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माननीय डॉ. एस. अय्यप्पन द्वारा कृषिवानिकी संस्थान का भ्रमण

माननीय डॉ. एस. अय्यप्पन, सचिव (कृषि अनुसंधान एवं शिक्षा विभाग) एवं महानिदेशक (भारतीय कृषि अनुसंधान परिषद्), नई दिल्ली और डॉ. आलोक कुमार सिक्का, उप-महानिदेशक (प्राकृतिक संसाधन प्रबंधन, भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली) द्वारा केन्द्रीय कृषिवानिकी अनुसंधान संस्थान, झाँसी का दिनांक 17 नवम्बर, 2014 को भ्रमण किया गया। इस अवसर पर महानिदेशक, उपमहानिदेशक तथा कुलपति, केन्द्रीय कृषि विश्वविद्यालय, झाँसी ने



पौधारोपण किया। डॉ. एस. अय्यप्पन ने संस्थान के सभी वैज्ञानिकों तथा कर्मचारियों से शोध सम्बन्धित कार्य प्रणाली पर चर्चा की और कृषकों के साथ मिलकर सहभागिता के आधार पर शोध करने पर बल दिया जिससे उन्नत कृषि तकनीकों के प्रसार की अड़चनों को दूर किया जा सके। डॉ. अय्यप्पन ने राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र



के उच्चीकरण पर सभी को बधाई दी और संदेश दिया कि इस उच्चीकरण के फलस्वरूप संस्थान से कृषकों की अपेक्षाएं और अधिक बढ़ गयी हैं जिन्हें पूरा करने के लिए संस्थान के सभी वर्गों के कर्मचारियों को वर्तमान में और अधिक मेहनत करने की आवश्यकता है।

NOTIFICATION

Consequent upon the decision of the Competent Authority of ICAR, The **National Research Centre for Agroforestry, Jhansi** under NRM Division has been upgraded as **Central Agroforestry Research Institute (CAFRI), Jhansi** w.e.f. 1st December, 2014 as approved in the XIIth Plan EFC (vide ICAR Communication F. No. 1-25/2014.PIM Dt.10/09/2014).

Happy New Year
2015

From Director & Editorial Board

International Training programmes on Agroforestry at Central Agroforestry Research Institute, Jhansi and World Agroforestry Centre, Nairobi, Kenya

In the current scenario, agroforestry is being looked upon as a solution to the problems related to low agricultural productivity, nutritional, energy and environmental security. To achieve full potential of the agroforestry and to remove the hurdles in the large scale adoption of the land use by the farmers across the country, the Government of India approved National Agroforestry Policy which was launched on 10th February, 2014 by the Hon'ble President of India Sh. Pranab Mukherjee while inaugurating the 3rd World Agroforestry Congress in New Delhi. To achieve the goals of this



policy and for its implementation in true sense there is a need of trained manpower in the subject. The Indian Council of Agricultural Research (ICAR), New Delhi and World Agroforestry Centre (ICRAF), Nairobi, Kenya signed a collaborative Work Plan for enhanced focus in R & D in agroforestry. Two simultaneous five days International training programmes were conducted under ICAR- ICRAF collaborative Work Plan during 1st -5th December, 2014. The training programme on Research Methods in Agroforestry was organized at Central Agroforestry Research Institute (CAFRI), Jhansi, India and the training programme on “Use of Geo-informatics for Mapping Agroforestry” was held at World Agroforestry Centre, Nairobi, Kenya. For the first time training programmes on agroforestry were formulated involving researchers from SAARC countries, ICAR Institutes and State Agricultural Universities of India. Dr. Javed Rizvi, Regional Director, South Asia Programme, ICRAF, New Delhi and Dr. S.K. Dhyani, Director, CAFRI, Jhansi were instrumental in formulation and organization of these two training programmes.

(1) Research Methods in Agroforestry at CAFRI, Jhansi



The training programme on “Research Methods in Agroforestry” commenced on 1st Dec. 2014 at Central Agroforestry Research Institute (CAFRI). Dr. Richard Coe, Principal Scientist (Research Methods) at World Agroforestry Centre having more than 24 years of experience in designing agroforestry experiments and Dr Ajit, Principal Scientist at Indian Agricultural Statistics Research Institute (IASRI), New Delhi an expert in agroforestry modeling were the resource persons for the training programme. The training programme evolved around interactive sessions between the resource persons and the participants enabling them to understand

the general principles of experimental design of agroforestry including participatory trials. During the training a field visit to the experimental farm of CAFRI was also conducted. This programme was attended by a total of 30 participants from Bangladesh, Nepal and Sri Lanka in addition to the scientists working under the All India Coordinated Research Project (AICRP) on Agroforestry at 15 State Agricultural Universities in India and local participants from Indian Grassland and Fodder Research Institute (IGFRI) and Central Agroforestry Research Institute(CAFRI), Jhansi.

Dr. S K Dhyani, Director, CAFRI while addressing during valedictory function informed that more such collaborative programmes will be organized in future and researchers must take full advantage of these opportunities to develop participatory trials with farmers. He called for establishing a South Asian Network on Agroforestry for strengthening partnership in the region.

Dr. A.K. Singh, Vice Chancellor, Rajmata Vijayaraje Scindia Krishi Vishwavidyalya (RVSKVV), Gwalior while distributing the certificates to the participants expressed happiness and congratulated the organizers for this initiative. He was of the opinion that such programmes help in capacity building of the researchers as well as provide opportunity for collaboration between the institutions and nations.



