Newsletter

CENTRAL POTATO RESEARCH INSTITUTE
Indian Council of Agricultural Research
SHIMLA - 171 001, HP, INDIA

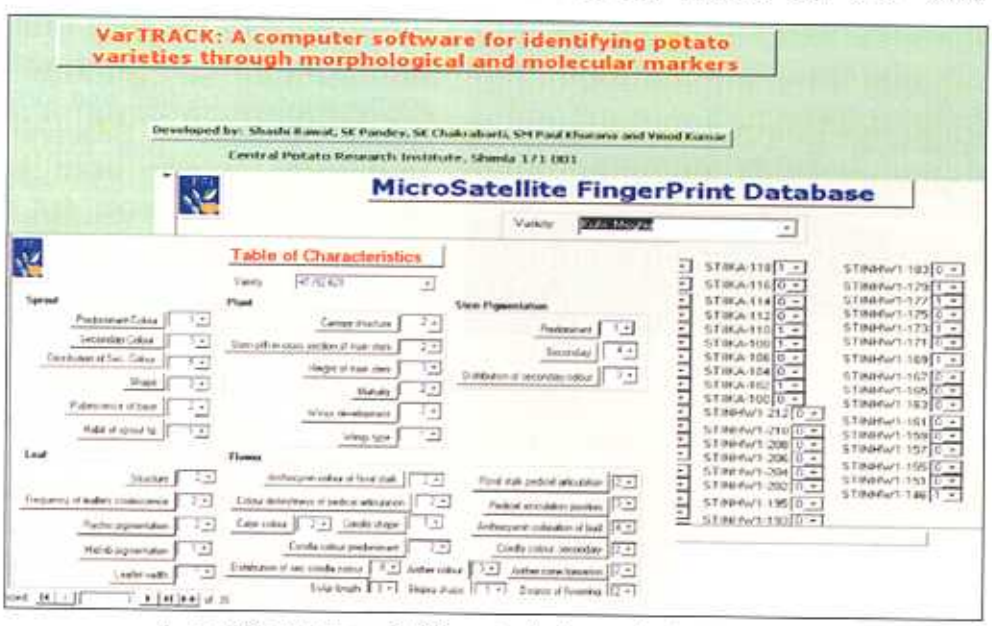
No. 30 JULY 2004

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 micro-satellite 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



A combined view of different windows of the "VarTRAC"

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 alongwith timely cultural operations and adequate spraying of fungicides, took keen interest in potato cultivation. He started cultivation of potato variety Kufri Ashoka that normally matures in 75-80 days. He planted potato in 250m^2 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 20 *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.

B Lal, B Prasad, TK Sinha, BK Singh, RP Rai and NK Pandey

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, amylase-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, amylopectin is also used as cement for textiles, paper, but it requires to be seperated from amylose first. Therefore, for many commercial uses, it is desirable to alter the proportions of amylose and amylopectin found in starch. High amylase-starches are useful in confectionery (because they thicken rapidly), frield 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.

on an average 18-19% dry matter, while these hybrids contain 4-6% higher dry matter. Among these, hybrid MP/97-322 has lower amylose content as compared to other two hybrids and may be more useful, for industrial use, while all hybrids, MP/98-172 and MP/98-172 and MP/99-406 may

MP/97-172 *MP/99-322* *MP/99-406*

High starch hybrids

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

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

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

be useful in preparation of bread, soups, confectionary items, etc. West-central plains are endowed with long potato growing season and these medium maturing high starch containing hybrids can, therefore, be grown in autumn for production of starch.

International Potato Conference & Fest-04

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

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

Inaugural session of Conference (L to R) Dr S Illangantilke (CIP), 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.

Dr KL Chadha with Director CPRI at the exhibition, Modipuram

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 Chakrabrti, 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 Kochar

100 m	Silver
High jump	Silver

Mrs. Kochar and Mrs. Shyamlata, 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 JS Minhas bags DBT & ICAR research grants

Deptt. of Biotechnology, Govt. of India has sanctioned a project "Development of dwarf potato cultivars suitable for cultivation in hills and peninsular India through recombinant DNA technology" to Dr JS Minhas, Principal Scientist. Another project on "*In vitro* mutagensis of potato to induce dwarfness for enhancing partitioning of dry matter to tubers under long days and high temperatures" has been sanctioned to him by the ICAR.

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.

