VarTRAC: A computer software for identifying potato varieties through morphological and molecular markers

Authentic identification of potato cultivars is important for plant breeders, the variety registration and certification agencies, seed producers, merchants, farmers, growers, processors, and other end-users. There is also increasing interest in the descriptive characterization of plant varieties in the context of intellectual property protection under the recent agreements within the framework of World Trade Organization. Currently, morphological descriptors are being used internationally for variety identification. However, there is a possibility of utilizing DNA fingerprint data to supplement morphological characters in near future. Central Potato Research Institute, Shimla, is, therefore, developing both morphological and DNA fingerprint databases for potato cultivars' identification.

Data on 50 different morphological attributes and DNA fingerprints based on 127 alleles from 4 microsatellite markers are currently being used at CPRI for varietal identification. Manual analysis of such huge data is not easy. Therefore, a computer software named “VarTRAC” was developed at CPRI for speedy identification of a variety based on the morphological and DNA fingerprint data.

In the software, each morphological character is taken as a field. All the characters necessary for the identification of a potato variety have been included. Scores are given for each character in a drop-down menu format, and the users have only to select the appropriate score for each character. Further, the help has also been provided for proper scoring. As regards DNA fingerprints, the data on 127 alleles have been recorded by giving a score of one for those alleles, which are present while zero for the absent ones. One most useful attribute of the software is that it can make generalized abstraction even from the minimum available information. For example, if only 5 morphological attributes of any unknown variety are known, the software can identify the group of varieties having similarity in respect of those 5 attributes. This group can then be further analysed for final identification of the unknown sample. This particular property of the programme will be very...
useful to minimize the cost of DNA fingerprinting. The programme has many other user-friendly features.

—Shashi Rawat, SK Pandey, SK Chakrabarti, SM Paul Khurana and Vinod Kumar

**Potato Seed Village**

Sri Laldeo Sharma, a small farmer of village Babhanpura, Patna (Bihar) owning 2 acres of agricultural land growing traditional crops like rice, wheat, potato, onion and pulses from this small holding were not sufficient to meet out his family needs and it compelled him to search out for another source of income.

**Son of Ladeo happy with the harvest of first year**

The TAR/IVLP team from Central Potato Research Station, Patna analyzed the problem through PRA in TAR adopted villages. It was found that the main constraints were lack of knowledge about new improved varieties, traditional methods of crop cultivation, untimely and injudicious use of fungicides. In order to improve economy through potato productivity, a well-designed training programme was organized/implemented on different aspects of potato cultivation. Sri Laldeo Sharma who underwent training on various aspects of potato cultivation along with timely cultural operations and adequate spraying of fungicides, took keen interest in potato cultivation. He started cultivation of potato variety Kulri Ashoka that normally matures in 75-80 days. He planted potato in a 250m² area and got yield of 9.5 q (380 q/ha) in 90 days from the crop, which was planted after the harvesting of rice. He spent Rs. 1400/- and got return of Rs.2300/-. Thus he got a net profit of Rs. 900/- (Rs. 36,000/-/ha) from only 2 Katha of land. In the subsequent year, he planted potato in 2 Katha (0.25 ha) area and got a net profit of Rs. 8000/-. Now he is growing potato in 1 ha area and getting a net profit of Rs. 32,000-36,000/- per ha by selling ware and seed potatoes.

The result obtained by Sri Laldeo Sharma was encouraging for the other potato-growing farmers. These improved practices were repeated for 3 years in the same village at different farmer’s fields. The yield performance gained by the farmers ultimately attracted the attention of farmers of the village and nearby areas and the village is emerging as the Seed Potato Village.

**High starch Indian potato hybrids**

Nutritional security is an important adjunct to food security especially in the developing world, where population growth is yet unchecked, while the yields of major food crops are fast approaching the plateau. Starch accounts for a large proportion of the energy content of many food crops like wheat, rice, maize, potatoes, etc. and enhancing the starch content of crops would also allow its cheaper production to compete with non-biological alternatives. Potato starch is considered superior than any cereal starch with wide application in paper, food and pharmaceutical industries. It is utilized in the food industry as bakers’ specialty items and confectionery additives, thickener in soups and gravies, for making instant puddings. Starch is also used in producing adhesives and dextrins, as fermentation raw material, binder for tablets and binder cum extender for sausages.

The texture of cooked starch is influenced by its amylose content. Starch with normal amylose content forms a thick paste upon heating with water, which lacks clarity and tends to retrograde (recrystallize) resulting in very poor freeze-thaw stability. This retrogradation is due to the crystallization of amylose molecules. Consequently, amylose-free starches produce pastes with little tendency to retrograde. They are more easily gelatinized than starches with normal amylose content and form clear pastes. However, amyllopectin is also used as cement for textiles, paper, but it requires to be separated from amylose first. Therefore, for many commercial uses, it is desirable to alter the proportions of amylose and amyllopectin found in starch. High amylose-starches are useful in confectionery (because they thicken rapidly), food snacks (as they resist the penetration of cooking oil), and photographic films (as of their toughness and transparency). The nutritional
properties of bread can be improved by using the high amylose flour. Amylopectin is preferred in paper-making and adhesives, because its branched chains give it greater binding power, and in frozen foods because it enhances their stability and shelf-life.

