From the Director's Desk

Seeing the diversified and different need of hill agriculture, the institute is working on development of new improved varieties through crop improvement, management and processing. Apart from this, the institute is also looking after the research and management aspect through scientific planning for creation of new climate resilient technologies. To reduce drudgery of women farmers in the hills, the institute developed new implements with increased efficiency. In addition, on and off-farm trainings, frontline demonstrations and awareness programmes were carried out to educate the farmers, line department officials and students who have been our clients. Skill development programmes for youths were conducted to increase availability of trained manpower in agriculture.

In this newsletter, a brief of the achievements and other activities of the institute during last six months is being presented. Any suggestion to improve the quality of output/service is welcome.

(Arunava Pattanayak)

Varieties Notified

The following varieties of various hill crops have been released and notified (Fig. 1) by the Central Sub-committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops (CSC on CSN&R/VAC) vide notification number S.O. 1498 (F), dated 1st April 2019.
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The following varieties of garden pea (Fig. 2) have been released and notified for Uttarakhand hills vide Gazette Notification No: S.O. 692 (E) February 2019.

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<td>VL Sahi  Mower 13</td>
<td>An early maturing variety, which takes around 124-125 days for the first green pod harvest in the mid hill conditions (November sown crop). The average green pod yield is 115 q/ha. At maturity, it escapes incidence of powdery mildew disease. The variety possesses long pod with 8-9 seeds/pod and high shelling percentage (&gt;46%).</td>
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<td>VL Sahi  Mower 15</td>
<td>A medium maturing variety, which takes around 126-130 days for the first green pod harvest in mid hill conditions (November sown crop). The average green pod yield is 128.10 q/ha. The variety is moderately resistant to powdery mildew disease. The pods are long with high shelling percentage (&gt;50%).</td>
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Research Achievements

First report of rust disease in Parthenium weed from Uttarakhand hills, India

Parthenium (Parthenium hysterophorus L.) belonging to the family Asteraceae, a poisonous plant, inhabits many parts of the world, in addition to its native range in North and South America and the West Indies. This noxious invasive species is considered to be one of the worst weeds currently known in the world. Parthenium is considered as the number one dangerous terrestrial weed because of its harmful effects both to humans and biodiversity. During the month of February 2019, severe incidence of rust disease in Parthenium at ICAR-VPKAS Experimental Farm, Haukaliwala (29° 56'N, 79° 40'E, and 1250 m MSL), Almora, Uttarakhand was recorded. The typical rust symptoms included brown color pustules on leaf and stem (Fig 3a). Entire foliage showed burnt appearance and complete drying of plants (Fig 3b). Frequent monitoring of pathogen was done for teliospore development.

Fig. 3. Symptoms of rust on Parthenium: a- leaves, b- stem, c- teliospores
but it could not be found during the season. This season only uredia (Fig 3c) could be observed on the infected plants. This report will envisage in development of effective bio-control method for management of noxious weed.

**VL Metallic Plough – A Boon for Environment**

The institute has developed an environment friendly, completely metallic plough “VL Metallic Plough” after improvement in existing VL Syahi Hai. Based on farmers’ feedback, material thickness has been slightly increased to reduce the wear and tear. Shear has been developed using EN40 material. There is provision for adjustment as per the height of operator, bullock and depth of ploughing. Broad side of the body rectangle has been changed to perpendicular to the beam for giving more strength than existing plough and wings of the plough have been changed for use in both irrigated and upland. Provision in the plough for levelling fields after ploughing has also been provided. The fuse bolt with wing nut is provided to overcome any obstruction while ploughing. Working efficiency is higher in comparison to the traditionally used wooden plough and ergonomically better for the bullocks. The operational cost is negligible except wear and tear. When the shear gets torn off or damaged, it can be easily replaced.

