

# Science and Technology Reporter

A Quarterly Newsletter of the Haryana State Council for  
Science and Technology



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April - June, 2009



  
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Director,  
Science & Technology Department,  
Haryana

## *From Director's Desk*

The second issue of the newsletter marches ahead with the commitment of this initiative taken up by Haryana State Council for Science and Technology, Department of Science & Technology, Haryana. The newsletter is endured towards serving as a tool for disseminating information about the Department of Science and Technology and the Council and generating valuable feedback about its programs and events. Besides this articles on recent and emerging areas of science and technology are also been included in the present issue.

The previous quarter proved to be quite progressive. The Department has instituted two new awards namely Haryana Vigyan Ratna Award and Haryana Yuva Vigyan Ratna Award for honouring the scientists of the state for their outstanding contribution in the field of Science & Technology. It has also been felt that there is a need to create world class research facilities in the universities/institutes of Haryana, therefore, a new scheme on setting up of Centres of Excellence / Common Research, Training and Education Facilities in emerging areas in Science & Technology has been proposed during year 2009-10. The Department will also implement the schemes on Dissemination of Innovative Technology, Fellowship/scholarship programmes and Exposure Visit for the meritorious students of the State to various scientific institutions towards creating the scientific temper among them, from this year in addition to its various on-going schemes in the State.

The Department also proposes to undertake a comprehensive natural resources and infrastructural mapping of Haryana using satellite imagery. This scheme would be implemented by Haryana Space Application Centre (HARSAC) at Hisar. The project proposal includes preparation of digital maps on all the natural resources of the state and digitization of infrastructure facilities like roads, canals, drainage, schools, colleges, hospitals, water works, police stations and other government assets. All this data would be made available to various line departments through a web portal.

The Department/Council is committed to the advancement of state through Science and Technology. The pages ahead will provide the glimpse of various activities alongwith some knowledgeable articles.

  
(SUMITA MISRA)

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## INAUGURATION OF OFFICE BUILDING OF HARYANA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY AT PANCHKULA

The office building of Haryana State Council for Science and Technology, Department of Science and Technology was inaugurated by Honorable Chief Minister of Haryana, Shri Bhupinder Singh Hooda at Bays no. 35-38, Sector 2, Panchkula on 27<sup>th</sup> February, 2009. The building with total covered area of approximately 650 sq yard on plot of 1299 sq yard was constructed and furnished at a cost of Rupees 357 lakhs.



Office building of Haryana State Council for Science and Technology at Sector 2, Panchkula



Honorable Chief Minister of Haryana, Shri Bhupinder Singh Hooda inaugurating the office building of HSCST at Panchkula

## RELEASE OF NEWSLETTER



Sh. Dharam Vir, IAS, Chief Secretary, Haryana (2<sup>nd</sup> from left) releasing first issue of Science & Technology Reporter at Chandigarh on July 1, 2009.

The first issue of Science and Technology Reporter, a quarterly newsletter published by Haryana State Council for Science and Technology (HSCST), Department of Science and Technology was released by Shri Dharam Vir, IAS, Chief Secretary, Haryana, at Haryana Niwas, Chandigarh on 1.07.2009 at 11:30 am in presence of Smt. Sumita Misra, IAS, Director, Department of Science and Technology, Haryana and Secretary/EC, HSCST and other dignitaries like Sh Ajit M Sharan, IAS, FC & PS, Finance Department, Haryana; Sh Rajan Gupta, IAS, FC & PS, Education & Languages Department, Haryana; Dr Girish Sahni, Director, IMTECH, Chandigarh; Dr Pawan Kapur, Director, Central Scientific Instruments Organisations (CSIO), Chandigarh; Prof. G.K. Mehta, Distinguished Honorary Prof., I.I.T. Kanpur and Hon. Eminent Scientist, IUAC-New Delhi; Prof. Anshul Kumar, Department of Computer Sciences & Engineering, Indian Institute of Technology, Delhi and Sh. Sanjay Bajpai, Scientist-E, Department of Science and Technology (DST), Government of India.