Dr J Gopal in the session at Agadir, Morocco

A Group photo of participants with resource persons (sitting)

Training, Workshop on Use of Sophisticated Instruments

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 (Deemed University) was held at CPRI, Shimla on June 7-9, 2004. The students were imparted training on TPS, crop production and protection technology & post harvest technology including commercial utilization.

Students of AAI, Allahabad (sitting) with some of the faculty members

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, 2004 in which 28 Scientists/ lecturers from SAUs viz HAU, Hissar, HPKVV Palampur, JNKVV, Jabalpur, IGAU, Raipur, Konkan Krishi Vidyapeth, 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.

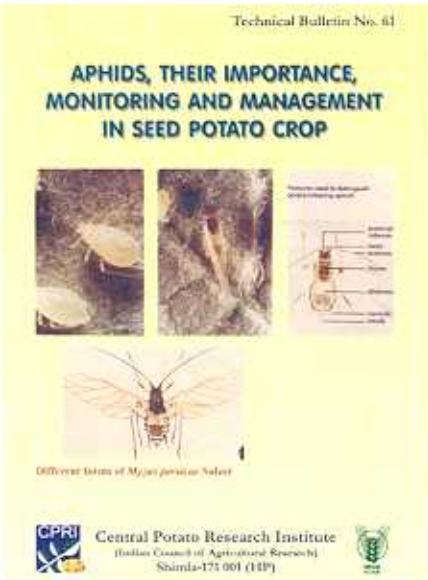
IMC Meeting

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

Dr VK Chandla (Centre, wearing light blue shirt) with the Afghan trainees at Parwan (Afghanistan)



Bulletin on Aphids published by CPRI

under potato in Afghanistan is covered by the popular Indian cultivar Kufri Chandramukhi. International Potato Center (CIP) had initiated trails of Kufri Chandramukhi, Kufri Pukhraj, 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, CPRI, Shimla

Trials of Indian Cultivars at Ghazni (Afghanistan)

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, 1004 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

Inaugural session of the Workshop on PTM

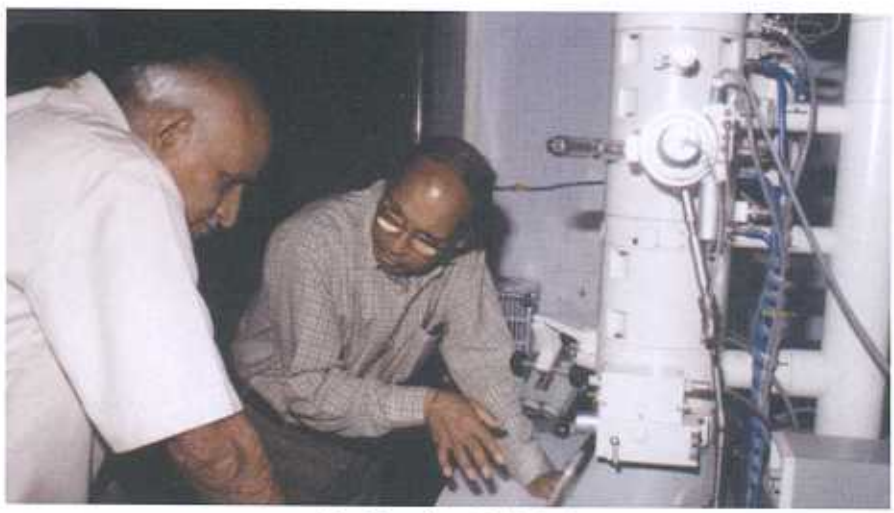
Group photo of participarts of PTM Workshop

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 HPKVV, Palampur on 23-25 June, 2004. Fifteen trainees from HP, HPKVV 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 HPKVV. The training was inaugurated by Dr. Tej Pratap, VC, HPKVV and closing function was presided over by Dr RC Thakur, Director of Research, HPKVV.

Chairman ASRB Visits CPRI

Dr AS Faroda, Chairman of Agricultural Scientists Recruitment Board (ASRB) visited CPRI on 18-20 June, 2004. Dr Faroda delivered a lecture in the Scientists Meet at CPRI and visited laboratories and Kufri Farm also. He was very happy and highly appreciative of the work at CPRI.

Dr Faroda addresses Scientist Meet



Dr Faroda at EM Lab

Dr Faroda at Kufri

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.

