



NEWSLETTER

Vol. 6, No. 2

July-December, 2004

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 Project on Medicinal & Aromatic Plants (AINPMAP).

AINPMAP 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 AINPMAP.

Contents

Group Meeting of AINPMAP.....	1
Editorial.....	2
Breakthrough & Research Highlights.....	3
Group Meeting of AINP on Betelvine.....	4
From the Institute.....	5
Human Resource Development.....	5
Plant types of Kalmegh.....	6
Endangered Species.....	6

Group meeting of AINP on Medicinal & Aromatic Plants organised



Fifteenth Group meeting of the All India Networking Project on Medicinal and Aromatic Plants organised by the Indian Council of Agricultural Research was held at MPUAT, Udaipur during 11-14th December, 2004. Dr. Pratap Singh, Director of Research, MPUAT welcomed the delegates and highlighted the contribution made by the university in popularising medicinal and aromatic plants cultivation in the state.

Dr. S. Maiti, Project Coordinator presented the salient achievements made by the various networking centres. He informed that a multidisciplinary team of about 33 scientists of various disciplines carried out research on various aspects on 21 Medicinal plants and 5 aromatic plants across the nine centres located in SAUs. A total of 20 multi-location trials on 10 crops were attempted. In addition, 54

station trials and 29 miscellaneous trials on 22 crop species were also carried out.

Dr. S. N. Pandey, Asstt. Director General (Horticulture & Plantation Crops), ICAR delivered the Chief Guest's address. He stressed that the cultivation of medicinal and aromatic plants was very important and ICAR was ready to support for its development in all sphere.

Prof. S. L. Mehta, Vice Chancellor, MPUAT released a CD of Digital Photo Library (Part I) in this occasion. He informed that the country having different agro climatic and soil types had wider scope to compete in medicinal and aromatic plants at the global level. He suggested a road map for systematic research work in this field. He emphasized on several

Continued on page 2...

EDITORIAL

At the Dawn of New Year, 2005

At the dawn of a new year when I look back to our efforts and achievement in the Medicinal plant sector, I got a mixed reaction of frustration for not able to perform the way it was visualized due to forces acted upon the sector which was beyond our control and satisfaction for whatever little bit contribution we could make collectively. The year has given a big jolt at the end in the form of Tsunami which has taken away a large number of precious life of all forms from the surface of this earth. This reminds us at a time how insignificant we become and how small we are in front of the nature; how limited our knowledge is when it comes to crisis management. With this humility we have to grow further for the benefit of the mankind.

Let's talk about my frustration first. In spite of our best efforts and best efforts of the council for last few years, clearance for manpower recruitment has not been materialized as a consequences half cooked technology is being tabled that does not fulfil the appetite of any of the stakeholders and continuous clamouring and blaming are directed against the system. Same is the situation of National Medicinal Plant Board (NMPB), which was created on the recommendation of Planning Commission but without seriously giving thought about its functional requirements and provision of man power. Country as a whole needs a serious view about the functional efficacy of the NMPB and immediate strengthening is the requirement of the hour. Future development of whole medicinal plant sector and export hike would only be possible if all the stake holders of this sector are recognized and encouraged to perform and their actions are integrated in complementary mode by curbing lopsided growth of any stake holder. This is the mandate of the NMPB which is also not being fulfilled because of delay in manpower strengthening in the board.

Despite this precarious situation some very good pieces of work have been done by our scientists that has enriched our scientific knowledge which is a matter of great satisfaction. To mention a few, two new clones of safed musli have been identified which have high yield potential; one new variety of safed musli has been released by AINPMAP efforts. Chromosomal study of safed musli revealed that basic chromosome number is different than that was initially reported and presence of polyploid. Variability in flower morphology of Shankpuspi and two new diseases of safed musli were identified. Production technology was refined to fit into Good Agricultural Practices.

Another matter of great satisfaction is to listen inaugural address of Honourble Prime minister, Dr. Manmohan Singh at the CII Partnership Summit at Kolkata on January 12, 2005. What a visionary speech!! He said "We can not afford to just do things better. We must do them differently. The challenge before us in all aspects is to "think out of the box". We must think anew, afresh and ahead. He clearly spelt out the master plan of future India by stating that An important step we must take to enable change of mind set is to innovate and rejuvenate our "knowledge in situation", our schools and colleges, universities and research laboratories, our think tanks and policy making institutions. He proposed to create a National Knowledge Commission and its agenda will be shaped by a knowledge pentagon with five areas of action, namely: (1) to increase access to knowledge for public benefit; (2) develop new concepts of higher education; (3) rejuvenate Science & Technology institutions; (4) enable application of knowledge by industry; (5) encourage intensive use of knowledge-based services by government to empower citizens. He also spelt out the roadmap by stating that we must make our universities world class and centers of innovation and excellence. Our science laboratories must be repositioned for creation of knowledge necessary to develop new products and services.

