PANT RESEARCH NEWS

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DIRECTORATE OF RESEARCH
GBPUAT, PANTNAGAR

Inside this issue:

Dean CBSH Message

Dr. Sandeep Arora , Dean CBSH

I am thankful to the Directorate of Research, GBPUAT, for providing this wonderful opportunity to connect with Scientists & Researchers across disciplines. The College of Basic Science & Humanities has been an epicenter of cutting-edge research and technological innovation. It was one of the first pillars to be instituted at the time of establishment of the University. The college has a unique characteristic of possessing a judicious mix of interdisciplinary science departments, that has fueled its growth from being a supporting college to one of the leading lights in teaching and research in frontier areas of basic & applied sciences.

——*Contd on Page 2*

Editor's Desk

Dr. S. P. Singh, Editor-in-Chief

The University has been in the fore-front of varietal development of various crops since its inception. Till date University has developed and released 316 varieties/hybrids in cereals, pulses, oilseeds, sugar crops, vegetables, flowers and tree crops. The University is producing huge quantity of quality seeds of newly developed and popular old varieties to distribute them among the farmers and to fulfill DAC indents. These varieties mainly aim at doubling farmers' income and adaptation to harsh hill conditions of Uttarakhand. The University has gone further in standardizing production technology. The technologies evolved by the university are helping farmers day-by-day to increase their economic sustainability and social upliftment.

Dean's Message

The fundamental scientific research has also helped us to establish a repository of knowledge by means of continuously evolving our education systems. Even under the Covid-19 pandemic, this college has shown exemplary resilience in adapting to the *new-normals*. Strengthening and reorienting research and innovation for developing self-reliance is one of the major objectives of the National Education Policy-2020 (NEP), and College of Basic Science & Humanities is one of the fittest examples of that. In line with the objectives of the National Education Policy, the college emphasizes on establishing multidisciplinary linkages, connecting hitherto unexplored sections of our education system. Towards this end, the humanities group of our college is standing at the verge of transformation and is destined to play a pivotal role in taking the college to newer heights. Through an integration of Humanities and Sciences, we intend to establish a multidisciplinary and integrated teaching and research system that aligns itself with the aspirational goals of our faculty as well as all our stake holders, including our students.

I would also like to take this opportunity to salute all our former and current faculty members without whose sincere and dedicated efforts this college would not have attained the place, it holds now. Throughout this journey, the Directorate of Research has been a consistent partner in our research endeavors and we hope to strengthen this partnership under the aegis of the 'Pant Park initiative'.

Research Story

Quality Litchi Production under Micro Irrigation and Fertigation in Uttarakhand

Dr. P.K. Singh
Professor, Irrigation & Drainage Engineering
College of Technology

Litchi is an important fruit crop of Uttarakhand. It constitutes the significant area of horticultural crops in the state. It has been identified as main fruit crop for the export. The major litchi growing belts are located in *Tarai* and *Bhabar* regions. Besides this, the litchi is also grown at higher altitudes in Pithoragarh and Pauri districts. Litchi in Uttarkhand occupies a total geographic area of 10250 ha with production of 23740 MT. The productivity of litchi in the state (2.32 MT/ha) is significantly lower than the average productivity in the country (7.4 MT/ha). One of the major factors limiting fruit production in litchi in Uttarakhand is lack of a suitable water and nutrient management programme.

Micro irrigation has proved for the effective water and nutrient management in almost all fruits crops including litchi. In this regard, a study to investigate response of litchi to micro irrigation and fertigation has been conducted under the project Precision Farming Development Centre (PFDC) at G. B. Pant University of Agriculture and Technology, Pantnagar. The focus of the study was on to analyze the response of micro irrigation and fertigation on yield increase, quality improvement and control of fruit cracking. The experimental result revealed that significant increase in marketable fruit yield from grown up orchard can be achieved (Average 190.28 kg per tree) under micro irrigation (bubbler) at 100% of estimated irrigation water requirement (80 -130 lpd /plant) +125% of recommended dose of fertilizer ($N:P_2O_5:K_2O::1500:625:750$ gm/plant) along with improvement in fruit quality and water saving of 61.56 % as compared to average yield of 112 kg/tree in conventional irrigation (surface). The study also revealed significant reduction in fruit cracking (less than 3%).

Based on 5 years of experimental study following water & nutrient management programme have been recommended for high yield & quality litchi production in Uttarakhand.

