



# Indian Potato News

A Half Yearly Newsletter of Indian Potato Association

<http://www.ipashimla.org>

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## From President's Desk

The horticulture sector in India is booming with breakneck speed in recent decades. This sector is mainly comprised of fruits, vegetables, medicinal and aromatic plants, ornamentals, and mushrooms. Horticulture will play a pivotal role in the realization of that stupendous goal. Most of the horticultural crops including potatoes have the potential to give a high economic return per unit farm area. Among horticultural crops, potato is one of the commodities which has made a significant contribution to the Indian food system. Potato (*Solanum tuberosum*) is one of the most important vegetables which is used in the Indian household system on a regular basis which is locally known as alu, bilatialu, batata, urulai, kilangu, urulaguddain various parts of the Indian subcontinent. Keeping in view the burgeoning population growth, economic development and changing dietary pattern/preferences of the country it is presumed that potato will play a critical role in future food and nutritional security. Though potatoes came to this ancient land only about 400 years ago during the Mughal dynasty by the Portuguese. They have introduced potatoes, which they called 'Batata', to India in the early seventeenth century when they cultivated it along the western coast. British traders introduced potatoes to Bengal as a root crop, 'Alu'. By the end of the 18th century, it was cultivated across northern hill areas of India. Potato is a major food crop that is grown in over 100 countries across the world. Asia alone accounts for half of the world's potato production, with China and India accounting nearly 38% of that production. In case of potato consumption, India's domestic demand has slowly increased over the last few decades.

The ICAR-Central Potato Research Institute was established in August 1949 at Patna (Bihar) on the



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recommendation of the then Agricultural Advisor to the Government of India, Sir Herbert Steward under the Ministry of Agriculture, Government of India. The institute was, later on, shifted to Shimla in 1956 to facilitate hybridization work in potato breeding programmes and maintain seed potato health. It was transferred to the Indian Council of Agricultural Research (ICAR) in April 1966. The institute has created the state-of-the-art laboratories for conducting basic and strategic research in different areas of potato. The All India Coordinated Research Project on potato (AICRPPotato) is also located in this institute and has been functioning since 1971. It has 25 regional centres located in nearly all agro-climatic zones of the country to test the performance of new potato varieties and technologies in different locations. An Agricultural Technology Information Centre (ATIC) is also functioning in the institute which looks after the transfer of technology activities of the institute. The institute not only develops new varieties and technologies for potato growers of the country but also takes care of the dissemination of these technologies to the ultimate consumers through various training, demonstrations, farmers fairs, exhibitions etc.

Today India is the second-largest potato producer only after China in the world and contributes nearly 11% of world potato production. Potato production has grown by leaps and bounds since Independence, thanks to the hard work of farmers and timely scientific intervention of ICAR-CPRI, Shimla and policy intervention in the

country. The ICAR-Central Potato Research Institute (ICAR-CPRI) is fully aware of this challenge and is pursuing strategic and applied research for addressing those challenges. Along with ICAR-CPRI, Shimla, IPA is also playing a pivotal role in bringing the research made by ICAR-CPRI, Shimla and technologies provided to the farmers. However, the income of farmers in real term is not treasured adequately during this time causing widespread agrarian distress. It is, therefore, a paradigm shift is necessary now from the policy of mere potato production to secure the income of farmers. Horticulture production has surpassed agriculture production significantly for the last 12 years and today the total production stands at 329 million tons and an area of 27 million hectares. Since independence horticulture production has grown about seven-fold in terms of volume as well as value, which has helped India in moving from food security to nutritional security.

India has taken a giant leap in terms of potato area and production since independence. Compared to 1949-50, the year of establishment of CPRI, when the total production was 1.54 million tonnes from an area of 0.23 million ha, we now produce about 52 million tonnes with an area of 22 lakh ha. In the year 2020, potato prices were in favour of farmers because of lower plantings and production, which was impacted by adverse weather during the harvest season in the potato-growing zones. Besides this, the COVID-19 pandemic condition also influenced the whole supply chain and buying behaviour of people. During the year 2020, the prices of potato in February and March was Rs. 1105 and Rs. 1250, respectively. Up to the end of January-21, competitive prices of potato prevailed in the market due to shortage and demand in Gujarat markets. However, from mid-February-21 and up till the harvesting period, there will be the arrival of the new crop in the market so prices may influence. Due to COVID-19 pandemic, export has not clutched its pace right now. This will ultimately influence the prices of potatoes in our domestic markets. In recent times many people especially urban residents wish to produce part of their vegetables/salads under their supervision due to the terror of COVID like pandemic situation and excessive application of insecticides /pesticides /fungicides etc. Various systems are commercially available which can be adopted for growing own vegetables but all have some limitations. Potato as a horticultural commodity is produced seasonally and are perishable, it registers fluctuation of prices and supply. Efforts are made by the Government to provide the best

