



IARI NEWS



Vol. 23, No. 3

July - September, 2007

Phytosiderophores for Remediation of Contaminated Soils

Heavy metal contamination of soil and water poses a major environmental and health risk. Grasses release different types of phytosiderophores, which bind with Fe. A study conducted at the Institute conclusively proves that phytosiderophores bind with heavy metals like Pb, Cd, Hg, Ni, etc., in addition to Fe, more so in a concentration dependent manner. Phytosiderophore (PS)-metal complexes either increase metal availability (Zn-PS and Ni-PS) to plants or decrease metal uptake by plants when the complexes have a high molecular weight or high stability (Cd-PS and Pb-PS). ¹⁴C-phytosiderophore measured the uptake and shoot transport of ¹⁴C-PS-metal complex and HPLC chromatograms, which showed the appearance of new metal-PS peaks at different retention times for Cd, Pb, Hg, Ni and Zn, and confirmed the significance of phytosiderophores in heavy metal phytoextraction and phytoremediation. Since the genes encoding the key enzymes in phytosiderophore biosynthesis, i.e., nicotianamine synthase (*nas*) and nicotianamine amino transferase (*naat*), have been characterized, the engineering of plants capable of overproducing phytosiderophores could be a viable strategy for heavy metal phytoextraction and phytoremediation of contaminated soils in future.

PCR Detection of Citrus Greening Bacterium and Citrus yellow mosaic virus in Citrus Tissues

PCR detection of Citrus greening bacterium (Ct) and *Citrus yellow mosaic virus* (CYMV) in citrus tissues was standardized by using a simplified template preparation protocol. Crude extract prepared without the use of liquid nitrogen in an alkaline solution

was spotted onto a nitrocellulose membrane (NCM)(BAS 85, pore size 0.45 µm, Schleicher & Schuell, Keene, NH) followed by elution in water by thermal treatment. Both the Ct and CYMV were detected through PCR when the eluted liquid from the spotted membrane was used. The eluted liquid was found comparable in detection efficacy to a multi-step laboratory method or a commercial kit for nucleic acid preparation. The protocol is simple, inexpensive, and rapid, and can be used in large-scale survey of citrus trees. Spotted membrane methodology can also be used for short-term sample storage for future testing or for long distance sample transport to a detection laboratory.

New Ash Gourd Variety Released

Pusa Ujwal, an improved variety of ash gourd from IARI, was released at the national level in a group



A recently released improved variety of ash gourd Pusa Ujwal

meeting of the All India Coordinated Research Project on Vegetable Crops, held at Chaudhary Charan Singh Haryana Agricultural University, Hisar from May 3 to 6, 2007. Its vine is medium (3-4 m) long, and its leaves are dark green, hairy and lobed with long petioles. Its flowering behaviour is monoecious. Male and female flowers are yellow and solitary; male flowers are borne with long pedicel but female flowers are borne almost sessile. The fruits are oblong ellipsoid

with greenish white rind and white flesh, and the average fruit weight is 7 kg. It is ideal for easy packaging and long distance transportation. The fruits have long storability (more than 6 months at room temperature). The average yield is 45 t/ha (32% higher than that of the best local check). The fruits contain high TSS, vitamin C and minerals, and are suitable for cooking as a vegetable and also for preparing *petha* candy.

Research Advisory Council Meeting

The meeting of Research Advisory Council (RAC) of the Institute was held under the chairmanship of Dr. H.K. Jain, former Director, IARI, from August 29 to 31, 2007. The meeting was held in two parts: the first at IARI, New Delhi on August 29, 2007, and the second at IARI Regional Station, Amartara Cottage, Shimla from August 30 to 31, 2007. The meeting was attended by Dr. Asis Datta, Director, National Centre for Plant Genome Research, New Delhi; Dr. G.L. Kaul, former Vice-Chancellor, Assam Agricultural University, Jorhat; Dr. S. Kannaiyan, Chairman, Biodiversity Authority; Dr. S.S. Magar, former Vice-Chancellor, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri District; Dr. A.G. Sawant, former Chairman, Agricultural Scientists Recruitment Board; Dr. S.N. Shukla, Assistant Director-General (Food and Forage Crops), ICAR; and Dr. S.A. Patil, Director; Dr. K.R. Koundal, Joint Director (Research) and Member-Secretary, RAC; other joint directors; project directors; heads of divisions and regional stations; unit in-charges; and the Principal Scientist (PPD) of IARI.