Scientific interactions during the training



Participants visiting the experimental farm of the CAFRI



Participants keenly observing the bio-diesel plant at the institute



Participants group photo

Dr. Pushpakumara from University of Peradeniya, Sri Lanka; Dr. C. Valli of Institute of Animal Nutrition, Kattupakkam, Tamil Nadu and Dr. M. S. Malik from Birsa Agricultural University, Ranchi provided the feedback about the training on behalf of the trainees.

Dr. Javed Rizvi, Regional Director, ICRAF assured full support on behalf of the World Agroforestry Centre for agroforestry research and development in the region. Dr. P. K. Gosh, Director, IGFRI, Jhansi, the Guest of Honour emphasized to develop more tree based agroforestry systems to meet the fodder demands of livestock. Dr. V. P. Singh, Senior Advisor, ICRAF, New Delhi and Prof. Biswapati Mandal, Pro-VC, BCKV, Kalyani also spoke on the occasion. Dr. Rajendra Choudhary from ICRAF, New Delhi along with Heads of Division from IGFRI, scientists and other staff of the institute and invitees were present during the programme.

During the programme Dr. A. K. Handa, Principal Scientist presented a brief report on the journey from the inception of NRC Agroforestry till its upgradation as CAFRI. Dr. Inder Dev, Principal Scientist conducted the function. Dr. A. R. Utthappa, Scientist proposed vote of thanks. Dr. Inder Dev was the Programme Director and Dr. A. K. Handa was the Programme Co- coordinator of this International Training Programme.

(2) Use of Geoinformatics in Mapping Agroforestry

The International Training Programme on Use of Geoinformatics in mapping Agroforestry was organized during 1st to 5th December, 2014 at World Agroforestry Centre, Nairobi, Kenya. Eight Indian scientists from CAFRI,

Jhansi; ICAR Research Complex for NEH Region, Barapani; CSWCR & TI, Dehradun; KAU, Thrissur; OUAT Bhubaneswar; UAHS, Shimoga and BISA, Jabalpur participated in this programme.

The participants were Dr. G.M. Devagiri, Associate Professor, UAHS Shimoga; Dr. P.J. Mishra, Senior Scientist, OUAT, Bhubhneswar; Dr. J.M.S. Tomar, Senior Scientist, CSWCR&TI, Dehradun; Dr. K.P. Mohapatra, Senior Scientist, ICAR RC-NEH, Barapani; Dr. Ramesh Singh and Dr. R.H. Rizvi, Senior Scientists, CAFRI, Jhansi; Dr. Asha K Raj, Assistant Professor, KAU, Thrissur and Sh. Pradeep Jangra, Asstt. Agricultural Engineer, BISA, Jabalpur.



Group Photo of participants & Faculty



Dr. Tor-G Vagen Interacting with Participants



Dr. M.N. Ahmad Presenting Geoportals of ICRAF



Visit of Participants to Geoscience Lab of ICRAF

The faculty included Dr. Tor-G Vagen, Geospatial Specialist and Course Director; Dr. Muhammad N Ahmad, Geoportals Developer both from Geoscience Lab of ICRAF and Dr. Leigh Winoweicki, Soil Scientist, International Centre for Tropical Agriculture. The training included lectures, laboratory visits, hands on exercises and interactive sessions. The participants expressed happiness on the completion to advanced techniques and instrumentation in the field. Dr. Dhyani and Dr. Rizvi expressed happiness on the completion of the two programmes simultaneously.

Research Achievements

Simultaneous tapping of gum and lac cultivation on *Butea monosperma* trees: Effect of lac production on gum yield and vice versa

Butea monosperma (Lam.) is a tree of paramount importance because of its many facet uses like medicine, food, fibre, and raw material for household industry. It is a medium sized deciduous tree distributed widely in India, Burma, Sri Lanka, Bangladesh and northwest Himalaya. It belongs to family of Fabaceae and known by various vernacular names such as dhak, palas, flame of forest, khakara, chichara, bastard teak and Bengal kino. In Indian

sub-continent it grows from 150 m to 1000 m altitude in Indo-Gangetic plain and thrives well in red soil of Indian Peninsula especially the Deccan Plateau. It is one of the most beautiful trees ascribed to have many medicinal properties and extensively used in Ayurveda, Unani and Homeopathic medicine. Every part of the plant has got some medicinal value. Roots are useful in filariasis, night blindness, helminthiasis, piles, ulcer and tumours. Flowers are useful in diarrhoea, astringent, diuretic, depurative and tonic. The stem bark is useful in indigenous medicines for treatment of dyspepsia, dysentery, ulcer, sore throat and snake bite. Gum is useful in diarrhoea, haemorrhoids, haepoptysis, haematemesis, leprosy and skin diseases. Its leaves are used for making platters, cups, bowls and beedi. The bark fibre is used for making cordage. Wood is used for well curbs and water scoop. It yields gum-butea which is one of the most economically important Non Timber Forest Produce. In addition, it is also a good host to the lac insect and produces natural leaquer. Gum butea is a dried astringent juice obtained from incisions made on the stem of the tree and known by names of *kino gum* and *kamarkas*.

