



# NEWSLETTER

Vol. 10, No. 1

January - June, 2009

### About the Newsletter

The Directorate of Medicinal & 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 out reach 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, 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 DMAPR and AICRPMAP&B.

### Network project on seed testing of medicinal and aromatic plants launched



A collaborative research network project on "Formulation of seed standards and standardisation of seed testing protocols in medicinal and aromatic plants" was launched at DMAPR on 28 February, 2009. The function was chaired by Dr. Mohan Lal Sharma, PCCF, Gujarat. Dr Satyabrata Maiti, Director, DMAPR; Dr. Rajendra Gupta, Expert, NMPB; Dr. S. K. Pareek, Principal Scientist, NBPGR and Expert, NMPB; Sh. R. V. Asari, Addl. PCCF, Gujarat and Sh. Kaboolchand, CCF, Gujarat were the other dignitaries present. The project launching meeting was also attended by scientists of DMAPR and AAU, Anand and personnel from Gujarat Forest Department. The function started with welcome address by Dr. S. Maiti. He highlighted the contribution made by DMAPR and its collaborating centres in

the field of MAP. Prof. S. S. Parihar, Division of Seed Technology, IARI, New Delhi and coordinator of the project highlighted the need of such collaborating project on MAP seeds. He highlighted in brief the concept of the project. He also added that availability of high quality seeds was fundamental to the success of agriculture since crop production relies heavily on high quality seeds. Dr. Parihar further added that "Formulation of Seed Standards in Medicinal and Aromatic Plants" was an important issue at present and it figured as an agenda item in the 14<sup>th</sup> Technical Committee Meeting of Central Seed Certification Board. He emphasised that fundamental knowledge about mechanism underlying in seed development, germinability, dormancy and storability was required to improve the performance of seed.

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## EDITORIAL

**M**edicinal and aromatic plants sector is now gradually gaining importance worldwide because of notional change in the mindset regarding safety and having lower side effects of herbal drugs than synthetic drugs. India is not an exception. It has rich cultural heritage of using medicinal plants in its well developed traditional health care systems such as Ayurveda, Unani and Siddha. Global upsurge of demand for medicinal plants and plant products has created an opening in India for more business, markets, involvement and awareness among the growers, collectors, policy makers, researchers, funding agencies, etc.; although it is not yet proportionate to the bio-diversity we have in our country. However, there is now euphoria among the funding agencies to be associated in this field. It is heartening to note that adequate fund is pouring in for research in the various institutions from agencies like, NMPB, DBT, DST, NHM and NAIP. Some of the states have gone one step further and are funding for developing and maintaining herbal gardens in primary and secondary schools. These efforts will not only increase the awareness among the common men but also help in conserving the biodiversity of medicinal plants. It will also revive the lost faith on herbal medicines and the culture of using medicinal plants in daily life for primary health care and also support the vast requirement of primary health care system giving a complementary alternative .

When so many agencies are eager to fund, no doubt, there will bound to be some discrepancies. All of a sudden many agencies are also trying to encash the “medicinal and aromatic plants” as buzz words for drawing the attention of funding agencies as well as getting funds for their projects. At present, there is no mechanism available to the funding agencies for sharing their information to benefit other agencies in the absence of a common platform for data sharing as available in the banking and credit card sectors. End result is duplication and unprofessional funding to substandard projects. In the existing situation, none is benefited rather defamed at certain occasions. It would be prudent if at national level a data sharing platform is created with the help of our highly recognised IT professionals which would support funding agencies to place their fund for right projects and in right institutions.

DMAPR has taken up a similar initiative for creating and maintaining a web platform [www.herbalgardenindia.org](http://www.herbalgardenindia.org) with the generous funding from NMPB for sharing the herbal gardens inventory data on voluntary membership basis. It helps everyone

to find the availability of a species at the nearest herbal garden unlike directing “Hanumanji” to bring “Gandhamadan Parvata” for “Mritha Sanjivani”.

