



NEWSLETTER

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About the Newsletter

The Directorate of Medicinal and Aromatic Plants Research (DMAPR) is one of the institutes of the Indian Council of Agricultural Research (ICAR). DMAPR's mission is to conduct research on all aspects of improvement, production and utilization of medicinal and aromatic crops. It also supports and is engaged in activities of multilocational testing of technologies through its outreach organ, All India Co-ordinated Research Project on Medicinal & Aromatic Plants and Betelvine (AICRPMAP&B).

AICRPMAP&B works in partnership with State Agricultural Universities and other organisations, undertakes research, multilocation testing of technologies and training; provides scientific information and technical advice to a host of clients such as farmers, industries, etc.

This newsletter is published half yearly to promote overall concern on medicinal and aromatic plants with emphasis on their conservation and production technology. It provides information, mainly generated in DMAPR and AICRPMAP&B.

XXth Group Meeting of the All India Coordinated Research Project on Medicinal & Aromatic Plants and Betelvine held at CCSHAU, Hisar



The 20th Group Meeting of the All India Coordinated Research Project on Medicinal & Aromatic Plants and Betelvine (AICRPMAP&B) was organized at Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar during October 3-6, 2012. Dr. K. S. Khokhar, Vice Chancellor, CCSHAU, Hisar, presided over the inaugural function and Dr. Umesh Chandra Srivastava, Assistant Director General (Hort.-II) attended the function as ICAR representative. Other dignitaries present included Dr. Satyabrata Maiti, Director, Directorate of

Medicinal and Aromatic Plants Research and Project Coordinator, AICRPMAP&B; Dr. Ramesh Kumar, Director, Directorate of Floriculture Research, New Delhi; Dr. Ram Singh, Dean, College of Agriculture, CCSHAU; Dr. H. P. Yadav, Professor & Head, Department of Genetics and Plant Breeding, CCSHAU and Dr. I. S. Yadav, Head, Department of Medicinal, Aromatic and Underutilized Plants, CCSHAU. The inaugural session started with welcome address by Dr. S. S. Dhamija, Assistant Director of Research, CCSHAU, Hisar .

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EDITORIAL

Dilemma in crop improvement of medicinal plants

As a part of agriculture, man started domesticating plants to meet his requirements of food, fuel, clothing and shelter. This is the time when human started to learn how to influence the process of natural evolution so as to breed plant.

Slowly and gradually, this process of expedited evolution, through selection and cultivation of plants, acquired the form of a routine attempt—what we today call 'plant breeding'. In this, heredity, which refers to the passage of various characteristic features from the parent to the progeny, plays an important role. The effects of heredity had been apparent to early man and he had taken advantage of them ever since the advent of agriculture. Agriculture recognised the need for good seed as the first input to grow healthy crop and to get a hefty return. Therefore seed of improved cultivars are of constant demand for increasing yield as well as quality in terms of nutrition, active principles, pest resistance, etc. Improved cultivars are the product of plant breeding efforts. Plant Breeding started as an art of selection by the farmers from the ancient agricultural days which has become a science in modern days with multimillion investment in both public and private sector. However, art of selection has not been vanished from the scene rather it has become an integral part of the science and moving hand in hand.

Farmers also have not lost their importance rather they have become integral part of the process by their participatory involvement in plant breeding. They have the mastery in art of selection which can not be replaced by scientific gadgets. Farmers participation in plant breeding therefore has rightly been recognized by the Protection of Plant Varieties and Farmers' Right Authority (PPVFA) by making provision for registration of Farmers' variety. Today a large number of farmers' variety has been registered by the authority to reward the farming community.

