

Science and Technology Reporter

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



Vol. 1, No. 3
July - September, 2009



NEW SCHEME ON HONOURING MERITORIOUS STUDENTS FROM HARYANA

HSCST has initiated a new scheme for encouraging the students of Haryana, who are selected in the National team for participation in the International Science, Mathematics, Astronomy & Astrophysics Olympiads and Junior Science Olympiads.

Homi Bhabha Centre for Science Education (HBCSE), Mumbai is the nodal agency for selecting and grooming the team of students for participation at the International Science, Mathematics and Astronomy & Astrophysics Olympiads. The Olympiad programme is financially supported by Board of Research in Nuclear Sciences (DAE), Department of Science and Technology, Department of Space and Ministry of Human Resource and Development. The selected students are some of the best in the country as they pass through a thorough selection process conducted by HBCSE.

It was felt that such students from Haryana should be suitably rewarded for representing Haryana at the International level. HSCST will award a cash prize of Rs 1 lakh to any student from Haryana who is selected in the National team for participation at International level Olympiads (Physics, Chemistry, Biology, Mathematics and Astronomy & Astrophysics).

Further, any student from Haryana who wins a medal at the above mentioned International Olympiads will be awarded a cash prize as per the detail below:-

- | | |
|---------------------------------|------------|
| 1. Student winning Gold Medal | Rs 5 Lakhs |
| 2. Student winning Silver Medal | Rs 3 Lakhs |
| 3. Student winning Bronze Medal | Rs 2 Lakhs |

Also for the International Junior Science Olympiad the following prizes will be given:-

- | | |
|--|--------------|
| 1. Student selected in the national team | Rs 0.5 Lakhs |
| 2. Student winning Gold Medal | Rs 2.5 Lakhs |
| 3. Student winning Silver Medal | Rs 1.5 Lakhs |
| 4. Student winning Bronze Medal | Rs 1 Lakhs |

Sh. Nitin Jain of Faridabad was awarded cash prize of Rs 5 Lakh, from HSCST, for winning gold medal at International Olympiad in Astronomy and Astrophysics held in Indonesia. The prize was given to him by Hon'ble Chief Minister, Haryana at 'Pratibha Samman Samaroh' held in July, 2009 at Chandigarh.

Editorial Board

Patron:

Shri SS Prasad, IAS

Financial Commissioner & Principal
Secretary, Science & Technology
Department, Haryana and
Chairman/EC, Haryana State
Council for Science & Technology

Shri Sandeep Garg, IAS

Director, Science & Technology
Department, Haryana and
Secretary/EC, Haryana State
Council for Science & Technology

Editor:

Dr Renu,

Senior Scientific Officer-1,
Haryana State Council
for Science & Technology

Members:

Dr AK Dhawan,

Director (Technical),
Centre for Plant Biotechnology

Dr RS Hooda,

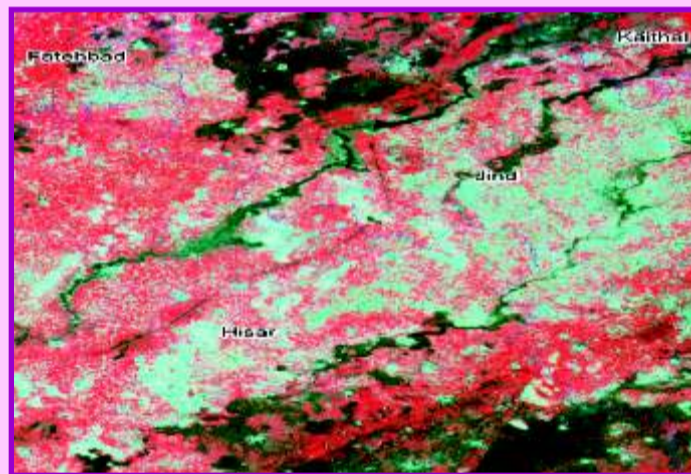
Chief Scientist,
Haryana Space Application Centre

