

and fruit rot cause yield loss of 10% in noni. Other commonly observed diseases and pests are mosaic and root rot nematodes. M. Jayakumar *et al.* (Sunagro Biotech Research Centre, Chennai) reviewed insect pest complex of noni in South India. A black ant species and an unidentified mite were reported.

Session V dealt with noni utilization and value-addition. Vigneswari Karthik and P. I. Peter (Health India Laboratories, Chennai) elaborated on noni-based products for health and nutrition. The wide range of noni-based products includes healthcare, homecare, food products, fruit drinks and cosmetics. Swatantra Kalra (Truely Natural, Gurgaon) talked on an instant protein noni

drink made of noni juice concentrate and soy protein.

Alok Sha *et al.* (Defence Food Research Laboratory, Mysore) mentioned about value-addition perspectives of noni. A protocol for packaging and shipment of noni fruits has been developed at CARI, Port Blair, according to D. R. Singh.

Session VI covered success stories and testimonials on the beneficial effects of noni on human health and wellness. B. M. Hegde (Manipal Institute of Medical Sciences, Manipal) delivered the plenary lecture. According to Hegde, 'God gives medicines where He gives the disease', was an old belief of the Peruvians in the 15th century, when malaria used to kill millions there every year. Peruvians got

what we now call quinine from the bark of a tree in their forests, which they named Cinchona, after the wife of their then viceroy. Quinine must have saved millions of lives all over the world. A similar effort by the Europeans resulted in aspirin from willow bark.

Nature has remedies which are safe, unlike the artificial chemical molecules, for all human ailments. May the noni effort bring succour to the needy in the area of human healing.

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## MEETING REPORT

### Sericulture and viable technologies for better silk production\*

A three-day workshop-cum-training programme on sericulture for the production of better silk production was organized for progressive sericulture farmers from all over Assam. The meeting was attended by sericulture farmers, delegates, including special invitees and the scientific community from the North-East Institute of Science and Technology (NEIST), Jorhat, Central Silk Board (CSB), Jorhat and Boko, Kamrup and representatives from NABARD, Guwahati, Jorhat and Sivasagar.

P. G. Rao (NEIST) in his welcome address mentioned that it is the initiative of NEIST to spread newer technologies to the local people in order to uplift their socio-economic status. He mentioned the role of NEIST in developing and transferring technologies to the local population and also requested the farmers to approach the institute in case they require any help in their farming practices. Rao also mentioned that concerted effort was made by all participating agencies – NEIST, CMER&TI and NABARD to

help sericulture farmers solve some of their problems. The Indian Institute of Chemical Technology (IICT), Hyderabad and CMER&TI, Jorhat have also helped disseminate the technologies developed, for successful and better cocoon production. He also stressed upon the prospect of using medicinal plants for control of various diseases of muga silkworms. He congratulated NABARD for successful implementation of programmes for the development of sericulture and supporting the cause of farmers.

Earlier, B. G. Unni (NEIST) in his welcome address, noted that the workshop was organized under the project entitled 'Implementation of new technology and training programme for rural development in sericulture at North-East states of India – Assam and Manipur' sponsored by CSIR in the 11th five-year plan under RSW-NET category to IICT. The main motive of the programme is to provide training to farmers in the area of sericulture, especially in muga culture, which is found to be essential in the NE region. Unni mentioned that updated information on simple technologies developed at laboratory and field level in the area of sericulture will also be imparted to the farmers.

U. S. N. Murthy (IICT), while delivering a lecture on the activities of IICT in sericulture development, mentioned that

the laboratory has taken up various programmes for rural development in different parts of the country, including the NE region. He particularly highlighted the performance of Samadhan Kendras (Rural IT centres, developed at the initiative of IICT) in various parts of the country, particularly in Andhra Pradesh, for providing necessary information to the farmers and mentioned how these can be established in this part of the country for the benefit of the farmers. He also informed about the partnership of IICT in India Development Gateway. In his lecture during the technical session, Murthy discussed the technology of pupal oil extraction and prospects of using pupal oil in various industries and invited the muga sericulture farmers to visit IICT to get a first-hand experience on various technologies on the extraction of pupal oil.

R. Chakravorty (CMER&TI) speaking on 'Readily available technologies for muga culture', mentioned that Assam is unique in respect of producing all the four varieties of silk, viz. those of mulberry, tassar, eri and muga. Muga silkworm, *Antheraea assamensis* is now patented on the basis of Geographical Indicator of the region. He mentioned that 6758 ha of land is included in muga culture, with 30,000 families directly engaged in pre-cocoon sectors and that

\*A report on the three-day Workshop-cum-Training Programme on 'Sericulture for Better Silk Production', organized by the Indian Institute of Chemical Technology Hyderabad, Hyderabad, in collaboration with North-East Institute of Science and Technology (NEIST), Jorhat at NEIST during 19–22 October 2008.