Research Story

Water Management Programme				
Water Requirement of Grownup Litchi Orchard		When to irrigate	Water saving under micro irrigation	Control of fruit cracking
March	80 liters /day/ plant	Frequent (1-3 days interval) and light application of water non-rainy months.	61.56 % over surface (conventional) irrigation	Over canopy fine jet micro sprinkling during 12:00 to 14:00 hrs daily from May 1 to May 20.
April	100 liters /day/ plant			
May	130 liters /day/ plant			

Nutrient Requirement and Fertigation Scheduling in Grown-up Litchi Orchards
N : P_2O_5 : K_2O : Cu: Zn: B :: 1500 : 750 : 750 : 250 : 250 : 250 (g/plant)
25 % during flower panicle elongation in 2 split doses, and 25% during fruit development and maturity stage in 6 split doses at weekly interval

General Irrigation Water Management Strategy for Litchi Orchards

1. Application of water in the plant root zone either by improved surface method or micro-irrigation.
2. For increased water use efficiency, significant water saving methods such as Micro (drip) irrigation should be preferred over surface method of irrigation.
3. Frequent and light application of water in young plants throughout the year during non-rainy months.
4. In case of bearing orchards of litchi, application of water is mainly required during fruit development and fruit maturity stage. If rainfall does not occur, the irrigation just after fruit harvesting is essential along with sufficient fertilization.
5. Point application of water in localized area for control of weed growth.
6. During winter young litchi orchard must be protected from frost by maintaining the sufficient moisture in the plant root zone and also over canopy through micro sprinkler irrigation.
7. The water requirement of young litchi plants (1-8 years old) varies from less than 2 liters per plant to 50 liters per plant during April-May. Therefore discharging devices ranging from 2-8 liter per hour should be selected.
8. Application of water during summer should be more frequent as compared to winter irrigation..

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Research Story

9. The water requirement of matured litchi plants (more than 20 years old) is as high as 250 liters per plant during April-May. Therefore high discharge devices such as bubblers should be selected.
10. To control the heavy fruit drop during the fruit development stage, it is important to provide the sufficient irrigation during this period.
11. To control the fruit cracking problem during the fruit maturity stage, it is important to provide the sufficient irrigation in the plant root zone and over canopy micro sprinkler irrigation during noon time (12 to 14 hrs) to modify the micro climate favorable for the better fruit quality.
12. Heavy irrigation of bearing plants of litchi in October – November is avoided to induce better flower bud formation and enhanced flowering.
13. Integrated application of nutrient through micro irrigation is suggested to increase the nutrient use efficiency and also to save the significant quantity of nutrients.

Development of District Agriculture Contingency Plan (DAPCs) for state of Uttarakhand – MoU signed between University and ICAR-CRIDA, Hyderabad

Dr. Subhash Chandra, Professor Agronomy
College of Agriculture

Climate is beyond our control and performance of agricultural activities is greatly affected by the prevailing climatic conditions. When climatic conditions deviate from the normal, become unfavourable for the crops as well as agriculture based enterprises. To offset the losses, contingent plan is used, which suggests alternatives in case the routine practice is failed due to sudden changes in climatic conditions. Development of contingent plan is imperative to reduce the risk in farming. For development of contingency plan for all the thirteen districts of the Uttarakhand state, MoU has been signed between the University and the ICAR- CRIDA, Hyderabad for a period of six months. Earlier the DAPCs were developed in the year 2012-13 only for the monsoon months. Now these will be updated and planning will also be made for remaining part of year (rabi and spring/summer seasons). A period of 3 months has been set to complete the task. A contingency cell has also been set up at the University under the chairmanship of Director Research. A team of scientists from the university, KVK scientists and officials of state line department have been entrusted to prepare the contingency plan.

