



Factors affecting lac crop production and the economy of the tribals living besides Kuldiha Wildlife Sanctuary, Balasore, Odisha

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ABSTRACT

Lac is one of the most valuable gifts of nature to man. It is the only resin of animal origin, being actually the secretion of a tiny insect *Kerria lacca* (Kerr), which is cultured on shoots of several species of trees, mainly Palash, Kusum and Ber. It basically yields three useful materials: resin, dye and wax. It has a wide range of applications in food, pharmaceuticals, cosmetics, perfumes, varnishes, paints, polishes, adhesives, jewellery and textile industries. Lac production promotes biodiversity and conserves host plants. Lac crop being vulnerable to both biotic and abiotic factors results in lowering of the yield. In the study site, 95.20 per cent respondents pointed out that the one of the major constraints faced in lac cultivation were due to lack of availability of brood lac and other inputs, bad weather, low and fluctuating market, etc.

Key words: Biodiversity, biotic and abiotic factors, constraints, host plants, lac.

INTRODUCTION

Worldwide global warming is one of the most confronting challenges for insects. The Inter-governmental Panel on Climate Change has predicted an increase in air temperature of 1.1°C to 6.4°C by 2100 (IPCC, 2007), due to the effects of greenhouse gases, including carbon dioxide (CO₂) and tropospheric ozone (O₃). These climate changes affect the biological and ecological characteristics of insect species, through direct effects on their habitat and thereby affect on agriculture (Cannon, 1998). Climate change impacts on pest population include change in phenology, distribution, community composition and ecosystem dynamics that finally leads to extinction of species (Walther et al., 2002). It also affects on the insects' host plants, natural enemies etc. Climate change factors such as rise of ambient temperature, rise in CO₂ concentrations in the atmosphere and precipitation

etc. have strong influence on the development, reproduction and survival of insect pests as a result of which these organism will be affected (Bale et al., 2002). Therefore, it is difficult for lac insects to survive in such extremities of sun light, heat, rains etc. and lac crops are vulnerable to several types of insect predators, parasites. The agricultural production continues to be constrained by a variety of biotic (e.g., pathogens, insects and weeds) and abiotic (e.g., drought, salinity, cold, frost and water logging) factors, that can significantly reduce the quantity and quality of crop production (Wang et al., 2013). Abiotic stress factors such as heat, cold, drought, salinity, and nutrient stress have a huge impact on world agriculture, as they reduce average yields by more than 50 per cent for most major crop plants (Wang et al., 2003). Ninety seven species of such insects have been reported which are either pests of the lac insects and their predators besides several fungal pathogens,

represent a rich diversity of lac ecosystem. Here, 22 species of lac predators, 30 species of primary and 45 species of secondary parasites are affecting the production of lac (Varshney, 1976 and Sharma et al., 2006). Kumar (1996) studied the marketing of Non-Timber Forest Products (NTFPs) in Rohtas district of Bihar. The market price appeared to be 25 times higher than the prices received by tribals indicating the exploitation of tribals in a marketing system, which is predominantly capitalistic. Tejaswi (2008) reported that the main problems faced by the tribals include government restrictions regarding NTFP collection and physical attacks by wild animals, which can be lethal or cause severe lifetime injuries. Limited employment possibilities, inappropriate benefit distribution, misuse of funds and lack of processing activity at the local level affect the production and processing of lac. Patel et al. (2008) studied the marketing of Minor Forest Products (MFPS) in Gujarat. They observed a high variability in the marketing and price of MFPS. Ahenkan and Boon (2010) reported that the NTFPs marketing in rural areas of Ghana are unorganized, dispersed and farmers also lack the necessary marketing skills and information required for optimal performance. Nedanovska (2012) reported that the most important problems that pickers are facing during the collection of NTFPs are identified lack of forest road, too much time spent on collection, low price of NTFPs, lack of buying points and other problems.

STUDY SITE

The study area was selected in the surroundings of Kuldiha wildlife sanctuary in Balasore district where lac is cultivated in an extensive scale. We found from the survey that the major lac growers are in sixteen villages of five Gram Panchayats (GPs) namely Kiakata, Chaindar, Balichua, Chekamara (Garudi G.P), Budhiachua, Khadichua, Natapada, Bhaxnal, Ashoknal, Gabapal, Kelamara, Badheipal (Krushna Chandra Pur G.P), Jamuna (Pithahata G.P), Telipal (Telipal G.P) and Tenda (Sajanagada G.P) for the years 2017-18 and 2018-19 to fringe forests (i.e. 5 km) around Kuldiha reserve forest of Balasore, Odisha. The surrounding villages are covered with forests having natural lac

host trees which provide essential food plant for lac and are largely inhabited by tribal population whose subsidiary occupation is lac cultivation. In all villages, lac is cultured mainly on traditional host trees: palas, ber and kusum. Information and data were collected from eighty number of lac growers for the study.

