

LAC. CULTURE:

INTRODUCTION:- Inregarious number of insects existing today in this gigantic animal realm has drawn the attention of biologists as well as non-biologists from the dawn of Civilization not only due to their nonsense activity, which sometimes proved itself as an unprecedented loss to the human society, but perhaps due to their beneficial activity also. The activity of some of the insects are liked and cordially welcomed. This infatuation towards the insect began long before the advent of Civilization, has continued without cessation to the present time, and will continue, no doubt as long as the human race endured. We commonly think of ourselves as the lords and conquerors of the nature, but insects had thoroughly mastered the world. Lac industry one of the product of the insects world, has drawn the attention of the naturalist since the time immemorial. Even in the earliest period we find its description in "VEDAS" or "LAKSHA" its commercial value was described in "Ain-i-Akbari" But credit regarding the earliest scientific account of Lac insects goes to Mr. KERR (1882) and Mr. GLOVER. Considerable advances have been made during last 30 years in the knowledge of this field as an investigation is being conducted at the Indian Lac. Research Institute, Namkum Ranchi.

The lac insect Laccifer lacca belong to the family Lacciferidae. This group constitutes highly specialized and isolated group in the Super-family - Coccidea of the Order Hemiptera.

SUBSPECIES AND STRAINS OF LAC INSECT:-

Generally two strains of the common Indian lac insects i.e. Laccifer lacca are recognised. the kushmi and Rangeeni. Each strain completes its life cycle twice a year but the duration of

life cycle and the seasons of maturity differs considerably.

<u>STRAIN</u>	<u>CROP</u>	<u>INCUBATION</u>	<u>HARVESTING</u>
	Aghawi	June & July	Jan & February
<u>KUSHMI</u>	Jethwari	Jan & February	June & July
	Kathi	June & July	Oct & November
<u>RANGEENI</u>	Baisakhi	Oct & November	April & May

Studies have been made to investigate the effect of crosses between Rangeeni and Kushmi strains of *L. Lacca* with a view to explore the possibilities of introducing the quality characters of Kushmi into Rangeeni insects. Result so far obtained with the F_1 progeny of the reciprocal cross indicate that the two strains can interbreed and produce fertile hybrids.

BIONOMICS:- The earliest scientific accounts of the life history is given by KERR (1882) Among recent workers are NEHL (1929-31) MISHRA (1936) and GLOVER (1937)

Trilobate short-bodied oval and crimson coloured larvae emerge in large numbers of certain time of year from the lac cells of the female insects and crawl over the surface of the wings and branches of the trees, which they infect. The larvae starts secreting the resin from the glands distributed under the cuticle all over the body except near the mouth parts, breathing pores and anus. The larvae moult twice before regaining maturity. The duration of each instar depends on several environmental factors such as temperature humidity and host plants. The sex is readily recognised by the shape of the lac cells even in the early stages of development.

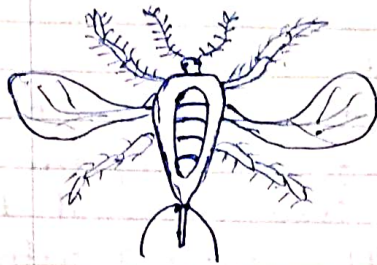
After the first moult the male as well as female leave their legs, antennae and eyes. The differentiation of the sexes is particularly marked after the first moult. The males after two moults and pre-pupal and pupal stages emerge out and may be winged or wingless. It has a life of 62 to 72 hr. After emergence the female after the third moult becomes sexually matured and is fertilized by the male.

From this time onwards lac is secreted by the female at a faster rate and the size of the insect as well as that of the enveloping lac cells increase rapidly and reach a size several times that of the mode lac cells. This stage of activity lasts for a varying number of weeks. According to their season place and host etc. The female lac insects are therefore chief source of lac secretion. At the time of egg laying the body of the female contracts at one side gradually vacating a space inside the lac cell. Simultaneously powdery wax and wax filaments are secreted and shed in the vacated space. The anal tubercles are then withdrawn inside the cell for laying cells which hatches into larvae immediately after laying.

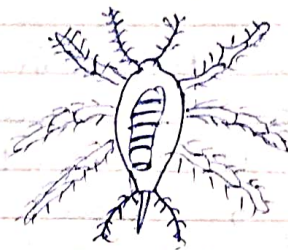
FACTORS OF EGG LAYING AND LARVAL EMERGENCE:-

By experiments it is seen that temperature plays an important role both in egg laying and larval emergence and have important bearing on the preservation and transport of brood lac over long distances and on forcing larvae to swarm at particular periods as desired. Methods have been developed to forecast the date of emergence of lac larvae out of the so many methods, simple visual methods based on the development of yellow spot (MENI 1955) have been found fairly accurate in Baigakhi, Jethuri and Katki crops but in Ashani crops.

