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B.Sc HONS Part-III Paper-VI
TOPIC:- Lac culture in India
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Q. Give an account of Lac culture in India.

Introduction : Lac insects and their products have been known to naturalists since very early times. The lac has been referred in ancient sanskrit works viz Atharva-veda (Dave, 1950; Hora 1952) and was called as 'Luxa'. It is mentioned in Mahabharat that 'Luxa Griha' was made up of lac which was prepared by Kaurava for Pandavas, Abul Fazal (1590) in his famous book 'Ain-i-Akbari' has mentioned in detail about the lac industry in India. Mahdihasson (1950, 1952), has referred about the lac insect and its products in China. The first scientific reference regarding the lac and lac insect is the report of Karr and Glover in 1782. Subsequently, much work has been done by various workers on the organization, distribution, taxonomy, host plants, culture production, enemies, chemistry and technology.

Three products from lac insects, viz, the lac-dye, lac-wax and lac (risin) have been items of trade and commerce.

Male : Male is red in colour and 1.2 to 1.5mm in length. It secretes bright crémy-lac. It has reduced eyes and ten segmented antamae. Themouth parts are of piercing and sucking type. Thorac bears three pairs of legs and one pair

of hayline wings. The abdomen is eight segmented and terminate into a short chitinous prominent general sheath containing penis. On either side of this genital sheath a white elongated caudal sets is found.

Female : Female is larger than males and measures about 4 to 5 mm in length. The Pyriform body of the female is enclosed in a resinous cell. The head, thorax and abdomen are not clearly distinct. The mouth parts are of piercing and sucking type. The antenne are clearly visible and degenerated. The posterior end of the body has a median and two lateral process. The legs are in degenerated form.

Life history : Each mature female just after fertilization lay about 200 to 500 eggs in a cell in which she is enclosed. The oviposition takes place into the incubating chamber which is formed by the contraction of the body of the female in forward direction inside the lac cell. The eggs are laid in the month of October and November. After six weeks of laying, the eggs are hatched into first instar larvae in the months of November and December. When larvae emerge they are in quite large number. This mass emergence of the larvae is known as swarming.

Larvae : At the time of emergence the larvae are about 1/2 mm in length, red coloured and boat-shaped. The head bears paired antennae, ocelli and ventrally situated piercing and sucking type of mouth-parts. The active larvae can crawl to a considerable distance so, just after emergence they start moving in search of food and reach their host plants, preferably on young and succulent shoots because the young larvae are unable to settle and feed on hard twigs.

These larvae settle very close to each other on the twig of the host plant which further collapses completely and forms a continuous covering even of the lower surface of the twig. Settled larvae sulk the sap from the twig of the host plant and start to secrete the resinous substance by special dermal glands which are located all over the body. As the resinous secretion comes in contact with air, it soon becomes hard and forms a coating over the body of larva and is called as "cell". Within this cell various life processes like growth of the larva, morphological changes and lac secretion take place. The male 'cell' is elongated and cigar shaped having two holes i.e. anterior and posterior. From the posterior hole which is covered by a flap or operculum, the male insect comes out by pemish open the operculum. After six to eight weeks of stationary life the larvae are metamorphosed as a result of which some (30%) active winged males and maximum (70%) emerge in the form of females which are wingless. The females get fixed on the host plant in resinous mass. The males walk over the encrustations of females and fertilize them within their oval cell though anal opening. Dueto short life peirod males do not take major part in the secretion of lac but female secrets lac throughout her life anal, its life span longer than males. Major quantity of lac is secreted from females. The life cycle period depends mainly on ecological factors of the region.

Cultivation of lac : Lac cultivation is a complicated process. So the cultivators should know well about the inoculation, swarming period and harvesting of lac.

Inoculation : The first procedure in the lac cultivation is the inoculation of lac in sect. Inoculation is the process by which young ones get associate properly with the host plant. Inoculation is of two types.

(1) Natural inoculation : The inoculation taking place in normal routine or in natural way is very simple and common process during which the swarmed larvae infect the same host plant again and start to suck the juices from the twiss.

(2) Artificial inoculation : The main idea behind the artificial method of inoculation is to check all possible dracks of natural inoculation.

Inoculation period : In India two types of crops viz, Rangini and Kusumi are grown in a year. The Rangini crop is of two types called as Kartiki and Baisakhi crop which produce Kartiki and Baisakhi lac respectively. The Kusumi crop is also of two types viz. Agahani and Jethi which produce Agahani and Jethi lac respectively. Thus the inoculation periods of all the four types of crops are different. The inoculations of Kartiki, Baishkhi, Agahani and Jethi crops are recommended in months of June to July, October to November, and January to February respectively. But if continuously four crops are taken the plants would not get any rest which may cause less production of lac.