Inauguration of Mela by Mrs Sumi Khurana

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 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 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 activities. The manpower shortage at this pace is likely to hamper the R & D activities.

Appointments

Dr. Vinay 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 CPRIC, 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 Rawal 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 CPRIC, Modipuram

Dr Raj Kumar Scientist Sr. Scale to Senior Scientist w.e.f. 14-09-2002, at CPRS, Jalandhar

Assessment of Technical Staff, CPRI, 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. CPRI, 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

Transferes

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, CPRI, Shimla, retired on 29-02-2004

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

Eritrean delegation visits CPRI

An Eritrean delegation comprising the Ambassor of Eritrea in India, Director General, Agriculture Development and Director, General, Research paid a visit to CPRI on 17-18 May 2004. The visitors met the Director CPRI 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 CPRI.

Obituary

CPRI 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), CPRI, 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

Director, CPRI with CPRS Shillong Staff

Director CPRI, Dr Khurana at CPRS Shillong

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 MM 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

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

to Sikkim he had discussions with the Secretary and Director of Horticulture, Govt. of Sikkim at Gangtoke 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.

Tribal women trainees in the field at CPRS Shillong

the Department of Horticulture and discussed various matters relating to potato development. On his visit

Demonstration under HFNS, CPRS Shillong

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

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

CPRI Scientist showing pest symptoms on potato to farmers at Imphal (Manipur)

Training of land preparation at Shillong under MM - I

Farmers trainees with CPRI resource persons at Aizwal

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.

Dr PH Singh of CPRi Shimla showing potato disease symptons to farmers in the field at Imphal

In the field training of farmers

Shillong station of CPRI has participated in Agriculture fair organized by the govt. of Maghalya and also at an exhibition, organized by ICAR Research complex at Barapani.

Inaugural session of training at Aizwal (Mizoram)

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Alu tharchhuah, venhim leh dahkhawl dan Training nei

Aizawl, June 18 : *Nimin khan Horticulture Department leh Central Potato Research Institute, Shimla t. Sultumin Alu (potato) thar chhuah, venhim leh dahthat dan inzirtirna neih a ni a, vawiinah chhunzawm a ni ang.*

H e m i chungchanga inzirtirna (training) nimin chawhma dar 10:00 atanga Horticulture Deptt. Conf.Hall a neihah Horticulture mi- ter Pu H. Ramm- Mizoram - dan leh enkawl dan hi mithiam bik kan la neih loh avangin harsatna tam tak kan tawk a, hemi atana min hrilhlhre tur mithiam kan nei hi kan vannei hle a ti. Mizoramah hmun pakhatah thlai chi hrang hrang kan chin-pawlh nuai a, a eng amah tha thei lovin kan siam a, chu chu dahthaa a chinn- hmun mumal nei- C- Area a kal da- tawh a - atanga scientist Pu Rajiv Kumar chuan Alu hi hmun (area) zim takah pawh thlai chin hlawk thei chi a ni a, mihring tlemna, Mizoram angah chin atan a tha hle a ti a .Hectare khatah 80 kan thar chhuah - 500 te tha- da- kaihruaiin alu chingtute chu thiam tura zir turin a chah a. Mizorama Alu chingtu thahnem tak kalkhawmte hnenah Alu chin dan, natna laka ven dan, dah that dan leh thar chhuah dante sci- entist te hian an zirtir a ni. awiin hian Chite-a Horti- lture Demonstration n te tlawhin Alu tute zirtirna an pe zawm ang. CPRI, atang hian Dr. Shiv rincipal scientist, sh Singh, senior Dr. P.H Singh, ist te an lokal.

Alu thar hlawk leh dahthat dan zir

Azl. June 17 : Horticulture Department leh Shilna-a Central Potato Research Institute tangkawp buatsaihin vawiin khan Horticulture conference hall-ah Alu thar hlawk dan leh a thar dahthat dan turah loneitute zirtirna pek an ni.

He zirtirna hun hawnnaah hian khuallian Agriculture Minister Pu H. Rammawi chuan Mizote duhzawng Alu chu a vawnthar kan la thiam ve loh vanga inzirtir a tul thu a sawi a, Mizoram chu thlai chawm ng'n leitha hmang lova organic farming-a siamtum mek a nih thu sawiin, hemi thlawhtling tur hian Mizoram Organic Bill pawh Assembly-ah putiuh mai tura peihfel a nih tawh thu a sawi bawk.

