English.CDR in E:/CPRI/Newsletter/49 No/psr/7/3/13/Ist proof

Central Potato Research Institute Newsletter

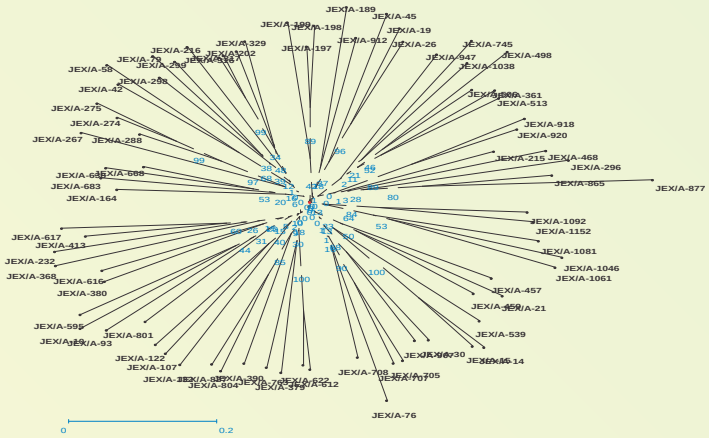
Number 49 July-September, 2012

Research Highlights

Molecular characterization of the Andigena potato core collection

The National Active Potato Germplasm Repository at Central Potato Research Institute, Shimla holds more than 3900 accessions of the cultivated Tuberosum (Solanum tuberosum subsp. tuberosum) and wild species of potato including more than 700 accessions of the Andigena (S. tuberosum subsp. andigena). The true potato seed (TPS) of Andigena accessions were imported during 1960 to 1980s from South America and being maintained for their utilization in potato breeding. Andigena potato is cultivated at elevations of 2500-4300 m in the Andean highlands of South America and is adapted to tuberization under short day conditions. It is therefore a good source for potato improvement in India. Since, more than 90% of potato crop is grown under short days of winter season in the Indo-Gangetic plains of India. Potato crop suffers from high heterozygosity and acute inbreeding depression on selfing. Therefore, homozygous breeding lines are not available for exploiting heterotic vigour. Andigena potato has wide diversity and immense potential for use in potato breeding by Tuberosum × Andigena heterotic crosses for tuber yield and its component traits. Out of 49 potato varieties released till date, Andigena has led to the development of 8 Indian potato varieties viz. Kufri Pukhraj, K. Giriraj, K. Chipsona II, K. Chipsona III, K. Shailza, K. Himasona, K Khyati and K Gaurav.

More number of Andigena accessions make comprehensive and impractical to maintain accurate descriptions. Since this collection is conserved as a clonal collection, the maintenance cost of field gene banks are expensive and are exposed to damage from poor management, inappropriate environments, pathogens, herbivores, theft and loss of support. An alternative to the efficient exploitation of genetic resources is the establishment of core collections, which retain most of the genetic diversity of the original collection in a smaller number of accessions. Therefore, CPRI has recently constructed a new Andigena core collection consisting of 77 (~10% of whole) Indian Solanum tuberosum subsp. andigena accessions representing entire 740 accessions. Core collection was constructed based on morphological, agronomic, disease and pest descriptors using conventional hierarchical cluster analysis and PowerCore, which apply the advanced M strategy using heuristic search (http://genebank.rda.go.kr/powercore) (Unpublished data). These accessions have large variability for foliage as well as tuber and agronomic characters. Core collection has wide implications in various studies, utilization, and management of genetic diversity maintained in large germplasm collections. This is specifically advantageous for those traits that require high technology and greater resources for characterization. Genetic diversity in a core gene pool indicates the possibility that a specific gene of interest can be extracted from the pool in limited resources.