Swarming : It is very importance phase in the life-history of lac insect. So one should have accurate knowledge about the actual date of the swarming. At the time of swarming, the upper surface has yellow spot on the anal region. At this stage muscle contracts and insect gets detached from the place of attachment. Thus, it is an indication that swarming has taken place. Thus by trials and learning methods i.e. by practice one could know about the exact date of swarming by looking at the colour of the eggs.

Harvesting : The process of collection of really lac from host tree is known as harvesting. In common practice the harvesting is of two types :

(i) Immature harvesting : The harversting of the lac before swarming is called as immature type of harvesting and the lac thus obtained is known as 'AKILAC'.

(ii) Mature harvesting : The collection of crop after the swarming is called as mature harvesting and the lac obtained is known as 'MATURE LAC'.

Recent plan for lac cultivation : With the increasing number of lac industries, some advanced plans have been recommended for the better cultivation of lac crops. Two types of planning is used now-a-days.

(i) Coupe system : All the trees of host plant of definite area are not used under continuous cultivation process of lac crop because if all host plants of a farm would be under continuous attack of lac insects, 100% plants may not get any rest and thus the production of the lac would be affected due to deficiency of nutritive cell sap to the swarmed larvae and adults. So the plants of a farm are numbered into 5 group of plants. This artificial division or marking

of trees is called as coupe system of crop cultivation. In this system when one group of host plants is under the proces of cultivation of lac, other group of host plants would be under rest.

Processing of the lac industry : When the crop matures fully most of the lac is harvested and some part is left on the host plant. For the proper cultivation, the host plant should be framed in January to June every year.

The twig bearing the lac along with eggs is called a BROOD LAC STIC and lac is known as BROOD or STIC LAC. The processing starts with the scraping of the stick from the twig. The scraped lac is subjected to removal of many impurities like dead parts of the lac insects, eggs and colouring matter and finally crushed by hand operated mortars. The material is air dried and obtained in the form of granules which is known as SEED LAC. This seed lac is soaked in water washed, dried in sun light, bleached and heated to melt on charcoal fire in cloth bag of 3 to 4 metre. At the time of heating the bag is twisted and the lac is squeezed out of the tag. The impurities of the lac are left out in the bag, and called as KIRRI LAC. The squeezed lac is now allowed to cool and solidity around the button shaped forms which is now called BUTTON LAC or pure LAC. This pure lac when stretched into thin sheet is called as SHEET LAC. This sheet lac when dissolved in water, produces white or orange coloured lac which is known as SHELL LAC. Shell lac is infact, prepared by boiling the seed lac with yellow arsenic in certain proportion. Thus the shell lac is most purified form of lac.

The equality of lac depends upon the host plant. Kusami lac is said to be the best lac while, Dhak is supposed to be the worst and cheapest one. The quality and colour of the lac is variable according to the presence of gum and resins in the host plants.

Composition of lac : Lac is complex substance having large amount of resins together with sugar, water and other alkaline substances. The percentage of various constituents are as given below :

1. Resin—63 to 90%
2. Dye—2 to 10%
3. Wax—6%
4. Albuminous matter—5 to 10%
5. Mineral matter—3 to 7%
6. Water—3%

Lac Industry in India : India used to produce about 97 percent of the total lac output in the world but at present it has come down to 50-60 percent. The cultivation of lac has been a good source earner of foreign currency.

About 50 percent of the total lac produced in India is obtained from Chhotanagpur area States like Orissa, Punjab, Madhya Pradesh, W. Bengal, Uttar Pradesh, Gujrat, Rajasthan, Assam etc. are increasing the production of lac now-a-days. On a very small level lac production is also reported from Delhi and Kashmir. The average yearly yield of lac in India is about 3,00,000

metric tons. A lac resarch institute 'Indian' Lac Research Institute 'Nam-Kum, Ranchi had been established in 1925 which is producing good quality of white lac. The Indian white lac is supposed stain or spots at places where they are kept. This is mostly small scale industry with around 350 factories, mostly located in Bihar. In Mirzapur district alone there are about 40 factories. Out of total lac produced in India about 85 to 95 percent is exported specially to Britain, U.S.A., U.S.S.R. and West Germany.