The meeting started with a welcome address by Dr. Patil followed by opening remarks by Dr. Jain. In his remarks, Dr. Jain gave an overview of



Dr. H.K. Jain, former Director, IARI, and Chairman, Research Advisory Council of IARI (second from left) speaking at the meeting of the RAC. Also seen in the picture are (from left): Dr. S.A. Patil, Director and Dr. K.R. Koundal, Joint Director (Research) of IARI, and Dr. Asis Datta, Director, National Centre for Plant Genome Research, New Delhi

agriculture, crop diversification, population pressure on agriculture for food, changing scenario of agriculture with regard to climate change and the role of RAC. Dr. Koundal while welcoming the Chairman and Members gave an overview of the monitoring of research activities at the Institute and presented the action taken report on the last RAC meeting. Dr. A.S. Sidhu, Head, Division of Vegetable Science; Dr. R.K. Jain, Head, Division of Plant Pathology; Dr. I.P.S. Ahlawat, Head, Division of Agronomy; Dr. P.S. Datta, Project Director, Nuclear Research Laboratory; and Dr. K. Vijayaraghavan, Professor of Agricultural Extension of IARI, presented the annual progress of the schools of Crop Improvement, Plant Protection, Resource Management, Basic Sciences, and Social Sciences, respectively. Dr. Koundal also made a consolidated presentation of the Institute mega projects. Mr. G.R. Deshbandhu, Chief Administrative Officer and Mr. B.K. Bansal, Finance & Accounts Officer of IARI apprised the RAC of the administrative and financial issues, respectively. The RAC made several important recommendations. At the end, Dr. A.K. Ganguly, Principal Scientist (PPD) proposed a vote of thanks.

The second part of the meeting held from August 30 to 31, 2007 at IARI Regional Station, Amartara Cottage, Shimla, was attended by Dr. Kannaiyan and Dr. Magar. They appreciated the work of the Station and made some observations for improvement of the research activities.

QRT Visits IARI Regional Station, Karnal

The Quinquennial Review Team (QRT) of IARI appointed by the Indian Council of Agricultural Research (ICAR), under the chairmanship of Dr. Asis Datta visited IARI Regional Station, Karnal on August 5, 2007. The team comprising Dr. Asis Datta, Dr. N.N. Goswami and Dr. S.N. Puri, were accompanied by Dr. A.K. Singh, Project Director, Water Technology Centre and Dr. K.R. Koundal, Joint Director (Research) of IARI. The team also visited different seed production fields of the Station, and farmers' fields where seed production programme undertaken by the Station is in progress. Dr. S.N. Sinha, Head, IARI Regional Station, Karnal gave a comprehensive presentation of the activities of the Station covering seed production, processing, distribution and associated multi-disciplinary research.

Hindi Chetna Maas and Hindi Varshikotsav

The Institute organized the *Hindi Chetna Maas* from August 17 to September 18, 2007. During this period, various Hindi competitions



Dr. Namwar Singh, renowned Hindi literary critic (chief guest), inaugurating the annual Hindi prize distribution function at IARI auditorium. Also seen in the picture is Dr. S.A. Patil, Director, IARI

like poetry recitation, essay writing, noting and drafting, debate and quiz, were organized for all the categories of staff. A "Shield competition" for doing maximum work in Hindi during the year was also organized among various divisions as well as sections of the Director's Office. The Water Technology Centre and Personnel-II Section of the Directorate were awarded shields for the year 2006-2007. A large number of scientific, technical and administrative staff took part in the competition.