**Siderophore production by Pseudomonas strains**

Out of 63 siderophore producing bacterial strains, 12 potential strains were further screened for SE and SI on CAS agar plates at 28°C. The SE and SI values ranged from (120 to 920%) and (2.2 to 10.2), respectively after 5 days of incubation.
28°C. These 12 siderophore producing strains were grown in SSM medium to assess the production of siderophore. Spectrophotometric analysis of liquid medium supernatants of eight strains revealed the production of siderophore in the range of 140.6 to 392.1 µg/ml of siderophore. Radar graph revealed that *Pseudomonas* sp. RTSRP(2) produced maximum (392.1 µg/ml) siderophore followed by *Pseudomonas* sp. CT4R32(2) (345.5 µg/ml) and *Pseudomonas* fraug* CS11RP4 (324.5 µg/ml) after 72hours at 28°C under shaking conditions (120rpm). Dual plate culture technique was employed to access the compatibility among the selected zinc solubilizing and siderophore producing bacterial isolates/strains at 28°C for the development of FGPR bacterial consortium.

**Plant growth promoting (PGP) traits of potential *Pseudomonas* spp.**

The plant growth promoting traits were analyzed for the selected nine *Bacillus* isolates and it revealed in LB broth with tryptone that only 4 spherical spore forming *Lysinibacillus sphaericus* isolates (SSC5, SSC7, SSC8 & SSC10) showed IAA production, while none of the ellipsoidal spore forming *Pseudomonas* spp. showed IAA production. On CAS agar, out of 9, 5 ellipsoidal spore forming *Pseudomonas* isolates (PpPES-C1C, PpPES-C1, PpPES-C1B & PpPES-G1) provided siderophore production after 96 hours of incubation at 28°C. Isolates PpPES-C1, PpPES-C1B & PpPES-G1 recorded maximum (2.4 and 43.9%); (3.3 and 49.2%) & (3.1 and 49.1%); zinc solubilization index (SII) and solubilization efficiency (SEE) or

Ellipsoidal spores of *Pseudomonas* polymyxa (100x magnification)

12 राइडरफोर्पे उत्पन्न वर्त्तमान द्वारा उत्पन्न राइडरफोर्पे के अभाव में इस्तेमाल डेर के पारा उत्पादन यी की सिक्का विभक्ति में सक्षम नहीं रही। इससे कृत्रिम शैली में उत्पादन योगी बन गए। आठ उर्ध्वरुपवर्ग के सरल सिक्का/णिक के द्वारा उत्पन्न सिक्का-संदर्भित विभक्ति में राइडरफोर्पे का उत्पन्न रेश को 140.6 व 392.1 महाकालिक/भीतरी राइडरफोर्पे पाया गया। क्रांति का उदा.हिस (6.6.2) से प्रदर्शित है कि दोहरे प्रयोग (120 rpm) के तहत 28°C उदाहरण पर 72 घंटे के प्रयोग स्ट्रेसियुलेशन प्रभाव।

RTSRP(2) ने अंतरगत प्रयोगकेस (392.1 µg/gm) उत्पन्न किया और प्रयोगकेस के नाम स्ट्रेसियुलेशन प्रभाव CT4R32(2) (345.5 µg/gm) और स्ट्रेसियुलेशन कंपांस (324.5 µg/gm) को प्रयोग किया। योजना एला व्यावसायिक ऋणकोण रूप में सही ईंधनिक अवधि चलाया गया।

संगठित वन्दे वैकल्पिक के पादप वृद्धि कारक विभाजन

ती वैकल्पिक एक का पादप वृद्धि कारक गुणों के लिए विश्लेषण किया गया और प्रयोग के वर्तमान भावनात्मक अवधि चलाया गया।