The density of 10-15 tree ha⁻¹ of *Butea monosperma* occurring naturally in Bundelkhand region offers an opportunity of alternative livelihood option in the form of gum and lac production. However, simultaneous tapping of gum and taking lac cultivation on Butea trees may affect yield of lac and vice versa. Hence, to find out effect of lac cultivation on gum yield and vice versa in Butea trees, a field trial was conducted on naturally occurring 15-20 years old trees of Butea on central farm of CAFRI, Jhansi. As far as possible trees of uniform size (tree height: 7.4 -10.8m and GBH: 0.73-0.84m) were selected for the study. The moisture contents of shoots on which lac insect was inoculated ranged from 40 to 72%. Lac insect was inoculated in the month of November, 2012 and lac yield was harvested in July, 2013. For exudation of gum, trees were knothed in December and exuded gum was collected. The results revealed (Table 1) that, on an average, settlement of lac insect was slightly better on trees inoculated with lac insect than those trees where production of both lac and gum was taken. On an average, gum exudation caused reduction in lac insect settlement which was reflected in lac yield. The trees where both lac and gum production was taken yielded less lac than trees having inoculated with only lac insect. Gum yield was enhanced in trees having inoculation of lac insect as compared to those trees where only gum production was taken. It is concluded that simultaneous production of gum and lac from Butea trees yields more gum but less lac. However, interesting observation is the fact that in the beginning yield of both gum and lac increases when taken simultaneously; and decline in yield of lac is noticed only when gum yield goes beyond 400 g tree⁻¹ of Butea (Fig.1). Yields of both gum and lac were positively correlated with GBH of trees.

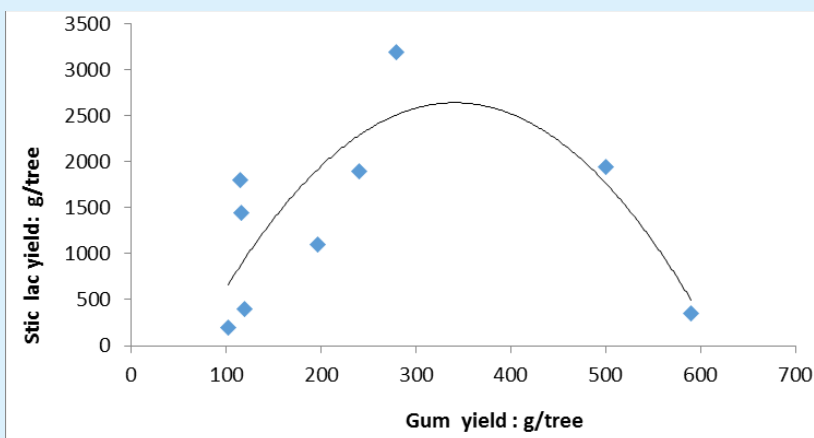


Fig. 1 Relation between Lac production and gum yield

Table 1. Effect of lac cultivation on gum yield and vice versa when taken simultaneously on Butea trees

Treatments	Tree GBH (cm)	Branch dia (mm) for lac insect inoculation	Branch length for lac insect inoculation (cm)	Sex ratio of lac insect (Male : Female) (cm ²)	Lac insect settlement (cm ²)	Gum Yield (g tree ⁻¹)	Harvested Stick lac (g tree ⁻¹)
Lac insect inoculation + Gum tapping	84.88	8.26	69.26	1:3.03	24.7	251.0	1327.2
Only Lac insect inoculation	82.33	8.46	70.67	1:3.08	26.7	75.3	--
Only Gum tapping	73	-	-	-	-	--	2083.3

Rajendra Prasad, V. D. Tripathi, Rajendra Singh and S. K. Dhyani
Central Agroforestry Research Institute, Jhansi-284003

Pear shaped Guava – A promising germplasm

Guava (*Psidium guajava*) is principle fruit crop of Bundelkhand region. Allahabad Safeda and L-49 are common commercial varieties grown in the region. However, seed origin plants can be seen scattered around wells and homestead in the region. Since guava is cross pollinated, these seed originated plants provide variability and ample opportunity for selection of promising types. One such variability was observed in Mauranipur, district Jhansi (U.P.). The solitary tree was located near well of a farmer and observed for three



years in rainy and winter season for fruiting behavior, quality and uniformity. Meanwhile, scion material was brought at Central Agroforestry Research Institute, Jhansi and plants were multiplied through soft wood cleft grafting. These were planted in Kitchen gardens of Scientists in the campus. Observations on fruit behavior indicated regular and profuse flowering and fruiting in winter season. Fruits turn light green to yellow at maturity with smooth surface.

The quality of fruits was uniform and unique with regards to shape and quality of pulp. All the fruits were pear shaped with distinct neck and belly. Seed cavity is very small and number of seeds per fruit very less. Average fruit weight is around 200g with about 120 seeds per fruit. As such, pulp constitutes about 98% of fruit weight. Seed cavity is around ¼th of fruit length with medium soft seeds. Total sugar of winter season fruits is about 7.25% with 0.4% acidity, 10° brix TSS and 150mg 100g⁻¹ pulp ascorbic acid. There is need to evaluate this germplasm with other commercial varieties for marketability/acceptability.

R. K. Tewari and C. K. Bajpai

Central Agroforestry Research Institute, Jhansi-284003

Research Advisory Committee

17th RAC meeting of NRCAF was held on 6th & 7th November, 2014 under the chairmanship of Dr. V.P. Singh, Regional Representative for South Asia, WAC, New Delhi. Dr. B. Mohan Kumar, ADG (AF & Agron.), ICAR, New Delhi; Dr. S. D. Kashyap, Former Dean, Dr. Y.S. P. University of Horti. & Forestry, Solan; Dr. D. K. Das, Former Head, IARI, Pusa, New Delhi; Prof. S. B. Nahatkar, Division of Agricultural Economics, JNKVV, Jabalpur and Dr. V. K. Gupta, Ex-Principal Scientist (NRCAF) and Dr. S. K. Dhyani, Director, NRCAF, Jhansi participated in the RAC meeting.



