



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2019; 7(5): 73-75

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Received: 07-07-2019

Accepted: 09-08-2019

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## Study on incidence of fruit borer (*Conopomorpha litchiella*) in main litchi growing areas of the (Himanchal Pradesh) India

**Ashish Kumar Pandey, RS Bhatia and MP Gautam**

### Abstract

The present investigations entitled on “Determine the incidence of fruit borer (*Conopomorpha litchiella*) in main litchi growing areas of the (Himachal Pradesh) India” was carried out during the year 2014-15. The studies on the incidence were carried out in five litchi growing districts of Himachal Pradesh. To assess the incidence of the pest, a survey was carried out in important litchi orchards in Kangra, Hamirpur, Mandi, Bilaspur and Sirmour districts of the state. At the time of harvest, 50 fruits per tree were selected at random from different varieties. The harvested fruits were examined for the presence of the borer larvae by peeling off the fruit skin at the pedicel end. The studies on incidence of fruit borer, *Conopomorpha litchiella* infesting litchi revealed maximum incidence of the borer pest in Kangra district followed by Mandi, Sirmour, Hamirpur and Bilaspur, respectively.

**Keywords:** Incidence, fruit borer, *Conopomorpha litchiella*, Litchi and Himachal Pradesh

### Introduction

Litchi (*Litchi chinensis* Sonn.) is a appetizing juicy fruit of brilliant quality. Botanically, it belong to family Sapindaceae. The translucent, flavored aril or safe to eat flesh is well-liked as a table fruit in India, while in China and Japan it is favored in dried or canned state. The food value of litchi typically lies in its sugar content which varies from variety to variety. The fruit is also affluent in Vitamin B1, Riboflavin and Vitamin C separately from proteins (0.7%), fats (0.3%), carbohydrates (9.4%), minerals (0.7%), fibrous matter (2.25%), calcium (0.21%), phosphorus (0.31%), iron (0.03%) and carotene [4].

India is the second largest producer of litchi in the World following China. Other major growing countries are Thailand, Australia, South Africa, Madagascar and USA (Florida State). Among fruit crops, litchi position seventh in area and ninth in production but is sixth in conditions of value in India. It is grown over an area of 84.2 thousand hectares in India<sup>[1]</sup>. In Himachal Pradesh, it is cultivated over an area of 4.3 thousand hectares<sup>[2]</sup> and district Kangra leads both in area and production in the state [7].

Though, the area under litchi cultivation has augmented extremely over the last few years in the state, but the productivity has not improved proportionately. Of the different cornerstones in the crop production, occurrence of insect pests and diseases assumes better significance. Olfert Dapper (1670) wrote that the tree in fruit seems to be decorated with ‘purple hearts’ which melt like sugar in the mouth and that rightly the litchi should be called “the Queen of fruits”. Grosier (1795) claimed that litchi is the most tasty and beautiful fruit that God has created in the Universe. And a writer on nature in modern times, Robert sparks walker, said that anyone who examines the litchi and notes the beauty and sanitary method by which the fruit is preserved, must admire it as ‘one of the daintiest packages that have ever been wrapped by nature’s hands [7].

### Materials and Methods

To assess the occurrence of the pest, a survey was approved out in significant litchi orchards in Kangra, Hamirpur, Mandi, Bilaspur and Sirmour districts of the state.

At the time of harvest, 50 fruits per tree were chosen at random from different varieties. The harvested fruits were examined for the attendance of the borer larvae by peeling off the fruit skin at the pedicel end. Those containing larva/ faecal matter just below the crown were measured as infested and the data so obtained were converted into per cent infestation.

