NATIONAL RESEARCH CENTRE FOR MEDICINAL & AROMATIC PLANTS

NEWSLETTER

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About the Newsletter

The National Research Centre for Medicinal & Aromatic Plants (NRCMAP) is one of the institutes of the Indian Council of Agricultural Research (ICAR). NRCMAP'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 out reach organ, All India Networking Research Project on Medicinal & Aromatic Plants (AINRPMAP).

AINRPMAP works in partnership with State Agricultural Universities and other organizations, undertakes research, multilocation testing of technologies, training and provides scientific and technical advice and information to a host of clients such as farmers and growers, 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 NRCMAP and AINRPMAP.

Contents

XVII Group meeting of AINRPMAP

Biennial group meeting of the AINRPMAP was held at Kerala Agricultural University (KAU), Trichur during November 15-17, 2008. The Inaugural session started with welcome address by Dr. D. Alexander, Director of Research, KAU. He highlighted the contributions made by KAU in popularising medicinal and aromatic plants cultivation in the state by motivating farmers and providing technology. Dr. U. C. Srivastava, Assistant Director General (Horticulture II), ICAR highlighted the achievements made by the AINRPMAP. He also made a mention about the positive step taken by the council in merging the AINRP on Betelvine with the AINRPMAP to increase its reach to different niche of the country.

Dr. Satyabrata Maiti, Project Coordinator, AINRPMAP presented salient achievements made by various Co-coordinating centres during last two years. He informed that under the project research was carried out on various aspects of crop production and improvement with a view to ultimately develop Good Agricultural Practices without compromising the quality and safety of the raw drug. A multidisciplinary team of 34 scientists of various disciplines such as Plant Breeding, Horticulture, Agronomy, Plant Pathology and Phyto-chemistry are engaged in research at 10 centres of the project.

Dr. M. K. Sheela, Director of Extension and Dr. P. K. Rajeevan, Associate Dean, KAU expressed their views on the cultivation of medicinal and aromatic plants in Kerala. Mr. Rajaji Mathew Thomas, MLA and Executive Member of the KAU delivered the inaugural address. He informed that Kerala has age old tradition of using medicinal and aromatic plants and maintains vast diversity of these

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EDITORIAL

Clouded by Confusion

Emile Durkheim, a French Sociologist, used a term and developed a theory to explain (anti) social behaviour. Although his theory was applied primarily to understand suicide, it can be and has been extended to other areas of human behaviour. Durkheim classified all periods of rapid change as leading to a state of 'anomie' or 'normalessness' in society. In such circumstances, individuals and groups are often in a state of confusion, uncertain of the appropriate norms to follow and uncertain of their place in society. Similar state of confusion are everywhere now-a-days in the R&D of medicinal plants because of rapid changes due to many fold increase in funding as a result of generous allocation in the XI plan and also eagerness to capture medicinal plants sector by various funding agencies.

The funding agencies are eager and in a hurry to road show their achievements and efficiency by sanctioning number of projects in a shortest time. As a result, quality of the projects are often being compromised. Many funny projects are being sanctioned by these agencies which ultimately bring, in place of laurels, hard criticism and bad name to the country at an international level. If I don't give a few examples, readers may feel that what I am raising are all imaginary or do not have much substances in it. But, If I name all those, some of the very renowned agencies will be publicly embarrassed for their negligence. One such example is, 'Rare, Endangered and Threatened' (RET) tags are often over used or abused to draw the attention and sympathy for getting the project sanctioned. Similarly these tags are also used indiscriminately again to draw the attention of the reviewer for getting paper published in national and international journals. All reviewers either may not have the access to check the real status of the species or take it granted that the proposer or the author are faithfully and consciously used these tags. Ultimately, project or manuscript gets through with lot of hope that we have to save the species of RET and extra soft corner is shown for such material. Very recently I saw a proposal claiming Tribulus terrestris, Asparagus adscendens, Desmodium gangeticum, Gymnema sylvestre, etc. are threatened species which provoked me to write this editorial to bring another side of this misuse of terminology.