METHODOLOGY AND DATA COLLECTION

A detailed questionnaire was designed which covered all the aspects on lac cultivation, special focused on constraints faced by lac growers. Focused group discussion (FGDs) was used to identify key challenges faced by farmers in lac cultivation and their view on possible solutions. Survey method was followed for the detailed enquiry of the farmer to arrive at the exact problems and possible solutions of lac cultivation in this area. Detailed interview with questionnaires and informal interaction were other tools which were used to collect data. Secondary information was conducted by collecting data from government offices of forest department, Integrated Tribal Development Agency (ITDA), Krishi Vigyan Kendra (KVK) and lac co-operative institutions. This helped in building a knowledge base on NTFP specially lac. The important inferences from the survey were compared with data from various sources to assess the validity and reliability. From sixteen selected village, 5 respondents were selected randomly by using simple random sample method. A total of 80 respondents were considered as respondents for the present study. Primary data for the study was collected by personal interview with the respondents with the help of pre-tested structured interview schedule.

RESULTS AND DISCUSSION

The data were collected through the interview schedule on the basis of objectives of the study. The data collected were classified, tabulated, analysed, presented, interpreted and discussed systematically. Based on the enquired data from the respondents sixteen number of constraints and twelve numbers of suggestions were given by the 80 numbers of lac growers (respondents) to overcome the problems faced by them (Table 1 and 2).

Table 1. Problems faced by the respondents in the collection and marketing of lac

Sl.	Particular	Frequency*	Percentage
1	Existence of bad weather	120	92.02
2	Low and fluctuated market price	125	90.86
3	Lack of skill oriented training programme related to collection, processing and marketing	58	57.50
4	Unavailability of brood lac and other inputs	119	95.20
5	Obstruction caused by forest rule and regulations in cultivation and collection of from restricted forest areas	110	51.52
6	Deforestation	72	59.12
7	Lack of developed market infrastructure for NTFPs (Lac)	67	47.50
8	Loss of lac quality due to insect, pests, predators and parasite incidences	30	19.18
9	Lack of low cost storage facilities	20	36.92
10	Lack of availability of timely market information	48	39.23
11	Lack of connective roads and transport facilities for marketing of lac	18	23.90
12	Lac of value addition	29	38.89
13	Natural calamities (drought, forest fire, storm etc)	38	40.27
14	Height of the trees	52	45.50
15	Inaccessibility of lac host trees	44	49.45
16	Theft of brood lac, encrusted lac and stick lac by outsiders	39	25.85

*Data are based on multiple responses. Frequency was studied yearly basis.

The result shows that majority of the respondent pointed out that they were facing the problem of non-availability of brood lac and other inputs (95.20%) followed by existence of bad weather (92.02%), low and fluctuated market price (90.86%), deforestation (59.12%), lack of skill oriented training programme related to collection, processing and marketing of lac (57.50%) i.e. these respondents cultivated lac in traditional manner resulting crop failure. Government machineries should take initiations to provide quality brood lac and also should extend training and demonstration. Brood lacs on an avg wt of 200-250g have been inoculated in standard height Kusum plants of Kishorechandrapur village (Fig. 1). Many of them never used any pest control mechanism, proper pruning techniques and other advance methods for lac cultivation, obstruction caused by forest rule and regulations in production and collection from restricted forest area (51.52%). Problems faced by respondents in other areas are inaccessibility of

lac host plants (49.45%), difficulties due to more height of Kusum tree (45.50%), lack of developed market infrastructures (47.50%), incidence of natural calamities such as drought, forest fire, storm etc (40.27%), lack of availability of timely market information (39.23 %), lack of value addition (38.89%) and lack of low cost storage facilities (36.92%). One cooperative society has been formed in Tartari village of Nilgiri block towards better storage, processing, value addition and marketing of lac products. (Fig. 3 and 4). Theft of brood lac, encrusted lac (Fig. 2) and stick lac being 25.85% happened usually in month of January when most of the farmers do not go to field for work. In Jamuna village, on supervision, large encrustation have been noticed in Ber plants (Fig. 2). The figure for rest shows that lack of transport facilities for marketing (23.90%) and loss of lac quality due to insect, pests, predators and parasite incidences and injuries caused by attack of wild animals (19.18%) (Table 1).