PALAEOCHANNELS IN HARYANA-AN OVER VIEW

Palaeochannels are the old rivers which were buried or became extinct due to endogenetic or exogenetic forces. The Indo-Gangetic alluvial plains had formed due to fluvial processes & had many rivers which were buried or extinct due to river piracy, less flow or other tectonic activities. The alluvial plain of Haryana has palaeochannels which originated from Himalayas. In the Vedas, River Saraswati have been described to flow through present Haryana state & meet the Arabian Sea. There is need to investigate the Palaeo Saraswati river. However, there are number of palaeochannels in the north & northwestern as well as southern parts of the state. Presently, there are number of rivers in the state like Ghagghar, Yamuna, Saraswati (Sarsuti), Som, Markanda, Dangri, Boli, Sarsa, Dohan, Krishnawati & Sahibi. Satellite data shows that there is shifting in Ghaggar near Sirsa & in Yamuna near Faridabad. These shifting are of three to four decades old only, which indicates that there are natural processes going on & anthropogenic activities are triggering these natural processes. Authors have delineated the palaeochannels in the north & northwestern parts of the state with the help of LANDSAT TM satellite data which indicates that the flow of the old rivers was towards northwestern direction & met the Arabian Sea.

Utility of these palaeochannels is multifarious for Haryana state having more than 70% population engaged in agricultural activities and the groundwater potentiality as well as quality varies in the state. There is no doubt that palaeochannels are the underground reservoir of fresh water which can be harnessed for drinking as well as irrigation purposes and an additional source of water for these purposes. These palaeochannels are the suitable recharging sites for groundwater augmentation in the state. The central part of the state is highly prone to flood and generally face flood in monsoon season. By suitable network of canals, the flood water can be diverted to these palaeochannels which can be used in lean period as well as in recharging of groundwater resource. Similarly, the water from waterlogged areas can also be diverted to these palaeochannels. In the southern part of the state, rivers like Sahibi,

Krishnawati and Dohan can be used for drinking water and artificial recharging of groundwater by spreading water method from canals in the dry bed of these rivers which help in checking the depleted groundwater resource in the area. In Gurgaon district, there are small drainages originating from hills of Delhi Super group which are good source of groundwater. In Mewat district, there are palaeochannels near Kotla Dhar and rivers and streams coming from Rajasthan state which can be used in solving the drinking water problem in the region. In Faridabad, the shifting course of the Yamuna is highly water potential zone and can be used for drinking, industrial and agriculture purposes. There is need to map all the palaeochannels in the state to harness the potential of these for solving the problem of drinking water especially in southwestern and southern parts of the state. In national capital region (NCR) of the state, there is also need of mapping of palaeochannels for groundwater exploration. The existing river/streams and delineated palaeochannels should be marked as no habitation zones.



Landsat TM Satellite Data Showing Palaeochannels in Hisar and Jind Regions

Anup Kumar^{1*}, V.S Arya¹, R.S.Hooda¹, Rajbir Singh²

**Assistant Scientist, ¹Haryana Space Applications Centre, CCS HAU Campus, Hisar,*

*²Deptt. of Science & Technology, Haryana
E-mail: anup0106@yahoo.com

MUSHROOMS CULTIVATION IN HARYANA

The mushrooms have been considered a DELICACY for several thousand years. The earliest cultivated edible fungus was a species of Auricularia, which was cultivated about 1000 years ago in China. The description of growing mushrooms was written by Toune Forte, a Frenchman, and it was published in Paris in 1707. In Haryana, the commercial mushroom cultivation was started in early 1980s by Master Jagdev Singh in the Bhadana village of Sonapat district, and now the Haryana is a leading producer of white button mushroom under seasonal conditions using low cost technology. Mushrooms basically have low calorie, low fat and high proteins, high fibres, high vitamin B-complex, vitamin C, phosphorus and potassium and high K:Na ratio. Mushrooms have also been considered to have medicinal value. In Japan, a top selling cancer drug, 'PSK' from mushroom (Coriolus versicolour) accounted for 25% of the country's total sales of anti cancer drugs. It also helps in treatment for hyperlipemia, diabetes and is also selective inhibitor of myxovirus multiplication. Some of the mushrooms are poisonous also and it is found mostly in summer or rainy months, when people collect wild mushrooms. The mushroom poisoning may cause nervous, gastric, haemolytic and muscular disorders.