In last December when I was discussing with some of the international delegates in the 3rd International Congress of Ayurveda held at Jaipur about various issues of the export of medicinal plants and drugs from India, one of the delegates raised the issue of exporting raw drug which are of RET category. She said that export is seriously affected since some of the European countries are averse of importing some of the species from India that are categorised as RET in various publications and reports available to them from India. These countries are not willing to relax their stand and do not understand the complexity of regional shortfall and regional categorisation of RET species. They are also taking serious account of loose categorization of RET followed by the researchers, policy makers and all those who are using RET phobia and euphoria to their advantage. She also opined that there should be a country level categorization of RET species so as to impress the importers about the exact status of the species. Under that situation one species may be in RET category in south India but largely available in North India and should not find place in the RET list of Indian species. This is the age of harnessing "competitive advantage" and MAP sector should identify the places of 'competitive advantage' within India, species by species.

I wish that our medicinal plant community should consider my observations seriously and use the RET tag judiciously so that research, cultivation, conservation and trade go hand in hand without creating imbalances due to over emphasis.

Jai Hind !

Satyabrata Maiti

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species. He suggested that plants useful against most critical diseases should be identified and researched upon. Some ayurvedic products made by the University were released by the dignitaries.

The project scientists from different centres took part in the deliberations for three days. Salient outcome, recommendations and future research programmes were presented in the plenary session held on November 17. The function came to an end with the vote of thanks proposed by Dr. S. Maiti.

Some of the important recommendations emerged from the group meeting are: (i) farmers of south-eastern Rajasthan should sow ashwagandha during September 10-16 and harvest during February 12-18 for higher productivity, (ii) after harvesting, fleshy root of safed mulsi (for planting material) should be stored in wooden box containing 4 inch layer of musli overlapped by 4 inch layer of soil, (iii) critical growth stages in opium poppy with respect to moisture stress (from most to least critical) are rosette (45 DAS), flower initiation (70 DAS), late capsule (98 DAS), 50% flowering (85 DAS), stem elongation (30 DAS), bud (58 DAS), after lancing (120 DAS) and capsule maturing (108 DAS) and (iv) under Trichur conditions, brahmi should be harvested after every 5 months for higher herbage yield and bacoside content.

A new yellow flowered plant type in Aloe

Aloe (*Aloe barbadensis*) is an important medicinal plant cultivated for its gel and aloin extracted from the leaf. The species is a native of Africa, Canary Islands, Spain and Mediterranean Countries from where it was introduced to India, China, East and West Indies, USA, Central America and other countries. Morphological variability in the available germplasm is very low, a lot of chemical variability is

available though. Flowers are normally either orange or saffron in colour. At NRCMAP, a new plant type has been identified (NRCAB-1) from the seedling progenies, which produces yellow flower. RAPD analysis confirms the distinctness of the yellow flowered plant type from the other orange/ saffron flowered normal plant types. A band of 1 kbp product is absent in the new type when DNA is amplified with OPJ 10 primer. Dry leaf exudates of the new plant type contains 22.26% Aloin A.

Ploidy distinction in male and female plants of betelvine

Betelvine (*Piper betle*) is a dioceous species with a basic chromosome number x=13. Ploidy determination in betelvine is complicated due to very small chromosome size and somatic variations in their number. Fragmented work has so far been reported on chromosome numbers and ploidy status of the species by a few workers. A large number of germplasm has been collected and assembled in AICRP centres by sustained efforts of Betelvine workers over a period of two and half decades. Hybridisation work initiated under AINRP on betelvine showed hybrid depression in certain cross combinations. Incompatible ploidy number between the parents could be a possible reason. Hence, ploidy level of 71 accessions including 3 hybrids of betelvine were determined at NRCMAP by flow cytometry. The control samples used for the analysis were Kapoori lines (Male, 2n= 3x= 39) and Bangla lines (Female, 2n= 4x= 52) which were first tested for chromosome number by cytological study. Ploidy comparison by flow cytometry confirmed that all the accessions could be grouped into two classes; all the males were triploids and females being tetraploids. The hybrids were having ploidy level higher than the females and were aneuploids (4n+). Hence the present study showed that the hybrid depression in certain hybrids possibly due to the formation of aneuploids by the fusion of unbalanced gametes (viz., 2n+1) produced from the triploid male parents.