![MP/97-172, MP/99-322, MP/99-406](image)

**High starch hybrids**

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### Per cent dry matter, starch amylase and amylopectin in high dry matter hybrids/variety

<table>
<thead>
<tr>
<th>Hybrid/Variety</th>
<th>Dry matter (%)</th>
<th>Starch (%)</th>
<th>Amylose (%)</th>
<th>Amylopectin (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP/98-172</td>
<td>24.16</td>
<td>17.53</td>
<td>29.60</td>
<td>70.40</td>
</tr>
<tr>
<td>MP/99-322</td>
<td>24.18</td>
<td>17.55</td>
<td>27.30</td>
<td>72.70</td>
</tr>
<tr>
<td>MP/99-406</td>
<td>22.72</td>
<td>16.25</td>
<td>30.50</td>
<td>69.50</td>
</tr>
<tr>
<td>K. Chipsona-1</td>
<td>23.20</td>
<td>16.68</td>
<td>27.98</td>
<td>72.02</td>
</tr>
<tr>
<td>Atlantic</td>
<td>22.04</td>
<td>15.64</td>
<td>33.14</td>
<td>66.86</td>
</tr>
</tbody>
</table>

For high starch recovery, potatoes with high dry matter contents are required, although sub-standard or surplus potatoes can be used. In the programme on development of varieties and technology for processing, we have identified three hybrids, viz., MP/98-172, MP/99-322 and MP/99-406 having very high tuber dry matter vis-a-vis starch content at Modipuram in west-central plains an area known for producing low dry matter potatoes (Table above).

Besides these hybrids yielded between 26-28 t/ha in 90 days with 86-88% processing grade tubers (>45mm) and between 31-34 t/ha in a 105 days crop with 92-96% processing grade tubers. Table potato varieties grown in cooler west-central plains contain

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The International Potato Conference & Fest-04 was organized jointly by Indian Potato Association and APEDA in collaboration with CPRI Shimla and CIPI-SWCA, New Delhi at Central Potato Research Institute, Campus, Modipuram on 13 March, 2004. About 500 delegates form

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Shri KS Mony, IAS, Chairman, APEDA delivering inaugural address

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Inaugural session of Conference (L to R) Dr S Illangantilke (CIF), Dr LC Sikka, Dr KL Chadha, Shri KS Mony, Dr SM Paul Khurama & Dr BP Singh
different parts of the world including Australia, Sri Lanka, Uzbekistan, Pakistan, Bangladesh, Qatar etc. participated in the conference. More than 25 business houses, trade/industry representatives including officials from Govt./private sectors participated and exhibited their products/technologies in potato exhibition.

Mr KS Mony, IAS, Chairman, APEDA was the Chief Guest of the function which was presided over by Dr KL Chadha, former DDG (Hort.) and National Professor, ICAR, Dr Sarath Ilangantileke, Regional Director, CIP-SWCA, Dr KC Garg, ADG (VC) and Dr LC Sikka, an eminent potato breeder and Dr. SM Paul Khurana, Director, CPRI, Shimla, were also present. On this occasion, souvenir entitled “Processing & Export Potential of Indian Potatoes” was released.

In the conference, discussion were held on potato production, processing export, storage, seed production and contract farming in two technical sessions. An exhibition and potato Fest was arranged on this occasion. A competition on potato recipes was organized where more than 80 potato based recipes were exhibited in four groups (fried, non-fried, dried, baked and cooked) and the best 4 potato recipes in each group were conferred mementos/certificates for promoting consumption of potato. The highlights of the Fest was Potato cuisines prepared by Hotel Crystal Palace and JP Institute of Hotel Management, Meerut.

Based on the Conference deliberations following recommendations emerged-

1. To promote potato production, utilization and trade, we need to establishing an Indian “Potato Board” on the pattern of British Potato Council.
2. To avoid potato gluts, India must aim for a larger percentage of the production for processing and exports. Detailed market research/survey should be conducted to identify destination countries and their requirements.

3. For processing, a backward linkage needs to be initiated between the processors, government and the potato growers. The processors should first enter into an agreement with state govt. for establishing a particular processing unit. State governments in turn should ensure availability of raw material in a phased manner by involving different Agri-export zones. Contract farming also would help ensure availability of raw material.

4. CPRI should endeavor to develop varieties suitable for international market based on the consumer preferences in different countries, wider adaptability and processing attributes.

**Documentary Film on Potato**

A documentary video on potato is being produced by Central Potato Research Institute on the scientific cultivation of seed potato in the hills of HP, National Doordarshan (Agricultural Channel) New Delhi, has agreed to telecast this. The film will be of 15 minutes duration and will be made in Hindi, English and other local languages.

**Dr SK Chakrabarti nominated member IMC of IIVR**

Dr SK Chakrabarti, Sr. Scientist (Crop improvement) CPRI has been nominated as member, Management
CPRI Shines in sports

CPRI has won 5 medals in ICAR Inter Zonal Sports Meet held at National Research Centre for Grapes, Pune from 24-28th May, 2004.

