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Current status, critical gaps and way forward for lac production in J&K

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Abstract

Lac was found abundantly before 1947 and people used to collect and sell it commercially. Interestingly, this State (J&K) is bestowed with ample of lac host plants, therefore its cultivation can be revived for the benefit of farming community of the region by scientific cultivation through systematic intervention. In view of fast shrinking area of lac cultivation elsewhere in the country, the region has been earmarked as a “green area” for conservation of biodiversity of the lac insect ecosystem. Comparative field performance of Rangeeni lac insect of Jammu origin with Purulia (West Bengal) stock were made at Jammu by inoculating ten (10) ber plants each with 0.5 kg broodlac during first week of July 2008 (Katki) crop at Raya of district Samba of J&K could result in a produce of 107 kg broodlac which was harvested in late October with output-input ratio (21). Similar number of plants when inoculated with local brood (Akhnoor) of district Jammu (J&K) produced output-input ratio (18). Besides, twelve farmers were trained for brood lac production on *Flamengia semialata* as well. The potential growers were trained on state of the art technology on lac production including pruning, inoculation, crop protection, lac processing and brood production on *Palas* and *Ber*.

Keywords: Lac, Current status, Korh, Rangeeni lac

Introduction

Not long ago, collection (gathering) of lac was carried out practically throughout the country including Jammu & Kashmir which contributed significantly to national lac production, but now its share is almost negligible. However, natural occurrences of lac insect, locally called as Korh in J&K is well established particularly on ber plants. It is pertinent to mention that lac was found abundantly before 1947 and people used to collect and sell it commercially. Interestingly, this State is bestowed with ample of lac host plants, therefore its cultivation can be revived for the benefit of farming community of the region by scientific cultivation through systematic intervention^[1]. There are vast untapped areas, which are ecologically favorable for lac production in Jammu region. These areas possess the potential lac host plants which if exploited properly in scientific and systematic manner will enhance the lac production. Enhancing the exploitation of the idle or unexploited lac host plants in favorable lac growing areas can also increase the lac production. In order to address these issues as well as to give impetus to increased production Indian Institute of Natural Resins and Gums (IINRG), a nodal Institute at national level for research and development on all aspects of lac and other natural gums & resins has started a programme on diversification of lac cultivation in new areas. Natural occurrences of lac insect, locally called as korh in J&K is well established particularly on ber plants. It is pertinent to mention that lac was found abundantly before 1947 and people used to collect and sell it commercially. Interestingly, this State is bestowed with ample of lac host plants, therefore its cultivation can be revived for the benefit of farming community of the region by scientific cultivation through systematic intervention. IINRG is actively engaged in addressing the objective of enhancing lac productivity and production through transfer and adoption of proven technologies by interfacing research, development and extension^[2]. In view of fast shrinking area of lac cultivation elsewhere in the country, the region has been earmarked as a “green area” for conservation of biodiversity of the lac insect ecosystem. Since, the existing flora and fauna associated with lac are inextricably linked to the fate of lac cultivation, economic importance of host plants which could be exploited for commercial production of lac needs to be realized. Based on ground realities, it has been realized that the vast area of Jammu region (Jammu, Kathua and Samba districts) i.e., southern plains of Jammu region known as Kandi belt (Rainfed areas) are bestowed with lac host plants viz., Ber,

Palas and *Ficus*. Therefore, it warrants cultivation of lac on commercial scale through large scale demonstration and extensive training programmes for the rural people of the area as well as extension workers at frequent intervals. Mass awareness through on-farm trainings at Zonal or district levels will not only enable the potential growers to take up this venture on regular basis but also upgrade the skill of the existing work force for entrepreneurship development ^[3].