RAPD marker linked to sex of guggal

Guggal (*Commiphora wightii*) is an endangered medicinal plant species of India. It is naturally distributed in the arid westerns states – Rajasthan and Gujarat. Oleo-gum-resin secreted by this plant is widely used in ayrvedic preparations against rheumatism, obesity, etc. Modern medicine also recognises its efficacy. Species is polygamous hence individual plant bears either male, female or hermaphrodite flowers. An attempt was made at NRCMAP to identify the sex linked Random Amplified Polymorphic DNA (RAPD) markers for reliable sex identification in the absence of flower. Sixty different random primers were screened of which only three primers were found to be associated with sex expression. These three primers were then tested with individual plant DNA samples. A 1280 bp fragment from the primer OPN06 was found to be present in all the female individuals but absent in the male and hermaphrodite plants. OPN16 primer resulted a 400 bp product which was present only in the hermaphrodite individuals. Whereas, a third marker, OPA20 amplified a 1140 bp fragment from female and hermaphrodite DNAs, but failed to do so from the male plants. Thus these three primers can be used for accurate sex (male, female and hermaphrodite) determination in guggal plants.

www.herbalgardensindia.org launched for networking of herbal gardens

In India, a number of herbal gardens have been established by funding from various agencies. However, no system was available for sharing the information for effective utilisation of these public and private funded gardens. NRCMAP has taken an initiative to create a web based facility of sharing information from these herbal gardens with generous

funding from National Medicinal Plants Board (NMPB). The website providesinformationonavailability of species, number of plants maintained in each species, quality planting material availability, etc based on information given by the participating member herbal gardens. Member herbal gardens have the access to the website for updating their data from time to time. New herbal gardens can also join network by sending request to the NRCMAP

The online website (http://www.herbalgardenindia.org) was launched in the International Symposium on Afforestation of Medicinal Trees at 3rd World Ayurveda Congress and Arogya 2008 held at Jaipur on December 20, 2008 by the honourable Chief Guest Thiru N. Selvaraj, Minister for Forests, Government of Tamil Nadu. Dr. Satyabrata Maiti, Director, NRCMAP, Anand made a presentation on the various information retrieval options of the website before distinguished guests like Shri. B.S. Sajwan, CEO, NMPB; Prof. M. C. Varshneya, V.C., AAU, Anand and international and national delegates.

Group meeting of AINRP Betelvine held

Twenty second group meeting of workers from AINRP on Betelvine was organised at Bidhan Chandra Krishi Viswavidyalaya (BCKV), Kalyani during December 13-15, 2008. The function started with the welcome address by Prof. S. K. Sanyal, Director of Research, BCKV. He welcomed all the delegates and gave a brief description of the prospects and opportunities of betelvine cultivation. Dr. U. C. Srivastava, ADG (Hort. II), ICAR presented prospect of the project and reaffirmed the cooperation from ICAR for making this old network more result oriented.

Dr. Satyabrata Maiti, Project Co-ordiantor, AINRP on Betelvine presented salient achievements made during 2006-08 by ten coordinating centres located in eight Agricultural Universities. A multidisciplinary team of about 26 scientists of various disciplines such as Plant breeding, Horticulture, Plant Pathology, Entomology and Agronomy were working on various aspects of Crop Improvement, Crop Production, Crop Protection, etc. Major emphasis was given on water management, organic farming and development of IPM for major insect pests and diseases. Breeding for elite betelvine varieties was initiated at IIHR. Hybrid seeds were obtained from several crosses. He highlighted that crop management technologies developed by the Centres were demonstrated in the farmers' fields and were found superior.

In the inaugural address Dr. R. K. Samanta, Vice Chancellor, BCKV congratulated the betelvine workers for the achievements made by the AINRP. He urged the betelvine workers to work in such a way that common man should be benefited by their efforts.