This is the first time that the country is fortunate to have a world-class scientist at the helm of countries affairs as President and a very learned economist as the Prime Minister. I look forward to see our mother country as a developed nation within short period because of the changes to be introduced as pronounced by Dr. Manmohan Singh. With this hope I look forward to our great future as a whole.

Jai Hind!!

Satyabrata Maiti

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points like marketing support, quality control lab, linking of private sector and NGOs, etc to strengthen this sector.

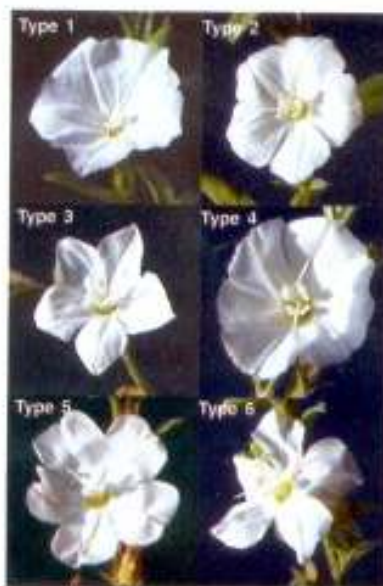
Five different technical sessions, one each in Crop Improvement, Crop Production, Crop Protection, Phytochemistry and Ad-hoc projects were conducted. Workers from different centres presented their research results. Research programmes formulated were presented in the plenary session. The three day long meeting ended with the vote of thanks proposed by Dr. S. Maiti.

Breakthrough & Research Highlights

Floral diversity of Sankhpushpi

Study on floral diversity was carried out in the natural population distributed in NRCMAP. The study revealed that the population included plants of different flower types. A range of colour shades starting from white, light pink to deep pink could be observed.

Based on corolla type, six different types were identified, which were mentioned as type 1 to type 6. Type 1 was the typical of the species i.e. gamopetalous mucronate/mucrunulate. However, it was found that the corolla varied from gamopetalous to polypetalous. Corolla margin varied from mucronate to mucrunulate type, round or blunt type, acute type and emarginated to retuse type. Type 1 to Type 4 included flowers with petals of gamopetalous nature. However, in Type 5, corolla was semi-gamopetalous where there was a distinct partition in the corolla and in Type 6 it was



Different flower types of sankhpushpi

polypetalous. Petal in Type 1 was mucronate or mucrunulate, round or blunt in Type 2, acute in Type 3 and 6 while it was emarginated in Type 4 and 5.

The frequency of occurrence of different flower types was also varied within the population. Plants with type 1 and 3 were

distributed maximum within the population (34.68%). The similar pattern of variation in corolla margin was observed in pink flowered plants also.

HPTLC analysis showed no qualitative difference so far chemicals constituents are concerned among the plant types, however, quantitative difference of chemicals constituents was noticed among the different types, which need to be harnessed in the selection of superior type for drug preparations.

Convolvulus microphyllus belongs to the family convolvulacea, characterized by its persistent calyx, regular gamopetalous corolla, five epipetalous stamens and bicarpellous ovary with definite number of ovules. However, present study, confirms presence of polypetalous flowers and range of flower colour in population, which is contrary to the systematic position of the species. This is therefore, the first report of floral diversity within the species.

Forecasting system for downy mildew of Isabgol

Downy mildew of Isabgol is known to be one of the major biotic stresses of the crop. To minimize the crop loss and avoid chemical residue in the final produce, timing of the fungicide spray is crucial for which a forecasting system has been developed at Udaipur. Under the field conditions, the disease caused by *Pseudoperonospora plantaginis* was found to appear when average temperature $[(\text{max. temp.} + \text{min. temp.})/2]$ reached 20°C . However, the disease incidence could not be seen when the plant age was less than 20 days. Based on this method, the disease can be conveniently managed with

minimum prophylactic application of fungicides. This will not only reduce the chemical load on the crop and environment but also reduce the cost of cultivation.

Extraction and estimation of podophyllotoxin

The podophyllotoxin is the active principle of *Podophyllum* having tumor necrotising property. It was separated from the mixture of lignans extracted by Soxhleting the rootstock (roots and rhizomes) in methanol followed by acidification and TLC. The mixture of lignans was dissolved in minimum volume of methanol and then got adsorbed by silica gel. The adsorbed mixture was then loaded

on silica gel packed column and was eluted with chloroform : methanol (95:5). The combined fractions corresponding to podophyllotoxin (monitored by TLC) were crystallized from benzene as a white crystalline material.

Analytical method for estimation of podophyllotoxin was standardised on HPLC using Waters 501 HPLC pump with Bonda pack C_{18} column, Rheodyne injector, Waters 484 tunable absorbance detector and Waters 745B Data module. The mobile phase used was methanol : water (62:38) at a flow rate of 0.9 ml min^{-1} . Monitoring was done at 280 nm. Pure podophyllotoxin showed

single peak at retention time of 3.41 minute.

