Agroforestry *Newsletter*

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National Research Centre for Agroforestry, Jhansi-284 003

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Forthcoming Events

- Farmer's Innovation Day: 16th November, 2013.
- Institute Joint Staff Council/ Women Cell's / PME Cell meetings.
- Painting and Essay Competition for Children under WAC 2014.

Issues Highlights

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***Parthenium* Awareness Week**

Parthenium hysterophorus L. (Asteraceae) commonly known as carrot weed, congress grass or gajar ghas is a native of Central and Southern America and is a major weed of both agricultural and urban situations throughout India. The weed was spotted for the 1st time in India in 1955 and has now invaded about 35 million ha area in the country.

Parthenium is an annual herb in which flowering occurs in about a month after germination. A single plant can produce about 5000-25000 seeds and can produces even up to 100,000 seeds in its lifecycle. Its seeds do not have a dormancy period and are capable of germinating anytime when moisture is available. The highest germination rates are at temperatures ranging from 12 to 27 ^{0}C. It is a neotropical weed, which also constitutes a serious health hazard due to its allergenic properties. The pollen grains, air borne pieces of dried plant materials and roots of *Parthenium* can cause allergy-type responses like hay fever, photodermatitis, asthma, skin rashes, etc. Infestation by *Parthenium* degrades natural ecosystems. It can be controlled by adopting mechanical measures (uprooting during monsoon season before flowering), sowing of *Cassia tora* seeds in the heavily infested areas, application of glyphosate (1-1.5%) before flowering. One of the best methods to eradicate this weed is through the release of bioagent Mexican beetle "*Zygogramma bicolorata*" during monsoon season.

NRCAF observed the "*Parthenium* awareness week" during 16th -22nd August, 2013. 50 boxes of bioagent Mexican beetle "*Zygogramma bicolorata*" were procured from DWSR, Jabalpur as a gift in a move to save the land and environment from *Parthenium*. Each box was containing about 400-500 beetles. During the *Parthenium* awareness week, NRCAF organized lectures, demonstrations, meetings etc. to spread the message. During the week's awareness movement a *Parthenium* awareness programme was organized at Parasai (Parasai-Sindh Watershed) in Babina Block of Jhansi district on 17th August, 2013. This programme was organized in collaboration with ICRISAT, Hyderabad and DWSR, Jabalpur. The awareness programme started with the welcome address and brief introduction about the watershed by Dr. Ramesh Singh, Principal Investigator, Parasai-Sindh Watershed project. On this occasion Dr. Sushil Kumar, Principal Scientist, DWSR, Jabalpur, the expert of *Parthenium* management was the key speaker. Dr. Sushil Kumar explained about *Parthenium*, its biology and control and also the efforts being done by DWSR, Jabalpur in its management. In his address he explained in detail about the biological control of *Parthenium* with Mexican beetle. On the occasion Dr. S. K. Dhyani stated that community level awareness and participation is needed to control this weed through various methods *viz*., chemical, biological control and mechanical and its indirect control through its utilization as compost. Thereafter, a practical demonstration was given on how to release the Mexican beetle on *Parthenium*. Mexican beetle "42 boxes" were distributed to the farmers of three villages' *viz*., Parasai, Chhatpur and Bachhauni (Parasai-Sindh Watershed); subsequently these beetles were released by the farmers in their fields in the presence of watershed team. During this programme Dr. Anil Kumar, Dr. R. K. Tewari, Dr. Ram Newaj, Dr. Rajendra Prasad, Dr. Mahendra Singh, Dr. K. B. Sridhar and Mr. Rajesh Srivastava from NRCAF were also present. The awareness programme was attended by about 120 farmers, farmwomen, school children as well as the watershed committee of Parasai-Sindh Watershed. Dr. R. P. Dwivedi, Pr. Scientist thanked the participants and scientists.

NRCAF also organised a lecture on *Parthenium* and its management on 17th August at the Centre and the key lecture was delivered by Dr. Sushil Kumar, DWSR, Jabalpur. A video on *Parthenium* was also shown to the audience on this occasion. The programme was attended by the farmers, U. P. State Govt. officials, NRCAF staff and students. There were about 80 participants present during the lecture. During the awareness week about 900 beetles (two boxes) were released at Banda in the *Parthenium* infested area. About 500 Mexican beetles were also released in the heavily *Parthenium* infested wastelands in nearby NRCAF area. In order to make NRCAF free from *Parthenium* mechanical and biological measures were adopted. Five boxes (about 2500) of Mexican beetles were released on the *Parthenium*

in the NRCAF campus and Research Farm area. Awareness Week was co-ordinated by Dr. Inder Dev, Pr. Scientist (Agronomy).