Research Story

Success Stories of Biological Control

Dr. Roopali Sharma, Senior Research Officer
Department of Plant Pathology
College of Agriculture

G.B.P.U.A. & T. Pantnagar Biocontrol Laboratory has been notified by the Directorate of Plant Quarantine and Storage, Government of India for **Quality Evaluation of Biocontrol Agents.** Department of Biotechnology also notified Biocontrol lab as a **Referral Lab** for the biocontrol agents. Subsequently, Government of India declared Biocontrol Lab, Pantnagar as **'Central Insecticide Lab'** in respect of biopesticides (The Gazette of India G.S.R. 756(E); No. 17-6/2006-PP.I). Four commercial formulations of biocontrol agents has been developed for soil borne plant pathogens *viz.*, Pant Bio-control Agent -1 (*T. harzianum*), Pant Bio-control Agent 2 (*P. fluorescens*), Pant Bio-control Agent -3 (consortium of *T. harzianum*+ *P. fluorescens*) and Pant Bio-control Agent -4 (consortium of two strains of *P. fluorescens*). The strains of *Trichoderma* and *Psuedomonas* as antagonists, for the management of plant pathogenic microorganisms as biocontrol agents, is due to their high reproductive capacity, ability to survive under unfavorable conditions, efficiency in the utilization of nutrients, capacity to modify the rhizosphere, strong aggressiveness against plant pathogenic fungi, and more efficient in promoting plant growth and inducing defense mechanisms.

Under AICRP on Bio-control, more than 350 quintals of quality biocontrol agents mass produced in Biocontrol Lab. It was distributed for large scale demonstrations at farmers' fields. That helped farmers to increased benefit-cost ratio and a healthy crop.

Technologies demonstration:

1. **The Common Minimum Programme**

A. **Plastic mulching (Soil solarization) of nursery beds**: It is a low-cost technique to reduce losses due to soil borne insect pests and diseases of the nursery. Under the technique, nursery beds are prepared 5-8 weeks in advance of seed sowing, irrigated and covered with a transparent polythene sheet (50-100 u thick), which is removed 3-4 days ahead of the seed sowing.

B. **Preparation and use of vermicompost**: It can be prepared in pits (with variable dimensions as per convenience and use) filled

Contd—

Research Story

with animal dung and other waste material available on farm. Thereafter, earthworms are released in the pits where they increase in population and convert the waste material to 'nutritious vermicompost' in about 3 months.

C. **Use of bioagents:** They are a better alternative by virtue of being environment friendly, cost effective, safe for humans and animals and improving soil health. At the Biocontrol Laboratory of Department of Plant Pathology, G. B. Pant University of Agriculture and Technology, Pantnagar mass multiplication of four *Trichoderma* and *Pseudomonas* spp based powder formulated bioagents is being done and distributed to farmers for popularization.

Large scale demonstrations at farmers' fields during last 5 years

Year	No. of farmers Adopted	Crops	Area (ha)
2015-16	74	Rice, Pea	34
2016-17	55	Rice, Tomato	26
2017-18	615	Rice, Chickpea, Lentil	258
2018-19	1004	Rice, Chickpea, Lentil	372
2019-20*	180	Rice, Pea, Tomato	176

