 13.13, 21.82, 30.10), number of branches (1.13, 3.26, 6.12, 6.89), dry matter production (2.69, 15.60, 23.06, 33.84 g) and leaf area (47.59, 90.53, 110.57, 118.57 dm2) at 28, 42, 56 DAS and at harvest, respectively, number of pods plant-1 (44.20), weight of pods plant-1 (35.14 g), number of seeds pod-1 -1 (2.86), seed yield plant-1 (16.80 g),100 seed weight (13.25 g) and soybean seed yield (29.22 q ha-1), straw yield (36.01 q ha-1), oil content in seed (18.70

%) and protein content (44.31 %), highest gross (₹.100706 ha-1), net monetary returns (₹. 61045.51 ha-1) and benefit: cost ratio (2.56) and it was followed by treatment 75 per cent RDF+ vermicompost 2.5 t ha-1 as compared to other treatment.

Key words: Organic, Inorganic, Nutrient management, Growth character, Yield attributes, Quality, FYM, Vermicompost, GRDF, Biofertilizers, Glycine max L.

Abstract ID- 3012020006

Increase Socio-Economy Offarmersby Practicing the Vermicomposting from Use of Animal Dung

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Need of proper management of the biological waste include animal dung is necessary to overcome the handling waste and related environment problems. Excess use of chemical fertilizers is reducing the soil fertility and cause adverse effect on human and livestock health. The vermicomposting is an important tool of organic farming which is done by less financial involvement. Farmers need to proper knowledge about the management, production, storage and marketing of vermicompost. Production of vermicompost from animal dung is very fast process as compare to other compost practices. It will raise socio economy of farmers, protect soil from erosion as well as help in achieving the goal of sustainable agriculture.

Keywords: Farmers, socio-economy, vermicomposting, organic farming.

Abstract ID- 3012020007

Utilization and Conservation of Medicinal Plants of Family Solanaceae in J.P. Nagar District (U.P.), India

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India is famous for its outstanding knowledge of medicinal plants and for contribution in traditional herbal therapies. Family solanaceae having about 2,700 species belonging to 98 genera worldwide. The people belonging to different culture and customs pose a very good knowledge about the medicinal utility of local biodiversity. A survey is carried out to document the role of solanaceous medicinal plants in the life style and health care of local people of J. P. Nagar district of Uttar Pradesh. Present paper deals with 9 plant species of the family which are associated with treatment of various ailments viz. skin problems, pain, asthma, rheumatism, urinary disorders, wounds, constipation and other gynecological disorders. These beliefs not only reveal the human-plant relationship but also provide a constructive device for conservation of plant biodiversity.

Keywords: Solanaceae, medicinal Plants, local people, J. P. Nagar, U.P.

Abstract ID- 3012020008

Mushroom Cultivation and Sustainable Livelihood

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Cultivated mushrooms have now become popular all over the world. There are over 200 genera of macrofungi which contain species of use to people.Common mushroom (*Agaricus*), Shiitake (*Lentinus*), Oyster (*Pleurotus*), Straw (*Volvariella*), Lion's Head or PomPom (*Hericium*), Ear (*Auricularis*), Ganoderma (Reishi), Maitake (*Grifola frondosa*), Winter (*Flammulina*), White jelly (*Tremella*), Nameko (*Pholiota*), and Shaggy Mane mushrooms (*Coprinus*). Commercial markets are dominated by *Agaricus bisporus*, *Lentinula edode*s and *Pleurotu*s spp, which represent three quarters of mushrooms cultivated globally.
The consumption of mushrooms can make a valuable addition to the often unbalanced diets of people in developing countries. Fresh mushrooms have a high water content, around 90 percent, so drying them is an effective way to both prolong their shelf-life and preserve their flavour and nutrients. Recently, there has been a spectacular growth in, and commercial activity associated with, dietary supplements, functional foods and other products that are 'more than just food'. Mushroom cultivation activities can play an important role in supporting the local economy by contributing to subsistence food security, nutrition, and medicine; generating additional employment and income through local, regional and national trade; and offering opportunities for processing enterprises. Mushroom cultivation can make a valuable contribution to sustainable livelihoods for both rural and urban poor, because they are highly compatible with other livelihood activities, requiring minimal physical and financial inputs and resources, to be undertaken successfully. Indeed, the basic requirements centre on an identified source for purchasing spores, access to suitable substrate and the means to sterilize it, some bags and a clean, dark room to cultivate in. For people interested in experimenting, the range in types of mushrooms and cultivation techniques can prove challenging and gratifying.

Keywords: Shiitake (*Lentinus*), Oyster (*Pleurotus*) .

Abstract ID- 3022020009

Response of Potato Crop to Different Combinations of Inorganic Fertilizers, Organic Manure and Biofertilizers.

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The present experiment was conducted at the, Department of Horticulture, College of Agriculture, RVSKVV, Gwalior (M.P.) during the Rabi season of two consecutive years 2017-18 and 2018-19.The experiment was comprised of 18 treatment combinations of three levels of inorganic fertilizers viz., (100% NPK), (75%NPK) and (50%NPK), two levels of farm yard manure(FYM 20 t/ha) and (FYM10 t/ha), and three levels of biofertilizers (Azotobacter 5 kg/ha), (PSB 5kg/ha) and(Azotobacter 2.5 kg/ha + PSB 2.5kg/ha) tested on potato processing cultivar Kufri Chipsona-1, for yield and economic parameters. The experiment was laid out in Randomized Completely Block Design (RCBD) with three replications. The tubers of uniform size were sown in plots of size 3 x 3 m at a spacing distance of 60 x 20 cm. Observations for yield parameters were grade wise yield of tubers(kg/plot),processing grade tuber yield (T/ha), marketable tuber yield and total yield (T/ha) of potato tubers. It was concluded that cultivarKufri Chipsona-1 responded well in terms of growth, yield and quality parameters.Thetreatment combination I3O2B3 (100%NPK + FYM at 20 t/ha + PSB2.5kg/ha+ Azotobacter 2.5kg/ha) resulted in maximum number of tubers per plant (12.4), maximum 'A' grade tubers (8.2 kg/plot), maximum 'B' grade

tubers(7.5kg/plot) and maximum average weight of processing (A grade) tuber per plant(97.0 g) during the pooled mean data, of the experiment.
The treatment combination I3O2B3 also resulted in maximum total yield (22.6 t/ha).Whereas minimum total yield (15.6 t/ha) was obtained in treatment I1O1B2, during the pooled mean data, of the experiment. The highest gross returns was recorded (Rs.220300.0 and Rs.213100.0) during first year and second year respectively, with treatment I3O2B3 (100%NPK + FYM 20 t/ha + PSB 2.5kg/ha+ Azotobacter 2.5kg/ha) and highest benefit cost ratio (2.56 and 2.47)during first year and second year respectively, was also obtained under same treatment.

Key words - Kufri Chipsona-1, NPK, FYM , Azotobacter, PSB.

Abstract ID- 3022020010

Performance of Seven Commercial Banana Varieties in Tarai Regions of Uttarakhand

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The present investigation was performed at Horticultural Research Centre, Patharchatta of G.B. Pant University of Agriculture and Technology, Pantnagar, Udham Singh Nagar, Uttarakhand during the year 2018-2019 in which seven commercial banana varieties were grown in two seasons viz, March and July. Experiment was laid in a factorial randomized block design with seven treatments (varieties) along with three replications of each treatment. Performance of seven commercial varieties was evaluated by planting their rhizomes in March as well as in July month.
During March planting season in all commercial banana varieties suckering was started from July onwards except Red Banana, late suckering tendency was observed in Red Banana (last week of September). However during July planting season suckering was started from September onwards but in Red Banana same trend of late suckering was observed (last week of October). However planting to shooting was recorded minimum and shooting to harvest duration was recorded higher in March planting season due to overlapping of shooting time with frost but during July planting season the duration from planting to shooting was higher due to occurrence of frost immediately after planting but shooting to harvest duration was found minimum because of availability of favourable growth conditions. As far as quality of fruits was concerned it was found better during July planting season alongwith good shelf life as compared to March. Damage due to frost injury was found maximum in March planting season as highest electrolyte leakage and membrane injury was recorded alongwith with minimum plant recovery. But the ratoon crop of March planted rhizomes performed better as suckers were promoted in October which completed their life cycle within 8 months. Therefore, in non-traditional tarai regions of Uttarakhand July planting was found best for all improved banana varieties with good fruit quality and higher yield which can provide better returns to farmers.

Abstract ID- 3022020011

Effect of Sonication on Physicochemical Properties of Wpc (Whey Protein Concentrate) Emulsion

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The present investigations were conducted atGBPUA & T, Pantnagar, U.S. Nagar, during 2018-2019, to study the effect of sonication on physicochemical properties of whey protein concentrate (WPC) solution.

Response surface methodology (RSM) was used to evaluatethe effects of independent variables [sonication power 180-230 Watt (X1), sonication time 15-60 minutes (X2), and WPC concentration 10-12 % (X3)] as well as their interactions on responses (Viscosity, TSS, Foaming capacity, Conductivity, Stability / Phase separation, pH change and Temperature change were evaluated.
The results of this study showed that the application of response surface method in finding optimum conditions of ultra sonication to produce stable emulsions is a very effective and reliable method. According to our findings, the sonication power, sonication time and WPC concentration having significant effect on all physicochemical properties viz: TSS, Viscosity, TSS, Foaming capacity, Conductivity, Stability / Phase separation and Temperature change except pH change.

Abstract ID- 3022020012

CRISPR/Cas Nuclease System as a Potential Tool for Pearl Millet Crop Improvement

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GM crops are less acceptable and considered harmful due to safety issues. Rather, fast advancing techniques like genome engineering is emerging and gaining popularity as it can speed up the development of improved crops. Genome editing with engineered nucleases (GEEN) is a type of genetic engineering in which DNA is inserted, deleted or replaced in the genome of a living organism using engineered nucleases, or "molecular scissors." It includes several new techniques such as mega-nucleases (homing endo nuclease), zinc finger nucleases (ZFNs), transcriptional activator-like effect or nucleases (TALENs) and the CRISPR/Cas nuclease system (clustered regularly interspaced short palindromic repeat/CRISPR-associated protein) but due to ease of use, precision and cost-efficiency CRISPR is mostly preferred. The development of CRISPR involves enzyme Cas9 which is based on guide RNA molecule to mark specific DNA sequence and later edits target DNA by making genome alterations either by disrupting genes or inserting new sequences. It is highly efficient, robust, less risky and has wide variety of agricultural applications. This technique has been applied in several crops like rice, Arabadopsis, tomato and sorghum and can also benefit pearl millet as studies in other suggests that Cas9/sg RNA system is very reliable, functional and proficient in two model system and thus gives lot of prospective for gene manipulations. Genetic modifications can help in nutritional improvement of pearl millet grains and thus can be major research area for nutritional security. Less research has been done in pearl millet on gene editing so far but good work in major cereals have proven that CRISPR can be very useful and efficient technique for crop improvement. It can be used in pearl millet once Zn and Fe pathways are better understood and can ultimately lead to development of nutrient rich improved varieties which can have acceptability to consumers and feasibility to smallholder farmers.

Keywords: Genome editing, CRISPR/Cas, Pearl millet, Nutricereal, Crop improvement

Abstract ID- 3022020013

Effect of Composite Edible Coatings on Post Harvest Physical Quality Characteristics of Ber (*Zizyphus mauritiana lamk*.) Cv Umran

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The present study entitled "Effect of composite edible coatings on post harvest physical quality characteristics of Ber (Zizyphus mauritiana Lamk.) cv Umran" was carried out to develop composite edible

coatings for improving the shelf life of ber. This investigation was undertaken in Post Harvest Technology Laboratory of Department of Horticulture, College of Agriculture, G.B. Pant University of Agriculture & Technology, Pantnagar, U.S. Nagar, (Uttarakhand) during March, 2019. Two types of edible coating are used in this experiment i.e. Aloe vera gel and lipid (olive oil and corn oil). The best edible coating combinations were selected on the basis of preliminary studies by incorporating different functional ingredients viz., calcium gluconate (CG) as texture enhancers and ascorbic acid (AA) as antioxidant. Aloe vera based coating composition of 50% and 75% incorporated with 2% CG + 1 and 2% AA; 100 % olive oil incorporated with 1 and 2% CG+ 1 and 2% AA and 100% corn oil + 1 and 2% CG + 1 and 2% AA were applied on Umran ber fruits and kept under ambient room storage. All the physical quality observations were under taken at 0th, 5th, 10th and 15th Days interval of storage. During storage study, coated fruits showed significantly reduced physiological loss in weight (PLW), fruit weight, fruit diameter, decay loss, percent shrinkage and firmness as compared to control. Moreover, there was significantly better retention of fruit weight, fruit diameter, decay loss, percent shrinkage, firmness and PLW in 100 % olive oil incorporated with 2% CG+ 2% AA followed by 75% Aloe vera gel incorporated with 2% CG + 2% AA. The application of respective composite edible coating enhanced the shelf life of ber fruits by 14 days at room temperature conditions. Therefore, in terms of insuring food security, post-harvest losses and food waste are alarming issues in developing and developed countries. This research provides a basic insight on reducing post-harvest losses with application of edible coatings and maintaining the nutritional compounds in ber fruits.

Abstract ID- 3022020014

Forest Structure and Regeneration Status of Tree Species at Two Different Altitudes in Churdhar Wildlife Sanctuary (CWS), Himachal Pradesh.

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The present study was aimed to find the regeneration performance and forest structure at CWS. The introduction of new recruitments and the survival of seedlings are the biotic factors considered to be significant for sustainable management of tropical moist forests (Janzen, 1970).. Poor regeneration potential is a principal problem in mountain forests (Krauchii et al., 2000). Presence of enough number of young trees, saplings and seedlings in a forest population depicts a successful regeneration. The present work was done in CWS, one of the protected area networks of Himachal Pradesh, Western Himalaya.CWS covers a wide altitudinal range varying from1900-3647m above sea level (Subramani et al.,2014). For present work two sites, first at 1900-2200m (lower altitude) and other at 2800-3100m (higher altitude) were selected. The lower altitude forest site was found to be dominated by *Quercus leucotrichophora* whereas at higher altitude *Quercus semecarpifolia* was found dominant among tree species. The quadrat method given by Khan et al. (1986) was used for investigating regeneration status of trees at selected forest sites. The method of Khan et al.(1987) based on population dimensions of seedlings and saplings were used for generating the regeneration status of trees at each selected forest site. Different successive diameter classes of trees such as 0-20 cm, 21-40cm, 41-60cm,61-80cm and so on, were divided and their total basal cover were recorded for determining the forest structure. The density–diameter (d-d) curves of dominant and co-dominant tree species were also drawn to find out their regeneration status. At lower altitude forest site 11 tree species were recorded, of which 45.45% species showed good and 18.18% showed fair regeneration, whereas no regeneration was observed in 36.36% species. On the other hand only 6 tree species were found at higher altitude forest site, of which 33.33% of species had shown good as well as poor regeneration while 16.66% species reflected fair regeneration. On the basis of different successive diameter classes of trees it was observed that total basal cover of lower altitude forest site was highest for 21–40 cm diameter class whereas maximum total basal cover of forest at higher altitude was recorded for 61–80cm diameter class which reflects that lower altitude forest site was comparatively young than the higher altitude forest site. Except *Rhododendron arboreum* (at lower altitude) and *Quercus semecarpifolia* (at higher altitude) all dominant

and codominant tree species of both the forest sites exhibited reverse j-shaped density-diameter (d-d) curve.Reverse j shaped curve revealed good regeneration of trees whereas interrupted reverse j-shaped d-d curve reflects that the species may be in trouble in the future.

Key Words: Regeneration Performance, Seedling, Reverse j-shaped curve, Protected Area.

Abstract ID- 3022020015

In Vitro Evaluation Offungicides, Bio-Agents and Botanicals against *Colletotrichum Lagenarium* (Pass.) Ell. and Halst.

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In-vitro study was conducted at Department of Plant Pathology, College of Agriculture, Dapoli for testing different systemic and non-systemic fungicides against *Colletotrichum lagenarium* causing anthracnose in bitter gourd. Five systemic and four non-systemic fungicides were evaluated at three concentrations. The result from this experiment revealed that all the treatments were significant over the control and there was significant difference between the systemic and non-systemic fungicides and their concentrations. Propiconazole, hexaconazole and thiophanate methyl inhibited cent per cent mycelial growth of C. lagenarium at all concentrations (0.05, 0.1 and 0.15%). Tricyclazole also recorded cent per cent inhibition at 0.1 and 0.15 per cent concentrations, while difenconazole showed cent per cent inhibition only at 0.15 per cent concentration. The least inhibition of mycelia growth among the systemic fungicides was observed in difenconazole (80.83%) at 0.05 per cent concentration. Among the non-systemic fungicides tested, the maximum mycelial growth inhibition was recorded by mancozeb (89.72%) followed by captan (86.25%) at 0.25 per cent concentration. The least inhibition of mycelial growth was observed in chlorothalonil (38.47 %) at 0.1 per cent concentration.

Abstract ID- 3022020016

Estimation of Genetic Parameters in Soybean Germplasm

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Soybean [*Glycine max* L.] is an unique grain legume globally known for its dual purpose use as pulse and oilseed crop containing 38-44% protein and 18-22% oil. The present study was carried out at N E Borlaug Crop Research Center , G B Pant University of Agriculture and Technology Pantnagar, Uttarakhand to estimate the genetic parameters such as analysis of variance, genotypic coefficient of variance (GCV), phenotypic coefficient of variance (PCV), heritability (h2) and genetic advance as % of mean (GAM) for 12 quantitative traits of soybean germplasm. Experimental material of the investigation comprised 276 genotypes along with 4 checks sown in augmented block design and analysis of variance was done by using the method given by Federer (1956) and as described by Federer, Ragavarao (1975) and Petersen (1985). Characters days to 50% flowering, days to maturity, plant height, number of nodes per plant, number of pods per plant, 100-seed weight, dry matter weight per plant, plant population per plot and harvest index (%) showed highly significant difference among checks. The significant difference indicates that these traits showed significant variation with the blocks. The phenotypic coefficient of variance ranged from 17.87% to 4.75% for plant population per plot and days to 50% flowering. The genotypic coefficient of variance ranged from 17.83% to 2.62% for plant population per plot and days to maturity. Highest heritability was observed for number of nodes per plant (99.86%) and lowest heritability for seed yield per plant (62.20%). Genetic advance as percent of mean ranged from 36.66% to 4.62% for plant population per plot and days to maturity. High heritability

coupled with high genetic advance as percent of mean was observed for plant height, number of pods per plant, dry matter weight per plant, plant population per plot and harvest index %. The Superior accessions were found over the best check for rest of the characters, i.e. days to 50 flowering (CAT 2399), days to maturity (CAT 2213), plant height (SPEC 56 A), number of primary branches per plant (CAT 307), number of nodes per plant (EC 14476), number of pods per plant (CAT 703), 100- seed weight (EC 241656), seed yield per plant (CAT 833), dry matter weight per plant (CAT 2234A), plant population per plot (CAT 2107) and harvest index% (CAT 376). It can be concluded that these superior accessions were selected for respective characters and can be used as a donor parents in future breeding programs for improving a particular trait to enhance the yield, oil % and protein in soybean crop.

Key words: Genetic parameters, Quantitative traits, Soybean and Variance.

Abstract ID- 3022020017

The Nutrient Use Efficiency of Wheat under the Influence of Rhizospheric Management

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Wheat is the most important food grains crop among all the food crops in India. For food and nutritional security, it can be essential to increase the wheat production. The wheat production can be increase only through enhancing the crop output per unit added inputs. The crop output can be increased by various approaches like as variety, tillage, nutrient management etc. The source of nutrients, rate, method and time of nutrient application are important factor that responsible for improving crop productivity. The source of nutrients (inorganic, organic and biofertilisers) and method of application (surface application, side and deep placement in soil and foliar application) are the more influence on nutrient availability and crop productivity where organic manure also work as carbon source for microbial community that help to increase the plant availability of nutrient to crop plant and improve crop productivity. The different placement methods (deep placement, side placement and surface application) and the source of nutrient application (organic, inorganic and Biofertilizers) have positive impacts on the nutrient use efficiency and crop productivity of wheat crop. The deep placement has significant effect on NUE and wheat Yield followed by side placement and surface application. Whereas, combined application of inorganic, organic and biofertilizer have significant influence on wheat yield and NUE. However, combined application of deep placement with inorganic, organic and Biofertilizers application have observed more influencing with respect to NUE and wheat yield. So, the nutrient management through the use of differentially nutrient placement methods and combined application of organic manure, inorganic fertilizers and biofertilizer are the possible scope for improving NUE and wheat productivity that provide a way toward the food and nutritional security.

Keywords:- Nutrient use efficiency, fertilizer placement, integrated nutrient management Wheat Productivity.

Abstract ID- 3022020018

Compensating Strategies for Anatomical Variations of Woody Plants Belonging to Similar Species and Wood Density

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Wood density has arisen as the core of ecology of woody plants as it is related to the aspects like mechanical strength, growth, life span, survival, efficiency and safety of hydraulic transport, storage, herbivory and pathogen resistance. It reflects the amount of carbon invested in the plant hence, it is considered as a key plant trait, governing various mechanical, physiological performances and architecture. Wood density is a complex trait incorporating properties of various wood elements: vessels for sap-conduction in angiosperms, fibers as the main support structures, and parenchyma for both storage and transport of food between xylem and phloem. According to various studies done so far, different wood elements are responsible for the increase or decrease in wood density. The studies reveal that vessel fraction has either negative or zero correlation with wood density, fibre and parenchyma positively influence the wood density. Fibre wall fraction is considered as the main contributor of wood density. The present study is an attempt to elucidate how tissue proportion of various wood elements is changing despite of same wood density and same species. The study includes examination of 22 wood samples of 11 species belonging to 10 families. Tissue proportion data was taken manually, fibre quantitative characters were examined using Schulz's method and photomicrographs were taken. It was found that plants bring changes in its fibre quantitative characters to compensate for the change in tissue proportion despite of same species and wood density.

Abstract ID- 3022020019

Comparison of Wood Microstructure and Ecological Adaptation of Endemic Trees from Two Biogeographic Zones of India

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The bio geographic zones of India are classified on the basis of different ecosystem and their spatial distribution in country. The adaptive response of xylem microstructure in response to variable water availability helps in the successful establishment of the species in particular ecological condition. Hydraulic tradeoffs are considered one of the species strategies for the species adaptation to water availability. The endemic trees are considered highly adaptive to a particular niche hence their exclusivity found to a specific zone. The present study was carried out to understand the adaptive responses of endemic tree species from two bio geographic zones: Western Himalayas and North-eastern region. Internationally acclaimed standard laboratory procedure was used to identify the qualitative characters as per the International Association of Wood Anatomists (IAWA) terminology. For the determination of the quantitative features of the hydraulic structure of wood, small radial chips were macerated following Shultz method. Photomicrographs were taken for the diagnostic features. Qualitative characters of the samples were found to be conservative. The study reflected variations and similarities in quantitative hydraulic structure features for the adaptation and the outline of vessel features significantly contributed were outlined for the two zones. The study can help to identify the adaptive hydraulic characters based on the species analyzed which can further help to select the suitable species during reforestation/ afforestation programmes.

Abstract ID- 3022020020

Effect of Pgrs and Their Methods of Application on Yield, Quality and Economics of Kharif Onion (*Allium Cepa* L.) Cv. Agri Found Dark Red

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An experiment was conducted in field of the nursery, Department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Indore during Kharif season, 2017-2018 to see the effect of plant growth regulators and their methods of application on yield, quality and economics of kharif onion (*Allium cepa* L.) cv. Agri found Dark Red and result have shown significant differences among the treatments. The maximum fresh weight of bulb (73.7g) and dry weight of bulb (8.70g), maximum yield per plot (8.50 kg) and per hectare (283.31q/ha), maximum TSS (17.67 0Brix) were recorded under treatment T3 (GA3 @ 100ppm-foliar spray). The lowest physiological weight loss (2.27 and 3.08 %) was also recorded under T3 (GA3 @ 100ppm-foliar spray) but maximum cost benefit ratio 1: 3.39 was found in T6 (NAA @ 100 ppm-foliar spray).

Abstract ID- 3022020021

Studies on the Bio-Efficacy of Carbosulfan in Cotton

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Experiment was conducted during *Kharif* 2014 and 2015 at research farm of Regional Agriculture Research Station, Khandwa (M.P.) with seven treatments namely, untreated control, carbosulfan 25 EC 250 g a.i., carbosulfan 25 EC 312 g a.i, carbosulfan 25 EC 375 g a.i, fipronil 5% SC, imidacloprid 17.8 % SL and thiamethoxam 25% WG./ha. These seven treatments were tested under randomized block design (RBD) with three replications against aphids and thrips, and also observed the phytotoxicity effect of different chemical treatments on cotton plants as well as record their impact on natural enemies of cotton pests like, *Coccinellid* beetles and *Chrysoperla* populations. Seeds of cotton CV. Bunny Bt (BG II) were sown in both experimental years. All the treatments were sprayed when target insect pests incidence was above Economic Threshold Level (ETL) and second application of spray was applied 15 days after first application. Phytotoxicity assessment in cotton was undertaken with by testing three different doses of carbosulfan 25% EC was applied on crop. Phytotoxicity observations were recorded at 1, 3, 5, 7, 10 and 15 days after application of the chemical. The level of phytotoxicity was estimated by visual assessment. The highest percent control of aphids recorded in treatments carbosulfan 25% EC @ 1500 ml/ha after second application. While similarly significantly lowest thrips incidence was recorded in carbosulfan 25 EC @ 1500 ml/ha after both application. Effect of carbosulfan 25 % EC against natural enemies revealed that there is no significant change observed in the population between the insecticidal treatments and the untreated control. Carbosulfan 25% EC @ 1500 ml/ha has recorded significantly highest yield of 16.80 g/ha (2014) and 18.71 g/ha (2015). It was at par with the treatments of carbosulfan 25% EC @ 1250 ml/ha. There was no phytotoxicity symptoms were observed on cotton plants after application of carbosulfan 25% EC @ 1250 ml/ha (x dose) and 2500 ml/ha (2x dose) at 1, 3, 5, 7, 10 and 15 days after application.

Key words: Phytotoxicity, Natural Enemies, Aphid and Thrips

Abstract ID- 3022020022

Isolation and Identification of Entomopathogenic Fungi and their Evalution against *Lipaphis Erysimi*

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The present investigation was conducted on survey and identification of entomo pathogenic fungi from Kumaun region and evaluates their virulence against *Lipaphis erysimi*. Among different entomo pathogenic fungi, *Beauveria bassiana* and *Metarhizium anisopliae* were dominated on the crop ecosystem. The infected cadavers were collected and brought to the laboratory for isolation and identification of the entomo pathogenic fungi. The morphological characters were identified on slide under the microscope.
Bio efficacy of *B. bassiana* and *M. anisopliae* were tested against *L. erysimi* recorded at 24hr, 48 hr, 72hr, 96hr, 120h, 144hr and 168hr revealed that the mortality increased with increase in concentration of inoculums. At 168hr, the highest concentration of 1 x 109 conidia ml-1 of *B. bassiana* showed 76.67 per cent mortality and *M. anisopliae* showed 66.67 per cent mortality in *L. erysimi* respectively. Hence, isolate of *B. bassiana* was holding high potential for development of efficient bio pesticide.

Keyword: entomo pathogenic, bio efficacy and bio pesticide

Abstract ID- 3022020023

Evaluating the Worth of Chitosan and Salicylic Acid on Chlorophyll Fluorescence, Peroxidase Proline and Total Phenolic Content of Mango Malformed Leaves

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Mango (*Mangifera indica* L.) is one of the most important cultivated tropical fruits in the world and one of the most popular fruits in India. It is the fifth largest cultivated fruit crop globally with the yields of approximately 40 million tonnes, second only to banana among the tropical fruit species (FAOSTAT, 2015). Mango malformation (MMD) is a mysterious disease of mango causing the incredible economic importance throughout the mango growing regions. Initially, research works were focused over finding the causes of this malady and different microorganism were isolated and claimed to be its causal agent. Despite not killing the host plant, it affects the leaf panicles and inflorescence leading to the massive reduction of yield. The most effective management of disease includes the avoidance of inoculums; selection of resistant varieties and the potential control of disease are targeted to eradicate the causative agent. In plants, various exogenous or endogenous signal molecules are involved in the activation of defense responses. They could substantially affect the physiology of host plants, leading to rapid increase in peroxidase activity proline content, total phenolic content and coordinated with reduction in chlorophyll fluorescence even in susceptible plants. Chitosan and salicylic acid are promising approach for controlling plant diseases is through induced plant resistance against inanimate and animate. Hence, the present study was designed to provide the brief information of the disease and effective management strategies of mango malformation through foliar application of chitosan (CT) and salicylic acid (SA). Eight different concentrations of 0.25% CT, 0.50% CT, 0.75% CT and 0.20% SA, 0.40% SA, 0.60 % SA foliar application done at three different stages i.e. (i) Panicle emergence (ii) Pre blooming (iii) Full blooming. The results have been shown that the chlorophyll fluorescence decreases and peroxidase activity, proline and total phenolic content increase in the CT and SA treatments in comparison to control (Water spray only). Chitosan and Salicylic acid in both varieties, help in scavenging reactive oxygen species and enhancing tolerance and pave the way to reduce the lethal belongings of mango malformation.

Key words: Chitosan, Salicylic Acid, Chlorophyll Fluorescence, Proline, Peroxidase and Mango Malformation.

Abstract ID- 3022020024

Effect Of Pgr's And Micronutrients On Fruiting Attributes Of Plum (*Prunus Salicina* Lindl.)