marketing ecosystem including the building of cold chain infrastructure in the country. With access to knowledge and new technology, younger farmers are getting attracted to precision farming, value addition and thereby generating better incomes. This also helps in tapping the export opportunities and restricting imports in certain cases.

To realize the expectation, it is necessary to chalk out a proper road map for the potato sector as a whole. Information on the agricultural sector in general and specifically on potatoes in a classified form is an essential requirement for realistic planning of the road map. Even though data generation and their publication are given due importance, information about research and the production aspect of potatoes are scattered over various types of published and unpublished records. This Newsletter by Indian Potato Association is an attempt to put together the main component of such information related to potatoes into a package, useful for stakeholders viz., farmers, researchers, policymakers, entrepreneurs, students and the potato industries.

The present publication of the IPA Newsletter's first issue by the Indian Potato Association has been updated with the input of the present ongoing research in the area of potato and related technologies. I appreciate the effort made by the Editorial Board to compile this important IPA Newsletter first issue which is related to data from different sources. I hope that this IPA Newsletter will serve a useful purpose in addressing the need of diverse stakeholders and other users. We also look forward to useful feedback from the readers to improve upon the utility of this publication in the future. I congratulate scientists and other staff of the institute for carrying out outstanding research and development during the year. I extend my special thanks to the editorial team for making this report brief and timely publication.

President IPA  
**Dr Narendra Kumar Pandey**  
Director (A)  
ICAR-Central Potato Research Institute  
Shimla-171001

## New Reports/ Research outcomes

### QR Codes for Wider Dissemination of Potato Technologies

Pooja Mankar, Sanjay Rawal, Manoj Kumar, VK Dua and NK Pandey

The major shortcoming between lab to land is the slow spread of developed technologies. A conventional approach like farmer's training has time and space constraints. Also, the printed extension publications are limited and difficult for broader distribution. So, innovative technologies are to be developed and adopted to disseminate knowledge to end-users rapidly. Recently, an attempt has been made to provide developed potato technologies for potato growers by developing QR (Quick Response) codes. These codes are machine-readable, 2-D barcodes having several advanced features than barcodes. For example, QR codes occupy very little space compared to barcodes for the same amount of information. Moreover, they can be scanned at 360°. These features make them more user-friendly and easy to use. With this motivation, QR codes have been developed for nine ICAR-CPRI publications using online QR code generators. Users need to scan QR codes using the cameras of their mobile smartphones. The camera itself will generate a link. Just follow the link to access the complete document. This technological intervention has no paper wastage, and information can be sought without any time and space restrictions. This is a cost-effective and novel approach using a new edge technology for wider knowledge dissemination for potato farmers and other stakeholders.



### Agricultural Transformation of Egypt Desert- a lesson for India

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Egypt is the largest potato producer (4.6 million tons) in Africa with the yield range of 32-45 tones/ha; and has become the 5th largest exporter of ware potatoes. Egypt, mostly a desert landscape, has put together an effective agricultural production. The agricultural region in Egypt was confined to the Nile Valley and Nile Delta, with a few oases and some arable land in Sinai. Interventions of new technologies have unlocked huge opportunities and Egypt is turning deserts into high productive agricultural lands using drip and pivot irrigation system.

New crop production areas have been developed in western desert starting from Frafra oasis, expanded towards Abusaleem, occupying vast area of Owinet down to south near Sudan border. These are sand-filled areas where irrigation water is being pumped from 600-900 feet down. Potato crop in these areas delivers a yield of 42-45 tonnes per hectare - attractive, dirt-free tubers and well known for its quality in the EU and Russian market. Not only potatoes but other crops like wheat, alphalpa and beet roots are also being grown successfully in these vast sandy desert area farms, which are equipped with pivot irrigation and fertigation systems.

The transformation of desert areas in Egypt carries a big significance for India where it can draw inspiration to transform desert regions like Jaisalmer, Barmer, Bikaner, Jalore in Rajasthan to an agriculture favorable land with the intervention of technologies. Potato crops in these areas will offer high yield, quality produce and a big opportunity for potato seed production.