Although herbal medicines are presumed to be safe, the greatest challenges facing growth and export of herbal medicines and raw drug are their quality, safety and efficacy which are interdependent and needs to be regulated and monitored starting from the production and collection of raw drug. Specific guidelines for Good Agricultural and Collection Practices have been framed by the NMPB in the line of GACP suggested by WHO. Now it is the time to bring GACP in practice with the help of implementing agencies. It would be successful only if the stakeholder involved in production and marketing of GACP compliance raw drug gets premium price commensurate to the extra care and caution to be taken up. Of course, if our herbal drug industries whole heartedly support the GACP certified raw drugs for their consumption, there will be immense opportunities for generation of rural employment in this new sector in the form of various record keeping and awareness activities.

I eagerly look forward to the growth and development of this vital sector which involves the health and should not compromise with the quality, safety and efficacy of drugs at no circumstance. Health is wealth for the nation.

Jai Hind!

Satyabrata Maiti

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Dr. Rajendra Gupta stated that Government of India prescribed seed standards were notified for more than 95 crops viz. cereals, millets, pulses, etc. However no such standards were available for medicinal crops and hence this kind of project was timely and promising at this juncture.

The objectives of the project are (1) to standardise and subsequent revalidation of seed testing protocols and (2) to formulate the ‘Seed Standards’ on the basis of market survey and testing of a large number of samples. The project at present will work on 21 species such as Bael, Dil, Akarkara, Malariabuti, Beladona, Kusum, Patang, Aparajita, Sankhpuspi, Viabidang, Ajawain, Mehndi, Chandrasur, Jivanti, Velvet bean, Bhui amla, Chitrak, Babchi, Manjistha, Silaras and Jojoba.

The programme came to an end with vote of thanks proposed by Dr. Manish Das, Sr. Scientist, DMAPR.

## Breakthrough & Research Highlights

### New improved tapping method for guggal

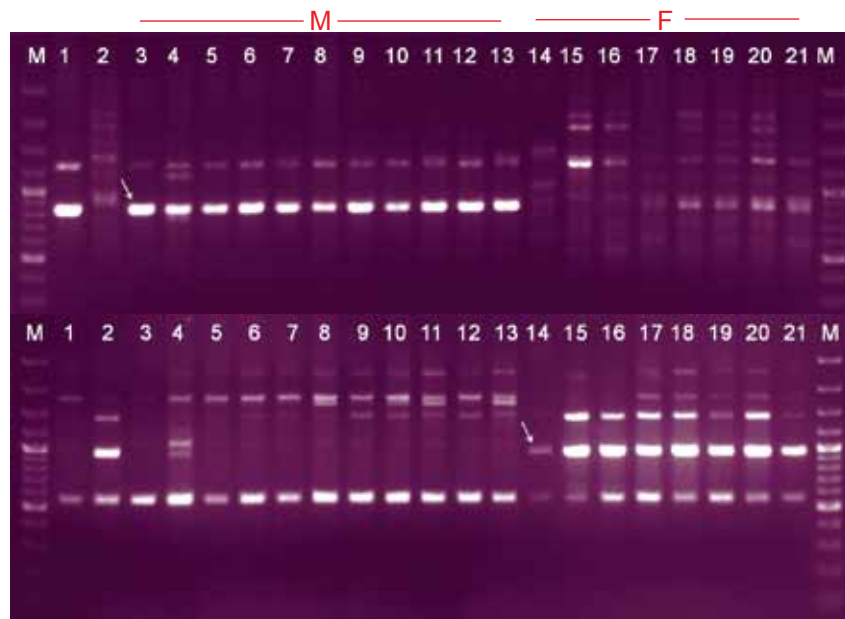
DMAPR has filed a process patent application in the Indian patent office, Mumbai for gum tapping of guggal (*Commiphora wightii*). Guggal gum, commonly known as guggulu, traditionally is used for its fragrance when burnt. It is also used in several ayurvedic preparations. Modern medicine has approved its efficacy in cholesterol lowering capacity. Guggulu is extracted by tapping 5–15 years old plants. Tapping method in vogue requires making an incision at the stem base and application of a suspension/ slurry of guggulu in



water. Several additives such as, copper sulphate, horse or wild ass urine, etc. are often used by local people with the belief to increase guggulu production.