This process has been yielding good results in all cereals, pulses, oilseeds, fruits and vegetables but did not find acceptance in totality for improvement of medicinal plants. The obvious reason for low acceptance is due to lack of understanding of mode of action

of majority of medicinal plants that are used in Ayurvedic preparations. In most of the cases, there is not a single bio-active molecule rather they are mixture of various groups of chemicals such as flavonoids, alkaloids, glycosides, terpenoids, phenols, etc which synergistically produce the curative result and their proportion is also important. Plant breeding for quality improvement in terms of increasing the percentage of these chemicals are possible only when the medicinal plants are used for extraction of specific chemicals such as sennoside from Senna; morphine from opium poppy; quinine from Cinchona; artemisinin from Artemisia. But when breeding of those medicinal plants used in Ayurveda, Siddha, tribal and folk medicines are concerned, it becomes difficult to set the breeding objectives. Problem of setting the breeding objectives in terms of increasing the quality of a particular constituent will not be accepted because it will upset the dosages prescribed and also efficacy will be altered. Therefore, each new variety of particular species has to be supported by further standardization of either dosage or quantity of the species in a codified Ayurvedic drug, which will jeopardise the entire Ayurvedic, Siddha and Unani medicines preparation.

At present the scope of plant breeding efforts in these group of plants would be limited to disease and insect pest resistance and yield improvement without compromising the initial quality in terms of chemical constituents. This is also a grey area to the researchers since there is no base value in terms of bio-active molecules available in various species of plants those have been considered as quality material in Ayurvedic preparations. So far Ayurvedic industry demands are concerned only right species with clean material are considered as quality standard. We therefore, are in cross road and need to put our lot of efforts to identify species-wise quality parameters before taking up any breeding programme in medicinal plants used for Ayurvedic medicines.

I wish that my scientist friends should ponder upon this dilemma and find the way out.
Jai Hind!

Satyabrata Maiti

...Continued from page 1

Dr. Maiti, presented salient achievements by the coordinating centres and mentioned categorically that AICRPMAP&B centres are located in every state except Jammu and Kashmir and in some of the North Eastern states. He mentioned that thirty five species of medicinal and aromatic plants (MAP) are under investigation in AICRPMAP&B. In context of the agro production technology, he highlighted that market is for the quality products. Mentioning the need for maintenance breeding in MAP, he opined that since seed chain in MAP has not been developed, this activity needs due consideration. Regarding Betelvine research, he mentioned that research on disease and pest resistance is very pertinent.

Dr. Umesh Chandra Srivastava described the growth of AICRPMAP&B and its centres since inception of the project during the Fourth Five Year Plan. He highlighted that India's per capita consumption cost of medicine is lowest in the world and about eighty percent population of the developing countries rely on MAP for primary health care. Sometimes, MAPs are the only means of disease cure among these populations. He also highlighted that approximately twenty five percent medicines of the modern pharmacopeia have originated from MAP. Further, he informed that essential oil blends are widely being used in food,

medicine, cosmetics and toiletries items. Regarding cultivation, he mentioned that about eighty five percent MAP are collected from the forests, therefore, domestication of MAP is very important and protocols for tissue culture of the indigenous plants need to be developed and transferred.

Dr. K. S. Khokhar, Vice Chancellor, CCSHAU, Hisar, in his presidential address remarked that medicinal plants are associated with every individual from birth to death either in one form or the other. In context of the importance of the medicinal and aromatic crops, he suggested that these crops could fit in the diversification process of many important crops. However, these crops get least priority at state level as well as at national level. Further, he mentioned that this type of co-ordinated research programme with more broad based research planning targeted for utilization of genetic biodiversity, improved varieties, production and protection technology and quality assessment is required.

The group meeting was divided into five technical sessions such as Action taken report, Crop Improvement, Crop Production, Crop Protection and Phytochemistry. Data of experimental trial conducted at the various coordinating centres during the year 2011-12 were presented. After thorough discussions of the results, the technical programme of the experiments

to be conducted during the year 2012-2013 was formulated.

The plenary session was chaired by Dr. N. K. Krishna Kumar, Deputy Director General (Horticulture), ICAR, New Delhi and co-chaired by Dr. J. S. Dhankar, Director of Research, CCSHAU, Hisar. Dr. Krishna Kumar, in his introductory speech mentioned that India has a rich base of traditional and herbal medicines and herbal and traditional medicines are becoming the order of the day. He informed the house that many of modern medicines are also manufactured from the plants and targeted medicines are produced developing the secondary metabolites using genomics. He mentioned the need for collection and cryopreservation of pollens of horticultural crops including MAP as *ex-situ* conservation measure. He suggested that for the collection of diverse wild species in order to develop varieties, mathematical mapping would be very useful.