Potato crop in desert areas of Egypt



## The problem of potato storage rots and possible management strategies

Rahul Kumar Tiwari, Ravinder Kumar R, Milan Kumar Lal, Kailash Chandra Naga, Dharmendra Kumar, Sanjeev Sharma

The storage diseases are a consistent problem for potatoes during storage. The major diseases that deteriorate the potatoes in storage include soft rot, dry rot, pink rot, silver scurf, Pythium leak, late blight, black dot, and early blight. Some diseases such as soft rot cause more severe damage and rapidly invade the tubers and predispose them to other storage pathogens. The main causal agent of soft rot is the bacterium *Erwinia carotovora* but another bacterium is also reported to cause this disease. The primary symptoms comprise of tan- to brown-coloured water-soaked areas of coarse, mushy tissue frequently delineated by brown to black margins. The rotted part of the tuber is initially differentiated from the healthy part, but the healthy part will succumb to the bacteria within few days of infection. The initiation of soft rot pocket results in intense respiration within the tubers that generate excess heat and accelerates the rotting process and an extreme foul smell is observed in piles. The grouping of high temperatures and wet, decaying tuber tissues leads to infection and the spread of another major disease known as dry rot. Dry rot, caused by the fungus *Fusarium sambucinum* and other 16 *Fusarium* species typically cause, shrivelling, mummification and internal rot that leads to collapsed tissue having enormous mycelial mass. One of the best suggestions to restrict the rots in tubers includes the extra care and avoidance of physical damage to tubers during harvesting, handling and transportation. All the storage pathogens usually enter through wounds and cause initial infection. Here, the requirement of “curing periods” for wound healing is also critical. The potato

harvested and stored after the inundation of rains must be properly dried before storage as surface wetness initiated fungal growth. The maintenance of optimum temperature nearby 10°C and proper ventilation for 15 days provides the best healing to the minor cuts and crevices. If potatoes are harvested with pulp temperatures above 15°C, cool them to at least 10-12°C within the first two days after harvest and maximize the duration of fresh-air intake. The three major factors to manage storage rot are temperature, humidity, and airflow. The proper identification of causal agents allows the optimal use of these storage factors to restrict the pathogen spread and disease development in storage.



a. Potato tubers infected with dry rots,



b. tubers bearing soft rot infection

## GLUTEN-FREE POTATO COOKIES

Arvind Jaiswal, Pinky Raigond, Milan Kumar, Sushil Kumar and Brajesh Singh

Food allergies and food intolerance are a growing public health concern causing a rapidly growing demand for gluten-free food. In the past few years, a considerable number of gluten-free food products are accessible in the food markets. Now people are demanding for gluten-free pizza, pasta, and noodles. Few exclusive gluten-free restaurants also opened in big cities of India. It is expected that the Indian market share would increase in the coming years due to an increased rate of diagnosis of Celiac Disease and greater awareness



about quality gluten-free foods and may reach up to 8.7% in the near future. Till now in India, mainly flour and multigrain mixes lead the market segment of gluten-free foods. Under these situations, the advantage of potatoes being free from gluten and fasting friendly can be taken. In fact, potato tubers contain plenty of dietary carbohydrates, proteins, vitamins, minerals, bioactive molecules, phytochemicals, anthocyanin, and carotenoids and metabolites which have beneficial effects on human health. Potato protein contains relatively well-balanced amino acid concentrations along with a higher content of essential amino acids compared to other proteins of plant-origin.

Recently, ICAR-Central Potato Research Institute, Shimla has standardized and developed the process for potato-based cookies which are made from whole potato flour. Potatoes based cookies are completely free from wheat/gluten/refined wheat flour and have novelty in their composition, which makes these cookies to stand alone among different cookies available in the market. Moreover, potatoes of any shape, size, and variety, sugar content and, the period of storage can be utilized for the production of cookies. Even these cookies can be prepared from partially damaged as well as both fresh and cold-stored potato tubers. These potato cookies are a good source of fiber, vitamin C, potassium. The low sodium content of these cookies makes them suitable for the high blood pressure population also. The protein and fat content of the potato cookies are almost like normal wheat flour-based cookies.