Agaricus bisporus, A. bitorquis, Pleurotus sajor caju (Oyster/Dhingri mushroom), Calocybe indica (milky mushroom) and Volvariella volvacea (paddy straw mushroom) are the commonly grown mushrooms in Haryana but Agaricus bisporus have achieved the commercial status in Haryana. Out of the India's estimated production of 60,000 tons, Haryana alone produces around 6000 tons of mushrooms annually. Farmers like to cultivate mushrooms because this venture is very less land dependent and also escapes the natural vagaries like rain, hailstorms, etc.

Environmentalists prefer it because of its eco friendly nature as mushrooms use agricultural wastes/by-products as their food and convert them into protein rich food and even spent compost is used as an organic manure in the field. Mushroom cultivation involves composting, spawning, casing and care during cropping.

Constraints in Mushroom cultivation:

1. Low consumption in domestic market.
2. Post harvest losses in quality
3. Lack of industries involved in post-harvest processing/marketing value added products.
4. Availability of quality spawn.
5. Weak financial status of entrepreneurs/growers and limited institutional financing.



Button Mushroom (*Agaricus bisporus*)

Satish Mehta

Project Scientist, Patent Information Centre
Centre for Plant Biotechnology, Hisar
* email: sk_mehta2006@yahoo.co.in

WATER TECHNOLOGY INITIATIVE

Department of Science and Technology, GOI under their Water Technology Initiative (WTI) is providing programmatic support to HSCST for 'Scientific Evaluation of Water Purification Systems in the State of Haryana. Under the first phase of this initiative water testing was done by HSCST in 20 schools representing different districts of Haryana through an NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited lab.

The second phase would consist of selection and installation of suitable water filters of appropriate capacity in the identified locations. The water testing kit would be provided to each school and the awareness and training camps of schools teachers and students would be part of project. The water quality of both the raw water and the treated water would be tested on a periodical basis as per the protocol developed at school level. The intermittent samples would also be validated by NABL accredited Lab. The system performance would be monitored for duration of 1 year as per the protocol prepared by the DST with the help of experts.

