Science and Technology Reporter

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

Vol. 2, No. 4
Oct. - Dec., 2010

Anurag Agarwal, IAS
Director,
Science & Technology Department,
Haryana

FROM DIRECTOR'S DESK

The level of development of science and technology is closely associated with the quality of our life. The progress of science and technology is basic foundation for the overall progress of any society.

Pandit Jawahar Lal Nehru's dream was of a modern, prosperous India propelled by science & technology. He felt that science should be more exciting, practical and alive. Such a model is only possible if we encourage the students to study it and develop a scientific temper . The efforts made by the Department of Science & Technology, Haryana towards this are visible through its schemes like Haryana Science Talent Search scholarship scheme for students of 9th to 12th classes, Promotion of Science Education scholarship scheme for B.Sc.(Honours) and M.Sc. students of pure sciences and Fellowship scheme for research scholars. These schemes would give a great boost to science education in Haryana at all levels whether it is School, College or University.

Besides, the department is organising a plethora of activities like, organising science congress, quiz competitions, essay writing competitions etc. to bring science on the fore front.

In order to realise the dream of a technology driven society, the staffs of the DST / HSCST are putting their heads together to infuse scientific approach in the young brains of Haryana.

(Anurag Agarwal)

Exhibitions

HARSAC paticipated in India International Trade Fair-2010 (14-27 November, 2010) at Pragathi Maidan, New Delhi. The exhibits displaying various Remote Sensing, GIS and GPS applivations, attracted students, acadamitions, decision makers and farmers. Hon'ble Governor Haryana Sh. Jagannath Paharia, Hon'ble Chief Minister Sh. Bhupinder Singh Hooda, Hob'ble Chief Secretary Haryana Smt. Urvashi Gulati, also visited the HARSAC Stall.

Hon' able Chief Minister Sh.Bhupinder Singh Hooda visited the HARSAC stall on 21.11.2010

Hon' able Governor Haryana Sh. Jagannath Paharia visited the HARSAC Stall on 25.11.2010.

Chief Secretary, Haryana Smt. Urvashi Gulati, IAS visited the HARSAC Stall on 14.11.2010

Seminar organized by HARSAC at ITF-New Delhi

HARSAC has organized a seminar at Haryana Pavilion, India International Trade Fair-2010 on 16th November 2010 on "Bio and Solar Energy Potential in Haryana". The seminar was coordinated by Dr. Anup Kumar, Assistant Scientist (Geology/Geophysics)-cum-Nodal Officer, Department of Science & Technology, Haryana for the IITF-2010. During the seminar Dr. Manoj Yadav, Assistant Scientist (Agriculture) HARSAC had delivered a lecture on "Bio Energy Potential in Haryana" and Mr. Sachin Bansal, Guest Lecturer, HARSAC, on " Solar Energy Potential in Haryana".

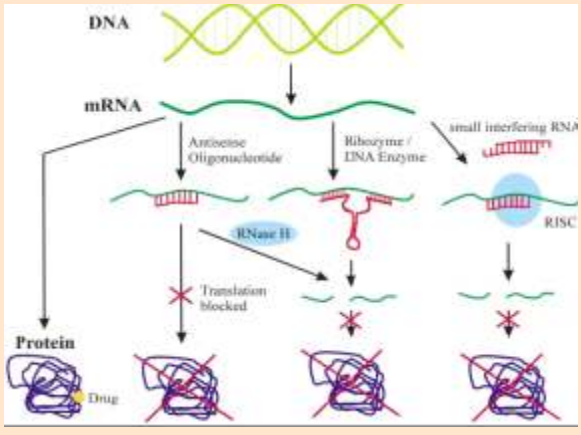
ANTISENSE TECHNOLOGY AND ITS POTENTIAL APPLICATIONS

Genes found in the living organisms are passed from one generation to the next. These genes have coded information which is used by the regulatory network present in the cell to make various types of proteins which in turn are required for various structural and functional attributes of the cell or an organism. In this process RNA or more specifically mRNA acts as a courier molecule that delivers the instruction coded in the genes in making proteins. This flow of genetic information is called the central dogma of molecular biology which deals with the transfer of sequential information from DNA to mRNA and finally to the Protein. Any interruption at any stage in this Central Dogma will prevent the protein synthesis. However we may be interested in blocking of protein synthesis in certain situations when the proetin in question produces undesirable effects such as diseases etc. Antisense RNA technology comes to play when the goal is to alter specific gene expression.

