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Assessment of adoption level of recommended rangini lac (*Kerria lacca*) production technology among the trible population of Chhattisgarh state

Harishchandra Tanwar, PK Pandey, MA Khan and Ashish Kumar Gupta

Abstract
The purpose of this study was to assess the adoption level of recommended rangini lac (*Kerria lacca*) production technology among the tribal population of Chhattisgarh state. To serve this purpose, a sample size of 120 respondents were selected from 2 blocks of Korba district during the year 2018-19. The primary data were collected from each respondents personally with the help of pre structured interview schedule. The findings of the study highlighted that most of the respondents (38.33%) had medium level of scientific orientation and 68.34 per cent had medium knowledge level about recommended rangini lac production technology. With regard to practice wise Adoption Index it was found that maximum value (100.00%) was noticed in the case of 'Scraping of lac after harvesting', while the minimum value (44.16%) was recorded for 'Diseases and their control measures'. Whereas, in case of overall adoption level it was found that 68.34 percent of respondents had medium adoption level for recommended rangini lac production technology.

Keywords: Rangini lac. *Kerria lacca*, trible population, Chhattisgarh

Introduction
Lac is a natural resin, secreted by a tiny insect known as lac. Lac is cultivated as a cash crop in different countries of south, southeast and east Asian countries including India, China (Ramani *et al.,* 2007) [17]. It is only the resinous compound of animal origin with great economic importance due to its safety for human use, renewable and ecosystem friendly source of different chemicals (Ranjan *et al*., 2011) [18]. It is secreted by phytophagous scale insect *Kerria lacca* Kerr belonging to the family Tachardiidae (Kerriidae) andorder Hemiptera (Ahmad *et al*., 2012) [2]. Common lac host trees especially *Buteamonosperma, Zizyphus mauritiana* and *Schleicheraoleosa* are usually found on undulating landscape in rainfed area (Ogle *et al*., 2006) [12]. Lac insects are reported to have 400 host plant species in the world (Sharma *et al*., 1997), while in India there are 113 species (Roonwal *et al.,* 1958) [19]. *K. lacca* is a scale insect belonging to order Hemiptera, Sub order- Homoptera, Super family- Coccoiddae, Family - Laciferridae. *K. lacca* are exploited for their product of commerce viz. resin, dye, and wax. Cultivation of lac not only provides livelihood to millions of lac growers, but also helps in conserving vast stretches of forest and bio-diversity associated with lac insect complex. Lac ecosystem is complex multi – trophic web of flora and fauna. Twenty two species of lac predators, 30 species of primary and 45 species of secondary parasites, beside several fungal pathogens, represent a rich bio-diversity of this ecosystem. Moreover, this natural lac complex also maintains a variety of other tree flora, micro-fauna and soil micro-organisms. Several of the insect of the fauna associated with lac insect are species - specific (exclusive to the ecosystem) and hence, loss of even one species of lac insect poses a danger losing many other related species (Sharma *et al*., 2006) [23]. There are two strains of lac insect viz., *Rangeeni* and *Kusmi.* Each strain is specific to particular host trees, having different life cycle and produces different body extracts but morphologically is too similar to be separated into different species. *Rangeeni*strain is specific to *B. monosperma* and *Z. mauritania*, and the *Kusmi* strain is specific to *S. oleosa.* The lac produced by the *kusmi*strain is of higher quality (Dwivedi, 1993) [8].