The RAC members interacted with the scientists, reviewed the ATR and visited the Research farm.

Institute Joint Staff Council and Women Cell Meeting

Institute Joint Staff Council (IJSC) and Women Cell meetings were held on 27th December, 2014 under the Chairmanship of Director Dr. S.K. Dhyani. Various issues related to welfare of the staff and women were discussed.

AICRP on Agroforestry, Jhargram under BCKV, Kalyani, West Bengal opts for homestead agroforestry system under TSP

Jhargram, sub-division under W. Medinipur, the most backward district of West Bengal is now coming to main stream. AICRP on Agroforestry centre under BCKV, Kalyani located at Jhargram has initiated a number of activities in participatory mode with the tribal farming communities. With the objective of developing livelihood and assuring nutritional security to the tribal people, homestead agroforestry is being developed in tribal dominated villages of Jhargram sub-division. Dr. P. K. Dhara, In-charge AICRP on Agroforestry Centre informed that on 28th September, 2014, the



Centre distributed more than 10,000 saplings including mango (var. Himsagar and Amrapali), guava (var. Baruiপুর khaga), ber (var. BAU), mahogani, kadamb, lamboo (*Dysoxylum binectariferum*) to the 510 tribal families of the 10 villages viz. Damdanga, Birdanga, Kannadoba, Pachakhali, Dalki, Krishnagar, Sirispara, Radhnagar and

Kadamkanan. The farmers were given trainings on planting the saplings and aftercare. Earlier, the Centre also demonstrated bamboo based agroforestry systems in village Banstala where farmers planted *Bambusa tulda* and *B. balcooa* with agricultural crops like paddy (upland), pigeon pea, bottle gourd and turmeric. Bamboos were also planted on the bunds of cultivated fields. Farmers are getting regular income from the sale of bamboos.



On 11th November, 2014 while visiting the tribal villages, Dr. S.K. Dhyani, Director & Project Coordinator, AICRP on Agroforestry observed very good growth and high survival of the planted saplings. It was impressive to note that the tree guards were made by the farmers utilizing locally available material. Dr. Dhyani and the team of scientists interacted with the tribal farmers to share the traditional ITK for raising bamboos, other trees and intercrops with existing plantation.

Scientists at National Children Science Congress

The district level competition for the 22nd National Children Science Congress, a nationwide science communication programme under National Council of Science & Technology Communication (NCSTC) Department of Science and Technology, Govt. of India with the focal theme of 'Understanding Weather and Climate' was organized at Mount Litera Zee School, Jhansi. Scientists from



CAFRI, Jhansi were invited to judge the forum of children from various schools with their exhibits and models on the focal theme on 11th November, 2014. A total of 70 exhibits were judged and 3 groups were selected for participation in State level and further in National level competition.



6th CCM of HPVA of NRG Project

The 6th Coordination Committee Meeting of the Network Project on Harvesting, Processing and Value Addition of Natural Resins and Gums was held during 17th & 18th October, 2014 at ICAR – National Research Centre for Agroforestry, Jhansi to review the annual progress of the centers and discuss their technical programme for the year 2014 – 2015. The representative scientists from all the networking centres namely IINRG, Ranchi (Jharkhand); CAFRI, Jhansi; CAZRI, Jodhpur (Rajasthan); Dr. YSPUH&F, Solan (Himachal Pradesh); IGKV, Raipur (Chhattisgarh); JNKVV, Jabalpur (Madhya Pradesh); MAU, Parbhani (Maharashtra); TNAU, Mettupalayam (Tamil Nadu); KAU, Thrissur (Kerala) and ICAR Research Complex for NEH Region, Umiam (Meghalaya) participated in the meet.



The meeting started with the welcome address by Dr. Rajendra Prasad, Principal Scientist & Principal Investigator, CAFRI, Jhansi followed by remarks by Dr. R. Ramani, Director, ICAR – IINRG, Ranchi; Dr. P. K. Ghosh, Director, IGFRI, Jhansi; Dr. S. K. Dhyani, Director, CAFRI, Jhansi and Dr. A. K. Bisaria, IFS and the Chief Guest of the inaugural function.

During the inaugural session, Dr. Rajendra Prasad welcomed and emphasized the need for addressing the issues related to production, processing and value addition of natural resins and gums in Bundelkhand region of to make these activities more profitable for resin and gum tappers and also to related industries. He also briefed about the objectives of the Network Project and suggested plantation of *Acacia senegal*, *Butea monosperma* at other centers of the project as well for gum tapping and lac cultivation.

Dr. R. Ramani, Director, IINRG, Ranchi also welcomed the dignitaries and briefed about three new centres included in the Network Project and emphasized that the linkages with the centres on the commodity assigned should be developed. Dr. Ramani stressed upon the adoption of integrated approach for plantation of resin, gum and gum – resin trees.

Dr. P. K. Ghosh, Director, IGFRI, Jhansi emphasized that all the components of agroforestry should be integrated with the farming system for livelihood improvement of the rural and tribal people. Dr. Ghosh stressed that gum production is declining due to unscientific tapping. Traditional tappers need be trained for scientific tapping of resin and gums.

Dr. S. K. Dhyani, Director, ICAR – CAFRI, Jhansi in his opening remarks stressed that the Bundelkhand region is suitable for NRG and the resin and gum trees can serve as carbon reservoirs. He emphasized that technological intervention can improve the production of NRGs.