An antisense strand refers to a short DNA or an RNA sequence or ribozyme/ DNA isozyme which is complementary to a specific gene sequence. It can block protein synthesis by binding to the sense strand of specific gene. This method of gene silencing directs a natural mechanism to degrade RNA instruction of a specified gene so that RNA can no longer produce the product of gene expression (protein). Because of its effect on RNA it is called RNA interference (RNA i). Antisense technology was first effectively used in plants to alter the levels of various degradative enzymes or plant pigments. Dr. Peter Waterhouse and his CSIRO team first discovered "hairpin RNA I" gene silencing in plants in 1995.

It is a highly specific technique which switches off the activity of only a targeted gene in order to determine the precise function of the genes in humans, plants, animals and insects. It is also used in metabolic pathway engineering and development of new traits and new crop varieties.

Comparison of different antisense strategies



(Photographs-courtesy: Eur.J Biochem. 270.1628–1644 (2003)

Some of the important applications of this technology include:

- Flavr savr tomato, produced by California Company Calgene, is the product of antisense technology in which antisense polygalacturonase gene was introduced to suppress the breakdown of pectin. As a result ripening process slows down and tomatoes show two weeks long shelf life than normal tomatoes.
- Antisense ACC oxidase gene was introduced in to the melon to reduce the production of plant hormone ethylene.
- Starch branching enzyme in potatoes has been successfully inhibited by antisense RNA, as a result high amylose starch could be obtained for commercial use while low amylose starch containing crops have been produced for industrial application.
- Arabidopsis plant contain "ACR 2 gene" which encode "arsenic reductase"(accumlate arsenic) , if this gene is silenced by hp RNA plant can accumlate arsenic10-16 fold more in shoots.
- Hypoallergic grasses cause hay fever and seasonal allergic asthma. Main allergens in these grasses are the pollen proteins lol p1and lol p2, level of these proteins can be down regulated by antisense RNA.
- Plant endotoxins could also be removed if the toxin biosynthesis genes are targeted with RNAi. Recently the "Theobromine synthase"of the coffee plant was knocked down with the hair-pin constructs of the transgene, leading to the production of decaffeinated coffee plant.
- Antisense based clinical trials for the treatment of HIV-1 and variety of cancers have been approved at different institutes worldwide.

However in order to exploit this technology successfully, certain challenges need to be addressed such as:

1) The choice of Gene targets: Target selected should be such that it should be critical in disease progression.
2) Target site on mRNA: Target binding sequence whether it is secondary or tertiary RNA must be known as binding site differs from target to target. Target can be 5' end of the mRNA or 3' UTR or region in between the two ends therefore optimum length of antisense sequence need to be used.
3) Antisense stability: Antisense oligonucleotide should be modified such that its half life is optimum.

Alpana Kulhari[1] and Manisha Mangal*
Junior Research Fellow, Center for Plant Biotechnology,
CCS HAU New Campus, Hisar
*Email - manishamangal@rediffmail.com

CPB'S FIVE YEARS OF PHENOMENAL GROWTH

The Centre for Plant Biotechnology established on March 1, 2000, initially earned a name by multiplying elite plant species through tissue culture. The first few years were slow, as for any organization, but a critical juncture came when DBT's funding to the Centre ended in December 2005 and the State Govt did not commit any grants. At this point, there was a question mark on the very existence of this Centre !

In early 2006, all that this Centre had was a Director (Technical) and four staff on a six-month contract running a tissue culture laboratory. However, the events took a major turnabout at the end of 2006, when Govt. of Haryana sanctioned twelve technical positions for CPB, a de facto recognition that the state government would henceforth support the Centre.

Between 2006 and 2010, CPB has not only survived, but has made a progress that would be envy of any research organization. Quickly bright and committed scientific and technical staff was appointed on the sanctioned positions. In October 2007, the Centre was given its present name, thereby widening the scope of activities (it was earlier a Centre for Plant Tissue Culture). In addition to tissue culture, six other Divisions were created. From a mere four contract staff in 2006; CPB now has a total of 31 positions: 12 regular technical positions and 19 contract scientists working as Research Associates, Project Scientists and Fellows. The revenue generated by CPB activities in the earlier years was on the average less than Rs 3.0 lacs a year: a total of Rs 13.0 lacs from inception to 2005. An amount of over Rs 1.0 crores from revenue receipts has been added to the fixed deposits in the past five years. Grant in aid from Govt of Haryana has increased from 30 lacs in 2006 to 1.90 crores in 2010. GOI sponsored projects during the period increased from 2 to 14. Six students are pursuing Ph.D. degrees at CPB: four of these are under an MOU with GJU which qualifies research done at CPB for a Ph.D. degree from GJUS&T. A Vision Group created by the Government of Haryana which included top biotechnologists of the country provided the mandate and a road map for future plans of CPB. The Vision Group also recommended an autonomous status for CPB and registration as a Society. These recommendations are awaiting an approval from the Executive Council of HSCST, which hopefully will meet anytime soon.