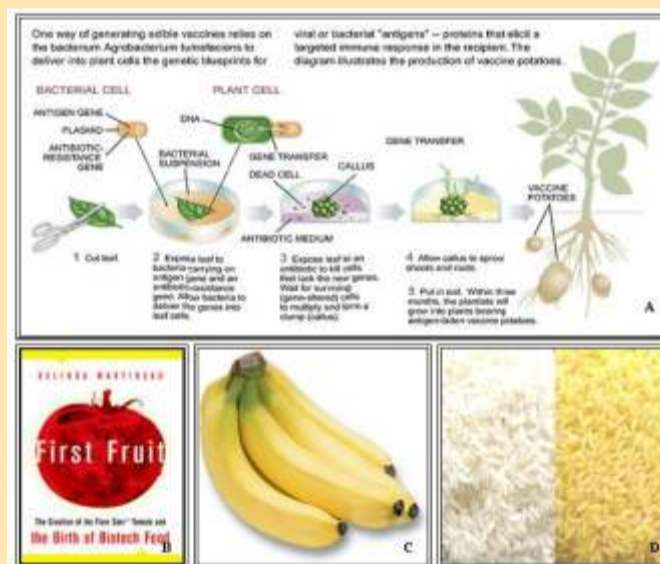
GENETIC ENGINEERING IN PLANTS

A key challenge for the twenty-first century is to provide food security to growing population of the world. This challenge has led agriculture sector towards gene revolution after green revolution with the help of advanced biotechnology. It has been proclaimed as third technological revolution following the industrial and computer revolution. The challenge for the future, therefore, lies in global food security that necessitates a doubling of food production in the next 50 years to meet the needs of the population. Today, 815 million people in the developing countries suffer from malnutrition and 1.3 billion are afflicted by poverty. Transgenic crops, often referred to as genetically modified (GM) crops, represent promising technologies that can make a vital contribution to global food, feed and fiber security. These are the outcome of direct manipulation of an organism's genes known as genetic engineering, recombinant DNA technology, and genetic modification. With the rapid development of genetic engineering techniques based on the knowledge of gene structure and function, plant breeding has been dramatically broadened. Gene transfer or DNA uptake refers to the process that moves a specific DNA (usually a foreign gene ligated to a bacterial plasmid) into the cells. Though the application of conventional techniques has resulted in significant improvement of major food crops, however this takes a long time. The genetic engineering techniques presently available rely on natural plant vectors (*Agrobacterium tumefaciens*), as well as, vectorless systems (Particle Gun or biolistic method, laser microbeam, electroporation, liposome mediated, with silicon carbide fibres, chemically stimulated DNA uptake and microinjection).

Agrobacterium mediated genetic transformation is currently the most widely used method of gene transfer into plant cells. It employs a reformed plant pathogen called *Agrobacterium* which has a natural ability to put foreign genes into plant cells. It is a soil bacterium with natural pathogenic activity which infects the roots and stems of dicotyledonous plants resulting in the cancerous growths (galls), a characteristic of crown gall disease. However, this technique is not suitable for monocotyledonous plants as they are not the natural host of *Agrobacterium*. Therefore, physical methods of direct gene transfer have been developed for use with monocots and other species. Direct delivery of free DNA molecules into plant protoplasts by physical (electroporation and micro injection) and chemical

(polyethylene glycol) methods have been developed to facilitate DNA delivery across the plasma membrane.

Worldwide, the use of transgenic crops has become an important component of crop improvement programs. The estimated global area under transgenic crop cultivation till 2005 was approximately equivalent to 222 million acres. The major traits harboring transgenic crops were herbicide resistance with 72% of the total transgenic area followed by insect resistance with 19.5%, whilst, virus resistance and other traits engaged very little area <1%. The flavr savr tomato was the first commercially grown genetically engineered food to be granted a license for human consumption. It was developed by plant physiologist, Autar Mattoo of ARS vegetable laboratory in Beltsville, Maryland and was produced by the Californian company. It was submitted to the U.S. Food and Drug Administration (FDA) in 1992 and first sold in 1994. The researchers lead by Dr. Charles Arntzen of A & M University, Texas, USA in 1992 developed plant derived cheap vaccine-delivery system.



A. Way of generating edible vaccines B. Flavr savr tomato, C. Vaccine Bananas and D. Golden rice.

Photographs courtesy:

- A. www.a-s.clayton.edu/fnorflus/.../Review%20of%20Edible%20Vaccines.ppt
- B. <http://www.amazon.co.uk/First-Fruit-Creation-Tomato-Biotech/dp/0071360565>
- C. <http://microbewiki.kenyon.edu/images/9/99/Bananas.JPG>
- D. <http://www.maclester.edu/environmentalstudies/students/projects/citizenscience2007/geneticallymodifiedcrops/images/goldenrice.jpg>

Vitamin laded vaccine potatoes and bananas producing a pathogen protein (or DNA) to induce immunity have been developed to prevent diarrhoea caused by Escherichia coli and Vibrio cholera bacteria. Four plant vaccines have been successful in phase I clinical trials (against cholera, hepatitis B, diarrhoea, dental caries). Golden rice has also been developed which can be a supplement of Vitamin A and can cure 70% children suffering from vision impairment in Southeast Asia. Some other commercially important crops like tobacco, petunia, tomato, potato, eggplant, arabidopsis, lettuce, celery, sunflower, flax, rape oil seed, cauliflower, cabbage, cotton, soybean, pea, chicory, liquorice, sweet potato, kiwi, papaya, grape, rose, chrysanthemum, popular, apple, pear, neem, satavar,

rye, rice, wheat, maize, oat etc. have been exploited through genetic engineering.