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Plum is one of the most important stone fruit crops of temperate region grown throughout the world. Although it is a temperate region fruit crop but some of its low chilling varieties are successfully cultivated in subtropical region particularly in Punjab, Haryana and Uttarakhand. Among subtropical varietiesSatluj purple, Kala Amritsari and Taturi are the important ones. Satluj Purple is the commercial variety in subtropical region. Besides having profuse flowering, pre harvest fruit drop creates heavy loss in this variety. The present experiment aimed to study the effect of micronutrients and PGR's on fruiting characteristics of plum cv. Satluj Purple. 15 years old plum trees were selected for the experiment. Foliar spray of micronutrients and PGR's was done soon after fruit set. The treatments consist of T_1:NAA @ 10 ppm T_2:NAA @ 15 ppm, T_3:NAA @ 20 ppm, T_4:NAA @ 15 ppm + Urea 2%, T_5:2,4-D @ 5 ppm, T_6:2,4-D @ 10 ppm, T_7:2,4-D @ 15 ppm, T_8:2,4-D @ 10 ppm + Urea 2%, T_9:Borax @ 0.50%, T_{10}:Borax @ 0.75%, T_{11}:Borax @ 1.0%, T_{12}:Borax @ 0.75% + Urea 2%, T_{13}:$ZnSO_4$ @ 0.4%, T_{14}:$ZnSO_4$ @ 0.5%, T_{15}:$ZnSO_4$ @ 0.6%, T_{16}:$ZnSO_4$@ 0.50% + Urea 2%, T_{17}:Control.The experiment was laid out in randomized block design with 17 treatments and 3 replications. Fruiting parameters like fruit length, fruit volume, fruit drop, fruit retention and fruit yield was recorded. Among all the treatments Auxin based PGR's i.e., NAA and 2,4-D had most pronounced effect on fruiting attributes. The treatment T_2: NAA@15ppm significantly reduced the fruit drop and increased the fruit retention and recorded highest yield as compared to other treatments.

Abstract ID- 3022020025

Studies on floral biology in Raspberry (*Rubus ellipticus*) under mid hill condition

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Raspberry (*Rubus ellipticus*) is an important commercial fruit crop, widely grown in all temperate regions of the world. Lack of good yielding varieties is the potential drawback for the growth of area under cultivation. Even though it is a potential crop, the breeding work for the development of the new varieties is not up to the mark for which may be due to lack of knowledge about floral biology of the crop is also one of the reason. To study the floral biology of the Himalayan yellow raspberry (*Rubusellipticus* var. *obcordatus*), data on the parameters like bearing habit, time and duration of flowering, flower bud development, anthesis and anther dehiscence were collected at an interval of one week over a period of 6 months. The results showed that under hilly condition, the vegetative growth was started during June to August and the plants enter into reproductive stage between November to March. Flowering commenced from the second week of December to second week of March in which peak flowering commences 90 days after opening of first flower. The flowers were hermaphrodite in nature where the male and female reproductive organs are present in the same flower. The maximum rate of anthesis was found between 10 am to 12 noon simultaneously with anther dehiscence. Increase in the temperature and decrease in the humidity hastens the anthesis as well as anther dehiscence.

Abstract ID- 3022020026

Bacterial Flora from River Yamuna and It's Impacts

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Water is an important nutrient and plays a vital role in life processes. Water pollution is a major problem in the global context. It has been suggested that it is the leading worldwide cause of death and diseases. Contaminated water with pathogenic bacteria affects the performance of humans. Bacterial infections are one of the major public health problems in many developing countries. In the present study water sample were collected from different location in Agra region and determination for the microbiological analysis using standard methods. The present study designed to isolate and characterize the bacterial flora from Yamuna river water. The determination of bacterial flora study was necessary in safeguarding public health.The presence of bacteria isolated and identified and some other species of bacteria samples were foundin contaminated water specially *Acetobacter, Acholeplasma, Flavobacteriumacidificum, Actinobacillus, Actinomyceshumiferus, Flexibacter, Gluconobacter, Haliscomenobacter, Haemophilussegnis, Aeromonas, Halobacteriumhalobium, Halococcus, Klebsiella, Nitrococcus, Pasteurella, Pectobacterium , Proteus mirabilis, Scotobacteria, Shigella, Staphylococcus, Streptococcus, Arachnia, Leptospirainterogans, Lysobacter, Macromonas, Succinimonas, Thiobacillusintermedius, Vibriocholerae, Vitreoscilla, Xanthomonas, Methanobacterium , Methanococcus, Azomonasagilis, Methylobacillus, Micromonospora, Mycobacterium bovis, Mycoplasma, E.coli,Bacillus,Bacteroidsbivius, Blastococcusaggregatus, Brucellaovis, Caulobacterfusiformis, Chlamydia, Pseudomonas, Salmonella, Chlorobium, Chromatium, Coprococcuscatus, Cystobacterfuscus, Desulfuromonas, Enterobacter, Erwinia, Eubacteriumaerofaciens,* All these were isolated, identified and characterized on the basis their morphological cultural and biochemical characterstics. To find out the pathogenic bacteria,culturing technique was used followed by staining for identification of bacterial species.Further experimentation is needed in order to find the specific cause and saves lives through provision of appropriate care and medicine. We believe that the isolated bacteria details and data recorded and highly useful for future disquisition. Circumspection should be taken to get rid of these organisms from laboratories by means of proper laboratory disinfection and sterilization as well as personal hygiene of laboratory workers. The high values of microbial indicators and pathogens detected and need for proper implementation of different pollution measures for improvement in the river water. Treatment facilities increasingly becoming of interest and ongoing disquisition in laboratory.

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In Vitro Evaluation of Antibacterial Chemicals against *R. Solanacearum*

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The antibiotics, antibacterial fungicides and bactericides tested in vitro were found effective against *R. solanacearum*. Among Antibiotics, average inhibition zone was ranged from 6.66 (Gentamycin) to 20.90 mm (Streptocycline). However, significantly maximum inhibition zone was recorded in the antibiotic Streptocycline (22.90 mm). This was followed by the Tetracycline (12.46 mm), Neomycin (9.17 mm), Cephalexin (8.55 mm), Dicrystacin (7.67 mm) and Gentamycin antibiotics were found less effective with 6.66 mm inhibition zone, respectively. Among antibacterial fungicides and bactericide, average inhibition zone was ranged from 7.77 mm(Azoxystrobin) to 19.21 mm (Calcium oxychloride). However, maximum inhibition zone was recorded in the bactericide, Calcium oxychloride (19.21 mm). This was followed by the antibacterial fungicides viz., Metalaxyl MZ (17.67 mm) and Copper oxychloride (11.43 mm). Antibacterial fungicides, Copper hydroxide and Azoxystrobin were found less effective with 8.01 mm and 7.77 mm inhibition zone, respectively.

Key words: *Ralstonia solanacearum*, antibacterial fungicides, bactericides and antibiotics.

Abstract ID- 3022020028

Influence of Picking Stages on Seed Quality of Okra (*Abelmoschus Esculentus*)

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Seed is the basic input in agriculture which alone can enhance the yield up to 15-20 per cent. Keeping this in view, an experiment was conducted to study the effect of picking stages on seed quality of okra (variety: Varshauphar) in the farm of Seed Science & Technology Department, CCS HAU, Hisar in kharifseason 2018-19. The seeds were dipped in water for 12 hours before sowing. The picking of matured and dry okra fruits was performed keeping in view of lower nodes (1 to 5), middle nodes (6 to 10) and upper nodes (11 to15).The seed quality parameters were assessed for the seeds harvested from the fruits of all the three seed lots viz., lower nodes (lot 1), middle nodes (lot 2) and upper nodes (lot 3). Results revealed that seed quality parameters (germination percentage, shoot and root length, seedling dry weight, vigour indices, electrical conductivity) were observed superior in lot 2 as compared to lot 1 and lot 3.

Key words: Okra, seed quality, seed lot, nodes, picking

Abstract ID- 3022020029

Influence of Potassium Silicate on Photosynthetic Pigments and Antioxidant Enzymes of Mango Malformation

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Mango (*Mangifera indica* L.) is the fifth largest cultivated fruit crop globally with the yields of approximately 40 million tonnes, second only to banana among the tropical fruit species. Mango malformation (MMD) is an ambiguous disease of mango with the tremendous economic importance throughout the mango growing regions. The most effective management of disease includes the avoidance of inoculums, selection of resistant varieties and the potential control of disease are targeted to eradicate the causative agent. Physical alteration followed by chemical treatment like Prochloraz and benomyl spray results in the reduction of disease incidence and increment of yield. In the present investigation Potassium Silicate was sprayed thrice in a week at flowering stage and a field experiment with two mango cultivars (Amrapali and Desheri) was performed using factorial randomized block design in the three replications. The impact of potassium silicate (0.25, 0.50, 1, 2 and 5%) on photosynthetic pigment content and antioxidant enzyme activity was evaluated. The result revealed that the total chlorophyll content and total carotenoids were increased with increasing potassium silicate concentration as compare to control. It was found that Chlorophyll content was more in Amrapali as compare to Desheri. The activity of SOD was also enhanced with increasing Potassium Silicate concentration while maximum SOD activity was observed in Desheri as compared to Amrapali. It was concluded that SOD is the most effective intracellular enzymatic antioxidant which is ubiquitous in all aerobic organism and in all subcellular compartments prone to ROS mediate oxidative stress.

Key words: Mango malformation, SOD, Photosynthetic pigment

Abstract ID- 3022020030

Impact of Plant Growth Regulators on chlorophyll Intensity and Improving growth Yield of Wheat (*Triticum Aestivum* L.) Under Late Sown Condition

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Wheat (*Triticum* spp.) is the largest grown cereal in the world occupying about 225 millionhectares with an estimated annual production of 726.55 million tonnes. India is the secondlargest wheat producer with a consecutive production of more than 90 million tonnes in thepast three years. The requirement for the nutritious cereal has been increasing tremendously owing to the growing demand for diverse and quality wheat products for consumption driven by population. Application of Plant growth regulators like Auxin influence the growth and development of a crop. These compounds are generally active at very low concentrations. The present study entitled "Impact of Plant growth regulators on chlorophyll intensity and improving growth yield of wheat (*Triticum aestivum* L.) under latesown condition"was conducted during Rabi season 2014-15 in completely Randomized Block Design in three replication with Plant growth regulator of two different concentrations i.e. IAA (25ppm and50ppm) and NAA(50 ppm and 100 ppm). In this experiment wheat variety taken was K-9423 (Unnat Halna). Results revealed that almost all trait varied significantly over the control. Morphological study finding disclosed that number of tillers appreciated by IAA 50 ppm. The total leaf area per plant varied significantly by both the doses of IAA.As far as biochemical character namely chlorophyll content enhanced by both doses of IAA. Consequently, the grain yield was improved by both the doses of IAA followed by NAA 50 ppm respectively. Maximum grain yield was found in concentration IAA 50 ppm which also resulted the highest harvest index (%) in comparison to other concentration and control. Based on overall performances of treatments, it was concluded that IAA 50 ppm enhanced the grain yield.

Key words : Plant growth regulators, Chlorophyll intensity, Number of tiller, Harvest Index.

Abstract ID- 3022020031

Effect of Organic, Integrated and Inorganic Use Efficiency on Leaf Area Index, Total Chlorophyll Content, Carotenoid Content and Chlorophyll Fluorescence of Pant Basmati I (*Oryza Sativa*)

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Rice (*Oryza sativa*) play significant role in sustaining millions of life around the world. It is a major staple food crop in India. More than thirty percent of the total cultivated area in India is planted with rice. Fertilizers are crucial input for improving fertility of soil and have become an integral part of modern crop production technology. Initial, studies reveal that judicious and proper use of fertilizers can markedly increase the yield and improve the quality of rice. Uses of vermicompost with chemical fertilizers increase the solubility of single super phosphate from 32% to 40%. However, organic fertilizers were essential for rice, increases fertilizer use–efficiency whereas, inorganic fertilizers are fast acting. These nutrient-rich salts dissolve quickly and are immediately available to the plants depending on them to provide essential nourishment in the form of nitrogen, phosphorus and potassium. All of the above directly and indirectly these fertilizers alter the physiology of crop plants. Keeping in view, the different treatments of organic, inorganic and integrated fertilizers were given to Pant Basmati I to evaluate their efficiency. Results showed that there is maximum increase in leaf area index, total chlorophyll content, carotenoid content

and chlorophyll fluorescence in 100% organic treated plot in comparison to the integrated and inorganic treated plot respectively.

Key Words: Rice, Fertilizers, Leaf Area Index, Total Chlorophyll Content, Carotenoid Content and Chlorophyll Fluorescence

Abstract ID- 3022020032

Studies on Cercospora in Garhwal Himalaya, Uttarakhand, 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- *Vicea faba, Spinacea*oleracea, *Ricinuscommunis* and *Beta vulgaris*. The pathogen was *Cercospora canescene, Cercospora chenopodii, Cercospora ricinelia and Cercospora beticola* respectively, which results into heavy losses when found suitable environmental and other conditions and causes heavy losses. This study reveals the detailed studies of life cycle and infection period of the fungus in Garhwal region of Uttarakhand.

Abstract ID- 3022020033

Combining Ability Studies Based on *Mori* CMS System in Indian Mustard [*Brassica Juncea* (L.) Czern And Coss]

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Line x tester analysis was carried out to estimate combining ability effects of 50 hybrids developed by crossing 10 *Mori* CMS lines with five restorers in Indian mustard [*Brassica juncea*(L.) Czern and Coss]. The F1 hybrids along with parental genotypes planted at Oilseeds Research Area, Department of Genetics & Plant Breeding, CCS Haryana Agricultural University, Hisar India during 2018-19 which evaluated for 12 characters including days to 50 % flowering, days to maturity, plant height (cm), number of primary branches per plant, number of secondary branches per plant, main shoot length (cm), numbers of siliquae on main shoot, siliquae length (cm), number of seeds per siliquae, 1000-seed weight (g), oil content (%) and seed yield per plant (g). Analysis of variance revealed that sufficient genetic variability present among lines, testers and crosses for most of the traits. There was presence of both additive and non-additive gene actions with preponderance of non-additive gene action in controlling yield and component traits. On the basis of overall performance of parents, line MA-023 and tester MR-38 were found the best general combiners for majority of component traits including seed yield per plant. Other three lines *viz*; MA-8701, MA-8812 and MA-9301 were also observed as good general combiners for most of component traits including seed yield per plant. Tester MR-43 and MR-44 were found good general combiner for earliness. On the basis of *per se* performance and specific combining ability, crosses MA-9301 x MR-44, MA-8701 x MR-38 and MA-9705 x MR-31 were observed as superior cross combinations for seed yield in desirable direction.

Key words: *Brassica juncea*(L.), Gene action, GCA, SCA, heterosis, *Mori* CMS

Abstract ID- 3022020034

Development of SCAR Markers for Apple Scab and Insect Pest Resistance from Crab Apple Biotypes

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Marker assisted selection saves the time and cost by reducing the laborious and long term selection procedure especially in horticultural crops. In this contest PCR based specific sequence characterized amplified region (SCAR) markers were developed from crab apple biotypes. Seven biotypes of indigenous crab apple biotypes maintained at two field gene banks of Himachal Pradesh state of India were used to identify RAPD markers for resistance to apple scab and woolly aphis. RAPD molecular analysis was evaluated among seven biotypes using 119 primers. Among these, 94 primers generated polymorphism. Four primers OPB-12, OPB-14, OPD-06 and OPA-18 amplified five unique bands of 500bp, 1kbp, 1kbp, 1kbp and 1kbp in *M. baccata* Shillong, *M. baccata* Khrot, *M. baccata* Kinnaur (Dhack), *M. baccata* Kashmir and *M. baccata* J&K respectively. These markers were gel purified and cloned into easy cloning TA vectors. Plasmid of the confirmed positive clones after restriction digestion and colony PCR was subjected to sequencing and homology search. Sequences showing homology with the apple scab and woolly aphid resistant genes were used to design pairs of six SCAR primers, which specifically amplified these RAPD fragments in crab apple biotypes as well as *M. floribunda* and apple rootstock MM106 of known resistance. All developed SCAR markers showed promising results in screening of resistant and susceptible apple genotypes.

Keywords : Apple, Molecular markers, SCAR, Disease resistance

Abstract ID- 3022020035

Response of different varieties of mustard grown as a succeeding crop on residual soil nutrients after *Ocimum basilicum*

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The study was conducted during rabi season of 2018-19 at Medicinal Plants Research and Development Centre (MRDC) of Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, District Udham Singh Nagar, India, to study the response of different varieties of mustard grown as a succeeding crop on residual soil nutrients after *Ocimum basilicum.* The experiment was laid out in split plot design (SPD), replicated trice. The experimental soil was sandy clay loam in texture, neutral in reaction, having pH 6.9, medium in organic carbon, low in available nitrogen and medium in both available phosphorus and potassium. Three mustard varieties viz. Kranti, PR-20 and NRCHB-101 were grown as a succeeding crop on residual nutrients of kharif season basil crop with different doses of fertilizers ie.100:60:40 and 150:60:40 kg NPK ha^{-1} along with 0, 20 and 40 kg sulphur ha^{-1}. Results revealed that NRCHB-101 variety of mustard perform better under residual nutrients followed by PR-20 and Kranti varieties respectively. It was recommended that 100:60:40 kg NPK along with 40 kg sulphur ha^{-1} was sufficient for good harvest of basil and need not to apply any nutrients for succeeding mustard crop under basil- mustard cropping system under tarai condition of Uttarakhand.

Key words: Basil, Mustard, Nutrients, Residual, Succeeding, Varieties,

Abstract ID- 3022020036

Incidence of Bunt in Major Paddy Growing Districts in Haryana

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The survey was conducted to record the incidence of paddy bunt in major rice growing districts of the Haryana state*viz.,*Jind, Kurukshetra, Yamunanagar, Karnal, Hisar, Kaithal, Sirsa, Fatehabad during 2015 to 2018.The total number of samples analyzed during the survey was 2033 and among them 501 samples were found infected. Paddyseed samples (1 kg)of commercially cultivated varieties were collected randomly from farmers as well as seed corporation processing plants (Kurukshetra, Yamunanagar, Karnal) of Haryana state.The observations were recorded in terms of number of samples tested, number of infected samples and average bunt infection. The data revealed that the average bunt infection was found in decreasing trend from 2015 to 2018 (0.082, 0.033, 0.014, 0.010) in farmers' seed samples. The data of Seed Corporationsrevealed the range of bunt infection was 0.010 to 0.022 during the survey period. The difference in incidence of bunt during the period under study was might be due to the local weather conditions and management practices followed by the paddy growers. The present study indicates that production of disease free seed should be taken from the districts having less bunt incidence.

Keywords: Bunt, IncidencePaddy, *Oryza sativa*

Abstract ID- 3022020037

Molecular identification of phytonematodes: A shift towards the development of rapid diagnosis protocols

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Phytonematodes is one of the major biotic stress factors for crop production. The crop's yield losses attributed to phytonematodes are approximately 10–15% worldwide. The proper diagnosis is the prerequisite for the selection of suitable and timely management practices. The traditional morphological characteristic based diagnosis is time-consuming and needed a skilled taxonomist while these constraints are not associated with the molecular diagnosis. The molecular methods are cost-effective, rapid and accurate and reduce the dependency on the particular life stages of nematodes. Internal transcribed spacer regions are conserved region among the nematode species and widely used in DNA based molecular identification of nematodes. Earlier ribosomal DNA, mitochondrial DNA, Satellite DNA, DNA markers and DNA barcoding were widely used in the rapid identification of plant-parasitic nematodes. The interest of scientific communities is shifting towards the development of techniques for the field-level diagnosis of plant-parasitic nematodes. The Loop-mediated isothermal amplification and other isothermal amplification processes offer an advantage and can be utilized in future for a field-level diagnosis of phytonematodes. Once the molecular-based rapid diagnosis protocols are available, it would help farmers to adopt early management practices, thus they can reduce the qualitative and quantitative yield losses.

Abstract ID- 3022020038

Reducing Post Harvest Losses in Fruits- Need of the Hour

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Fruits are important source of vitamins and minerals and play role in improving nutritional status, but most horticultural produce are highly perishable. Qualitative and quantitative losses to fruits are due to lack of awareness among farmers about post harvest management and inadequate storage facilities. Post harvest losses of fresh fruits is estimated approximately 10-20%, thus reduction of these losses becomes quite essential. Losses in terms of quality and quantity occur at all stages in the post harvest system from harvesting to consumption. The losses are high when fungus and pathogens make the fruits unfit for utilization. Thus, importance of good post harvest practices in minimizing post harvest losses cannot be ignored. By checking respiration and microbial activity in fruits, it is possible to extend the storage life. Most feasible strategies such as modified atmosphere storage, controlled atmosphere packaging, use of antitranspirants, oil coatings, coatings of wax, chemical coatings, use of irradiation and different types of packaging material *etc*. help to proliferate the storage ability and shelf life of the horticultural commodities and also make fruits available in off-season to consumers. Reduction in post harvest losses by coatings of natural bioextract helps to keep environment clean and packaging of fresh produce is meant to provide shelter against environmental factors involved in quality degradation. This will reduce the glut in the market in the growing season and it will also help to enhance the economy of farmers and country.

Keywords: post harvest losses, shelf life, quality. fruits, packaging, bioextract coatings, storage.

Abstract ID- 3022020039

Biogas Slurry: A Boon for Sustainable Crop Production

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Biogas slurry is a by-product of anaerobic digestion that produced from biogas plant and also produces biogas (combustible methane gas) that is used for cooking, lighting and running engines. The digested biogas slurry (DBGS) is rich in macro and micro nutrients that provide essential plant nutrients for longer period. Slurry contains a considerable amount of organic material like N P K FYM 0.5-1.0%, 0.5-0.8%, 0.5-0.8%, Compost 0.5-1.5%, 0.4-0.8%, 0.5-1.9%, Biogas slurry 1.4-1.8%, 1.1-2.0%, 0.89-1.2%. By applying the digested biogas slurry (DBGS) in the field for long term basis help in reducing fertilizer demand and provide an eco-friendly way of maintaining productivity and soil health. It improves the physical properties of the soil like reducing bulk density, increasing water holding capacity, increasing porocity etc. which helps easier for roots penetration in soil. Tillage becomes easier and soil becomes well-drained. The binding effect also reduces also controls wind and water erosion. In this study we are summarizing nutrient potential of digested biogas slurry (DBGS) and relation with synthetic fertilizers in India, as a potential source. Yield increases due to biogas slurry application, have also reported for many crops including field crops, tobacco, castor, peas, mustard, onion, cabbage, banana, chilli, pearl millet and sugarcane Finally, we come out with conclusion that biogas slurry provide a beneficial way for farmer's community, eco-friendly, reduces environmental pollution by replacing the application of chemical fertilizer dose and its burden on economy of country and improves sustainability of field.

Keywods: Digested biogas slurry, eco-friendly, environmental pollution, fertilizer.

Abstract ID- 3022020040

Growth and Future Prospects of Indian Organic Food Market

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The market for organic food is currently exhibiting strong growth in India. A key factor surging the demand of organic food is the rising levels of health consciousness in the country. Consumers are moving towards consumption of organic food to avoid adverse health effects of chemical preservatives and residues present in non-organic food. Indian consumers have started giving attention to the nutrient content and the quality of the food they eat, that is leading to an increasing demand of organic food. Moreover, driven by other factors such as strong economic growth, urbanization, and rising income levels, the consumer expenditure on health and wellness products have increased significantly. Additionally, the demand of organic food in India is also being catalysed by the strong support of the government. The Indian government is promoting organic farming by providing financial Support to farmers who are adopting organic farming under various government schemes such as Mission for Integrated Development of Horticulture (MIDH), National Food Security Mission (NFSM), National Mission for Sustainable Agriculture (NMSA), Rashtriya Krishi Vikas Yojana (RKVY) etc.
Rising awareness about the benefits of consuming organic food products coupled with rising health concerns is driving the demand of organic food products in India.Moreover, increasing popularity of organic products has significantly expanded the availability of organic food in retail stores over the last few years. With organic food becoming easily accessible, the market is expected to witness remarkable growth at a CAGR of 20% reaching a value of US$ 2,091 Million by 2024.

Keywords: Organic food, market growth, health consciousness and awareness.

Abstract ID- 3022020041

Problems and Prospects in the Marketing of Fruits and Vegetables

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India is considered as the fruit and vegetable basket of the world. India ranks the second no. after china in both fruit and vegetable production. Fruits and vegetables together account for the 90% of the total horticulture production in the country still there is a huge gap between in the demand and supply due to losses during the post harvest storage and handling. All these losses occur due to many reasons which includes inefficient storage, improper handling and unavailability of cold storage facilities, lack of temperature controlled vehicles and many more. Once the reports mentioned that only 22% of the total fruit and vegetable in India reach to the wholesale market. Due to this improper handling the country accounts the losses of nearly two lakh crore every year. In fruits and vegetables, losses in the post harvest stages are around 30-40%. Besides the second largest producer only 2% of the fruits and vegetables are processed in the country, around 65% in USA and nearly 23% in China which are far ahead in India in reducing the wastage. Many organizations in India are trying to find out the solutions at a serious note to prevent the amount of such a huge loss. Various studies revealed that a proper supply chain management in fruits and vegetables has to be improved in all the stages of the supply by adopting best global practices in storage, packaging, handling, transportation, value added service etc to meet the country's demand of fruits and vegetables. Also the public private partnership can be proved beneficial in improvement of the physical infrastructure, information sharing and the services required for quality improvement of the supply chain. This study is an endeavour to critically analyse the various problems

that occur in the handling of fruits and vegetables which leads to a huge loss and ultimately some suitable measures that can reduce the wastage.

Keywords: Fruits and vegetables, losses, processing, wastage, Value addition.

Abstract ID- 3022020042

ISSUES in Supply Chain Management of Fruits and Vegetables in India

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Fruits and Vegetables are so common in human diet that a meal without them is supposed to be incomplete in any part of the world. India is the second largest producer of fruits and vegetables in the world, next to China. Instead of having this huge share in total world production there exists a huge gap in the demand and supply of these commodities. Horticultural development had not been a priority until recent years in India. It was later in the post 1993 period that focused attention was given to horticulture development through an enhancement of plan allocation and knowledge-based technology. Although fruits and vegetables being the high value crops are a great source of rise in income of the farmers and also generates the employment opportunities but inefficiency in the supply chain and cold chain hinders the growth of the production of fruits and vegetables. This paper attempts to reflect the scenario of issues and challenges related fruits and vegetables sector. There are heavy post-harvest and handling losses, resulting in low productivity per unit area and high cost of production. However, on the other hand India's long growing-season, diverse soil and climatic conditions comprising several agro-ecological regions provide ample opportunity to grow a variety of horticulture crops. Thus, efforts are needed in the direction to capitalize on our strengths and remove constrains to meet the goal of moving towards a horticulture lead agricultural growth in India.

Keywords: Supply chain, Fruits and Vegetables,

Abstract ID- 3022020043

Mustard Performance under Different Planting Geometry of *Mahaneem* (*Ailanthus Excelsa* Roxb.)

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The investigation was conducted at Research Area of CCS Haryana Agricultural University Regional Research Station, Bawal during rabi season of 2016-17, to study the effect of different plant geometries, *i.e.*, 10×20, 10×10, 10×6.5 and 10×5 m of *Mahaneem* on growth, yield and its parameters of mustard. The maximum plant height at 60, 90 and 120 DAS (93, 202.7 and 206.3 cm) was recorded under 10×20 m. Different plant geometries affected the yield significantly under close geometry, *i.e.*, 10**×**5 and 10**×**6.5 m. Among all the plant geometries, the plant geometry of 10×20 m exhibited higher yield and yield attributes such as highest number of siliquae per plant, *i.e.*, 268.42 number of grains per siliqua, *i.e.*, 12.5, test weight (5.89 g), grain yield (1.90 t/ha), stover yield (2.70 t/ha), root weight (0.76 t/ha) and total biomass (5.36 t/ha) of mustard crop. Yield reduction in mustard indicated that closer plant geometry (200 trees/ha) had more suppressing effect on crops, reduced solar radiation on crop canopy and lower availability of moisture and nutrients. Fuel wood and fodder from *Mahaneem* compensated the reduction of crop yield and resulted in higher returns in association with mustard crop.

Key words: *Ailanthus excelsa*, *Mahaneem*, mustard, growth parameters, yield parameters

Abstract ID- 3022020044

Mechanisms of Glyphosate Resistance by Weeds, Effective Weed Management Strategies and Future Prospects

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The early development of herbicides was although promising in killing the weeds without harming the desired crop plant but the continued use of herbicides in increasing levels had led to a more undesired situation where the weeds have acquired resistance against majority of herbicides that are being used currently. In the year 1996 first Glyphosate Resistant (GR) crop soybean was introduced in USA and in the same year first glyphosate resistant weed *Lolium rigidum* was identified in Australia. The number of weeds that developed resistance against glyphosate went on increasing and till the year 2015 there were more than 32 weeds that have gained resistance against glyphosate around the world. The solution to this emerging problem might become easy when we try to understand the root cause of this problem. Hence it becomes necessary to understand the various mechanisms like Target site resistance, Non-Target Site Resistance, Multiple mechanisms through which many weeds have adopted to gain resistance against glyphosate. The current compilation explains most of the possible strategies that might be helpful in overcoming this problem of GR by weeds and related future prospects along with effective weed management strategies that can be implemented rather than focusing only on the GR crops.