He hunah hian CPRI, Shimla atanga lokal Dr. Shiv Kumar, Dr. PH Singh leh Dr. Brajesh Singh-te'n zirtirna an pe a, June 18 hian Chite-a Horticulture farm-ah an thil zirte a takin an enchhin dawn a ni.

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

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 Kunming 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 proframmes 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

Discarded potato peels heal the wounds

potatoes, have been found to be very useful for dressing burn wounds.

Dr Arvind Vartak, Dr MH Keswani and Dr AR Patil, surgeons working at the Burn Research unit, Bai Jerbai Wadia Hospital for children in Mumbai have pioneered a simple and cheap technique of using boiled potato peels for dressing burn wounds. The technique consists of pasting the outer surface of cleaned and dried potato peels on roller bandages with starch paste. These bandages are sterilized and stored at 4°C and used for dressing. It is reported that burns healed within ten days, when superficial burns were dressed with boiled potato peel bandage smeared with 1% silver sulphadiazine cream. When dressing is done with ordinary bandage, there is loss of blood at the time of changing the dressings and also painful. But when dressing is done with boiled potato peel bandage, there is neither the loss of blood at the time of dressing nor the dressing painful. About one hundred burn patients - children and adults are being treated every year with this technique with excellent results.

What is praise worthy about potato peel bandage technique is that it was developed for the first time in 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.

1. MH Keswani and AR Patil (1985). The boiled potato peel as a burn wound dressing: A preliminary report. **Burns.** 11: 220-224.
2. MH Keswani, AM Vartak, A Patil and JWL Davies (1990). Histological and bacteriological studies of burn wounds treated with boiled potato peel dressings. **Burns.** 16: 137-143.
3. A Vartak, MH Keswani, M Savitri and AR Patil (1991). The boiled potato peel dressing. **Indian Journal of Surgery.** 52: 399-402.

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

Kisan Diwas Inauguration by Dr OP Verma

Dr Khurana addressing farmers, on dias are Dr VS Kushwah, Head CPRS, Gwalior & Dr OP Verma the Chief guest

A view of Kisan gosthi, CPRS, Gwalior

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.

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 casava 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.

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 मिलना ही केवल मुश्किल नही है बल्कि यह काफी मंहगा भी होता है। इस समय केन्द्रीय आलू अनुसंधान संस्थान शिमला मैदानी एवं पहाड़ी क्षेत्रों में 25 से 30 हजार क्विंटल प्रजनक बीज का उत्पादन प्रति वर्ष करता है और इसे राज्यों के बागवानी एवं कृषि विभागों, राष्ट्रीय बीज निगम एवं सहकारी समितियों को आगे की बढ़ोतरी के लिए उपलब्ध कराता है। इन विभागों एवं समितियों द्वारा इस बीज को लगातार तीन गुणन विधियों (FS I,II एवं प्रमाणित बीज) द्वारा इस बीज को 54 लाख क्विंटल प्रमाणित बीज तक बढ़ाया जा सकता हैं। यदि स्वस्थ बीज आलू की कीमत घटानी है और इसकी उपलब्धता बढ़ानी है तो किसानों को स्वयं बीज उत्पादन करने की तकनीक को अपनाना होगा। 30 क्विंटल प्रति हैक्टर के अनुसार आलू की फसल के अन्तर्गत आने वाले क्षेत्र (वर्तमान क्षेत्र १२ लाख हैक्टर) के लिए 360 लाख क्विंटल बीज आलू की आवश्यकता होगी। जबकि इस समय देश में उपलब्ध बीज आलू मात्र 15% की आवश्यकता की पूर्ति करता हैं। यदि देश की स्वस्थ बीज आलू की आवश्यकता को पूरा करना है अथवा माँग एवं उपलब्धता के बीच का फासला कम करना है तो किसानों को स्वंय बीज तैयार करना होगा जो कि थोड़े से प्रयास द्वारा संभव हो सकता है। मैदानों में पंजाब, हरियाणा, उतर प्रदेश एंव मध्य प्रदेश के कुछ भाग तथा हिमालय के 2500 मी० से उँचे पहाड़ी क्षेत्रों एवं दक्षिण पश्चिम हिमालय क्षेत्र में स्वस्थ बीज आलू का उत्पादन संभव है। साधारण खुरण्ड, भूरा गलन एंव जड़ग्रन्थि सूत्रकृमि से ग्रसित भूमि तथा किणक (वार्ट) व स्वर्णिम सूत्रकृमि से ग्रसित भूमि स्वस्थ बीज आलू उगाने के लिए उचित नहीं है। केन्द्रीय आलू अनुसंधान, संस्थान शिमला द्वारा विकसित की गई "बीज खेत तकनीक" द्वारा किसान न केवल कम खर्च से अपने लिए स्वस्थ बीज आलू पैदा कर सकते हैं बल्कि देश में स्वस्थ बीज आलू की आपूर्ति के लिए अपना योगदान दे सकते हैं।