Sapogenin content of Safed musli changes with age

Safed musli attains physiological maturity at 90-120 days after planting (DAP). However, considering the keeping quality of the fleshy roots as next year's planting material, farmers usually harvest the fleshy roots at 240 to

270 DAP. The information about the changes in active principle of the raw drug during this period was limited. The steroidal sapogenine was maximum (1.06%) at 90 DAP (October) which declined continuously to reach 0.86%, 0.70% and 0.61% at 150 DAP (December), 210 DAP (February) and 270 DAP (April), respectively. Moisture content of the fleshy roots also showed

decreasing trend. It decreased from 81.33% at 90 DAP to 65.42% at 270 DAP. Harvesting of the crop hence, should be done according to the usage of the fleshy root. For drug purposes, early harvesting should be practised to avoid loss in active principle. Whereas, fleshy roots meant for propagation should be harvested later to avoid loss due to drying and it may also reduce loss due to storage pathogens.

Group meeting of the AINP on Betelvine held

Twentieth Group meeting of the All India Networking Project on Betelvine was held at Acharya N. G. Ranga Agricultural University, Bapatla during December 2-4. The inaugural function was presided over by Dr. A. Padma Raju, Director of Research & Dean of Agriculture. In his welcome address, Dr. A. Thirupati Reddy, Associate Director of Research, RARS, Lam Farm, Guntur gave a brief description of the prospects and opportunities of betelvine cultivation. Dr. Satyabrata Maiti, Project Co-ordinator, AINP on Betelvine presented salient achievements made by the various networking centers during last two years. He highlighted that at eight centres located in Agricultural Universities, 24 scientists of various disciplines conducted research on various aspects. Major emphasis was given on water management, organic farming and development of IPM for major insect pests and diseases. Three multi-location experiments in crop improvement, six in crop production, five on plant diseases, three in nematode disorders and eight in insect pests and mites in addition to three station trials were conducted. He also mentioned that the demonstrations of disease management technologies conducted by ANGRAU, AAU, BCKV, OUAT and TNAU centres

in the farmers' field proved better in terms of disease reduction, higher yield and higher cost benefit ratio.

Dr. A. Satyanarayana Reddy, Member of Board of Management, ANGRAU gave a felicitation address to the gathering. He suggested some very vital points for refinement of the technical programmes and cautioned to consider the cost : benefit before recommending any new package of practices.

Sri. Gade Venkata Reddy, MLA, Bapatla addressed the gathering on this occasion. He informed the house that Andhra Pradesh is contributing a considerable share in Indian agri business. He praised the scientists for their efforts in betelvine cultivation.

Dr. S. N. Pandey, ADG (PC) and Chief Guest of the function appraised the house about existing broad framework of functioning of the project since its inception. He emphasized on excellent research in Betelvine and assured Council's full support for the project. He informed that in the present WTO scenario characterisation of germplasm would be very important.

The discussion was held in three technical sessions one each for crop-improvement, -production and -protection. Recommendations like use of drip irrigation, bio-fertilisers, bio-control agents, etc. were emerged

from the discussions. The technical programmes formulated were presented in the plenary session. The meeting ended with the vote of thanks proposed by Dr. S. Maiti.

Project on development of herbal anti-malarial drug

Malaria has become endemic to tropical developing countries. Every year, millions suffer from malaria, throughout the country. Quite a few parasitic strains are resistant to chloroquine, evading the normal therapy. Hence an alternative method of treatment with low cost involvement and easy accessibility is required.

The pilot survey made by the South Gujarat University revealed that an ethnic recipe using either young buds or latex of *Calotropis* spp with milk worked seemingly well against recurrent malaria. It was also observed that there was no case of failure of the treatment! On the basis of this study, an industry-institutional collaborative project comprising Department of Bio-Sciences, Sardar Patel University, V. V. Nagar; South Gujarat University, Surat and Petlad Mahal Arogya Mandal Pharmacy, Nadiad have been taken up with the aim to develop and standardise herbal anti-malarial drug using *Calotropis* spp, with special respect to subacute and acute toxicity effects of the drug on animal model.

From the Institute

SRC Meeting

Staff Research Council (SRC) meeting of the institute was held on 8th November under the chairmanship of Dr. S. Maiti, Director, NRCMAP. Principal Investigators presented progress report of the ten institute-funded projects. The projects covered the improvement, production and chemical evaluation aspects of six medicinal and aromatic crops. Two new projects one each on water use efficiency and water stress were also presented and discussed.