क्रियात्मक वाक्य के प्रयोग करने वाले वैकल्पिकात्मक में से फिक्सके में ती ईंधन ईंधनिक अवधि चलाया गया। ती ने सी इंधनिक रूप से चलाया गया करने वाले वैकल्पिकात्मक (PpPES-C1C, PpPES-C1, PpPES-C1B & PpPES-G1) प्रयोगकेस के वर्तमान पर 36 पर् के प्रयोगकेस रूप एकट वर्तमान योगी बन गए राइडरफोर्पे उत्पन्न नहीं रही। अंतिम एक (PpPES-C1, PpPES-C1B & PpPES-G1) ने वर्तमान रूप विभिन्नता और पात्रवर्ती द्वारा (2.4 and 43.9%); (3.3 and 49.2%) & (3.1 and 49.1%); समय: ZnO, ZnCO3.
ZnO, ZnCO₃, & ZnPO₄ respectively after 5 days of incubation at 28°C.

All the nine isolates were Gram positive rods, producing ellipsoidal or spherical spores (without production of parasporal crystal) during sporulation. Five isolates (PpES-C1, PpES-G1, PpES-C1c, PpES-C1b & PpES-S213) produced ellipsoidal spores and brick red colour colonies with fruity smell on Peptone Starch Agar-NaOH (PSA-NaOH) medium were identified as Paenibacillus polymyxa. However, four (SS C5, SS C7, SS C8 & SS C10) isolates produced spherical terminal spores in swollen sporangium were identified as Lysinibacillus sphaericus.

\[ \text{ZnPO}_4 \text{, जिना मिशिगल मौकीय में 28°C तापमान पर 5 दिनों के बाद अभिलिपित की।} \]

सभी नीचे लिखित प्रकार का रासा-पीला प्राकृतिक रासा, इलेमिकाइडल या गोल्कार एवं उपर उद्धृत विभिन्न जैविक चिह्नों के अनुसार निर्धारित गये। गोल्कार एक जैविक (PpES-C1, PpES-G1, PpES-C1c, PpES-C1b & PpES-S213) द्वारा प्रतिक्रिया रासायनिक अन्तर-युक्त रूप से मिशिगल पर फ़ाट सूखे के लापता इलेमिकाइडल एवं एक ईल लाल रंग की जैविक चिह्नों को पैकि़सिकाइड जैविक चिह्नों के रूप में पहचाना गया। जबकि, वह (SS C5, SS C7, SS C8 & SS C10) एक जैविक प्रकार प्रतिक्रिया में गोल्कार एवं इलेमिकाइडल जैविक चिह्नों के उपरांत आधिकारिक प्रतिक्रिया के रूप में पहचाना गया।

**Activities of Krishi Vigyan Kendras**

Training programmes on different aspects of hill agriculture were organized at KVK Uttarkashi and Bageshwar for the farmers of respective districts. Apart from this, extension of improved technologies as front line demonstrations were also done at farmers field by KVKs.

**Activities**

**KVK, Chinyalisaur (Uttarkashi)**

- Trainings: 16 (425 beneficiaries)
- FLDs: 40.5 ha (843 beneficiaries)

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VPKAS Newsletter, January–June, 2019
Seed Production - 44.75 q, seed of various crops and 36,740 seedlings

KVK, Kafligair (Bageshwar)
Trainings - 30 (551 beneficiaries)
FLDs - 62.28 ha (2136 beneficiaries). Besides, 500 chicks were distributed to 33 farmers for backyard poultry farming.

Field Day on Wheat Organized at Village Barethi, Uttarkashi
Field Day on Wheat Organized at Village Barethi, Uttarkashi

Agriculture Extension Service Provider Training at KVK, Chinyalisaur

1st prize for Stall at Hilans Kisan Mela at Uttarkashi organized by Aajeevika Pariyojna

Monitoring of onion (VL Pusa) seed production at farmer’s field by KVK Bageshwar
Participants of water and energy conservation programme at KVK Bageshwar
Awards

- Dr. J.K. Bishit was honoured as Excellent forage scientist in AICRP on forage crops national group meeting at IGKVV, Raipur on February 26, 2019.

