



*Research Paper*

**STUDY ON THE INFESTATION AND ITS RELATIVE IMPACTS OF LITCHI FRUIT BORER (*Platyepela illepida* Meyr.) IN BIHAR**

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**Abstract**

The Litchi (*Litchi chinensis sonn*) is an important subtropical evergreen fruit crop belonging to the family *sapindaceae*. Known for its embattled and spiked tough skin with a Luscious, sweet pulp inside. Litchi is a summer time favourite in India. It is highly specific to climatic requirement and preservation from insect pests for its establishment, plant growth and fruiting. The major Litchi harvesting areas include Bihar, Uttara Khand, West Bengal and Assam. North Bihar is one of the highest Litchi Producing area and its contributed an identify in litchi harvesting business in world wide market. Among many factors affecting litchi harvesting and productivity insect pests are a major constraint in recent past causing 40-60% yield loss which are worths crores of rupees. Observations from this study revealed that the fruit borer *Platyepela illepida* Meyr is the major pest which makes loss of not only the production but also of the quality of litchi. In various generation of *Platyepela illepida* first and second generation is resulting higher infestation during development of litchi fruit. It is affecting the two major varieties Shahi and Longia which are markated out of state and world wide. The unpredictable infestation in Shahi and Longia causes direct and indirect economical losses to farmers in Bihar and adjoining states also. But maximum infestation of the pest has been observed in litchi orchards of Muzaffarpur and its nearest area in Bihar.

**INTRODUCTION**

Litchi (*Litchi Chinensis sonn.*) is an important subtropical evergreen fruit belonging to family *Sapindaceae*. It has high nutritive value and suitable for geotropic weak person. As litchi fruit mature the concentrations of sugar. Principally those of sucrose, glucose and fructose increase (Chan.et al.1975. Paull.et al.1984). Litchi crop is cultivated in 27 districts of Bihar included Muzaffarpur. Vaishali, Samastipur, East Champaran, Sitamarhi, darbhanga with adjoining districts called "Litchi Kingdom" as mentioned in Table 1. In Bihar Litchi fruit crop is being cultivated commercially in an area of 32,000 ha with an annual production about 2,50,000 MT having productivity of around 7.8 tonnes/ha. [Data Source :- Indian Horticulture Data base : 2015-16]. The most demanded varieties of litchi are Shahi and Longia cultivating in north Bihar orchards.

Litchi crop is attacked by more than 54 insects pests infestation [singh et al.2001]. Scientists have reported on the bionomics and development of litchi fruit borer [*Platyepela illepida* Meyr] by various researchers like [Butani 1977], [Kumar et. al.

2007,2010], [Jha and sen-sarma.2003], [Iall B.S. 1976], [jones & caprio 1992] and many others. Litchi fruit borer is one of the arthropods belonging to class-Insecta. order-lepidoptera, Family-Geometridae and genus-*Platyepala* infesting and resulting economical losses for Litchi farmers.



**Fig. 1. Infested Litchi fruits showing infestation by *P.illepida***

The study of infestation of pests on Litchi crop is important. The reason behind it is increasing demand of litchi fruit in Indian and international Market. Due to infestation of Litchi fruit borer *P.illepida* the fruits emit foul smell and reduce market Prices rapidly (Jha and Sen-Sarma 2003).

**Table-1 :-Production and Productivity of litchi crop in Bihar in the year 2014-15.**

Sl. No.	Litchi Producing Districts of Bihar	Production Kg/Plant	Productivity MT/Ha	Production in MT
1.	Muzzaffarpur	72.41	9.4	68027
2.	Vaishali	65.00	9.1	17988
3.	Samastipur	69.50	9.5	13853
4.	East champaran	66.50	9.1	10471
5.	Sitamarhi	45.00	5.4	630
6.	Darbhanga	42.10	5.2	525

