ICAR – Central Potato Research Institute
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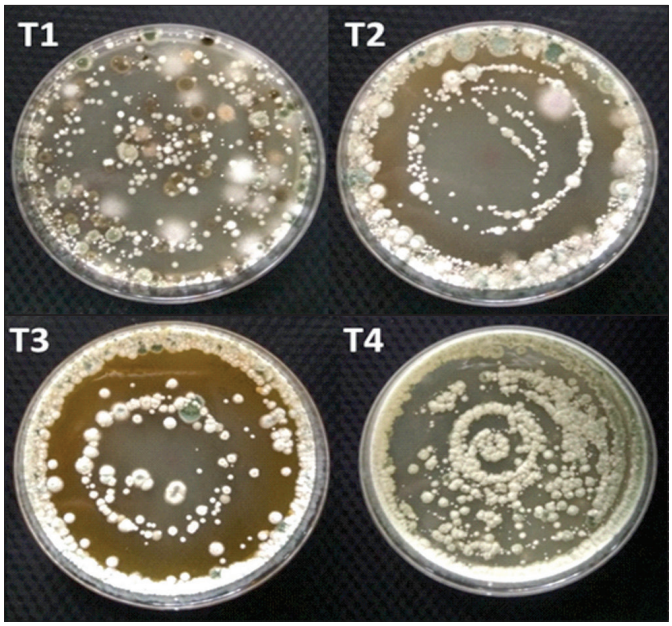
Research Highlights

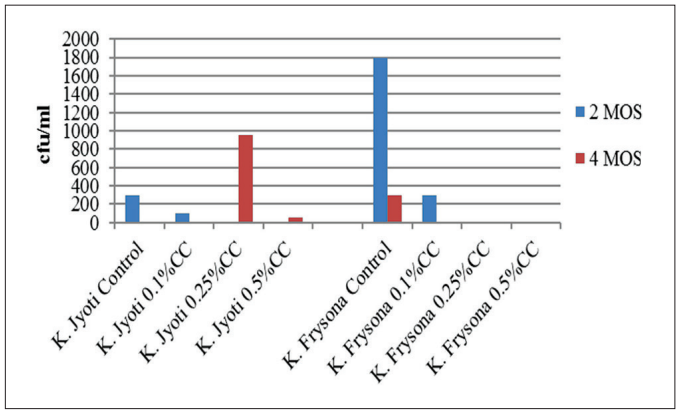
Chitosan: A safe replacement of synthetic fungicides to reduce dry rot losses in stored potatoes

In India, problem of dry rot in tubers stored at elevated temperatures (10-12°C) was not faced in the past but in 2009 dry rot was reported in potatoes stored in cold stores. Potatoes meant for processing are generally stored at 10-12°C, where *Fusarium* species affects the tuber quality and leads to higher rot losses combined with physiological losses.



Effect of chitosan coating on Fusarium population (CC: chitosan coating)

Various synthetic fungicides are available to control dry rot in cold stores, however, their residual level is a concern. Chitosan can be a safe alternative for synthetic fungicides as it has been recommended as 'Generally Recognized as Safe' food additive by the United State Food & Drug Administration. To reduce the physiological and pathological losses, tubers of Kufri Jyoti (procured from Modipuram) and Kufri Frysona (procured from Gujarat) were coated with three concentrations of chitosan (0.1%, 0.25% and 0.5%) and stored at 12±1°C up to 170 days and analyzed for processing quality, physiological losses and pathogen incidence periodically. Chitosan coating not only reduced the rate of respiration and weight loss, it also reduced accumulation of sugars, thereby retained the processing quality. Maximum decrease in rate of respiration with coating was approximately 23.5% (average of both varieties) and weight loss reduction was approximately 20% (average of both varieties) compared to uncoated tubers. Chitosan @ 0.25% concentration was able to completely inhibit the Fusarium growth.



