RESEARCH ARTICLE

# SEASONAL INCIDENCE AND NATURAL ENEMIES OF LAC INSECT (*LACCIFER LACCA)* IN KORBA

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**Abstract:** The seasonal incidence of natural enemies of lac insect was carried out on Rangeeni lac during 2019-2020 at Kerajhariya Village, Pali block, Korba District of Chhattisgarh. Natural enemies of lac viz. *Eublemma amabilis* and *Pseudohypatopa pulverea* recorded as key or major predator of lac, these was noticed a potential Predator reached peak second fortnight of April with 10.00 and 9.80 insect /30 cm lac sticks respectively, whereas *Chrysopa* sp. recorded as moderate predator, *Tachardiaephagus tachardiae was* recorded as major parasitoid these parasitoid reached peak First fortnight of April with 6.60 to 9.40 insect per 30cm of lac sticks, whereas *Eupelmus tachardiae and Aprostocetus purpurenu* as a minor parasitoid of baisakhi lac crop.

**Keywords:** Seasonal incidence, Lac insect, Natural enemies

## INTRODUCTION

Lac is a natural, non-poisonous, biodegradable, inodorous, taste less, hard resin, non-injurious to health and non- timber forest produces (NTFP). Lac is one of the most precious gifts of nature to man. It is the natural commercial resin of animal origin, being actually the secretion of a tiny scale insect, *Kerria lacca* Kerr. *Karria lacca* belongs to the class-insecta, family-Tachardiidae (Kerriidae), super family-Coccoidea, and order- Hemiptera, suborder-homoptera. It has a reddish or dark brown colour with a disagreeable smell. The word "lac" is derived from a Sanskrit word which means "hundred thousand" indicating the gregarious habit of this insect. It is commonly called shellac and in Nepal, the laha. The insect are commercially utilize global for the production of lac which has various industrial applications. *Laccifer lacca* is the common Indian lac insect. Lac is produced mostly in India, Bangladesh, Thailand and china. India is still the largest producer of lac in the world. Out of the nine genera and 99 species of lac insects reported throughout the world, 2 genera and 26 species are found in India out of which *Kerria lacca* is the most widely available species in the country (Paul *et al*. 2013). Major two factors which are responsible for reduction in yield of lac crop viz: biotic factor and abiotic factors, biotic factors includes predators and parasitoids while abiotic factors includes weather factors.

Major predators of lac insect are *Eublemma amabilis* moore (Lepidoptera; noctuidae) *Psuedohypatopa pulverea* meyr (Lepidoptera; blastobesidae) and *Chrysopa lacciperda* kimmins and *C madesters* banks (chrysopidae; neuroptera) (Sharma *et al*.,2006)

The lac insect is prone to attack by insect predators and parasitoids. Among them, two Lepidopteron predators, *Eublemma amabilis* Moore (Lepidoptera: Noctuidae) and *Pseudohypatopa pulverea Mayr*. (Lepidoptera: Blastobasidae) are key pests causing a loss of around 30-40% to lac production (Glover, 1937, Narayanan, 1962, Jaiswal *et al.,* 2008*). Chrysopa lacciperla* Kimmins and *C. madestes* Banks (Chrysopidae: Neuroptera) are the most prevalent in lac ecosystems and they caused considerable damage especially in the winter season (Aghani) kusmi lac crop. Larvae of *E. amabilis* and *P. pulverea* bore into the lac encrustations where they remain confined while they feed on the lac insects

Predators are main factor that affect lac cultivation, around 35 to 40 percent loss cause by predators (Glover, 1937; Jaiswal *et al.,* 2008) while 5 to 10 percent damage cause by parasitoids (Varshney, 1976). Different management practices are used to recover yield loss due to predators and parasitoids like cultural and physical (Bhattacharya *et al*.,2006) biological (Bhattacharya *et al.,* 2008, SiMing *et al*.,2010), and chemical (Singh *et al*.,2009). Since the government of India has banned endosulfan insecticide, new and safer insecticide need to evaluated for the management of lac insect predators and parasitoids (Arora *et al*.2009). Hence the present research entitled study the seasonal incidence of natural enemies of lac insect.

## MATERIALS AND METHODS

The seasonal incidence of natural enemies of lac insect was carried out on Rangeeni lac during 2019-2020 at Kerajhariya Village, Pali block, Korba district of Chhattisgarh. Population of natural enemies were recorded from randomly selected 5 host plants of palas at fortnightly intervals during the rangeeni, strain baisakhi season. The three samples will be collected from 30 cm lac sticks in each 5 plant *i.e.* top, middle and lower part. Collected samples of lac sticks were kept in 60 mesh nylon basket for

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emergence of natural enemies to record their incidence.