Abstract ID- 3022020045

Effect of Soil Fertility Levels on Chlorophyll Content of Maize Crop

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The field experiment was conducted at VNMKV Parbhani for two years in maize crop which comes under semi-arid tropics with annual rainfall ranging from 700 to 900 mm in VNMKV Parbhani. Chlorophyll is the most important independent factor affecting spectral reflectance. In growing crop on an average for chlorophyll 'a' was from 0.18 to 0.70 and 0.20 to 0.63 and for chlorophyll 'b' concentration of maize leaves increases from 0.18 to 0.61 mg g^{-1} and 0.17 to 0.59 mg g^{-1} up to 78 days then it was decreases. However total Chlorophyll concentration in maize leaves about 0.96 mg g^{-1}. Further, only nitrogen fertilization contributed significantly to total chlorophyll production followed by the additional P + S + Zn + Fe fertilizer (Treatment F_5). With addition of each nutrient application (from treatment F_1 to F_5) there was increase in chlorophyll content in maize.

Keywords: - Chlorophyll 'a', Chlorophyll 'b'

Abstract ID- 3022020046

Impact of Conjunctive Use of Gliricidia Green Leaf Manure and Inorganic Fertilizers on Soil Biological Properties and Yield of Cotton in Vertisols

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A field experiment was initiated on the research field of AICRP for Dryland Agriculture, Dr. PDKV, and Akola since 2015-16. The present study was undertaken during 2016-17 with the cotton crop. The soil of the experimental site was moderately alkaline in reaction (pH 8.1). The nine treatments comprised of control, 100% RDF through chemical fertilizers and 100% NP + 10kg K(inorganic)+20kg K through gliricidia and 100% NP + 15kg K(inorganic)+15kg K through gliricidia in randomized block design with three replications. The results indicated that glyricidia green leaf manuring in combination with inorganic

fertilizers enhanced the SMBC, dehydrogenase activity, CO_2 evolution, alkaline phosphatase and yield of cotton. The application of 100% NP + 10kg K(inorganic)+20kg K through gliricidia was found to be beneficial for improvement in soil biological properties and yield of cotton in Vertisols.

Keywords: glyricidia green leaf manuring, cotton, inorganic

Abstract ID- 3022020047

Genetic Variability, Correlation, Heterosis, Combining Ability and Path Analysis for Yield and Quality Traits in Forage Sorghum [*Sorghum Bicolor* (L.) Moench] Hybrids.

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The present investigation was carried out during *Kharif* season of year 2017-18 at the Instructional Dairy Farm of GBPUAT Pantnagar. The experimental material was developed by mating seven pollinator parents (CSV 15, PC 5, 04K693, 04K 700, 01K 733, UPMC 8, 04K 668) of forage sorghum with ten cytoplasmic male sterile lines (ICSA 467, $11A_2$, HB94004 A, SPA_2 94012, ICSA 469, ICSA 271, 993100A, ICSA 276, ICSA 293, SP 55609 A) in line X tester mating design. The field experiment with 91 treatments including $70F_1$s, ten CMS lines, seven pollinator lines and four standard checks (CSH 20 MF, CSH 24 MF, SSG 59-3 and CSH 13) was planted in randomized block design with three replications. The observations were recorded on plant height, number of leaves per plant, leaf length, leaf width, leaf area, stem girth, total soluble solids, leaf:stem ratio, green fodder yield, dry fodder yield, HCN content and protein percent. The statistical analysis was carried out using analysis of variance, correlation, heterosis, combining ability and path analysis. The analysis of variance revealed highly significant genotypic differences for all the characters studied which clearly indicated the presence of sufficient variability for each trait in the experimental material. Correlation studies revealed significant genotypic and phenotypic correlations between yield and quality traits in desired directions. Variable magnitude of three types of heterosis (heterobeltiosis, mid-parent heterosis and standard heterosis) exhibited for various characters by different cross combinations indicated sufficient divergence in parental material for yield and quality traits. The variance ratio less than unity and near unity revealed preponderance of non-additive gene action and additive gene action respectively for different yield and quality traits. The different male sterile lines and testers exhibited variable *gca* and *sca* effects for yield and quality traits. Path analysis revealed different direct and indirect effects of various quality traits on green forage yield and HCN content. Based on these findings, we found that different crosses exhibited significant amount of heterosis and combining abilities for different yield and quality traits in desired directions. These findings may be helpful in developing forage sorghum hybrids in the future breeding programme for yield and quality traits.

Key Words: forage sorghum, heterosis, gca, sca and gene action.

Abstract ID- 3022020048

"Sarvera"- The Healthy Future of Wealthy Agriculture.

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In the era of 21st century, everything has been modified, so as the agriculture. Bio-prospecting of agricultural and horticultural produce is being emerged out. The scenario of present agricultural products is now changed. The people want healthy options for betterment of their life. So there is the need of advancement in value addition of our agricultural produce. "SARVERA" is the combination of 'Saragvo' and 'Javera' which are Gujarati words for Moringa and Wheatgrass respectively. It is the kind of value addition to our basic agricultural produce. With the advancement in the food habit, the nutritive value of food is decreasing, thus the requirement of such products is brought out. As we know in the ancient era, people were totally depending on the herbs and their by-products for the healthy lifestyle. Now the times come when we have to go back to that period and find out our roots. In the "SARVERA" juice of 'Javera" is enriched with powder of 'Saragvo' leaves. It can be the ready to serve fully nutritive drink for diabetic patient. It combines the medicinal value present in Wheatgrass and Moringa leaves, which is again beneficial for all, from growing kids to aged people. Along with that there is cultivation benefit also for making this product. As the Moringa is perennial tree, the spacing between the trees is well utilized by growing Wheatgrass in orchard, thus cultivation of Moringa can be complemented by this small scale product in unit of SARVERA, which will not require any high value installments plus it will leads to 'Best from the West' and 'Healthy Future of Wealthy Agriculture' . It will provide the way toward the sustainable secondary agriculture.

Keywords: Sarvera, Wealthy agriculture, Sustainable secondary agriculture.

Abstract ID- 3022020049

***In Vitro* Antibacterial Activity Of *Chrysopogon Zizanioides* (Vetiver) Against Dreadful Human Pathogens**

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Medicinal and their crude extracts were successfully used in chemotherapy for new drugs in curing many diseases due to their aromatic and therapeutic properties. In our present study *Chrysopogon zizanioides* (Vetiver), tall tufted perennial grass are used as active curing ailment against human pathogens. The extracts of root and leaf were obtained by using various solvents viz., methanol, chloroform and ethanol. The antimicrobial activity of various extracts from root and leaf were determined by agar well diffusion method. The minimum inhibitory concentration (MIC)of the extracts were tested by broth macro dilution method. The highest zone of inhibition was observed in methanol vetiver leaf and root extract against *B. anthracis*. The highest MIC value was observed in methanol extract of vetiver root and leaf against *B. antharics*.

Key Words: *Medicinal plants, Vetiver, Antimicrobial activity, MIC value.*

Abstract ID- 3022020050

Response of Organic Manures, Fermented Liquid Organics and Rhizobacteria on Various Soil And Plant Parameters in Bell Pepper

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Bell pepper or sweet pepper is most widely and popularly cultivated vegetable crop among the farmers of hilly region; requires temperature range from 21°C to 29°C; grown especially in the mid hills of Himachal Pradesh. The present investigation was carried out in the open field conditions in the experimental farm of Department of Soil Science and Water Management, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh; designed with Randomized Block Design and 7 different treatments. RDN is provided through Poultry manure and Vermicompost in 50:50 ratio with N equivalence, the PGPR is applied as seedling dip at the time of transplanting and fermented liquid manures (Amritpani, Jeevamrut and Panchagavya) is applied as 5% solution and applied as 50 ml per plant as soil drenching at 15 days interval repeatedly. The maximum plant height (583 mm), plant biomass (0.066 kg plant^{-1}) and fruit yield (270 q ha^{-1}) were significantly observed in T2 comprising 90 per cent of RDN along with fermented liquid manure and PGPR application but the root length (153 mm) was significantly recorded in the treatment T3 comprising 80% of RDN along with PGPR and fermented liquid formulation. The available nutrient status of soil i.e. macro nutrients viz. N (442 kg ha^{-1}), P (77 kg ha^{-1}) and K(290 kg ha^{-1}) and DTPA extractable micro nutrients viz. Fe (7.5 ppm), Cu(2.9 ppm), Zn(3.1 ppm) and Mn(2.8 ppm) were analysed and recorded significantly in treatment T2. The experimental evaluation concluded that the application of Poultry manure and vermicompost along with fermented liquid organics and PGPR was best among all treatments; significantly increased the plant production and biomass; also affect the available nutrient status of soil.

Keywords: Panchagavya, Jeevamrut, Amritpani, PGPR, Poultry manure and Vermicompost.

Abstract ID- 3022020051

Effct of Irrigation Regimes and Fertigation Levels on Yield and Economics of Turmeric

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The agronomic investigation entitled, "Effect of irrigation regimes and fertigation levels on yield, quality and soil properties of turmeric (*Curcuma longa* L.) was undertaken during 2012-13 and 2013-14 on clay loam soil at Irrigation Water Management Project, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar (M.S). The experiment was laid out in split plot design with three replications and nineteen treatment combinations comprising of three irrigation regimes viz., at 0.5 ET_C, 0.7 ET_C , 0.9 ET_C drip, and six fertilizer levels viz.,100 per cent general recommended dose of water soluble fertilizer through conventional fertilizer, 100 per cent general recommended dose of water soluble fertilizer - P and K basal conventional and N through drip, 100 per cent general recommended dose of water soluble fertilizer through drip, 75 per cent general recommended dose of water soluble fertilizer through drip, 50 per cent general recommended dose of water soluble fertilizer through drip. The application of 100 per cent general recommended dose of water soluble fertilizers (200:100: 100. N, P_2O_5 and K_2O + 25 t FYM ha^{-1}) produced significantly more fresh and dry rhizome yield than surface irrigation i.e conventional method during both the years and in pooled data. The gross monetary returns, net monetary returns and B : C ratio were significantly more under application of 100 per cent general recommended dose () of water soluble fertilizers in combination with irrigation regime 0.9 ET_C followed by 0.7 ET_C in combination

with 75 per cent of general recommended dose of water soluble fertilizers through drip than other irrigation and fertigation level combinations.

Keywords: Turmeric, yield, economics, irrigation, regimes, fertilizer

Abstract ID- 3022020052

Physiological Parameters Contributing to Stable Cane Yield and Ethanol Estimation in Sweet Sorghum"

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The investigation entitled, "Physiological parameters contributing to stable cane yield and ethanol estimation in sweet sorghum [*Sorghum bicolor* (L.) Moench]" was undertaken during *kharif* and *summer* 2017-18 at All India Co-ordinated Sorghum Improvement Project, MPKV Rahuri, (M.S) to identify photo thermo insensitive genotypes adoptable/suitable to both rainy (*kharif*) and post rainy (*summer*) season with high biomass in terms of green cane yield stability coupled with better juice quality parameters. The experiment was laid out in RBD plot design with two replications. Four sowing dates are E1-22nd June (timely *kharif*), E2-22nd July (late *kharif*), E3-1st February (timely *summer*), E4-1st March (late *summer*) were assigned as main plot with 23 genotypes and 1 hybrid of sweet sorghum. The observations on growth, phenology, physiology and dry matter production were recorded during crop growth period. The data on juice yield and yield contributing characters were recorded at physiological maturity. The growth studies indicated that, the plant growth parameters *viz.,* plant height, number of leaves, leaf area and stem girth were highest in June (timely *kharif*) sowing date followed by July (late *kharif*) sowing date. The phenological studies indicated that the lowest mean number of days required for panicle initiation and 50% flowering was observed in the month of June (timely *kharif*) sowing date in overall experiment. The photoperiod sensitivity, heat unit and heat unit efficiency were computed as per the standard formulae. The photoperiod sensitivity studies revealed that the sweet sorghum genotypes RSSV-430 (1.25%), RSSV-269 (3.19%), RSSV-313 (5.26%) displayed lower magnitude of photoperiod sensitivity among the genotypes studied indicating their photoperiod insensitivity for respective seasons. The genotypes RSSV-503 (2.74%) timely *kharif* flowering to late *kharif* flowering, RSSV-503 (5.48%) timely *kharif* flowering to timely *summer* flowering and RSSV-350 (8.11%) timely *kharif* flowering to late *summer* flowering which displayed higher magnitude of photoperiod sensitivity indicating they are sensitive for respective seasons. The physiological parameters *viz*., photosynthetic rate, canopy temperature, transpiration rate, stomatal conductance and PAR were highest in March sowing (late *summer*) and lowest in June sowing (timely *kharif*). The leaf, stem, panicle and total dry matter (g/plant) recorded at physiological maturity stage which was highest in the month of June sowing (timely *kharif*) followed by July sowing (late *kharif*). The biochemical parameters *viz*., ^{0}brix, juice yield (l/ha), reducing sugar (%), non-reducing sugar (%), total sugar (%), computed ethanol (l/ha) were higher in June sowing (timely *kharif*) and lowest in March sowing (late *summer*). In cane yield and its components, the hybrid RSSH-50 recorded highest stalk girth, fresh biomass yield (t/ha), green cane yield (t/ha) in June sowing date *i.e* (timely *kharif*) followed by July sowing (late *kharif*). Data on grain yield revealed that, the highest grain yield was observed during June sowing (timely *kharif*) season than *summer* season. The harvest index (%) was lowest during March sowing (late *summer*) season. Significant differences were observed among the sowing dates and genotypes in case of grain yield (kg/ha) and harvest index (%). The significantly highest mean number of grain yield (603.19 kg/ha) and harvest index (20.34%) were recorded in the month of June, while lowest mean grain yield (385.58 kg/ha) and lowest mean harvest index (13.97%) were recorded at March sowing date. The stability studies from the environmental indices observed that June sowing date indicating favorability for green cane yield while, July, February and March sowing dates were unfavorable for this trait. Among the 23 sweet sorghum genotypes and 1 hybrid the genotypes RSSV-493, RSSV-540 shown below average stable performance whereas, RSSV-

386, RSSV-466, RSSV-454, RSSV-269, RSSV-512, RSSV-430, CSV-19SS exhibited average stable and RSSV-260, hybrid RSSH-50 showed unstable performance for different environment.

Keyword: Physiological, cane, yield, ethanol, sweet sorghum

Abstract ID- 3022020053

Challenges and Opportunities of Sustainability in Agriculture

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Agriculture serves as most important livelihood sector for people of India. International Food Policy Research Institute (IFPRI) released report on Global Hunger. As per the report India has been placed at 102nd place out of total 117 countries in 2019 with score 30.3 shows the place of our country found in serious category. The neighbor countries like Nepal, Bangladesh, and Sri Lanka are better in hunger score. Increasing population and related food demand always remain the major challenges for our country. The green revolution during 1966 led to substantial increase in agricultural yield but at the cost of natural resource degradation. The application of fertilizers and pesticides led to a considerable decline in soil fertility and environmental resilience. The existing condition of agriculture and trend of various indicators show serious concern over future of Indian agriculture. It calls for a integration of different approach which should inculcate the farmers to utilize their traditional knowledge to produce more grains by using less environmental degradation. Sustainable agriculture is a prime need for developing India for the sustained development. The sustainable agriculture meets the needs of present generation without foregoing the needs of future generations. Thus, sustainable agricultural practices are supposed to be resource-conservative and resilient to the present climate change scenario. In the same line, a brief insight has been developed on the concept and requirement of sustainable agriculture, a critical analysis in terms of challenges and opportunities for overall sustainability of India. The study also focuses on the development of integration of traditional and modern technologies for maintaining the balance between society and environment.

Keywords: Global Hunger Report, agriculture, green revolution, environmental degradation and sustainability.

Abstract ID- 3022020054

Seed Spices Export from India:Prospects and Challenges

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India is the largest producer, consumer and exporter of seed spices. The seed spices constitute an important group of agricultural commodities, playing an important role in our national economy. Spices are used not only to add flavour to foods and beverages, but as medicines, disinfectants, incenses, stimulants and even as aphrodisiac agents. Total 109 spices are listed by International Standardization Organization and 63 spices are grown in India and out of which 20 are being classified as seed spices. The seed spices are well distributed over different agro-climatic regions in India. The major growing belt of seed spices spreads from arid to semi-arid regions, covering large areas in Rajasthan and Gujarat, which contribute more than 80 per cent of total seed spices production in the country. Indian spices export has been able to record strident gains in volume and value. During 2018-19, a total of 11,00,250

tons of spices and spice products valued Rs. 19505.81 crore (US $2789.50 Million) have been exported from the country as against 10,28,060 tons valued Rs.17980.16 crore (US$ 2789.35 Million) in 2017-18, registering an increase of 7 % in volume and 8% in rupees terms and 6% in dollar terms of value. Looking into the importance of deed spices export for India present study focuses on identification of prospects and challenges faced in seed spices export. The export performance of a country is determined by the growth in world demand. Reduction in exportable surplus on account of increasing domestic demand, dependence on nature, low technology infrastructure and arbitrary imposition of standards and stringent food laws by importing countries are the major challenge with the spice industry in India. Export promotion being one of the main factors for economic growth.

Key words: Seed Spices, export.

Abstract ID- 3022020055

Organic Vegetable Cultivation

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Well-managed organic vegetable production systems can provide food security and healthy diets for humans, while being less harmful to the environment. For many centuries, humans farmed without synthetic biocides or inorganic fertilizers, relying on organic fertilizers derived from plants and animals, and protecting crops from pests and diseases using naturally-occurring materials. From the second half of the nineteenth century growers around the world successfully developed and refined farming systems that relied on synthetic biocides or inorganic fertilizers. Organic cultivation on the production quantity and quality characteristics of vegetables. Analyses of studies reported in the literature showed the following: (1) Organic cultivation affected the growth of vegetables positively in 43% of studies and negatively in 57% of studies. (2) Organic cultivation affected the yield of vegetables 59% positively, 29% negatively and 12% did not have any significant influence. (3) Organically grown vegetables have, in most studies (65%), better nutritional value than conventionally grown ones; 20% were not significantly different and only in 15% was there a reduction in nutritional value. Nitrate levels were lower in 86% of studies with organic cultivation and greater in only 14% of studies. (4) Organic cultivation of vegetables uses a variety of methods for disease and insect control: hot water, hot air and electron treatment, biological seed treatment groups like microorganisms, plant extracts and inducers of resistance, solarization for nematode control, biopesticides, insect net. (5) Weed control is the most difficult part of vegetable production in organic cultivation. (6) Efficient methods against weeds are tillage, mulching, flaming, hot water treatment. If the proper technology is used, the organic cultivation of vegetables is not so time- and money-consuming and produces vegetables of better quality and nutritional value with no pesticide residues.

Key Words: Organic Vegetables, Mulching, Solarization, Nutritional Value, Synthetic biocides.

Abstract ID- 3022020056

Effect of Drip Irrigation Levels and Planting Geometry on Growth and Flowering Attributes of Gladiolus

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Land and water paucity are major constraints to crop production. These both are limiting factors for to meet the global demand in the mid-twenty-first century. Water significantly affects the growth and

development of flowering plants and is needed in sufficient amount to ensure optimum yield. Water usage is a vital factor for all agricultural crops as well as for floricultural crops. In many areas, water use is unsustainable; water supplies are also under pressure from other consumers and are being affected by agro-climate change. Much effort is being made to reduce water use by crops and produce 'more crop per drop'. To obtain the best quality of flowers, it is essential to supply optimum level of water whenever it is required. The experiment comprising of five drip irrigation levels and four plant densities as treatments in different combinations was conducted at Precision Farming Development Centre of the Department of Horticulture, CCS Haryana Agricultural University, Hisar during the years 2015-16 and 2016-17. The objective was to find out the most effective irrigation level and plant geometry for gladiolus. The experiment was laid out using Randomized Block Design (factorial) and the data were recorded on several attributes *viz.*, plant height, length of spike, length of rachis, number of florets per spike. All these attributes were registered maximum under the treatment of 12 mm water applied after 10 mm of CPE (Cumulative Pan Evaporation) irrigation level with the planting geometry of 32 plants/m^2. The days taken for emergence of spike, showing color of basal floret and opening of first and fifth floret were recorded minimum at lowest level of irrigation in combination with plant geometry of 20 plants/m^2.

Key words: Gladiolus, irrigation levels, plant geometry, CPE, growth, flowering

Abstract ID- 3022020057

Identification of Promising Recombinant through Transgressive Segregation and Inter-relationship Analysis in Chickpea

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Chickpea is the second most important pulse crop in the world after dry bean. This crop has high productivity and holds prominent position in the international food grain trade. The aim of this study was to identify transgressive segregants and to estimate the correlation coefficients for yield and yield components under the climate change in F_2 population of cross PG-13107 x BDNG-797 in chickpea. Three generations of chickpea of the cross PG-13107 x BDNG-797 were evaluated at Botany Section Farm, College of Agiculture, Dhule (Maharashtra) during *Rabi*, 2017. The field experiment was arranged in a randomized block design (RBD) with three replications. In most of the transgressive segregants, better parent yield was transgressed with transgression of one or several other characters. In general, highest proportion of transgressive segregants were recorded for grain yield per plant (20) followed by plant height (19), number of pods per plant (16), plant spread (15), number of seeds per pod (14), number of primary branches per plant (13), 100-seed weight (11), and number of secondary branches per plant (10). In most of the transgressive segregants, better parent yield was transgressed simultaneously with transgression of one or several other characters. Simultaneous transgression of grain yield per plant in association with plant height, number of primary branches per plant, number of secondary branches per plant, plant spread, number of pods per plant and 100-seed weight was observed more frequently. It was concluded that either grain yield per plant is dependent on this character or there may be linkage drag, so that genes responsible for these characters move together. The most promising transgressive segregants observed in F_2 generation of cross PG-13107 x BDNG-797 were plant no. 30. Phenotypic correlation of grain yield per plant with nine other characters studied in F_2 generation of the cross indicated, significant and positive correlations with number of primary and secondary branches per plant, plant spread, number of pods per plant, number of seeds per pod and 100-seed weight. These characters also showed significant and positive correlation among themselves uniformly. From the above observations the improvement in grain yield of chickpea appears to be possible by selection through aforesaid characters.

Key words: Transgressive segregation, Correlation coefficient, Chickpea

Abstract ID- 3022020058

Beekeeping Practices and Organic Honey Production: A Case Study in Garhwal Himalaya.

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Agriculture is the main occupation of livelihood in India but as it is well known fact that around 65% of India's agriculture depending on rain and more than half the population on agriculture. Currently the agriculture sector is going through most stressed phase in the last couple of years. Although agriculture is most important and must be maintained, there are so many problems faced by this sector but the two main issues that may influence the success of future agriculture are loss of agricultural land and decrease in important crop varieties and livestock population. To cope with the loss in agriculture farmers may shift their occupations and applying new and non-farming based occupations.
Beekeeping is an income generating activity for farmers. It gives direct benefit and supply chain of beekeeping products- are honey, bee wax, pollen, royal jelly and bee venom. The production system of beekeeping is environmentally friendly and economically sustainable. Bees plays very important and significant role as pollinator in the environment and provides positive impacts on fauna and flora found within. Keeping in view the idea, Shivalik Natural Product was started as a honey production centre in the Uttarakhand Tarai Bhaber and Garhwal Himalaya with the mission of supporting beekeepers to organic honey production from Apiary. It is an equitable, economically and environmentally sustainable system and also purely organic based pioneering system of its own kind in Uttarakhand Himalaya region. Thus Beekeeping may provide a simple, easy, and profitable source of income without any technical training and land.

Abstract ID- 3022020059

Influence of Planting Methods, Mulching Materials and NAA Application on Growth and Yield Components of Bell Pepper (*Capsicum Annuum* L.)

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A two year field study was conducted in Himachal Pradesh during the year 2017-18 and 2018-19 in order to evaluate the effect of planting methods, mulches and NAA application on growth and yield components of bell pepper (*Capsicum annuum* L.). Results showed that planting methods, mulch materials and NAA levels significantly influenced the yield and yield contributing traits. Raised bed planting method proved best for maximum plant height (66.58 cm), minimum days to 50 per cent flowering (30.79), maximum fruit length (6.61 cm), fruit breadth (5.62 cm), fruit weight (46.93 g), number of fruits per plant (23.50), yield per plot (46.46 kg) and per hectare (327.74 q). Silver/black polythene mulch also have significantly tallest plants (71.08 cm), minimum days to 50 per cent flowering (28.79), maximum fruit length (6.86 cm), fruit breadth (5.96 cm), fruit weight (46.90 g), number of fruits per plant (24.32), higher yield per plot (49.93 kg) and yield per hectare (352.22 q). NAA application @ 15 ppm at 30 and 45 days after transplanting have significantly maximum plant height (67.23 cm), minimum days to 50 per cent flowering (30.26), maximum fruit length (6.73 cm), fruit breadth (5.71 cm), fruit weight (47.21 g), number of fruits per plant (24.03) yield per plot (47.83 kg) and yield per hectare (337.45 q). As for as the interaction of planting methods, mulches and NAA levels is concerned, the maximum plant height (73.96 cm), least number of days to 50 per cent flowering (26.89), maximum fruit length (7.29 cm), fruit breadth (6.31 cm), fruit weight (50.06 g), number of fruits per plant (25.95), yield per plot (54.53 kg) and yield per hectare (384.69 q) was noticed under raised bed planting method coupled with silver/black polythene mulch and NAA application @ 15 ppm at 30 and 45 days after transplanting.

Abstract Id- 3022020060

Variation in Forest Biomass and Carbon Stock Along Altitude and Aspects in Temperate Natural Forests of Western Himalaya, India

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Forest grow and their biomass increases; they absorb carbon from the atmosphere and store in plant tissue. In this present study, three different altitudinal ranges (<1800m, 1800-2100m and >2100m) were selected in four different aspects viz., northern, southern, western and eastern. At each altitude has three replications in each aspect. However, thirty-six plots were enumerated above and below ground biomass, total biomass, carbon stock, vegetation carbon densityand shrub, herb biomass in this study. The above ground biomass ranged between 112.20 t ha^{-1} at 1800-2100m on northern aspect and 22.55 t ha^{-1} at >2100m on southern aspect. The below ground biomass ranged between 49.21 t ha^{-1} at 1800-2100m on northern aspect and 17.53 t ha^{-1} at >2100m on southern aspect. Shrub biomass ranged between 1.29 t ha^{-1} at >2100m on northern aspect and 2.84 t ha^{-1} at <1800m on southern aspect. Maximum herb biomass (3.99 t ha^{-1}) was reported at 1800-2100m on southern aspect and minimum herb biomass (2.34 t ha^{-1}) was found at >2100m on northern aspect. Higher carbon stock (80.71 t ha^{-1}) was detected at 1800-2100m on northern aspect and least carbon stock (20.04 t ha^{-1}) was observed at >2100m on southern aspect. The maximum vegetation carbon density (83.47t C ha^{-1}) was found at middle altitudinal range on northern aspect and the minimum (21.85 t C ha^{-1}) at >2100m altitudinal range on southern aspect. Our result reveled that, maximal biomass and carbon stock at 1800-2100m on northern aspect and minimal at >2100m on southern aspect. However, this study followed the trend of decrease biomass with increasing altitudinal range.

Keywords: Tree biomass, Carbon stock, Altitude, Aspect

Abstract ID- 3022020061

Horticulture Enhance Farmer's Income

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Diversification is an integral part of the process of structural transformation of an economy. It is basically understood as signifying the shift from the agricultural to the industrial domain. Though the former type of diversification indicates shift from one crop to another crop or from one enterprise/sub-sector to another enterprise/sub-sector, the other type of diversification may involve income-enhancing enterprises in addition to the existing ones. Agricultural diversification towards high-value crops can potentially increase farm incomes, especially in a country like India where demand for high-value food products has been increasing more quickly than that for staple crops. Horticulture emerged as a one of the fastest growing sector within agriculture during last few decades. The sector has not only triggered the India's agricultural development but has also offered wide ranges of choices to farmers to enhancing their farm income. India witnessed the shift in area from food grain towards horticulture crops over last five years. During 2017-18 horticultural produce surpass the total food grain production. Agriculture has met the goal of food security with surplus food grain production; however, there is a need to assure the nutritional security, along with the gains in farmer's income. Value is important for generating high income of farmers, but according to DFI committee, no direct correlation among area and value is observed. In case of field crops, it is observed that 42 per cent of the area is under major cereal crops

(rice, wheat and maize) contributing only 20 per cent in the value of output, and just 7 per cent area is under horticultural crops but contributes 25 per cent to the value. Owing to the increasing population over the years, demand for food is naturally expected to increase in coming years. Various studies have projected that demand for fruit and vegetable increasing rapidly. Furthermore, the probability of participation in fruits and vegetable cultivation and allocation of land to horticulture decreased with size of land holding. It is necessary to increase the area under cultivation of horticulture commodities along with adaptation of new technology to bridge demand gap.

Keywords: Diversification, Fruits and vegetable

Abstract ID- 3022020062

The Potential Ripening Mutants for Increasing Storage Life of the Tomato

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Tomato is one of the most widely cultivated and consumed vegetable crop in the world. India is second largest producing country in the world. It also referred as "Poor man's orange" and "Protective Food" due to its special nutritive value. Demand for tomato fruit increasing day by day but tomato have poor storage life due to the highly perishable nature. Several post-harvest treatment for prolong storage life include use of gibberellic acid, calcium chloride, potassium and salicylic acidwith chlorine it show decline in fruit decay and weight loss in tomato. To overcome this problem few ripening mutant identified and include slow-ripening alcobaca (*alc*), ripening inhibitor (*rin*), non-ripening (*nor*), green-ripe (*gr*) and never ripe (*nr*).These single recessive gene mutants alter respiration, ethylene evolution, pectolytic enzyme activities, pigment concentrations and modify ethylene's downstream effects on specific biochemical processes related to fruit ripening also take longer to transition from mature green to red ripe stages as compared to normal genotypes.Ultimately fruits from these mutant alleles having longer shelf-life than normal ripeningcultivars and gives higher prices due to scarcity in market.