Usually, plants are tapped after rainy season (October–November). However, success rate is very erratic. The novel process involves application of a natural bio-initiator at certain concentration to induce guggulu oozing. The claimed method results uniform success rate in tapping. This is found to induce guggulu production from any guggal plant irrespective of its age and season. Any branch can be tapped by this method which ensures full extraction of the guggulu over a prolonged period of time. Hence, this method can be used for organised guggulu farming for assured gum tapping and increased productivity.

### Identification of sex-linked molecular markers in betelvine



The Random Amplified Polymorphic DNA (RAPD) technique was used to amplify DNA segments, with the objective of finding markers linked to sex determination in male and female plants of betelvine (*Piper betel*). Fifty different random decamer primers were to identify markers associated with sex expression of

which only four primers were found to be associated with sex expression. These four primers were then tested with individual plant DNA samples where sex-associated RAPD markers were identified. A ~1400bp and ~850 bp fragments from the primer OPA 04 and OPN 02, respectively were found to be present in all

the male individuals and absent in all the females. However, primer OPC 06 resulted a ~980 bp amplification product only in the female individuals. A common primer OPA 08 showed both male and female specific markers of 650 bp and 1200 bp, respectively. Thus, the three male-specific RAPD markers OPA04<sub>1400</sub>, OPA08<sub>650</sub> and OPN02<sub>850</sub> and two female-specific markers OPA08<sub>1200</sub> and OPC06<sub>980</sub> can reliably differentiate the male and female plants of *P. betel*.

### New leaf blight disease of Artemisia

**A**rtemisia (*A. annua*) is a commercially important medicinal plant used by traditional Chinese herbalists to treat fever. Interest in this plant renewed after it was found to contain an antimalarial sesquiterpene lactone – artemisinin. Its cultivation has been initiated in different parts of India. The crop was introduced at DMAPR, Anand and the crop growth was satisfactory. However, a leaf blight disease became prevalent. Initial symptom was



the appearance of minute, brown lesions on the leaf margin. As these lesions enlarged the lamina turned yellowish and later appeared blighted. The leaves often curled upward and dried prematurely. *Alternaria alternata* was found to be associated with the disease. The organism

was isolated, purified and its pathogenicity was established. As artemisinin is chiefly located in the leaves, the disease may affect its yield. The fungus is also known to produce several mycotoxins in different hosts. Hence, occurrence of this disease needs serious attention.

### Nursery technology for Kalmegh standardised

**K**almegh (*Andrographis paniculata*) is a well known antipyretic and used against fevers. It is also an immunomodulator drug with a bitter diterpenoid – andrographolide as the active principle. It is an annual medicinal herb cultivated during kharif season. Seeds are small in size and difficult to harvest due to shattering. Hence, usually it is grown as a transplanted crop. DMAPR took up nursery technology development. It was observed that application of 4



kg FYM for 1 m<sup>2</sup> seedbed was optimum. It supported good vegetative growth of the seedlings and produced average seedling height of 6 cm at 7 weeks after sowing (WAS). Seeds sown in rows at 12.5–15 cm distance produced maximum transplantable seedlings from unit area. Close spacing possibly increased inter-plant competition and the seedling growth was affected. Application of 3–4 gm seeds in a 1 m row was optimum. Lower and higher seed rates than this produced fewer transplantable seedlings. Erecting agro-shade net over the nursery and mulching seedbeds with straw favourably helped seedling development. Any shade net providing 30–75% light cut were equally effective for kalmegh. Both these interventions reduced temperature of the seedbed and conserved soil moisture. Thus seed germination and seedling development were better and uniform. Accordingly, plants became ready for transplanting 10-14 dys earlier than the open seedbeds.