Current status

Cultivation of lac was initiated in 2007 by SKUAST-Jammu in collaboration with IINRG, Ranchi owing to its increased value and demand. Comparative field performance of Rangeeni lac insect of Jammu origin with Purulia (West Bengal) stock were made at Jammu by inoculating ten (10) ber plants each with 0.5 kg broodlac during first week of July 2008 (katki) crop at Raya of district Samba of J&K could result in a produce of 107 kg broodlac which was harvested in late October with output-input ratio (21). Similar number of plants when inoculated with local brood (Akhnoor) of district Jammu (J&K) produced output-input ratio (18). Subsequently, both these stocks were re-inoculated on ber and palas for their evaluation during summer season (baisakhi 2008-09) crop. Both these lines survived on ber trees and crop progressed well till mid May, followed by heat mortality resulted to harvest the crop at this stage. Whereas, on palas sever mortality was observed in the month of March but few scattered survival up-to broodlac was noticed. Thereafter, both these stocks (Jhaldah and Jammu) were once again raised as rainy season (katki 2009) crop with output-input ratio (9.6) and (8.3) when raised on ber whereas, it was (4.2) and (5.7) on palas respectively, at Jammu. On the basis of the trials it has been concluded that cultivation of lac has high potential for generating employment for both men and women particularly in the off-agricultural season in this lac growing regions of the country. In the forests, sub forest area and in the farm lands having host trees, lac will be an important source of cash flow to the marginal, small and large farmers having very low investment. These efforts were supplemented forward with a DBT funded project to popularize lac cultivation in this region. Extensive community motivation and awareness campaign was carried out in Jammu, Kathua and Samba districts for the potential growers to take up this venture on regular basis using media aids, field trips, farmers camp and field demonstration. Under this project, about 844 potential growers were identified where adequate potential for lac cultivation exists, *i.e.* vicinity of forest and availability of useful trees. The total quantity of brood lac that was produced and distributed to 63 growers in 5 different villages for inoculation on respective trees was 8.6 qtls. Besides, twelve farmers were trained for brood lac production on *Flamengia semialata* as well. The potential growers were trained on state

of the art technology on lac production including pruning, inoculation, crop protection, lac processing and brood production on *Palas* and *Ber*. About six farmers showed keen interest for adoption the technology and earned more than 100 days employment per annum with lac grown on host trees. In order to promote lac based activities a joint work shop cum exhibition on lac promotional activities was organized wherein lac crafts men and women from West Bengal, Jaipur and Orissa trained local lac growers, women trainees, handloom and handicraft workers, orphans and participants from NGO's in processing and use of lac for manufacturing various lac based handicraft and jewelry items. Besides a special exhibition stall was displayed in Kissan Mela at University Campus Chatha, SKUAST-J in collaboration with IINRG, Ranchi. Technical workshop on lac production techniques was also conducted for field functionaries from Horticulture, Agriculture and Forest departments. The on farm demonstrations were monitored by Department of Biotechnology. In order to conserve and promote lac cultivation in the region surveys were conducted in various districts of Jammu region namely, Jammu, Samba, Kathua, Udhampur, Reasi and Rajouri, for searching sample lac insect (*Kerria* sp.; Kerriidae: Hemiptera) on naturally infected trees of *Ber* (*Ziziphus mauritiana*) during June to December, 2014 to 2019 under NP-CLIGR by IINRG, Ranchi. It was found that natural occurrence is highly threatened through human interventions, inclining temperature during summer coupled with the occurrence of parasitoids and predators. Eleven strains of *Rangeeni* insects were collected and maintained *in-situ* and *ex-situ*. The density of settlement of lac insect ranged between 48.3 to 162.0 no. of crawlers/cm² in *Rangeeni* strain on *Flamengia*. The range of resin output per cell as 5.60-8.15 mg for summer crop of *Rangeeni* strain. Conservation initiatives enhanced the frequency of natural occurrence of lac insect in the region with 13.5 per cent increased ^[4]. For in situ conservation, a gene bank was established wherein sufficient quantity of natural lac was multiplied on the bushy host and distributed on the 475 host plants for four small scale demonstrations. The mean yield per tree on ber was 12.8 kg (brood lac) and 1.86 kg mature lac. On the basis of these trials it was concluded that cultivation of lac has high potential for sustaining livelihood for both men and women particularly in the off-agricultural season in this lac growing regions of the country.

Critical Gaps

Despite huge potential there exist a wider gap between demand and supply of lac. There is sufficient numbers of host trees. However, these lac host trees are not exploited for production. Community mobilization and demonstration could fulfill the existing gap coupled with up gradation of Skills and technology for lac cultivation.

Table 1: Constraints and remedial strategies

Issues	Strategies	Remarks
Religious	It is known as Korh in vernacular language and generally perceived as curse.	After through deliberation with the concerned people perception stands changed
Religious	Secondly, on the religious places it is very difficult to harvest the lac as peoples sentiments are attached with these plants and they didn't allow us to harvest the lac from these plants. However, these plants acts as good brood conservers, but due to excessive brood these plants ultimately die out.	Almost 20% of stakeholders were motivated for partial harvesting of lac from the trees so as to save the lac as well as tree.
Nomadic communities	These peoples prune the host trees for fodder for their animals especially during winter or fodder scarcity period.	The owners of these trees were motivated to left over some of the branches un-pruned to conserve lac insect.