It is a rich tribute to the credibility of its scientists with GOI agencies that CPB is a part of National Bamboo Mission, National Bio-diesel Mission and National *Hippophae* network of DBT, New Delhi. CPB has been selected as a Centre for multi-location testing and is one of the four National Conservation gardens established by DBT in the country. CPB's faculty competed and received grants of Rs 5.39 crores from GOI agencies.

CPB has been sponsored by DST, GOI, New Delhi as Patent Information Centre for the State of Haryana. It has organized ten patent awareness workshops and established nodal offices in four universities in the state. In view of its progress, DST chose to make CPB a regular “Patent Information Centre” from the April 2009. Further, Ministry of Micro, Small and Medium Enterprises proposes to establish an “Intellectual Property Facilitation Centre” at CPB with a grant of Rs 45 lacs.

Haryana State Council for Science and Technology has set up a new Facility on “DNA Fingerprinting and Diagnostics” at a cost of Rs. 233.85 lakhs at CPB, Hisar. This Facility is one of the two Centres established under a new initiative called “Centre of Excellence (COE)” started by Department of Science and Technology in 2010. This centre will test the quality of transgenics, hybrids and elite seeds and help in detection of spurious seeds.

Centre for Plant Biotechnology now provides several long and short term trainings every year. Indeed, for students of B. Sc/ B. Tech / M. Sc. and Ph.D. from all over the country, CPB has

become a very popular destination, where they come to seek training and enhance their employability. An amazing number of 487 students have obtained training at CPB in the past five years. CPB has also organized trainings for officers of sugar mills, horticulture department and college and school teachers regularly. Students and general public are invited to CPB on "Open Day" to create public awareness for biotechnology activities.

CPB organized a National seminar on "Biotechnological and Physiological Approaches to Improving Plant Productivity" in March 2008. Over, 200 scientists from all parts of the country and abroad participated. A Zonal seminar was organized in December 2009 and a seminar on IPR issues was organized in March 2010. All these have put CPB on the national scene and enhanced its prestige several folds.

CPB's work has been recognized at National and International forums. Dr. Ashok Dhawan won J. J. Chinoy Award 2007, Y. S. Murti Award 2008 and was also conferred prestigious Noel Deerr Award 2009 by former president A.P.J. Abdul Kalam. Dr. Renu and Dr. Aditi won gold medals for their presentations in the national Seminar. A paper presented by Dr. Subhash Kajla won a commendation certificate in the International conference at Hungry in 2010 and another paper published by Dr. Rajwant Kalia was the third most downloaded paper in Euphytica. Dr. Manisha Mangal and Dr. Rajwant Kalia won BOYSCAST fellowships of Govt. of India. It is a rare distinction for any organization to have won two of these fellowships in a row. Research Fellows trained at CPB have secured positions in most prestigious laboratories in India and abroad.

The theme phrase of CPB, "Where the mind is without fear and the head is held high" is what made its scientists excel, while following our core values of honesty and respect for all. CPB continues to be on the march, progressing every single day, dedicated to the growers, industries and the people of the state with highest order of commitment.

Ashok K. Dhawan
(Director Technical)

A TRIBUTE TO INDIAN SCIENTIST

Chandrasekhara Venkata Raman was born at Tirachirapalli in Tamil Nadu on 7 November 1888. His father was lecturer in mathematics and physics. So from the very beginning he was immersed in an academic atmosphere. Raman's academic brilliance was established at a very young age. He finished his secondary school education at the tender age of thirteen and entered the Mrs. A.V.N. College at Vishakapatnam, Andra Pradesh. Two years later he moved to the prestigious Presidency College in Chennai.

When he was fifteen, he topped his class to receive his B.A. degree with honours in Physics and English. Raman continued his studies at the Presidency College and when he was barely eighteen, graduated at the top of his class and received his M.A. degree with honours.