Dendrogram based on the NJ coefficient showing the Andigena core collection of 77 accessions

In the past, many criteria were used to construct a core collection, such as morphological descriptors and biochemical data. It was also considered that marker assisted selection as the preferred method to construct core collection, but it was initially considered too expensive. Later with the advent of several DNA markers technologies with increased efficiency, cost reduction and assay in less time, increased their popularity to construct core collections. Moreover, molecular markers are useful for management of ex situ collections to address genetic identification, redundancy, and genetic variations. Among the several DNA markers, simple sequence repeats (SSR) or microsatellite provide excellent

ISSUE HIGHLIGHTS

markers system for discriminating closely related genotypes for diversity analysis in the several crop species. Due to their locus specific, co-dominant inheritance, robustness, amenability to high throughput and capable to detect allelic variation in the genome, SSR markers have become a tool of choice for researchers in germplasm management.

Twenty-four informative microsatellite (SSR) markers of a new PGI kit developed by International Potato Centre, Lima, Peru were used to characterize the recently developed Indian Andigena potato core collection. To validate the core collection, in SSR analysis showed the high diversity of core collection. These SSR results support and validate the genetic differences of the Andigena core collection constructed based on various agronomic traits. These findings not only demonstrate the diverse core collection but also useful for selecting genetically distinct potato materials to widen the genetic background of the potato gene pool. This core collection may be a useful source for detecting genes/QTLs underlying quantitative traits in potato marker-trait association analysis. Moreover, this is the first ever report on microsatellite characterization of Andigena core collection of potato in India (Fig. 1).

Jagesh K. Tiwari, Poonam, BP Singh, Jai Gopal, Vinay Bhardwaj, VU Patil, S Sundaresha and CM Bist

Yield gap analysis of potato variety Kufri Frysona

Kufri Frysona was released in the year 2009 as a medium maturing variety with white oblong tubers having shallow eyes and creamy flesh. It is resistant to major potato disease late blight. It has been developed to provide French fry grade potatoes to the potato processing industries in the country. The variety has a potential yield of 300-350 q/ha and is suitable for growing in North Indian plains. A total of 14 On-farm trials of this variety were conducted in selected locations of Bihar and UP.

In Bhojpur district of Bihar, nine trials of K. Frysona were conducted with C-40 as control and the results of demonstration plots were compared to farmers' practice. The results of demonstration revealed that farmers harvested on an average 224 q/ha from demonstration plot as against 184 q/ha from control plot of C-40 variety. Thus, yield gap of 40 q/ha was observed which is 22% higher than existing variety. Another 5 field trials were conducted in Meerut, Panchsheel Nagar and Muzaffarnagar district of UP to assess performance of this variety. K. Bahar was taken as control to compare the results. It was found that there was no incidence of late blight in both demonstration as well as control plot except one field where blight was observed to the extent of 20% in K. Frysona and 70% in case of K. Bahar. Demonstration plots gave an average yield of 280 q/ha which is nearly 14 % higher than control plot yield (247 q/ha). Yield gap observed in this case was 33 q/ha. Therefore, farmers should adopt this variety with recommended package of practices so that they can get higher price for their produce and thereby gain more profit from potato cultivation.

Dhiraj K. Singh, NK Pandey, Ashok K. Chauhan, TK Sinha and BP Singh

Training & Technology Transfer

Training programme for farmers

The institute organized 3-day training on "Modern techniques of seed and table potato production" sponsored by ATMA, Aurangabad for 20 potato growers of Aurangabad district of Bihar from August 23-25, 2012. Besides, 3-day training on "Value addition in potato crop" for 31 potato growers of Sabarkantha district of Gujarat from 18-20 September, 2012 was also organized. Two more on campus trainings were organized by the institute on 13-14 August and 17-18 August, 2012 for farmers of tribal regions of HP i.e. Kinnaur and Lahaul Spiti districts. A total of 40 farmers participated in these training. The scientists from relevant discipline of the institute gave lectures on planting, diseases and pest management, water and nutrient management harvesting, post harvest management and processing of potato in these trainings. Field visits to Kufri-Fagu regional station was also organized.