The production process involves the use of potato flour as a major ingredient along with sugar, fat and leavening agents. Thereafter, the dough is shaped and baked for sufficient time. Potato cookies have the shelf life of 4 months if stored in a cool, dark and dry place. Potato flour can be easily procured from the market or prepared in a large amount during gluts at a relatively low cost. This flour can be stored at ambient temperature throughout the year. The process can be easily adopted by industries involved in the production of baked foods. Since biscuits and cookies are consumed by the population of all age and income groups. Therefore, there will be huge business opportunities for potato cookies. In our knowledge at present, there is no such type of potato-based cookies available in the Indian market. ICAR-CPRI have developed a total of 10 variants of gluten-free cookies and some variants are suitable for consumption in fast/*vrata* also.



Gluten-free potato cookies

## VEGFAST

Sukhwinder Singh, Brajesh Nare,  
Arvind Jaiswal, Sugani Devi, Yogesh Kumar Gupta

In recent times many people especially urban residents wish to produce part of their vegetables/salads under their supervision due to the terror of COVID like pandemic situation and excessive application of insecticides /pesticides /fungicides etc. Various systems are commercially available which can be adopted for growing own vegetables but all have some limitations. Considering urban lifestyle and available space, ICAR-CPRI has developed the concept of VEGFAST.

VEGFAST is a technology for growing safe fresh vegetables, fruits, herbs, medicinal plants and flowers in limited space such as on rooftops, balconies, open porch and backyards. The beauty of this technology is that urban residents can enjoy the pleasure of harvesting their own grown vegetables and fruits. VEGFAST helps in converting the concrete jungles into green and provides a new way to create a hobby by which a family can reduce their stress level by spending some time with nature. It also helps your kids in learning how the vegetables/plants are cultivated which they consume throughout their life. Families and kids can enjoy the close proximity of nature. ICAR-CPRI provides training to the entrepreneurs to act as service providers of VEGFAST system, which will further help in installing this system in end user's houses, schools, restaurants, balconies and rooftops. This technology has been licensed to 34 service providers pan India. In VEGFAST concept, the service providers are trained to install the troughs with appropriate soil mix and shift the stage-1 plants in the troughs so that, the end-users can enjoy the green beauty of their vegetable garden on day one.

To prevent the unauthorized use of this technology five unique designs of this technology have been protected under the Indian patent act. Besides this ICAR-Central Potato Research Institute (ICAR-CPRI), Shimla registered a trademark "VEGFAST " घर पर उगाएं ताजा खाएं for this technology.

## Awards/Honours/Promotions

- i. **Dr. Brajesh Singh** was awarded the Fellowship of the National Academy of Agricultural Sciences (NAAS), New Delhi for the year 2021.
- ii. **Dr. Brajesh Singh** bagged JJ Chinoy Gold Medal Award (2020) in Plant Physiology from the Indian Society for Plant Physiology, New Delhi.
- iii. **Dr. Ravinder Kumar**, Scientist (Plant Pathology), ICAR-Central Potato Research Institute, Shimla, HP was conferred upon with Outstanding Achievement Award for the year 2020 by Agricultural Technology Development Society, Ghaziabad, UP, India in recognition of his valuable contribution in the field of Plant Pathology
- iv. **Dr. Ravinder Kumar**, Scientist (Plant Pathology), ICAR-Central Potato Research Institute, Shimla, HP was conferred Best oral presentation award for the entitled “Development of one-step RT-LAMP for visual detection of Potato virus M” authored by Kumar Ravinder, Kaundal P, Tiwari RK, Sundaresha S, Naga KC, Sharma S and Chakrabarti SK during International conference on 'Multidisciplinary approaches for plant disease. management in achieving sustainability in agriculture” organised by Department of Plant Pathology, College of Horticulture, Bengaluru, University of Horticultural Sciences, Bagalkot, India during 6-9th October, 2020.
- v. **Dr. Ravinder Kumar**, Scientist (Plant Pathology), ICAR-Central Potato Research Institute, Shimla, HP was conferred Best oral presentation award for the entitled “Development of one step reverse transcriptase recombinase polymerase amplification method for the detection of potato virus S” authored by Kumar Ravinder, Kaundal P, Tiwari RK, Sundaresha S, Naga KC, Sharma S and Vinay Sagar during National e-Conference “Plant Health and Food Security: Challenges and Opportunities” held from 25-27 March, 2021 at ICAR-IARI, New Delhi, India