Raman then joined the Indian Audit and Accounts Service and was appointed the Assistant Accountant General in the Finance Department in Kolkata. In Kolkata, he sustained his interest in science by working in the laboratory of the Indian Association for the Cultivation of Science, in his spare time studying the physics of stringed instruments and Indian drums.

In 1917, Raman gave up his government job to become the Sir Taraknath Palit Professor of Physics at the Science College of University of Calcutta (1917 – 33). He made enormous contributions to research in the areas of vibration, sound, musical instruments, ultrasonics, diffractions, photeelectricity, colloidal particles, Xray diffraction, magnetron, dielectircs, etc. In particular, his work on the scattering of light during this period brought him worldwide recognition.

Sir C.V. Raman
(1888 – 1970)

In 1942 he was elected a Fellow of the Royal Society of London and a year later was honoured with the prestigious Hughes medal from the Royal Society. Four years later, at the joint meeting of the South Indian Science Association and the Science Club of Central College, Bangalore, he announced his discovery of what is now known as the Raman Effect.

He was knighted in 1929, and in 1930, became the first Asian scientist to be awarded the Nobel Prize for his discoveries relating to the scattering of light (the Raman Effect). In 1934, he became the Director of the newly established Indian Institute of Science at Bangalore, where he remained till his retirement. After retirement, he established the Raman Research Institute at Bangalore, where he served as the Director. The Government of India conferred upon him its highest award, the Bharat Ratna in 1954.

SCIENCE QUIZ CONTESTS

Haryana State Council for Science & Technology (Department of Science & Technology, Govt. of Haryana) in its efforts to popularise science in the state has been conducting various science popularisation programmes involving school children such as Children Science Congress, Science Essay Writing Competition, Science Workshops, Haryana Talent Search Examination, Scholarship to the students who pursue their studies in basic Science, Fellowship to Research Students, Science Quiz Contests etc. The aim of organisiang quiz contests in the state are, to impart science education to the students through fun and entertainment, to create a deep urgs for curosity, to inculcate the spirit of asking logical questions and their prompt reply. The science quiz contest is organised at three levels i.e. district level, zonal level and state level. There are two categories of the quiz i.e. category 'A' (Schools affilaited with CBSE/ICSE) and category 'B' (schools affilaited with Haryana School Education Board). The district level science quiz contest is organised by the District Education Officer of the concerned districts. The best 7 teams from each district take part in the zonal level science quiz contest which is organised by HSCST with the help of experts. The best four teams from each zone will take part in the state level quiz contest. During November and December, the Zonal level quizzes for all the four zones of Haryana were organized. The details of the winning teams are given below:-

For Hisar Division Organized at Govt. Sr. Sec. School, Hisar on 23.11.2010 & 24.11.2010

Name of the school		Position	Prize
CATEGORY 'A'	CATEGORY 'B'		
St. Xaviers Sr. Sec. School, Sirsa	Govt. Girls Sr. Sec. School, Fatehabad	Ist	5000
Halwasiya Vidya Vihar Sr. Sec. School, Bhiwani	Vaish Sr. Sec. School, Charkhi Dadri, Bhiwani	IInd	4000
Vaish Model Sr. Sec. School, Bhiwani	Sharda Sr. Secondary School, Fatehabad	IIIrd	3000
O.P.Jindal Model School, Hisar	Govt. Sr. Sec. School, Satrod Khurd, Hisar	Consolation	2000

For Ambala Division Organized at DAV Sr. Sec. School, Yamuna Nagar on 30.11.2010 & 01.12.2010

Name of the school		Position	Prize
CATEGORY 'A'	CATEGORY 'B'		
Aggarsain Sr. Sec. School, Kurukshetra	S.M.B. Gita Sr. Sec. School, Kurukshetra	Ist	5000
Maharana Pratap Public School, Kurukshetra	Govt. Model Skt. Sr. Sec. School, Barara Ambala	IInd	4000
P.K.R. Jain Public School, Ambala City	S.D. Sr. Sec. School, Jagadhari (Yamuna Nagar)	IIIrd	3000
DAV Sr. Sec. Public School (River Side), Ambala Cantt.	Adarsh Niketan Sr. Sec. School, Cheeka, Kaithal	Consolation	2000

For Rohtak Division Organized at John Weslay Sr. Sec. School, Rohtak on 16.12.2010 & 17.12.2010