Fusarium population after 2MOS in Kufri Frysona (T1-uncoated, T2-0.1% Chitosan Coating, T3-0.25% Chitosan Coating, T4-0.5% Chitosan Coating)

After 2 months of storage (MOS), chitosan has shown dose dependent decrease in Fusarium infection. Disease incidence was significantly high in Kufri Frysona compared to Kufri Jyoti. The population of Fusarium propagules was high after 2 MOS and decreased significantly after four months of storage in both the varieties. A good correlation was observed between Fusarium propagules' population and weight loss (Kufri Jyoti 0.804 and Kufri Frysona 0.957). Similarly,

Fusarium propagules' population also exhibited positive correlation with rate of respiration (Kufri Jyoti 0.233 and Kufri Frysona 0.722). Chitosan coating of whole tubers before storage may be highly useful for potato processors to achieve low physiological and pathological losses and retain the processing quality of stored tubers.

Pinky Raigond, Vinay Sagar, Tanuja Mishra, Asha Thakur, Brajesh Singh,Vinod Kumar, Vijai Kishor Gupta, Som Dutt & Sushil S Changan

Complete genome sequencing of Potato Dry Rot Pathogen *Fusarium sambucinum* Fckl.

Fusarium sambucinum is a soil fungal saprophyte and a plant pathogen that causes storage rots of fruits and potatoes. It is one of the most predominant species among several species of Fusarium (*Sordariomycetes; Hypocreales; Nectriaceae*) that cause dry rot, an economically important post harvest fungal disease, affecting potato (*Solanum tuberosum* L.) tubers worldwide. The yield losses attributed to dry rot in storage range from 10 to 25%, with almost complete loss of stored tubers in some cases. Besides, the pathogen is known to produce toxic metabolites like trichothecenes, beauvericin and fusarine in tubers which pose serious hazard to human and animal health. To date, seven species of *Fusarium viz. F. graminearum* (2007), *F. solani* (2009), *F. oxysporum* (2010), *F. verticilloides* (2008), *F. fujikuroi* (2013), *F. virguliforme* (2014) and *F. circinatum* (2016) have been sequenced and reported. This is the first ever report of draft genome sequence of *F. sambucinum* (Strain F4).

The purified DNA of Fusarium isolated from cold stored potato was used for sequencing using Roche 454 GS (FLX Titanium) platform. Two shotgun sequencing runs yielded high quality 920 Mb with 18- fold coverage of its estimated ≅42 Mb genome. The draft genome of strain F4 has G-C content of 47.81%, and 12,845 protein coding regions (CDSs) with an average CDS length of 1484 bp and largest CDS being more than 8Kb. The total number of exons predicted was more than 35,900 and average gene density was found to be 3.13 per 10 Kb which is higher than *F. virguliforme* (2.92%) and *F. oxysporum* (2.96%). pBLAST of predicted genes revealed that nearly 80% genes had similarity hit with *F. graminearum*, 6% with *F. oxysporum* and remaining with several other organisms including genes with unknown functions. The total rRNA genes were predicted to be 64 and the total tRNA coding genes to be 594. The repeat region studies revealed abundance of *tri, mono,* and *di* mer repeats in the genome. A total of 338 genes microsatellites were found to be present in 308 coding sequences. The phylogenetic studies among the *Fusarium* species revealed a nearest association between *F. sambucinum* (Strain F4) and *F. graminearum* (Strain PH1) (99.12%), whereas, least relationship was found with *F. verticillioides* (Strain 7600) (97.81%). The homology results also indicated the existence of enormous diversity and complexity among all the eight *Fusarium* species. When compared the phylogeny using protein sequence of highly conserved TEF 1α (Translation Elongation Factor 1α) gene, a close evolutionary relation was observed between *F. sambucinum* and *F. culmorum*, causal agent of seedling and ear blight, foot, stalk and root rot in cereals and grasses. Both are morphologically very similar and only the relative rapid growth of *F. culmorum* distinguishes from *F. sambucinum*.

This is the first report of whole genome sequencing of *F. sambucinum* (F4 strain) not only in India but also in the world and the availability of the genome sequence is certain to be an important resource in epidemiological and quarantine studies. A more detailed analysis of this genome and a comparative analysis with other *Fusarium* spp. genomes could expand our understanding of evolutionary relationships to obtain greater insights into their origins and pathogenicitiy. These studies would be of great help for developing the management strategies for the pathogen.