India is the largest producer of Lac in the world, followed by Thailand, Indonesia, China, Vietnam and Burma (Ogle *et al.,* 2006) [12]. India has a share of 62 per cent of the world production of 44,000 m tons. India export lac and its products worth Rs 15,262 lakh (Ogle *et al.,* 2006) [12]. Lac is produced mostly by tribal, in the states of Jharkhand, West Bengal, Chhattisgarh, Madhya Pradesh, Orissa, Maharashtra and part of Uttar Pradesh, Andhra Pradesh, Gujarat and NEH region (Pal *et al.,* 2010). On an average around 28 per cent of total agriculture income is contributed by lac cultivation and more than 80 per cent of lac produced

in India is exported (Chamberlin, 1923; Prasad *et al.*, 2004; Pal *et al.*, 2010) [6, 15] (Ramani *et al.*, 2010) [16]. The annual lac production of the country varied from 18000 tons (Prasad *et al*, 2004) [15], 23,229 tons (Pal *et al.*, 2007) [13] and 21,935 tons (Pal *et al.*, 2010). On the basis of survey in the markets of different lac producing districts and states, the estimated national production of lac during 2013-14 was approximately 21,008 tons (Yogi *et al.*, 2014) [25]. Chhattisgarh being one of the leading lac producing state in the country, annual production of lac is approx 4000 MT. major lac producing district in the state are jagdalpur, Kanker, Mahasamund, Griaband, Korea, Sarguja and Kabirdham (Ogle *et al*., 2006) [12].

Predators and parasitoids are the biotic stress factors, while weather factors create abiotic stress. *Eublemmaamabilis* Moore (Lepidoptera; Noctuidae), *Psuedohypatopa pulverea* Meyr (Lepidoptera; Blastobesidae) and *Chrysopalacciperda* Kimmins and *Chrysopamadestes* Banks (Chrysopidae; Neuroptera) are the major predators (Sharma *et al.*, 2006) [23]. Predators cause around 35 to 40 per cent loss to lac production (Glover, 1937; Jaiswal *et al*., 2008 while 5 to 10 per cent damage by parasitoids (Varshney, 1976) [24]. The predator *Pseudohypatopapulverea* are destructive predator of lac insects and found in all lac growing areas of the country. It feeds on the live and dead lac insects and is found in large numbers in stored lac and so it is responsible for the qualitative and quantitative deterioration of stored lac. Larval stages feed on the lac larvae and spin a loose web. A single larval predator is capable of destroying 45-60 mature lac cells (Chattopadhyay, 2011) [7]. Lac suffers losses both during the production and storage. There are numerous studies on the production losses of lac in the field. Unfortunately this export commodity reaches the port or origin of export after a process of storage and trading. Storage loss of lac is not seriously studied earlier in spite of the fact that India is the largest producer and exporter of lac in the world. Therefore the present investigation was carried to see the incidences of pest during storage of lac.

Research Methodology

The study was conducted in Korba district of Chhattisgarh state during 2018-19. Korba district was selected purposively because this district having maximum area under forest and Rangini lac cultivation in the state. Out of 5 blocks in the district only two blocks namely Korba and Pondi-Uprora were selected purposively for the study. Then 4 representative villages from each of the selected block were selected randomly. In this way, total 8 villages will be considered for this study. 15 *Rangini* lac producers were selected randomly from each of the randomly selected village. In this way, a total of 120 *Rangini* lac producers were considered as respondents for study purpose. The data was collected personally by using structured interview schedule and appropriate statistical tools will be used for the computation and analysis of research data.

Results and Discussion

Scientific orientation

The findings reveals that majority (38.33%) of the respondents had medium level of scientific orientation, followed by 32.50 percent of respondents had high level of scientific orientation. About 29.17 percent of the respondents had low level of scientific orientation. Similar findings were also reported Narbaria (2013).