Director, NRCAF, Jhansi and Dr. Sushi Kumar, DWSR, Jabalpur speaking on *Parthenium* and its management during *Parthenium* Awareness week at Parasai (Parsai-Sindh Watershed), Jhansi

Director, NRCAF, Jhansi demonstrating the release and gifting of Mexican beetle to the farmers

Zygogramma bicolorata (Mexican beetle) feeding on Parthenium

Inder Dev and Ramesh Singh
National Research Centre for Agroforestry, Jhansi-284003

Use of Ethephon for Inducing Gummosis in Trees: Effects on Gum Yield and Health of A*nogeissus pendula* E. in Bundelkhand, Central India

Gum and resin form an important group of non-wood forest products. The industrial applications of gum and resin have expanded tremendously in recent years. They are used in many industries such as paper, textile, petroleum, pharmaceutical, cosmetics, food, varnishes, lacquers and soaps. *Anogeissus pendula* is a gum producing tree occurring naturally in arid and semi-arid areas, particularly in Bundelkhand region and offers livelihood options through its potential uses. The main constraint is that it exudes negligible quantity of gum in nature, which can be overcome by the use of gum inducer. For enhancing gummosis, ethephon (2-chloroethylphosphonic acid), a synthetic chemical compound which releases ethylene in plant tissue has been used as gum inducer in several plants (Bhatt and Mohan Ram, 1990). However, its unscientific application for tapping gum leads to the death of plants. Therefore, a study was undertaken at the Centre aiming standardization of proper dose and season of application of ethephon for optimizing gum yield from *A. pendula* without affecting tree health. The field trial consisting of three doses *viz.,* 390, 780 and 1170 mg of active substance of ethephon was conducted on 15 years old plantation of *A. pendula* at Central Farm and 4 ml solution of each dose was injected at base of tree-trunk (Plate 1) in a hole made by tree borer. After injecting ethephon solution, hole was plugged with mud ball. Each dose was applied on 4 trees and trial was repeated every month throughout the year. In each month ethephon was applied on new trees. The exuded gum (Plate 2) was collected within 15 days of ethephon application. Trees receiving ethephon were monitored for any defoliation, dryness or casualty and sugar content of wood was analyzed before and after one month of application of ethephon to assess tree health.

It was observed that the dose of ethephon as well as season had significant influence on gummosis in *A. pendula.* The data on gum exudation as affected by use of ethephon has been depicted in (Fig 1). During rainy season (July and August) exudation in *A. pendula* was not observed. During summer months (April, May and June) gummosis was noticed only with ethephon dose 1170 mg. On an average, maximum gum yield (65.3g tree^{-1}) was obtained in the month of October with the ethephon dose of 1170 mg.

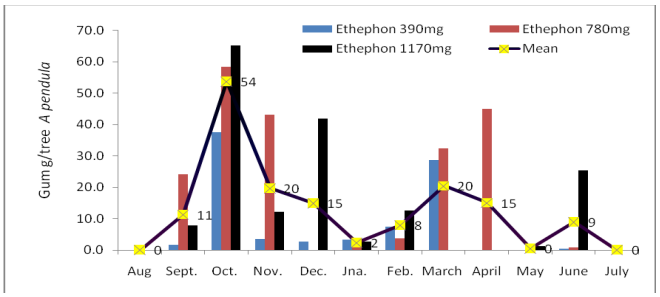

Fig. 1. Effect of use of ethephon on gum yield from 15 year old trees of *A. pendula*

Plate1. Hole at base of

Plate 2. Gum-bead exuded after ethephon application

The exuded gum presented variety of forms *viz.* globular, tear shaped or irregular masses and of good quality. Use of ethephon did not show any negative effect on tree health in term of defoliation, wilting or drying. The injury caused due to boring a hole for injecting ethephon solution also got healed in 3-4 months. Doses of ethephon had no effect on sugar content of wood. However, on an average, wood sugar increased significantly from 3.38 to 4.45 mg g^{-1} after one month of ehethphon application (Table1).

Table 1. Effect of Ethephon on sugar content of wood of *A. pendula*

Treatment	Sugar (mg g^{-1})
Ethephon dose	
390 mg	3.9
780 mg	3.82
1170 mg	4.16
Level of significance	NS (P=0.285)
Sugar content before ehtephon application	3.38
Sugar content after one month of ethephon application	4.45 (31.7%)
Level of significance	** (P=6.54E-09)

Study concluded that in view of negligible amount of gum oozing from *A. pendula* in nature, application of ethephon @ 1170 mg tree^{-1} in the month of October will enhance gummosis and gum yield and provide livelihood options for people of semi-arid and arid region in general and poverty stricken Bundelkhand region in particular.