Training programme for extension functionaries

Training of extension officers from UP

A 5-day training on "Techniques of seed potato cultivation, marketing and management" for district and block level extension officers was organized at CPRI, Shimla w.e.f 27-31 August, 2012 in which 25 extension functioneries from Farukhabad, Kannauj and Rahmankheda districts of UP participated. The training was sponsored by SAMETI, Rahmankheda. Lectures on different aspects were given by experts using audio-visual aids followed by practical. Field visit was also organized.

Practical training on dipstick technique

Farmers training under Mini-Mission Programme

One On-Farm training on "Improved cultivation techniques for potato and other vegetables" was conducted during 5-6 Sept., 2012 under the project "Training entrepreneurial skills of farmer in potato based farming system of Himachal Pradesh". A total of 37 farmers attended this training programme at Shakrori panchayat of Shimla district.

Organised Short Course on "Plant Disease Diagnostics: Theory and Practices"

Organised short course on "Plant Disease Diagnostics: Theory & Practices" sponsored by Indian Council of Agricultural Research, New Delhi w.e.f. 4-13 July, 2012

Plant disease diagnostics training at Shimla

in the Division of Plant Protection. The course was attended by 14 participants from 13 ICAR institutes/SAUs representing 8 states. In this course emphasis was given on practical aspects of plant disease diagnosis.

Live Phone-in Programmes

Expert scientists of CPRI, Shimla on different subjects participated in the Live-phone in programmes on Doordarshan from July to September, 2012. The details of the topics along with experts are given below:

Month	Title/Topics
July	Fungal soil borne diseases and insect pest management of potato in higher hills of HP - **Dr. Sanjeev Sharma & Dr. Ravinder Kumar**
August	Care of crop, roughing, haulm cutting and drainage in seed potato - **Dr. SS Lal & Dr. Ashwani Sharma**
September	Harvesting and post harvest operations of seed potato in high hills of HP - **Dr. Vinod Kumar & Dr. Brajesh Singh**

In addition, CPRI scientists were also involved in Live-phone in programmes on AIR, Shimla. A brief summary is given in following table:

Live Phone- in Prgramme on AIR, Shimla

Month	Title/Topics
July	Diseases in potato and their management - **Dr. Sanjeev Sharma**
August	Potato cultivation practices - **Dr. NK Pandey**
September	Efforts of CPRI for transfer of potato technologies- **Dr. Dhiraj K. Singh**

Important Meetings & Visitors

News for foundation day

Central Potato Research Institute, Shimla celebrated its Foundation Day on 9th august, 2012 with great enthusiasm. Shri Suresh Bhardwaj, Hon'ble MLA of Shimla constituency graced the occasion as the chief guest of this function. In this function, Dr. N.M. Nayar, former director of CPRI and a renowned agricultural scientist delivered IPA Ramanujam Memorial Lecture award. During afternoon session, Dr Rakesh Pandit from Department of Ayurveda (HP state Govt.) was also invited for delivering a lecture on “Life style related Health Problems in Office workers and Remedial measures”. Approximately 250 persons including scientists and farmers attended this function. On this occasion, a Workshop cum Exhibition was also organized for the benefit of potato farmers and training was given to framers on improved methods of potato production by expert scientist.

Inauguration of Foundation Day

Farmers' Day celebrated at CPRS Ooty

Farmers' day was organized on 9th July 2011 at CPRS, Ooty. Twenty five farmers from Appukodu village of the Nilgiris district participated in the programme. The scientists of the station delivered talk on various aspects for successful potato cultivation such as suitable varieties, interculture practices and plant protection measures for getting higher returns. There was good interaction from the farmers and doubts were cleared by the scientists. A visit was also arranged to the farm where latest technologies developed by the station were shown to the farmers.

Participants of Farmers' Day at Ooty

Hindi day and pakhwada celebrations

Hindi day and pakhwada were celebrated at CPRI, Shimla and all of its stations. Prof. OP Sarswat delivered a special lecture on the occasion of Hindi day at CPRI, Shimla. The regional stations conducted various hindi competitions/activities during hindi pakhwada and the staff of the stations were motivated with different prizes. At CPRS, Patna, the Director, Dr BP Singh inaugurated the hindi pakhwada.