All the successful participants were awarded prizes at the annual Hindi prize distribution function (*Varshikotsav*) held on September 20, 2007. Dr. Namwar Singh, renowned Hindi literary critic was the chief guest. Dr. S.A. Patil, Director, IARI presided over the function. Dr. K.R. Koundal, Joint Director (Research) and Chairman of Official Language Implementation Committee of the Institute also graced the function. A comedy '*Kuchh Tum Kabo Kuchh Ham Kaben*' was staged by the famous theatre group, Nat Samrat. The chief guest expressed his pleasure at the progress being made by the Institute in the use of *Rajbhasha* (Hindi). The programme ended with a resolution to make all efforts to increase the use of Hindi in administration as well as in agricultural research.

Field Days/Kisan Goshtbis

- The Centre for Agricultural Technology Assessment and Transfer (CATAT) organized a *kharif* crop field day at Kannoja village, Ghaziabad district, Uttar Pradesh on August 27, 2007. A *kisan goshtbi* was also organized on this occasion. More than 100 farmers participated. The relevant queries of the farmers were answered by the subject matter specialists in the *kisan goshtbi*.

The CATAT also organized field days sponsored by NFL on the use of bio-fertilizers at various villages: on August 16, 2007 at Dhaka Mandi village, Jhunjhunu district, Rajasthan; on September 8, 2007 at Jharoda village, Jhunjhunu district; and on September 20, 2007 at Sandhal Kala and Sandhal Khurd villages, Sonapat district, Haryana. Another field day cum *kisan goshtbi* on *kharif* crops was organized by CATAT at Nekpur village, Bulandshahr district, Uttar Pradesh on September 10, 2007. More than 200 farmers participated and their problems regarding production technology of various *kharif* crops were addressed by the scientists of the Institute.

- The Division of Soil Science and Agricultural Chemistry organized a field day on September 12, 2007 in Lohtaki village, Gurgaon district, Haryana, where 14 on-farm trials are being conducted in farmers' fields

under the on-going IARI-IPNI Collaborative Project. A large number of farmers participated in the field day.

- A field day was organized in a farmer's field in Brass village, Karnal district, Haryana, by the Institute's regional station at Karnal on September 12, 2007. This field day was a part of the farmers' participatory seed production programme undertaken under the aegis of ICAR Mega Seed Project "Seed Production of Agricultural Crops and Fisheries". A large number of local farmers participated in the event and appreciated the excellent rice crops (vars. Pusa 1121 and Pusa 44) raised by Shri Gurcharan Singh in his field.

Trainings

- The Unit for Simulation and Informatics (USI) organized an internet training programme for nodal officers of various divisions of IARI on July 3, 2007. Twelve officers attended the programme.
- The Division of Plant Pathology organized a training on "Biological Control of Plant Pathogens" from August 1 to 21, 2007. Twenty-one candidates from 13 states of India attended the training course.
- The CATAT organized two one-day trainings on "Importance of Bio-fertilizers in Crop Production" sponsored by NFL the first in Ureeka village, Jhunjhunu district, on July 5, 2007, and the second in Sandhal Kala village, Sonapat district, on July 10, 2007.

The CATAT also organized various training programmes for agricultural officials of Delhi Government and progressive farmers. These were: Importance of Biotechnology in Agriculture (August 3, 2007); Pre-seasonal *Kharif* Crops (August 9-10, 2007); Water Harvesting and Water Conservation (August 17, 2007); Integrated Pest Management in Vegetable Crops (August 24, 2007); and Dryland Farming (August 31, 2007).

- The Division of Soil Science and Agricultural Chemistry organized the fourth advanced level training on "Soil Testing, Plant Analysis and Water Quality Assessment" from September 6 to 26, 2007. Fifteen

participants representing seven states (Madhya Pradesh, Uttarakhand, Rajasthan, Karnataka, Kerala, Uttar Pradesh and Maharashtra) attended the training.

- The Division of Plant Pathology organized the thirty-fifth annual mushroom cultivation training programme from September 17 to 22, 2007, which was attended by 33 trainees.
- The IARI Regional Station, Karnal organized a training programme entitled "Farmer Training on Rice Hybrid Seed Production Technology (PRH 10)" from September 21 to 22, 2007, which was attended by 25 participants from Uttar Pradesh, Punjab, Delhi and Haryana.