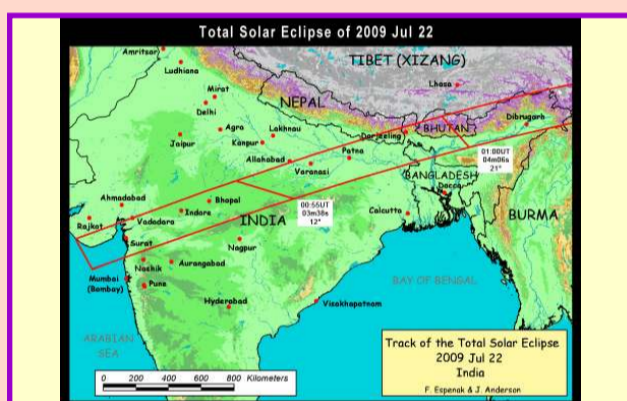
Speaking on the occasion, Shri Dharam Vir, IAS, Chief Secretary, Haryana focused on the need of dissemination of information and knowledge in the field of science and technology to various stakeholders. He stressed on the need of inculcation of scientific temper among all strata of society so that the state emerges on upfront where science and technology is concerned. He also said that there should be focus on identification and working in the priority areas of science and technology for development of Haryana. He congratulated the Department of Science & Technology for this literary and journalistic initiative and hoped that it will go long way to meet the above objectives. The occasion was covered by various media prints like Dainik Bhaskar, Amar Ujala, Punjab Kesari and Aaj Tak and on India News Calling on internet

## JULY 22, 2009-FULL SOLAR ECLIPSE

Waiting for 22<sup>nd</sup> July 2009? If still not, then you must and get ready to see this century's greatest celestial phenomenon. Yes you are right!! It is the Total Solar Eclipse. Apart from other countries like Nepal, Bhutan, Bangladesh and China, India is the one where the Moon's umbral shadow will touch first. This will be the eclipse of the century with longest duration i.e., 6 minutes and 39 seconds, a rarest celestial event. The moon's umbral shadow path (as shown in the Fig. 1) will pass through populated Indian cities of Surat, Vadodra, Indore, Bhopal, Varanasi, Patna & Dibrugarh. At rest of the places we can see a partial Solar Eclipse. On an average a Total Solar Eclipse may occur at a particular place on earth once in about 360 years. Most of the individuals don't get an opportunity to view Full Solar Eclipse in their lifetime. So, let us get out of our homes on 22<sup>nd</sup> July morning to enjoy nature's rarest event. The time of start of eclipse varies as per the geographic location of the place on the map i.e.: Longitude & Latitude. Timings for some of the places are given below:

Location	Latitude	Longitude	Start of Partial Eclipse H: M: S (IST)	Maximum Eclipse H: M: S (IST)	End of Partial Eclipse H: M: S (IST)
Kurukshetra	29°96'N	76°79'E	05:35:01.5	06:27:23.6	07:24:40.9
Hisar	29°14'N	75°69'E	05:34:43.2	06:26:50.0	07:23:49.6
Panchkula	30°69'N	76°86'E	05:35:41.0	06:27:51.9	07:24:53.2
Chandigarh	30°82'N	76°94'E	05:35:46.6	06:27:57.4	07:24:58.2

(Credit: <http://eclipse.gsfc.nasa.gov>)



**Fig.1: Moon's Umbral shadow path**  
(Credit: <http://eclipse.gsfc.nasa.gov>)



**Fig. 2: Total Solar Eclipse**  
(Credit: <http://alexis.brandeker.se>)

How to observe an Eclipse: We can observe eclipse by projecting the Sun's image on a white blank paper or shaded wall using a pinhole camera or a simple mirror or a telescope. If we want to see the sun directly then we must use tested solar filters only and it is better to do this under the guidance of an experienced person.

Don'ts: During the time of eclipse never see directly towards the Sun (eclipsed or uneclipsed) because it

- ✘ could damage our eyes permanently.
- ✘ Never look at the Sun using a telescope or binoculars.
- ✘ For directly looking at the Sun only use tested filters only, don't use X-ray film, magnetic disk film or any colored glass.