## RESULTS AND DISCUSSION

The associated three predators i.e. *Eublemma amabilis, Pseudohypatopa pulverea, Chrysopa sp.* and three parasitoids i.e. *Tachardiaephagus tachardiae, Eupelmus tachardiae, Aprostocetus purpurenus* were recorded in season Rangeeni Baisakhi (Summer) from at Kerajhariya Village, Pali block, korba district of Chhattisgarh during year 2019-2020 (Table 1).

*Eublemma amabilis* was recorded as major or key predator of lac growing field of Palas from Kerajhariya Village, Pali block, korba district of Chhattisgarh The mean larval populations of *Eublemma amabilis* was noticed ranged between 1-11 numbers during the crop period. Maximum population of *E. amabilis* 10.00 was exhibited on 11th fortnight in between 20st April to 5th May whereas 1.2 minimum on 7th fortnight (5th February to 20th February).

*Pseudohypatopa pulverea* predator was noticed as moderate population against lac insect Kerria lacca from Kerajhariya Village, Pali block, korba district of Chhattisgarh, Chhattisgarh. The mean larval populations of black moth (*Pseudohypatopa pulverea*) are presented on table1. *Pseudohypatopa pulverea* population was recorded range between 1-11 numbers cm lac stick of 30 cm during the crop period. The mean larval population of *Pseudohypatopa pulverea* was maximum on 11th fortnight in between 20st April to 5th May and minimum on 7th fortnight (5th February to 20th February).

*Chrysopa* sp. was also recorded as predator of lac insect *Kerria lacca* with low intensity in aghani crop of Palas during present investigation. The mean larval populations of Chrysopa sp. was varied between 0-4 numbers in lac stick of 30 cm during the crop period. The mean larval population of Chrysopa sp. was maximum during 2nd fortnight in between 20th December to 5th January and minimum on 9th fortnight (5th March to 20th March).

*Tachardiaephagus tachardiae* exhibited as moderate parasitoide of lac insect *Kerria lacca* in rangeeni strain of palas during present investigation. The mean larval populations of *Tachardiaephagus tachardiae* are presented in table no. 1. *Tachardiaephagus tachardiae* population was found ranged 0-5 numbers lac stick of 30 cm during the crop period. The mean larval population of *T. tachardiae* was maximum on 11th fortnight in between 5th April to 20th April and minimum on 6th fortnight (20th February to 5th March) after the brood lac inoculation.

*Eupelmus tachardiae* was recorded as parasitoide of lac insect *Kerria lacca*. *Eupelmus tachardiae* population was found varied between 0-3 numbers in lac stick of 30 cm during the crop period. The mean larval population of *E. tachardiae* was maximum on $2^{nd}$ fortnight in between $20^{th}$ April to $5^{th}$ May and minimum on $6^{th}$ fortnight ($5^{th}$ January to $20^{th}$ February) after the brood lac inoculation.

*Aprostocetus purpurenus* was noticed the parasitoid first appearance on the crop during first fortnight of march with 0.40 parasitoid per 30 cm stick whereas, peak density was observed in 11th fortnight of April with 0.60 parasitoid per 30 cm lac stick.

Meshram *et al* (2017) who studied during year 2014-15 and 2015-16 at Korba District of Chhattisgarh. The predators viz. *Eublema amabilis* and *Pseudohypatopa puverea* were recorded as key predator fauna of lac reached peak first fortnight of May with 9.30 and 10.10 insect/30 cm lac sticks, whereas the incidence of *Chrysopa mandestes* was noticed minor. *Tachardiaephagous tachardiae* was noticed a potential parasitoid reached peak second fortnight of April with 9.60 and 9.80 insect/30 cm lac sticks but in case of *Aprostocetus purpureus* and *Eupelmus tachardiae* were noticed as minor parasitoid of Rangeeni lac.