Mrs. Shyam Lata Bekta
- Shotput Gold
- Discuss throw Silver
- Javelin Throw Bronze

Mrs. Tarvinder Kocher
- 100 m Silver
- High jump Silver

Mrs. Kochar and Mrs. Shyamalata, trophies in their hands with Director seen in picture at extreme left Sh Vinod Kumar who represented India at Asian Taekwando Championship and extreme right Mr Shashi Rawat, Manager CPRI sports team

Committee of Indian Institute of Vegetable Research, Varanasi for three years w. e. f. 4.2.2004.

Dr Jai Gopal visited Morocco

Upon invitation by African Potato Association Dr Jai Gopal, Principal Scientist (Genetics) CPRI, Shimla was deputed for the International Potato Conference held at Agadir, Morocco from 5th - 10th April 2004. He chaired the first Session “Potato chains and pathways for development”. There was participation of 85 delegates from 29 countries. Dr Jai Gopal delivered a lecture on “True Potato Seed: breeding for hardiness” in the conference.

Training, Workshop on Use of Sophisticated Instruments

Dr J Gopal in the session at Agadir, Morocco

A four day workshop on “working principles and uses of sophisticated instruments in biological sciences” was held at CPRI Shimla during May 24-27, 2004 organized by CPRI and SAIF, Punjab University, Chandigarh. The workshop was attended by 17 participants from...
different universities/colleges. The main theme of the training workshop was to acquaint the participants about the uses of sophisticated instruments. This workshop provided opportunity to the participants to see and work on electron microscope, HPCL, DNA sequencing, PCR, ELISA instruments etc.

Training of students

A three day training of 7 students of B.Sc. Ag. & Tech. students of Allahabad Agricultural Institute 2004 in which 28 Scientists/lecturers from SAUs viz HAU, Hissar, HPKV Palampur, JNKVV, Jabalpur, IGAU, Raipur, Konkan Krishi Vidyapeeth, Dapoli, UAS, Dharwad, RAU, Pusa, Uttar Banga Agril University, Cooch Behar, APAU, Hyderabad, TNAU, Coimbatore and CPRI will be participating. The Summer School is to be inaugurated by HE Shri VS Kokje, Governor of HP on 1st July, 2004.

Training Course on Virus Detection Techniques

CPRI, Shimla in collaboration with Advanced Centre of Virology, IARI, New Delhi is going to organize a training course on “Virus Detection Techniques” at Shimla during 20-31 August, 2004 mainly for the organizations involved in tissue culture for propagation of seed stocks. This training is being organized under a NATP mission mode project on “Diagnostics for Virus Diseases. Latest methods of virus detection using sophisticated equipment will be demonstrated at the training.

IMC Meeting

The Institute Management Committee Meeting of CPRI was held on 14 March, 2004 at Central Potato Research Institute, Campus, Modipuram.

CPRI Scientist Trained Afghan Scientists

A training course on “Aphids monitoring and management in seed crop” was organized by the

Summer School at CPRI

A 21 day long ICAR sponsored Summer School on Potato Improvement Production and Utilization would be organized at CPRI, Shimla during 1-21 July.
under potato in Afghanistan is covered by the popular Indian cultivar Kufri Chandramukhi. International Potato Center (CIP) had initiated trials of Kufri Chandramukhi, Kufri Pukhray, Kufri Bahar and Kufri Badshah at Ghazni (Afghanistan). The performance of all these four cultivars was found very good there.

**Potato processing prospects**

Potato processing in India particularly in the organized sector getting momentum owing to increased production and development of processable potato cultivars by CPRI. Fritolay India a multinational company engaged in potato processing in India has registered 50 to 60% annual growth rate during last three years. Fritolay India is soon setting up a processing plant at Sankrail near Kolkata in West Bengal with annual capacity to 20,000 tonnes. According to FLI, potato processing industry in India under organized sector is on the threshold of a rapid growth trajectory and is expected to grow to 0.345 million tonnes by the year 2006 and further to about 1.74 million tonnes by 2010 from a mere 0.125 million tonnes in 2003.

*Source: The Economic Times, June 4, 2004 and presentation by the Frito-Lay India in the Conference on Processing and Export Potential of Potatoes within Asia held at CPRIC, Modipuram on March 10, 2003.*

Rajesh K. Rana, Sr. Scientist, CPRIC, Shimla

**Training-cum-workshop on PTM**

Potato tuber moth (PTM) is a devastating pest of potatoes in some pockets and states damaging standing crop and tubers in the country store. Though

International Potato Center, SWCA, New Delhi during June 15-17, 2004 at Parwan, Afghanistan. Dr. VK Chandla, Principal Scientist (Entomology) from CPRI was the main resource person in this training.