एक हैक्टर भूमि के लिए स्वयं बीज उत्पादन निम्नलिखित विधि से किया जा सकता है। किसान इस कार्य को आरम्भ करने के लिए कृषि एवं बागवानी विभाग राज्य सरकारों, राष्ट्रीय बीज निगम/ सहकारी समिती / उन्नतशील किसानों से एक किंवटल बीज प्राप्त करें और अपने खेत के एक कोने में चरण-I के अन्तर्गत 60 x 30 से० मी० के पर बोयें। बीज के फासले आकार के अनुसार कंद से कंद की दूरी घटाई या बढ़ाई जा सकती है। यदि बीज का आकार बड़ा हो तो इसे 35 से० मी० तक बढ़ाया जा सकता है।

इस तकनीक से पहले चरण में लगभग 6 किंवटल बीज आलू का उत्पादन होगा सीड नर्सरी-I के अन्तर्गत पैदा किया गया समस्त बीज अगले वर्ष सीड नर्सरी-II के अन्तर्गत बीजना होगा जिसकी पैदावार लगभग 30 किंवटल होगी जो कि एक हैक्टर भोज्य आलू की फसल उगाने के लिए प्रयाप्त होगी। (देखिए -सारिणी I)

खेती के तरीके

1) क्षेत्र के लिए उचित किस्म के अच्छी प्रकार से अकुंरित बीज का प्रयोग करना चाहिए

2) 250 किंवटल प्रति हैक्टर अच्छी प्रकार से गली- सड़ी गोबर की खाद अथवा 100 किंवटल प्रति है० वर्मी कम्पोष्ट का इस्तेमाल करें, यदि खाद का उपयोग बुवाई के समय गुलों में करना हो तो इसकी मात्रा घटाई जा सकती है। इसके अतिरिक्त 400 कि० ग्रा० केन, 165 कि० ग्रा० मयूरेट ऑफ पोटाश एवं 625 कि० ग्रा० सुपर फॉस्फेट का प्रति हैक्टर के हिसाब से उपयोग बुबाई के समय करना चाहिए।

3) फसल के अंकुरित होने से पहले मिटटी चढ़ाने का कार्य पूरा कर लेना चाहिए ताकि नमी को संरक्षित किया जा सके और फसल पर संस्पर्शी वायरस एक्स और एस के प्रभाव से भी बचाव हो जाए।

4) खरपतवार नियंत्रण के लिए फसल के अंकुरण से पहले लासो एवं ग्रामोक्सीन जैसे खरपतवारनाशक दवाईयों का प्रयोग करना चाहिए । इसके लिए 2.5 लीटर प्रति हैक्टेयर की दर से

खरपतवार नाशी का प्रयोग करें। मौसम की अनिश्चितता के कारण पहाड़ी क्षेत्रों में खरपतवार नाशी का प्रयोग ज्यादा प्रभावशाली नहीं होता अतः इसका प्रयोग मौसम के मिजाज को देखकर करना चाहिए। जब पौधे 20 से 25 से० मी० लम्बे हो जाएं तो दूसरे चरण की मिटटी चढ़ाने का कार्य पूरा करना चाहिए और इसी समय 20 कि० ग्रा० नाईट्रोजन प्रति हैक्टेयर के हिसाब से देनी चाहिए।