Frequency of occurrence was low	Conservation initiatives undertaken	The frequency of natural occurrence of lac insect in the region got enhanced
Mortality of brood during summer or even extreme winters	The strategy to overcome this problem was successfully devised in term of selection of host trees with good canopy and adaptability i.e., wild ber and kikar and <i>ex-situ</i> multiplication on <i>Flamengia</i> in mid hills.	Trees around canal or in shady places must be conserved
Parasitism	We follow the spray schedule properly in the ongoing crop but for the upcoming summer crop, rainy season crop must be completely harvested from trees (coupe) with complete scrapping and thereafter burning of branches.	Complete burning of previous crop residue is strongly advocated
Unlike other areas natural occurrence was never recorded on the host trees other than ber	In depth investigations on Insect plant interactions are required.	Artificial inoculation on few host plants other than ber proved effective

Lesson learned and future prospects

Lac is known as Korh in vernacular language and generally perceived as curse. Secondly, on the religious places it is very difficult to harvest the lac as peoples sentiments are attached with these plants and they didn't allow us to harvest the lac from these plants. However, these plants acts as good brood conservers, but due to excessive brood these plants ultimately die out. These peoples prune the host trees for fodder for their animals especially during winter or fodder scarcity period. People used it in natural medicines (*Hakeem*). Goldsmith of Jammu region used it for making mould for ornaments. Some of painters (very few) were aware to use it as wood polish. Interestingly, People in Akhnoor told us that it was used, collected and marketed by people in Sialkot (now in Pakistan) before partitioning [6]. People were aware of lac dana and they told us that it is used in bat manufacturing industry. It was the important component of Desi-medicine. It was used for sealing purpose in wood. It was used as polishing agent in walking sticks of old age people. It was used as polishing in hookah and for making decorative items on the hookah. On the basis of these trials and technology demonstration cultivation of lac has high potential for sustaining livelihood for both men and women particularly in the off-agricultural season in this lac growing regions of the country. Despite natural occurrence of lac coupled with good number of host plants *viz.*, ber (9-10 lakh), palas (9.5 lakh), khair (21.5 lakh) and *Ficus* spp. (2 lakh) the possibility of its scientific cultivation in the kandi region of this State has not been yet explored. The kandi belt is 10 to 30 km wide stretches from Akhnoor in the west to Kathua in the east with an area of nearly 811km². Most of the farmers living in this area hardly secure their livelihood from agriculture due to lack of fertile soil and irrigation.

Way forward

Growing lac hosts for timber and fuel yields revenue in cycles of long years, whereas cultivation of lac on these trees gives a return almost every year. Thus, lac growers give more importance to regular income from cultivation of lac over the years to one-time income from timber or fuel. The introduction of lac cultivation as a commercial venture can augment various socio-economic welfare programmes being implemented in the state for the benefit of the rural poor. By implementing and adopting the scientific method of cultivation, proper host plant management, integrated pest management, enhancing exploitation of unexploited host plants, and cultivation through 'Joint Forest Management' programme in this State, lac production can be enhanced in future. Jammu and Kashmir is known as fruit bowl of India. With increasing demand for natural products, e.g. in fruits and vegetable coating for increasing shelf life and as food color,

the time is ripe to introduce lac culture in Jammu and Kashmir on idle lac host trees in the forests [7]. Further, it is also known for land of artesian with unique handicraft skills on Kashmir wood wherein lac could be of immense utility. Promotion of lac cultivation through large scale demonstrations and scientific interventions is therefore extremely important. This venture provides high economic returns to the farmers and also foreign exchange to the country through its export. On the basis of existing host plant population, total production potential of Rangeeni stick lac is about 15000 tones in J&K which could earn a revenue of 80-100 crores /annum at existing prices it amounts. However, if Kusmi strain is used it would result in the double production (30000 tones) with a turnover of about 160-180 crores. To be more realistic, since only 25 % of host population is used at national level, the projected production at this level would be about 3500 tonnes and 7000 tonnes with a revenue generation of 20-25 and 40-50 crores for Rangeeni and Kusmi strain, respectively [8].

Conclusions

Cultivation of lac not only provides livelihood to millions of lac growers, but also helps in conserving biodiversity associated with lac insect complex. Interestingly, this State (J&K) is bestowed with ample of lac host plants, therefore its cultivation can be revived for the benefit of farming community of the region by scientific cultivation through systematic intervention.

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