Total number of eclipses over India Since 1898

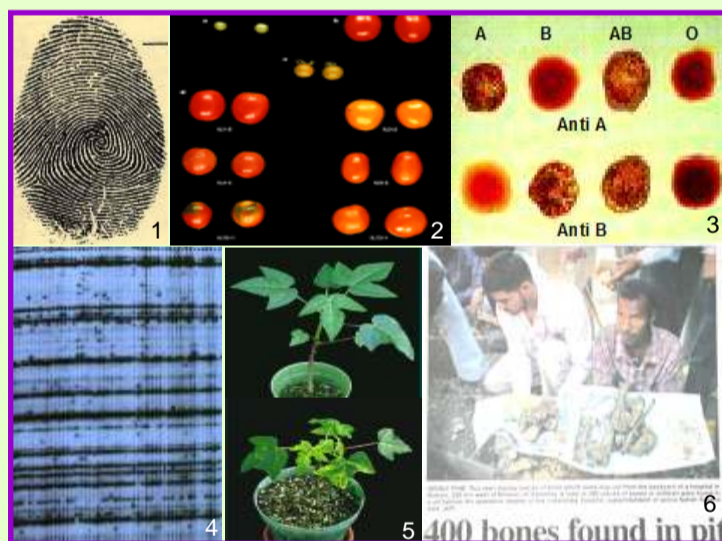
Past	This Year	Next
22 <sup>nd</sup> January, 1898	22 <sup>nd</sup> July, 2009	20 <sup>th</sup> March, 2034
16 <sup>th</sup> February, 1980		
24 <sup>th</sup> October, 1995		
11 <sup>th</sup> August, 1999		

(Credit: Vigyan Prasar)

**Compiled by: Sumit**  
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## DNA FINGERPRINTING AND ITS APPLICATIONS

Fingerprinting has been defined as the analysis of patterns formed by fingertip ridges and furrows. Dermatoglyphics is the science of comparing these fingerprints to identify and distinguish individuals. This science came into existence in the 19<sup>th</sup> century when Sir Francis Galton developed the system of fingerprint analysis and used it for crime investigation. This method has been used for crime investigations since then but has limitations. Even identical twins can show variation in fingerprint pattern under influence of different environments. In addition, morphological features like height, size, colour, shape etc have been used since times immemorial to distinguish varieties/ individuals. Similarly, biochemical markers like blood groups, protein and isoenzyme profiles have been used for individual / variety identification. However, all these marker systems are beset with constraints like small number, low polymorphism and possibility of their expression being tissue-, developmentally- or environmentally-regulated. Therefore, we need to develop a fool proof marker system that can be used for individual identification with 100% surety.



Figures: (1) Fingerprint, (2) Morphological markers –size and shape, (3) Biochemical markers – Blood groups, (4) DNA fingerprint, (5) Healthy and diseased plant, (6) Newspaper clipping of Nithari case.

DNA fingerprinting seems to be the most reliable and practical option for the purpose. DNA fingerprinting has been defined as the pattern of bands produced when DNA fragments are separated by gel electrophoresis. The process was invented by Alec Jeffery in 1985 who was awarded noble prize in 1994. The various features that

make DNA fingerprinting an ideal technique include – stability of DNA irrespective of environmental factors, age of individual and type of tissue used for DNA isolation. Moreover, DNA markers are unlimited in number and cover the whole genome. Also, DNA can be isolated from biological remains of 1000s year old and even from fossils that are millions of years old. DNA fingerprinting is the most powerful tool available till date for establishing the identity of an individual because the chances of two people having exactly same DNA profile is 30,000 million to 1 except for identical twins. DNA of every human being on the planet is 99.9% same. The 0.1% only makes the difference which is used for personal identification purposes using DNA fingerprinting. The entire DNA can be grouped into 3 types of sequences - preserved sequences, low variation sequences and high variation sequences. The last type which include short tandem repeats (STRs) and variable number of tandem repeats (VNTRs) is the major target for DNA fingerprinting. The chances of a person meeting the same set of VNTRs as another are one in millions.

The various steps of DNA fingerprinting include – collection of tissue, DNA extraction, amplification of markers, electrophoretic separation of markers followed by visualization and scoring of markers of each individual for data analysis.

DNA fingerprinting has been used for many practical applications in plants, animals and human beings. The major applications in plants include variety identification, testing of clonal fidelity, selection of hybrids and gene pyramiding during breeding, authenticity of consumer products, transgenic detection, germplasm conservation, etc. In animals, DNA profiling has been used in wildlife conservation, sex determination and pedigree analysis. In addition, it is being used for establishing authenticity of animal products like ivory sculptures, tiger skin products, etc. In humans, DNA fingerprinting has been largely used for crime investigations, forensic studies, paternity disputes, pedigree analysis and personal identification and for medical disorder detection. The famous cases using DNA fingerprinting include Naina Sahni Tandoor murder case, Swami Premananda case and the Nithari case.