- vi. **Dr. Ravinder Kumar**, Scientist (Plant Pathology), ICAR-Central Potato Research Institute, Shimla, HP was conferred Best oral presentation award for the entitled “Isothermal based advanced techniques for rapid and visual detection of potato pathogens” authored by Kumar Ravinder, Tiwari RK, MK Lal, P Kaundal, Sundaresha S, Naga KC, Sharma S and Vinay Sagar during 4th International conference on “Global Approaches in Natural Resource Management for Climate Smart Agriculture (GNRSA- 2020)” held from 26-28 February, 2021 at Conference Hall, Shobhit Deemed University, Modipuram, Meerut, UP, India.
- vii. **Dr. Ravinder Kumar**, Scientist (Plant Pathology), ICAR-Central Potato Research Institute, Shimla, HP was conferred with certificate of appreciation for the year 2020 by Indian Potato Association, Shimla for his invaluable contribution in organization of Global Potato Conclave 2020 (GPC-2020) held during 28-31 January, 2020 at Gandhinagar, Gujarat (India).
- viii. **Dr. Kailash Chandra Naga**, Scientist, ICAR-CPRI-Shimla (For outstanding contribution in the field of entomology) **Young Scientist Award-2020** from Agricultural technology development society, Ghaziabad, UP
- **Dr Sushil S Changan** received **Young Scientist Award** on the occasion International Conference on “**New Paradigms for Agriculture, Food and Sustainability Concerns (NPAFSC-2021)**” 26-28 February, 2021.
  - **Dr Sushil S Changan** received **Best Cover articles and Best articles award** for article “High-throughput phenotyping: An emerging crop breeding frontier” of Volume 02, Issue 03-04 (March-April, 2021) of 'Agriculture Letters'.
  - **Dr Milan Kumar Lal** received **Young Achiever Award (2021)**, presented by Institute of Scholar, Bengaluru.
  - **Dr Milan Kumar Lal** received **Best Poster Award** for research paper “Standardization of Protocol for *Chaetomium globosum* mediated synthesis of nanosilver and evaluation of its antifungal properties” in the theme “Potato Disease Management”.
  - **Dr Milan Kumar Lal** received **Best Oral**



**Presentation** for research topic “Glycemic Response of Starchy Crops: Postharvest factors affecting starch digestibility” presented at International Conference on “Postharvest Disease Management and Value Addition of Horticultural Crops” organized by Division of Plant Pathology, ICAR-IARI, New Delhi during August 18-20, 2021 at ICAR-Indian Agricultural Research Institute, New Delhi, India. Technical session 6: Postharvest quality, value addition, export and entrepreneurship.

- **Dr Rahul Kumar Tiwari**, Scientist, ICAR-CPRI- Shimla (For outstanding contribution in the field of Plant Pathology) **Young Scientist Award-2020** from Agricultural Technology Development Society, Ghaziabad, UP.
- **Dr Rahul Kumar Tiwari** received **Best Poster Award** for research paper “Standardization of Protocol for *Chaetomium globosum* mediated synthesis of nanosilver and evaluation of its antifungal properties” in the theme “Potato Disease Management”.
- Dr. Aarti Bairwa, Scientist (Plant Nematology), ICAR-Central Potato Research Institute, Shimla, HP was conferred Best oral presentation award for the entitled “Loop-mediated isothermal amplification (LAMP) for rapid and precise detection of the golden nematode of potato, *Globodera rostochiensis* directly from soil.” authored by “Aarti Bairwa, Bhawna Dipta, Gaurav Verma, E P Venkatasalam, H M Priyank, A Shanthi and Sanjeev Sharma” during International Web-Conference on “New Trends in Agriculture, Environmental & Biological Sciences for Inclusive Development (NTAEBSD- 2020)” on 21 -22 June, 2020.
- Dr. Aarti Bairwa, Scientist, ICAR-CPRI-Shimla received Young Woman Scientist Award-2020 from Agro Environmental Development Society (AEDS), Rampur, UP on the occasion of International Web-Conference.
- Dr. Vinay Bhardwaj awarded fellowship of Indian Academy of Horticultural Sciences (IAHS) for 2020, Professional Society.
- Dr. Vinay Bhardwaj awarded fellowship of Indian Society of Vegetable Sciences (ISVS) for 2019, Professional Society

## IPA ELECTION RESULT -2021

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## UPCOMING EVENTS

- **International Potato e- Conference**  
New Paradigms in Food Security & Industrial Applications  
23-26 November, 2021.
- National Webinars series every month on potato production technologies from October, 2021.

## EDITORIAL BOARD-INDIAN POTATO NEWS



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