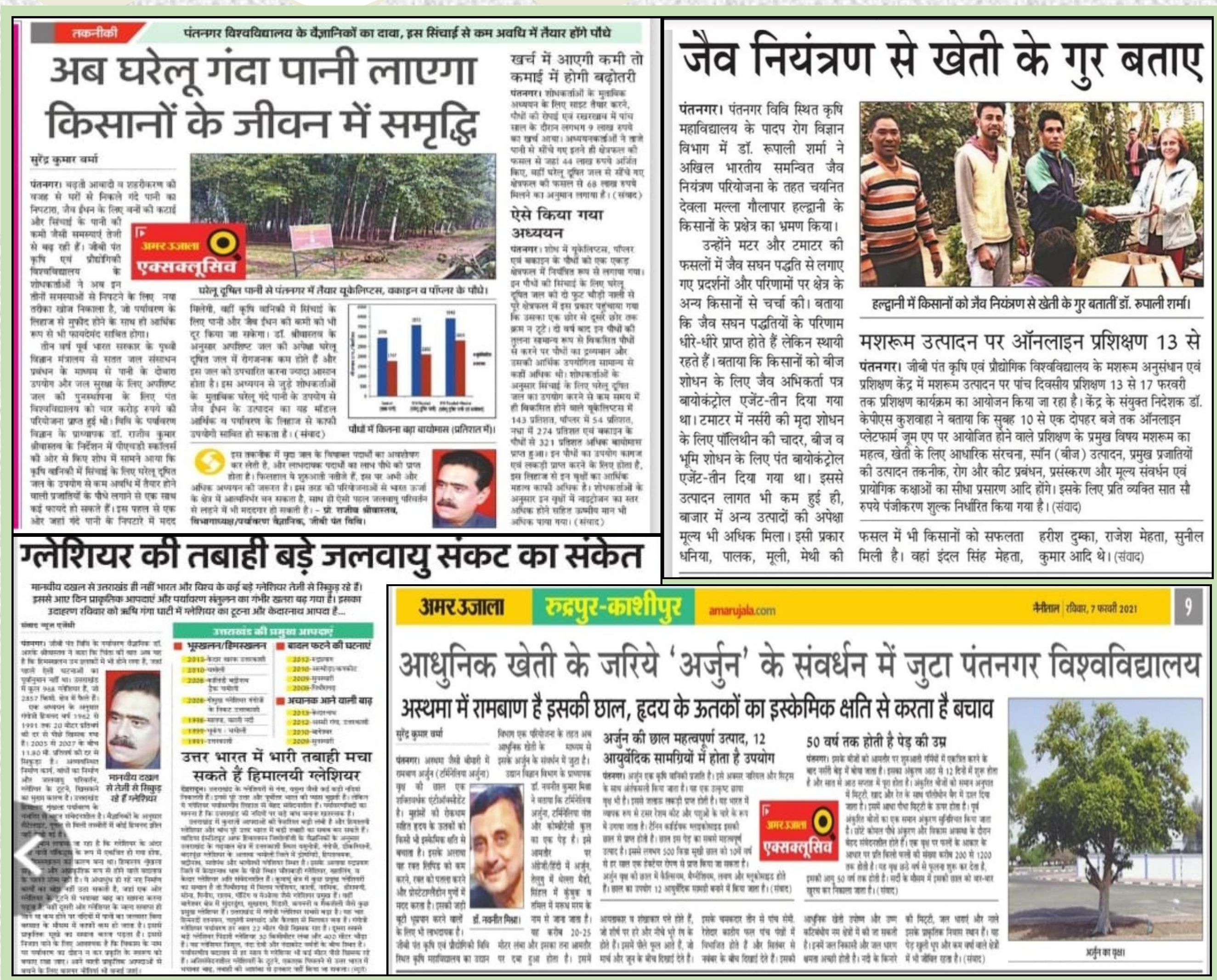
**During COVID-19 pandemic period*

Bioagents could be used in one of the following ways:

- ***Seed treatment through biopriming*:** Seeds are mixed with the formulated BCAs @ 8-10g/kg and incubate under moist conditions for 24 to 48h before sowing.
- ***Rhizome treatment*:** Rhizomes dipped in solution of bioagent (@ 8-10 gram/ liter water) for 30 minutes, dried in shade and planted.
- ***Seedling treatment*:** Before transplanting roots of seedlings dipped in solution of bioagents @ 8-10 g/ liter for about 30 minutes.
- ***Spray*:** @ 8-10 g/ liter on standing crop at 10-12 days intervals
- ***Drench*:** @ 8-10 g/ liter in soil in the nurseries from time to time.

D. **Value addition of vermicompost: Before use, vermicompost is supplemented with bioagents @ 1Kg/q. This increases the nutritive value of the compost and provides opportunity to the bioagent to grow faster on the compost so that it can compete well with plant pathogens in the soil. Further, it facilitates rapid spread of bioagents in the soil.**

Pantvarsity in News



तकनीकी — पंतनगर विश्वविद्यालय के वैज्ञानिकों का दावा, इस सिंचाई से कम अवधि में तैयार होंगे पौधे

अब घरेलू गंदा पानी लाएगा किसानों के जीवन में समृद्धि

सुरेंद्र कुमार वर्मा

अमर उजाला एक्सक्लूसिव

घरेलू दूषित पानी से पंतनगर में तैयार यूकेलिप्टस, बकाइन व पॉप्लर के पौधे।

खर्च में आएगी कमी तो कमाई में होगी बढ़ोतरी

ऐसे किया गया अध्ययन

पौधों में कितना बढ़ा बायोमास (प्रतिशत में)।

जैव नियंत्रण से खेती के गुर बताए

पंतनगर। पंतनगर विवि स्थित कृषि महाविद्यालय के पादप रोग विज्ञान विभाग में डॉ. रूपाली शर्मा ने अखिल भारतीय समन्वित जैव नियंत्रण परियोजना के तहत चयनित देवला मल्ला गौलापार हल्द्वानी के किसानों के प्रक्षेत्र का भ्रमण किया।