CPRI has brought out a technical bulletin “Aphids, their Importance, Monitoring and Management in Seed Crops” copies of which were given to the trainees in Afghanistan. According to a rough estimate more than 60% area
integrated management practices for PTM have been developed still due to lack of knowledge and resources the pest could not be checked. PTM has assumed a serious proportion in Kangra District of Himachal Pradesh where potatoes are mostly stored in country stores. Keeping this in mind, a 3 days training-cum-workshop on Integrated Management of PTM was organized jointly by CPRI and HPKV, Palampur on 23-25 June, 2004. Fifteen trainees from HP, HPKV and other SAUs participated in this workshop. The resource persons from CPRI included Dr VK Chandla, PS (Ento.), Dr RS Chandel, Sr. Sci. (Ento.) besides Dr. Desh Raj, Head, Ento. Dr DC Sharma and Dr Ajay Sood from HPKV. The training was inaugurated by Dr. Tej Pratap, VC, HPKV and closing function was presided over by Dr RC Thakur, Director of Research, HPKV.

Chairman ASRB Visits CPRI

Dr AS Faroda, Chairman of Agricultural Scientists Recruitment Board (ASRB) visited CPRI on
CPRI Welfare Mela

CPRI Staff Welfare Association organized a Mela on 5 June, 2004 at CPRI lawns. CPRI staff with their families and people from adjoining residential colonies thronged in to the Mela where they enjoyed various sporting events, fun games, relished the dishes at the stalls. ICICI Bank and City Bank also put up their stalls at the Mela to popularize their various loan schemes.

Ten farmers was selected for the bee keeping intervention module under TAR. They were taken to Bee Keeping Unit, RAU, Pusa (Samastipur) for the training.

Personnel News (January-June, 2004)

Manpower shortage

Govt. of India and ICAR have imposed a ban on new activities. The manpower shortage at this pace is likely to hamper the R & D activities.

Appointments

Dr. Viray Singh joined as Sr. Scientist (Seed Technology) on 11 May, 2004 at CPRI Campus Modipuram, Meerut

Shri Chandran KP, Scientist (Statistics) CPRI, Shimla on 17.02.2004

Promotions granted on the basis of Assessment to Scientists

Dr Devendra Kumar, Sr. Scientist w.e.f. 07-08-1999 at CPRI, Modipuram

Dr (Mrs.) K Manorma, Scientist Sr. Scale, w.e.f. 13-02-2001, CPRS, Ooty

Dr Birbal, Scientist Sr. Scale w.e.f. 22-02-2003, CPRS, Gwalior

Dr. Vinod Kumar, Sci. Sr. Scale, w.e.f. 26-12-2000, CPRS, Kufri

Shri G Ravichandran, Sci. Sr.Scale w.e.f. 20-02-2001, CPRS, Muthorai

Shri Ashwani Kumar, Sci. Sr. Scale, w.e.f. 01-09-2003, CPRS, Kufri

Dr VK Dua, Sr. Scientist, w.e.f. 09-06-2001, CPRI, Shimla

Dr D Sarkar, Sr. Scientist, w.e.f. 21-07-2002, CPRI, Shimla

Shri Sanjay Rawel Scientist Sr. Scale to Scientist SG, w.e.f. 27-07-2003 at CPRIC, Modipuram

Dr Name Singh Scientist Sr. Scale to Sr. Scientist, w.e.f. 27-07-2003 at CPRI, Modipuram

Extension activities at Patna

Training programme on “IPM in rice cultivation” was organized for the IVLP/TAR farmers in collaboration with IPM centre (Govt. of India) at Patna in which 50 farmers participated. Under the Technology Assessment and Refinement Project, 15 farmers mostly rural youths were selected and underwent one week training programme on “Cultivation of Mushroom” in the Division of Microbiology, RAU, Pusa, Samastipur (Bihar). A group of recruitments about 3 years back. During these 3 years due to retirements and transfers from CPRI the total manpower position has been on decrease. On 31 March 2001 total staff strength of CPRI was 706 which came down to 639 on 31 March, 2004. During 2004-05 also about 20 staff members will be retiring and hence the staff strength will be reduced to just 619 by March 31, 2005. The sanctioned staff strength of CPRI is 767 which was fixed keeping in view the number of regional stations, work requirement for proper operations of R&D
Dr Raj Kumar Scientist Sr. Scale to Senior Scientist w.e.f. 14-09-2002, at CPRS, Jalandhar

Assessment of Technical Staff, CPRS, Shimla

Mrs. Shruti Gupta, T.II-3 FFT, granted grade T-4, w.e.f. 22-02-2003

Shri Ranjesh Bhardwaj, T-1, FFT, granted grade T-2, w.e.f. 07-06-2002

Shri AK Atrey, T-4, FFT, granted grade T-5 (TO) w.e.f. 30-01-2003

Mrs. Sumita Sharma, T.II-3, FFT, granted grade T-4, w.e.f. 28-05-2003

Shri Vijay Kumar, T-1, FFT, granted grade T-2, w.e.f. 17-11-2002

CPRIC Modipuram

Shri Munna Lal Driver to T-3 w.e.f. 12-02-2003

Shri Vijay Kumar FFT to T-4 w.e.f. 19-10-2002

Shri Jasvir Singh FFT to T-4 w.e.f. 16-02-2003

Shri Dinesh Singh Computer Technician to T-4 w.e.f. 17-02-2003.