VU Patil, Vanishree G, HB Kardile, Vinay Sagar & SK Chakrabarti

Breeding of specialized potatoes for higher amylose/ amylopectin content

Starch is the main carbohydrate in human nutrition and potato is primarily considered as the carbohydrate rich crop. Starch has two constituents, amylose and amylopectin, which are high molecular weight polymers of D-glucose bound by α-1,4-glycoside linkage. Amylose rich starch is considered good for the consumption for its various health benefits whereas, amylopectin rich starch is of great importance for industrial starch production. It is well known fact that mealy potatoes have higher amylose than the waxy potatoes.

Modern food processing and consumption practices have led to lower amylopectin/ resistant starch consumption leading to rising health problems. Starches with increased levels of amylose are of interest because of correlation between amylose content and elevated levels of resistant starch, which has been shown to have beneficial effects on health for combating obesity and diabetes. All these offer opportunities for development of new potato cultivars with specialized properties i.e amylose rich potato cultivars for consumption purpose and amylopectin rich potatoes for industrial starch.

Cross	Parents	F1	Selected clone/s for advancement
1.	K. Chipsona 1 X	64	36.10% Amylose content clone
2.	K Chipsona 1 X	107	96-60% Amylopectin content clone
3.	K Chipsona 1 X CP 2378	92	90% Amylopectin content clone
4.	K Chipsona 1 X CP 2173	09	90% Amylopectin content clone

Considering importance of ICAR-CPRI, Shimla initiated the work on breeding for specialized potato cultivars with high amylose and/or amylopectin. More than 400 germplasm lines including 68 andigena and 50 Indian potato cultivars were screened for their starch content and ratio of amylose to amylopectin in them during 2015-16 using rapid high throughput amylose determination in freeze dried potato tuber protocol (Fajardo et al. 2013). Statistical analysis revealed that variability of amylose content among the lines tested is significant. The range of amylose content was found to be between 4.64 to 32.26 per cent. To obtain transgressive segregants, this variability was utilized in breeding for high amylose/amylopectin potato cultivars. Five lines viz CP1673, CP2173, CP2378, Kufri Chipsona 1 and Kufri Frysona having contrasting composition and ratio of amylose to amylopectin were selected as parents and were crossed in various combination in 2016-17 at fields ICAR-CPRI, RS, Kufri. A total of 272 F1 seeds from all four crosses were planted and developed tubers used for testing total starch and ratio of amylose to amylopectin in them (Table 1). Four promising clones containing amylose as high as 36.10% and Amylopectin as high as 96.60% were selected and carried forward for the second season. These promising lines will be of great help for developing the specialized potatoes containing high resistance starch for table purpose and high amylopectin potatoes for industrial purpose.

Vanishree G, Rajendra Singh, VU Patil, Mehi lal, Vinod Kumar, Vinay Bhardwaj & SK Chakrabarti

Transmission efficiency of *Potato leafroll virus* (PLRV) by *Aulacorthum solani*

Virus transmission by vectors is among the most important studies that may elucidate the infection process of phytoviruses. Therefore, knowing the potential of aphid vectors occurring in potato fields is necessary to understand the virus epidemiology. PLRV virions are transmitted by several aphid species in a persistent and circulative non-propagative manner. Most of the studies conducted to investigate PLRV epidemiology used *Myzus persicae*, and only rarely other potato colonizing aphids. The *Aulacorthum solani* have also been recorded in potato at different potato growing regions apart from *M. persicae* and found viruliferous to PLRV. Hence, the present study was aimed to investigate the transmission efficiency of *Potato leafroll virus* (PLRV) by two aphid's species viz., *M. persicae* and *A. solani* on potato variety Kufri Jyoti. Virus transmission was undertaken by allowing five aviruliferous aphids of each species to acquire the PLRV (Potato as source plant) for 96 hrs as acquisition access period (AAP). After the prescribed AAP, the aphids were then transferred on the healthy tissue culture raised plants with a constant 96 hrs inoculation access period (IAP). After the IAP of 96 hrs, the transmission was terminated by the application of insecticide (Imidacloprid 17.8 SL). The plants were allowed for symptoms development at 24±2^{0}C under glasshouse conditions in insect proof cages and thereafter, two months old plants were tested for PLRV through PCR. The *A. solani* could transmit PLRV with low efficiencies (7.1%) only in one plant out of fourteen plants which is the first ever report of transmission whereas *M. persicae* could transmit the virus in eight plants out of twelve (66.6 %). This study indicates *A. solani* as potential vector of PLRV though the transmission efficiency is less as compare to *M. persicae* a known vector of PLRV worldwide. The stakeholder involved in potato production should take into account the *A. solani* also as a vector.