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## New Projects Sanctioned at Centre for Plant Biotechnology, Hisar

Centre for Plant Biotechnology, Hisar, which already had Government of India research grants of Rs. 1.66 crore, received a further boost to its activities when GOI agencies approved several research proposals submitted by CPB scientists in the past months. Following are five new research projects for which approval was received during past months:

- ✘ “Screening *Jatropha* germplasm for survival and high oil in frost prone areas” funded by the NOVOD Board, Gurgaon. Amount: Rs. 09.76 lakhs. Principal Investigator: Dr. A.K. Dhawan
- ✘? “Mycorrhizae as a biohardening agent in tissue culture raised plants” funded by the HSCST, Chandigarh. Amount: Rs. 06.47 lakhs. Principal Investigator: Dr. Rakesh Chugh; Co- Principal Investigators: Dr. Renu and Dr Subhash
- ✘? “Multilocational trials of *Jatropha curcas*: testing of elite genotypes at Hisar” funded by the Department of Biotechnology (DBT). Amount: Rs. 23.83 lakhs. Principal Investigator: Dr. Manisha Mangal; Co- Principal Investigator: Dr. A.K. Dhawan and Dr Subhash
- ✘? “Molecular characterization and multiplication of elite germplasm of *Commiphora wightii*- an endangered oleo gum resin species heading towards” funded by the Department of Biotechnology (DBT). Amount: Rs. 72.76 lakhs.

Principal Investigator: Dr Manisha Mangal; Co-Principal Investigator: Dr. A.K. Dhawan and Dr. Rajwant Kalia

- ✘? “Genetic Diversity analysis of *Hippophae rhamnoides* using AFLP markers” funded by the Department of Biotechnology (DBT). Amount: Rs. 23.57 lakhs. Principal Investigator: Dr. Rajwant Kalia; Co- Principal Investigator: Dr. A.K. Dhawan and Dr Manisha Mangal

Besides this following on-going projects funded by Department of Biotechnology, Government of India were extended:

- ✘? In view of CPB's credible performance the project on “Production of high quality planting material of *Jatropha curcas*” under National Biodiesel Mission got extended by two years with additional grant of Rs. 19.06 lakhs. Principal Investigator: Dr. A.K. Dhawan; Co- Principal Investigator: Dr. Manisha Mangal
- ✘? Being part of the National Mission on Bamboo Technology and Trade Development, CPB is involved in the production and supply of in vitro raised high quality bamboo plants. In view of CPB's performance DBT has extended this project by two years with additional research grant of Rs. 12.92 lakhs. Principal Investigator: Dr. A.K. Dhawan ; Co- Principal Investigator: Dr. Rajwant Kalia

## Science Essay Writing Competition for School and College Students

The science essay writing competition for school and college students was organised during the year 2008-09. The essay competitions for school students were organised initially at the district level through District Education Officer and at state level competition was by HSCST with the help of a panel of experts. For college students, the competitions were initially organised at

college level and finally at state level by HSCST. A total of 171 entries were received for the school level competition and a total of 91 entries were received for the college level competition. Varun Rathi from Kendriya Vidyalaya Karnal-132001 and Priya Rani from K.L.Mehta Dayanand College for Women, NIT, Faridabad won first prize at State level from school and college categories, respectively.

## Dr. Ashok K. Dhawan invited at University of Saskatchewan, Saskatoon, Canada

Dr. Ashok K. Dhawan, Director (T), CPB was invited by University of Saskatchewan, Saskatoon, Canada to deliver a lecture on “Sugar accumulation in sugarcane stems: a unique system, dynamic controls”. His lecture was greatly appreciated by the faculty as well as the students of

the University. Dr. Dhawan also attended a meeting on bio-fuels with officers of Govt. of Saskatchewan on March 31 – April 1, 2009. Funds for his travel were provided by University of Saskatchewan, Saskatoon.

## CPB signs MoU with G.J.U S. & T, Hisar

An agreement for academic co-operation was signed between Centre for Plant Biotechnology, (CPB), Haryana State Council for Science and Technology, DST, Haryana and Guru Jambheshwar University of Science and Technology, Hisar (GJUS&T) on June 18, 2009. This agreement was signed by Financial Commissioner and Principal Secretary, Science & Technology Department, Haryana on behalf of CPB, Hisar and by the Vice-chancellor of the University on behalf of GJUS & T, Hisar.

This agreement is a major milestone in the progress and academic recognition of CPB, since as per this agreement GJUS&T recognizes CPB as at par with the university's academic departments and CPB Faculty as at par with the faculty of the university. The agreement also envisages that the research work carried out at CPB will be recognized for the theses to be submitted for Ph.D. degree of GJUS&T. Thus, apart from a complete academic recognition of CPB by GJUS&T, this MOU will allow research fellows and students working at CPB to obtain degrees from GJUS & T. Also, CPB scientists will have

access to library and research facilities of GJUS & T. It is pertinent to mention that GJUS & T has been rated as an "A" grade university by the National Assessment and Accreditation Council of UGC.