#### **MATERIALS AND METHODS :-**

All field experiments related the study on infestation and its relative impacts of litchi fruit borer *Platyepala illepida* Meyr was carried out during the litchi crop harvesting 2013-2015. The standard method of observation and random sampling of litchi fruits were taken from on the tree [early stage attached with tree] and off the tree [Mature fruit. deattached] from litchi growing areas of Muzaffarpur, Vaishali district and different areas of North Bihar as given in Table 1. 10 green (unripen) fruits from 20 trees (n=200) were covered over pinacles with similar numbers of fruits. The bunch of fruits were covered by light weight plastic (20 cm/30 cm) in the first week and second week in April Similarly. 10 ripen fruits from 20 same trees were collected in the second and third week in June. The fractional design included on the tree (attached fruits, size about 16-20 mm) and off the tree (deattached fruits, Mature) and repeated two times. Which took the complete duration of litchi fruiting season data collected carefully for analysis which was then analysed.

Standard methods have been followed to arrange the data of critical infestation of litchi fruit borer *P.illepida* Meyr on two different types of litchi fruit Shahi and Longia during the month (April-July). To examine the relationship between the number of eggs laid on a fruit and of hatching of Larvae, fruits are inspected and egg/fruit were counted.

## RESULTS AND DISCUSSION :-

Observation related to infestation and its relative impacts of Litchi fruit borer *P.illepida* done in the Litchi cultivating areas in north Bihar during the month April-July and random collection of samples for on the tree and off the tree of litchi was made in year 2015. The results were mentioned in table 2. The infestation of *P.illepida* is concerned on generations as well as fruit size. There by table also reveals data of the infestation by litchi fruit borer on the tree and off the tree fruit crops in litchi cultivating orchards of North Bihar.