CPRS Jalandhar

Mr Munna Lal, Technical Assistant (T4) to technical Officer (T5) w.e.f. 22.4.2003

Mr Baljinder Singh, Technical Assistant (T3) to (T4) w.e.f. 21-10-2001

CPRS Patna

Shri Albert Nagasia, T.II-3, FFT granted grade T-4, w.e.f. 01-01-2003.

Shri SK Lal Karan, T.II-3, FFT granted grade T-4, w.e.f. 01-01-2003

Shri Hans Raj Chauhan, Driver, granted grade T-4, w.e.f. 01-01-2003

CPRS, Shillong

Shri PR Khangbuh, T-1, FFT, granted grade T-2, w.e.f. 04-10-2002

Shri NK Budneh, T-1, FFT, granted grade T-2, w.e.f. 17-09-2002

Shri Hesty Jyrwa, Driver granted grade T-3 w.e.f. 01-01-2003

CPRS Muthorai

Shri R Lakshmanan, T-1, FFT granted grade T-2, w.e.f. 13-04-2003

CPRS Rajgurunagar

Shri ED Thorat, T.II-3, FFT granted grade T-4, w.e.f. 01-07-2002

Administrative staff

Shri Baldev Raj, promoted as Asstt. CPRS, Shimla w.e.f. 04-03-2004

Shri YP Gupta, Assistant promoted as AAO at CPRS, Jalandhar

Smt. Sandhya Kapila, promoted as Sr. Clerk, CPRS, Jalandhar, w.e.f. 09-03-2004

Transfers

Mr. Raj Kumar, AAO on promotion as Administrative Officer, CPRS Jalandhar transferred to IVRI, Izatnagar on 14-10-2003

Retirement

Shri Ram Bahadur Rai, T-2, FFT CPRS, Patna, retired on 31-05-2004

Shri Suchha Singh, Driver (T-4), CPRS, Jalandhar, retired on 31-05-2005

Shri Ram Dass, SS Gr. IV, CPRS, Shimla, retired on 29-02-2004

Shri Haria Ram, SS Gr. IV, CPRS, Shimla, retired (Voluntary) w.e.f. 03-04-2004

Eritrean delegation visits CPRS

An Eritrean delegation comprising the Ambassador of Eritrea in India, Director General, Agriculture Development and Director, General, Research paid a visit to CPRS on 17-18 May 2004. The visitors met the Director CPRS and had discussion with scientists in a meeting about exploring collaboration between ICAR & Govt. of Erlea on the potato research and development in Eritrea. The delegation visited Kufri Seed Farms of CPRS.

Obituary

CPRl family deeply mourn the untimely and sad demise of Shri Dharam Pal Singh T-2 CPRIC, Modipuram on 9.05.2004 while on election duty,

Shri Baksu Manjhi, T-3 (FFT) CPRS, Patna, on 20.01.2004 and

Shri Balak Ram, T-2 (Blacksmith-cum-Carpenter), CPRS, Shimla, on 28.01.2004.
Potato development in North-eastern India

Central Potato Research Institute has a station at Shillong in Meghalaya which is looking after potato R&D in the entire NEH region. Beside the routine R&D projects of the station, 3 other projects have been under operation there. Shillong station is one of the cooperating centres of Mini Mission I — Integrated Development of Horticulture in NE states including Sikkim. Under the Mini Mission I, apart from organizing training programmes for farmers at different places in the region, on farm activities and

demonstrations of improved technologies were conducted in the villages near Shillong town. Two NATP projects one on Household Food and Nutrition Security and other Empowerment of Tribal farm women of Rural Meghalaya were successfully implemented.

Dr SM Paul Khurana, Director, CPRI had visited the Shillong station on 1st May, 2004 and had interaction with the staff of the station, took stock of various activities as well as problems. The Director appreciated the work being done by the CPRS, Shillong. Dr Khurana also visited Imphal (Manipur state). He also met with Director and various officers of

Shri MN Jacob, Governor of Meghalaya (wearing cap) with Dr KL Chadha, National Professor (Hort) on his right watching potato exhibition arranged by CPRS Shillong at ICAR Research Complex, Shillong
to Sikkim he had discussions with the Secretary and Director of Horticulture, Govt. of Sikkim at Gangtok on the potato development.

Under NATP (HFNS) project, 20 frontline demonstrations on disease free seed production were conducted during January to June 2004 and a training programme of 10 days for farm women in May 2004 was arranged. Twenty five demonstrations were conducted under Mini Mission on use of stable bleaching powder for the management of bacterial wilt and potato cultivation practices.

A full fledged Tissue Culture Laboratory has become functional at Shillong station established under NATP (HFNS) and Mini Mission I. Seed Production programme as well as research

A view of newly established Tissue Culture Lab at CPRS, Shillong

Tribal women trainees in the field at CPRS Shillong

Demonstration under HFNS, CPRS Shillong

Demonstration of fertilizer application under NATP (CGP III) at Shillong

CPRI Scientist showing pest symptoms on potato to farmers at Imphal (Manipur)
Farmers training under Mini Mission I

Two training programmes of 2 days each were organized by the Institute at Aizwal (Mizoram) on

Commissioner, Horticulture, Govt. of Manipur with CPRI scientists discussing potato development

on breeding will get a boost in the region by the establishment of the Tissue Culture laboratory. Within a short period, the TC lab helped in producing 10 quintals of disease free seed of Kufri Giriraj and Kufri Jyoti. Under the NATP (CGP III) project on empowerment of farm women, 100 tribal farmers were

surveyed, two training programmes were arranged during 2004 wherein farm women were imparted training on improved potato cultivation practices.