Dr. A. K. Bisaria, the Chief Guest discussed about the conservation of resin and gum tree species and mentioned that we should have mental pool/network for *Boswellia serrata* which may be included in the mandate of ICAR – CAFRI, Jhansi. He further added that technology awareness programme be introduced between commerce and sustainability of NRGs production. Dr. Bisaria also mentioned that rubber plantation has changed the overall scenario in Tripura. Similarly, the information related technology should reach the actual workers/tappers involved in resin and gum tapping work for promotion of resin and gum production. *Anogeissus pendula* needs to be promoted among tappers so that gum production from *A. pendula* may be enhanced. Plants related to carbon sequestration need to be promoted and on- farm agroforestry should be done in collaboration with KVKs. Gaps between commerce and conservation should be minimized through technological interventions. He informed that about 295 – 300 g palas gum may be tapped per tree per year. He stressed upon the need for promotion of processing and value addition of gums.

During technical sessions the annual progress report for 2013-14 and technical programme for the year 2014-15 were presented by PIs of all the networking centres. All the delegates also visited Agroforestry models developed at central farm of CAFRI, Jhansi.

Award and Recognition

Sh. Piare Lal, Member IMC, CAFRI and Proprietor, Kisan Bharti Clones, Village- Gangapur Kalan, P.O. Anwaria Talvabad, District- Rampur (U. P.) was awarded with Lifetime Award for Contributions to Advancement of Forestry Science by Indian Council of Forestry Research and Education and Forest Research Institute, Dehradun. The award was given by Shri Prakash Singh Badal, Hon'ble Chief Minister of Punjab at Convocation Hall of FRI Dehradun on 27th November, 2014 during 13th Silvicultural Conference.

Dr. Asha Ram, Scientist, CAFRI, Jhansi was awarded the Second Prize of Dhiru Morarji Memorial Award for Best Article in Agricultural Sciences 2013-14 for his article on "Direct and Residual Effect of S on Productivity, Protein Content and Nutrient Uptake in Wheat under Aerobic Rice- Wheat Cropping System" published in March, 2014 issue of Indian Journal of Fertilizers, New Delhi.

Human Resource Development

Dr. Sudhir Kumar, Principal Scientist attended and presented poster on "Improving productivity, profitability and sustainability through agroforestry intervention in fruit orchards" in the National Seminar on "Strategies for Conservation, Improvement and Utilization of Underutilized Fruits" held at CHES, Chettalli, during 1st -3rd December, 2014 organized by Central Horticultural Experiment Station (CHES), ICAR-IIHR, Chettalli, Kodagu and Society for Promotion of Horticulture (SPH) ICAR-IIHR, Bengaluru.

Dr. Badre Alam, Principal Scientist participated in the Annual workshop/Coordination Committee Meeting of the "Network Project on Harvest and Post-Harvest processing and value addition of natural resins, gums and gum resins" during 17th -18th October, 2014 held at NRCAF, Jhansi. He also participated and presented a research paper in the National Conference of Plant Physiology (NCP 2014) on 'Frontiers of Plant Physiology Research: Food Security and Environmental Challenges' held during 23rd to 25th November, 2014 at Orissa University of agriculture and technology, Bhubaneswar.

Dr. Asha Ram attended training Programme on Conservation Agriculture Developing Resilient Systems during 27th September to 4th October, 2014 held at CSSRI, Karnal sponsored by CSSRI-CYMMIT, Karnal. He also attended Training Course on Strengthening Ecosystem Services through Integrated Natural Resources Management for Building Climate-Resilient Communities during 27th to 31st October, 2014 held at ICRISAT, Hyderabad.

Dr. R. K. Tewari, Pr. Scientist & Nodal Officer (RFD) and Dr. Rajeev Tiwari, Chief Tech. Officer participated in the RFD Meeting of NRM Division on 28th October, 2014 held at NASC, New Delhi.

Dr. Anil Kumar, Dr. Rajendra Prasad, Dr. R.P. Dwivedi, Dr. S. Vimala Devi, Sh. S.B. Chavan, Sh. A.R. Uthappa and Dr. Asha Ram attended International training on "Research methods in Agroforestry" during 1st to 5th December, 2014 held at ICAR-CAFRI, Jhansi.

Sh. A.R. Uthappa Scientist participated in a training course on "Ecosystem Services of Agroforestry Systems" during 17th to 21st November, 2014 held at ICRISAT, Patancheru, Hyderabad.

Donation

Communal Harmony Campaign and Fund Raising Week from 19th to 25th November, 2014 was observed at the Institute and during this week a sum of ₹ 12,320.00 was collected. Institute Staff members also donated an amount of ₹ 18,220.00 for the Staff of Sher-e Kashmir University of Agricultural Sciences and Technology of Kashmir suffered by the Flood in Kashmir. Sh. Veer Singh Pal, Sr. Clerk collected the amount from the staff members.

Farm Innovators Day & World Toilet Day

Central Agroforestry Research Institute (CAFRI) observed Farm Innovators Day and World Toilet Day on 19th November, 2014 at Parasai-Sindh watershed in Babina block of Jhansi district.