उन्होंने मटर और टमाटर की फसलों में जैव सघन पद्धति से लगाए गए प्रदर्शनों और परिणामों पर क्षेत्र के अन्य किसानों से चर्चा की। बताया कि जैव सघन पद्धतियों के परिणाम धीरे-धीरे प्राप्त होते हैं लेकिन स्थायी रहते हैं। बताया कि किसानों को बीज शोधन के लिए जैव अभिकर्ता पत्र बायोकंट्रोल एजेंट-तीन दिया गया था। टमाटर में नर्सरी की मृदा शोधन के लिए पॉलिथीन की चादर, बीज व भूमि शोधन के लिए पंत बायोकंट्रोल एजेंट-तीन दिया गया था। इससे उत्पादन लागत भी कम हुई ही, बाजार में अन्य उत्पादों की अपेक्षा मूल्य भी अधिक मिला। इसी प्रकार धनिया, पालक, मूली, मेथी की फसल में भी किसानों को सफलता मिली है। वहां इंदल सिंह मेहता, हरीश दुम्का, राजेश मेहता, सुनील कुमार आदि थे। (संवाद)

हल्द्वानी में किसानों को जैव नियंत्रण से खेती के गुर बताती डॉ. रूपाली शर्मा।

मशरूम उत्पादन पर ऑनलाइन प्रशिक्षण 13 से

पंतनगर। जीबी पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय के मशरूम अनुसंधान एवं प्रशिक्षण केंद्र में मशरूम उत्पादन पर पांच दिवसीय प्रशिक्षण 13 से 17 फरवरी तक प्रशिक्षण कार्यक्रम का आयोजन किया जा रहा है। केंद्र के संयुक्त निदेशक डॉ. केपीएस कुशवाहा ने बताया कि सुबह 10 से एक दोपहर बजे तक ऑनलाइन प्लेटफार्म जूम एप पर आयोजित होने वाले प्रशिक्षण के प्रमुख विषय मशरूम का महत्व, खेती के लिए आधारिक संरचना, स्पॉन (बीज) उत्पादन, प्रमुख प्रजातियों की उत्पादन तकनीक, रोग और कीट प्रबंधन, प्रसंस्करण और मूल्य संवर्धन एवं प्रायोगिक कक्षाओं का सीधा प्रसारण आदि होंगे। इसके लिए प्रति व्यक्ति सात सौ रुपये पंजीकरण शुल्क निर्धारित किया गया है। (संवाद)

ग्लेशियर की तबाही बड़े जलवायु संकट का संकेत

मानवीय दखल से उत्तराखंड ही नहीं भारत और विश्व के कई बड़े ग्लेशियर तेजी से सिकुड़ रहे हैं। इससे आए दिन प्राकृतिक आपदाएं और पर्यावरण संतुलन का गंभीर खतरा बढ़ गया है। इसका उदाहरण रविवार को ऋषि गंगा घाटी में ग्लेशियर का टूटना और केदारनाथ आपदा है...

मानवीय दखल से तेजी से सिकुड़ रहे हैं ग्लेशियर

उत्तराखंड की प्रमुख आपदाएं

उत्तर भारत में भारी तबाही मचा सकते हैं हिमालयी ग्लेशियर

अमर उजाला | रुद्रपुर-काशीपुर | amarujala.com | नैनीताल | रविवार, 7 फरवरी 2021 | 9

आधुनिक खेती के जरिये 'अर्जुन' के संवर्धन में जुटा पंतनगर विश्वविद्यालय

अस्थमा में रामबाण है इसकी छाल, हृदय के ऊतकों का इस्केमिक क्षति से करता है बचाव

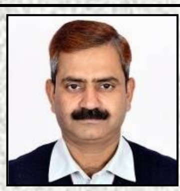
सुरेंद्र कुमार वर्मा

अर्जुन की छाल महत्वपूर्ण उत्पाद, 12 आयुर्वेदिक सामग्रियों में होता है उपयोग

50 वर्ष तक होती है पेड़ की उम्र

अमर उजाला एक्सक्लूसिव

अर्जुन का वृक्ष।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Directorate of Research

G.B.P.U.A & T, Pantnagar

US Nagar, Uttarakhand

Contact details

Phone: +91 5944233363

Email: desgbpuat@gmail.com