115 mt of raw silk was produced during 2007–08. Raw silk and its products are in high demand throughout the world because of the characteristic golden yellow colour. Chakravorty also spoke about the formation of different clusters among the sericulture farmers of the state to intensify the developmental programmes. I. Padbidri (NABARD, Guwahati) in his talk emphasized on the need of community effort on the part of the farmers and judicious investment of capital in the sericulture sector. He also stressed on the need to follow proper procedure of loan procurement from the financial institutions.

In the technical session, A. K. Sahu (CSB, Boko, Kamrup) in his lecture 'Muga seed technology', told the farmers about the need of quality seeds in sericulture and the techniques to be followed to produce the same. He described the technology of building grainage for quality seed production and storage, chemical and physical disinfection methods for grainage sanitation, factors affecting quality seed production and methods to control these factors. He also discussed the methods of preparing and application of disinfectants like formaldehyde, handling of cocoons during transportation, selection of good cocoons to ensure quality seed production, sanitation, control of biotic and abiotic factors in storage of seeds along with improved methods to be followed to enhance egg-laying, seed sterilization, egg hatching, egg transportation, etc.

Jayanta Ghosh, in his lecture on post-cocoon technologies, discussed the disadvantages of traditional post-cocoon practices like reeling, cooking of cocoons, drying, etc. He also discussed advanced technologies for post-cocoon practices and also about the use of improved and low-cost machinery available for cocoon drying, cooking, reeling, etc.

Unni in his lecture on 'Technologies for upliftment of the muga farmers', discussed the problem of flacherie and different bioformulations developed by NEIST to control this dreaded disease. He talked about the bio-formulations developed from locally available *Terminalia chebula* (Helica) plants for controlling the disease and described methods to prepare the formulation and its application in the field. This formulation was also found to improve silk production in terms of quality and quantity. He also

described the technologies developed by the institute to use PGPR bacteria from muga host plantation area to increase silk production. A simple technology for better cocooning with a bamboo cage filled with paddy straw was also discussed by Unni.

Kartik Neog (CMER&TI) talked about the different diseases of muga silkworm like flacherie, pebrine, infectitious flacherie, grasserie and muscardine. He discussed the mode of transmission of these diseases, symptoms and the causal organisms. He also described the methods of sorting disease-free layings, sanitation techniques for host plantation as well as handling techniques of muga silkworms to avoid spread of the diseases, along with management techniques of all the diseases.

In the later part of the training session, Sankar Das and Mayur Bora (NABARD, Sivasagar and Jorhat units respectively) discussed various aspects of financing muga sericulture activities. Das informed the farmers about different schemes for availing bank loan facilities. He elaborated on the formation of self-help groups, joint liability groups, and handloom weavers' group scheme initiated by NABARD and how loan can be availed through these groups. He also discussed about facilities like availability of subsidies for procurement of machines for reeling, taking individual loans from banks and also the facilities provided by NABARD to farmers' clubs through sponsoring training programmes on sericulture and other agriculture activities. Bora discussed the need for joint efforts and coordination among the farmers, importance of adopting positive attitude for seeking loan from banks and different procedures of applying for loan as well as repayment of loan, etc.

The training session was followed by an interactive session between the farmers and the resource persons from all the participating institutions. Murthy, Unni, Neog, Das and Bora represented their respective institutions as resource persons. In this session, all the farmers expressed their satisfaction about the training programme. They felt motivated to take up sericulture as a larger industrial activity after this training. The farmers asked questions on many related subjects. How to procure seedlings of hybrid host plants to establish a good host plantation?; effect of pesticide application in nearby tea

gardens on silkworm population as they have noticed that after application of pesticides, silkworms die in the nearby area; whether trainings of longer duration can be taken under CMER&TI and how to proceed for availing training in the institute regarding improved methods of silkworm rearing; how project plans can be prepared and whether any guidance is available from any related institutes like CSB and NABARD on estimating capital requirement, applying for loan, etc.; how to establish a silk rearer's society; whether technical instructions are available regarding establishing and managing a host plantation (from CMER&TI); how to increase income generation from a large host plantation area and develop it into a full scale industry; whether training and financial assistance will be available for pupal oil extraction industry; and other problems of getting financial assistance from banking sector and how to tackle it.

The resource persons addressed all the questions raised by the farmers and discussed the issues. The problem of existing communication gap between the farmers and the persons involved in marketing of muga products was also discussed. It was proposed that in future programmes, persons from the marketing sector should also be invited, so that a solution can be found. The farmers were also informed about the available training facilities from CMER&TI, provision of subsidies to procure reeling machines, procuring good dfls (disease-free laying, eggs) and seedlings of hybrid host plants from these institutions, facilities and schemes provided by NABARD, establishment of silk rearer's society and its operation, regular loan repayment, etc. A demonstration and field visit to a muga farm at CMER&TI was arranged for the sericulture farmers at the end of the workshop. The trainee farmers were exposed to first-hand experience on modern technologies that can be adopted for food plantation and post-cocoon processing technology.

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