Dr. Javed Rizvi, Regional Director and Dr. Rajendra Choudhary, Senior Liaison & Monitoring Officer, South Asia Programme, ICRAF, New Delhi visited the Parasai-Sindh watershed and interacted with the farmers. They observed the interventions taken up in watershed and discussed the impact of the measures with the accompanying farmers. The ICRAF officials were overwhelmed after seeing the surface water in ephemeral drains in about 2.0 km length, large scale adoption of teak based agroforestry (more than 200 acre) on field boundaries and homestead agroforestry in majority of the households. The team held interactions with community and realized that



virtually there is no impact of deficit rainfall (31% less than long term average rainfall) on agricultural activities. More than 90% area of the watershed is cultivated. Villagers opined that hardly 40% area is expected to be cultivated outside watershed during rabi 2014-15 due to deficit rainfall.

As of now enough water was available in the wells and checkdams in the watershed and more than 90 % of crop sowing was completed already. Dr. S. K. Dhyani, Director, CAFRI informed the ICRAF officials that this scenario indicates that watershed management through alternate land use system such as agroforestry is one of the best viable options in the region

as far as water availability is concerned and it will also check the migration in search of livelihoods.

The issue of sanitation and cleanliness was also raised and the team advised the villagers about benefits of having plants of guava, aonla, drumstick, tulsi and giloy in the backyard of the household. There was an interaction with the students of middle school and farmers at Chhatpur regarding World Toilet Day and general cleanliness as well as importance of agroforestry in day to day life along with its role in mitigating climate change.

हिन्दी कार्यशाला

दिनांक 30 दिसम्बर, 2014 को डा. एस. के. ध्यानी, निदेशक की अध्यक्षता में हिन्दी कार्यशाला सम्पन्न हुई। कार्यक्रम की अध्यक्षता करते हुए डा. ध्यानी ने अपने उद्बोधन में कहा कि हमें हिन्दी में अपने अनुसंधान लेख/प्रसार बुलेटिनों को सरल भाषा में लिखकर अनुसंधान उपलब्धियों को किसानों तक पहुँचाना होगा, जिसे किसान भाई उन तकनीकियों को पढ़कर तथा अपने खेतों में इस्तेमाल कर लाभ प्राप्त कर सकें। कार्यशाला के मुख्य वक्ता डा. रमेश सिंह एवं डा. आर.एच.रिजवी थे। जिन्हें “जियो इनफोरमेटिक्स” विषय पर दिनांक 01-05 दिसम्बर 2014 तक की अवधि में प्रशिक्षण हेतु विश्व कृषिवानिकी केन्द्र, नैरोबी, केन्या के लिये नामित किया गया था। उन्होंने अपना व्याख्यान विश्व स्तर पर स्थाई वानस्पतिक आवरण का विश्लेषण के तरीकों पर दिया। उन्होंने कार्यशाला के दौरान केन्या में प्रचलित कृषिवानिकी पद्धतियों के बारे में अवगत कराया। चर्चा के दौरान वक्ताओं द्वारा केन्या की सभ्यता के बारे में भी अवगत कराया। हिन्दी शोध पत्र लेखन में आने वाली सामान्य अड़चनों पर भी चर्चा की गई। उन्होंने बताया कि परिषद के हिन्दी विभाग द्वारा कृषि से सम्बन्धित तकनीकी शब्दों की शब्दावली तैयार की गई है जो कि परिषद की वेबसाइट पर उपलब्ध है। उन्होंने यह भी बताया कि हिन्दी भाषा में अंग्रेजी से इतर एक शब्द के अनेक समानार्थी शब्द मौजूद हैं जिन्हें शोध पत्र लेखन के दौरान सरल सामान्य भाषा के रूप में प्रयोग किया जा सकता है। कार्यशाला संयोजक डा. सी. के. बाजपेयी, प्रभारी अधिकारी राजभाषा ने सभी का स्वागत करते हुए कार्यशाला की उपयोगिता पर प्रकाश डाला। कार्यशाला में केन्द्र के समस्त वैज्ञानिक, अधिकारी तथा कर्मचारी उपस्थित थे।



‘ट्राइकोडरमा’— एक “विरोधी फफूँदी” का जैविक नियंत्रण में योगदान

पादप धरातल एक ऐसा प्राकृतिक क्षेत्र है जहाँ पर रोग जनक एवं अरोगजनक सूक्ष्मजीवी रोगाणुओं की बहुत अधिक आबादी रहती है। विभिन्न पादप अंग एक विशेष पारिस्थितिक को चित्रित करता है, जो कि क्रिया धार/अनस्तर (Substrate) की प्रकृति एवं पाये जाने वाले सूक्ष्मजीवी पर आधारित है। यही कारण है कि एक विशेष रोग जनक, अनुकूल पारिस्थितियों में पौधे के एक विशेष भाग पर ही आक्रमण करता है। विरोध का अर्थ है—एक जीव दूसरे जीव के लिए प्रतिकूल पारिस्थितियों का निर्माण कर दें। पादप धरातल पर भी इस प्रकार की विपरीत पारिस्थितियों का सृजन होता रहता है और शायद इसी वजह से पौधे पर घातक व्याधिजन का आक्रमण नहीं हो पाता है जबकि हो सकता है कि वह वहाँ पर उपस्थित भी हो। सामान्यतयः ये व्याधिजन मिट्टी में जड़ों की सतह में पाये जाते हैं एवं पुराने भागों में अधिक पनपते हैं। ट्राइकोडरमा एक विरोधी फफूँदी (antagonistic fungi) है जो कि एक सूक्ष्मदर्शीय (microscopic) कण (conidium) उत्पन्न करती है। यह विशेष रूप से सभी प्रकार की मिट्टियों में तथा सबसे अधिक मात्रा में विभिन्न स्थानों में पायी जाने वाले फफूँदी है। पौधों में रोगों की रोकथाम के लिए ट्राइकोडरमा संतति बहुत समय से एक जैविक नियंत्रक के रूप में अभिज्ञात है।