### Results and Discussion

The survey carried out close to fruit harvest to record the incidence of fruit borer in five districts of the state is presented in Table 1 and fig 1. The perusal of the data reveals that out of 25 orchards surveyed in five important litchi growing districts of the state, maximum mean incidence was recorded in Kangra followed by Mandi, Sirmour, Hamirpur and Bilaspur, respectively. In Kangra district where 17 orchards were surveyed, the borer incidence ranged between 46.0 to 69.2 per cent; maximum being in Nagrota Bagwan (69.20%), followed by Rait (61.00%), Nurpur (52.00%) and Panchrukhi (46.00%) in the decreasing order. On the other hand, an incidence of 57.20 to 61.00 per cent was recorded in the two orchards surveyed one each in Harabagh and Madhaan, in Mandi district. In Bilaspur district however, minimum (15.00%) borer incidence was recorded in two orchards in Jukhala area which was closely followed by Bhota (16.00%) in Hamirpur. It was also found that in all the districts predominantly two varieties i.e. Dehradun and Calcuttia were found existing in the orchards barring Kangra and Mandi where other varieties did exist in addition to these two cultivars. The results (Table-1) also reveal that late maturing varieties were more prone to the attack of the pest, however, among predominant ones, cv. Calcuttia recorded higher (12-86%) fruit damage compared to Dehradun (10-56 %). (Bhatia *et al.*, 2000) [3] reported mean fruit infestation between 20.1-63.7 per cent from Kangra which corroborates the present findings. These studies are also supported by (Nair and Sahoo 2006) [8] who reported 26.0-89.0 per cent fruit damage due to the pest from West Bengal, however, differ from those reported by (Sharma *et al.*, 2007) [10] who recorded higher (88.0-94.0 %) fruit infestation by nut borers (*Blastobasis* sp. and *Gatesclarkeana* sp.) on litchi from Punjab which may be attributed to the variation in the pest species and the climatic factors (hot weather in Punjab compared to Himachal Pradesh).

Higher (96.1–100 %) fruit infestation by a closely related species *Conopomorpha sinensis* Bradley on litchi in untreated orchards have been reported by (Hung and Chen 2008) [6] from Taiwan which also differ from the findings of the present work. Also, our results differ considerably from those reported earlier by (Hung and Chen 2008), (Sharma 1985) [6, 9] who recorded lower (24.0-32.0 % and 7.5-47.0 %) infestation by fruit borer on litchi in Bihar and Taiwan, respectively which is too low in comparison to the one obtained in the main litchi growing belts of the state (34.0-86.0 %) which can also be explained on the grounds that the pest is well established in these areas (Bihar and Taiwan) because the crop (litchi) has been introduced long time back and in general regular control measures are in vogue and also that the natural enemy fauna must have established itself in these areas over these years compared to the present studies where litchi has been established some 50-60 years back and farmers are not used to application of pesticides and that the natural enemy complex is also not well established in these areas that must have resulted in population build up and higher infestation of the borer.

On cocoa, however, (Zam and Azhar 1992) [13] reported an average fruit infestation to the tune of 90 per cent by the borer, *C. cramerella* in Malaysia which is slightly higher than what has been obtained in the present work. Similarly, (Sulistyowati and Junianto 1995) [12] also reported pod borer, *C. cramerella*, a very serious pest of the crop in Indonesia, Malaysia and Philippines and recorded higher (82.2%) loss of cocoa beans due to heavy infestation by the borer in these countries.

In the present studies the late varieties (Calcuttia, Late Seedless, McLean and Large Red) were found more prone to the attack of the borer and the fruit damage was recorded to vary between 46.0 and 86.0 per cent which corroborates the earlier findings reported by (Bhatia *et al.*, 2000) [3] where these values varied between 33.3 and 85.7 per cent on these varieties and also with the findings of (Singh and Sharma 2010) [11] who reported the higher (63.5 to 72.0 %) fruit damage due to borer infestation in the late maturing variety (Calcuttia) in Sirmour district of Himachal Pradesh. (Sharma 2007) [10] also reported maximum (91.8%) damage by nut borers on Calcuttia variety at fruit harvest on litchi in Punjab.