Kailash C Naga, Kamlesh Malik, Tanuja Buckseth, Ravinder Kumar, Aarti Bairwa, Md Abas Shah, G Verma, Sundaresha S, Sanjeev Sharma & SK Chakrabarti

Transfer of Technology

Awareness Programme on Developed small Tools

An awareness programme on manual tools, developed by ICAR-CPRI was organized by Agriculture trade incubators on 29th Nov., 2018 at CPRI RS, Jalandhar.

This Programme was inaugurated by Dr. Daljeet Singh, Project Officer, Kartarpur, Jalandhar (Centre for

excellence on vegetables) who was the Chief Guest of the programme. All the scientists and Technical Officers of the centre, along with 30 potato farmers participated in the programme. On this occasion chief guest, Sh. Daljeet Singh emphasized on the importance and utility of manual tools in farming. During the programme, the problems faced by the participants and scientists while using prevalent manual tools and its potential preventive measures were also discussed. After that, all the scientists and participants practically used the tools developed by ICAR-CPRI and also gave their feedbacks for the improvement of the tools.

Farmers of Balrampur and Sravasti districts visited ICAR-CPRI, RS, Modipuram

On 24th October, 2018, the farmers of Balrampur and Sravasti, districts of Uttar Pradesh (declared as aspirational districts) visited this campus to know more about Potato farming. This training visit was sponsored by Regional centre of Uttar Pradesh, Sugarcane Institute in Gonda. During their excursion in campus, farmers visited fields, Potato museum, laboratories and attended workshop in which information related to crop activity, irrigation method, balanced use of fertilizers, management of insects and diseases was detailed. Farmers showed keen interest in all the activities.

Live Phone-in Programme at Doordarshan

Scientists from ICAR-CPRI, Shimla participated in live phone-in programmes during Oct. to Dec. 2018. The details of the topics along with experts are given below.

Month	Topics	Name of the Expert
December	Potato diseases and their management in lower hills of Himachal Pradesh	Dr. Ravinder Kumar Dr. Aarti Bairwa

Important Meetings, Events & Visitors

ICAR-CPRI celebrated its 70th Foundation Day

ICAR-CPRI Shimla Celebrated its 70th Foundation day on 5th October, 2018 and Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare was the Chief Guest of this event. On this occasion, Hon'ble Agriculture minister of Himachal Pradesh, Dr. Ramlal Markande, Hon'ble Horticulture minister of Himachal Pradesh, Sh. Mahender Singh Thakur and Professor Ashok Kumar Sarial, Vice-Chancellor, CSK H.P. Agriculture University, Palampur were also present as the special guests. During the event, awards were given to all categories of staffs of the institute and progressive farmers of Himachal Pradesh. The new logo of the institute was also launched along with some publications of the institute. Three newly released varieties, namely, Kufri Lima, Kufri Ganga and Kufri Neelkanth were devoted to the country.

During the foundation day, institute organized an exhibition which was inaugurated by Hon'ble Agriculture and Farmers' Welfare minister. Other ICAR institutes like IARI's Regional Station (Shimla), IIWBR's Regional Station (Shimla) and NBPGR's Regional Station (Shimla) in Himachal Pradesh also exhibited their technologies during the event. Various technologies of the institute like live sample of potato varieties, processed products, True Potato Seeds (TPS), minitubers from net house, microtubers from aeroponic system, virus testing kits etc were displayed during the exhibition. In addition to farmers and school children, a large of visitors which includes scientists, policy makers, entrepreneurs and other stakeholders in agriculture and allied activities visited the Institute and they were made aware about various technologies of the institute.

Seed village workshop in East Champaran, Bihar

ICAR-CPRI, Shimla organized a one-day workshop for establishment of potato seed villages on 28th October, 2018

in Krishi Vigyan Kendra, Piprakothi, East Champaran, Bihar. Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare was the chief guest of the function and launched the development of potato seed villages.