Dr. Dhankar, suggested that KVK scientists should also be involved in testing of technologies developed for the medicinal and aromatic plants.

Finally, recommendations of each session and technical programme were presented in the plenary session. The programme ended with vote of thanks proposed by Dr. Satyabrata Maiti to ICAR, the host university, participating centres and delegates.

Breakthrough and Research Highlights

Psyllid pest of Dodi: a real cause of concern

Cork swallow wort *Leptadenia reticulata* (Retz) Wight and Aruott (family: *Asclepiadaceae*) popularly known as Dodi or Jivanthi is a branched twinning

high value medicinal shrub. It grows in the sub Himalayan tracts of Punjab, Uttar Pradesh and throughout the Deccan Peninsula up to an altitude of 900 m. It is specifically known for its stimulant and restorative

properties in *Ayurveda* and also an important constituent of many *Ayurvedic* formulations. During routine survey for incidence of pests on medicinal and aromatic plants at DMAPR, severe infestation of Psyllid bug was



Damage in Dodi (*Leptadenia reticulata*) and adult of pest psyllid (*Diaphorina dakariensis*)

observed on dodi throughout the year. Adult psyllids were 3 to 4 mm in length with transparent and perfectly demarcated black veined wings held roof-like over

the body. Adult Psyllids were commonly found aggregated on new flushes where they feed and mate. The adult laid yellow colour transparent eggs on the

unfolded leaves, leaf margins and leaf buds. Nymphs were yellow with red eyes and visible wing pads in later instars and they secrete waxy filaments. The feeding of the Psyllid adults and nymphs cause curling of leaves and the nymphs were seen inside the leaves. In severe cases of infestation, the terminal growing parts get crinkled, fail to develop and get aborted. In later stages, the whole plant get dried. The psyllid was identified as *Diaphorina dakariensis* Boselli (Courtsey Dr. V.V. Ramamurthy, Insect Identification Division, Division of Entomology, IARI, New Delhi).

New mutants of Isabgol identified



DPO 9- an extended bract mutant

DPO 296-4 : a golden yellow leaf mutant

DPO 296-4 with parent (GI-2)

Isabgol (*Plantago ovata* Forsk.) is an important medicinal plant mainly used as laxative worldwide. Mutation breeding was initiated in Isabgol variety GI-2 using chemical mutagens like DES, EMS and Colchicine for induction of variability at DMAPR. In M_6 generation, among the various

stable mutants, two distinctly new mutants *viz.* golden yellow colour leaf (DPO 296-4) and extended bract mutant (DPO 9) were identified. DPO 9 was obtained from DES (0.3%) treatment while DPO 296-4 was obtained from DES (0.1%) treatment. Both the mutants have stabilized and

are true to the type. In Isabgol, distinct morphological markers are less and hence, these two mutants may be useful as makers in the varietal identification while developing high yielding varieties of Isabgol.

Chandrasur-an emerging medicinal crop



Chandrasur (*Lepidium sativum* L.) belongs to family *Cruciferae*, is an emerging medicinal crop of India. It is

commonly known as garden cress or water cress and is mainly cultivated in Madhya Pradesh, Uttar Pradesh, Rajasthan, Gujarat,

Maharashtra and Haryana. Seeds are used as galactogogue to promote growth in children also in treatment of asthma and piles. Roots are used in secondary syphilis and tenesmus. At CCSHAU, Hisar, germplasm lines were evaluated for variability in leaf shape, size and length. Selection-10 had round leaf and tall where as Selection- 12-1 had long leaf and Selection-HLS-5 had serrated leaf with compact plant habit.