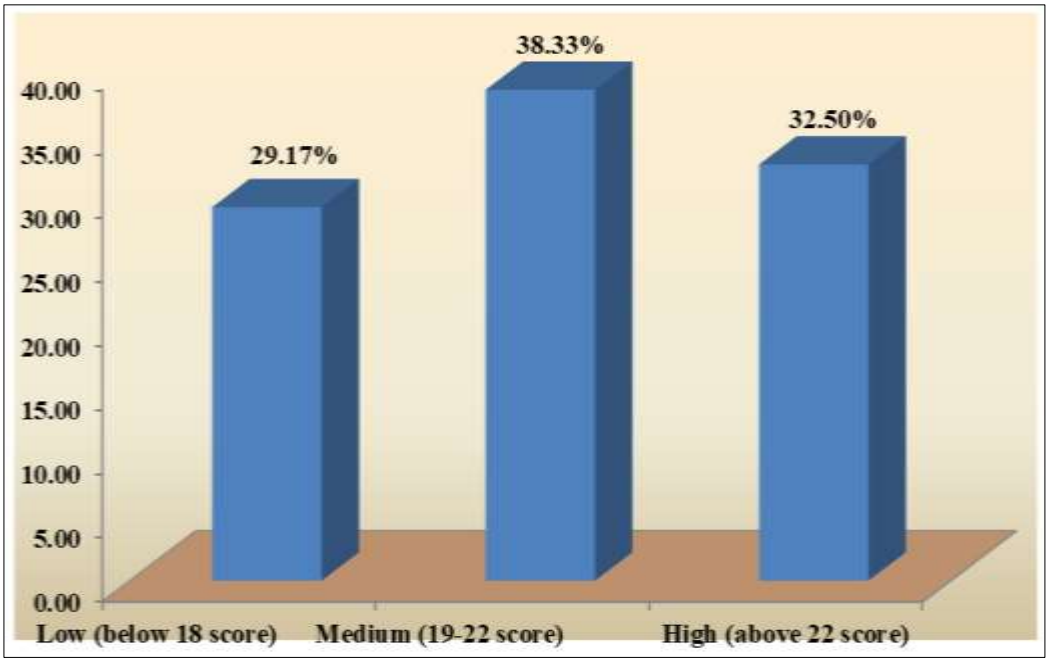

Fig 1: Distribution of the respondents according their scientific orientation

Knowledge about recommended *Rangini* lac production technology

Data concerning to distribution of respondents according to their overall knowledge level is presented in Table 2. The findings pointed out that maximum respondents (68.34%) were having the medium knowledge level followed by high (16.66%) and low (15.00%). These finding were found similar to the Pandey, *et al*. (2004) [21].

Table 2: Distribution of the respondents according to their overall knowledge level about recommended *Rangini* lac production technology, (n=120)

Knowledge level about recommended *Rangini* lac production technology	Frequency	Percentage
Low level (below 32 score)	18	15.00
Medium (33-39 score)	82	68.34
High level (above 39 score)	20	16.66

Mean= 35.98, SD= 3.64

Adoption of recommended *Rangini* lac production technology

The data presented in Table 3 concludes the extent of adoption of recommended *Rangini* lac production technology by the respondents. In case of higher level of adoption, it was observed that, all of the respondents were adopted the scraping practice of lac during the harvesting followed by 64.17 percent respondents who were highly adopted recommended procedure of lac seed selection while, inoculation of seed lac and time of pruning of host trees practice was adopted at higher extent by 60.83 and 56.67 percent respondents respectively.

In case of medium level of adoption of recommended *Rangini* lac production technology, majority of the respondents (67.50%) were adopted the practices of identification of *phunki* lac of higher level followed by 59.17 and 56.67 percent respondents, who adopted the practices to select the suitable host trees and pruning procedure of host trees respectively. Whereas, selection of seed lac and materials required for inoculation of seed lac were adopted by 52.50 percent respondent at medium level. About 51.67 percent respondents were adopted the practices of insect pest control measure and appropriate time of harvesting of *Rangini* lac at medium extent. Another practices like, adoption of crop cycle, removal of *phunki* lac, inoculation of seed lac at proper time and time of pruning of host trees were adopted at medium extent by 49.17, 45.83, 34.17 and 30.83 percent respectively.