New Projects Sanctioned

- "Analysis of Fruit Characteristics, Expression Profile of Ripening Genes and Limited Open Field Trials of Tomato Transgenic Over-expressing Polyamine Biosynthesis Genes" funded by the Department of Biotechnology. Amount: Rs. 10.13 Lakhs. Principal Investigator: Dr. R.K. Pal, Division of Post Harvest Technology.
- "National Programme on Isotope Fingerprinting of Waters of India-I-WIN" funded by the Department of Science and Technology. Amount: Rs. 4.80 lakhs. Principal Investigator: Dr. P.S. Datta, Nuclear Research Laboratory.
- "Antagonistic Potential of *Bacillus licheniformis* MTCC 7445 for the Control of Damping-off, Fusarium Wilt and Dry Root Rot of Chickpea" funded by the Department of Biotechnology. Amount: Rs. 14.78 lakhs. Principal Investigator: Dr. Prem Dureja, Head, Division of Agricultural Chemicals.
- "Analysis of Host-Pathogen Interaction in Leaf Rust Infection of Wheat: A Transcriptomic Approach" funded by the Department of Biotechnology. Amount: Rs. 13.71 lakhs. Principal Investigator: Dr. K.V. Prabhu, Head, Division of Genetics.
- "Visioning Policy Analysis and Gender (V-PAGE)" funded by the National Agricultural Innovation Project (NAIP). Amount: Rs. 15.35 lakhs. Convener: Dr. Prem Lata Singh, Senior Scientist, Division of Agricultural Extension.

- "Ecofriendly Weed Management in Conservation Agriculture: Development of Novel Bioherbicide Based on *Sesbania* sp." funded by the Indian Council of Agricultural Research (ICAR). Amount: Rs. 19.43 lakhs. Principal Investigator: Dr. Anupama, Scientist (Senior Scale), Division of Agricultural Chemicals.
- "Design and Development of a Heat Pump Dryer for Fruits, Vegetables and Flowers" funded by the Indian Council of Agricultural Research (ICAR). Amount: Rs. 30.48 lakhs. Principal Investigator: Dr. Abhijit Kar, Scientist (Senior Scale), Division of Post Harvest Technology.

MoUs Signed

- An MoU was signed between the Indian Agricultural Research Institute (IARI) and selected farmers of Karnal for seed production of three rice varieties (Pusa 44, Pusa Basmati 1 and Pusa 1121) and one hybrid rice (PRH 10).



A farmer signing a memorandum of understanding with the Institute under the seed production programme at the Institute's regional station at Karnal in the presence of Dr. K.R. Koundal, Joint Director (Research), IARI, and Dr. S.N. Sinha, Head, IARI Regional Station, Karnal (extreme right)

- An MoU was signed between IARI and M/s Fresh and Healthy Enterprises Ltd. (a subsidiary of CONCOR, which is a wholly owned PSU under the Ministry of Railways, Government of India), New Delhi on providing advisory consultancy on "Controlled Atmosphere Storage of Fruits".
- Two MoUs were signed between IARI and M/s Krishidhan Seeds Ltd., Jalna on: (i) Licensing of gene construct with *CryIFa1* gene and transgenic brinjal seed material, and (ii) Licensing of *CryIAabc* gene.
- An MoU was signed between IARI and M/s Ankur Seeds Pvt. Ltd., Nagpur on licensing of gene construct with *CryIFal* gene.

Dr. P.K. Aggarwal Appointed ICAR National Professor



Dr. P.K. Aggarwal

Dr. Pramod Kumar Aggarwal joined as ICAR National Professor on August 27, 2007 at the Indian Agricultural Research Institute.

Dr. Aggarwal was earlier working as the Head of the Division of Environmental Sciences at the Institute (since 2002).