Keywords: Ripening mutants, Storage life, Post-harvest, shelf-life, Biochemical processes

Abstract ID- 3022020063

Effect of Organic Manures and Biofertilizers on the Growth, Yield and Fruit Quality of Strawberry (*Fragaria × ananassa*) cv. Jutogh Special Under Mid Hill Conditions of Uttarakhand

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The present investigation entitled "Effect of Organic Manures and Biofertilizers on Growth, Yield and Fruit Quality of Strawberry (*Fragaria* × *ananassa*) cv. Jutogh Special Under Mid Hill Conditions of Uttarakhand" was carried out at the Fruit Nursery, College of Horticulture, VCSG UUHF, Bharsar, Pauri Garhwal during the month of Aug2018 to June 2019. The experiment comprising ten treatments and three replications having different organic manures and biofertilizers laid out in Randomized Complete Block Design. In present investigation it was observed that the treatment combination T_8(FYM @10t/h + Vermicompost @2.5t/h + *Azotobacter* @2.5kg/h + PSB @2.5kg/h) was found best for plant growth, yield and quality *viz.*, plant spread (22.167cm), leaves per plant(21.60), leaf area(32.63cm^2), no. of runners per plant(14.20), no. of flower per plant(27.98),duration of flowering (63.38 days), fruit set per cent (89.97%), duration of fruiting (89.97days), fruit yield per plant (342.79g), fruit yield per plot (2.06kg), fruit length (4.70cm), fruit breadth (2.89cm), average fruit weight (13.62g), Fruit volume (6.83cc), TSS

(11.80^{0}B),titrable acidity(0.387), ascorbic acid (61.26%), reducing sugar (6.013), non-reducing sugar (2.33), total sugar (9.367), anthocyanin content (59.38 mg/ 100 mL). The gross return (Rs. 3,090,000), net return (Rs.2,348,670) and B:C Ratio (1:3.1) was also found highest under the treatment T_8 which contain FYM @10t/h + Vermicompost @2.5t/h + *Azotobacter* @2.5kg/h

Abstract ID- 3022020064

Medicinal and Aromatic Plants in Himachal Pradesh

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Himachal Pradesh despite being a small state has lot of plant biodiversity especially of medicinal and aromatic plants because of its location in western Himalayas. Collection of a large number of crude drugs has been in vogue in state since ancient times and the tradition is being continued till date. The flora of Himachal Pradesh consists of around 1600 plant species. Of these, about260 species are attributed to medicinal value and another 100 species are aromatic in nature.State is one among the major suppliers of medicinal and aromatic plants in the Indian market. More than forty species, enlisted by the state forest department, are exported from the state fore.g. atish, salampanja, dhoop, kutki, daruhaldi, talispatra, revandchini, bach and somlata .But the actual list of products could well be much longer.Collection and selling of medicinal plants occupy an important place in the household economy inrural Himachal Pradesh. Because of this there is tremendous pressure on wild populations and only a few crops like kuth, kalazeera,kesar,hops are cultivated in Lahaul –Spiti and Kinnaur. Therefore It is suggested that the herbal resources of the State should be scientifically documented, commercial cultivation initiated combined with value addition for ushering in economic prosperity to the people of this hill state.

Abstract ID- 3022020065

To Study Soil Organic Carbon Stock and Carbon Sequestration in Sal Forest of Doon Valley

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Developing technologies to reduce the rate of increase of atmospheric concentration of carbon dioxide (CO_2) from annual emissions of 8.6Pgcarbon per year from energy, process industry, land-use conversion and soil cultivation is an important issue of the twenty-first century. One of the possible solution of this problem is carbon sequestration. Carbon sequestration implies transfer of atmospheric CO_2 into other long-lived global pools including oceanic, pedologic, biotic and geological strata to reduce the net rate of increase in atmospheric CO_2. Engineering techniques of CO_2 injection in Deep Ocean, geological strata, old coal mines and oil wells, and saline aquifers along with mineral carbonation of CO_2 constitute abiotic techniques. These techniques have a large potential of thousands of Pg, are expensive, have leakage risks and may be available for routine use by 2025 and beyond. In comparison, biotic techniques are natural and cost-effective processes, have numerous ancillary benefits, are immediately applicable but have finite sink capacity. An excellent type of biotic technique is storing excess carbon dioxide in forests. Several studies have established the fact that carbon sequestration by trees could provide relatively low cost net emissions reductions. Different plant species have different capacity of carbon sequestration. My present study is on soil organic carbon stock and carbon sequestration in Sal forest. Sal a fairly large deciduous tree is found in forests covering about 12 million ha, representing about 16% of the total forested area .Soil organic carbon pool in sal forest of Garhwal Himalayas was found to be 60.07 tonne per hectare.

Abstract ID- 3022020066

Diversity of Dragon Fruit in India

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Dragon fruit (*Hylocereus* spp.) commonly known as pitaya cultivated from last 10-12 years in India but still considered as an exotic fruit. It is native to South Americaand it was broughtto west Bengal as an ornamental plant in 2002.Red skin dragon fruit belongs to *Hylocereus undatus* genus cultivated in Maharashtra,Gujrat, Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal and Rajasthan.Yellow skin dragon fruit belongs to *Hylocereus megalanthus* which is known as pitaya. Most common species is *undatus* which is white flesh and red skin found all around growing regions in India. *Hylocereus polyrhizus* have red skin and pinkish-red pulp fruit dragon fruit is grown in Maharashtra, Gujrat, Karnataka and west Bengal. *Hylocereus costaricensis* have red skin and violet colored flesh of dragon fruit found in Kerala. It can be cultivated in arid zone where the irrigation facilities are limited and rain fall is less in such area it can gives fair income to the farmers at lower management cost. This fruit crop has potential to be cultivated in non – conventional area where it has been not so popular.

Abstract ID- 3022020067

Reproductive Behavior of *Cedrus Deodara* (Roxb.) G. Don along an Altitudinal Gradients in North-Western Himalaya

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The study on "Reproductive behavior of *Cedrus deodara* (Roxb.) G. Don along an altitudinal gradients in north-western Himalaya" was taken under four altitude range of <1800 masl (L_1), 1800-2100 masl (L_2), 2100-2400 masl (L_3) and >2400 masl (L_4) of Himachal Pradesh. Variation in reproductive traits with respect to cone and seed parameters was studied. The highest dimensions of cones of in relation to cone weight (146.82 g), cone length (9.53 cm), cone diameter (7.04 cm), 100 seeds weight (10.49 gm), number of seeds/cone (155.54), seed weight/cone (16.18 gm) was recorded at L_2 (1800-2100 masl) and the minimum was observed at L_4 (>2400 masl) at higher altitudinal range. This study revealed that the highest values of seed viability (76.86%), germination per cent (74.49%), germination capacity (78.56%) and germination energy (40.55%) were recorded at L_2 (1800-2100 masl) the lowest values was found at L_1 (<1800 masl). However, the minimum germination energy was found at L_4 (>2400 masl). The present study is in conformity with these studies that the middle altitudinal range (1800-2100 masl) was found superior and might be the better site selection for collection of cone and seed of *C.deodara*.

Key wards: altitudinal gradients, reproductive traits, *Cedrus deodara, germination*

Abstract ID- 3022020068

Role and Opportunities of Nano Technology for Mitigation of Arsenic Contamination in Bihar

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Arsenic is one of the most dangerous heavy metal contaminating ground water and further leading to contamination of soil and food chain as secondary and tertiary contamination over about forty percent districts of Bihar. Long term uptake of arsenic contaminated water or food for causes skin, bladder, kidney and lung cancer, disease of leg & feet blood vessels with reproductive disorders as well as (WHO

2010). About 67 out of 534 blocks in Bihar are facing severe arsenic contamination as per BIS standards (less than 50 ppb), And as per WHO standards(less than 10 ppb) more than 13 million peoples are affected with direct or indirect arsenic contamination.With the development of nanotechnology,research scientists used modified nano particles for treatment of arsenic contaminated water and mitigation of arsenic effected soils. According to Liang and Zhao,starch stabilized magnetite nanoparticles are found to be effective for enhancing sorption and immobilization of arsenate As(V).Results shown that amount of water leachable As(V) was significantly decreasedunder *insitu* soil conditions. Amorphous zirconium oxide nano particles and zero valent iron(ZVI) nano particles are also found to be effective in mitigation of arsenic in soil system. Nanotechnology also offers extremely efficient, less expensive methods forwater treatment, which may be adopted without using high cost, largeinfrastructures to overcame the currently faced water purification problems. Still there is a huge opportunities for research and adaptabilityfor use of nanotechnology in arsenic mitigation. Residual effects of ZVI or nanoparticles is still unknown, which is limiting use of nanoparticles for Arsenic mitigation.

Key words:- Arsenic, Nanotechnology, Nanoparticles, ZVI, Water purification , Arsenic mitigation.

Abstract ID- 3022020069

Doubling the Farmers' Income By 2022"- Strategies and Constraints

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Agriculture is the backbone of Indian economy. More than 70 percent of the country's population is agrarian. But beyond the time tested and ancestral farming techniques, the farmers are not given any formal training to upgrade their skills to increase their farming yield and income. The NSSO data on consumption expenditure Survey for the year 2011-12 reveals that more than one fifth of the rural households with self-employment in agriculture as their principal occupation were having income, less than poverty line (NSSO report, 2014). Farmer's income also remained low in relation to income of those working in the non-farm sector. The low and highly fluctuating farm income is causing detrimental effect on the interest in farming and farm investment, and is also forcing more and more cultivators, particularly younger age group, to leave farming. This can cause serious adverse effect on the future of the agriculture in the country. Realizing the need to pay special attention to the plight of farmers, the Central Govt. changed the name of Ministry of agriculture to Ministry of Agriculture and Farmers Welfare in 2015 (Sharma NL, 2017). In this background, the goal set by the Prime minister to double farmers' income by 2022-23 is central to promote farmers' welfare, reduce agrarian distress and bring parity between income of farmers and those working in non-agricultural profession. The goal of doubling the income of the farmers by 2022 cannot be achieved by increasing the production only, but has to be accompanied by improvement in infrastructure, policy support, marketing and value addition. Doubling real income of farmers till 2022-23, over the base year of 2015-16, requires annual growth of 10.41% in farmers' income. This implies that the on-going and previously achieved rate of growth in farm income has to be sharply accelerated. Therefore, strong measures like improvement in productivity, saving in cost of production, increase in cropping intensity and diversification towards high value crops will be needed to harness all possible sources of growth in farmers' income.

Key words: Agriculture; diversification; farming; infrastructure

Abstract ID- 3022020070

Detection of Mycotoxins from Some Endophytic Ascomycetes Fungi

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The immense importance of endophytic fungi in industries has attracted the attention of researchers for their chemical and biochemical properties. Some of ascomycetes fungal species like *Penicilium*, *Aspergillus*, *Neurospora* are the novel source of secondary metabolites such as mycotoxins, tannins, alkaloids, terpenoids, etc. Some of the secondary metabolites are useful in pharmaceutical industries for drugs production whereas some mycotoxins are screened to be harmful in most of the cases, hence, it becomes imperative to know the biochemical aspects of fungi regarding usage. This study involved screening of mycotoxins from some endophytic ascomycetes fungi *viz.*, *Fusarium solani*, *Penicilium chrysogenum*, *Xylaria* species, *Daldinia* species and *Geotrichum candidum* through Thin Layer Chromatography (TLC) techniques. In TLC, different solvent systems were used for extrication of compounds/mycotoxins based on their colours. The identification of mycotoxins was done by toning the colours on the TLC plates as per standard methods and protocols. The probable identified mycotoxins were Zearlenone (faint blue), Citrinin (yellow or bright yellow) , Aspertoxin (pink), Nivalenon acetate (orange) and Diacetoxiscipenol (brown). These kind of studies can be helpful in categorizing any wild fungal species as toxic or non toxic and either edible or inedible. There are also some mycotoxins that possess medicinal properties and some are harmful, thus, this detection can open new vistas and prospects of new fungal source/s of medicinally important compounds/mycotoxins. The future proposal of this study is to further identify the particular mycotoxin/s available in target fungal species by standardizing the isolation and identification through advance techniques.

Keywords: *Daldinia* species, *Fusarium solani*, *Geotrichum candidum*, *Penicilium chrysogenum*, TLC, *Xylaria* species.

Abstract ID- 3022020071

Role of Indigenous Knowledge in Inclusive Agriculture Development

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While India was facing food insecurity, to attain self-sufficiency in food a new agricultural strategy was put into practice in kharif season of 1966 which was High-Yielding Varieties Programme (HYVP). As Green revolution is considered as radical during that time but it partly solved the problem of food and fibreneeds, appeared to be too expensive, as the costs of technology transfer, soil erosion andloss of plant genetic materials that were resistant to diseases were high.World population is steadily increasing, poverty is growing and natural resources are degrading. Some 550 million of the1370 million hectares of global arable land have suffered degradation as a result of non-sustainable cultivation in this regard; indigenous knowledge or traditional knowledge and traditional agriculture practices are believed to have been very sustainable. Indigenous knowledge has contributed to major developments in agriculturesuch as the domestication of crops and livestock, the development of animaltraction, and the dissemination of species around the world.The integration of scientific and

traditional knowledge would help to develop technologies that are need based better problem solving, locally available easily acceptable, cost effective, convincing and credible to the rural clientele.

Abstract ID- 3032020072

Multivariate Analysis of Seed Vigour Parameters in Late Sown Wheat (*Triticum Aestivum* L. Em. Thell)

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An experiment was conducted during *Rabi* 2017-18 at reasearch area of Wheat and Barley section, Department of Genetics and Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar to determine variability parameters, correlation, path coefficient and principal component analysis for seed vigour parameters *viz.* standard germination, seedling density, seedling length, seedling dry weight, seedling vigour index I, seedling vigour index II, 1000 grain weight and grain yield plot^{-1}. The analysis of variance (ANOVA) uncovered a wide range of variation existing in the material studied. The highest phenotypic and genotypic coefficient of variance (PCV and GCV) recorded for seed vigour index II (21.16 and 20.95 respectively), moderate values for seed density, seedling length, seedling dry weight and seed vigour index I. The maximum value for heritability (broad sense) was found for seed vigour index II (98.77 %) whereas grain yield plot^{-1} had moderately high (62.09 %) heritability. The correlation analysis revealed that there is positive significant correlation between standard germination and seedling density, seedling length, seedling dry weight, seedling vigour index I, seedling vigour index II and 1000 grain weight. The results of path analysis for seed vigour parameters reported that seed vigour index I estimated highest direct positive effect on grain yield plot^{-1} followed by seed vigour index II , 1000 grain weight and seedling density. The Principal Component (PC1 and PC2) having Eigen value >1(significant), accounted 64.70% of total variation. Maximum value was explained by component 1 with 50.5 % of total variation.

Keywords: Correlation, Path analysis, Principal component analysis, Seed vigour parameters and Wheat

Abstract ID- 3032020073

Doubling of Farmer's Income through Value Chain Analysis of Major Pulses in Bihar: An Analysis

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The Study has been attempted to examine the scope of enhancement in farm income through the integrated approach of market network. The market map frame work was used to identify and analyses the value chain that enables suitable policy formulation on product specific market. The analysis of value chain revealed that 90% of farmers sold their produced to the village trader/in local market to meet the operational expenditure. Producer's share in consumer rupees was 60% through which most of the major pulses were marketed by the famers in study area. Value addition network indicated that producers fetched a reduced price due to their lack of bargaining power and the profit realized by the market intermediaries is as high as Rs. 91/kg. Appropriate backward and forward linkages of pulse growers will enhance returns from pulses. The non-availability' of dal mills /processing plants in specific location followed by lack of suitable pulse variety, storage problem, lack of market information for forward linkage with other markets were major constraints faced by the farmers in the study area. Further it was also noted that 30 percent of the produce was wasted and lost every year before it reached to the market. The study concludes with some policy suggestions like the farmer should adopt seed replacement

technology in every year to ensure higher productivity, to realize remunerative prices for their produce, the farmer should link with efficient system of marketing as well take some value addition at household level. To increase the area under pulses, diversification of chickpea is one of the reliable options with new technology interventions (improved seed, package and practice).The co-ordination of research extension and farmers to encourage farmer's participatory research along with enabling environment to get remunerative prices is need of the hourfor doubling offarmer's income.

Keywords: Backward linkage, forward linkage, consumption, cost of cultivation, pulse, value chain Analysis,

Abstract ID- 3032020074

Tip-Pruning for Synchronized Vegetative Growth and Regular Bearing in Mango

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The mango (*Mangifera indica* L.), commonly known as 'King of the fruits' and it is most important fruit crop in tropical and subtropical regions of the world. It is one of the oldest and most popular fruit crop having delightful flavor and taste, because of these feature it is ranked as one of the choicest fruits in the national and international markets. India is the leader producer sharing 39.4 per cent of the world's mango production. As it is seasonal in nature demand for fruit increasing day by day. Its early production can gives higher prices in the market. Proclimatic aberration especially initiation of flowering in mango result in production of vegetative shoots instead of flowering panicle which delay harvesting and alternate bearing. It is one of the main hurdles in maximizing fruit production thus causing a major threat to the expansion of mango industry. To address this problem tip pruning practiced, it gives early maturity by converting vegetative shoots into flowering and regular bearing in mango. Tree was tip pruned just below first node after crop harvest and thereafter drenched with paclobutrazol @ 3.2 ml/m canopy diameter during September. It was also performed in October to study its effect on panicle emergence bypassing vegetative flushing. Thus whole tree tip pruned after harvest of 'on' year fruits followed by soil drenching with paclobutrazola month prior to flower bud differentiation to gives regular flowering and fruiting during 'off' year. Plants treated with tip pruning showed a higher flowering percentage. Branch tip pruning increased the number of fruits per branch, fruit quality and also help in canopy management.

Keywords: Alternate bearing, Flowering panicle, Tip pruning, Vegetative shoot

Abstract ID- 3032020075

Conservation of *Litsea glutinosa*: An Endangered and Threatened Medicinal Tree of North-West Himalayas

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Litsea glutinosa (Lour) C.B. Robinson is semi-evergreen, multi-purpose, drought resistant, tree species belongs to family *Lauraceae*. It found throughout Asia including several regions of Bhutan, China, Nepal, Myanmar, Philippines, Thailand and Vietnam. The species is reported under endangered category by IUCN. Excessive removal of species from natural population at a tremendous rate therefore conservation technique were developed to save the species therefore propagation of species were carried out through seeds, air-layering, juvenile shoot cuttings and root cuttings through macro-propagation techniques. Propagation of species through seeds, 30.04 per cent germination were recorded under nursery condition

and 41.48 per cent under controlled conditions. Propagation through air-layering callus were developed but rooting was not developed while propagation through juvenile shoot cutting 43 per cent rooting has been recorded. Poor seed setting, low germination per cent, infertility and difficulties of rooting in branch cuttings therefore, propagation through macro-proliferation technique was carried out. Through this technique 35-50 plants were produced from a single root cutting (thong) and it is a cost effective, eco-friendly and innovative technique. The species should be planted in agro-forestry system therefore species will be intensively managed by farmers. This will not only increase the employment opportunities but also enhance the diversity of species outside the natural habitat.

Key words: *Litsea glutinosa*, IUCN, Propagation, agro-forestry and employment

Abstract ID- 3032020076

Economic Feasibility of Different Organic and Ipm Modules Against Major Pest of Okra

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The present investigation was carried out during 2017-2018 at Vegetable Research center, G.B. Pant University of Agriculture and Technology, Pantnagar .The trial was conducted for comparison of different organic module and IPM module in okra crop against major insect pest of okra crop. Among nine treatment chemically treated treatment followed by IPM module show high insect pest management as compare to other organic modules in case of sucking pest while in case of borer organic module was significantly better than IPM and chemically treated plot. The highest natural enemy population was found in organic module followed by IPM module. Even if chemical treatment is giving high yield, it can't be advisable as it is not safer as ecological point of view while the organic module with comparative low yield and lesser management of insect pest are advisable, as in today era the chemical poisoning is a major problem causing many other hazards like resistance ,resurgence and chemical residue.

Abstract ID- 3032020077

Effect of Elevated Carbon Dioxide on Soil Organic Carbon

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Carbon dioxide concentration in the atmosphere increases in a substantial rate along with other parameter of climate, since last decades. The exchange of carbon between soiland atmosphere is one of the important process of Earth. Due to the rise in atmospheric CO_2 concentration growth of plant as well as carbon input of the soil increases, it seems that soil might help to get rid of the problem of global warming and CO_2 rise in atmosphere. Rhizosphere is becoming the main source of mitigation of increasing carbon dioxide and global warming with increase in plant growth and carbon inputs to soil in form of soil organic matter. Studies shown that there were up to 60 percent increase in soluble soil carbon when plants were grown under elevated carbon dioxide. Also the high soil carbon inputs with elevated carbon dioxide turns to higher rates of microbial decomposition, enzymatic activities and metabolism. Which further results in little effect on priming of total soil carbon pool but significantly increases biological carbon pool. Increase in soil carbon was also found to be related with added nitrogen as it doesn't increase in significant way when there is a lack of nitrogen in rhizosphere. Use of nitrogen in soil under elevated carbon dioxide may mitigate the increasing carbon dioxide and global warming but still there is needs and opportunities for long term experiments in this direction about intelligent use of

nitrogen fertilizers. Therefore it isalso important to know the status of nitrogen in order to determine the direction of interaction of elevated carbon dioxide and soil organic carbon.

Key words:- Elevated Carbon dioxide, Soil organic carbon, Global warming, Rhizosphere

Abstract ID- 3032020078

Utilization of Apple Pomace Fibre for the Preparation of Fibre Enriched Apple Juice

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The suitability of utilization of apple pomace fibre for the preparation of fibre enriched apple juice was evaluated. Apple juice beverage was prepared by reconstituting the apple juice concentrate (74^0B) to 13^0B by adding water. To the apple juice, varying proportions of apple pomace fibre i.e. 2, 4 and 6% was added and evaluated for its mixing properties. In order to improve the appearance of the beverage, the suitability of adding carboxymethyl cellulose (CMC) at different proportions (0.6, 1.2, 1.8, 2.4 and 3%) was optimized. The beverage containing 1.8% CMC, 4% apple fibre at TSS of 13^0B was adjudged the best with respect to better appearance, and better mixing and hence optimized. Similarly suitability of adding isabgol (*Plantago ovata*) fibre was evaluated as a source of fibre in the apple beverage. Out of three different proportions of 0.5, 1 and 1.5%, a beverage containing 0.5% isabgol was found equivalent to an apple beverage containing 4% pomace fibre with respect to appearance and consistency. Thus, both the beverages were evaluated for various physico-chemical and sensory attributes and compared with the product containing no added fibre. Changes in quality attributes during storage of the fibre enriched apple juice beverage were monitored by storing the beverage at low (0-4^0C) and ambient temperature (13.2-26.7^0C) upto six months. The products were evaluated at periodic intervals of 0, 3 and 6 months. Thus, for preparation of fibre enriched apple beverage, a proportion of 4% pomace fibre alongwith 1.8% carboxymethyl cellulose at a TSS of 13^0B was optimized for preparation of fibre enriched apple beverage. Similarly, 0.5% isabgol (*Plantago ovata*) fibre concentration was found to be equivalent to 4% apple fibre for preparation of isabgol fibre enriched apple beverage.

Abstract ID- 3032020079

Influence of Iron Sulphate and Calcium Carbonate on Seed Germination and Seedling Growth Parameters of Moth Bean (*Vigna aconitifolia*)

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Moth bean (*Vigna aconitifolia*) is a legume crop, commonly grown in arid and semi-arid regions of India. it's have several name likematki, dew bean, and mat bean. The seeds and sprouts are the economical important parts of moth bean which is very rich in protein content. Nowadays the concept of Nutripriming has great potential for viability of seed so that it can survive well during initial days of crop establishment. For better germination and proper establishment of moth bean seedling we treated the seed with different concentration of iron sulphate and calcium carbonate both in Petri plate and in soil condition respectively. After experiment it was recorded that better germination occurred at 1% concentration of $CaCO_3$ in Petri plate and 2% concentration of $FeSO_4$ in soil condition. It was recorded that more seedling height was recorded in soil condition as compared to petri-plate. $CaCO_3$ has inhibitory effect on seed germination, rate of germination, seedling height and total soluble protein. High concentration of $FeSO_4$ has significant effect on reduction in seedling height over control. It is reported that $FeSO_4$ has more beneficial effect than $CaCO_3$.It was found that seed priming is a important tool to reduce the deficiencies

of nutrients. Seed priming significantly increases not only nutrient content but also speed up the transportation of food material which is stored into seed to the seedlings and to further parts of the crop.

Keywords:- Seed germination, Nutri priming, Seedling growth, Total soluble protein

Abstract ID- 3032020080

Perpetual Yogic Agriculture :- "A Novel Step Towards a New Era"

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We have been listening for some time about organic farming process. Many a farmers have been using this type of farming technique. However, it is essential at the present day, farmers adopt the Farming Technique that uses Rajayoga Meditation. The Thinking power of the soul is called Mind The Decision making power of the soul is called Intellect, and The impression of What we do or decide affects our memory and, therefore, is called Sanskar. Thoughts are generated in our mind. The quality of our thoughts creates our Chitt. It also creats our attitude, and that culminates into our opinion. We behave according to our opinion. Our Pure thoughts are the source of pure vibrations, and pure vibrations create a pure atmosphere. Only through pure atmosphere all around us, we can have good experiences. In the remembrance of supreme soul when we experience such divine virtues, grain acquisition become pious which influence the human mind through the food as it is said that as the food so the mind and as the mind so the body. Before sowing any seed in the ground, fill it with spiritual powers. Giving the vibrations of supreme power to the internal energy of the seed, prepare a cover of purity outside the seed. Now sow the seed in the remembrance of Supreme Soul. If other person is sowing the seed, we can give our vibrations to it siting anywhere. Similarly while working in the farm, if we remember Supreme Soul in soul-conscious stage, through our vibrations, we can see very good results of the land and the crop. Organic fertilizer is used in the land. Fill this fertilizer with the vibrations of supreme powers like peace, purity and knowledge. Think that this fertilizer will help in making crop healthy and firm. Sir Jagdish Chandra Bose has proved that there is a definitive impact of emotions on the flora of the world. All of you are practise Yogic Agriculture by keeping this principle in your mind. If violent animals too can become non-violent, the productivity of the vegetation in the form of crops, too, can increase. This is at the core of the Yogic Agriculture. There are various methods of agriculture and crop cultivation applied by the farmers in the world. Science has made easy availability of wheat, pulse, oils, vegetables, fruits, and milk possible. However, the produce lacks in good taste, nutritional value and in the absence of purity and vegetarian nature of food, our mental and physical health is becoming poorer by each passing day. In the bygone eras, people enjoyed healthy body and long life. We have to rediscover those processes and virtues again so that our mother earth has blissful state, peace, prosperity, wealth and food-grains in abundance. Perpetual Yogic Agriculture is the call of time towards that dream.

Abstract ID- 3032020081

Seed Priming Approach Towards Agricultural Sustainability

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India being an agricultural country, more than 80% population of rural India depends on agriculture and its associated activities for their living. To satisfy the requirements of Indian population, there is need for adequate crop yield. But due to urbanisation, pollution, biotic and abiotic stresses, unavailability of micronutrients etc. there are various constraints on seed germination and crop yield.It exercises on seed priming technology that can synchronise seed germination and improve vigour, leading to better crop

establishment and yield. Seed priming stimulate the processes hydration of seeds to a level that allow pre-germinative metabolic activity to continue, but interrupt the emergence of the radicle. Seed priming improves seed performance**,** ensures uniformity and better establishment**,** enhances the yield in diverse environments**,** greater tolerance to environmental stress and helps to overcome dormancy. Change in seed water content, cell cycle regulation, modification of seed ultra structure, management of oxidative stress and reserve mobilization are the major physiological and biochemical changes takes places during seed priming. Seed priming should be influenced by factors such as light, aeration, temperature, time and seed quality. Seed priming had significant effect on agriculture. It will promote and synchronize the germination, enhances the plant growth, have better stress resistance, increase the use efficiency of nutrients and water and have better weed suppression effect.Extensive study using different seed priming techniques *viz*. hydro-priming, osmo-priming,on-farm priming, hormone priming, nutripriming,halo-priming matrix priming, osmohardening, biopriming nano particle priming etc. has been carried out. Studying the use of different techniques and their need put an insight in the new research area of bio nano seed priming produced by amalgamating nano-fertilisers and plant growth promoting rhizobacterias, to improve the productivity of crops.

Keywords: Seed priming, Seed priming methods, Germination, biotic and abiotic stresses

Abstract ID- 3032020082

Study of Genetic Variation and Key Genomic Regions Regulating N Uses Efficiency and Associated Traits in Rice (*Oryza sativa* L.)

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N use efficiency of crops such as rice is very low which is about 30-35 percent. The remaining 65-70 percent of N is lost through leaching, denitrification, environmental volatilization. Several QTLs have been identified for improving N usage efficiency in Rice which generally has minor effects on this N usage trait. Hence this analysis was undertaken to classify the most important genomic regions (meta-QTLs) that control N use trait in Rice. Research work started with the assessment of 65 genotypes under three N levels N_0, N_{50} and N_{100} for agronomic and N-use related traits.A meta-analysis revealed sixteenmQTLs, related to N usage efficiency and grain yield located on six chromosomes 1, 3, 4, 8, 9 and 11. The associated marker mQTLs were used to genotype the same set of germplasms used for field assessment. The validation test showed that RM 202 was found to be associated with two N use parameters with an allele of 179 bp with a 23 percent distribution in germplasm.In Rice, these markers may also be used for breeding for N efficacy use. The potential carrier for N efficiency also listed which areAcharmati, ADT 38, ADT 42, ASD 16, Chandrahasini, CR Dhan 310, Jaiphoola, Kamlesh, Nagina 22, Nidhi and Pusa 44. However, these genotypes may be used as donors in future for the efficient breeding of N varieties.