Reference

Bhatt J.R. and Mohan Ram H.Y. 1990. Ethephon induced gum production in *Acacia senegal* and its potential value in the semi-arid regions of India. *Current Science*, 59(23): 1247-1250.

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NRCAF Technologies Adopted by Line Departments and NGOs

In India, the needed increase in food grain production to meet increasing demand has to come largely from 94 m ha of rainfed areas, as there is little scope to expand large-scale irrigation in the country. In turn, Government of India has to invest huge sum towards rainwater harvesting structures to augment water availability in such regions. Therefore, any efforts for cost effective design of rainwater harvesting structure and extending the life of existing structures through leak proofing leads to significant saving of public money. NRCAF developed appropriate technologies for designing Cost-effective Rainwater Harvesting Structures (RHS) and leak proofing technique for existing structures. A brief note of adoption of these technologies is give here.

The technique of construction of low cost RHS was applied in the checkdams constructed in the Garhkundar-Dabar and Parasai-Sindh watersheds. These checkdams are serving the community efficiently for more than seven years without any repair and maintenance. The technique can potentially reduce 15-25% cost of construction without affecting efficacy and life of RHS particularly checkdams.

1 This technique was popularized through trainings/workshops/exposure visits/lectures etc. A number of government agencies/NGO successfully adopted the technology and therefore, saved significant amount of government exchequers.

2. Rainwater harvesting was in practice in Bundelkhand region since ages and it was done through construction of large structure across the flow of water. Rainwater stored against such structure was used for drinking, irrigation and ground water recharge. Usually, site of such structure was very strategic. Large areas draining between two adjacent hillocks were ideal for construction of such structure. The two hillocks were joined together with huge earthen structure and fortified with stone masonry. Water accumulates on the upstream. Usually such structures were provided with masonry spillway to drain out excess water for safety of structures. The submergence area of such structures ranged from 50 to 500 ha. Large structures were never completely drained. They were used for fish culture and sometimes for cultivation of water chestnut and lotus. Such huge structures were even equipped with canal for providing for irrigation in downstream. Small to medium structures were completely drained off in October to facilitate growing of wheat/gram/peas/mustard during *rabi* season in impounded bed area. It was observed that spillway of small to medium structures, with time, started leaking. Similarly checkdams constructed in water courses to store small quantities of rainwater in drains were also found leaking due to faulty construction particularly below ground. Thus, the very purpose of construction of such structures was lost. Therefore, it was thought essential to develop a technology to check leakage. The Center developed a technique to check leakage of such old structure while working in Garhkundar-Dabar watershed and advocated the use of this technology at various platforms by line departments engaged in soil and water conservation.

These technologies *viz.* cost effective design of RHS and leak proofing were adopted by govt. and non-governmental agencies for the benefit of stakeholders. A list of line departments those adopted and narrated success of technologies with location is given below:

List of agencies adopted technologies developed by NRCAF, Jhansi

S. No.	Name of agencies	Village	Name of	State

		Panchayat (Nos)	Tehsil/District	
1.	Deptt. of Land Development and Water Resources, Govt. of U.P.	12	Jhansi	U.P.
2.	Dept. of Agriculture, Govt. of U.P.	11	Mahoba (in Kulpahad, Charkhari and Mahoba tehsils)	U.P.
3.	Development Alternatives (DA), Taragram Pahuj, Jhansi (NGO)	07 (43 structures)	Datia and Jhansi	M.P. and U.P.

A number of agencies are approaching NRCAF for training and demonstration of theses technologies.

Ramesh Singh, R. K. Tewari and S. K. Dhyani
National Research Centre for Agroforestry, Jhansi-284003

Visit Abroad

Dr. S.K. Dhyani, Director participated in the 22nd International Grassland Congress in Sydney, Australia during 15th to 19th September, 2013.

Van Mahotsava

NRCAF organized Van Mahotsava at Parasai- Sindh Watershed, Jhansi on 17th July, 2013. About 1200 plants of various species of Teak, Bamboo, Citrus and Guava were planted on farmland as agroforestry plantation by the farmers, ITC trainees and staff members of the Centre.