About 550 farmers participated in the workshop. In his address, Shri Radha Mohan Singh gave special emphasis on how to double the farmers' income. Shri Pramod Kumar, Hon'ble Minister of Tourism, Government of Bihar was also present as a special guest and addressed the gathering. Dr. SK Chakrabarti, Director of the Institute gave the welcome speech and discussed about the objectives of the workshop and how to establish seed villages in a phased manner. During the technical session, the detailed discussion on how to develop seed villages and role of farmers in it was coordinated by the multidisciplinary team of scientists of the institute.

Cleanliness Drive under Mera Gaon Mera Gaurav

As a part of the *Swachhata Pakhwada* celebration of the institute, a one day cleanliness drive was organized under *Mera Gaon Mera Gaurav* programme on December 28, 2018 in the selected villages of Cheog Panchayat, Shimla (HP).

During this event, school children of Government High School, Cheog, staffs of the institute, farmers and residents of the villages were actively involved in cleaning the school and the market surroundings. Dr. NK Pandey, Principal scientist and Head of the Division of Social Sciences sensitized all participants about the objectives and importance of *Swachhata Pakhwada* and motivated them to take cleanliness activities as their daily routine.

Rashtriya Ekta Diwas celebrated at ICAR-CPRI, Shimla and its regional stations

On the eve of birthday of Indian ironman Sardar Vallabhbhai Patel, *Rashtriya Ekta Diwas* was celebrated at ICAR-CPRI, Shimla and its regional stations on 31st October, 2018. On this occasion, Rashtriya Ekta Sapath ceremony was organized and all staff members took pledge to be united and to make all possible efforts towards national integration.

Vigilance Awatreness week Observed

Vigilance awareness week was observed at ICAR-CPRI, Shimla and its regional stations from 29th October to 3rd Nov. 2018. On the first day *i.e.* on 29th October, 2018, all the staff of the Institute took oath of integrity and all pledged to fight against corruption. All the employees demonstrated their commitment to end the corruption which is a barrier in the progress of the country and determined to be honest and follow the rules of law in all

walks of life. During the vigilance awareness week, a workshop was organized on ICAR-CPRI, Shimla and

lectures on "My Vision- Corruption fee India" were delivered to the staff. Pamphlets were distributed to School children and civilian for making them aware of the importance and Vigilance Integrity pledge was also taken by private organizations and school children in their assembly sessions.

Celebration of World Soil Day

World soil day celebrated on 5th December, 2018 at ICAR-CPRI, RS, Modipuram. On this occasion, a farmers' forum (*Kisan Goshti*) on the topic "Importance of Soil health and advanced potato farming" was organized, in which 84 farmers participated. Prof. Gaya Prasad, Vice Chancellor, SVPUAT, Meerut graced this occasion as the chief guest of the function whereas Dr. NC Upadhayay, Formar Principal Scientist was the guest of honour. During the programme, experts detailed about the importance of soil health and its conservation.

Human Resource

Scientific

Joining

1. Dr. Raghavendra K.V., Scientist, ICAR-CPRI, RS, Modipuram joined on 08.10.2018.
2. Sh. Rahul Kumar Tiwari, Scientist, ICAR-CPRI, Shimla joined on 08.10.2018.
3. Dr. Kumar Nishant Chourasia, Scientist, ICAR-CPRI, Shimla joined on 08.10.2018.
4. Sh. Dharmendra Kumar, Scientist, ICAR-CPRI, Shimla joined on 09.10.2018.
5. Sh. Milan Kumar Lal, Scientist, ICAR-CPRI, Shimla joined on 09.10.2018.
6. Ms. Preeti Singh, Scientist, ICAR-CPRI, Shimla joined on 09.10.2018.
7. Sh. Subhash S., Scientist, ICAR-CPRI, Shimla joined on 09.10.2018.

Promotions

1. Dr. (Mrs.) Sarla Yadav, Scientist, ICAR-CPRI, RS, Patna promoted to the next pay matrix level-11 (Pre-revised PB 15600-39100 + RGP 7,000/-) *w.e.f.* 15.12.2015 through CAS.