Key words: Rice, Nitrogen, N use efficiency, mQTLs, germplasm.

Abstract ID- 3032020083

Disease Management of *Alternaria* sp. on *Grewia optiva*

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Grewia optiva (bhimal) is a popular tree found near agriculture fields in the hills. It occurs naturally in the field bunds and is conserved by the villagers for its multipurpose utility. It is considered as a family tree

of inhabitants. During survey at Central nursery of Forest Research Institute, Dehradun; leaf spot disease on *Grewia optiva* was observed. The spots were found sunken, dry, necrotic and appear light brown to dark brown in colour. The pathogen was isolated and on the basis of morphological and microscopic features, the causal agent has been identified as *Alternaria* sp., which is newly reported disease-causing strain on this plant. Thus, the present study was conducted to evaluate the use of *Trichoderma koningii* and *Trichoderma viride* as an antifungal agent against *Alternaria* sp. by dual culture experiments. The growth of Alternaria spp. was found to be inhibited by *T. koningii* and *T. viride* and effectiveness of these biological agents against *Alternaria spp.* was compared with one systemic and two nonsystemic commonly used fungicides obtained from the market. It was found that growth inhibition was higher using biological agents rather than chemical fungicides and using biological agents have their own significance and effectiveness as they are natural antagonistic organism to suppress the plant pathogens.

Keywords:-,*Alternaria* sp., Bhimal tree, Disease management, Fungicide, *Trichoderma* sp.

Abstract ID- 3032020084

Study on the Population Of House Sparrow (*Passer domesticus*) in Urban Areas of Kupwara District, Jammu & Kashmir, India

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House Sparrow belongs to genus Passer, family Passeridae and is closely associated with human habitations. A radical decrease in the population of house sparrow has been reported over the globe including different countries especially in urban regions. The main purpose of this study was to assess the population size of house sparrow in urban areas of Kupwara District, Jammu & Kashmir. This study was conducted over a period of two years from May 2017 to April 2019. During the study period three sampling sites were established Viz. Salkoot, Branwari and Kupwara. Observations were made early in the morning from 6.00 to 9.00 am when they are most active and in the evening from 5.00 to 7.00 pm when they came back to their nesting places. The population of house sparrow was studied by applying Point count method. From the results it was observed that a large number of house sparrows were recorded in Branwari and Salkoot due to the presence of home gardens were different varieties of bushes and shrubs were easily available for house sparrows as they use them for forage and shelter. A low number of house sparrows were recorded in Kupwara due to modernization of buildings that lack holes because of which house sparrows face a shortage of nesting sites. Therefore, it is recommended that for better management and protection of house sparrow a conservation awareness programmes and long term monitoring activities with the participation of local people may be a prolific approach for maintaining the sparrow population in the study area. Further studies are needed in Kupwara District and its adjacent areas to track the real status of this species and other avifauna of the area as well.

Key words: Kupwara District, Population of House Sparrow, Urban areas.

Abstract ID- 3032020085

Effect of Pruning Time on Growth, Yield and Quality of Guava (*Psidium Guajava* L.) Genotypes

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The present investigation was carried out at the Instructional-cum-Research Farm, Department of Horticulture, MPKV, Rahuri during the year 2016 and 2017. The present investigations were conducted on seven different genotypes namely RHR-Guv-58, RHR-Guv-60, RHR-Guv-14, RHR-Guv-16, RHR-Guv-3, RHR-Guv-6 and Sardar with five pruning time i.e. 15th May, 15th June, 15th July, 15th August, 15th Sept. and no pruning (control). The results revealed that the significantly maximum growth attributes was recorded in Sardar. The significantly maximum number of fruit (265.00) was recorded in Sardar with 15th May pruning time. The significantly maximum length (8.80 cm), diameter (8.17 cm) and weight (266.25 g) was observed in G_4 (RHR-Guv-14) genotype with 15th June pruning time. The significantly maximum marketable yield per plant (12.18 kg) and per ha (3.37 t) was observed in G_1 (Sardar), which was at par with G_4 (RHR-Guv-14) genotype (12.03 kg and 3.33 t, respectively). The significantly maximum marketable yield per plant (14.77 kg) and per ha (4.09 t) was recorded in 15th July pruning time. Significantly lowest fruit fly infestation (9.94 %) was observed in P_5 (15th Sept. pruning time) treatment.

Key words: Guava, Pruning, Quality, Fruit fly, Marketable yield, Genotypes

Abstract ID- 3032020086

Comparative Study in Un-Bagged and Bagged Fruit on Yield Parameters, Fruit Fly Infestation and Quality of Guava (*Psidium guajava* L.) Genotypes

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The present investigations were conducted on seven different genotypes namely RHR-Guv-58, RHR-Guv-60, RHR-Guv-14, RHR-Guv-16, RHR-Guv-3, RHR-Guv-6 and Sardar with five pruning time i.e. 15th May, 15th June, 15th July, 15th August, 15th Sept. and no pruning (control) at the Instructional-cum-Research Farm, Department of Horticulture, MPKV, Rahuri during the year 2016 and 2017. In order to minimize the infestation of fruit fly an additional treatment bagging of fruits was undertaken. The results revealed that the significantly maximum length (8.48 and 9.44 cm), diameter (7.83 and 8.27 cm) and weight (251.44 and 302.08 g) was observed in G_4 (RHR-Guv-14) genotype of un-bagged and bagged fruit, respectively. The significantly maximum marketable yield of un-bagged fruits per plant (29.53 kg) was recorded in 15th July pruning time, whereas the maximum marketable yield of bagged fruits per plant (43.14 kg) was observed in 15th May pruning time. Significantly lowest fruit fly infestation in un-bagged and bagged fruit (9.94 and 1.22 %, respectively) were observed in P_5 (15th Sept. pruning time) treatment. The maximum total sugars (8.08 and 8.94 %), reducing sugars (5.07 and 5.52 %), sugar: acid ratio (22.33 and 26.17) with minimum acidity (0.36 and 0.34 %) were recorded in G_3 (RHR-Guv-58) genotype of un-bagged and bagged fruit, respectively. The maximum ascorbic acid of un-bagged fruit (208.33 mg/100 g) and bagged fruit (230.29 mg/100 g) and shelf life of un-bagged fruit (9.20 days) and bagged fruit (8.27 days) was recorded in G_4 (RHR-Guv-14) genotype. Very crispy pulp texture and fruit luster was observed in all genotypes rather than Sardar. Fruit quality of genotypes was remained more or less similar irrespective to pruning time. In general, it is observed that, maximum total and marketable yield, TSS, total sugars, reducing sugars and ascorbic acid with less infestation of fruit fly were recorded in bagged fruits compare to un-bagged fruits.

Key words: Pruning time, Fruit fly infestation, Marketable yield, Quality, Un-bagged and Bagged fruit, Genotypes

Abstract ID- 3032020087

Effect of *Rhizobium* and PGPR Biofertilizers Application in Mungbeanon Productivity and Soil Health in Mungbean-Wheat Sequence

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Biofertilizers are one of the best modern tools for agriculture.Legumes as biological nitrogen fixation capable represents the major source of nitrogen input for sustainable agriculture. Thus recommended to ensure yield and soil health. The potential of biofertilizers in enhancing the crop production has been studied widely however; information on the contribution of biofertilizer application in mungbean on residual effect on productivity of succeeding crop and soil health is meager. The study was conducted during 2017-18 and 2018-19 to examine the residual contribution of biofertilizers (*Rhizobium* sp. and PGPR) application in mungbean (*Vigna radiata* L.) on productivity of succeeding wheat (*Triticum aestivum* L.) in Mollisols in sandy loam soil of pH 7.4 and EC 0.46 dSm^{-1} having 0.79% organic C and 228.3, 23.4 and 218.1 $kgha^{-1}$ available N, P &K, respectively. Treatments in mungbean (PM 5) comprising seed inoculation with *Rhizobium* sp. (MR-14), PGPR (*Bacillus cereus*, NE-10), *Rhizobium* sp.+ PGPR, RDF (20 kg N+40 kg P_2O_5 ha^{-1}) and uninoculated control were replicated thrice in main plots following split plot design. Each main plot was divided into 3 sub plots after mungbean harvesting for raising succeeding wheat (PBW 550) at 3 N levels of 50, 75 and 100% levels of recommended N (120 kg ha^{-1}). Inoculation of different biofertilizers increased the number and dry weight of root nodules in mungbean. Conjoint use of *Rhizobium* sp. and PGPR also resulted in 8.6 % and 11.7 % (2017-18) and 10.0 % and 10.6 % (2018-19) increases in mungbean grain and straw yields, respectively. Irrespective of N levels, combined application of biofertilizers further increased the wheat grain and straw yields by about 9.1 % (2017-18) and 10.2 % and 9.7 % (2018-19) over the uninoculated mungbean. Their conjoint use in mungbean also increased soil chemical and biological properties over the uninoculated mungbean.

Key words: Biofertilizers, residual effect, yield, soil health, sustainability

Abstract ID- 3032020088

Approaches to Reduce Juvenility of Fruit Crops

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Juvenility is defined as the extended period of post-germination, vegetative development in which flowering is repressed even under favorable environmental conditions. The length of the juvenile phase for tree fruit crops extend from at least three years (peach) to 15 or more years (Avocado).In nature, juvenility ensures that flowering is not initiated before the plant has reached the photosynthetic capacity to produce fruit and viable seed, or that resources are not diverted to flowering before a plant has reached a competitive size in its environment. However, this natural safeguard can be subverted by breeders, who are able to maintain plants under optimal growth conditions, and often need only to obtain pollen to advance to the next generation. Approaches to reduce juvenility of fruit crops are cultural (Use of dwarfing rootstocks, Soil solarisation, Girdling), chemical and biotechnological tools. Reducing juvenility is benefit for early fruit production, reaching profitable orchard early and rapid breeding cycle. As the long juvenility period in fruit crops became barrier to both producer and breeder to evolve new improved varieties there is urge to adapt these approaches. All the approaches are able to meet standard tree characters with respect to yield and quality of produce. There is gap to make these technologies reach to the growers and make them adopt these methods thereby they can reduce non profitable orchard period which reduces the orchard budget and can fetch the economic yield in shorter period.

Abstract ID- 3032020089

Transgenic Fruit Crops: A Review

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A transgenic crop plant contains a gene which has been artificially inserted instead of the plant, acquiring them through fertilization or pollination. Transgenic means transfer of genetic material (DNA fragment carrying known genes) from across the biological systems through *in-vitro* techniques. Genes so transferred are known as transgene. Breeder always tries to incorporate beneficial genes in a crop which will be more useful and productive. Through conventional breeding approaches genes can be incorporated from related species, but most of the times it does not possible due to several reasons, so in that case transgene pave the wonderful way, where gene can be taken from unrelated species. Purpose of the transgenic is design plants with specific characteristics from other species or sometimes even different kingdoms eg. Transgenic papaya. The power of this technique lies in its ability to move genes from one organism to crop plants to impart novel characteristics. Transgenic research in fruit crops is very low due to difficulty in regeneration and transformation procedure being perennial and woody in nature. So that present information will be utilized by fruit breeders to a design future program for developing transgenic that ultimately open the way for those crops where gene transfer is difficult through conventional breeding. Need of the transgenic is meet the world's need of balance food, increase quality yield, improve quality (Shelf life, Texture), crop better with climatic change, nutritional improvement, reduce loss during transportation and storage, abiotic stress resistance (drought, heat, cold, salt etc.), Biotic stress resistance (Insect, pest and diseases),resistant against herbicides.

Key words: Transgenic, Biotic résistance, Fruit, Abiotic stress resistances

Abstract ID- 3032020090

Seasonal Variation of Soil Chemical Characteristics at Agriculture Technical School, Manjri Farm, Pune

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The impact of seasonal variation on soil nutrient quality at Agriculture Technical School, Manjri Farm, Pune, Maharashtra, India during year 2018-2019. Total 94 surface soil samples (0-22.5 cm depth) were collected in pre-monsoon (April-2018) and post-monsoon (October-2018) season. The chemical parameter viz., pH, EC, organic carbon, calcium carbonate, available nitrogen, phosphorus, potassium, sulphur and DTPA extractable micronutrients iron, manganese, zinc and copper, were 7.52, 0.36 dSm^{-1}, 0.68, 5.90 per cent, 216.71, 11.56, 363.0 kg ha^{-1}, 9.34 mg kg^{-1} and 0.98, 8.43, 3.47 and 5.60 mg kg^{-1}, respectively in pre-monsoon season. In post-monsoon, the pH, EC, organic carbon, calcium carbonate, available nitrogen, phosphorus, potassium, sulphur and DTPA extractable micronutrients iron, manganese, zinc and copper, were 7.58, 0.40 dSm^{-1}, 0.72, 5.38 per cent, 205.80, 10.70, 358.25 kg ha^{-1}, 10.20 mg kg^{-1} and 1.01, 8.45, 3.39 and 5.82 mg kg^{-1}, respectively. The soil chemical properties pH, EC, organic carbon, available sulphur, iron, manganese and copper were high in post-monsoon season while calcium carbonate available nitrogen, phosphorus, potassium and zinc were high in pre-monsoon season.

Key-words: Production, Projects, Salinization and Pollution

Abstract ID- 3032020091

Relationship between Land Surface Temperature and Vegetation Index over Dehradun

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Land Surface Temperature (LST) is defined as the skin temperatureof the earth's surface. Vegetation coverage has a significant influence on LST. In the present study thermal band of the Landsat satellite imagehas been used for the estimation of LST over Dehradun.Dehradun, the capital of Uttarakhand state is situated in the foothills of Himalayas. Normalized Difference Vegetation Index (NDVI) is used to examine the relationship between LST and vegetation cover. The results from the study shows that aninverse relationship exists between LST and NDVI.

Keywords: LST, NDVI, Landsat.

Abstract ID- 3032020092

Effect of Water Stress on Yield Components of Iranian Landraces under Irrigated, Restricted Irrigated and Rain-Fed Conditions

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Drought stress is one of the most important environmental factor which affects the plant at almost all stages like tillering, booting, anthesis, grain formation and grain filling. Drought stress has been shown to retard the formation of the yield components that are most actively developing at the time of stress which results in reduction of 17% to70% grain yield. The aim of present study was to investigate the effect of water stress on 27 Iranian landraces along with commercial relevant checks under irrigated, restricted irrigated and rain-fed conditions. These lines were selected on the basis of minimum reduction of vigor index under water stress induced by Polyethylene glycol (6000) as compared to control lines under lab conditions. A field experiment was carried out at experimental area of Department of Plant Breeding & Genetics, Punjab Agricultural University Ludhiana, Punjab during 2016 with three replications. Morphological traits of 27 lines were investigated that was Spikelet per spike, Grains per spike, Thousand grain weight, Grain yield and Harvest index were recorded from each Iranian landraces and commercial checks. Analysis of variance showed that mean square under drought stress were highly significant for all the characters under irrigated and rain-fed condition but under restricted irrigated is non-significant for spikelet per spike and grain per spike. On the basis of performance of Iranian lines under field conditions these three lines IWA 8600064, IWA 8600179 and PETTERSON ML68-10 considered as water stress tolerant on the basis of spikelet per spike, grains per spike, thousand grain weight, grain yield and harvest index. The identified landraces can be included in future breeding programmes for the wheat improvement for drought prone areas.

Keywords: Drought stress, Iranian landraces and Yield parameters

Abstract ID- 3032020093

Character Association and Path Coefficient Analysis of Wheat Genotypes under Drought Condition

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Agricultural drought is the lack of sufficient moisture needed to complete the life-cycle for normal plant growth and development. Plant responses to the stress of drought are very diverse and include beneficial or deleterious effects. Drought affects plant morphology, growth, and metabolism in most plants that restricts grain yield. In present study forty wheat accessions in randomized block design with 3 replications were evaluated at field research area of Wheat and Barley Section, Department of Genetics & Plant Breeding, CCS HAU, Hisar under drought condition during Rabi 2018-19. The results revealed highly significant variations among the genotypes for all traits studied. Correlation coefficient analysis revealed that the association of grain yield per plant with harvest index followed by biological yield per plant were positive and highly significant. Path analysis revealed that harvest index and biological yield per plant showed the highest direct and positive effect on grain yield per plant. While, other traits contribute significantly indirectly to the grain yieldper plant via biological yield per plant and harvest index. This indicates that harvest index and biological yield per plant having significant positive correlation and high direct effect on grain yieldper plant has clarified the real relationship and direct selection of genotypes through such traits is the best way to enhance the yield potential.

Keywords :- Character association, Path Coefficient Analysis, Direct effects and Indirect effects.

Abstract ID- 3032020094

Effect of Pyrolysis Temperature on Physico-Chemical Properties of Biochars Prepared from Different Biomasses.

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Biochar is a carbon rich product obtained when biomass, such as leaves, wood or manure is heated at relatively low temperature (<700° C) in a closed container under oxygen deprived condition. Biochar is produced through pyrolysis process under different pyrolytic conditions, and thus, has varying nutrient contents. As a complex carbon-rich substance, biochar adsorption mechanism of heavy metals in aqueous solution is very diverse. Prior to field application for soil remediation, it is important to understand the adsorption characteristics and mechanisms of different micronutrients onto biochar surface. In this experiment, biochars prepared by incineration of different biomass sources like *Lantana camara*, *Pinus roxburghii* and *Triticum aestivum* at 300ºC and 450ºC were examined for different physico-chemical properties and macro and micro nutrient compositions. In general, increase in temperature increased pH and electrical conductance. An increase in incineration temperature decreased the content of carbon and hydrogen but increased the content of oxygen and phosphorus. The contents of micro nutrients like Zn, Cu, Fe, Mn, B and Mo increased in biochar prepared at higher temperature than those prepared at lower temperature. Further characterization of these biochars is in progress.

Abstract ID- 3032020095

Yielding Behaviour of Chickpea Varieties under Varying Plant Rectangularity's in Late Sown Conditions of Pantnagar

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Pulses hold prime position in Indian Agriculture. India is the largest producer (25% of the global production), consumer (27% of the world consumption), and importer (14%) of pulses in the world. Pulses account for around 20 % of the area under food grains and contribute around 7-10% of the total food grains production in the country. Among pulses, chickpea (*Cicer arietinum* L.), the premier pulse crop of Indian subcontinent, is predominantly consumed as a pulse. One of the major constraints of poor yield of chickpea is improper population. Too low plant population at harvest beyond a certain limit very often affects the crop yield adversely. Number of plants per unit area influences plant yield components and ultimately the seed yield. Plant spacing in the field is also very important to facilitate aeration and light penetration in to plant canopy for optimizing rate of photosynthesis. Row and plant spacing is also one of the important factors which ultimately affects nutrient uptake, growth and yield of plant. Increase in spacing decreases the total population, but with more nutrition to the individual plant grows better and yield more and vice-versa. This increase or decrease of plant population per unit area has definite pattern in relation to the yield. So the plant rectangularity, one of the important crop density characters, can be manipulated either by varying row or plant spacing or by both to attain the maximum production from unit land area. The space requirement to individual plant depends on variety, its growth habit and agro climatic condition. Thus, the present investigation "Yielding behaviour of chickpea varieties (PG186, PG4, PG5) under varying plant rectangularities (30×5 cm, 30×10 cm, 30×15 cm, 30×20 cm) in late sown conditions of Pantnagar" was undertaken and found that chickpea variety PG5 recorded more yield attributing characters like number of pods/plant, number of seeds/pod, 100-grain weight and ultimately higher seed yield than other varieties. While among all the plant rectangularities 30×5 cm perform better than other.

Abstract ID- 3032020096

Evaluation of Maize (*Zea Mays* L.) Hybrids for Drought Tolerance, Disease (Turcicum Leaf Blight And Maydis Leaf Blight) Resistance and Productivity Traits in Northern Dry Tract of Karnataka

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In the present investigation, twenty six maize hybrids were evaluated along with five check hybrids for drought tolerance, disease (Turcicum and Maydis leaf blight) resistance and productivity traits under natural environmental conditions at RARS, Vijayapur during *kharif* 2018.The hybrids AH 1634 (4.96 t/ha), AH4274 (4.34 t/ha), AH4271 (3.97 t/ha) and AH 4142 (3.95t/ha) were found to be better yielding under stress situations based on their yield related traits. Hybrids AH4158, AH4142, AH4274, NK6240 and RCRMH2 were identified as drought tolerant based on their relative water content in the leaves, relative chlorophyll content, leaf firing symptom and per se performance. The hybrids AH4158 and AH4142 were found to be resistant to Turcicum and Maydis leaf blight diseases. Further, evaluation of these hybrids is required to test their resistance reaction under artificial epiphytotic condition and over multi location to confirm their superiority and their adoptability in the region.

Key words: Maize hybrids, Turcicum leaf blight, Maydis leaf blight, drought tolerance, yielding ability.

Abstract ID- 3032020097

Comparison Among Glomalin Content Present in Rhizosphere of Soybean Varieties

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In agroforestry systems, the root induced changes to the chemical environment of the rhizosphere are crucial to the nutrient acquisition of many plant species. Molecules contained in tree root exudates influence the development of Arbuscular mycorrhizal fungi (AMF), a fungal group that favors short-lived crops growth by improving plant nutrition and protecting plants from stresses. Breeding strategies must take into account functional traits like the ability of some crop varieties to increase their own AMF colonization when associated with trees.
It is a tedious and difficult task to determine AMF biomass in field soils resulting in recognition of glomalin, a glycoprotein, as a biochemical marker to consider for the study of AMF. AMF hyphal growth has been linked to GRSP (glomalin related soil protein) production in forest soils and root mesh of crop cultivars. The present investigation involved isolation of root mesh of eight different soybean varieties grown under poplar based agroforestry system. The extraction of the total glomalin was carried out as described by Wright and Upadhyaya (1996 and 1998). Total glomalin is the maximum amount of glomalin that can be extracted by autoclaving at 121°C in one hour with 50 mM Sodium citrate buffer. The differences among the extractants tested by one-way analysis of variance (ANOVA) were found to be highly significant ($p<0.05$). The range of total glomalin concentration (mg/ml) was from 217.82 to 131.15, lowest being for P1042 and highest for PS1241. Based on the findings, promising genotypes can be selected for breeding under agroforestry systems in future to come.

Keywords: agroforestry; glomalin; AMF; sodium citrate buffer

Abstract ID- 3032020098

Effect of Poplar and *Eucalyptus* based Agroforestry System on Soil Properties

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The present investigations entitled "Effect of Poplar and *Eucalyptus* based agroforestry system on soil properties". The field experiment was conducted during winter season of 2016-17 at experimental site of Agroforestry Research Centre (old site), Patharchatta of G.B. Pant University of Agriculture and Technology, Pantnagar, Distt. Udham Singh Nagar, Uttarakhand. Poplar and *Eucalyptus* are intercropped with different wheat varieties (UP-2526, UP-2565, UP-2628, and DPW-621-50). Experiment was laid out in Split plot design. After harvesting of wheat crop, the soil sampling was done from all the treatments and each replication. Soil parameters like EC, organic carbon and nitrogen, phosphorus and potassium was higher in agroforestry system as compared to open farming system. Maximum soil pH (7.53) was found in open farming system and lower pH in agroforestry system. Under *Eucalyptus* agroforestry pH was recorded 7.48 and minimum in poplar based agroforestry system. Soil EC in agroforestry system was slightly higher than open farming system. Under poplar agroforestry system EC (0.38 dSm^{-1}) was higher over *Eucalyptus* (0.37 dSm^{-1}) agroforestry system. Organic carbon was maximum (1.33%) under poplar agroforestry system than the others. Under poplar based agroforestry system N, P, K, were higher by 230.2, 19.6, 174.0 Kg/ha respectively. Under *Eucalyptus* based agroforestry system N, P, K, were 239.0, 20.2, 176.5 Kg/ha respectively.

Key Words: pH, Electric conductivity, Organic carbon, Available N, Available P, Available K.

Abstract ID- 3032020099

Evaluation of Pharmaceutical Properties of Some Selected Plant Species of Family Asteraceae

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Asteraceae is the largest family of dicotyledonous plants has 1911 genera and 32 913 species in the world, 166 genera and 800 species in India and 125 genera and 376 species in Uttarakhand. In the present study, sixteen wild plant species of family Asteraceae were selected to assess their pharmaceutical potential. In all these plant species, extraction yield and antioxidant activities were comparatively higher in methanol than in acetone extract. Antioxidant properties were investigated by using 1, 1- diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging assay, Phosphomolybdenum assay (Total Antioxidant Activity, TAA) and Ferric Reducing Antioxidant Power (FRAP) assay. Quantitative phytoconstituents were examined by total phenol and total flavonoid contents. In both methanol and acetone, 1, DPPH activity (%) was maximum in *Vernonia cinerea* and *Lagascea mollis* and FRAP in *Ageratum houstonianum* and *Gnaphalium pensylvanicum* whereas TAA was highest in *Erigeron bonariensis* and *Youngia japonica*. The Total Phenol Content (µg GAE/ mg) was highest in *Erigeron bonariensis* and *Ageratum houstonianum* in methanol and acetone, respectively; while TFC ((µg QE/ mg) was maximum in *Ixeris polycephala* in both methanol and acetone. Thus, these findings will be presented and discussed in the present presentation. Further, the study will laid a scientific foundation to exploit potential natural antioxidant resources of these species which can be utilized by pharmaceutical industries for developing natural curatives.

Abstract ID- 3032020100

Potential Role of Biological Agents in Decontamination of Agricultural Soil

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A pesticide can be defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest (insects, mites, nematodes, weeds, rats, etc.). Pesticides like insecticides, herbicides, fungicides, and various other substances are used to control pests. In modern agriculture practices, the extensive use of pesticides is very frequent to fulfill higher yield requirements.Persistent nature of most of the synthetic pesticides causes serious environmental concerns. Decontamination of these hazardous chemicals is very essential.Various biological agents playspotential role in decontamination of agricultural soils. The agricultural crop fields are contaminated by the periodic applications of pesticides. Biodegradation is an ecofriendly, cost-effective, highly efficient approach compared to the physical and chemical methods which are expensive as well as unfriendly towards environment. Biodegradation is sensitive to the concentration levels of hydrogen peroxide and nitrogen along with microbial community, temperature, and pH changes. Experimental work for optimum conditions at lab scale provides very fruitful results about specific bacterial, fungal strains.
Keywords: Pesticides, Decontamination, Biodegradation

Abstract ID- 3032020101

First Report of Tomato Brown Rugose Fruit Virus (ToBRFV)

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In the middle of summer and autumn season of 2019, Beris*et al* (2020) were detected virus-like symptoms in tomato (*Solanum lycopersicum*) planted in some greenhouses of Greece i.e.Chania and Kyparissiaregion. The virusexhibited a particularly hostile profile reaching about 100% incidence. Symptoms ranging from mild to severe mosaic, blistering and deformation on leaves escorted by brown as well as yellow spots onfruits. To identify the virus, total RNAs were isolated from the 7infectedtomato plants and inspected with a commercial tobamovirus screen RT-PCR kit. PCR products of 568 nucleotides were initiated from all samples assesed. The seven PCR products were againexposed to sequencing. BLAST analysis of the sequences has shown the incidence of tomato brown rugose fruit virus (ToBRFV) in all specimens. ToBRFV, a rather new member under genus Tobamovirus, was originally described in Jordan (Salem *et al* 2016). It is previously known for its ability to overcome upon*Tm-2*^{2} resistance to tobamoviruses in tomato. The incidence of ToBRFV was affirmed in symptomatic leaves with the help of RT-PCR using primer pairsToBRFVGr-F (5-' GAATATCCGGCCTTGCAGAC-3')andToBRFVGr-R (5'-TCGAAATTCCACATAAGGTTGGC -3') andby DAS-ELISA with the commercial polyclonal antibodies against ToBRFV. This is the first report of ToBRFV in Greece. Thevirus can be easily transmitted through mechanically as well as infected seeds, in combination with the lack of any commercial resistant tomato cultivars. ToBRFV is comprised in EPPO's alert list.

Abstract ID- 3032020102

Cyanobacteria and their Role over the Monuments of Garhwal Region

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Cyanobacteria (Blue-Green Algae), the gram- negative primitive photosynthetic prokaryotes, are well known for their significance in biofertilizers, nutraceuticals, industries and agriculture. They are important ecologically as well as economically as contribute significantly in primary production of numerous ecosystems and biogeochemical cycles. The cyanobacteria are widely adaptable in almost all aquatic, terrestrial habitats including the most extreme environments like rock and rock-made buildings by virtue of their protective mechanisms and wider adaptive strategies. These phototrophic biofilm gives unsightly appearance to the monuments as well as leads to the mechanical damage. Recently, the issue of biodeterioration of our ancient cultural sites like- temples and monuments is the rising concern among the researchers due to the colonization of cyanobacteria on them in association with others microorganisms like- algae, fungi, heterotrophic bacteria, lichens etc. This paper discusses about the physical presence of cyanobacteria and their role over our cultural monuments of Garhwal region.

Keywords: nutraceuticals, primary production, biodeterioration.