Development of transgenics may lead to innovative ventures in research and development that will benefit farmers and consumers with profits and high quality products. Biotechnology has thus proven to be a safe tool for scientific crop improvement and it fights against hunger and poverty to effectively face the challenge of feeding the rapidly growing world population in the next millennium.

Aditi Arya
Centre for Plant Biotechnology
CCS HAU New Campus, Hisar -125004
Email- aditi29parkash@yahoo.com

AWARDS

Noel Deerr Award for the year 2008 to Dr. Ashok K. Dhawan



Hon'ble Former President Dr. A.P.J. Abdul Kalam conferring Noel Deerr Gold Medal to Dr. A.K. Dhawan (Director, T) at a function in 70th Annual Convention of STAI

Dr. Ashok Dhawan, Director (T), CPB, Hisar has been awarded the prestigious Noel Deerr Award for the year 2008 for his research by the Sugar Technologists Association of India (STAI). The award was conferred

by Dr. A.P.J. Abdul Kalam, Former President of India on 26th August, 2009 during the inaugural ceremony of the 70th Annual Convention of STAI held at Hotel Radisson Plaza, Udaipur. The deliberations during the Convention highlighted major research activities going on in sugarcane industry.

Dr. Dhawan and his group working at Regional Research Station of CCS HAU, Uchani, Karnal have been actively involved in deciphering the physiological and molecular mechanisms of sugar transport and accumulation for over 22 years. Dr. Dhawan, was recently invited by University of Saskatchewan, Canada to deliver a lecture on "Sugar accumulation in sugarcane stems: a unique system, dynamic controls". In addition to this Dr. Dhawan has been a recipient of several prestigious awards including K.K. Nanda Memorial Award and J.J. Chinoy Award by Indian Society for Plant Physiology, New Delhi and Y. S. Murty Memorial Lecture Award by Indian Botanical Society.

Environmentalists of the Year Award-2009

Dr. Anup Kumar, Assistant Scientist (Geology/ Geophysics), HARSAC, Department of Science and Technology, Haryana, CCS HAU Campus, Hisar has been conferred upon the prestigious Environmentalists of the Year Award-2009 by the National Environmental Science Academy (NESA), New Delhi, a premier national environmental academy

in the country, in recognition of his outstanding research work on Water Resources and Environment. The award will be conferred in the academy's annual conference to be held at Osmania University, Hyderabad, December 27-29, 2009.



HARSAC SIGNS MOU WITH GJUS&T TO START M.TECH. GEO-INFORMATICS COURSE

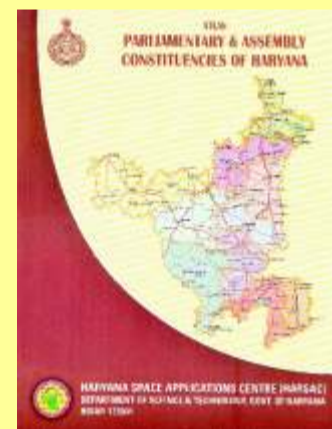
Geo-Informatics has been recognized as an important tool for developmental planning and for sustainable management of resources. Realizing that collaboration between Haryana Space Application Centre (HARSAC) and Guru Jambheshwar University of Science & Technology (GJUS&T) would considerably leverage technical abilities of both and enable a framework for professional education and research program in Geo-informatics, both HARSAC and GJUS&T entered into a MoU for collaboratively conducting M.Tech. Geo-informatics course. MoU was signed by Sh. S.S. Prasad, IAS, Financial Commissioner & Principal Secretary Science & Technology (FCPS S&T) and Chairman HARSAC and Dr. D.D.S. Sandhu, Vice-Chancellor, GJUS&T, in the presence of Sh. Dharam Vir, IAS, Chief Secretary, Haryana on 11th August 2009 at Chandigarh. The course curriculum mainly includes Remote Sensing, Geographic Information System (GIS), Global



Positioning System, Computer Science and Information Technology. Under the agreement 30 students with B.Tech. or M.Sc. qualifications would be admitted to the course each year through an entrance test. The admissions, conduct of examinations and award of degrees would be done by GJUS&T and conduct of classes and practicals would be done by HARSAC.