From the Directorate

Trainers' training programme on "Good Agricultural and Collection Practices (GACP) for Medicinal and Aromatic Plants" organised



A five day trainers' training programme on "Good Agricultural and Collection Practices for Medicinal and Aromatic Plants" sponsored by National Medicinal Plant Board (NMPB), New Delhi was organized

during September 25-29, 2012 at the directorate. The themes of this training programme were capacity building and dissemination of the key principles of GACP for medicinal and aromatic plants. Nineteen participants

from NMPB, SAUs, DBT institute and nongovernmental organization attended the training programme. Different aspects such as identification, collection, cultivation, pest and diseases management, post harvest management and value addition were covered in the training programme. The participants were also educated through a visual display of CD on GACP of MAP compiled by NMPB and DMAPR. Other relevant aspects on protection of plant varieties, breeders and farmers' right, DUS testing, quality control, certification, marketing and supply chain and biodiversity management were also covered. In the valedictory function, Dr. Satyabrata Maiti, Director, DMAPR appreciated the participants for their keen interest on the subject and their involvement during the entire training programme.

DMAPR scientist got ICAR award for outstanding post graduate doctoral thesis in agricultural and allied sciences



Dr. R. Nagaraja Reddy, scientist (Plant Breeding), got the prestigious Jawaharlal Nehru award for outstanding post graduate doctoral thesis on "Identification of genomic regions responsible for stay green and other agronomically important

traits in Sorghum" in agricultural and allied sciences for 2011. Dr. Reddy was awarded the degree by Osmania University, Hyderabad, in 2010. The Jawaharlal Nehru award includes a medal, a citation and Rs. 50000 in cash.

Institute management committee (IMC) meeting held

24th and 25th IMC meetings were held on July 07 and September 15, 2012, respectively under the chairmanship of Dr. Satyabrata Maiti, Director, DMAPR. Various developmental issues and activities were discussed in the meeting. In the 25th meeting salient recommendations of the QRT were presented by the QRT chairman which were discussed.

QRT meeting held

QRT team under the chairmanship of Padamashree Prof. P. Pushpangadan with members including Dr. C. K. Katiyar, Dr. Bhag Mal, Dr. S. Edison, Prof. S.R. Yadav and Dr. S.K. Pareek visited DMAPR during September 14-15, 2012 and prepared a draft recommendations which were presented in the 25th IMC meeting held on September 15, 2012.

हिन्दी दिवस का आयोजन



औषधीय एवं सगंधीय पादप अनुसंधान निदेशालय में राजभाषा कार्यान्वयन समिति के तत्वाधान में १४ से २१ सितम्बर, २०१२ तक हिन्दी सप्ताह हर्षोल्लास से मनाया गया, जिसके अन्तर्गत हिन्दी के प्रयोग को बाढ़ावा देने हेतु अनेक रूचिकर कार्यक्रमों का आयोजन किया गया। संस्थान के सभी कर्मचारियों ने इन प्रतियोगिताओं में बढ़-चढ़ कर माग लिया। २१ सितम्बर को समापन समारोह

का आयोजन किया गया। समारोह के मुख्य अतिथि श्रीमान अशोक कुमार श्रीवास्तव, उपमंडल अभियंता, भारत संचार निगम लिमिटेड, आणंद व श्री आनन्द प्रकाश राय, वरिष्ठ अध्यापक, हिन्दी, केन्द्रीय विद्यालय, वल्लभ विद्यानगर, आणंद, विशिष्ट अतिथि थे तथा समारोह की अध्यक्षता निदेशालय के निदेशक व राजभाषा कार्यान्वयन समिति के अध्यक्ष डॉ. सत्यब्रत माईति ने की।

Vigilance awareness week observed at DMAPR



Vigilance awareness week was observed at the directorate from October 29 - November 03, 2012. A workshop on "Transparency in Public Procurement" was organised on November 03, 2012. Shri Vinod Chakravarty, Deputy Commissioner (Income Tax), Anand, was Chief Guest and Dr. Satyabrata Maiti, Director, DMAPR presided over the valedictory function. Shri Chakravarty, in his

speech suggested the need for application of information technology (IT) tools in order to bring transparency in public offices. Dr. Maiti highlighted the usefulness of Right To Information (RTI) Act and its role in bringing transparency in public administration. At the end, Mr. K. Raghunadhan, Assistant Administrative officer, DMAPR proposed the vote of thanks.