**Table 1:** Fruit borer incidence on litchi in different districts of Himachal Pradesh

Districts	Places (Orchards Surveyed)	No. of orchards visited	Varieties	Av.* fruit infestation (%)	Mean infestation (%)
Bilaspur	Jukhala	2	Dehradun	12.00	15.00
			Calcuttia	18.00	
Hamirpur	Bhota	2	Dehradun	10.00	16.00
			Calcuttia	22.00	
Kangra	Nagrota Bagwan	6	McLean	68.00	69.20
			Large Red	56.00	
			Calcuttia	86.00	
			Rose Scented	62.00	
			Muzzafarpur	74.00	
	Nurpur	3	Dehradun	46.00	52.00
			Calcuttia	58.00	
	Panchrukhi	4	Dehradun	40.00	46.00
			Calcuttia	52.00	
	Rait	4	Dehradun	56.00	61.00
Calcuttia			66.00		

Mandi	Harabagh	1	Rose Scented	76.00	57.20
			Calcuttia	78.00	
			Dehradun	34.00	
			Large Red	48.00	
			Seedless	50.00	
Mandi	Madhaan	1	Dehradun	50.00	61.00
			Seedless	82.00	
			Rose Scented	66.00	
			Large Red	46.00	
Sirmour	Dhaulakuan	2	Dehradun	34.00	37.00
			Calcuttia	40.00	

\*Average of 50 fruits

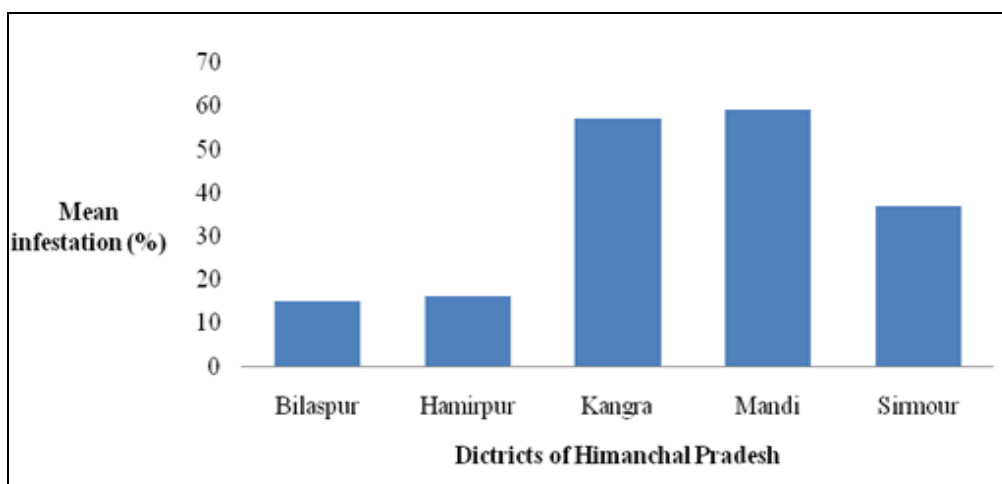


Fig 1: Mean infestation of fruit borer of litchi in different districts of Himachal Pradesh

## Conclusion

The survey on incidence of litchi fruit borer in five major litchi growing districts of the state revealed maximum incidence in Kangra district followed by Mandi, Sirmour, Hamirpur and Bilaspur, respectively. Nagrota Bagwan area in Kangra district recorded the highest (69.20%) borer infestation whereas Jukhala in Bilaspur recorded the lowest (15.00%). The late maturing varieties of litchi were found to have more infestation of the borer pest compared to early maturing ones.

## Acknowledgement

The authors are thankful to Department of Entomology, Dr. Yashwant Singh Parmar University of Horticulture & Forestry, (Nauni), Solan (H.P.). 173230 India and entire faculty for providing necessary facilities for conducting the investigation and valuable suggestions during the course of investigation.

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