Abstract ID- 3032020103

Diverse Mechanisms of Regulation of Male Sterility in Various Crop Species

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Plant male sterility, in its broadest sense is the failure to produce dehiscent anthers, functional pollen, and viable male gametes. In plants, male sterility can be caused either by mitochondrial genes with coupled nuclear genes or by nuclear genes alone; the resulting conditions are known as cytoplasmic male sterility (CMS) and genic male sterility (GMS), respectively. Emerging research on CMS systems of diverse crops supports four models for the mechanisms that cause CMS: the cytotoxicity model, the energy deficiency model, the aberrant programmed cell death (PCD) model, and the retrograde regulation model. The restoration of fertility in CMS/*Rf* systems (referred to as CMS restoration) may be achieved by various mechanisms at different molecular levels. CMS and GMS facilitate hybrid seed production for many crops and thus allow breeders to harness yield gains associated with hybrid vigor (heterosis). In CMS, layers of interaction between mitochondrial and nuclear genes control its male specificity, occurrence, and restoration of fertility. Proteomics analysis showed that plant mitochondria contain more than 1,000 proteins, most of which are encoded by the nuclear genome. Environment-sensitive GMS (EGMS) mutants may involve epigenetic control by noncoding RNAs and can revert to fertility under different growth conditions**,** making them useful breeding materials in the hybrid seed industry.
Although our understanding of the molecular mechanisms of CMS/*Rf* systems in rice and *Brassica* has advanced tremendously, CMS/*Rf* research in some major cereal crops, such as wheat, sorghum, and corn, has remained stagnant in recent years. More CMS systems in staple crops need to be studied and applied in agriculture to avoid genetic vulnerability in hybrid crop production that relies on a few CMS cytoplasms. Scientists and breeders need to pay more attention to research on EGMS because of its great potential and advantages in hybrid seed production to meet the increasing demand for food.

Abstract ID- 3032020104

Diverse Mechanisms and Approaches to DNA Damages and it's Check Points

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DNA damage is an alteration in the chemical structure of DNA, such as a break in a strand of DNA or a base missing from the backbone of DNA. DNA may be modified in a variety of ways, which can ultimately lead to mutations and genomic instability. DNA damage can occur naturally or via environmental factors. DNA damage response (DDR) is a complex signal transduction pathway which recognizes when DNA is damaged and initiates the cellular response to the damage. This control is achieved by multiple levels of regulation, including checkpoint signalling, non-coding RNAs and post-translational modifications such as ubiquitylation. DNA damage is distinctly different from mutation, although both are types of error in DNA. The eukaryotic cell cycle is guarded at three checkpoints: at the G1/S boundary, the G2/M boundary, and the metaphase/anaphase boundary. Progress through the chromosome cycle can be halted at these checkpoints if the conditions for successful cell division are not met. Multiple mechanisms act after the G1/S transition to block licensing in order to prevent replication. These regulatory strategies include regulated protein degradation, Cdk dependent inhibitory phosphorylation, transcriptional control, and

inhibition by direct binding. The restriction point control is proposed to permit normal cells to retain viability by a shift to a minimal metabolism upon differentiation *in vivo* and *in vitro* when conditions are suboptimal for growth. Malignant cells are proposed to have lost their restriction point control. Hence, under very adverse conditions, as in the presence of antitumor agents, they stop randomly in their division cycle and die. A single un-repaired or slowly repaired double-strand break (DSB) in the budding yeast triggers the Mec1–Ddc2-dependent DNA damage checkpoint, causing G2/M cell cycle arrest through the activation of a protein kinase cascade. The protein kinase cascade generates an arrest signal that is apparently nuclear-limited.

Abstract ID- 3032020105

An Invasive Species Spread is Rooted in Landscape Metrics ? Case of *Lantana camara* in Terai Habitat

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Invasive species are known to be the second largest threat to global biodiversity. *Lantana camara* is one such obnoxious weed of global importance which has been classified as one of the world's worst invaders. It is known to interfere with ecosystem functioning and nutrient recycling, negatively affecting native biodiversity and various other biotic or abiotic interactions. Many factors have been known to favour or limit the success of invasive plants, their invading potential being both species as well as site specific. Heterogeneity in forest patches, high degree of disturbance, canopy gaps and changes in land-use patterns correspond to high degree of invasiveness. Studies on the invasiveness of Lantana has got impetus in the recent times which has explored information regarding distribution, mapping and ecological facilitations for its invasiveness. However, where the correlation with various factors has been robustly understood in the protected areas in Western Ghats, Himalayas and Central India, the Terai forests present a peculiar situation of scattered presence of the species.
The present study was undertaken to understand the underlying factors shaping invasion dynamics in the Terai. An attempt has been made to study Lantana infestation with relation to proximity to disturbance sources and landscape heterogeneity with use of GIS tools and literature review. Further suggestions for management interventions is asserted while the extent of its spread is still restricted to certain patches.

Keywords: Invasion, *Lantana camara*, Forest management, landscape metric, GIS

Abstract ID- 3032020106

Heterosis Studies Using Diallel Analysis in Bread Wheat (*Triticum aestivum* L.)

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The present study was carried out for the estimation of heterosis and heterobeltosis in bread wheat during the year 2017-18. A diallel set of 9 x 9 was prepared by crossing nine genotypes in all possible combinations excluding reciprocals. Parents and their F_1 generations were planted during *rabi,* 2017-18 in RBD (randomized block design) with three replications. The observations were recorded on five randomly selected plants in parents and F_1s for thirteen traits. Analysis of variances showed that significant variation is present among all the genotypes for all studied traits. The mean sums of squares due to parents as well as crosses were found highly significant for all thirteen traits, indicating the existence of substantial variation for all the traits among the genotypes as well as crosses. No any cross combination was found that exhibit significant heterosis for all the traits in the present investigation. The crosses *viz,* HD2967 x Raj3765, WH1105 x HD3059 and HD3059 x Raj3765 showed significant and positive heterosis over better

parent for the traits namely, biological yield per plant, grain yield per plant and harvest index. The superiority of the above crosses over their better parents indicated their worth for hybrid crop development.

Abstract ID- 3032020107

Agribusiness Education, Research,Extension and Training in India

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Agribusiness and allied supply chains in developing and emerging economies are facing dual challenges: the first is feeding their own population and second, the integration of their food supply chain with global markets. This can not be denied that the opportunities for agribusiness especially in developing countries are plenty enough in global market. So, rapid advancement in agriculture has resulted into increased demand for qualified managers to manage agricultural sectors. Indian agriculture faces several challenges with rapidly changing business environment, pace of technology, globalization, competitive environment and changing rule of government. These will place unmatched demands on the capabilities of forthcoming manager's. Agribusiness Education has potential to address these challenges. With increasing economy, the demands for value added agri products would also increases, subsequently driving the demand for Agribusiness Managers. Currently, the average innovation intensity of India is estimated to be around 11.5%. New research creates an opportunities not only for the managers but also to our farmers. Government of India (GOI) is playing a vital role for research field by providing funds, extending the work and by providing trainings at different institutes. Further, it is important to disseminate information regarding emerging technologies as the farmer is able to use them for agricultural development. Technology support is extremely vital for success of land based programmes. Agricultural Extension services (AESs) serves as a flyover between farmers and agricultural research station and is fully based on enhancing farmers' knowledge concerning crop techniques which could help to increase productivity. This is done through training courses, on-farm trials, kisan-mela, kisan-clubs, and advisory bulletins. So, it would teach about cooperative effort, based on creating interest by seeing and doing that develops the leadership quality, the principle of cooperation, participation, adaptability, and the principles of organization.

Keywords: Supply Chain; Globalisation; Research station; Onfarmtrials

Abstract ID- 3032020108

Solar Drying of Bitter Gourd Slices using Modified Drying Cabinet and Its Quality Evaluation

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Increasing global population will be requiring more agricultural production to fulfill the food demands. Significant quantity of farm produce is lost due to inadequate handling, processing and storage facilities. Drying of food is done to improve shelf life of product, to reduce packaging costs, to lower the shipping weights, to retain quality and to make it available year round. Solar drying is a clean and hygienic way to process the agricultural produce without any expenditure on energy. Solar drying overcome the drawbacks of traditional open sun drying such as contamination from dust, insects, birds, lack of control over drying conditions, possibility of chemical, enzymatic and microbial spoilage due to long drying times,

more area and labor requirement. The indirect type solar dryer with modified drying cabinet was used for the drying of sliced bitter gourd and compared with existing drying cabinet with trays. Drying cabinet was modified with skewers on rack arrangement for proper air circulation over the samples and better maneuvering of samples during drying. The bitter gourd was washed and cut into slices, blanched and pretreated by dipping in KMS solution. The dried product obtained using modified drying cabinet was of better quality. The samples got dried during 12-25 sunshine hours. The pretreated bitter gourd slices dried in solar dryer has phenolic content (0.176-0.227 mg/g dry weight), flavonoids content (0.020-0.032 mg/g dry weight), and ascorbic acid (1.021-1.263 mg/g dry weight) with good rehydration characteristics. By drying of bitter gourd slices the postharvest losses will be reduced and it may also add to farmers' income if taken up as a business.

Keywords: bitter gourd, pretreatment, solar drying, quality.

Abstract ID- 3032020109

Economic Value of Ecosystem Services from Forest Ecosystem in Himalayas.

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Ecosystem services from forest ecosystem have significant importance in human wellbeing. Forest provides number of provisioning, supporting, regulating services that makes life possible in a way we know now. While making decision of altering forest ecosystem very little consideration is given to these ecosystem services, which result is temporary or permanent of these services. The most significant way to conserve the forest ecosystem monetary value to these ecosystem services need to be defined. The paper estimates the economic value of provisioning, supporting, regulating services and cultural services in all Himalayan State Uttarakhand, Himachal, Jammu and Kashmir, Arunachal, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, and states with some part of Himalayas Assam, West Bengal. Results showed that provisioning, supporting, regulating services and cultural services shares 50.95%, 40.09%, 7.87%, and 1.07% in the total economic value of all the ecosystem services. State wise economic values are (in Million) Uttarakhand (37464.14), Himachal (18439.78), Jammu and Kashmir (29057.88), Arunachal Pradesh (88806.92), Nagaland (16428.44), Manipur (22170.55), Mizoram (27644.00), Tripura (6344.20), Meghalaya (23712.95), Assam (48769.98), and West Bengal (14569.29).

Abstract ID- 3052020110

Disease Management of *Alternaria* sp. on *Grewia optiva*

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Grewia optiva (bhimal) is a popular tree found near agriculture fields in the hills. It occurs naturally in the field bunds and is conserved by the villagers for its multipurpose utility. It is considered as a family tree of inhabitants. During survey at Central nursery of Forest Research Institute, Dehradun; leaf spot disease on *Grewia optiva* was observed. The spots were found sunken, dry, necrotic and appear light brown to dark brown in colour. The pathogen was isolated and on the basis of morphological and microscopic features, the causal agent has been identified as *Alternaria* sp., which is newly reported disease-causing strain on this plant. Thus, the present study was conducted to evaluate the use of *Trichoderma koningii* and *Trichoderma viride* as an antifungal agent against *Alternaria* sp. by dual culture experiments. The growth of Alternaria spp. was found to be inhibited by *T. koningii* and *T. viride* and effectiveness of these biological agents against *Alternaria spp.* was compared with one systemic and two nonsystemic

commonly used fungicides obtained from the market. It was found that growth inhibition was higher using biological agents rather than chemical fungicides and using biological agents have their own significance and effectiveness as they are natural antagonistic organism to suppress the plant pathogens.

Keywords:-,*Alternaria* sp., Bhimal tree, Disease management, Fungicide, *Trichoderma* sp.

Abstract Id- 3052020111

Disease Management in *Saraca indica* using biological and chemical method

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The emerging diseases in agro-forestry sector need establishment of important methods for disease management. Among these, *Saraca indica*, commonly called as Asoka tree is one of an important tree in the cultural tradition of the Indian sub-continent and adjacent areas. In the present study, leaf spot disease of *S.indica*was investigated and the causal organism was identified as *Macrophomina* sp. The pathogenicity have been proved. Further, bio-efficacy of two plant extracts (*Murraya koenigii* and *Lantana camara*), bioagents and systemic and non-systemic fungicides was evaluated under in-vitro conditions against *Macrophomina* sp., *Phomopsis* sp, *Alternaria* sp., *Fusarium* sp. and *Pestalotiopsis* sp. The results indicate that *M. koenigii* and *L. camara* showed average mean inhibition of 64.04% and 45.8% respectively at 1.5% botanical concentration. Among the *Trichoderma* sp., *Trichoderma harzianum* showed an average mean of 66.62% growth inhibition against all pathogens while *Sphingobacterium* sp. showed maximum inhibition of 46.87% than *Pseudomonas fluorescens.* With above all, systemic and non-systemic fungicides (1%) were used where benomyl and mancozeb showed 100% mycelial growth inhibition. Thus, using combinations of different methods, we can bring the improvement and management of diseases occurring in important tree species.

Keywords: Ashoka tree, biocontrol, fungicide, disease management

Abstract ID- 3062020112

Generation Mean Analysis for Yield Traits in Basmati and Aromatic Rice

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The present investigation was undertaken to study gene action involved in the inheritance of various yield related traits in five crosses among basmati rice genotypes using generation mean analysis. Six generations P1, P2, F1, F2, BC1 and BC2 of each of these five crosses were evaluated in a replicated trial during kharif season 2019-20 at Norman E. Borlaug Crop Research Centre Pantnagar, Uttarakhand, India. Scaling test showed existence of epistasis in the inheritance of all the characters. Results showed higher magnitude of estimates of dominance × dominance interaction as compared to additive × additive interaction for grain yield and their components. Considering the sign of dominance (*h*) and dominance × dominance (/), the nature of epistasis was identified as duplicate for majority of the yield related traits in all the crosses.

Abstract ID- 3062020113

Impact of Crop Residues Burning on Soil Health

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Agriculture plays a major role in the overall economic growth of the world. Being an agriculture dominant country, India produces more than 500 million tons of crop residues annually. Crop residues benefit the soil physically, chemically and biologically. These are an excellent source of organic matter and plant nutrients. Crop Residue Burning has been identified as a major health hazard. It causes remarkable pollution problems in the atmosphere, huge nutritional loss and physical health deterioration of the soil. Apart from loss of nutrients, some of the soil properties like soil temperature, pH, moisture, available phosphorus and soil organic matter are greatly affected due to burning in the fields. The most common reason of burning crop residues in the fields is to clear the left over straw and stubbles after the harvest. Increase in the use of combine harvesters, non availability of labour and high cost of residue removal from the field are the other reasons behind burning of crop residues in the fields. Heat produced as a result of burning residues elevates soil temperature and ultimately causing death of beneficial soil organisms. As a result of frequent residue burning, there is complete loss of microbial population and reduction in the level of nitrogen and carbon in the top layers of soil profile. This in turn has lead to slow and steady reduction in soil health that will eventually result in reduced productivity that cannot be overcome with increased additions of mineral fertilizers. Conservation agriculture, with crop residues as an integral component, is an effective solution to the above challenges and this in turn will ensure a strong natural resource base and a healthy soil.

Abstract ID- 03062020114

COVID-19, Agriculture and Sustainable Development: Issues and Challenges Lying Ahead

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The present article is going to highlight the impacts of COVID-19 (Coronavirus Disease-2019) on sustainable development of our country. As we all are well aware with the fact that Coronavirus has emerged as an global pandemic and has taken lives of millions of people. But we can not deny the fact that it has also put large stones in the path of sustainable development. As we all are continuously losing human lives day by day, we can't deny the fact that the national lockdown has also caused negative impacts on the economy of the country. The farmers are also affected by this and facing losses due to poor sales of their produce. The GDP (Gross Domestic Product) growth rate has also fallen poorly due to it. Even government is also trying it's hard to cope up with this situation. But, the situation is getting out of reach again and again. Everyday, we are listening about increment in the corona cases and how doctors are working hard to heal them. So, how in such condition, our country is going to attain sustainable development? The answer to question is simple, but not as easy as it seems. Even our agricultural sector is also worst affected by the ongoing crisis of COVID-19. So, in such situation, we should contribute together in achieving this development by following rules and regulations like social distancing, working from home etc. And government can play a key role in it like development and implementation of those policies (like Agriculture-related policies) which will help in reducing the impact of coronavirus and uplifting the standard of living and quality of life of the people. Hence, by following all this, one day we will win this war against corona virus and will achieve the target of sustainability.

Keywords: *Coronavirus, Sustainable Development, Agriculture, Government, Policies*

Abstract - 03082020115

Economic Feasibility Of Different Organic And Ipm Modules Against Major Pest Of Okra

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The present investigation was carried out during 2017-2018 at Vegetable Research center,G.B. Pant University of Agriculture and Technology, Pantnagar .The trial was conducted for comparison of different organic module and IPM module in okra crop against major insect pest of okra crop.Amoung nine treatment chemically treated treatment followed by IPM module show high insect pest management as compare to other organic modules in case of sucking pest while in case of borer organic module was significantly better than IPM and chemically treated plot.The highest natural enemy population was found in organic module followed by IPM module. Even if chemical treatment is giving high yield, it can't be advisable as it is not safer as ecological point of view while the organic module with compairative low yield and lesser management of insect pest are advisable,as in today era the chemical poisioning is a major problem causing many other hazards like resistance ,resurgence and chemical residue.

Abstract - 03082020116

Review on therapeutic drugs from medicinal plants for Alzheimer's Disease

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Alzheimer's disease is a neurodegenerative disease particularly affecting elder people above the age of 65. AD is characterized by the depletion of beta-amyloid and tau proteins between neuronal glial cells and it also interrupts the neurotransmitter signaling. In spite of the large-scale drug development, a finite number of drugs only approved by the FDA. But these drugs making some adverse effects with indicative relief therefore alternative therapies are needed for AD. The literature survey suggests that various medicinal plants are improving mental and cognitive functions through influence the various biochemical pathways. Accordingly, one of the main approaches is to detect the pharmacological properties of medicinal plants. Nevertheless, several of these phytomedicines were not studied with AD patients in comprehensive clinical trials. Due to the limited bioavailability, the phytoconstituents doesn't reach the brain in potent concentration. This review represents the concerning statistics of pharmaceutical products recommended together with their limits, therapeutic goals, and drug production approaches for AD drug development. Numerous studies have demonstrated the therapeutic use of medicinal plants and their medicinal efficacy as a possible research and innovation strategy to AD therapeutic items outlined in this study. This article also emphasized the issue of optimization and metabolite screening in pharmacognosy of medicinal plants.

Keywords: Medicinal Plants, Alzheimer's Disease (AD), Alkaloids, Nootropics.

Abstract - 03082020117

Attitude And Perception Of Farmers Towards Natural Farming In Saurashtra Region

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Economic status of the people in country mostly depends upon the agricultural production. Need for more intensive and economic agricultural production led to in discriminate use of high doses of chemical fertilizers, pesticides *etc*. relentless use of these chemicals not only alter the ecosystem but also claim death to many lives every year due to their hazardous nature. Natural Farming is one such low-input, climate-resilient type of farming that encourages farmers to use low-cost locally-sourced inputs, eliminating the use of artificial fertilizers and industrial pesticides. Natural farming is a self-developing, self-nourishing and self-sufficient farming. So, in this system, there is no any human made exploitation. It is a pain free, care free and loan free farming. The present investigation might be the first attempt to assess farmers' attitude and perception towards natural farming in Saurashtra region. The results of the study will bring out selected characteristics of the respondents in relation to their attitude and perception towards natural farming. Further, this study will also involve constraints faced by respondents in natural farming. All these information and findings generated through the present study will be helpful to the whole community engaged in the promotion of natural farming in the region and beyond the boundaries.

Abstract - 03092020118

Silviculture: An Effective Tool for Climate Change

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The present article is an attempt to accentuate that silviculture can be used as an effective tool to deal with climate change. The predicted climatic changes within the coming years, will lead to the extinction of various important forest species from their present environments. An important role of forests outside conservation reserves will be act as a repositories for species which are threatened by the climate change. Silviculture can and should be used within these forests to maintain species in desired locations and to introduce them to suitable new locations. Native forest silviculture is complex and our understanding of most of the species is limited, but we must endeavour to overcome the effects of past disturbances and realise the various benefits that forests can provide us in future. With the current COVID-19 outbreak, nature is sending us the message that we have failed to take care of this planet. Forests have served as safety nets for human beings, as in this crisis of COVID-19 pandemic many essential supplies that public health systems rely on are derived from forest products. In addition to these consumable products, forest bathing is also considered as the best preventive medical therapy for many ailments. Hence by adopting significant silvicultural practices, the goal of sustainable forest management can be achieved that can withstand pandemics, climate changes and other global challenges.

Keywords: *Silviculture, COVID-19, Forest bathing, Sustainable Development*

Abstract - 03092020119

Disease management of *Alternaria* sp. on *Grewia optiva*

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Grewia optiva (bhimal) is a popular tree found near agriculture fields in the hills. It occurs naturally in the field bunds and is conserved by the villagers for its multipurpose utility. It is considered as a family tree of inhabitants. During survey at Central nursery of Forest Research Institute, Dehradun; leaf spot disease on *Grewia optiva* was observed. The spots were found sunken, dry, necrotic and appear light brown to dark brown in colour. The pathogen was isolated and on the basis of morphological and microscopic features, the causal agent has been identified as *Alternaria* sp., which is newly reported disease-causing strain on this plant. Thus, the present study was conducted to evaluate the use of *Trichoderma koningii* and *Trichoderma viride* as an antifungal agent against *Alternaria* sp. by dual culture experiments. The growth of Alternaria spp. was found to be inhibited by *T. koningii* and *T. viride* and effectiveness of these biological agents against *Alternaria spp.* was compared with one systemic and two nonsystemic commonly used fungicides obtained from the market. It was found that growth inhibition was higher using biological agents rather than chemical fungicides and using biological agents have their own significance and effectiveness as they are natural antagonistic organism to suppress the plant pathogens.

Keywords:-,*Alternaria* sp., Bhimal tree, Disease management, Fungicide, *Trichoderma* sp.

Abstract- 03092020120

Influence of foliar fertilization of zinc and copper on photosynthetic pigments and herbage yield of vegetatively propagated *Bacopa monnieri* (L.)

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Bacopa monnieri (L.) Pennell is one of the most important medicinally important herbs, commonly known as Brahmi and used as a memory promoter and in neurological disorder. The principal constituents of this plant are dammarane-type triterpenoid saponins (bacoside). It is well known that Copper and Zinc, are required as micronutrients in biological systems to act as a co-factor and/or as a part of prosthetic groups of enzymes in a wide variety of metabolic and developmental pathway. But little is known about the combined effects of Cu and Zn fertilizers on *Bacopa monnieri*. To find out the effect of foliar application of zinc and copper alone/combinations on photosynthetic pigments that correlated with overall herbage yield, an experiment was conducted in the year 2019-2020 at GBPUA&T, Pantnagar. For Biochemical studies the samples were analysed after 10 days of two sprays i.e. first foliar spray and second foliar spray in 30 days of interval whereas the herbage yield was observed after each spray in 30 days of interval. The study revealed a significant increase of 33.07% in Chl a with concentration of Cu (1 ppm) and 67.81% with Zn (2.5ppm) after 10 days of first foliar spray when compared with control. While 297.21% increase in Chl b with Zn (2.5 ppm) and 115.22% increase with (1ppm Cu+2.5ppm Zn) was reported after 10 days of second spray when compared with the control. The highest percent (75.55% and 69.64%) of total chlorophyll and the Carotenoid (205.77% and 87.81%) was produced from plants sprayed with Zn (2.5 ppm) after two (first and second) foliar sprays over control. However, higher doses of foliar supply reduced the chlorophyll and carotenoid production. There was a significant increase in fresh herbage yield per m-2 (39.91% and 43.06%) and dry herbage yield per m-2 (58.37% and

114.21%) of the plant when Zn (2.5 ppm) was applied foliarly twice after 30 days of interval. Hence, it is concluded that the uptake of optimum level of Zn and Cu significantly affected concentrations of chlorophyll a, chlorophyll b, total chlorophyll and carotenoid in the leaves of Bacopa followed by improved yield of a crop.

Keywords: Herbs, Micronutrients, Photosynthetic pigments, Herbage yield.

03092020121

Effect Of Mulching, Nitrogen Levels And Weed Management Practices On Crop Growth Rate Of Direct Seeded Rice In Eastern Uttar Pradesh Under Rainfed Condition

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A field experiment was carried out in the year 2014 and 2015 at experimental field of Banaras Hindu University, Varanasi, Uttar Pradesh to evaluate the influence of mulching, nitrogen levels and weed management practices on crop growth rate of direct seeded rice. Twenty-four treatment combinations consisting of two mulching *viz*. no mulch and live mulching (brown manuring with *Sesbania*) and nitrogen levels (120 kg ha^{-1}, 150 kg ha^{-1} and 180 kg ha^{-1}) in main plot and four weed management practices *viz*. weedy check, two hand weeding at 20 and 40 DAS; azimsulfuron @ 30 g ha^{-1} + bispyribac-sodium @ 25 g ha^{-1} at 10-15 DAS; pendimethalin @ 1 kg ha^{-1} at 1-3 DAS *fb* bispyribac-sodium @ 25 g ha^{-1} 15-20 DAS were allocated to sub plots. Observations on CGR were taken at 30 days interval after sowing. It was observed that CGR increased gradually with advancement of crop growth stage reaching its maximum value during 60-90 DAS and after 90 DAS till harvest it declined drastically. Mulching, nitrogen levels and different weed management practices significantly influenced crop growth rate under direct seeded rice. The effect of brown manuring with *Sesbania* was found non-significant initially however at later stages it resulted in significantly higher crop growth rate over no mulching for both the years. Under nitrogen levels 180 kg N ha^{-1} recorded highest value being statistically at par with 150 kg N ha^{-1} and amongst various weed management practices, pendimethalin @ 1kgha^{-1} *fb* bispyribac-sodium @ 25g ha^{-1} achieved higher growth character at all crop growth stages for both the years.

Key words: Direct seeded rice, CGR

Abstract- 03092020122

Importance of mushroom cultivation

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Cultivated mushrooms have now become popular all over the world. There are over 200 genera of macrofungi which contain species of use to people.Common mushroom (*Agaricus*), Shiitake *(Lentinus)*, Oyster (*Pleurotus*), Straw (*Volvariella*), Lion's Head or PomPom (*Hericium*), Ear (*Auricularis*), Ganoderma (Reishi), Maitake (*Grifolafrondosa*), Winter (*Flammulina*), White jelly (*Tremella*), Nameko (*Pholiota*), and

Shaggy Mane mushrooms (*Coprinus*). Commercial markets are dominated by *Agaricusbisporus*, *Lentinulaedodes* and *Pleurotusspp*, which represent three quarters of mushrooms cultivated globally.
The consumption of mushrooms can make a valuable addition to the often unbalanced diets of people in developing countries. Fresh mushrooms have a high water content, around 90 percent, so drying them is an effective way to both prolonge their shelf-life and preserve their flavour and nutrients. Recently, there has been a spectacular growth in, and commercial activity associated with, dietary supplements, functional foods and other products that are 'more than just food'. Mushroom cultivation activities can play an important role in supporting the local economy by contributing to subsistence food security, nutrition, and medicine; generating additional employment and income through local, regional and national trade; and offering opportunities for processing enterprises. Mushroom cultivation can make a valuable contribution to sustainable livelihoods for both rural and urban poor, because they are highly compatible with other livelihood activities, requiring minimal physical and financial inputs and resources, to be undertaken successfully.. Indeed, the basic requirements centre on an identified source for purchasing spores, access to suitable substrate and the means to sterilize it, some bags and a clean, dark room to cultivate in. For people interested in experimenting, the range in types of mushrooms and cultivation techniques can prove challenging and gratifying.

Keywords: Shiitake (*Lentinus*), Oyster (*Pleurotus*) ,'more than just food'.

Abstract- 03092020123

Management of Chronic Vaginal Prolapse with EVP in a Crossbred Cow: A Clinical Case Study

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A pleuriperous 8 month pregnant crossbred cow aged 6 year and 6 month was presented with the chronic history of vaginal prolapse since three months. It was her third pregnancy and suffered with the problem in every gestation. The prolapsed vagina was reposited every time by the farmer or local vet and medicines and rope truss was used to manage the problem. The clinical observations show that cow was healthy with normal feeding and watering. The faeces were of normal consistency but defecating with slight straining. In this case, the exposed part was swollen, reddish pink hanging out through vulvar lips. Cold water application was made to reduce the prolapsed mass and to remove any debris and finally, potassium permanganate solution used to cleanse. Cold water application reduced the mass significantly and the prolapsed mass was reposited after evacuating the urinary bladder with little amount of urine. Rope truss was applied to reduce the possibility of relapse. Cow was orally administered with 60 g of fresh aerial roots of banyan tree (*Ficus bengalensis* Linn.) for 14 days. Although, the problem was resolved on 7^{th} day and rope truss was removed on 9^{th} day, however, on day 15^{th}, the cow was declared to be recovered and kept under observation till parturition with no recurrence of the vaginal prolapse. The current case study reflects the use of ethnoveterinary practice (EVP) for the successful management of prepartum vaginal prolapse in a female cow which needs to be validated further.

Keywords: Pleuriperous cow, Vaginal Prolapse, Prepartum, EVP, Banyan tree.

03092020124

EVP Management of Haemolactia in a Crossbred Cow: A Case Study

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Haemolactia i.e. blood in milk, is an indication of a ruptured blood vessel in the mammary gland which may be due to internal or external trauma. A primiperous Holstein Frisian crossbred cow aged 4 years 6 months, yielding 6 kg milk per day was presented in the veterinary hospital with the problem of red coloured milk in left forequarter, since 2 days. The feed and water intake were normal and defecation and urination were also normal. The left fore-teat was grossly enlarged but the cow has no history of trauma and pain. The clinically observed cow was good in health with normal rectal temperature (100.5° F). The milk from the left forequarter was reddish in colour with grossly clotted blood in milk and the other three quarters appear normal. The milk samples from left forequarter, right fore and hind quarters were positive on laboratory analysis for erythrocytes and negative for mastitis. The current was diagnosed as Haemolactia. As the case was not affected with mastitis and depending upon the severity of the current problem, 4 handful (250 g) fresh leaves of curry leaf plant were administered orally, twice a day for 5 days. There was uneventful recovery in 5 days. The current case of haemolactia reflects the successful use of ethnoveterinary practice (EVP) for the treatment in a Holstein Frisian crossbred primiperous cow which needs to be validated further in the interest of society and increasing antimicrobial resistance.