Hindi week celebrated

The Centre celebrated Hindi week during 13-18 September. During this week, several competitions viz. Hindi vocabulary, Hindi debate, Hindi recitation, Hindi essay writing, etc. were organised. Official Language Implementation Committee of the Centre organised a small function to commemorate Hindi day at the end of the week. The chief guest of the function, Dr. Madan Mohan Sharma, Senior Reader, S. P. University felt that any step towards enforcing the Hindi language in school curricula would create negative impact in the people. He urged the need to bring awareness about the use of this language among the common man. Sh. Suresh Chandra, Hindi officer, Central Bank of India

(Regional Office), was the guest of honour in the function. He suggested the need to spread the technologies using Hindi that would help people to understand with ease. In his presidential address Dr. S. Maiti, Director, NRCMAP expressed that it would not be sufficient to remember Hindi language once in a while by organising such functions. He stressed that use of Hindi in day to day work would be necessary. The function ended with vote of thanks proposed by Dr. O. P. Aishwath, Officer-In-Charge, Hindi.

Annual day celebrated

Foundation of the Centre was observed as the Annual day on 24th November. A humble function was organised by the Staff Welfare Club to commemorate the occasion. The members of the NRC family along with their family members observed the day with fan fare. The function started with welcome address by Dr. P. P. Joshi, Principal Scientist. He also presented a brief note on achievements of the Centre. He congratulated all the members on this occasion and wished a very happy march forward so that everybody can uphold one's esteem and dignity by doing best for the NRC. The function was then flagged off by lighting of

traditional lamp. Cultural programmes and few friendly games were also organised on the day.

Distinguished Visitors

- Mr. Mukesh Thakkar, AGM (DD), NABARD, Godhra on 20.7.2004
- Dr. R. P. Sharma, Project Director, PDP, Hyderabad on 30.9.2004
- Prof. I. L. Kothari, Professor, Department of Biosciences, SPU, V. V. Nagar on 8.10.2004 & 27.12.2004
- Dr. H. Minoo Parabia, Professor, Department of Biosciences, South Gujarat University, Surat on 12.10.2004
- Dr. S. V. Ngachan, Joint Director, ICAR Research Complex for Manipur Centre, Imphal on 25.10.2004 and 28.10.2004
- Mr. J. A. Solanki, MLA, Sarsa on 10.11.2004
- Dr. T. A. V. Murthy, Director, INFLIBNET, Ahmedabad on 20.11.2004
- Dr. Mohd. Aslam, Addl. Director, Department of Biotechnology, New Delhi on 6.12.2004
- Dr. M. Heble, Retd. Scientist, BARC on 6.12.2004

Human Resource Development

Name	Course	Date
Dr. G. Sridhar, Scientist (Plant Physiology)	78 th FOCARS training at NAARM, Hyderabad	August 10 – December 7, 2004
Mr. N. Srinivasa Rao, Scientist (Computer Application)	PERMISNet at IASRI, New Delhi	August 17-18, 2004
	ERNET training on Networking at ERNET India, New Delhi	September 6-11, 2004

Plant types of Kalmegh

In Kalmegh (*Andrographis paniculata*), plants of two different architectures were identified at NRCMAP. Plant type I (NRCAP 1) was erect type. It was commonly found in the population. Plant type II was compact type (NRCAP 2). A third plant type (NRCAP 3) having narrow leaves was also identified. The identification of these plant types is important for suitable adoption in the present cropping systems based on medicinal plants.

*Coscinium fenestratum* Coleber

A branch of Daruharidra

Daruharidra is an important medicinal drug referred in Ayurvedic system of medicine. Root, root bark and stem are the useful parts. However, plant source for the raw drug is quite confusing. In Southern parts of India, *Coscinium fenestratum* Coleber is equated to Daruharidra, however, in North India, *Berberis* spp. is used as the source of Daruharidra. The drug is a constituent of well known Ayurvedic preparations like *Aswagandhadyarishtam* and *Asokarishtam*.

Coscinium fenestratum Coleber. is a member of the family Menispermaceae and the plant is a woody climber. It is distributed in the hilly regions of Karnataka, Tamil Nadu and Kerala. The plant is variously known in different languages such as Daru haridra in Sanskrit, Jhari haldi in Hindi and tree turmeric in English

The root and root bark are bitter and used as tonic and also used in dysentery and debility. Stem yields yellow dye resembling turmeric which is known as false Calumba and used as substitute for Calumba (*Jateorhiza palmate* Miers). It is used in dyeing purposes, dressing wounds and ulcers. In Sri Lanka, the plant is used for the treatment of skeletal fractures.

The plant population in the natural habitat is highly reduced and it is considered at the verge of extinction. The species is in the negative list of export notified by Govt. of India. The attempts made for regeneration of the plant by vegetative stem cuttings is quite discouraging and hence *ex situ* conservation attempts of the species is very limited at present. Research programmes for the domestication of the species were taken up in the Xth plan at AINPMAP at KAU, Trichur.