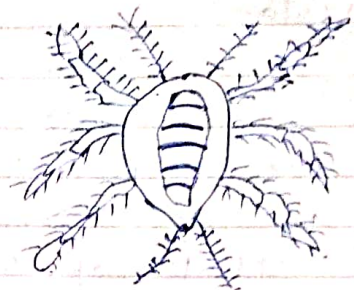
Recent investigations have shown that females of both Rangeeni and Kuchmi strains of *L. lacca* are capable of parthenogenetic reproduction. But the female when deprived of fertilization, not only fail to produce any progeny but also suffer much in their development and resin secretion though such female live for a relatively longer period than fertilized females.



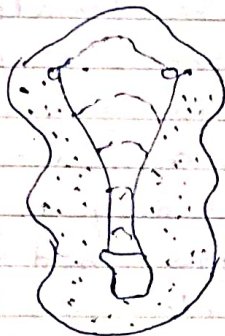
Winged Male



Wingless Male



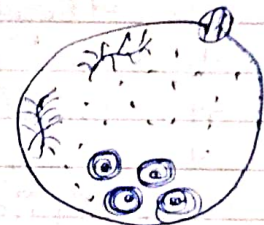
Larvae.



Male chamber.



Young female



Adult female.
Chamber.

ANATOMY AND PHYSIOLOGY:-

The work of Mishra (1931) and Mehdi Hassan (1961) on *L. lacca* are noteworthy. Recent workers like Dikshit and Krishnaswami at the namnum institute have shown that the lac resin resin glands are of only one kind very small in size and distributed all over the dermis except near the two branchial pores and anal region. Each gland consists of a bulbous glandular portion, a narrow duct and a chitinized outlet. There are four different kinds of wax gland restricted to four different

disposition of the bodies (the glands of the body) are in reality the gland was glands and position of glands.

ENEMIES OF THE LAC INSECT:

1. Certain parasites belonging to the large family Chalcididae.
2. *Euclyptus* variable hardy plants which are the important predators responsible for lowering the lac insects.

LAC CULTIVATION:

This is carried out chiefly in photographs in India state. The traditional method of lac cultivation in the traditional form of the forest to provide substantial evidence of work for the forest. This has resulted in the loss of the forest to the quality of the forest for the use of alternate host.

HOST PLANTS: 13 host plants from India having been listed by Reynolds (1937) he further added 20 more species of host plants. Out of these 13 are the common hosts. Out of these the most common three are - *Palas*, *Ber* and *Kasani*. But are either of scientific importance or regional importance.

Pruning: Extent and time of the pruning of the tree is an important effect on the production of succulent branches. These branches feed to the insects and hence affect the lac crop. The proper time for pruning is given as below:

Tree	Crop	Inoculation time	Pruning time
Palas	Katki	June 2nd July	March & April
Ber	Katki	" "	February & March
Palas	Bacchi	Oct 2nd Nov	March & April
Ber	"	" "	July -

COWPE SYSTEM:-

To keep all available host plant in continuous cultivation is the local practice, which deteriorates the health of the plants. So to divide them into Cowpes and provide rest by rotation is much beneficial. In case of Palas, Bar and some other hosts of Rangrezi strain the available host have been divided into 3 Cowpes. The ratio is 3:1:3. In the two larger Cowpes alternate years Baisanki crop grows and in the smaller Cowpe Katki is cultivated every year.

In extremely host areas two Cowpes of equal number of trees are recommended by Negi (1956) Malhotra (1963) recommended a plan which saves lower cost, provides adequate rest and ensure maximum yield. According to him there should be 3 equal numbered Cowpes, two for producing brood lac in alternate year and one for Commercial crop.

INOCULATION:-

The proper Method for inoculation is by cutting brood lac sticks of 15 to 30 cms. They are tied to succulent shoots of the host. According to Krishnaswami (1963) heavy inoculation should be given on palas during Katki season. The brood should not be left on trees beyond 3 weeks because this allows the enemies of lac insects to spread.

ALTERNATION OF LAC HOSTS:- When more than one host are available then it is profitable to exploit them for different crops in the seasons which suits them best.

HARVESTING:- Recent experiment of Kunder forest revealed that in not areas to cut the crop in April-May gives the best yield of stick lac and to cut the crop fully in October and November for brood purpose.

PEST OF HOST PLANTS:- Pest of the host plant indirectly affected the production of lac. These pests damage both the plants as well as the lac insect by feeding upon the various tissues and the sap of the insects and plant respectively.

USE OF LAC:-

1. It is used in Gramophone record industry.
2. To Manufacture floor polishes.
3. It is used in the manufacture of insulating varnishes.
4. Used in the production of oil clothes.
5. It is also used in the production of sealing wax and toys etc.