Table 3: Distribution of the respondents according to their level of adoption, (n=120)

Practices of recommended *Rangini* lac production technology	Level of adoption			AI
	High	Medium	Low	
	F/ (%)	F/ (%)	F/ (%)	%
Adoption of host plants according to strain	35 (29.17)	72 (60)	13 (10.83)	72.77
Adoption of crop cycle	21 (17.50)	59 (49.17)	40 (33.33)	61.38
Selection of host tree	43 (35.83)	71 (59.17)	06 (5.00)	64.16
Pruning of host tree	35 (29.17)	68 (56.67)	17 (14.16)	71.66
Time of pruning of host trees	68 (56.67)	37 (30.83)	15 (12.50)	81.38
Pruning instruments	77 (64.17)	24 (20)	19 (15.83)	82.77
Selection of seed lac	28 (23.33)	63 (52.50)	29 (24.17)	66.38
Inoculation of seed lac in host tree	17 (14.16)	26 (21.67)	77 (64.17)	50.00
Materials required for inoculation of seed lac	39 (32.50)	63 (52.50)	18 (15)	72.50
Inoculation of seed lac at proper time	73 (60.83)	41 (34.17)	6 (5.00)	85.27
Identification of *phunki* lac	34 (28.33)	81 (67.50)	05 (4.17)	74.72
Removal of *phunki* lac	22 (18.33)	53 (44.17)	45 (37.50)	60.27
Squirrel and their control measures	26 (21.67)	36 (30)	58 (48.33)	57.77
Insects and their control measures	30 (25)	62 (51.67)	28 (23.33)	66.22
Diseases and their control measures	17 (14.17)	5 (4.16)	98 (81.67)	44.16
Time of harvesting of lac from host tree	47 (39.17)	62 (51.67)	11 (9.16)	76.66
Scraping of lac after harvesting	120 (100.00)	0 (0.00)	0 (0.00)	100.00
storage of lac at suitable place and temperature	12 (10)	18 (15)	90 (75)	45.00
Overall Adoption index = 58.40%				

F*= frequency, **%** = percentage

In case of lower level of adoption of recommended *Rangini* lac production technology, majority of the respondents (81.67%) were adopted at lower extent the practices of disease control in lac cultivation followed by the 75.00 percent respondents who were adopted the practices of storage of suitable place at low extent. About 64.17 percent respondents were adopted the practices of inoculation of seed lac at lower extent which was followed by 48.33 percent respondent who adopted the control measures of squirrel and other harmful animals at very lower extent. The recommended practices of removal of *phunki* lac, adoption of crop cycle, selection of host trees, selection of seed lac and control measures of insects were adopted at lower level i.e. 37.50, 33.33, 30,83, 24.17 and 23.33 percent respectively. These findings are in line with as reported by Poswal *et al* (2005) [14].

Data related to Adoption Index shows that maximum value (100.00%) was found in the case of 'Scraping of lac after harvesting', while the minimum value (44.16%) was recorded for 'Diseases and their control measures' Over all extent of adoption is clearly indicated that out of total respondents, maximum number 68.34 percent of them had medium level of adoption of recommended rangini lac production technology.

Table 4: Distribution of the respondents according to their overall adoption level, (n=120)

Adoption level	Frequency	Percentage
Low (below 34 score)	21	17.50
Medium (35-40 score)	82	68.34
High (above 40 score)	17	14.16

Mean= 37.408, S.D.= 3.03

Whereas, 17.50 percent and 14.16 percent of them had low and high level of adoption respectively. Similar finding are also reported Suchan, *et al.* (2005) [22].

Conclusion

The findings reveled that respondents had medium adoption level for recommended *Rangini* lac production technology practices with 58.40 per cent of overall adoption index. So it's become so imperative to bridging the existing adoption gap, so that respondents can increase the production of *Rangini* lac and take it's optimum economic advantage.

Application of research: Findings of the study will be helpful in designing messages and developing extension strategy for promoting recommended production technology practices on *Rangini* lac production in the study area.

Research Category: Agricultural extension, Entomology.

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