- The Institute contingent participated in the ICAR International Sports Tournament – 2018 held at ICRISAT, Anantapur, Andhra Pradesh from 25 to 28 February 2019 and bagged 7 medals (3 Gold, 2 Silver and 2 Bronze) in different events. The gold medal for chess (women) and high jump (women) were won by Ms. Usha Birdi. She also won bronze medals for 100 and 200 m race. Sh. Rajendra Prasad Meena won gold medal in 800 m race and silver medals in 1500 and 400 m race and was declared best athlete of the Sports Tournament – 2018.

- Sh. R.P. Meena receiving the best athlete award

- Misa Usha Birdi (centre) receiving gold medal for high jump

- Dr. J.K. Bishit receiving excellent forage scientist award

One day workshop was organized by HESCO on "Development and sensitization of the Academic Community of the Uttarakhand-Almora on formulation of the S&T proposal on location specific challenges" at ICAR-VPKAS, Almora on January 20, 2019.

Final Meeting of QRT 2013-17 of ICAR-VPKAS, Almora was held on March 14-15, 2019 under the Chairmanship of Dr. Tej Partap, Vice-Chancellor, GBPUA&T, Pantnagar. QRT Report 2013-17 of ICAR-VPKAS, Almora was submitted to Hon’ble DG, ICAR on April 15, 2019 by the Chairman, Dr. Tej Partap, Vice Chancellor, GBPUA&T, Pantnagar. On these occasions, institute’s newsletter and technological inventory were also released by the dignitaries.

The meeting of the Institutional Biosafety Committee (IBSC) was held on April 30, 2019 under the Chairmanship of the Director ICAR-VPKAS, Almora.
Shri Sushil Kumar, Additional Secretary (DARE) & Secretary (ICAR) visited ICAR-VPKAS, Almora, its Havelagah Campus and model village Bhagartola during May 16-19, 2019 and interacted with scientists and other staff. A meeting with all staff members was held at Almora auditorium. Shri Sushil Kumar in his address appreciated the work of the institute. He asked the staff to work with full dedication so that the flag of ICAR always flies high. A leaflet titled Purvutya Mahilaon hona Poshan Suraksha ka Mahatva was also released by Horible Secretary.

A team of 6 Scientists viz., Dr. Lakshmi Kant, Dr. J.K. Bisht, Dr. Nirmal Chandra, Dr. K.K. Mishra, Dr. N.K. Heda and Dr. Sher Singh under the leadership of Director, Dr. A Pattanayak participated at ICAR-ATARI Zone VI, Guwahati, ICAR-ATARI Zone VII, Umiam and visited upper Shillong villages under NEH programme during

Meeting of Institutional Biosafety Committee

Museum Visit of Horible Secretary

Release of leaflet by Horible Secretary

Participants in the meeting between ICAR-VPKAS and Department of Agriculture, Horticulture, Soil Conservation & Training, Govt. of Meghalaya

The following officers attended the meeting:

Sh. S.K. Bhakat, VC, ICAR

Sh. K.K. Mishra, Director (Research & Training)

Sh. M.N. Heda, Director (HR & Admin)

Sh. P.C. Bisht, Director (Research & Administration)

Sh. J.K. Bisht, DARE & Secretary (ICAR)

Sh. Y.P. Pandey, Secretary (ICAR)

Sh. M.B. Nanda, Director (ICAR)

Sh. E.K. Singh, Director (ICAR)

Sh. D.K. Bisht, Director (ICAR)

Sh. S.K. Bhakat, Secretary (ICAR)
"International Day of Yoga" was organized in the morning on 21st June 2019 at ICAR-VPKAS Headquarter, Almora, Experimental Farm Hawalbagh and both the Krishi Vigyan Kendras as per the Common Yoga Protocol (CYP) developed by the Ministry of AYUSH, Government of India. The Yoga programme began with the prayer followed by loosening exercises, Yogasana, Kapalbhati, Pranayama, Dhyana/Meditation and ended with Sankalpa followed by Shaaanti Paatha. Director of the Institute, Head of Divisions, scientists, administrative, technical and supporting staff of the Institute showed keen interest in the Yoga Programme and actively participated in it.