Shillong station of CPRI has participated in Agriculture fair organized by the govt. of Meghalaya and also at an exhibition, organized by ICAR Research complex at Barapani.
Alu tharchhuah, venhim leh dahkhwal dan Training nei

Aizawl, June 18: Nimin khan Horticulture Department leh Central Potato Research Institute, Shillma: Suttinnin Alu (potato) thar chhuan, venh im leh dahthat dan inziirtana neih ni ni a, vawvahah chhuhanwann ni ni ang.


Aizawl, June 17: Horticulture Department leh Shillma-a Central Potato Research Institute tang-khawn bantsahin vawvah khan Horticulture conference halh-leh Alu thar blawk dan leh a thar dahthat dan tuchh lonekte inziirtana pek ni ni.

He-chhuanin bun vawvahah hian Khuallian Ag-

Training programmes organised by CPRI were very much appreciated by the people and press of NEH states - some news clippings on potato training at Aizawl.

17-18 June, 2004 Inaugurated by the Minister of Horticulture Mizoram Mr Pu H Rammawai and at Bomdila (Arunachal Pradesh) on 21-22 June, 2004 inaugurated by Additional Deputy Commissioner West Kuning district Mrs. Y.W. Ringu under the Central Sector Scheme Integrated Development of Horticulture in NEH states including Sikkim Mini-Mission I. Resource persons from CPRI, Shimla namely Drs Shiv Kumar, PH Singh and Brajesh Singh imparted the training in production, protection and storage of potatoes. In all 15 training programmes have been organized under the scheme so far.

Potato peels for dressing burn wounds

Potatoes are a favourite food throughout the world. Besides being a wholesome food, potatoes have other uses which a common man is not aware of. For example, potatoes have many medicinal values. They can prevent scurvy and obesity, they are good for diabetics and patients with renal failure, they lower blood pressure and improve digestion. Even potato peels, which are normally discarded after boiling the
1985, by Indian doctors that too working at a hospital in India. For more information on this aspect readers are referred to the following articles.


R Ezekiel and SM Paul Khurana

Kisan Diwas: Central Potato Research Station, Gwalior

A Kisan Diwas was organized on 13th Jan., 2004. It was inaugurated by Dr. OP Verma, Dean, College of Agriculture, Gwalior. Dr SM Paul Khurana, Director, CPRI, Shimla was also present on this occasion. More than 200 farmers attended the function. Dr VS Kushwah, Head, CPRS, Gwalior welcomed the Chief Guest, present dignitaries & farmers. He narrated the importance of good quality potato seed and important activities going on at CPRS, Gwalior. Dr OP Verma in his speech highlighted the major events in Potato Research and development and advised the farmers to take advantage of good quality potato seed. Dr SM Paul Khurana, Director, CPRI, Shimla in his address said that potato production has acquired the status of an industry and urged the farmers to become quality conscious to meet the demands of the industry in the Country. In the technical session, lectures were delivered by Dr AK Somani, Principal Scientist, (Plant Pathology), Dr Anuj Bhatnagar, Sr. Scientist (Entomology), Dr SP

What is praise worthy about potato peel bandage technique is that it was developed for the first time in
Record breeder’s seed production at CPRS, Gwalior

In 2003-04 winter season, Gwalior Station of CPRI had a record production of 557.66 tones of quality breeder seed of recommended cultivars from an area of 29.94 ha. with an average yield 18.62 t/ha.

Potato Export

The year 2004 is likely to achieve good results on potato export. No official figures of export are yet available, but seeing the prices of potatoes in the domestic markets export of potatoes has been estimated on higher side than last year.

Potato and printing

“Quality printing is very much depends on quality of paper. And if paper is coated with potato starch it gives excellent printing results. In India printing paper is coated with cereal or cassava starch while paper imported from European countries with potato starch gives far better results than Indian paper”, says Mr Vinay Malhotra Proprietor of Malhotra Publishing House, New Delhi.

Singh, Scientist (SS) (Agronomy) and Dr Birbal, Scientist (Hort.) on various aspects of potato production technology. Farmers were also taken on farm round to see of breeders seed production of potato, experiments and rotational crops. They were also shown ELISA Testing in laboratory. An exhibition depicting various potato technologies and farm implements was also arranged for the farmers. At last, a question answer session was also held to satisfy the queries of the farmers.