Farmers' Training Programmes on Ber Budding

A three days training programme on Ber budding was organized by the NRCAF during 26-27 & 29 July, 2013 at Parasai, Chhatpur and Bachhauni in Babina block of Jhansi district. The programme was coordinated by Dr. R. P. Dwivedi, Pr. Scientist (Agril. Extension) and Dr. Ramesh Singh Sr. Scientist (SWCE). Total 13 farmers were trained in ber budding. Extension and training tools and approaches were used to conduct the training programme.

Institute Research Council

Institute Research Council (IRC) meeting was held on 2nd & 3rd July, 2013. All the Scientists of the Centre participated in the meeting and presented the progress and significant findings of their projects as well as new research proposals.

PME Meeting

A meeting of the Prioritization, Monitoring and Evaluation (PME) cell was held on 7th August, 2013 which was attended by all the Scientist of the Centre.

Trainings on Agroforestry

Centre organized three days training from 15th to 17th July, 2013 on "Agroforestry Models for Improving Soil Health by Promoting Vegetation in M.P." coordinated by I T C, Bhopal for different NGOs working on watersheds in Malwa and Mahakaushal region of M.P. In the training 29 participants participated. The programme was coordinated by Dr. Indre Dev, Pr. Scientist and Dr. K. B. Seedhar, Scientist.

Two Training programmes (2nd to 4th and 16th to 18th August,2013) for officers /officials of Watershed Project Implementing Agency, WDT members, members of Watershed Committee, members of SHGs, grassroot level workers and farmers from Banda –II on Planning and Execution of Watershed project under IWMP Scheme were organized. 62 participants from Banda district participated in the training. These two training programmes were coordinated by Dr. Indre Dev, Pr. Scientist and Dr. Ramesh Singh, Sr. Scientist and Sh. S.P. S. Yadav, Tech. Officer.

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Human Resource Development

- Dr. K. B. Sridhar, Scientist participated in one week management training programme on "Consultancy Project Management" during 1st -7th August, 2013 held at NAARM, Hyderabad.

- Dr. Ramesh Singh, Sr. Scientist (Soil and Water Conservation Engineering) attended All India Seminar on "Recent Advances in Watershed Development Programme (RAWDEP)" organised by Institution of Engineers, Ahmednagar Local Centre, Maharashtra at Padamashri Dr. Vitthalrao Vikhe Patil College of Engineering, Ahmednagar, during 5th & 6th September, 2013 and presented research paper.

- Dr. Badre Alam, Sr. Scientist participated in a National Workshop on "Building Awareness about the Need and Nature of National Fund for Basic Strategic and Frontier Application Research in Agriculture (NFBSFARM)" during 6th to 7th September, 2013 held at NDRI, Karnal.

- Dr. Ajit, Pr. Scientist participated in the "Partner's Meet and 4th Installation-cum-Training Workshop for SAS-Nodal-Officers" during 17th &18th September, 2013 held at IASRI, New Delhi.

- Dr. A. K. Handa, Pr. Scientist delivered invited lecture on "Agroforestry Role in Integrated Farming System Approach" organized by Zonal Project Coordinated III at Guwahati on 18th September,2013 for Scientists from KVKs of Zone III.

- Dr. Ramesh Singh, Sr. Scientist (Land and Water Management Engg.) and Dr. K. B. Sridhar, Scientist attended "Asia Pacific Workshop on Forest Hydrology: Water and Forest-Beyond Traditional Forest Hydrology" organised by FRI, Dehradun, APAFRI, Malaysia and KFRI, Korea at FRI, Dehradun during 23rd -25th September, 2013. Dr. Ramesh Singh presented a research paper titled "Influence of Land Use on Water Yield in Drought Prone Bundelkhand Region of Central India" authored by Ramesh Singh, R. K. Tewari and S. K. Dhyani

World Congress on Agroforestry, 10th -14th February, 2014
New Delhi
Organized by:

World Agroforestry Centre

ICAR

INDIAN SOCIETY OF AGROFORESTRY ISAF

global initiatives®

Painting and Essay Competition for Children

(Cash prize and trophy/medal)
Age group for painting competition: 6-12 years
Age group for Essay competition: 13-18 years

Painting and Essay theme: Trees for Life

Award will be given on 10 February, 2014

For Important information for Painting and Essay competition visit www.nrcaf.ernet.in

The painting and essay must reach on or before 30.12.2013 through registered/speed post to **President, Indian Society of Agroforestry (ISAF), National Research Centre for Agroforestry, Gwalior Road, Jhansi-284003 (Uttar Pradesh). The essay may also be sent through email (email address: isaf.secretary@gmail.com; isaf.nrcaf@rediffmail.com)**

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