In return, CPB, which has world class facilities for plant tissue culture, will train students from GJUS&T without charging any fees and also CPB scientists will not charge fees when invited by GJUS&T for lectures or examination work, etc. Also, researchers from GJUS&T will have access to CPB facilities.

The co-operation between these two premier organizations will go a long way in developing newer biotechnologies for the benefit of the state of Haryana. The intellectual property generated out of co-operation under this agreement will be jointly owned by the two organizations. This MOU has generated wide, media interest and was covered by Hindustan Times, Dainik Bhaskar, Dainik Jagran and several local papers such as Dainik Nabh Chhor.



Sh. SS Prasad, IAS, Financial Commissioner and Principal Secretary, Science and Technology Department, Haryana and Dr. Devendra Dayal Singh Sandhu, Vice-chancellor of Guru Jambheshwar University of Science and Technology, Hisar sign the MOU



News clippings of signing of MoU from various newspapers

## Dr. Manisha Mangal awarded BOYSCAST Fellowship

Dr Manisha Mangal, Production Scientist at CPB, Hisar, has been awarded BOYSCAST (Better Opportunities for Young Scientists in Chosen Areas of Science and Technology) fellowship for the year 2008-2009 by Department of Science & Technology, New Delhi. This prestigious fellowship of Government of India is awarded only to a few selected scientists in the country for

conducting research and undergoing specialised training in overseas research organizations in frontline areas of science & technology. Dr. Mangal has been selected to work on Molecular Biology of biotic & abiotic stresses in plants at the University of California, Davis, USA which is among top two Universities in the area of Plant Sciences in USA.

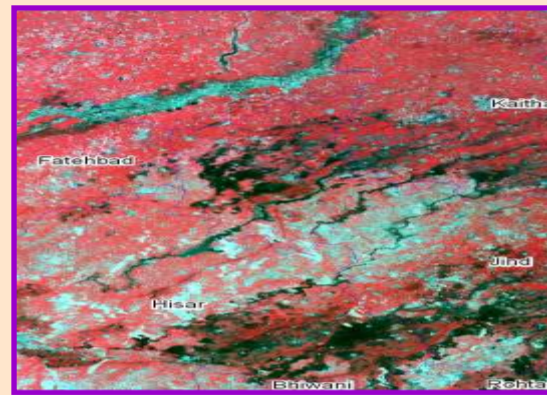
## Geographical Indications identified

Some of the Geographical Indications of Haryana like Rohtak ki rewri, Hansi ka pera, Taroari Ka Basmati Rice, Rewari ke Peetal ke Bartan, Siwani ki mirch, Gohana ka gur,

Gohana ki jalebi, Bawal ke ber, Jind ka ghewar were identified by Patent Information Centre at CPB, Hisar.

## Mapping of Palaeo-channels in Haryana state

Palaeo-channels are the old channels which have become relict because of some environmental changes of tectonic movements in the past which led to stoppage of their source of water. Haryana Space Application Centre (HARSAC) delineated Palaeochannels using microwave and multispectral Landsat TM (USA) satellite data in the north-western parts of Haryana. This satellite based geo-spatial information will be an ideal tool for groundwater exploration, recharging of groundwater and to minimize flood damages during monsoon season to take punitive action in case of violations of NBRA directions, procedures or guidelines.



IRS satellite image showing Palaeochannels

## Science Quiz Competition

Science quiz competition was organized by Haryana State Council for Science and Technology (HSCST) during the year 2008-09 separately for two groups namely for the students studying in schools affiliated with CBSE/ICSE (Gr. 'A') and for the students studying in schools affiliated with Haryana School Education Board (Gr. 'B'). The quiz contests for both the above categories were organized initially at district level, zonal level and finally at the state level. More than 2100 students participated in district level science quiz contests in both the categories. The zonal level science quiz contest were organized in the four districts of the State namely Panchkula (in Ambala Division) Gurgaon (in Gurgaon Division), Jind (in Hisar Division) and Karnal (in Rohtak Division). The 96 teams in Gr. 'B' and 93 teams in Gr. 'A' and 288 students in Gr. 'B' and 279 students in Gr. 'A' participated in the Zonal Level Quiz Competition. The zonal level Science Quiz Competition was inaugurated by Mrs Sumita Misra, IAS, Director Science & Technology Department, Haryana at Bhawan Vidyalaya, SSS, Sec.-15, Panchkula where she announced the increase in the prize money to motivate and enhance the participation of the students. At zonal level for first, second, third and consolation prize winner money was increased from Rs 2000, Rs 1500, Rs 1200 and Rs 900 to Rs 5000, Rs 4000, Rs 3000 and Rs 2000, respectively. Similarly at State level for first, second, third and consolation prize winner money