List of distinguished visitors

- Dr. D. J. Patel, Ex. Principal, B A College of Agriculture, AAU, Anand on July 27, 2012
- Dr. Srinivasan, Director, NRC on Plant Biotechnology, New Delhi on September 1, 2012
- Padamashree Prof. P. Pushpangadan, DG, AIHBPD, Trivandrum on September 14, 2012
- Dr. C.K. Katiyar, Vice President & Head, Health Care Research, Dabur India Ltd., New Delhi on September 14, 2012
- Dr. Bhag Mal, Former Coordinator, Bio-Diversity International, New Delhi on September 14, 2012
- Dr. S. Edison, Former Director, CTCRI, Trivandrum on September 14, 2012
- Prof S.R. Yadav, Deptt. of Botany, Shivaji University Kohlapur on September 14, 2012
- Dr. S.K. Pareek, Retd. Principal Scientist, NBPGR, New Delhi on September 14, 2012
- Dr. Shyam Singh, Ex. Director, NRC on Citrus, Nagpur on September 22, 2012
- Dr. R. N. Pal, Ex. DDG (Horticulture), ICAR, New Delhi on September 22, 2012
- Dr. Ramana Rao, Ex. ADG (Horticulture II), ICAR, New Delhi on October 10, 2012
- Dr. V. J. Shivankar, Director, NRC for Citrus, Nagpur on October 11, 2012
- Dr. N. K. Krishna Kumar, DDG (Horticulture), ICAR, New Delhi on November 21, 2012
- Dr. S. K. Sharma, Director, CIAH, Bikaner on November 22, 2012
- Dr. A. R. Pathak, Vice Chancellor, NAU, Navasari on November 24, 2012
- Dr. A. M. Shekh, Vice Chancellor, AAU, Anand on November 24, 2012
- Dr. A.J. Pandya, Director Student Welfares, AAU, Anand on November 24, 2012
- Dr. Rameshwar Singh, Project Director, DKMA, New Delhi on November 29, 2012
- Mr. S. N. Tyagi, Ex. CEO, SMPB, Gandhinagar on December 11, 2012
- Dr. K. S. Varaprasad, Director, DOR, Hyderabad on December 19, 2012

Foundation day celebrated



The 21st Foundation Day was celebrated on November 24, 2012 at the directorate. On this occasion, a voluntary blood donation camp was organized. Dr. A.M. Shekh, Vice Chancellor, AAU, Anand presided over the annual day function. Dr. A.R. Pathak, Vice Chancellor, Navasari Agricultural University, Navasari was the Chief Guest and Dr. K.C.Dalal, Ex. Director,

DMAPR was the Special Guest in the function. On this occasion, "Agriculture Education Day" was also celebrated at the directorate and a special lecture on "Career Prospects in Agriculture" by Dr. A.J. Pandya, Director, Student Welfares, Anand Agriculture University was organized. Fifty four higher secondary students from Kendriya Vidyalaya, Vallabh Vidhyanagar and Anandalaya, Anand attended the programme.

Our new colleague



Dr. Vandana Tripathy, Senior Scientist (Agricultural Chemicals) joined on July 20, 2012. DMAPR family extends heartily welcome to her.

Super critical extraction facility created

Super critical extraction facility (SFE) for research applications has been created at the directorate. SFE is an advance green technique for extraction of natural products.