पौध संरक्षण उपाय

पहाड़ी तथा मैदानी दोनों इलाकों के लिए रस चूसक कीड़े जैसे जेसिड तथा एफिड के प्रकोप से आलू की फसल को बचाने के लिए आलू की बुआई के समय 15 कि० ग्रा० थिमेट 10 जी० प्रति हैक्टेयर का उपयोग करना चाहिए इसके अलावा मैदानों में इसके बाद दो छिड़काव रोगर 1.25 लीटर/हैक्टेयर या मेटासिस्टाकस (1.5 लीटर प्रति 800-1000 लीटर पानी / है०) का छिड़काव करना चाहिए। पिछेता झुलसा एवं पता धब्बा रोगों के नियन्त्रण के लिए मैदानी क्षेत्रों में नवम्बर के अन्त व दिसम्बर के मध्य तथा पहाड़ी इलाको में जून के मध्य और जुलाई के शुरू में डायथेन -45 का 2 कि० ग्रा० प्रति है० की दर से छिड़काव करना चाहिए। दोनों ही क्षेत्रों के लिए कीटनाशक एवं फफूंदनाशक दवाईयों को एक साथ मिला कर छिडकाव किया जा सकता हैं। पिछेता झुलसा के ज्यादा प्रकोप में रिडोमिल 2.5 कि०प्रति हैं० की दर से छिड़काव करना चाहिए। इससे 20 दिन तक फसल का बचाव हो सकता है। इसके बाद एक छिड़काव डायेथेन एन -45 का करना चाहिए। अगर अभी फसल पकने में देरी हो तो एक छिडकाव मेटासिस्टोक्स और डाईथन एम-45 का एक साथ मिला कर करना चाहिए।

निरीक्षण

मैदानी क्षेत्रों में विषाणुओं से ग्रसित पौधे व दूसरी किस्म के पौधों को निकालने के लिए फसल का पहला निरीक्षण बुवाई के 30 से 40 दिनों के बाद व दूसरा निरीक्षण 50 से 60 दिनों के बाद करना चाहिए। पहाड़ी इलाकों में फसल के अकुंरण के तुरन्त बाद फसल का पहला निरीक्षण करना चाहिए ताकि पिछले वर्ष के छूटे आलू के जमे पौधों को निकाला जा सके और दूसरा निरीक्षण बुवाई के 50 से 60 दिनों के बाद करना चाहिए। तीसरा निरीक्षण पौधों में फूल आने के बाद करना चाहिए। बीमारी से ग्रसित एवं अनावश्यक पौधों को प्रत्येक निरीक्षण के समय मातृ आलू के साथ उखाड़ देना चाहिए।

डंठलों की कटाई

पश्चिमोतरीय मैदानी भागों में दिसम्बर के अन्त में तथा मध्यपूर्वी मैदानी भागों में

सारणी-1 एक हेक्टयर के लिए बीज तैयार करने की विधी

सोपान	विभिन्न अवस्थाओं में आलू बोने के लिए आवश्यक क्षेत्रफल (है०)	बीज की मात्रा (कु०)	बीज का स्त्रोत
सीड नर्सरी प्रथम चरण	0.04 (400 वर्गमीटर)	1	आधार बीज राज्य कृषि एवं बागवानी विभाग, राज्य बीज निगम, राष्ट्रीय बीज निगम, सहकारी सिमितियाँ
सीड नर्सरी द्वितीय चरण	2500 वर्गमीटर	6	सीड नर्सरी प्रथम चरण उत्पाद
भोज्य आलू फसल	1 है०	30	सीड नर्सरी द्वितीय चरण उत्पाद

जनवरी के आरम्भ में पौधें के डंठलो की कटाई भूमि के नजदीक से करनी चाहिए। पहाड़ी इलाकों में उन किस्मों में जो पिछेता झुलसा प्रतिरोधी नही है के डंठलों की कटाई जुलाई के मध्य या जब फसल आधी या आधे से ज्यादा ग्रसित हो जाए कर देनी चाहिए। पिछेता झुलसा अवरोधी किस्मों की कटाई अगस्त के मध्य में करनी चाहिए। इस बात का विशेष ध्यान रखना चाहिए कि ठूंठों पर कोंपले न आयें अगर हो जाये तो उनको तुरन्त काट देना चाहिए।

खुदाई

डंठलो की कटाई के 15 दिनों के बाद आलू की फसल की खुदाई करनी चाहिए। खुदाई के 15 दिनों तक आलुओं को ढेर बनाकर रखना चाहिए ताकि उसका छिलका सख्त हो जाए।

पहाड़ी क्षेत्रों में नमी वाले मौसम में आलू की खुदाई नही करनी चाहिए। आलू को खोदने के बाद हवादार कमरे में रख देना चाहिए ताकि आलू आसानी से सूख जाए।