Dr. Aggarwal is also the National Coordinator of the ICAR Network on Climate Change and Indian Agriculture. He is the Coordinating Lead Author for agriculture for the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), United Nations, which was recently awarded the Nobel Peace Prize. Dr. Aggarwal is a member of the Editorial Boards of the journals, Agricultural Systems, and Outlook on Agriculture. He is a Fellow of the National Academy of Sciences, India,

and National Academy of Agricultural Sciences, India. He obtained his first Ph.D. degree from the University of Indore, India, and the second from Wageningen University, Netherlands. In his 31 years of research career, he has published more than 120 papers. His major research interests are in the areas of impacts and adaptation to global environmental change, greenhouse gases, modeling agricultural systems, yield forecasting, biofuels, and impact assessment of development on agriculture.

IARI Scientist Bags Rafi Ahmed Kidwai Award of ICAR



Dr. T.B.S. Rajput

Dr. T.B.S. Rajput, Principal Scientist, Water Technology Centre (WTC) of IARI bagged the Rafi Ahmed Kidwai Award of the ICAR for the biennium 2005-2006 in the area of natural resource

management. This award carrying a medal, a certificate, a citation and a cash prize of Rs. 3 lakhs was given to Dr. Rajput in recognition of his outstanding contributions in both hardware and software aspects of irrigation water management. His major contributions include development of canal operation policies, canal water distribution policies for achieving different levels of equity, development of procedures for optimal layout of fields of water

courses and development of flow meters and irrishceduler. In the field of drip irrigation, his contribution includes development of design criteria for drip, fertigation, hydraulics and dynamics of nutrient movement under different types of drip systems. Dr. Rajput has also conducted a large number of training programmes for state government officials and farmers for popularizing water saving technologies, including those developed by him.

Patent Filed

- Improvement in Pesticidal Neem Preparations with Oxime Esters

Awards

- Dr. T.B.S. Rajput, Principal Scientist, Water Technology Centre received the Rafi Ahmed Kidwai Award of ICAR for the biennium 2005-2006 in the area of natural resource management.
- Dr. S.K. Singh, Senior Scientist, and Dr. V.B. Patel, Scientist of the Division of Fruits and Horticultural Technology received the Hari Om Ashram Trust Award of ICAR for the biennium 2005-2006.
- Dr. Abhijit Kar, Scientist (Senior Scale), Division of Post Harvest Technology, received the Lal Bahadur Shastri Young Scientist Award of ICAR for the biennium 2005-2006 for his contribution to the field of process and food engineering.

Visitors from Abroad

During the period, July-September, 2007, six delegations – one each from Madagascar, Bhutan, Swaziland, Nepal, Uzbekistan, and Ethiopia-visited the Institute. Others who visited the Institute include: Dr. Jose Maria Sumpsi Vinas, Assistant Director General, Agriculture and Consumer Protection Department, FAO, Rome, Italy; Mr. M. Mbongwa, Director General, Department of Agriculture, South Africa; Her Excellency F.B. Marshoff, Premier, Free State Province of South Africa; Dr. Bob Stewart, Director of Dryland Agriculture, West Texas A&M University, United States of America; and His Excellency Kayumbo Nyamwasa, Ambassador, and Mr. Eric Rubayita, First Secretary, Embassy of the Republic of Rwanda, New Delhi.



Dr. S.A. Patil, Director, IARI, presenting a set of the Institute's publications and a CD containing information on the growth and development of the Institute to the leader of Bhutan delegation, Mr. Sherub Gyaltsen, Director-General, Druk Seed Corporation, Bhutan



Dr. S.A. Patil, Director, IARI, welcoming the leader of Madagascar delegation, His Excellency Marius Rotolojanahary, Minister of Agriculture, Breeding and Fishing, Government of Madagascar

Published quarterly by the Publication Unit on behalf of the Director, Indian Agricultural Research Institute (Indian Council of Agricultural Research), New Delhi - 110012; and printed at Royal Offset Printers, A-89/1, Naraina Industrial Area, Phase-I, New Delhi-110028. Website : www.iari.res.in Joint Director (Research) & Incharge (Publication Unit) : Dr. K.R. Koundal; Editor : C. Thomas