Technical

Joining

1. Sh. Sanjay Kumar, Technical Asstt. (T-3), ICAR-CPRI, Shimla joined on 22.12.2018 (FN).
2. Kumari Nisha Verma, Hindi Translator, ICAR-CPRI, Shimla joined on 24.12.2018.
3. Sh. Vivek Kumar, Technical Trainee, ICAR-CPRI, Shimla joined on 10.12.2018 (FN).
4. Sh. Rohit Verma, Technical Trainee, ICAR-CPRI, Shimla joined on 19.12.2018 (FN).
5. Sh. Rahul, Technical Trainee, ICAR-CPRI, Shimla joined on 19.12.2018 (FN).
6. Sh. Sanjay Kumar, Technical Trainee, ICAR-CPRI, Shimla joined on 21.12.2018 (FN).
7. Sh. Rakesh Kumar, Technical Trainee, ICAR-CPRI, Shimla joined on 28.12.2018 (FN).
8. Sh. Rajat, Technical Trainee, ICAR-CPRI, RS, Kufri joined on 18.12.2018 (FN).
9. Sh. Rishav Kumar, Technical Trainee, ICAR-CPRI, RS, Patna joined on 26.12.2018 (FN).
10. Sh. Siddharth Saroha, Technical Trainee, ICAR-CPRI, RS, Modipuram joined on 29.12.2018 (FN).
11. Sh. Sumit Kumar, Technical Trainee, ICAR-CPRI, RS, Shillong joined on dated 29.12.2018 (FN).
12. Sh. Virender Kumar, Technical Trainee, ICAR-CPRI, RS, Jalandhar joined on 28.12.2018(FN).
13. Sh. Dhanvantri Meena, Technical Trainee, ICAR-CPRI, RS, Gwalior joined on 31.12.2018 (FN).
14. Sh. Sanjeev Kumar Meena, Technical Trainee, ICAR-CPRI, RS, Patna joined on 18.12.2018 (FN).

Promotions

1. Sh. Harvir Singh, ACTO, ICAR-CPRI, RS, Modipuram promoted to CTO *w.e.f.* 30.03.2018.

Retirements

1. Sh. Narayan Singh, TA (Driver), ICAR-CPRI, RS, Modipuram retired on 31.12.2018.

Administrative

Joining

1. Sh. Rajesh Chauhan, LDC, Admn. Block, ICAR-CPRI, Shimla joined on 24.12.2018.
2. Sh. Suraj Singh, LDC, ICAR-CPRI, RS, Modipuram joined on 17.12.2018.
3. Sh. Sunil Singh, LDC, ICAR-CPRI, RS, Modipuram joined on 07.12.2018.

Granted financial upgradation under MACP Scheme

1. Smt. IC Dharmapal, Asstt. Admn. Officer, ICAR-CPRI, RS, Muthorai, granted 2nd MACP *w.e.f.* 14.10.2017 in Pay Matrix Level 8.
2. Smt. Seema Verma, UDC, ICAR-CPRI, RS, Modipuram, granted 2nd MACP *w.e.f.* 09.10.2018 in Pay Matrix Level 5.
3. Smt. Geeta Devi, UDC, ICAR-CPRI, Shimla, granted 2nd MACP *w.e.f.* 18.08.2018 in Pay Matrix Level 5.
4. Smt. Bimla Salhotra, UDC, ICAR-CPRI, RS, Jalandhar, granted 2nd MACP *w.e.f.* 26.02.2018 in Pay Matrix Level 5.

Skilled Supporting Staff

Granted financial upgradation under MACP Scheme

1. Sh. Sukhwinder, SSS, ICAR-CPRI, RS, Jalandhar, granted 2nd MACP *w.e.f.* 30.06.2018.
2. Sh. Jagai Ram, SSS, ICAR-CPRI, RS, Jalandhar, granted 2nd MACP *w.e.f.* 30.06.2018.
3. Sh. Paramjit Singh, SSS, ICAR-CPRI, RS, Jalandhar, granted 2nd MACP *w.e.f.* 30.06.2018.
4. Sh. Shiv Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
5. Sh. Niranjan Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
6. Sh. Kailash, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
7. Sh. Ram Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
8. Sh. Jagdish, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
9. Sh. Shyam Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
10. Sh. Prakash Tomar, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
11. Sh. Virendra Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 4.7.2018.
12. Sh. Ranbir Singh, SSS, ICAR-CPRI, RS, Gwalior, granted , 2nd MACP *w.e.f.* 04.07.2018.
13. Sh. Kallu, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
14. Sh. Ashok Kumar, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
15. Sh. Jaswant Singh, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
16. Sh. Kedar, SSS, ICAR-CPRI, RS, Gwalior, granted 2nd MACP *w.e.f.* 04.07.2018.
17. Sh. Sompal, SSS, ICAR-CPRI, RS, Modipuram, granted 2nd MACP *w.e.f.* 25.06.2018.
18. Sh. Krishan Pal, SSS, ICAR-CPRI, RS, Modipuram, granted 2nd MACP *w.e.f.* 25.06.2018.