Celebration of International Day of Yoga at ICAR-VPKAS
- A sensitization workshop on identification, importance and management of fall army worm in maize was conducted at ICAR-VPKAS Experimental Farm, Hawalbagh for state department officials of Kumaon Mandal on June 7, 2019 and at Directorate of Agriculture, Dehradun for state department officials of Garhwal Mandal on June 10, 2019.

- The meeting of Institute Management Committee (IMC) was held on June 11, 2019 under the Chairmanship of Dr. A. Pattanayak, Director.

**Skill Development Training Programmes for Youths**

- A skill development training programme on micro-irrigation technique was organized for 20 youths at the institute from December 27, 2018 to January 25, 2019. This programme was sponsored by Agricultural Skill Council of India under Ministry of Skill Development and Entrepreneurship (Skill Development Programme).

- The workshop was held in conjunction with the National Workshop on “Micro-Irrigation Technology” organized by ICAR-VPKAS, Hawalbagh. The workshop aimed to provide hands-on training to participants on various aspects of micro-irrigation technology.

- Participants of skill development training programme on micro-irrigation technique.
Twelve-five days (200 hrs) training on “Mushroom Growers” was organized under Agriculture Skill Council of India from Feb 01-March 02, 2019 at Experimental Farm, Hawalbagh, Almora. Total 20 participants from Almora and Nainital districts attended the training.

**Skill Training Programmes for Supporting Staff**
- Skill development training for Skilled Supporting Staff of ICAR-VPKAS, Almora was conducted on March 27-28, 2019 at Experimental Farm, Hawalbag.

**Summer Training Programme for students**
- Summer training program on Hill Agriculture was conducted for three batches of B.Sc. (Ag) students of Banaras Hindu University, Varanasi during 7-10, 21-24 and 28-31 May 2019 at Experimental Farm, Hawalbag of ICAR-VPKAS.

**Start-up Samwad Conducted**
- Start-up Samwad was organized by a-IDEA, Technology Business Incubator of ICAR-NAARM, Hyderabad at ICAR-VPKAS, Almora on March 25, 2019 to sensitize

**Training on Mushroom Harvesting and packaging at Hawalbag**

**Kushal Sahayak Karmachariono Heetu Kushal Prakshan Karyakram**
- Kushal Sahayak Karmachariono Heetu Kushal Prakshan Karyakram was organized under Prakshan Karyakram in collaboration with ICAR-VPKAS on March 27-28, 2019.

**Vidhyarthiono Heetu Girijakalin Prakshan Karyakram**
- Girijakalin Prakshan Karyakram was organized for three batches of B.Sc. (Ag) students of Banaras Hindu University, Varanasi during 7-10, 21-24 and 28-31 May 2019 at Experimental Farm, Hawalbag of ICAR-VPKAS.

**Start-up Samwad Conducted**
- Start-up Samwad was organized by a-IDEA, Technology Business Incubator of ICAR-NAARM, Hyderabad at ICAR-VPKAS, Almora on March 25, 2019 to sensitize
the entrepreneurs, students, agric entrepreneurs by focusing on importance of entrepreneurship. This event was Sponsored by Caspian Impact Investors (CII). The program was witnessed by more than 80 participants mainly comprised of students, scientists, researchers, entrepreneurs, start-ups, SHGs, FPOs.