Name of the school		Position	Prize
CATEGORY 'A'	CATEGORY 'B'		
Dyal Singh Public School (colony school), Karnal	S.M. Hindu Sr. Sec. School, Sonepat	Ist	5000
MASD Public School, Panipat	B.M.D. Sr. Sec. School, Majra Dubaldhan (Jhajjar)	IInd	4000
Dyal Singh Public. School, Sector-7, Karnal	Saini Sr. Secondary School, Rohtak	IIIrd	3000
S.R.Centuary Public School, Bahadurgarh	Mother India Sr. Sec. School, Maraut, Jhajjar	Consolation	2000

For Gurgaon Division Organized at Lady Fatima Sr. Sec. School, Gurgaon on 21.12.2010 & 22.12.2010

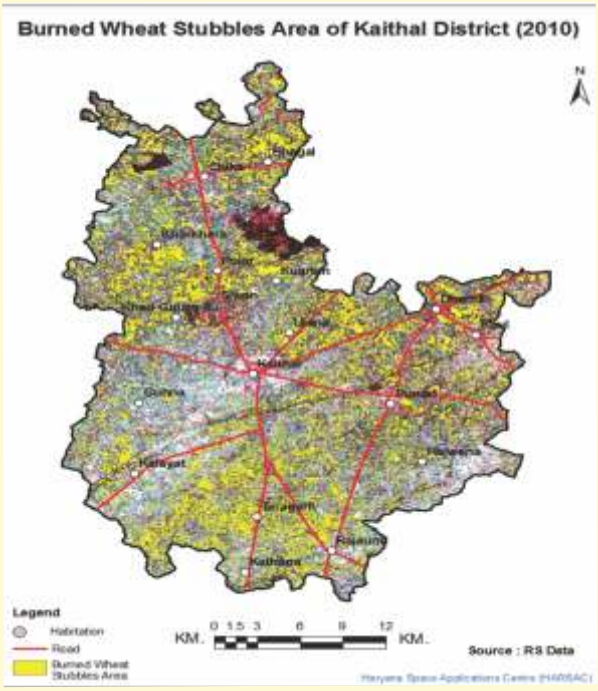
Name of the school		Position	Prize
CATEGORY 'A'	CATEGORY 'B'		
Blue Bells Model Sr. Sec. School, Gurgaon	Govt. Model Sr. Sec. School, Bodia Kamalpur (Rewari)	Ist	5000
Modern Vidya Niketan, Sector-17, Faridabad	Jain Girls Sr. Sec. School, Rewari	IInd	4000
Delhi Public School, Jaunawas (Rewari) Gurgaon	DAV Sr. Secondary School, Khandsa Road,	IIIrd	3000
CCA School, Sector-4, Gurgaon	Govt.Sr.Sec. School, Mewla Maharaj Pur (Faridabad)	Consolation	2000

HARSAC PROJECTS

HARSAC to estimate burning area of Wheat/Rice Stubbles in Haryana

HARSAC has estimated the area of burning of crop residues in various districts (Kaithal, Karnal, Kurukshetra) of the state using Multi-date IRS-P6 LISS-3 and AWiFS satellite data. Burning of crop residue is being discouraged as it not only creates environmental pollution but also kills helpful soil microbes and degrades biomass and organic matter. The wheat burnt stubbles spatial distribution for the districts is shown in the table and the status in Kaithal district is depicted in the map. Highest area i.e. 26.83 per cent of the total wheat sown area was recorded for Kaithal district.

Sr. No.	District	Burned Wheat Stubbles Area (000' hectares)		
		Burned Area	Wheat Area	% of Wheat
01	Kaithal	46.15	172	26.83
02	Kurukshetra	16.85	116	14.53
03	Karnal	37.05	171	21.67
	Total (3 Dist.)	100.05	459	21.80



DEM of Hansi-Bhuttan Canal

On the request of Irrigation Department, Haryana, Digital Elevation Models (DEM) for Hansi Butana Multipurpose Canal Link Channel (HBMCLC) area has been prepared by HARSAC by digitizing the 1' contour data available with them. This acted as a supporting document with reference to a case in the Hon'ble Supreme Court of India for Interstate & Liaison Division, New Delhi. This provided strength to the argument put forward by Haryana that construction of Hansi-Butana Canal does not create flooding in Punjab area.