**Table 1.** Incidence of predator/parasitoid of lac insect on Rangeeni crop of Palas plant during 2019-2020.

| Host | Crop | Date of Sample Collection | Predators | | | Parasitoid | | |
|---|---|---|---|---|---|---|---|---|
| | | | ***Ea*** | ***Pp*** | ***Cm*** | ***Tt*** | ***Et*** | ***Ap*** |
| Palas | Baisakhi | **20/12/2019** | 0.00 | 0.00 | 3.20 | 0.00 | 0.40 | 0.00 |
| | | **05/01/2020** | 0.00 | 0.20 | 2.40 | 0.00 | 0.20 | 0.00 |
| | | **20/01/2020** | 0.00 | 0.60 | 1.40 | 0.00 | 0.20 | 0.00 |
| | | **05/02/2020** | 1.20 | 0.80 | 1.00 | 0.00 | 0.20 | 0.00 |
| | | **20/02/2020** | 2.40 | 1.40 | 0.60 | 0.00 | 0.00 | 0.00 |
| | | **05/03/2020** | 3.60 | 3.00 | 0.20 | 1.60 | 0.00 | 0.00 |
| | | **20/03/2020** | 5.00 | 3.60 | 0.00 | 4.40 | 0.00 | 0.40 |
| | | **05/04/2020** | 5.60 | 5.00 | 0.00 | 6.60 | 0.00 | 0.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **20/04/2020** | 8.20 | 8.20 | 0.00 | 9.40 | 0.00 | 0.60 |
| **05/05/2020** | 10.00 | 9.80 | 0.00 | 6.00 | 0.00 | 0.20 |
| **Total** | **36.00** | **32.60** | **8.80** | **28.00** | **1.00** | **1.80** |

*Ea = Eublema amabilis , Pp= Pseudohypatopa pulverea ,Cm= Chrysopa mandesles Tt=Tachardiaephagus tachardiae , Et=Eupelmus tachardiae , Ap= Aprostocetus purpurenus*

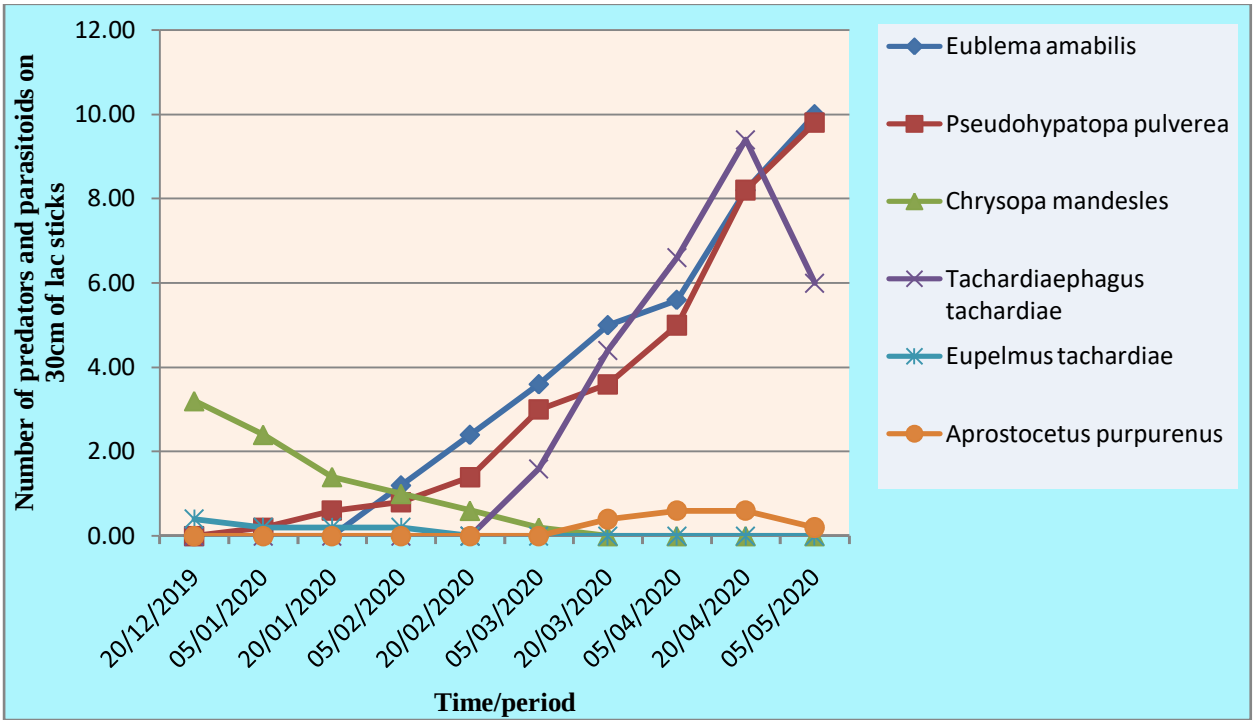


**Fig 1.** Population fluctuation of lac predators and parasitoids on rangeeni strain during 2019-20

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