Human Resource Development

Date	Training/seminar/ conference/meetings	Participating scientist
July 18-19, 2012	Review meeting of the scheme "Spices and Aromatic Plants Under Central Sector Scheme" at UAS, Bangalore	Dr. R.S. Jat
September 3-23, 2012	Training on "Resource Conservation Practices for Soil Health Security" at Dr. Panjabrao Desmukh Krishi Vidyapeeth Akola	Dr. B.B. Basak
October 3-5, 2012	XX th Annual Group Meeting of AICRP on MAP&B at CSSHAU, Hisar	Drs. P. Manivel, Satyanshu Kumar, Vipin Chaudhary, R.S.Jat, N.S.Rao and Vanita Salunkhe
November 6-7, 2012	National Seminar on Medicinal Plants: Status and Future at Shivaji University, Kolhapur	Dr. P. Manivel
November 15-17, 2012	7 th International Symposium on Recent Advances in Natural Products at Amity University, Noida, U.P.	Dr. Satyanshu Kumar Dr. V.S. Rana
November 26-30, 2012	Third International Agronomy Congress at IARI, New Delhi	Dr. R.S. Jat
December 1-2, 2012	Symposium on Managing Stress in Drylands under Climatic Change Scenarios at Central Arid Zone research Institute, Jodhpur	Dr. Vipin Chaudhary
December 5-6, 2012	Meeting of Project Coordinators' for Streamlining and Consolidating the AICRPs and Network Project for XII Plan.	Dr. Vipin Chaudhary
December 9, 2012	Sensitization meeting of Scientist In-Charges of PME Cells of ICAR at NDRI, Karnal	Dr. Satyanshu Kumar

**Dr. N. K. Krishna Kumar
joined Indian Council of
Agricultural Research as
Deputy Director General
(Horticulture)**



Dr. N. K. Krishna Kumar, joined Indian Council of Agricultural Research, New Delhi as Deputy Director General (Horticulture) on August 09, 2012. Dr. Kumar obtained his Ph.D. degree from USA. He was also associated with University of California Davis, California as post doctoral fellow and has visited several countries such as Republic of China, Taiwan, Malaysia, Singapore, Spain, Denmark, etc. He is associated with many national and international professional societies in various capacities. Dr. Kumar has contributed significantly in working out pest management strategies in horticultural crops and has developed integrated methods for the management of important insect pests, affecting tomato, brinjal, chilli, bell pepper, okra, cabbage, cauliflower, French bean, etc., In recognition of his outstanding contribution to horticultural sciences, Dr. Kumar was bestowed with East-West Centre Award, Award of Merit Gamma Sigma Delta, Pacific Branch and ICAR Merit Fellowship. DMAPR family congratulates Dr. Kumar and extends heartily welcome.

The secret of improved plant breeding, apart from scientific knowledge, is love.

- Luther Burbank.

Species of Conservation Interest

Iswarmul (Aristolochia indica L.= A. lanceolata Wight)



Aristolochia indica L. (*A. lanceolata* Wight) is a perennial climber belonging to family Aristolochiaceae. The species is found in the plains throughout the humid parts of India, Nepal, Bangladesh and Sri Lanka. It is commonly known as *Iswarmul*, *Arkamul*, *Iswari* or *Isarmula* in different Indian languages. In English the plant is known as Indian birthwort. The plant bears greenish white grooved stem with twisted slightly tuberous roots with leaves of variable shapes. Flowers are pale green, inflated, lobed and with trumpet shaped mouth which are arranged singly or in 2-3 flowered axillary racemes. Fruit is oblong or globose-oblong capsule and is six valved.

The species flowers during July to August. Seeds are mainly used for propagation and the root stocks also can be used for propagation.

The species is medicinally important in Indian System of Medicines (ISM). In Ayurveda, the drug is known as *Iswari*. Stem, leaves and root are mainly used for therapeutic purposes. The stem and sometimes, the leaves are used to remove the toxic effects of poisons especially snake poisons. The drug is a bitter tonic and emmenagogue and is also used as gastric stimulant. The root is used in dyspepsia, fevers and bowel troubles in children. In addition to the ISM uses, the plant is also used in various tribal medicines in India for the treatment of body pains, rheumatism, cholera, fevers, cough and inflammations.

The plant contains Aristolochic acid which is the active ingredient of the species, however in higher doses it is proved carcinogenicity in rodents.

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