Hindi workshop held at CPRS, Ooty

As a part of Official Language Implementation, Hindi Workshop was conducted on 27.08.2012 at CPRS, Ooty. All the scientific, technical, administrative and skilled supporting staff members attended the programme. Dr.T.A.Joseph, Principal Scientist and Head, CPRS, Ooty encouraged the scientists to increase their usage in Hindi as official language and Dr. (Mrs.) K. Manorama, Senior Scientist gave practical exercises in Hindi writing.

Inauguration of Hindi Pakhwada at Patna

Human Resource

Promotion

Name	From	To
Technical		
Sh. Yogesh Chaudhary	T-5	T-6
Sh. Parvesh Jassal	T-5	T-6
Sh. YK Gupta	T-5	T-6
Sh. Satinder Kumar	T-5	T-6
Sh. Murari Lal	T-5	T-6
Sh. Kundan Singh	T-4	T-5
Sh. NK Sharma	T-3	T-4
Sh. Harbans Lal	T-3	T-4
Sh. Ranjesh Bhardwaj	T-2	T-3
Sh. Naresh Kumar	T-2	T-3
Sh. Pawan Kumar	T-2	T-3
Sh. Atma Ram	T-1	T-2
Sh. Mohan Lal	T-1	T-2
Sh. Dev Raj	T-1	T-2
Sh. Ram Dayal	T-1	T-2
Sh. Anil K.Dubey	T-1	T-2
Administrative		
Sh. Baldev Raj	Assistant	AAO
Supporting		
Sh. Baljinder Singh, Sh. Pawan Kumar, Sh. Tara Chand, Sh. Sita Ram, Sh. Satpal Singh, Sh. Parvesh Kumar, Sh. Laiq Ram	SSS	T-1

Transfers/ Selections

Name	From	To
Scientific		
Dr. (Mrs.) TC Kumari Sugitha, Scientist	Ooty	Shimla
Technical		
Shri Sita Ram Sahu, T-3	Kufri	Jalandhar

Administrative

Name	Joined as	Location
Miss. Prawartika Das	Assistant	Shimla
Miss. Simranjeet Kaur Lal	Assistant	Shimla
Mr. Narender	Assistant	Shimla
Sh. Sandeep	Assistant	Shimla

Retirements

Name	Post	Retired on
Sh. T. Selvraj	T-2	31.8.2012
Dr. AK Somani	Head & PS	30.9.2012

From the Director's Desk

The development of new technologies is not enough to encourage production and productivity but transfer of these technologies to appropriate stake holders is equally important. In order to transfer potato technologies to different sections of stakeholders, CPRI conducts training for farmers/extension personnels etc. During July-September, 2012, CPRI organized two 3-days training programme for 51 potato growers of Aurangabad (Bihar) and Banaskantha (Gujrat) in which participants were trained in improved techniques of potato cultivation. A 5-days training for 25 Extension fuctionaries of Farukhabad, Kannauj and Rehmankheda districts of UP was also organized. Under the Tribal Sub area Plan, two 2-days training was organized at CPRI, Shimla where a total of 40 farmers from tribal districts Lahaul-Spiti andKinnaur of HP were trained. Objective of these trainings is aimed for providing ultimate benefits to the stakeholders i.e. potato growers. researchers, extension workers and private companies involved in potato production and utilization aspects.

Compiled and edited by: Brajesh Singh, Sanjeev Sharma, S Sundaresha and Praveen Chandla
Published by: Director, Central Potato Research Institute, Shimla 171 001, HP, India
Assistance : A.K. Attrey, Sachin Kanwar & Suresh Kumar
Phone: 0177-2625073, Fax: 0.11-2624460, E-mail: directorcpri@gmail.com, Website: cpri.ernet.in
Printed at : Azad Offset Printers (P) Ltd., 144, Press Site, Indl. Area-1, Chandigarh, Ph. : 0172-2656144, 2657144, 4611489