HARSAC RELEASES ATLAS ON ASSEMBLY AND PARLIAMENTARY CONSTITUENCIES

While Election Commission of India is pressurizing for using GIS for the election process in the country, as a first step forward HARSAC has prepared the an Atlas of Assembly and Parliamentary constituencies of the state. The atlas indicates all the village locations, road, railway and canal network in all the post-delimitation constituencies of the state. The atlas could be of great help to election planners and managers, security agencies, politicians, government officials and the general public. The Atlas was widely used by the administration and the observers in various districts in the recently conducted assembly elections in the state. Sh. Randeep Singh Surjewala, Minister Science and Technology, Haryana has sent a complimentary copy of the Atlas to all the MPs and MLAs of the state.



SETTING UP OBSERVATORY IN THE MORNI HILLS AREA

The Haryana State Council for Science & Technology has decided to purchase and install an 11" telescope of Celestron make in the Morni Hills area. The purchase order amounting to Rs. 3.75 lacs has already been released to M/s Audo Viso Pvt. Ltd. for supplying the telescope. The matter regarding the finalization of site for installation of

telescope in the Morni Fort is being taken up with Forests / Technical Education Departments, Haryana. This office is also coordinating with Panjab University for technical assistance regarding the construction work of the dome for installation of telescope and connectivity with computers for recording the astronomical events.

TRAINING/ AWARENESS PROGRAMS CONDUCTED

Following training programmes were conducted by Haryana Space Application Centre (HARSAC), Department of Science and Technology, Haryana, CCS HAU Campus, Hisar:

1. One day awareness program for school children on Space Technology and its Applications was conducted on the occasion of birth anniversary of Dr. Vikram Sarabhai, father of Indian Space Program on 12.08.09 at HARSAC. About 90 science students of classes 10th to 12th from various schools of Hisar and nearby areas participated in the program.
2. One day awareness program for school children on Space Technology and its Applications was conducted at Govt Senior Secondary School, Rohtak on 25.08.09. About 90 science students of classes 10th to 12th from various schools of Rohtak town and nearby areas participated in the program.
3. One day awareness program for school children on Space Technology and its Applications was conducted at Govt Senior Secondary School, Karnal on 16.09.09. More than 100 science students of classes 10th to 12th from various schools of the district participated in the program.

NEW PROJECT SANCTIONED

- ❖ Change Detection Study of Traditional Surface Water Bodies in Southern Part of Haryana Using Space Technology. Under Collaborative Science and Technology Programme (CSTP) of State Science and Technology Programme of Department of Science and Technology, Govt. of India, New Delhi. Duration: 18 months, Rs. 6.76 Lakh. Principal Investigator: Dr. Anup Kumar, Haryana Space Application Centre (HARSAC), Hisar; Nodal Coordinator: Dr. Renu
- ❖ A study on Socio Economic benefits of Organic Farming in Haryana Under Collaborative Science and Technology Programme (CSTP) of State Science and Technology Programme of Department of Science and Technology, Govt. of India, New Delhi. Duration: 32 months, Rs. 10.549 Lakh. Principal Investigator: Mr Sunil Gupta, Dharani Suuphalam, Raja Ram Dharamshala, Mandi Dabwali; Co- Principal Investigator: Mr Ompal Singh; Nodal Coordinator: Dr. Renu