was increased from Rs 7500, Rs 6000, Rs 4500 and Rs 3000 to Rs 20000, Rs 16000, Rs 12000 and Rs 8000, respectively, alongwith a trophy for 1<sup>st</sup> prize winning school. In state level quiz contest 32 teams and 96 students in Gr. 'A', 30 teams and 90 students in Gr. 'B' participated. Anshul, Abhishek and Aashish comprising team of students from D.H.D.S.D. Public School, Ambala Cantt won 1<sup>st</sup> prize in Gr. 'A' and Suresh, Neha, Prince of Nehru Sr. Sec. School, Mandi Dabwali, Sirsa were winner of 1<sup>st</sup> prize in Gr. 'B' category.



Mrs Sumita Misra, IAS, Director Science & Technology, Deptt., Haryana inaugurating zonal level science quiz competition at Bhawan Vidyalaya, Sector 15, Panchkula

## Meetings/Seminars/Other events Attended

- ✘ Dr. R. S. Hooda, Chief Scientist, HARSAC, Hisar attended meeting with Departments of local bodies under the chairmanship of Sh. Dharam Vir, IAS, Chief Secretary, Haryana on 23.04.2009 regarding demarcation of unauthorized colonies in all the 76 towns of Haryana using high resolution satellite data.
- ✘ Dr. R. S. Hooda participated in the meeting under the chairmanship of Mrs. Urvashi Gulati, IAS, Financial Commissioner Development and Panchayat, on 22.05.2009 regarding installation of automated weather stations (AWS) in Haryana by ISRO.
- ✘ Dr. R. S. Hooda participated in the meeting of the Administrative Secretaries of all the live departments under the chairmanship of Sh. Dharam Vir, Chief Secretary, Haryana on 17.06.2009 regarding GIS based infrastructure and resources mapping in Haryana.
- ✘ Dr. A.K. Dhawan, Director (T), CPB, Hisar delivered a lecture in the National Convention of Sugarcane Technologists Association of India at Aurangabad and the Indian Society for Plant Physiology meeting at New Delhi.
- ✘? Dr. Kamla Malik, Technical Officer and Dr. Aditi Arya, JTS, CPB presented Posters in National Symposium on "Plant Propagation, Conservation and Modification" held at IHBT, Palampur (H.P.) on 3-4 April, 2009.
- ✘ Dr. Rajwant Kalia, Senior Scientist, CPB attended meetings of National Network on Seabuckthorn at DBT, New Delhi on 8<sup>th</sup> May, 2009.
- ✘ Director (T), CPB attended Research Degree committees at K.U., Bhopal University, H.N.B. University, Gharwal and GBPUA&T, Pantnagar and conducted Ph.D. examinations at Delhi University and GBPUA&T, Pantnagar

## Training, Awareness & Popularization Activities

- ✘ Centre for Plant Biotechnology (CPB), Hisar exhibited Plant Tissue Culture activities at State livestock show organized by animal Science Department, Govt. of Haryana on 13-14 March 2009
- ✘ CPB participated in exhibitions at Kisan Mela, organized by CCSHAU on 17-18 March 2009
- ✘ CPB participated in exhibitions during Science & Technology Day at Kalka, Biotech Exhibition, Delhi and AgriExpo, Delhi and at Bangalore.
- ✘ Haryana Space Application Centre (HARSAC), Hisar is organizing six weeks summer training course on Remote Sensing and GIS for MA/MSc students from June 22nd to 31st July, 2009.
- ✘ CPB organized tissue culture awareness workshop for Horticulture officers and sugarmills staff: In order to create awareness regarding immense potential of Biotechnology and plant tissue culture technology ,

Centre for Plant Biotechnology organized a one day workshop on "Plant tissue Culture : Challenges and Opportunities" for the officers of Horticulture department and Sugar Mills of the state on 25<sup>th</sup> March, 2009. Twenty-two officers from all parts of the state attended the training.



Participants in Workshop for officers of Horticulture department and sugarmills staff

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