Keywords: Crossbred cow, Haemolactia, Curry leaves, EVP, Antimicrobial resistance.

Abstract- 03092020125

Management of Corneal Opacity in a Buffalo with EVP: A Case Study

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A graded murrah buffalo aged 5 years was presented with impaired vision and complete bilateral corneal opacity since 3 days, affected 12 days post haemorrhagic septicaemia (HS) and foot and mouth disease (FMD) combined vaccination. The feed and water intake, defecation and urination of the buffalo were also normal. The treatment was given by the local vet with no response. It was also reported that 6 months earlier, the buffalo had also suffered with same problem post vaccination with the same combined vaccination and got treated successfully. It is most probably the first such case encountered post-vaccination with HS and FMD combined vaccine. The clinical observations revealed that buffalo was good in health with 100.5° F rectal temperature, deviated gait, loss of vision with both eyes, no lachrymation and conjunctivits, no foreign body or parasite in the eyes. Clinically, the case was diagnosed as bilateral corneal opacity. A combination of triturated fresh betel vine leaves (5 numbers), black pepper seeds (5 numbers), and common salt (5 g) and distilled water (3.0 ml) added to extract the solution for treatment. 2 - 3 drops of extracted solution were instilled thrice a day for five days and on 6th day, buffalo had regained eyesight and was declared to be recovered. The current case study reflects the use of ethnoveterinary practice (EVP) for the successful treatment of the corneal opacity in a she buffalo which needs to be validated further.

Keywords: Corneal opacity, EVP, Buffalo, Treatment.

Abstract- 03092020126

Combining ability studies based on *Mori* CMS system in Indian mustard [*Brassica juncea* (L.)Czern and Coss]

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Line x tester analysis was carried out to estimate combining ability effects of 50 hybrids developed by crossing 10 *Mori* CMS lines with five restorers in Indian mustard [*Brassica juncea*(L.) Czern and Coss]. The F1 hybrids along with parental genotypes planted at Oilseeds Research Area, Department of Genetics & Plant Breeding, CCS Haryana Agricultural University, Hisar India during 2018-19 which evaluated for 12 characters including days to 50 % flowering, days to maturity, plant height (cm), number of primary branches per plant, number of secondary branches per plant, main shoot length (cm), numbers of siliquae on main shoot, siliquae length (cm), number of seeds per siliquae, 1000-seed weight (g), oil content (%) and seed yield per plant (g). Analysis of variance revealed that sufficient genetic variability present among lines, testers and crosses for most of the traits. There was presence of both additive and non-additive gene actions with preponderance of non-additive gene action in controlling yield and component traits. On the basis of overall performance of parents, line MA-023 and tester MR-38 were found the best general combiners for majority of component traits including seed yield per plant. Other three lines *viz*, MA-8701, MA-8812 and MA-9301 were also observed as good general combiners for most of component traits including seed yield per plant. Tester MR-43 and MR-44 were found good general combiner for earliness. On the basis of *per se* performance and specific combining ability, crosses MA-9301 x MR-44, MA-8701 x MR-38 and MA-9705 x MR-31 were observed as superior cross combinations for seed yield in desirable direction.

Key words: *Brassica juncea*(L.), Gene action, GCA, SCA, heterosis, *Mori* CMS

Abstract- 03092020127

Diversity, Antagonism And Plant Growth Promotion Activities Of Endophytic Fungi Associated With *Anaphalis Contorta* (D.Don) Hook. F.

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Anaphaliscontorta being a medicinal plant harboured large number of endophytic fungi. The endophytic fungi show unique symbiotic biological system which leads to production of various bioactive compounds. In the present study, endophytic fungi were isolated from leaf, stem, root and inflorescence of the host plant. A total of 40 different endophytic fungi were isolated. The endophytes were identified based on colony morphology and sporulatingstrucuturesand were grouped under 16 genera, 13 families and 4 classes (Dothideomycetes, Mucoromycetes, Eurotiomycetes, Sordaromycetes) along with 4 morphotypes of Sterile mycelia. *Penicillium*, *Trichoderma*, *Fusarium*, *Colletotrichum* and *Cladosporium* were the most frequently isolated genera. The diversity of the fungal isolates was analysed using Simpson's dominance index, Simpson's diversity index, Species richness, Shannon-Wiener index and Evenness. Antagonistic activity of 10 fungal isolates were evaluated using in-vitro dual culture technique against 3 fungal plantpathogens (*Curvularialunata*, *Fusariumoxysporum* and *Rhizoctoniasolani*) and 2 fungal human

pathogens (*Aspergillus niger* and *Aspergillus flavus*) and calculated their percentage of inhibition. The genus *Trichoderma*shows prominent antagonistic activity.To assessed plant growth promotion activities all the isolates were screened for the production of ammonia and hydrogen cyanide and also phosphate solubilisation.Thirty-seven fungal isolates produced ammonia, 20 produced hydrogen cyanide and only 2 isolates could solubilize phosphate. The antagonistic activity suggests production of antimicrobial compounds which can be use aseffective biocontrol agent and treating mycoses. The plant growth promotion abilities of the endophytic fungicould serve as animportant source of biofertilizer for sustainable agriculture.

Key words: Endophytic fungi, bioactive compounds, antagonistic activity, biocontrol.

Abstract- 03092020128

Characterizing the Physiological Trails for Improving Heat Tolerance In Wheat (*Triticum Aestivum* L.) Under Different Sowing Conditions

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Wheat is considered as the 'king of cereals' and consumed by majority of world's population. Its production is highly influenced by various abiotic stress factors like drought, high & low temperatures, salinity etc. Among these elevated temperatures during anthesis and grain filling (sensitive stage) is the most prominent one. Delayed sowing is the major cause of elevation in temperature during anthesis which ultimately reduces the crop yield. Various studies suggested numerous traits related to heat tolerance which are heritable, additive in nature and shows continuous variation. Identifying these traits in different wheat varieties provides greater scope for study of thermo-tolerant behaviour in wheat which helps to assist the selection of heat tolerant genotypes. To observe the effect of terminal heat stress on four different wheat varieties an experiment was conducted in two consecutive years 2018 and 2019 with two different sowing dates i.e; November(timely) and December(lately). The results revealed that the chlorophyll fluorescence in flag leaves of different wheat varieties were found higher during anthesis but reduces upto 28.08% when plant reaches towards grain filling in both sowing conditions, while the values of fv/fmax were found differentially affected in different varieties by delayed sowing. Maximum photosynthetic efficiency was found in variety HD3086 (0.76) under timely sowing condition & in variety UP2565 (0.75) under delayed sowing. Canopy temperature depression was also measured to identify the fitness of plant under heat stress condition and it was found that during anthesis wheat varieties showed cooler canopy by 11.49 $^{\circ}$C in late sowing condition and during grain filling by 9.76ºC under timely sowing. Heat susceptibility index (HSI) was measured to analyse the ratio of plant performance for grain yield under stressed and non-stressed condition and it was found that variety HD3086 and UP2526 are the most tolerant varieties with minimum HSI (0.226 and 0.251).

Abstract- 03092020129

Effect of staggered transplanting on incidence of different insect pests on cabbage and cauliflower in Manipur conditions

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Cabbage and cauliflower areone of the most important vegetables grown in *rabi*season in Manipur. These are attacked by several insect pests, mainly Cabbage butterfly, Diamondback moth and Aphids which constitutes the important insect pests of Cole crops in Manipur conditions. When seedlings were transplanted on five different dates at 15 days interval starting from second fortnight of October to second fortnight of December,there were marked variations of insect incidence on the crop in different transplanting dates. The first transplanted crop (15 Oct) recorded lowest population of Diamondback moth (DBM) both in cabbage and cauliflower i.e. 1.08 and 0.97no. of larvae/ plant. Aphids incidence was also lowest in early transplanted crop i.e. 0.25 and 0.35 no. of aphids/ square inch leaf area in cabbage and cauliflower. Incidence of DBM and aphids infestation was followed by the subsequent planting dates i.e. 1 November, 15 November and 1 December. The highest population of Diamond back moth and aphids were observed in late transplanted crop i.e. 15 December. The incidence of Diamondback moth on late transplanted crop was 3.02 and 3.29 no. of larvae/ plant in cabbage and cauliflower. Highest aphid infestation was also in late transplanted crop i.e. 11.76 and 11.89 no. of aphid/ square inch leaf area in cabbage and cauliflower. The pooled data of two years showed that there exists a significant difference between staggered planting dates and incidence of Diamond back moth and aphids.Incidence of cabbage butterfly remained almost similar throughout the crop period irrespective of planting dates. There were no significant difference between staggered transplanting of cabbage and cauliflower and incidence of cabbage butterfly.

Key words: Transplanting dates, Cabbage and cauliflower, Manipur, Diamond back moth, Cabbage butterfly, aphids

Abstract- 03092020130

Growth behaviour of chickpea varietiesas influenced by different plant rectangularity

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Among pulses, chickpea (*Cicerarietinum* L.), the premier pulse crop of Indian subcontinent, is predominantly consumed as a pulse. The seeds of chickpea contain about 18-22% protein, 52-70% total carbohydrates, 4-10% fats, 6% crude fibre and 3% ash. India is the largest chickpea producer as well as consumer in the world. For raising the production of chickpea, varietal response may vary to a great deal particularly with respect to seed rate and row spacing arrangement as late planted crop has less vegetative growth. One of the major constraints of poor yield of chickpea is improper population. Too low plant population at harvest beyond a certain limit very often affects the crop yield adversely. Number of plants per unit area influences plant yield components and ultimately the seed yield. Plant spacing in the field is very important to facilitate aeration and light penetration into plant canopy for optimizing rate of photosynthesis. Row spacing is also one of the important factors which ultimately affect nutrient uptake, growth and yield of plant. Increase in spacing decreases the total population, but with more nutrition to the individual plant grows better and yield more and vice-versa. This increase or decrease of plant population per unit area has definite pattern in relation to the yield. The plants are able to utilise

available space by initiating lateral branches and, thus, can compensate for poor emergence and thin stands. Increasing row or plant spacing significantly influenced the growth, yield attributes and yield characters**.** Both over and under plant densities resulted in significant yield decrease. So the plant rectangularity, one of the important crop density characters, can be manipulated either by varying row or plant spacing or by both to attain the maximum production from unit land area.

Keywords: Chickpea, Variety, Plant rectangularity, Yield.

Abstract ID- 03092020131

Determination of antagonistic effect of bioagents on seed mycoflora of okra (*Abelmoschus esculenta*) and effect on seed health.

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The biological control has received a worldwide attention and is being integrated effectively with other management practices, in the content of environmental pollution the use of biological agents is considered quite safe. Three bio agents *Trichoderma harziznum, T. viride* and *Pseudomonas fluorescens* were evaluated for their potentiality on seed borne fungi, germination percentage and seedling parameters in okra *in vitro* condition. The collected seeds were coated with spore suspension of each strains of *Trichoderma* supplemented with 2% of starch (w/v) as an adhesive at the rate $5x10^5$ conidia/ml and talc powder formulations of *P.fluorescens* ($1x10^8$) at the rate 5g/kg seed. All the antagonists reduced the seed mycoflora incidence, significantly increased seed germination, root and shoot length although the results varied with different bio agents treatments. The treated seeds were evaluated for reduction of *Helminthosporium sp., A.flavus, Fusarium sp., C.lunata* and *R.stolonifer.* The experiment indicated that *T. harziznum* was more effective in reducing the seed associated fungi and proved to be superior for inhibition of the above pathogen as compare to *T.viride* and *P.fluorescens.* Less association of seed borne fungi was exhibited by pre treated seed samples over untreated ones (control). Further investigations however were required to study *in vivo* effect of *Trichoderma* strains on morphological characteristics in okra plant and fruit production.

Key words: Bio agents, *Trichoderma harzianum,* spore suspension, seed mycoflora, seedling parameters, okra.

Abstract ID- 03092020132

Actinomycetes- A Credible Tool For Agricultural Sector

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Developing countries, like India where grains are the staple food, face a huge demand, as we are facing depletion and receding towards a sustainable future. The need for peddling and remunerative development peaks the insistence for various cash crop products. The emergence of many phytopathogens constitutes serious threats to quality. Extensive use of fertilizers, fungicides, insecticides, etc., often expend the soil fertility, its composition, and pose a threat of risk to human health through Bio amplification although farmers reap the benefits.Introducing favourable bacteria in the soil could be an efficient and facile alternate farming technique rather depending upon the use of chemicals. Microorganisms play a vital role in soil and plant health, among which actinomycetes are a group of the rhizosphere colonizing bacteria with various growth-promoting accredits.Actinomycetes are the presiding group of soil population along with bacteria and fungi.Actinomycetes establish host-rhizosphere symbiosis and are capable of producing enzymes and organic compounds beneficial to the plants. They are capable

of breaking down complex compounds in the soil into simpler forms for the plants to absorb easily. Actinomycetes are also found to act against plant pathogens and in the production of plant growth-promoting factors such as IAA, siderophores etc., with few of them being commercialised.This article shows the importance of this group of bacteria as a potential tool for more eco-friendly and sustainable agriculture and focuses on the isolation and characterization of novel actinomycetes from agricultural soil and that may pose an alternative to chemicals and fertilizers in improving the soil fertility and plant health.

Keywords: Actinomycetes, Agricultural sector, Soil fertility, Rhizosphere Bacteria

Abstract ID- 03092020133

Phytochemical Analysis Of *Calotropis Giantea* And *Vitex Negundo*

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Calotropisgigantea known as Giant Calotrope, bowstring hemp andswallow-wort belongs to the family Asclepiadaceae.It is a shrub, salt-tolerant weed, drought-resistant plant and a wasteland weed,which grows in a warm climate on dry, sandy and alkaline soil. *Vitex negundo*is known as Indian pivet, horseshoe Vitex and Chinese Chaste tree.It belongs to the family Verbenaceae.It is an aromatic shrub or a small tree and grows abundantly in tropical to temperate regions. The parts of flowers and leaves from *Calotropis gigantea* and *Vitex negundo*were collected and extracted usingsolvents such asethanol, chloroform and water in different ratios.1:10(1gm of plant sample and 10 ml of solvent)and1:50 (1gm of plant sample and 50ml of solvent). Phytochemical such asalkaloids,saponins, carbohydrates, proteins, tannins, amino acid, anthraquinone glycosides, phenols, cardiac glycoside, coumarins, lipids, quinone were analysed. Fats and oils present in the plant extracts were estimated qualitatively. Water was selected as the solvent for the study as it is safe for the environment and human consumption when compared to solvents such as chloroform and ethanol. Macromolecules such as carbohydrates, proteins, phytosterols were also determined quantitatively. Alkaloids and saponins were found to be present ata high levelin both fresh and dried extracts of flowers and leaves of*Calotropis gigantea* and *Vitex negundo*. Quantitative levels of coumarins and phytosterols were determined.Qualitative analysis showed moderate levels oftannins, amino acid, anthraquinone glycoside and terpenoids.Low level of cardiac glycosides was confirmed.

Abstract ID- 03092020134

Ethnoveterinary Treatment of Diarrhoea in Crossbred Cows - The Case Reports

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Two crossbred Holstein Frisian lactating cows were presented with chronic diarrhoea, partial anorexia and reduced milk yield since more than 18 days. They were found to be afebrile, alert and clinically normal except the diarrhoea. Although, there are numerous causes of diarrhoea and internal worm infestation is one of them. However, the faecal samples tested were negative for any intestinal worm infestation. Both the cows were previously administered with antimicrobials and anthelmintics by local veterinarians with no significant result. Both the cows were diagnosed as diarrhoic with non-infectious origin. Chronic diarrhoea impairs the antioxidant defense system in both the small and large intestine. The phenolic constituents of brinjal (*Solanum melongena*) fruits increases with roasting, thus the biological activity of antioxidant compounds which may play the positive role in the treatment of diarrhoea. So, both the cows were decided to administer orally one kg roasted brinjals sprinkled with 10 – 15 gm common salt, once in a day for 3 – 4 days. On fourth day, both the cows were recovered from diarrhoea with normal feed and

fodder intake. There was also an increase of 1 kg of milk production per day in both the cows . These cases have been successfully treated with ethno veterinary medicine (EVM) by feeding the brinjal fruits. However, no use of brinjal has been documented previously for diarrhoea in cattle and buffaloes and therefore, it has to be suggested for further investigations.

Key Words: Cow, Faeces, Diarrhoea, EVM, Brinjal

Abstract ID- 03092020135

Genetic Divergence Study In Bread Wheat Genotypes For Yield Attributing Traits In Addition To Grain Zinc & Iron Content

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Wheat is considered as one key staple food crop in numerous places of our globe not only in terms of the area under cultivation but as a source of food also. It covers all the continents of the globe, engaging 17% of the world acreage of crops and feeds almost 40% population globally. Malnutrition of micronutrient, predominantly the deficiency in Zinc and Iron worldwide afflicts more than three billion people. Since the Green Revolution, the yields of cereal grains worldwide have been boosted spectacularly, but cereal-based diet falls petite to provide adequate nutrients. The genetic diversity of various crops has drastically been wrinkled with the domestication and courses of breeding. Keeping these considerations insight, the current experiment was conducted by taking 30 bread wheat genotypes in the experimental area of Wheat Breeding section of DRPCAU, Pusa, Samastipur, Bihar during the *Rabi* season of 2019-20. The total 30 bread wheat genotypes under investigation were grouped into nine clusters. Cluster II included eight genotypes which were the highest followed by Cluster I, IV and VII containing 6, 6 and 5 genotypes respectively. The utmost inter-cluster distance was noted between the clusters VII and IX and the least inter-cluster distance was noted between the clusters V and VI. Genotypes RAUW-18-15, RAUW-18-21, DBW 16, BHU 25, RAUW-16-4 were recorded genetically diverse having the highest intra-cluster distance. The highest contribution in manifesting genetic divergence was revealed by grain Fe content, followed by grain Zn content, days to fifty percent flowering, 1000-grain weight, grain yield per plant, number of grains/ ear. This means it may be rewarding to execute selection for these traits.

Keywords: Wheat, Micronutrient Malnutrition, Clusters, Genetic divergence.

Abstract ID- 03092020136

Evaluation Of Pre Plantherbicides On Weed Management In Transplanted Rice

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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 late *Samba*(*Rabi*) 2018-19, to study the effect of pre plant application of herbicides on weed control efficiency, grain yield and economics of rice. Treatments consisted of three pre plant herbicides *viz*., glyphosate 2.5kgha^{-1}, glufosinate ammonium 1.0kgha^{-1}, halosulfuron methyl 67.5gha^{-1} and control. Pre plant herbicides were sprayed 15 days before puddling. The paddy variety TRY 3 was used.Observations on weeds density, dry weight, weed control efficiency before puddling, 40 and 60 DAT in paddy, grain yield were recorded and

economics were assessed. Results revealed that among the pre plant applicationof herbicides, glufosinate ammonium 1.0 kg ha^{-1} recorded lower total weed density (5.0 m^{-2}), dry weight (7.1 g m^{-2}) and higher weed control efficiency (99.3%) over other pre plant applicationof herbicides at the time of puddling. However, it was comparable with glyphosate 2.5 kg ha^{-1}, which registered lower total weed density(15.0 m^{-2}), dry weight (12.5 g m^{-2}) and higher weed control efficiency (98.7%). Whereas in paddy, pre plant application of glyphosate 2.5 $kgha^{-1}$ registered significantly lower total weed density(18.1 and 16.7m^{-2}), dry weight (14.5 and 15.0 gm^{-2}) and higher weed control efficiency (78.1 and 88.3%) on 40 and 60 DAT respectively. This was followed by application of glufosinate ammonium 1.0 $kgha^{-1}$. Among the pre plant herbicides, glyphosate 2.5 $kgha^{-1}$ recorded significantly higher grain yield (4232 $kgha^{-1}$), net return (Rs. 54391 ha^{-1}) and B:C ratio (2.51) over control. However, this was on par with glufosinate ammonium 1.0 $kgha^{-1}$, which gave grain yield (4145 $kgha^{-1}$), net return (Rs. 51198 ha^{-1}) and B:C ratio of 2.39. From the above study, it could be concluded that pre plant application of glyphosate 2.5 kg ha^{-1} or glufosinate ammonium 1.0 kg ha^{-1}at 15 days before puddling recommended for effective weed control as well as higher productivity and profitability of transplanted rice. Recently, glyphosate has been banned in many states in India includes Kerala, Punjab, Maharashtra and Andhra Pradesh. In this field experiment, glufosinate ammonium was comparable with glyphosate in controlling weeds as well as improving rice yield. Hence, it may be an alternative to glyphosate in future.

Abstract ID- 03092020137

Analysis of variance for phosphorous in various species of *Vigna*

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The Present investigation was conducted in crop research centre, G. B. Pant University of Agriculture and Technology, Pantnagar. Twenty four yield, yield contributing and root morphological traits were used to identify superior genotypes among 31 genotypes of eight *Vigna* and one *Phaseolus* species based on normal (100%) and deficient (50%) Phosphorous conditions. The species included nine blackgram and mungbean genotypes each, three wild relatives of blackgram and one mungbean, three genotypes of rice bean and five genotypes of cowpea and one genotype of common bean. The experiment was planted in *kharif* season in Randomized Block Design with two replications. Analysis of variation of twenty four traits revealed that estimated variances for all the characters under study were significant, which indicates sufficient variation among the genotypes under study. Seed yield per plant and 100 seed weight in both conditions i.e. sufficient (100 %) and deficient (50%) showed highly significant differences.

Key words: *Vigna*, *Phaseolus*, genotypes, Analysis of variation

ABSTRACT ID- 03092020138

Effect of organic manures and inorganic fertilizers on growth, flowering and yield of gladiolus (*Gladiolus grandiflorus* L.)

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The present investigation was carried out at Model Floriculture Centre, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, District- Udham Singh Nagar, Uttarakhand, during October 2015 to April 2016. Investigation was laid out in randomized block design (RBD) with 9 treatment and three replications to study the effect of organic manures and inorganic fertilizers on growth, flowering and yield of gladiolus (*Gladiolus grandiflorus* L.)". Observations were recorded on various parameters of vegetative

growth, flowering and corms attributes. At 60 days the maximum plant height (76.87 cm) was obtained in T_2 (Farmyard Manure + 75% Recommended Dose of Fertilizers) while the maximum leaves number/plant (13) was exhibited by T_5 (50% Farmyard Manure + 50% Neem Cake). Regarding flowering characters the treatments T_6 (75% Farmyard Manure + 25% Poultry Manure) responded best result especially in commercial traits like spike length (100.83 cm), number of floret/spike (15.58) and rachis length (56.17 cm). In respect of corms characters there were a positive response by the application of various organic manures. The maximum number of corm/plant (1.9) was recorded in T_8 (75% Vermicompost + 25% Poultry Manure) while maximum weight of single corm (146 g) was found in T_5 (50% Farmyard Manure + 50% Neem Cake). The equal proportion of all organic manures [T_9 (25% Farmyard Manure + 25% vermi compost + 25% Neem Cake + 25% Poultry Manure)] recorded maximum number of cormels/plant. On the basis of present findings it may be concluded that there was a positive effect of the application of organic manures on vegetative growth, flowering, and corms characters as well as to sustain the soil fertility by the residual presence of nitrogen, phosphorus, potassium, organic carbon and maintenance of normal pH and electrical conductivity of the soil.

Abstract ID- 03092020139

Cardamom (Elaichi): A health-conscious spice

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Cardamom is one of the world's very ancient and expensive spice, second only to saffron. It is often adulterated and there are many inferior substitutes from cardamom-related plants, such as Siam cardamom, Nepal cardamom, winged Java cardamom. However, it is only *Elettaria cardamomum* which is the true cardamom. *Elettaria cardamomum* Maton, belonging to the family *Zingiberaceae*. In India, cardamom is cultivated in the southern states of Kerala, Karnataka and Tamil Nadu. India is one of the biggest producers of cardamom in the world. The useful part of cardamom is the dried mature fruit. It is usually termed as a capsule. Cardamom is used for flavoring cakes, curries and bread and for other culinary purposes. Cardamom is also used for digestion problems including heartburn, intestinal spasms, irritable bowel syndrome, diarrhea, constipation, liver and gallblader complaints, and loss of appetite. It is also used for common cold and other infections, cough, bronchitis, sore mouth and throat, urinary problems epilepsy.

Keywords: Cardamom, *Elettaria cardamomum* and capsule spice.

Abstract ID- 03092020140

Malnutrition is still a serious problem for India

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India is a country historically plagued by malnutrition. An inadequate diet can lead to malnutrition. Malnutrition is a condition which is caused by an imbalance between what a person eats and the nutrients that they need to maintain good health. Macro and Micro nutrients are part of nearly every process in your body. Some even act as antioxidants. Due to their important role in health, they may protect against diseases. Green leafy vegetables, such as spinach, legumes, nuts, seeds, milk, fish oil, beans and whole grains, are good sources of macro and micro nutrients. According to Food and Nutrition

Board - Ministry of Women and Child Development -India, malnutrition in India continues to be at a high level with 42.5% children below the age being underweight and almost 70% being anaemic. 22% children are born with low birth weight. Lack of adequate information on nutritional needs, has been identified as a major factor for the prevailing nutritional situation in the country. Child malnutrition is both the result of economic conditions and poor nutritional awareness. Nutrition education and extension has been recognized as one of the long-term sustainable interventions essential to tackle the problem of malnutrition and to generate awareness and to promote the nutrition status of the country. In order to relieve malnutrition and prevent obesity, India's government must continue taking an active role in the affairs of its citizens. The benefits of the eradication of malnutrition would be enormous, not only in terms of the alleviation of human suffering, but in financial terms as well.

Keywords: Malnutrition, Macro and Micro nutrients

Abstract ID- 03092020141

Impact of Climate Change on Plant Diseases

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Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have also been identified as significant causes of recent climate change, often referred to as "global warming". Climate systems change more rapidly than in the past. Change in temperature will directly influence infection, reproduction, dispersal and survival of a pathogen. Rise temperature can modify host physiology and resistance. In case of soil borne pathogen *Sclerotium rolfsii* infesting groundnut, it has been observed that the resistant variety at temperature 35 ^{O}C lost resistance and variety show susceptibility. High winds, summer storms, rains etc. may create wounds on plant parts and which will facilitate the entry of phytobacteria into the hosts. Effect of acid rain has been observed on four patho-systems: alfalfa leaf spot, peanut leaf spot (PLS), potato late blight (PLB), and soybean brown spot. These diseases were found to increase with acid rains. Elevated ozone concentration may enhance the fungal and bacterial diseases of crop plants. If changes in atmospheric composition and global climate continue in the future as predicted, there will be relocation of crops and their diseases and impacts will be felt in economic terms from crop loss. Survival, longevity and aggressiveness are increased with passage of time due to change in climatic condition. There is a need to develop and apply a standard methodology for various studies related to climate change and agriculture.

Key words: climate change, plant disease, pathogen, resistance and susceptibility

Abstract ID- 03092020142

Evaluation of Liquid Formulations of *Trichoderma* spp. and *Pseudomonas* spp. and Their Efficacy against Anthracnose of Chilli

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The present study was conducted with an aim to develop and evaluate the shelf life of liquid formulations of *Trichoderma* spp. and *Pseudomonas* spp. and their efficacy against anthracnose of chilli. The diseased leaf and twig samples were collected to isolate the pathogen *Colletotrichum capsici* and pathogenicity was confirmed. Four isolates of *Trichoderma* spp. and two isolates of *Pseudomonas* spp. were evaluated for their efficacy against *Colletotrichum capsici In vitro*. Among the four isolates of *Trichoderma, T. viride*- T_5 (*T.v*$_{01}$) was found to be most effective with 71.32 per cent growth inhibition of *C. capsici*. Similarly, *P.*

fluorescens (*P.f*$_{01}$) was found highly effective with a maximum growth inhibition of 81.47 per cent. The compatibility studies were carried out between commonly used fungicides and the promising bioagents under *In vitro* conditions. Among the seven fungicides used, Azoxystrobin was found to be most compatible with both *T. viride*-T_5 and *P. fluorescens* at all the tested concentrations (50, 100, 250, 500 and 1000 ppm). *T. viride*-T_5 showed minimum growth inhibitions of 0.78, 2.35, 3.92, 11.76 and 19.61 percent at respective concentrations. *P. fluorescens* showed 1.67 per cent inhibition at 1000 ppm concentration of the fungicide and at other lower concentrations it was fully compatible.Two oil-based (glycerol and paraffin oil) and two broth-based (Potato Dextrose broth and Nutrient broth) formulations and sterile distilled water formulation of *T. viride*-T_5 and *P. fluorescens* were evaluated for their shelf life at 15 days interval up to 90 days of storage. Glycerol based formulations were found the best carrier for *T. viride*-T_5 and *P. fluorescens* with maximum CFU counts 18.8×10^6 and 129.2×10^6 (CFU/ml) respectively. Paraffin oil was the next best carrier with CFU counts 16.8×10^6 and 116.6×10^6 (CFU/ml) for *T. viride*-T_5 and *P. fluorescens* respectively. Two oil-based (glycerol and paraffin oil) formulations of *T. viride*-T_5 and *P. fluorescens* and a compatible fungicide (azoxystrobin) were evaluated for suppression of the disease anthracnose in pot condition. The combination of azoxystrobin + glycerol-based formulations gave the satisfying results with a minimum PDI of 24.67 and 23.34 and maximum PEDC of 43.59 and 48.82 for *T. viride*-T_5 and *P. fluorescens* respectively after 2nd spray. The experiment was further carried out in microplots and the results were similar to those in pots. Minimum PDI (27.6 and 28.27) and maximum PEDC (53.12 and 53.93) were recorded with the combined application of azoxystrobin + glycerol based formulations of *T. viride*-T_5 and *P. fluorescens* respectively. The results obtained suggested that oils are the good carriers of *T. viride* and *P. fluorescens* and thus can be recommended for the management of anthracnose disease of chilli in the field. The compatible nature of these bioagents with azoxystrobin would help the farmers get better yield and profit by reducing the cost of the fungicide.