Probation clearance

1. Smt. Sodha Devi, SSS, ICAR-CPRI, RS, Kufri, *w.e.f.* 10.03.2018.
2. Sh. Rajinder Singh, SSS, ICAR-CPRI, Shimla, *w.e.f.* 10.03.2018.
3. Smt. M. Angamma, SSS, ICAR-CPRI, RS, Muthorai, *w.e.f.* 15.03.2018.
4. Sh. Ramdin, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
5. Sh. Net Ram, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
6. Sh. Mangal, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
7. Sh. Lala Ram, SSS. ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
8. Sh. Tilak Singh, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
9. Sh. Sikander Singh, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 17.03.2018.
10. Sh. Kali Charan, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 18.03.2018.
11. Sh. Bhagirath, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 18.03.2018.
12. Sh. Jandel Singh, SSS, ICAR-CPRI, RS, Gwalior, *w.e.f.* 18.03.2018.

Retirements

1. Kr. Thapa, SSS, ICAR-CPRI, RS, Shillong, retired on 30.11.2018.
2. Sh. Satya Pal Singh, SSS, ICAR-CPRI, RS, Modipuram, retired on 31.12.2018.
3. Sh. Sita Ram, SSS, ICAR-CPRI, RS, Kufri, retired on 31.12.2018.

From the Director's Desk

The impact of extensive potato research and development in India during last seven decades had been phenomenal in all aspects of potato production. The crop has witnessed 9.19 times increase in area, 31.3 times increase in production and 3.4 times increase in productivity during 1949-50 to 2016-17. The area, yield and production in 1949-50 was 0.234 million ha, 6.59 t/ha and 1.54 million tonnes, respectively. By the end of XII plan period i.e. 2016-17, the country produced 48.2 million tonnes of potatoes from an area of 2.15 million ha with an average yield of 22.4 t/ha (NHB, 2017, 3rd estimate).

As a consequence India became the second largest potato producer in the world. On the contrary, recurrent gluts in potato production have become a common event with the increase in potato production in the country. The prices crash drastically during harvesting months leading to panic sale by the farmers thereby incurring huge monetary losses. Lack of proper marketing avenues, insufficient/expensive cold storage facilities and low domestic utilization are some of the factors that precipitate glut situation. The potential for exporting seed, table potatoes and processed products has hardly been explored in India. In the true sense our country is not yet prepared to absorb excess potato production. Issues related to promotion of utilization, storage, marketing, processing and export need urgent attention for easing recurrence of gluts in potato production. India contributes around 13% of the total world potato production; but our contribution to world potato export is around 1.6% only, which is not even 1% of the total potato production in the country. Potato being semi-perishable and bulky agri-commodity, its export from India is not guided by a long term policy support. As potato is a politically sensitive crop, targeted steps are taken to keep its retail prices at affordable level for the ordinary consumers.

Export is generally a crisis management tool during the years of oversupply. However, in international markets exports can only be increased through building credibility and making long term contracts. It is anticipated that the future food policy will concentrate more and more on ensuring national food security and low value export of agri-commodities may be discouraged. Under these circumstances steep rise in export of fresh potatoes from the country is unlikely. India being the massive producer of potatoes, a healthy growth in processed potato products is anticipated. However, unknown and complex future developments at international level are difficult to be assessed. Moreover, in the absence of a clear cut support through a robust export policy it is not possible to estimate and assign future targets for the export of processed potato products. Therefore, for encouraging export of potatoes from the country, the Institute has done the SWOT analysis and a "Road Map"has been prepared for the purpose. It is expected that following the road map, the export of potatoes may increase in times to come.

Compiled and edited by: Brajesh Singh, Ravinder Kumar, Pynbianglang Kharumnuid, Aarti Bairwa & Rakesh Mani Sharma
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