वर्गीकरण

खुदाई के बाद उपजे कंदो को बड़ा, मध्यम, छोटा व अन्डर साईज वर्गो में छँटना चाहिए।

उपचार

बीज आलू को भण्डारण में होने वाली बीमारियों से मुक्त रखने के लिए 3% बोरिक एसिड धोल में 30 मिनट तक उपचार करना चाहिए।

भंडारण

मैदानी इलाकों में किसान पहले ही शीत गृह मालिकों से बीज भंडारण के लिए सम्पर्क रखे ताकि बीज आलू की अप्रैल से सितम्बर तक शीत गृह में रखा जा सके लेकिन पहाड़ी क्षेत्रों में बीज को फरवरी माह तक बोरियों में भर कर किसी एक कमरे में भंडार करे परन्तु मार्च माह में बोरियों से निकाल कर फर्श पर फैलाए और कमरे में कम ताकत वाले बल्ब से रोशनी दें।

— डॉ सरजीत सिंह

आई.जे.एस.सी. की चौथी बैठक सम्पन्न

केन्द्रीय आलू अनुसंधान संस्थान, शिमला में मार्च 2004 को केन्द्रीय आलू अनुसंधान संस्थान के निदेशक डॉ सत्येन्द्र मोहन पाल खुराना की अधयक्षता में संस्थान की 6वीं आई.जे.एस.सी. की चौथी बैठक सम्पन्न हुई। बैठक में सभी नामित सदस्य तथा चयनित उपस्थित रहे तथा कर्मचारियों की सुविधाओं से संबंधित कई महत्वपूर्ण निर्णय लिए गए। अंत में अध्यक्ष महोदय ने सभी उपस्थित सदस्यों का धन्यवाद दिया तथा बताया कि आई.जे.एस.सी. की अगली बैठक केन्द्रीय आलू अनुसंधान केन्द्र, मदुरई, उटी में सितम्बर-अक्तूबर 2004 में हो सकती है।

डा. राणा सम्मानित

हिमाचल प्रदेश मार्केटिंग बोर्ड एव बागवानी विभाग हि.प्र. द्वारा आयोजित "कृषि बागवानी विपण्न विकास एवं प्रबधन" गोष्ठी के अवसर पर संस्थान के वरिष्ठ वैज्ञानिक डा राजेश राणा को सम्मानित किया गया, यह सम्मान उन्हें कृषि बागवानी विपणन में महत्वपूर्ण शोध एवं सुझाव देने के लिए प्रदान किया गया।

पारम्परिक हिमाचली टोपी और शॉल पहनाकर डा राणा का सम्मान

की फरक पैन्दा

केन्द्रीय आलू अनुसंधान संस्थान के वैज्ञानिकों द्वारा गत वर्ष व इस वर्ष आलू अनुसंधान तकनीक का प्रभाव जानने के लिये कई राज्यों में सर्वेक्षण किया गया पंजाब में सर्वेक्षण के फलस्वरूप पाया गया कि यहाँ 85 प्रतिशत किसान उन्नत व सिफारिश की गई तकनीक का प्रयोग कर रहे हैं, सर्वेक्षण के दौरान वैज्ञानिकों ने पाया कि पंजाब के किसान अधिक उपज लेने के लिये सिफारिश की गई मात्रा से अधिक रसायनिक खाद का प्रयोग करते हैं। कुछेक सम्पन्न किसानों से जब प्रश्न किया गया तो उनका उत्तर था "की फरक पैन्दा" यानी क्या फर्क पड़ता है थोड़ा ज्यादा खाद खेत में डाल दी, फर्क तो पड़ता है आवश्यकता से अधिक खाद व कीटनाशक दवाओं का अधिक प्रयोग और कम मात्रा में प्रयोग दोनों अवस्थाओं में फर्क पड़ता है, क्या फर्क पड़ता है इस बारे में इस न्यूज लैटर के अगले अंक में विस्तार से चर्चा की जायेगी।

SRC, RAC and Biosafety Committee Meetings

Staff Research Council of CPRI will hold its meeting on 29-30 July 2004 while Research Advisory Commitee will meet during 16-17 August, 2004. Institute Biosafety committee meeting has been decided to be held on 23 July, 2004 at CPRI, Shimla.

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 choosen for these three categories of awards. List of receipients will be published in the next issue of the newsletter.

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