HARSAC AND SOI INK PACT FOR BASE MAPPING OF HARYANA TOWNS

With a view to make use of high resolution satellite data in urban planning process, it is proposed to prepare base maps of all the 76 towns of the state on 1:2,000 scale. The base maps would be prepared using high resolution satellite data and GPS. The base map would include network of roads and streets, sector nos., names of localities, sector/ colony boundaries (including residential, commercial, industrial, public and semi-public use, open spaces) and collection of GPS location of all basic urban amenities, major land marks, institutions, facilities, govt. offices, etc. An MoU for

technical collaboration on the base mapping has been signed between HARSAC and Survey of India (SOI), Dehradun, DST, GOI by Sh. S.S. Prasad, IAS, FCPS S&T and Chairman HARSAC and by Sh. Sanjiv Nain, IAS, Joint Secretary, DST, GOI, in the presence of Sh. Bhupender Singh Hooda, Chief Minister, Haryana and Sh. Prithvi Raj Chavan, Minister Science and Technology, GOI on 26th August 2009 in New Delhi. Under the MoU, SOI will procure the freshly acquired high resolution satellite data for the all the towns of the state, geo-reference it and supply it to HARSAC for preparation of base maps.

DR. K.S. KHOKKAR, HON'BLE VICE CHANCELLOR CCS HAU HISAR VISIT AT CPB

Dr. K. S. Khokhar, Vice-Chancellor of Chaudhary Charan Singh Haryana Agricultural University (CCS HAU), Hisar awarded certificates to the trainees in the Valedictory function organized by Centre for Plant Biotechnology (HSCST, DST, Haryana), CCS HAU New Campus, Hisar at Conference Hall of HARSAC, Hisar. In his message to the budding biotechnologists of Haryana, he emphasized on the use of latest techniques of Biotechnology including transgenics for crop improvement.



Dr. K.S. Khokhar Hon'ble Vice-Chancellor, CCSHAU, Hisar distributing certificates to the trainees at a valedictory function in CPB, Hisar

UPCOMING EVENTS

1. 10th PIC workshop is to be held at Deenbandhu Chhotu Ram University of Science and Technology (DCRUST), Murthal (Sonapat). Patent Information Centre (PIC), Haryana has opened



Dr. K.S. Khokhar, Hon'ble Vice-Chancellor, CCSHAU, Hisar inaugurating 9th PIC workshop at Regional Research Station, Bawal (Rewari) on 29th July 2009

two IPR cells, one at DCRUST, Murthal (Sonapat) and another at GJUS&T, Hisar. It has also initiated to open IPR cells at KU, Kurukshetra, MDU Rohtak and BPS

Women University, Khanpur Kalan. PIC, Haryana has organized 8th PIC workshop at CCS Haryana Agricultural University, Hisar, 9th at Regional Research Station, Bawal (Rewari) and 10th PIC workshop is expected to be held in end of September 2009 at DCRUST, Murthal (Sonapat).

2. Zonal Seminar-2009 CPB is organizing Zonal Seminar on "Abiotic Stress Tolerance in Plants: Physiological and Molecular Approaches" on 5th December, 2009). The conference features plenary lectures by eminent speakers. Submitted papers will be presented by way of poster presentations by the contributors. The contributory papers are invited covering the following broad research areas with an emphasis on abiotic stress tolerance: (a) Plant Physiology, (b) Biochemistry, (c) Tissue culture, (d) Molecular Biology, (e) Functional genomics and (g) Transgenics. All plant species of agricultural, horticultural, silvicultural, bio-fuels and pharmaceutical significance are included. The abstracts of papers to be presented should be e-mailed as a word file attachment to cpbhisar@hotmail.com on or before October 15, 2009. For further details, visit our website – www.cpbhisar.org

Haryana State Council for Science & Technology,
Bays 35-38, Sector 2, Panchkula
Ph. : 0172-2561339, 2560339, Fax : 0172-2560018
Website : <http://dstharyana.org/>

Kindly send us your feedback to renuari@rediffmail.com
Available online on www.dstharyana.org

Published by : Dr. Renu, Senior Scientific Officer - 1, on behalf of Haryana State Council for Science & Technology, Panchkula
Designed & Printed at : Azad Offset Printers (P) Ltd., 144, Press Site, Indl. Area-1, Chd. Ph. : 0172-2652349, 2651316
www.azadoffsetprinters.com