Work done report by the project scientists from different centres was presented at different technical sessions. The group felicitated Prof. Chitreshwar Sen, former Head, Department of Plant Pathology, BCKV for his outstanding contribution to plant pathology in general and betelvine research in particular. Salient outcome, recommendations and future research programmes were presented in the plenary session held on 15th December. The project proposed integrated crop management package viz. maintenance of recommended plant population, application of recommended NPK (200:100:100 kg/ha), irrigation to replenish 100% of CPE, maintenance of sanitation, soil drench of Bordeaux mixture at the time of planting followed by soil application of *Trichoderma* (after one month) and one more soil drench of Bordeaux mixture for better betel leaves as well as satisfactory control of diseases in comparison to farmers' practice. The function came to an end with the vote of thanks proposed by Dr. S. Maiti.

RAC meeting

The Sixth RAC meeting of NRCMAP was held on July 8, 2008 under the Chairmanship of Dr. B.R. Tyagi, Ex-Deputy Director, CIMAP. Other members of the committee who attended the meeting were Dr. A.A. Farooqui, Dr. S.K. Pareek, Dr. Umesh Srivastava, Prof. I.L. Kothari and Dr. S. Maiti. Dr. Tyagi highlighted the importance of projects with highly focused objectives with a multidisciplinary collaborative team. Dr. S. Samantaray, Member-Secretary appraised the house about the action taken on suggestions made during last RAC. Dr. Satyabrata Maiti, Director, NRCMAP made an elaborate presentation on the progress of research work since February 2007. The Committee gave some useful suggestions for future work of the Centre. The meeting ended with vote of thanks proposed by Dr. P. Manivel, Pr. Scientist, NRCMAP.

SRC meeting

XVII Staff Research Council (SRC) meeting was held on July 10-11, 2008 under the chairmanship of Dr. Satyabrata Maiti, Director, NRCMAP. The meeting was attended by all scientific staff of NRCMAP. It started with welcome note by Dr. P. Manivel, Member Secretary, SRC. Major achievements of previous six months viz. filing of a patent application by NRCMAP and registration of a unique germplasm of *Centella asiatica* with NBPGR were also highlighted in the meeting. that All the project leaders presented work done report. Discussion was held on 13 projects which coverd crops like aloe, ashoka, ashwagandha, giloi, guggal, harde, isabgol, safed musli and senna on various aspects like crop improvement, production, protection and quality management. The Scientist of computer application presented projects on various database development and maintenance.

Celebrations at NRCMAP

NRCMAP celebrated Hindi Week during September 15-22, 2008. On September 22 a function was organised under the chairmanship of Dr. S. Maiti. Sh. D. C. Agrawal, retd. Principal, Kendriya Vidyalaya, V.V. Nagar was present as the chief guest of the function.

The NRCMAP observed vigilance awareness week from November 3-7, 2008 by keeping records open for verification to bring transparency in the functioning of the institute.

Annual Day was observed on November 14, 2008. The staff welfare club of NRCMAP organised a function to commemorate this occasion. The staff members along with their family observed the day with great fanfare.

Best paper & poster awards

Dr. G. Sridhar, Scientist (Plant Physiology), NRCMAP and Mrs. G. Aneeja, Tech. Officer, NAARM bagged the best paper award for their presentation entitled "Prospects of Open Access to Indian Agricultural Research: A Case Study of ICAR" in the 8th Indian Science Communication Congress held at Chennai, Tamil Nadu during December 10-14, 2008. The theme of the Congress was "Media Convergence and Knowledge Revolution."

Mr. Arun K. Phurailatpam, SRF received the best poster award at National Seminar on Piperaceae – harnessing agro-technologies for accelerated production of economically important piper species, held at Indian Institute of Spices Research, Calicut during November 21-22, 2008. The poster was titled "Ploidy distinction in male and female plants of betelvine – a study by flow cytometry."