For health, eat potato (boiled roasted, baked) daily but fried potato kabhi-kabhi
स्वयं बीज आलू उत्पादन करने की तकनीक

आलू की खेती में स्वस्थ बीज आलू का महत्वपूर्ण स्थान है। स्वस्थ बीज आलू का निर्माण ही केवल मुश्किल नहीं होता है बल्कि यह कष्ट ही फसलों की भी होता है। इस समय केन्द्रीय आलू अनुसंधान संस्थान शिमला में एवं पहाड़ी क्षेत्रों में 25 से 30 हज़ार किवड़े प्रति क्वार्टल की उत्पादन तकनीक वर्चुअल कर्मवाही है और इससे जनसंख्या से वायवनीश्वरी एवं कृषि विभागों, राज्य बीज निगम एवं सहकारी समीक्षाओं को आयोजन के लिए उपलब्ध करता है।

इस विभागों के अनुसार, स्वस्थ बीज आलू की उन्नत सज्जा में स्वस्थ बीज आलू का उत्पादन संभव है। साधारण खुराक, भूरी गलन एवं जड़प्रथिक सुतुक्रम से प्राप्ति भूमि का निदान ट्यूना या व्हिटमिन्स सुतुक्रम से प्राप्ति भूमि स्वस्थ बीज आलू उगाने के लिए उचित नहीं है। केन्द्रीय आलू अनुसंधान, संस्थान शिमला में वित्तीय ग्राहक निदान का संदर्भ बीज खेत के लिए उचित नहीं है। केन्द्रीय आलू अनुसंधान, संस्थान शिमला में वित्तीय ग्राहक निदान का संदर्भ बीज खेत के लिए उचित नहीं है।

एक हैकर भूमि के लिए स्वस्थ बीज उत्पादन निरंतर विधि से किसान जा सकता है। किसान इस कार्य को आरंभ करने के लिए कृषि एवं वायवनीश्वरी राज्य सरकारों, राज्य बीज निगम/ सहकारी समीक्षाओं / उपचारी किसानों से एक किवड़े बीज प्रदान कर और अपने खेत के एक कोमे में चरण-1 के अन्तर्गत 60 x 30 सेठू में के पर बोइंगों। बीज के प्रदान आकड़े के अनुसार केंद्र से केंद्र की दूरी घटाये या बढ़ाई जा सकती है।

यदि बीज का आकड़ा बढ़ाये तो इसे 35 सेठू में तक बढ़ाया जा सकता है।

इस तकनीक के सहले चरण में लगभग 6 किवड़े बीज आलू का उत्पादन होगा। सोड नसरी-I के अन्तर्गत पेड़ा किया जा समस्त बीज आलू बगले वर्ष सोड नसरी-II के अन्तर्गत बीजन को जिसकी पैदावार लगभग 30 किवड़े होगी जो कि एक हैकर भोजन आलू की फसल उगाने के लिए प्राप्त होगी। (देखें सारणी I)

खेती के तरीके

1) केन्द्र के लिए उचित निदान के अनुसार प्रकाश से अनुशंसित बीज का प्रयोग करना चाहिए।

2) 250 किवड़े प्रति हैकर अनुशंसित प्रकाश से गले- सर्दी गोबर की खाद अवधा 100 किवड़े प्रति हैकर है। वामी कमीशन का इस्तेमाल करें, यदि खाद का उपयोग बुधवार के समय गुड़ में करना हो तो इसकी मात्रा पढ़ाई जा सकती है। इसके अन्तिरिक्त 400 किलो ग्राम ब्लैक 165 किलो ग्राम मूर्चेट ओवर पोटास्ट्र एवं 625 किलो ग्राम सुपर फॉक्सेंट का प्रयोग हैकर के हिसाब से उपयोग में बुधवार के समय करना चाहिए।

3) फसल के अंकित होने से पहले और धूपी खोने के बाद पूरा कर लेना चाहिए। यदि नमी को संरक्षित किया जा सके और फसल पर समय के वादः एवं एस के प्रभाव से भी बचाव हो जाए।

4) खरपतवार नियंत्रण के लिए फसल के अंकित से पहले लास्ट्रायों एवं ग्रामिकेरीन जैसे खरपतवारकार शर्मा का प्रयोग करना चाहिए। इसके लिए 2.5 लीटर प्रति हैकर दूध से...
खरसात्रा नाशी का प्रयोग करें। मौसम की अनिश्चितता के कारण पहाड़ी क्षेत्रों में खरसात्रा नाशी का प्रयोग ज्यादा प्रभावशाली नहीं होता अत: इसका प्रयोग मौसम के भित्रजय को देखकर करना चाहिए। जब पोंड़े 20 से 25 सें. मी. लम्बे हो जाएं तो दूसरे चरण की मिटटी चढ़ने का कार्य पूरा करना चाहिए और इसी समय 20 किलो मिलिट्रेज प्रति हेक्टेयर के हिसाब से देनी चाहिए।

पोष संक्रमण उपाय

पहाड़ी तथा मेधानी दोनों इलाकों के लिए रस चूक्रक कोड़ जैसे जेंसिड तथा एफड के प्रकोप से आती की फसल को बचाने के लिए आलू की बुआई के समय 15 किलो मिटर 10 जीटी प्रति हेक्टेयर का उपयोग करना चाहिए। इसके अलावा मेडिन ने इसके बाद दो छिड़काव रोग 1.25 लीटर/हेक्टेयर या मेटासिट्राक्स (1.5 लीटर प्रति 800-1000 लीटर पानी/घंटा) का छिड़काव करना चाहिए।