**Other training programmes and activities conducted**

Following training programmes were conducted at the institute:

<table>
<thead>
<tr>
<th>Training Programme</th>
<th>Duration</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day training on “Pot of roti crops and their management”</td>
<td>January 05, 2019</td>
<td>50 state officials from Alimora district</td>
</tr>
<tr>
<td>A three days training programme on “Ponies in Rajbagh” at Jharkhand</td>
<td>February 14-16, 2019</td>
<td>24 farmers under ICAR-Seed project</td>
</tr>
<tr>
<td>A three day’s training programme on “Jharkhand”</td>
<td>February 19-21, 2019</td>
<td>36 farmers from Jharkhand</td>
</tr>
<tr>
<td>A five day’s training programme on “Mysore”</td>
<td>February 25 to March 1, 2019</td>
<td>47 farmers from Mysore</td>
</tr>
<tr>
<td>A three day’s training programme on “Uttarakhand”</td>
<td>March 11-13, 2019</td>
<td>21 farm women of Pithoraghar district</td>
</tr>
</tbody>
</table>

- **Research Achievements**
- **Human Resource Development**
  - Dr. Kushagra Joshi, Scientist attended training programme on Experimental Design and Statistical Data Analysis during January 03-16, 2019 at ICAR-IASRI, New Delhi.
  - Mr. H.L. Manna, Administrative Officer attended training programme for Group ‘A’ and ‘B’ officers on GPRS during January 14-15, 2019 at ISTM, New Delhi.
  - Mr. G.S. Bisht, Technical Officer attended training programme on Good Agricultural Practices for enhancing resource-use efficiency and farm productivity during January 02-11, 2019 at ICAR-IARI, New Delhi.
  - Dr. Kushagra Joshi, Scientist attended MDP on Information and Communication Technologies for Empowering Farmwomen during February 01-06, 2019 at ICAR-NAARM, Hydembad.

- **Manager Samsahin Vikas**
  - Shri. Kishore Joshi, Whisket的安全 to Jan 01-08, 2019, he was attended the training programme on “Farmers and Agriculture” during January 02-11, 2019 at ICAR-IARI, New Delhi.
• Mr. Medhi Pratap Singh, from Manager, KVK, Bageshwar attended training on farm Management during February 13-19, 2019 at ICAR-HFSR, Modipuram, U.P.
• Mr. Saleem, Driver (T-3) attended training on Automobile maintenance/repair of office Vehicle/tractor and farm implements during February 13-25, 2019 at ICAR-CIIEE, Bhopal.
• Dr. ARNS Subbanna, Scientist attended training on DNA Barcoding and Bioinformatics Applications in Entomology during February 25 to March 3, 2019 at ICAR-NBAIR, Bengaluru.

Retirement
• Shri B. S. Nagarkoti, Technical Officer on 31.01.2019
• Shri Govind Singh Bishoi, Technical Officer on 30.06.2019

New Colleagues
• Shri A. K. Joshi, Administrative Officer on 15.01.2019

Resignation
• Ms. Mohnika Yadav, Technical Assistant/T-3 on 02.05.2019

Promotion
• Dr. Dibakar Mahanta, Scientist to Sr. Scientist (RGF 8000/–) w.e.f. 01.07.2017.
• Dr. Kushagura Joshi, Scientist to Scientist (RGF 7000/–) w.e.f. 01.01.2017
• Dr. Rajashekar, H. Scientist to Scientist (RGF 7000/–) w.e.f. 01.01.2018
• Dr. Vijay Singh Meena, Scientist to Scientist (RGF 7000/–) w.e.f. 01.01.2018
• Shri Har Singh, SSS to Lower Division Clerk w.e.f. 08.04.2019
• Shri Vishnu Dutt Pandey, SSS to Lower Division Clerk w.e.f. 08.04.2019
• Shri Anand Singh Adhikari, SSS to Lower Division Clerk w.e.f. 08.04.2019

Published by: Dr. Anurag Pattnayak, Director, ICAR-V.P.K.A.S., Almora, Uttarakhand
Compiled, Edited & Printed by: Dr. J.K. Bishoi, P.K. Mishra and Renu Sanwal
Hindi Translation: Shri T.B. Pal
Weld Processing: Shri Charu Chandra Joshi

VPKAS Newsletter, January - June, 2019