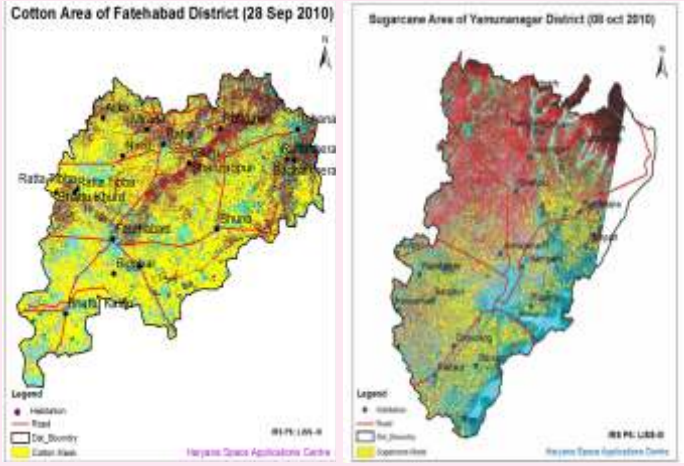
Crop Area and Production Forecasting

HARSAC estimated area and forecasted production of Cotton, Sugarcane and Mustard crops for 2010-11 under the "Forecasting Agriculture output using Space, Agro-meteorology & Land Based Observations (FASAL)" project being sponsored by Ministry of Agriculture, GOI.

Cotton: This year the state level cotton acreage increases by 0.73% and production decreased by 3.81% as compared to last year.

Sugarcane: State level acreage estimates shows marginal decrease by 1.21% and production increased by 4.49% compared to previous year.

Mustard: State level acreage increased by 3.51% compared to previous year.



SCIENCE WORKSHOP AT KARNAL

In order to communicate development in the field of Science & Technology to public and particularly students, lectures on emergiang field of Science & Technology are organized in different districts of the State. The first State science workshop was organized at Dyal Singh College Auditorium, Karnal on 11th November, 2010. Sh. Piyush Pandey, Director, Nehru Planetarium, Mumbai gave the talk 'How the stars take birth and diminished'. He explained the details for the formation and diminishing stars and other celestial astronomical activities to the participants. In the above workshop, about 750 students and 50 teachers from different districts of State participated. After the lecture, question answer session was held. The participants showed good response and asked many questions relating to astronomy.

DR. ANUP KUMAR HONOURED WITH SCIENTIST OF THE YEAR AWARD

Dr. Anup Kumar, Assistant Scientist (Geology/Geophysics), HARSAC has been awarded "Scientist of the Year Award" by National Environmental Science Academy, New Delhi during the conference held at Jamia Hamdard University, New Delhi from 27-29,December, 2010.

TRAININGS / WORKSHOPS / CONFERENCES ATTENDED

- Dr. Deepak Gupta, Chief Scientific Engineer from HSCST and Sh. Vishal Gulia, Scientific Engineer (B) from DST attended the 11th International Conference on Public Communication of Science & Technology (11th PCST-2010) organized by the Department of Science & Technology, Govt. of India and various international scientific organizations at New Delhi from 6th – 10th December 2010.
- Sh. Rajvir Singh, Scientific Engineer (A) from DST attended the 2010 India Planetarium Conference – "Planetarium & the Outreach Activities" at Kovalam, Trivandrum during 18th – 21st November 2010 organized by Evans & Sutherland, a US based firm.
- Dr. Sandeep Arya, Assistant Scientist (Forestry) of HARSAC visited CSIRO Australia during November-December 2010 for one month training program as a part of the overall project titled 'Improved prediction of agroforestry productivity and reclamation opportunities in shallow watertable and salt-affected landscapes of India' funded by Australian Agency for International Development (AusAID).

CPB ORGANIZED "OPEN DAY"

The Centre for Plant Biotechnology, Hisar organized one day programme called "Open Day" on 18th November 2010 at the centre. The programme was inaugurated by Sh. Anurag Agarwal, IAS, Director Science & Technology, Haryana. On this occasion, the centre is kept open for viewing by the general masses comprising of school / college / university students, teachers, researchers, farmers and common people, so that they can learn about the tissue culture techniques & other activities being carried out at the centre. Wide publicity through letters and newspaper advertisement was given for the open day, so that maximum persons can gain knowledge about the centre and its activities.

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

Kindly send us your feedback to *vishalgulia@gmail.com*
Available online on *www.dstharyana.org*

Published by : Vishal Gulia, Scientific Engineer (B), 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