Distinguished visitors

- Dr. B. R. Tyagi, Chairman, RAC on 8.7.2008
- Dr. A. A. Farooqi, Member, RAC on 8.7.2008
- Dr. S. K. Pareek, Member, RAC on 8.7.2008
- Dr. Umesh C. Srivastava, ADG (Hor. II) on 8.7.2008
- Prof. I. L. Kothari, Member, RAC on 8.7.2008
- Sh. Chaman Kumar, Addl. Secretary & FA, DARE, New Delhi visited on 24.11.2008
- Dr. C. D. Mayee, Secretary, ASRB, New Delhi visited on 4.12.2008
- Dr. N. N. Singh, Vice Chancellor, Birsa Agricultural University, Ranchi on 5.12.2008
- Dr. S. K. Nanda, Principal Secretary, Forest & Environment, Govt. of Gujarat, Gandhinagar on 5.12.2008
- Dr. M. L. Sharma, PCCF, Govt. of Gujarat, Gandhingar on 5.12.2008
- Sh. B. N. Shrivastava, Addl. PCCF, Govt. of Gujarat, Gandhingar on 5.12.2008
- Sh. R. V. Asari, Addl. PCCF (D&M), Govt. of Gujarat, Gandhingar on 5.12.2008
- Dr. R. K. Samanta, Vice Chancellor, Bidhan Chandra Krishi Viswavidyalaya, Kalyani on 6.12.2008

Transfer

- Sh. V. S. Parmar, AAO transferred to CIFE, Mumbai on promotion as AO on 30.8.2008

New Colleagues

- Sh. Vinay Kumar joined as , Scientist (Biotechnology) on 5.7.08
- Sh. R. T. Thakar joined on deputation as AAO on 22.9.2008
- Dr. Abirami joined as Scientist (Horticulture) on 29.9.08

A new Association of Medicinal and Aromatic Plants formed

Medicinal and Aromatic Plant Association of India (MAPAI) was launched on December 24, 2008 with its registration under society registration Act at Anand (No. GUJ/1181/ANAND). MAPAI has registered office at NRCMAP. It was formed with the aim to promote research on MAPs; to promote general interests and interaction among researchers working on MAPs; to provide a forum for the exchange and dissemination of research information and experiences related to MAPs; to publish an Open Access scientific journal. The society's activities can be accessed at http://sites.google.com/site/mapaindiaorg. The journal to be published through this society is named Open Access Journal of Medicinal and Aromatic Plants (OAJMAP) with ISSN 0974-7877.

Call for Papers

The Medicinal and Aromatic Plants Association of India calls for papers in areas like botany, taxonomy, ecology, crop husbandry, crop protection, genetic improvement including molecular genetics, physiology, biochemistry, microbiology, and related areas from researchers working on medicinal and aromatic plants for its official publication, 'Open Journal of Medicinal and Aromatic Plants'. Authors may visit http://www.ojs.oksociety.in/index.php/oajmap for more details and submission.

Species of Conservation Interest

Jyotishmati

Jyotishmati (*Celastrus paniculatus* Willd.) is an important medicinal trailing plant. It is variously known as Maalkagni (Hindi) or, Black oil plant in different languages. The species belongs to family Celastraceae and it is a woody climber. Globally it is distributed in Indo-Malaysia to China and Australia. In India it is found in dry deciduous to semi-evergreen forests at an altitude of 1800 m in Himachal Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu. Bark is yellow and corky; flowers are unisexual arranged in pendulous panicles. Capsules are globose and 1-6 seeded. Seeds are yellowish brown in colour enclosed in scarlet arils. Flowering occurs in February to April and it fruits in May to December.

Seeds are bitter with unpleasant smell and are medicinally important. It has emetic, diaphoretic and nervine properties and is used for the improvement of memory. It also cures sores, ulcers, rheumatism and gout. Seeds are sold under the trade names of Maalkagni, Maalkagni beej and Jyotishmati. The seeds contain oil, which is dark brown in colour and is popularly known as Celastrus oil or Malkagni oil. The oil is stimulant and is used to treat scabies, rheumatic pains, eczema and paralysis. The oil is also having tranquilizing effect and used to treat mental depression and hysteria. The stem bark is abortifacient and brain tonic.

The plants can be propagated by seeds and stem cuttings. The raw drug is collected from the wild since the species is not under cultivation. Hence, at present the species' conservation status in its wild habitat is vulnerable in Kerala and at lower risk to near threatened in Karntaka and Tamil Nadu.

Seeds of Jyotishmati

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