### A new insect infesting satavari

**S**atavari (*Asparagus racemosus*) is perennial medicinal plant commonly found distributed all over India. Fleshy roots are used for indigenous medicines. In India, the crop is cultivated in small pockets. Among insect pests, grasshopper, aphids, army worm and a mite is known to infest but no major damage is observed. During a survey for insect pests, it was observed that both grubs and adults of a beetle were feeding on the young shoot of asparagus in the herbal garden of DMAPR, Anand. They were found to gnaw at the tender shoot at the tip and surface of stems and also chew the leaves. On an average 10-12 grubs and 5-6 adults per shoot were recorded. The adult beetle was metallic light brownish in colour and measure about 4.8 mm in length and 2.3 mm in width; while the grubs were greyish in colour with dark black head and legs. The infestation by this insect was recorded on more than 50% of the plant population. The beetle was identified as *Lema downesi* Baly (courtesy Dr. V.V. Ramamurthy, IARI, New Delhi). This is the first record of this insect on *Asparagus racemosus* from India.



Grubs on *Asparagus* shoot and mature male (M) and female (F) beetles

## From the Institute

### Institute Management Committee meeting

The IMC meeting was held on February 13, 2009 under the chairmanship of Dr. Satyabrata Maiti, Director, DMAPR. The meeting was attended by Dr. B. G. Bagle, Head, CHES, Godhra; Dr. S. Samantaray, Sr. Scientist (Biotechnology); Dr. M. Das, Sr. Scientist (Plant Physiology); Dr. K. Mandal, Sr. Scientist (Plant Pathology); Mr. R. T. Thakar, AAO and Mr. T. A. Vishawanath, AFAO as members. Dr. Maiti welcomed all the members and highlighted achievements of *Centella asiatica* unique germplasm registration and filing of a patent on aloin extraction from *Aloe vera*. Action taken on the earlier recommendations was presented followed by discussion on new agenda items. The meeting ended with vote of thanks.

### Research Advisory Committee meeting held

Meeting of the RAC was held on June 11, 2009 under the chairmanship of Dr. B. R. Tyagi, Ex-Deputy Director, CIMAP. The meeting was attended by Dr. A.A. Farooqui, Ex-Prof. & Head, Divn.

of Hort., UAS, Bangalore; Dr. P.L. Tandon, Ex Principal Scientist, PDBC, Bangalore ; Dr. Umesh Srivastava, ADG (Hort. II), ICAR, New Delhi; Dr (Mrs) Sushma Chaphalkar, Director, School of Biotechnology, Baramati, Pune; Dr. S. Maiti, and all scientists of DMAPR. The meeting started with presentation of bouquet to the chairman and members of the RAC. Dr. S. Samantaray, member-secretary appraised the house about the action taken on suggestions made during the last RAC meeting. Dr. Maiti made an elaborate presentation on the progress of research work since February 2008. He emphasised, with limited scientific and technical staff the institute had tried its level best to achieve the set targets. Chairman and members suggested several aspects to be taken up for further research. The meeting ended with vote of thanks proposed by Dr. P. Manivel, Pr. Scientist, DMAPR.

### Distinguished Visitors

- Dr. Pitam Chandra, ADG (PE), ICAR, New Delhi on 17.1.2009
- Dr. S. D. Kulkarni, PD, SPUC, CIAE, Bhopal on 17.1.2009

- Prof. J. P. Khurana, Dept. of Plant Molecular Biology, New Delhi on 17.2.2009
- Prof. D. R. Sharma, Ex. Director of Research, Dr. YSPUH&F, Solan on 17.2.2009
- Dr. K. A. Singh, Director, IG&FRI, Jhansi on 23.2.2009
- Dr. Mohan Lal Sharma, PCCF, Govt. of Gujarat, Gandhinagar on 28.2.2009
- Dr. R. V. Asari, Addl. PCCF (D&M), Govt. of Gujarat, Gandhinagar on 28.2.2009
- Dr. Rajendra Gupta, Retd. Project Coordinator, AICRP on MAP, New Delhi on 28.2.2009
- Dr. S. Nagarajan, Chairperson, PPV&FRA, Govt. of India, New Delhi on 4.3.2009
- Dr. S. N. Shukla, ADG(F&FC), ICAR, New Delhi on 4.4.2009
- Dr. B. R. Tyagi, Chairman, RAC & Retd. Dy. Director, CIMAP, Lucknow on 11.6.2009
- Dr. Umesh Srivastava, ADG (Hort. II), ICAR New Delhi on 11.6.2009
- Dr. J. B. Misra, Director, DGR, Junagadh on 26.6.2009