Keywords: Liquid Formulations**,** *Colletotrichum capsici, Trichoderma* spp., *Pseudomonas* spp.,

Abstract ID- 03092020143

Impact Of Nanofertilizer On Agriculture

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Nano fertilizer technology is designed to deliver nutrients in a regulated pattern in correspondence with the crop demand thereby nutrient use efficiency can be improved without associated ill-effects (Naderi and Shahraki, 2013). This serves as an excellent slow release fertilizer that assists in sustained release of nitrogen that commensurate with crop growth without associated environmental harm. Nano fertilizers are the important tools in agriculture to improve crop growth, yield and quality parameters, reduce wastage of fertilizers and cost of cultivation. Nano fertilizers are very effective for precise nutrient management in precision agriculture with matching the crop growth stage for nutrient and may provide nutrient throughout the crop growth period. Nano fertilizers provide more surface area for different metabolic reactions in the plant which increase rate of photosynthesis and produce more dry matter and yield of the crop. It is also prevent plant from different biotic and abiotic stresses. Nanotechnology can reduce the rate of fertilizer nutrients loss through leaching and increase their availability to plants which ultimately leads to reduced water and soil pollution. Present days nano fertilizers are emerging as an alternative to conventional fertilizers, build-up of nutrients in soils and thereby eutrophication and drinking water contamination may be eliminated. Nanotechnology improves the nutrient use efficiency (Veronica *et al.,* 2014) nutrients are released at a slower rate throughout the crop growth; plants are able to take up most of the nutrients without waste by leaching.

Key words: Nanofertilizer, Nanotechnology,Eutrophication

Abstract ID- 03092020144

***Trichoderma* :- A Significant Bio-pesticide in Agriculture**

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Trichoderma-based biofungicides are booming in an agricultural market with more than 50 formulations registered products worldwide. Nowadays, there are more than 50 different *Trichoderma*-based agricultural products being produced in different countries and are sold to farmers to get better yields in different crops. Presently, *Trichoderma* spp. based products are considered as relatively novel type of biocontrol agents (BCAs). The size of current biopesticide market is vague and only scattered information could be obtained based on registered as well as non-registered biofungicides. Recently, *Trichoderma* based BCAs share about 60% of all fungal based BCAs and an increasing number of *Trichoderma* spp. based BCAs products are registered regularly. *T. harzianum* as an active agent in a range of commercially available biofertilizers and biopesticides is being used recently. The inherent qualities of *Trichoderma* based BCAs are driving factors for their steadily cumulating success. There are numerous reports on the ability of *Trichoderma* spp. to antagonize a wide range of soil borne plant pathogens combined with their ability to reduce the incidence of diseases caused by these pathogens in a wide range of crops. The mechanisms that *Trichoderma* uses to antagonize phytopathogenic fungi include competition, colonization, antibiosis and direct mycoparasitism. This antagonistic potential serves as the basis for effective biological control applications of different *Trichoderma* strains as an alternative method to chemicals for the control of a wide spectrum of plant pathogens. The metabolomics of *Trichoderma* spp. are incredibly complex, especially in terms of secondary metabolites production but with the help of advanced molecular and proteomic approaches.

Key Words: *Trichoderma*, Biocontrol agents (BCAs), Mycoparasitism, secondary metabolites etc.

Abstract ID- 03092020145

Role of nanotechnology in disease management

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Nanotechnology is an innovative and emerging discipline in the field of science and technology. With its broad application, Nanotechnology can offer advantages to pesticides, like reducing toxicity, improving the shelf-life, and increasing the solubility of poorly water-soluble pesticides, all of which could have positive environmental impacts. Nanoparticles can be utilized for plant disease management: either as nanoparticles alone, acting as protectants; or as nano-carriers for insecticides, fungicides, herbicides, and RNA-interference molecules. Despite the several potential advantages associated with the use of nanoparticles, not many nanoparticle-based products have been commercialized for agricultural application. The scarcity of commercial applications could be explained by several factors, such as an insufficient number of field trials and underutilization of pest–crop host systems.

Abstract ID- 03092020146

Role of Bio-herbicides in Weed Management

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Biological control of weeds is the intentional use of living organisms (biotic agents) to reduce thevigor, reproductive capacity, density, or impact of weeds. The strategies of biological control can be classified in two broad categories: (i) classical or inoculative, and (ii) inundative or mass exposure.The bioherbicide approach to weed management involves the inundative use of selected microorganisms for attacking specific weeds and controlling their infestations within the same year of application. Ideally, bioherbicides are most effective for weed management in annual cropping systems that are unsuitable for the classical biological control approach, which involve the use of natural enemies requiring more than one year to develop effective,weed suppressive populations. Only a few bioherbicides are successful in field-scale control of weeds while the effectiveness of other candidate bioherbicides has been limited by restricted host-range, elaborate formulation requirements, and lack of persistence in the field. Special situations in which bioherbicides may be most effective include management of weeds that are considered herbicide-resistant, parasitic, and invasive. Based on the current status of bioherbicide use, strategies for widening host ranges, improving formulations for practical use, and improving techniques for enhancement of weed-suppressive activity in conventional and sustainable agricultural systems are needed if bioherbicides are to make significant contributions to nonchemical weed management.

Key Words: Bio herbicides, living organisms, weed-suppressive activity etc.

Abstract ID- 03092020147

Micropropagation of *Amorphophallus paeoniifolius* cv. Gajendra

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Amorphophallus paeoniifolius, also known as Elephant Foot Yam, belongs to *Araceae* family. The corms and pseudostems of elephant foot yam are used popularly as vegetables, for preparing ayurvedic medicines and in the treatment of many diseases like tumors, elephantiasis, inflammations and anaemia. The tissue culture experiment was conducted in this crop to explore the possibility of micropropagation. The four types of media selected for culture of explants i.e. cormel, apical shoot bud, petiole and leaf were M1 (MS + 17.75µM BAP), M2 (MS + 8.87 µM BAP), M3 (MS + 2.21 µM BAP + 2.5mg/L NAA) and M4 (MS + 4.43 µM BAP + 15% Coconut water). Among eleven different methods of surface sterilization of explants used, best result was obtained by using 0.1% Bavistin (1hr) and 0.05 % streptomycin (1hr) and 0.1% HgCl2 (5min). Culture of these explants resulted into their aseptic establishment, swelling and enlargement, development of apical shoot bud and cormel shoot. Shoot bud development percentage from cormel was the best observed in M1 medium (50.08 ± 1.45) %. Apical shoot bud development took place in all media with equal percentage (100%), but M3 medium (76.66 ± 3.33) % suppressed their growth up to some extent because of presence of NAA. Swelling of leaf explant was the best observed in M1 medium (88.85 ± 0.22) %. For enlargement of petiole, M2 (83.98%) and M4 (83.78%) media were at par and can be regarded as the best media among four media. Callus was also formed from pseudostem explant on a new medium (MS + 18.17µM 2,4-D). The growth of Apical shoot and cormel shoot suggested the possibility of shoot development and micropropagation of this economically important plant.

Keywords: *Amorphophallus paeoniifolius*, Micropropagation, MS medium and Shoot bud Development

Abstract ID- 03092020148

ISSR-Based Molecular Characterization of Opium poppy (*Papaver somniferum* L.) Genotypes

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Indian medicinal plants are the essence of Ayurveda and Ayurvedic treatments.In several ancient books like Vedas, Ramayana, and Mahabharata the roles of medicinal plants have been described in details. The demand for medicinal plants in the Global markets is increasing day by day because of their broad spectrum like anti-microbial, anti-fungal and anti-cancer activity without any side effects as compared to synthetic drugs. Opium poppy (*Papaver somniferum* L.) is an important medicinal crop in the world. In the present investigation 24 prominent opium accessions were assessed by ISSR molecular markers for the genetic diversity analysis. A total of 116 amplified bands were obtained from the 15 primers, out of which 98 were polymorphic. Overall size of PCR amplified products had ranged between 300 bp to 2800 bp. The polymorphism percentage ranged from 16.66% to 100% for nine primers. The ISSR similarity matrix revealed the Jaccard's similarity values lie between 0.35-0.90. The 24 genotypes could be divided into two major clusters at a similarity coefficient of 0.47, Chetak Aphim sole genotype made single cluster while Cluster II included 23 genotypes. UPGMA method used for dendrogram exhibited the proper genetic diversity in all the 24 accessions of opium poppy. The present investigation revealed that significant diversity existed in all the genotypes of Opium poppy.

Abstract ID- 03092020149

New trend in Indian Agriculture: An Review

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Agriculture is the backbone of Indian economy. Agriculture along with its allied sectors is consideredas the largest livelihood provider in India. With the advancements in the field of science andtechnology along with the global urbanization resulted in the evolution of agricultural research [1].Rise in per capita income of developing nations, occupational changes and global linkages have changed the food preferences. Increasing agriculture productivity by employing conventional techniques poses a limitation. There is a tremendous increase in diversification of agriculture through which farmers can earn more profit by growing food grain crops along with horticultural crops,commercial crops, aromatic and medicinal crops and can also perform dairy farming, poultry farming,fisheries etc.Commercialization of crops is setting a new trend towards development of processing industry and creating huge potential for agriculture exports. A new trend of organic farming andvertical farming are helping in sustainable agriculture development and reducing threat to environment, due to dependence on chemical fertilizers and pesticides for increasing productivity and pest management respectively[8].These trends suggest that new innovations in agriculture are inevitably needed and these innovations should be integrated with the main stream agriculture.

Keywords: organic farming, vertical farming, food processing, cropping pattern and diversification

Abstract ID- 03092020150

Comparative efficacy of bio-agent agents against mycelial growth of *Fusarium solani*

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Cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.], commonly known as *guar* is a member of Leguminosae (*Fabaceae*) family and use of cow fodder or otherwise fodder of the livestock .The present experiment was carried out during *kharif* season 2018-19 Department of Plant Pathology, S.K.N. College of Agriculture, Jobner (Jaipur) Rajasthan. The experiment consisted of seven treatment of wilt management practices i.e., check, *Trichoderma harzianum, Trichoderma viride, Trichoderma asperlum,Trichoderma virens, Bacillus subtilis and Pseudomonas fluorescence.* The seed treatment were with three replication. The pooled data over two years revealed that all the bioagent practices for the management of wilt in guar resulted in significantly low wilt disease. The pooled analysis of data further revealed that inhibition of mycelia with *Trichoderma harzianum* resulted in more inhibition of mycelia growth 85.20% followed that *Trichoderma viride* showed inhibition of mycelia growth 82.20%. Next effective that showed inhibition of mycelia of 66.00% and 64.00% , respectively. Mycelia growth inhibition *Pseudomonas fluorescence* and *Bacillus subtilis* were found to be least effective which showed growth inhibition of 66.00% and 64.00 per cent.

Keywords: Cluster bean, wilt, *Fusarium solani,* Bioagents, Treatments, mycelia growth Inhibition

Abstract ID- 03092020151

Improving Growth, Yield and Quality of Kinnow Mandarin through Foliar Application of Potassium and Zinc

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Present investigation entitled "Improving growth, yield and quality of Kinnow mandarin through foliar application of potassium and zinc" was carried out at Krishi Vigyan Kendra, Chittorgarh and Department of Horticulture, Rajasthan College of Agriculture, MPUAT, Udaipur. Experiment was conducted during March-January in fruiting season of 2013-14. Experiment consists of 10 treatments combinations comprising T1 - (control), T2 - (0.5% K2NO3 + EDTA Zinc 0.1%), T3 - (1.0% K2NO3 + EDTA Zinc 0.1%), T4 - (1.5% K2NO3 + EDTA Zinc 0.1%), T5 - (0.5% K2PO5 + EDTA Zinc0.1%), T6 - (1.0% K2PO5 + EDTA Zinc 0.1%), T7 - (1.5% K2PO5 + EDTA Zinc 0.1%), T8 - (0.5% K2SO4 + EDTA Zinc 0.1%), T9 - (1.0% K2SO4 + EDTA Zinc 0.1%), T10 - (1.5% K2SO4 + EDTA Zinc 0.1%) applied at fruit set and peach size stage of fruit through foliar spray. These treatments were evaluated under one way analysis of variance replicated thrice with adopting uniform cultural schedules during the experimentation. The results revealed that all treatments significantly increased the vegetative attributes (tree height, tree spread (N-S & E-W), shoot length), yield characteristics {fruit retention, number of fruit plant-1, fruit weight, fruit diameter (equatorial & polar), yield plant-1}, estimated yield ha-1, qualitative attributes (TSS, acidity, TSS/acid ratio, reducing sugars, total sugar, ascorbic acid, rind thickness, juice content, number of seeds fruit-1) and leaf nutrient status (NPK and zinc). Among the treatments combined application of 1.5 per cent potassium phosphate + 0.1 per cent EDTA zinc (T7) was found best for yield and vegetative growth and treatment 1.5 per cent potassium sulphate + 0.1 per cent EDTA zinc (T10) produced best quality fruits. As far as relative economics of treatments is concerned highest B:C ratio (1:5) was obtained in T7 (1.5% K2PO4 + 0.1% EDTA Zn) and this treatment gave the highest gross return (Rs. 3,83,760 ha-1) as well as highest net returns (Rs.3,19,820 ha-1) with maximum yield/ ha.

Abstract ID- 03092020152

Growth Rate of Area, Production and Productivity of Major *Rabi* Crops in Rajasthan

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The study pertains to Rajasthan state as a whole. Secondary data are considered to study the objectives for the period covering, the time period under study has been divided into three sub-head of 10 years, such as first period (1988-1997), second period (1998-2007) and third period (2008-2017). These growth rates have been calculated for the period of\ thirty years i.e. 1988 to 2017. During the last 30 years (1988-2017), the growth rate of area of wheat, barley rapeseed & mustard were positive and growth rate of area of gram was negative while production, productivity of wheat, barley, gram and rapeseed & mustard showed positive growth rate. During last thirty years (1988-2017), the growth rate of area of wheat, barley, rapeseed and mustard were positive. These three crops are grown where assured cultivation facilities are available. Out of there three crops wheat in most stable crop of north India, while barley is consumed commercially and industrial importance, Rapeseed & mustard in cash crop. Hence, growth rate in area, production and productivity of their crops was positive except average rainfall was not happened. Gram is most susceptible in north India as its production in affected by moisture and frost. It is clear that when average rainfall was low area under gram was also low. It is also important that area allocation under crops in depends upon MSP.

Keywords: Growth, Crops, Area, Production and Productivity

Abstract ID- 03092020153

Effect of Heading Back Height and Pruning Intensity on Rejuvenating Guava Plants

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The present investigation was carried out to study the entitled "Effect of heading back height and pruning intensity on rejuvenating guava plants" on growth, fruit and quality parameters of L-49. This experiment was conducted in one way classification with three replications during June 2018 to July 2019 at Kushal bagh Farm, Rca, Maharana Pratap University of Agriculture and Technology, Udaipur. In this experiment heading back at 3 levels *i.e.* 1.0, 1.5 and 2.0 m, pruning intensity at 3 levels *i.e.* 25, 50 and 75%, their different combination were evaluated. There were 9 treatment tasted. The result revealed that H2P2 (Heading back at 1.5 meter height + 50% pruning of shoots) exhibited the highest increment in number of sprout per plant (20 & 72), length of shoot (8 & 45 cm), and diameter of shoot (6 & 9 mm) at 30 and 60 days after pruning (DAP), number of fruit per plant (56), length of fruit (5.4 cm), breadth of fruit (6.32 cm), weight of fruit (113.7 g), fruit yield per plant (6.36 kg), volume of fruit (103.2 g/cc), specific gravity of fruit (0.86 g/cc), seed & pulp ratio (0.029%), TSS (13.79 °B), acidity (0.49%), ascorbic acid (190 mg/100g), reducing sugar (7.57%), total sugar (11.56%) and pectin (0.86%). Therefore, among various treatments used in present study, the treatment application H2P2 (Heading back at 1.5 meter height + 50% pruning of shoots) was found to be significantly effective for improve quality production of L-49 guava fruits.

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Evaluation of Liquid Formulations of Trichoderma spp. and Pseudomonas spp. and Their Efficacy against Anthracnose of Chilli

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The present study was conducted with an aim to develop and evaluate the shelf life of liquid formulations of Trichoderma spp. and Pseudomonas spp. and their efficacy against anthracnose of chilli. The diseased leaf and twig samples were collected to isolate the pathogen Colletotrichum capsici and pathogenicity was confirmed. Four isolates of Trichoderma spp. and two isolates of Pseudomonas spp. were evaluated for their efficacy against Colletotrichum capsici In vitro. Among the four isolates of Trichoderma, T. viride-T5 (T.v01) was found to be most effective with 71.32 per cent growth inhibition of C. capsici. Similarly, P. fluorescens (P.f01) was found highly effective with a maximum growth inhibition of 81.47 per cent. The compatibility studies were carried out between commonly used fungicides and the promising bioagents under In vitro conditions. Among the seven fungicides used, Azoxystrobin was found to be most compatible with both T. viride-T5 and P. fluorescens at all the tested concentrations (50, 100, 250, 500 and 1000 ppm). T. viride-T5 showed minimum growth inhibitions of 0.78, 2.35, 3.92, 11.76 and 19.61 percent at respective concentrations. P. fluorescens showed 1.67 per cent inhibition at 1000 ppm concentration of the fungicide and at other lower concentrations it was fully compatible.Two oil-based (glycerol and paraffin oil) and two broth-based (Potato Dextrose broth and Nutrient broth) formulations and sterile distilled water formulation of T. viride-T5 and P. fluorescens were evaluated for their shelf life at 15 days interval up to 90 days of storage. Glycerol based formulations were found the best carrier for T. viride-T5 and P. fluorescens with maximum CFU counts 18.8×106 and 129.2×106 (CFU/ml) respectively. Paraffin oil was the next best carrier with CFU counts 16.8×106 and 116.6×106 (CFU/ml) for T. viride-T5 and P. fluorescens respectively. Two oil-based (glycerol and paraffin oil) formulations of T. viride-T5 and P. fluorescens and a compatible fungicide (azoxystrobin) were evaluated for suppression of the disease anthracnose in pot condition. The combination of azoxystrobin + glycerol-based formulations gave the satisfying results with a minimum PDI of 24.67 and 23.34 and maximum PEDC of 43.59 and 48.82 for T. viride-T5 and P. fluorescens respectively after 2nd spray. The experiment was further carried out in microplots and the results were similar to those in pots. Minimum PDI (27.6 and 28.27) and maximum PEDC (53.12 and 53.93) were recorded with the combined application of azoxystrobin + glycerol based formulations of T. viride-T5 and P. fluorescens respectively. The results obtained suggested that oils are the good carriers of T. viride and P. fluorescens and thus can be recommended for the management of anthracnose disease of chilli in the field. The compatible nature of these bioagents with azoxystrobin would help the farmers get better yield and profit by reducing the cost of the fungicide.

Keywords: Liquid Formulations, Colletotrichum capsici, Trichoderma spp., Pseudomonas spp.,

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Saffron: Jewellery of gods

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Saffron, originated from the Arabic word "Zafaran" meaning yellow. Saffron is a spice derived from the flower of *Crocus sativus*. It is believed that saffron originated and was first cultivated in Greece, but today the spice is primarily grown in Iran, Greece, Morocco and India. It is one of the most precious spices in

the world. The thread like red stigmas and the yellow hue they impart are quite literally the stuff of legend. Golden coloured, pungent stigmas which are dried and used as a spice to flavour foods and as a dye to colour foods and other products. Saffron has a strong, exotic aroma and a bitter taste. It is used to colour and flavour many Mediterranean and Asian dishes, particularly rice and fish and English, Scandinavian and Balkan breads. Saffron is not only used as a spice, it is also used for pharmaceutical purposes in Ayurvedic medicine. The majority of health claims surroundings saffron relate to its high levels of specific antioxidants. The main active antioxidants are crocin, picrocrocin and safranal. These antioxidants help fight against oxidative stress and free radicals in the body. As oxidative stress and free radicals play a role in the development of many health conditions, including cancer and heart diseases, antioxidants such as these may help protect a person's health.

Keywords: Saffron, *Crocus sativus* and Ayurvedic medicine.

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CLIMATE SMART AGRICULTURE: AN ANSWER TO CLIMATE CHANGE

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The world has come a long way towards ensuring food security. However, all the good work of the past has the potential to be unravelled due to the looming threat of climate change. Agricultural production systems are facing increasing competition from other sectors for limited natural resources. The availability of these resources and their quality are also being affected by unsustainable management practices and changing climatic and weather conditions. Climate-smart agriculture (CSA) is an approach for transforming and reorienting agricultural production systems and food value chains so that they support sustainable development and can ensure food security under climate change. Climate-smart agriculture relates to actions in fields, pastures, forests, and oceans and freshwater ecosystems. It involves the assessment and application of technologies and practices, the creation of a supportive policy and institutional framework and the formulation of investment strategies. Climate-smart agricultural systems include different elements such as the management of land, crops, livestock, aquaculture and capture fisheries to balance near-term food security and livelihoods needs with priorities for adaptation and mitigation.

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Studies on comparative efficacy of botanicals and biochars for management of root and stem rot of cucumber caused by *Fusarium oxysporum* f.sp. *radicis cucumerinum*

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The present study was undertaken in cucumber root and stem rot disease caused by *Fusarium oxysporum* f.sp*. radicis cucumerinum* leading to rotting of stem, roots. The studies were aimed; Occurrence and pathogenecity of *Fusarium oxysporum* f.sp. *radicis cucumerinum* in field and polyhouse condition and develop management strategy through botanicals and biochars. The disease samples of cucumber were collected from severely affected field of RCA Horticulture farm and RCA Polyhouse during *Kharif* 2017-18 when crop was one month old. Eight Botanicals as water and ether extract such as *Ipomea carnea, Calotropis gigantean, Allium cepa, Datura stromonium, Catharanthus roseus, Azadirachta indica, Curcuma longa* and *Piper nigrum* were evaluated *in vitro* against mycelia growth of *F. oxy*sporum f.sp. *radicis cucumerinum* at three concentrations *viz*., 10, 20 and 30 per cent by poison food technique.

Among the above botanicals water and ether extracts of *A. indica* found to have maximum per cent growth inhibition of the pathogen, 77.77% and 82.22 % with water and ether extracts, respectively.
The biochar treatments were used to evaluate their influence on the growth parameters like germination shoot and root length. The biochar combination Eucalyptus wood (EW) + Citrus wood (CW) + Green house waste (GHW) showed maximum germination 100%, shoot length 7.73 cm and root length 12.10 cm. In order to device the efficient management strategy of the disease root and stem rot of cucumber under pot conditions seven treatments of biochar such as Eucalyptus wood (EW), Citrus wood (CW), Green house waste (GHW), Eucalyptus wood (EW) + Citrus wood (CW), Eucalyptus wood (EW) + Green house waste (GHW), Citrus wood (CW) + Green house waste (GHW) and Eucalyptus wood (EW) + Citrus wood (CW) + Green house waste (GHW) were evaluated against of *F. oxy*sporum f.sp. *radicis cucumerinum* at four concentrations *viz*., 1, 2, 3 and 4 per cent by per cent mortality. Among the above mentioned treatments the lowest mortality rate 4.17% was recorded with Eucalyptus wood (EW) + Citrus wood (CW) + Green house waste (GHW) at 3% concentration. The results obtained suggested that botanicals and biochars are good inhibitors of the disease *in vitro* and *in vivo*, respectively and thus can be recommended for the management of root and stem rot of cucumber in the field. The use of biochars would help the farmers get better yield and profit by reducing the cost of the fungicide and also the biochars improve the soil quality by maintaining the pH and EC of the soil.

Keywords: *Fusarium oxysporum* f.sp. *radicis cucumerinum; Biochars; Botanicals;* Growth parameters; Root and stem rot; Plant Mortility.

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Employment Diversification and Income Augmentation among NAIP Beneficiaries in Rajasthan

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The ambitious agricultural research Programme in the country was launched in India on 26th July, 2006. It is known as National Agricultural Innovation Project (NAIP), the project focuses on innovations in agricultural technology. The study was conducted in four Districts (Udaipur, Durgapur, Banswara and Sirohi) of Rajasthan. Data were collected through personal interview technique with the farmers. The findings led to the conclusion that the vegetables' production activities contributed more in terms of sources of employment generation among the NAIP beneficiaries in comparison to employment generation through fruits production activities, it is also of worth concluding that the NAIP beneficiaries of Udaipur district relatively could get employment generation through vegetables and fruits' production activities as compared with three district (Sirohi, Dungarpur and Banswara). The cultivation of fruits among the farmers of all the four districts should be encouraged with special emphasize on the farmers of Dungarpur, Banswara and Sirohi districts that may lead to their livelihood nutritional security through consumption of seasonal fruits.

Key words: National Agriculture Innovation Project (NAIP), livelihood, Nutritional Security,

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Study Of Applications Of Technology In Agriculture

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The history of agriculture is the story of humankind's development and cultivation of processes for producing food, feed, fiber, fuel, and other goods by the systematic raising of plants or animals. Earlier, the agricultural processes were performed on small scaled farms with limited resources, just to meet the

needs of the farmer's family, and was termed as Subsistence Farming. Later, due to the modernization and increasing population, Commercial Intensive Agriculture came into effect, which included farming on large fields with large resource inputs and high level of mechanization.But, since a few years, the world is facing unprecedented challenges that affect the sustainability of our food and agriculture systems. From an ever-increasing and urbanized world population to deteriorating natural resources and loss of biodiversity, to climate change impacts, these challenges combined threaten the livelihoods of millions of family farmers across the globe. Due to these, the researchers and scientists are talking about a term, i.e. Agricultural Innovation. Agricultural innovation is the process whereby individuals or organizations bring new or existing products, processes or ways of organization into use for the first time in a specific context in order to increase effectiveness, competitiveness, resilience to shocks or environmental sustainability and thereby contribute to food security and nutrition, economic development or sustainable natural resource management. Innovation in agricultural practices and technologies are changing the world, which includes, Urban Agriculture, Smart Design, and Vertical Farms, as it helps in the innovative reimagining and utilization of space that can be extremely efficient in future. The Drones and the bees can be utilized in drone photography for a quick look at fields, automated crop harvest, and even as delivery drones in the future. Another one is Artificial Intelligence, IoT, and Automation, which fully automates a grain cart tractor, which provides farmers much needed assistance during the demanding harvest season. It also includes, advanced detection of diseases in crops using many of the same techniques. Blockchain Technology is also considered effective as it can record and updatethe status of crops from planting to harvest to storage to delivery.

Keywords: Agriculture, Sustainability, Innovation, Efficiency, Development.

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In vitro **antibacterial activity of** ***Chrysopogon zizanioides*** **(Vetiver) against dreadful human pathogens**

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Medicinal and their crude extracts were successfully used in chemotherapy for new drugs in curing many diseases due to their aromatic and therapeutic properties. In our present study *Chrysopogon zizanioides* (Vetiver), tall tufted perennial grass are used as active curing ailment against human pathogens. The extracts of root and leaf were obtained by using various solvents viz., methanol, chloroform and ethanol. The antimicrobial activity of various extracts from root and leaf were determined by agar well diffusion method. The minimum inhibitory concentration (MIC)of the extracts were tested by broth macro dilution method. The highest zone of inhibition was observed in methanol vetiver leaf and root extract against *B. anthracis*. The highest MIC value was observed in methanol extract of vetiver root and leaf against *B. antharics*.

Key Words: *Medicinal plants, Vetiver, Antimicrobial activity, MIC value.*

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Seed spices export from India:Prospects and Challenges

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India is the largest producer, consumer and exporter of seed spices. The seed spices constitute an important group of agricultural commodities, playing an important role in our national economy. Spices are used not only to add flavour to foods and beverages, but as medicines, disinfectants, incenses, stimulants and even as aphrodisiac agents. Total 109 spices are listed by International Standardization Organisation and 63 spices are grown in India and out of which 20 are being classified as seed spices. The seed spices are well distributed over different agro-climatic regions in India. The major growing belt of seed spices spreads from arid to semi-arid regions, covering large areas in Rajasthan and Gujarat, which contribute more than 80 per cent of total seed spices production in the country.Indian spices export has been able to record strident gains in volume and value. During 2018-19, a total of 11,00,250 tons of spices and spice products valued Rs. 19505.81 crore (US $2789.50 Million) have been exported from the country as against 10,28,060 tons valued Rs.17980.16 crore (US$ 2789.35 Million) in 2017-18, registering an increase of 7 % in volume and 8% in rupees terms and 6% in dollar terms of value.Looking into the importance of deed spices export for India present study focusses on identification of prospects and challenges faced in seed spices export. The export performance of a country is determined by the growth in world demand. Reduction in exportable surplus on account of increasing domestic demand, dependence on nature, low technology infrastructure and arbitrary imposition of standards and stringent food laws by importing countries are the major challenge with the spice industry in India. Export promotion being one of the main factors for economic growth.

Key words: Seed Spices, export.

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