There have been 12 number of suggestions enlisted by the same 80 number of respondents to

overcome the problems faced by them have been presented below in Table 2.

Table 2. Suggestions given by the respondents to overcome the problems faced by them in the production and marketing of lac

Sl.	Particular	Frequency*(No of problems identified and studied by respondent)	Percentage
1	Selling prices of lac to be ensured by the government	102	85.56
2	Regular training programme should be organized for skill development in collection, processing and marketing of lac	68	77.52
3	Brood lac and inputs to be provided from govt. agencies	98	85.25
4	Flexibility in forest rule and regulations for lac cultivation and collection	80	59.83
5	Deforestation should be checked	81	75.20
6	Development of existing market infrastructure by the government for marketing of lac	87	37.90
7	Low cost storage facility should be provided	28	46.52
8	Availability of timely market information about lac price	54	59.20
9	Availability of transport facilities for marketing of lac	27	9.80
10	Value addition of lac to be developed through lac co-operative	28	30.19
11	Forest fire to be checked by controlled burning of weeds, leaves before commencement of summer season	48	29.25
12	Checking of thefts by outsiders through expanding lac cultivation areas in the surrounding villages	67	10.85

* Data are based on multiple responses.

The above suggestions given by the respondents indicate that majority of the respondents (85.56 %) opine that selling prices of lac should be ensured by the government; followed by brood lac and other inputs to be provided from govt. agencies (85.25%). The respondents for regular training programme to be organized for skill development in collection, processing and marketing of lac being 77.52%, 75.20% respondents suggested that deforestation should be checked, 59.83% for flexibility in forest rule and regulations for lac cultivation and collection, 59.20% for availability of timely market information about lac, 46.52%

of respondents suggested for low cost storage, 37.90% respondents for development of existing market infrastructure by the government for marketing of lac, 30.19% respondents for value addition of lac to be developed through lac co-operatives, 29.25% respondents for forest fire to be checked by controlled burning of weeds and leaves before commencement of summer season, 10.85% respondents for checking of thefts by outsiders through expanding lac cultivation areas in the surrounding villages and 9.80% respondents for good road connectivity of villages with market (Table 2) .



Fig. 1. Brood lac inoculation in Kusum Plant



Fig. 4. Lac co-operative in Nilgir, Balasore, Odisha

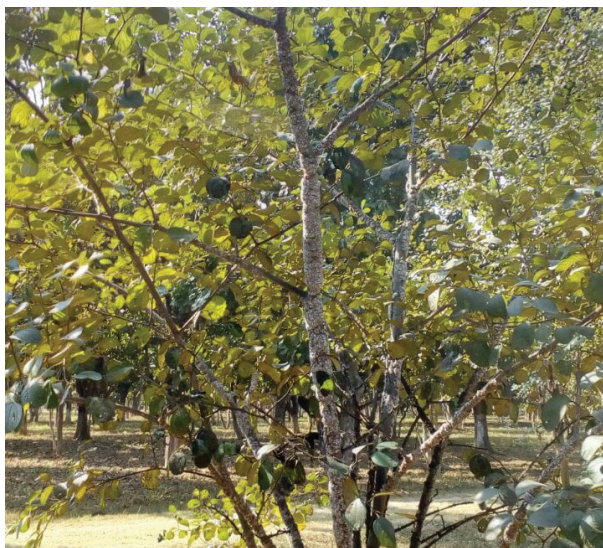


Fig. 2. Lac encrustation in Ber tree in Jamuna village



Fig. 5. Enemy insects of lac



Fig. 3. Value addition of lac

CONCLUSION

K. lacca is a valuable insect of economical and ecological interest. Lac production is an subsidiary activity among rainfed farmers and forest dependants in the surroundings of Kuldiha wildlife sanctuary. Cultivation of lac not only provides livelihood to millions of lac growers but also helps in conserving vast stretches of forests, lac insects and associated biota as most of the lac hosts are in forest areas and farmers resist felling of these trees and protect them for lac cultivation. Thereby, lac culture plays a vital role in the protection of our bioresources. *K. lacca* is prone to biotic and abiotic stress, thus affects the productivity, influencing

the cash inflow of poor and marginal farmers and requires to be managed sustainably. This approach will reduce the cost as well as protect the environment.

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