## Human Resource Development

Name	Details	Date
Dr. P. Manivel, Principal Scientist (Plant Breeding) Mr. T.A. Vishwanath, AF&AO Mr. R.T. Thakar, AAO	Training/ workshop for consortia partners on "Procurement related matter and financial management system under World Bank funded project of NAIP" at CIFE, Mumbai	4-6 <sup>th</sup> January, 2009
Dr. K. A. Geetha, Senior Scientist (Plant Breeding)	Training on ovule clearing technique at NRCPB, New Delhi	13-16 <sup>th</sup> January, 2009
Dr. L. Saravanan, Scientist (Entomology)	Training on "Modern trends in Pest Management" at TNAU, Coimbatore	13 <sup>th</sup> February to 5 <sup>th</sup> March, 2009
Dr. Mahesh V. Kawale, Research Associate (Botany)	Training/workshop on "Taxonomy, reproductive biology and conservation" at CEMDE, University of Delhi.	18-27 <sup>th</sup> February, 2009

## Farmer-Industry meet



A farmer-Industry meet was organised at DMAPR on March 9, 2009. Representatives from the essential oil industry led by Dr. Shivam Varshney, Director, Som Extracts Ltd, Noida along with Mr. Vinoo Assar, Mohini Perfumers Pvt. Ltd., Mumbai; Mr. Kamlesh Shah, Anant Fragrance Pvt. Ltd., Ahmedabad and others attended the meet. More than ten farmers practising or interested in aromatic crops cultivation were major participants of the meeting. The meeting started with welcome address by Dr. S. Maiti, Director, DMAPR and followed by presentation of bouquet to the guests. Dr. Varshney informed the state of aroma industry in the country and demand of natural fragrance. He emphasised that some crops like artimisa, mint, etc which were not yet cultivated in Gujarat extensively could also be tried. Principal part of the meeting was interaction between the industry and farmers. Individual farmers shared their experiences, clarified doubts and expressed their needs. The meeting ended with vote of thanks proposed by Dr. K. Mandal, Sr. Scientist, DMAPR.

## Species of Conservation Interest

### *Garcinia cambogia* (Gaertn.) Desr. (syn. *G. gummi-gutta* (L.) Robson)



*G. cambogia* belongs to the family Clusiaceae (Guttiferae). It is a tree of about 5-15 m tall with rounded crown and horizontal or drooping branches. It is distributed in semi-evergreen to evergreen forests of Western ghats in Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu. It is popularly known as Bilaiti amla or kokkam.

Leaves are dark green with shining surfaces. Male, female and bisexual flowers are separately seen in the same or different plants. Male flowers are arranged in clusters and female and bisexual flowers are found solitary or in clusters. Fruit is ball shaped berry with 4-10 vertical grooves in the outer fleshy rind. On ripening, fruits turn yellow in colour. Seeds are 4-10, covered with fleshy, white or red aril. The trees flower in December to February and fruit in March

to August. The fruits are edible and the rind is sour in taste. The dried rinds are valued as condiment in Kerala. The leaves, fruits and seed oil are medicinal and are used for the treatment of ulcers, inflammations, bleeding piles, diarrhoea, dysentery and indigestion. The fruit pulp extract is used for treating obesity. Decoction of the fruit rind is given in rheumatism and bowel complaints. The seeds yield edible fat and can also be used as kokkam butter which is commonly prepared from *G. indica*.

It is propagated by seeds, stem cuttings and grafts. The study conducted by FRLHT (Foundation for Revitalization of Local Health Traditions), Bangalore enlisted this species under 100 threatened categories of medicinal plants. The species is categorised as 'lower risk near threatened' globally.

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Published by : The Director, Directorate of Medicinal & Aromatic Plants Research, Boriavi, Anand 387 310, Gujarat. • Phone : 02692-271602 • Fax : 02692-271601

E-mail : director.dmapr@gmail.com • Visit at: www.dmapr.org.in

Printed at : Anand Press, Anand 388 001 • E-mail: anandpress@gmail.com