निरीक्षण

मेडिनी क्षेत्रों में वियानुओं से प्रसिद्ध पोष व दूसरी किस्म के पोषों को निकालने के लिए फसल का पहला निरीक्षण बुवाई के 30 से 40 दिनों के बाद दूसरा निरीक्षण 50 से 60 दिनों के बाद करना चाहिए। पहाड़ी इलाकों में फसल के अग्रहन के तुरंत बाद फसल का पहला निरीक्षण करना चाहिए। तथापि, फसल के पूरे अन्त तक बाद फसल का दूसरा निरीक्षण करना चाहिए। तीसरी से प्रसिद्ध एवं अन्यायक रोगों का प्रकाश निरीक्षण के समय मात्र आलू के साथ उड़ा देना चाहिए।

डंडलों की कटाई

पश्चिमांतरीय मेडिनी भागों में हिस्सौरे के अन्त में तथा मध्यपूर्वी मेडिनी भागों में

| सारणी-1 एक हेक्टेयर के लिए बीज तेजार करने की विधि |
|---------------------------------|-----------------|------------------|-----------------|
| सौजन्य | विभिन्न अवस्थाओं में आलू बोने के लिए आवश्यक क्षेत्रफल (घंटा) | बीज की मात्रा (केच) | बीज का स्थोनि |
| सीड नसन्द्री प्रथम चरण | 0.04 (400 वर्गमीटर) | 1 | आधार बीज राज्य कृषि एवं बागवानी विभाग, राज्य बीज निगम, राष्ट्रीय बीज निगम, सहकारी सिमितियाँ |
| सीड नसन्द्री द्वितीय चरण | 2500 वर्गमीटर | 6 | सीड नसन्द्री प्रथम चरण उत्पाद |
| भोजन आलू फसल | 1 हेक्टर | 30 | सीड नसन्द्री द्वितीय चरण उत्पाद |
जनवरी के आरम्भ में पौधों के डंठलों की कटाई भूमि के नज़दीक से करनी चाहिए। पहाड़ी इलाकों में उन किस्मों में जो पिछली झुलसा प्रतिरोधी नहीं हैं के डंठलों की कटाई जुलाई के मध्य या जब फसल आखी भी आयें तो न्याय ग्रसित हो जाएं कर देनी चाहिए। पिछली झुलसा अवरोधी किस्मों की कटाई अगस्त के मध्य में करनी चाहिए। इस बात का निरोप व्यापार रखना चाहिए कि दुनिया पर आयें न आयें अग्र हो जाये तो उनको तुम्हारे काट देना चाहिए।

प्रभाषण

मदनली इलाकों में किस्मन पहले ही शीत गुह मालिकों से बोज़ प्रभाषण के लिए सत्मक रखे हो तक बैज आलू को अप्रैल से सितंबर तक झील गुह में रखा जाय सके लेकिन पहाड़ी क्षेत्रों में बैज की फसल में भर कर किसी एक कमरे में पंडाल बनाकर परस्तु माह में बैरियों से निकाल कर फिन्स पर फेलाए और कमरे में कम ताकत बाले बच्चे से रोहनरी है।

- डॉ सरजीत सिंह

आई.जे.एस.सी. की चौथी बैठक सम्पन्न

केंद्रीय आलू अनुसंधान संस्थान, शिमला में मार्च 2004 को केंद्रीय आलू अनुसंधान संस्थान के निदेशक डॉ. जतेश्वर मोहन पाल खुर्साना की अध्यक्षता में संस्थान की 6वीं आई.जे.एस.सी. की चौथी बैठक सम्पन्न हुई। बैठक में सभी नामित सदस्य तथा व्यापनूहालेल रहे तथा कर्मचारियों की सुविधाओं के संबंधित कई महत्वपूर्ण निर्णय लिए गए। अंत में अध्यात्म महोदय ने सभी उपस्थित सदस्यों का धन्यवाद दिया तथा लेखा कि आई.जे.एस.सी. की अगली बैठक केंद्रीय आलू अनुसंधान केंद्र, रेड, मुंबई, उड़ीसा सितंबर-अक्टूबर 2004 में हो सकती है।

डा. राणा समाप्त

हिमाचल प्रदेश मार्केटिंग बोर्ड एवं बागवानी विभाग हिमाचल प्रदेश मार्केटिंग बोर्ड एवं विभाग हिमाचल प्रदेश मार्केटिंग बोर्ड एवं विभाग के अध्यक्ष डा. राणा राणा को समाप्त किया गया, यह समाप्त किया गया, यह समाप्त किया गया, यह समाप्त किया गया, यह समाप्त किया गया।

उपचार

बैज आलू को प्रभाषण में होने वाली वीमारियों से मुक्त रखने के लिए 3% वोरिक एसिड धोल में 30 मिनट तक उपचार करना चाहिए।


**Awards**

CPRI had decided to give away distinguished service, Merit awards and Appreciation certificate to the scientists and other staff of CPRI on the occasion of Ramanujam Birth Centenary celebrations. A total of 120 staff members of all categories were chosen for these three categories of awards. List of recipients will be published in the next issue of the newsletter.