विरोधी फफूँदी ‘ट्राइकोडरमा’ का प्रायोगिक उपयोग पादप रोग वैज्ञानिकों एवं प्रकाश-सूक्ष्म जीव वैज्ञानिकों के जैव नियंत्रण में एक विशाल चुनौती का आह्वान उपलब्ध कराता है। यह एक मुक्त एवं जीवित फफूँदी है जो कि मिट्टी एवं जड़ परितन्त्र में सामान्य रूप से पायी जाती है। यह प्रायः जड़ों, मिट्टी एवं पर्णसमूह पर्यावरण में सामान्य रूप से अतन्त्रव्यवहार करती है। यह विभिन्न प्रकार के यौगिकों को उत्पादित या विमोचित करती है जो कि पौधों में स्थानीय या सर्वांगीय प्रतिरोधक प्रतिक्रिया उत्प्रेरित करती है। यह फफूँदी ‘सैल्यूलेस’, ‘ग्लूकिनेस’ व अन्य इन्जाइमों का उत्पादन करती है, जो कि बीमारी फैलाने वाले फफूँदी के कवकजाल (mycelia) का विघटन करती है तथा जिसकी वजह से व्याधिजन (pathogen) का असर तथा प्रचण्डता कम हो जाती है एवं पौधे की रक्षा होती है।

ट्राइकोडरमा प्रभेद (strain) को बहुत समय से पादप रोगों के नियंत्रण के लिए एक जैव नियंत्रक के रूप में पहचाना जाता है एवं इसका उपयोग बहुतायत में किया जाता है। इसका उपयोग जड़ों की संवृद्धि एवं विकास, उपज की उत्पादकता, अजैव प्रतिबल के प्रतिरोध तथा पोषक तत्वों को ग्रहण करने तथा उसके उपयोग को बढ़ाने के लिए किया जाता है। यह फफूँदी के विरुद्ध कार्य करती है। इस विरोधी फफूँदी ‘ट्राइकोडरमा’ का उपयोग मिट्टी से उत्पन्न होने वाली बीमारियाँ जैसे ‘पाइथियम’, ‘फ्यूजेरियम आक्सीस्पोरम’, ‘स्क्लीरोशियम रोलफसाई’, ‘राइजोक्टोनिया सोलेनाई’ एवं ‘फाइटोपथोरा’ में सफलता पूर्वक किया गया है। ‘शैथिल्य रोग’ (wilt) तथा ‘जड़-सड़न’ मटर उत्पादन में एक खतरनाक बीमारी बन गया है, जिसकी वजह से करीब-करीब 35 प्रतिशत की हानि होती है, जो कि कभी-कभी 80-100 प्रतिशत तक बढ़ जाती है। यह एक गंभीर रोग है, जिसकी वजह से बिना किसी उत्पाद के पूरा का पूरा पौधा मर जाता है। चूँकि यह रोग मिट्टी से होता है अतः इसका रासायनिक नियंत्रण मुश्किल होता है। ‘ट्राइकोडरमा’ की उपस्थिति में रोग के स्तर में 60-80 प्रतिशत की कमी आ जाती है। इसके अतिरिक्त ट्राइकोडरमा का उपयोग मूंगफली में ‘राइजोक्टोनिया’, मटर में ‘स्क्लीरोपेनिया स्क्लोरोशियम’ तथा सरसों में ‘पाइथियम ऐफेनीडरमेटम’, गन्ने में ‘पाइथियम ग्रैमेनीकोला’ नामक फफूँदी से होने वाली बीमारियों की रोकथाम में किया जाता है। इसी प्रकार ‘ट्राइकोडरमा हारजीएनम’ का उपयोग चना पर ‘स्क्लोरोशियम रोफल साई’ नामक फफूँदी से होने वाली बीमारी एवं चुकन्दर पर ‘पाइथियम ऐफेनीडरमेटम’ नामक फफूँदी से होने वाली बीमारी की रोकथाम के लिए किया जाता है।

‘ट्राइकोडरमा’ की पहचान : ट्राइकोडरमा को ‘आलू-डेस्ट्रोस-अगर माध्यम (PDA medium) से प्राप्त किया जाता है तब ‘ट्राइकोडरमा’ संतति को आकारिकी (Physiology) एवं रंग के आधार पर पहचाना जाता है। ‘ट्राइकोडरमा’ संतति की अधिक पहचान ‘कोनिडिया’ एवं ‘कोनिडियोफोर’ (कर्णाधन) की रचना के आधार पर सूक्ष्मदर्शी द्वारा की जा सकती है।

‘ट्राइकोडरमा’ की क्रियाविधि : ट्राइकोडरमा को ‘राइजोक्टोनिया’ वाली मिट्टी में मिलाया जाता है, उसके उपरान्त ट्राइकोडरमा के कवकसूत्र, पोषिता कवक जाल को चारों ओर से लपेट लेते हैं तथा बीमारी करने वाली फफूँदी अन्ततः नष्ट और विघटित हो जाती है। ट्राइकोडरमा को खाद या शाकनाशी (herbicide) के साथ मिलाया जा सकता है।