**Fig. 2A. Fresh egg of *P.illepida***

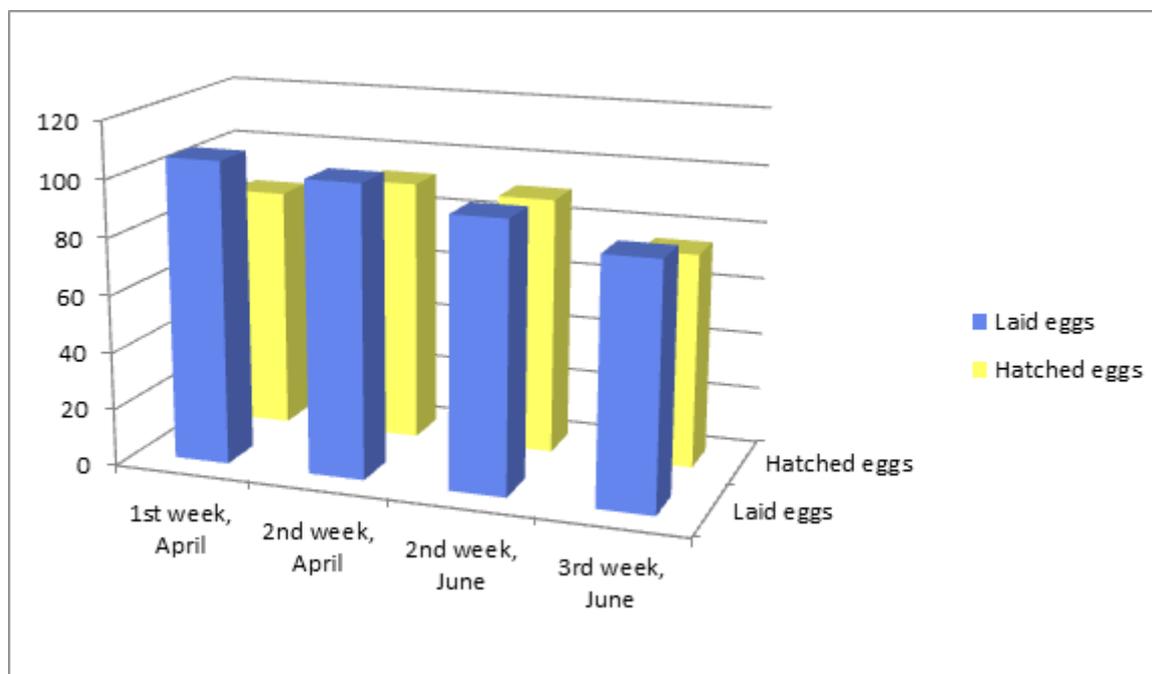


**Fig. 2B. egg with Red lines (3 days)**



**Fig. 2C Mature egg before hatch (6 days)**

Total 253 out of 800 fruits had eggs. A total number of 387 eggs were found or 1.52 eggs/fruit and the greatest number of eggs (fig. 2) per fruit were three. After two weeks from the data of sampling infested fruits had checked and fruits had live larvae (fig. 1) inside. All larvae from infested fruit were identified as 75.25% of *P.illepida* and 24.75% of other pests and fruit flies. The 75.25% larvae of *P.illepida* showing a average of 31.25% infestation of total numbers of fruits.



**Graphical presentation showing laid eggs and hatchings of *P.illepida*.**

Our hypothesis that litchi fruit on the tree is more infested by the first generation of *P.illepida* than off the tree by second generation is true for *P.illepida*. In the first and second observation during early stage of litchi.

**Table 2 :- Showing number of laid eggs, hatched egg, percentage of *P.illepida* larvae and percentage infestation by *P.illepida*.**

Stage	Duration	1 egg/fruit	More Than 1egg/fruits	Total eggs	Avarage eggs	Hatched egg	% of <i>P.illepida</i> larvae	% of other fruit borer spp.	% infestation by <i>P.illepida</i> of total production
Attached fruits early stage	1st week, April	45	22	106	1.58	85	80%	20%	34%
	2nd week, April	42	24	102	1.54	92	75%	25%	34.5%
Deattached fruits Harvesting stage	2nd week, June	34	28	94	1.48	80	70%	30%	28%
	3rd week, June	37	21	85	1.46	75	76%	24%	28.5%

Only one larvae showing infestation of more than one fruit but during the third and fourth observation one larvae (fig.3A) infested only one fruit. The reason for higher infestation in attached litchi fruit is possibly due to small size of litchi.



Fig. 3A Larvae of *P.illepida*



Fig. 3B Pupae of *P.illepida*

During the course of observation an activity of larvae is observed if it was disturbed it ejects a glue like substance, sweet in taste. May be it is for defense. Due to infestation of first generation of *P. illepida* resulting large quantity of litchi fruits drop and the infestation of second generation resulting fruits unfit for marketing out side of state. It is also observed that infestation of *P.illepida* is more serious for on the tree (attached fruits) than in off the tree (deattached fruits) of litchi fruit crop.

### CONCLUSION :-

The present study in relation to infestation and its relative impacts of litchi fruit borer *Platypedea illepida* Meyr in Bihar reveals that Muzzaffarpur, Vaishali, Samastipur, East Champaran, Sitamarhi, Darbhanga are the highly affected area by the infestation of *P.illepida*. The litchi crop damage by the infestation of *P. illepida* has been found more serious in Muzzaffarpur followed by Vaishali and Samastipur districts which are called Litchi Kingdom. The infestation of *P. illepida* on attached litchi fruit is greater than harvested litchi fruits. In the complete duration of litchi cultivation first and second generation of *P.illepida* are resulting more infestation and crops loss causing great economical losses to litchi cultivators and decreasing the assumption of employment and export market values. The Insect Pest *P.illepida* is becoming serious especially in humid conditions at the time of developing fruit size and at the time of ripening. The findings of present study will definitely contribute towards the better cultivating management of litchi fruit and new technology like hot-water immersion, Pheromone traps, mating

disruption, Phytosanitary treatment could help decrease the infestation of *P. illepidida* and increase productivity, employment and export market assumption of litchi crop in kingdom of litchi.

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