ट्राइकोडरमा के लाभ

1. **रोग नियंत्रण:** ‘ट्राइकोडरमा’ एक शक्तिशाली जैविक नियंत्रक है एवं इसका उपयोग एक सस्योत्तर (post harvest) (कटाई के बाद) रोग नियंत्रक के रूप में विस्तृत रूप से किया जाता है। इसको सफलतापूर्वक विभिन्न व्याधिजन फफूँदियों के विरुद्ध सफलतापूर्वक प्रयोग किया जाता है।
2. **पौधे की वृद्धि प्रवर्तक:** ‘ट्राइकोडरमा’ संतति फास्फेट एवं ‘माइक्रोन्यूट्रेंट’ को घुलनशील कर देती है। ‘ट्राइकोडरमा’ को घासों के साथ प्रयोग करने से गहरी जड़ों की संख्या बढ़ जाती है, जिससे पौधों में सूखे से प्रतिरोध करने की क्षमता बढ़ जाती है।

3. **बीमारी से प्रतिरोध के लिए जीव रासायनिक पदार्थ:** 'ट्राइकोडरमा' पौधों में बीमारियों के विरुद्ध प्रतिरोधिकता (resistance) को प्रेरित करते हैं। अनेक प्रकार के यौगिक (compounds) ट्राइकोडरमा में प्रतिरोधिकता को प्रेरित करते हैं। जैसे कि 'इथलीन उत्पादन' 'अतिदृशता प्रतिक्रिया' (hypersensitive response) एवं दूसरी प्रतिरक्षा संबंधी (defence related) प्रतिक्रिया को प्रेरित करते हैं।
4. **ट्रान्सजेनिक पौधे:** तम्बाकू एवं आलू के पौधों में 'इन्डोकाइटिनेज जीन्स' के प्रवेश से पौधों में फफूँदी वृद्धि के प्रति प्रतिरोधिकता बढ़ायी जा सकती है। चुनी हुई 'ट्रान्सजेनिक श्रेणी' पर्ण रोगाणु (Foliar pathogens) को सबसे ज्यादा सहन कर सकती है जैसे कि 'आल्टरनेरिया', 'आ. सोलेनाई' एवं 'बोट्राइटिस सीरिया' तथा इसके अतिरिक्त मिट्टी में रहने वाले रोगाणु जैसे कि 'राइजोक्टोनिया' प्रजाति।
5. **बायोरैमिडियेशन:** 'ट्राइकोडरमा' प्रजाति 'रोगनाशी' (pesticides) एवं 'शाकनाशी' (herbicides) दूषित मिट्टी के बायोरैमिडियेशन में अत्यंत महत्वपूर्ण योगदान देती है। उनमें 'आरगैनोक्लोरीन' 'आरगैनोफास्फेट' तथा 'कारबोमेट' प्रकार के कीटनाशी को उपचयन (degrade) करने की क्षमता होती है।

ट्राइकोडरमा को प्रयोग करने की विधि

1. **बीजो का उपचार** – अनाज, दालों एवं तिलहन के लिए 10 ग्राम 'ट्राइकोडरमा संविन्यास' को एक लीटर गोबर के साथ मिलाएँ।
2. **रोपणी बीज क्यारियों का उपचार** – बोने से पहले रोपणी बीज क्यारियों को 5 ग्राम ट्राइकोडरमा संविन्यास के साथ भिगोएँ।
3. **कटिंग तथा पौधे की जड़ों का उपचार** – 10 ग्रा. ट्राइकोडरमा संविन्यास को एक लीटर पानी में मिलाए तथा कटिंग एवं पौधे की जड़ों को लगाने से 10 मिनट पहले रखें।
4. **मिट्टी का उपचार** – एक किलो ट्राइकोडरमा संविन्यास को 100 किलो खेत की खाद के साथ मिलाएँ तथा इसे 7 दिनों के लिए पॉलीथीन से ढक दें। 3-4 दिन के उपरान्त मिश्रण को बदलते रहे और बाद में खेत में इससे बुआई करवा दें।
5. **ट्राइकोडरमा संविन्यास** – 'सनबानी', 'गार्ड' 'नीपराट', 'बायोडर्मा', नाम अत्यन्त महत्वपूर्ण संविन्यास बाजार में उपलब्ध है।
6. **'ट्राइकोडरमा' का जैविक तंत्र (Biocontrol mechanism)** – 'ट्राइकोडरमा' विभिन्न प्रतिक्रियाओं द्वारा जैसे कि 'स्पर्धा' (competition), 'प्रति जीविता' (antibiosis), 'कवक परजीविता' (mycoparasitism), 'कवक सूत्र पारस्परिक क्रिया' (hyphal interaction) एवं 'विकर उदासर्जन' (enzyme secretion) द्वारा व्याधिजन की वृद्धि, अति जीविता (survival) एवं सक्रमण को कम करता है।

पादप रोगों का जैव नियन्त्रण एक आधुनिक कार्यक्षेत्र बन गया है। इसके लिए इनके अविष्कार, संवर्धन, पारिस्थितिकी एवं इसके सफलतापूर्वक प्रयोग के लिए प्रयास करने चाहिए। जैव नियन्त्रक कर्ताओं की श्रेणी में कवक परजीवी (Mycoparasites) की एक महत्वपूर्ण स्थिति है। कवक परजीविता का सघन अध्ययन प्राकृतिक अवस्था में करना, एक लाभप्रद उद्यम है। मिट्टी से उत्पन्न होने वाली पादप बीमारियों में ट्राइकोडरमा को अपनी रुचिकर गुणों की वजह से एक आशाजनक जैव नियन्त्रक के रूप में जाना जाता है। अतः इन इच्छित लक्षणों को मिलाकर हम एक श्रेष्ठ वंश (Superior strain) को बना सकते हैं।

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