



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(5): 131-133

© 2018 JEZS

Received: 21-07-2018

Accepted: 22-08-2018

**Rajeev Ranjan**

Department of Entomology  
Dr. Rajendra Prasad Central  
Agricultural University, Pusa,  
Samastipur, Bihar, India

**Vijay Kumar**

Department of Entomology  
Dr. Rajendra Prasad Central  
Agricultural University, Pusa,  
Samastipur, Bihar, India

## Varietal reaction against the incidence of major pests of litchi (*Litchi chinensis* Sonnerat)

**Rajeev Ranjan and Vijay Kumar**

**Abstract**

Litchi (*Litchi chinensis* Sonn.) is attacked by several pests and litchi mite (*Aceria litchii* Keifer), litchi fruit borer (*Conopomorpha cramerella* Snellen) and litchi leaf roller (*Dudua aprobola* Meyrick) as major pests of litchi causing substantial damage to litchi foliage and fruits at various stages of growth. Study on varietal reaction against these pests reveal that litchi cultivar 'Shahi' was proved most preferred by the pests recording maximum pest incidence viz; mite (53.10%), fruit borer (49.70) and leaf roller (39.90) followed by cv. 'Rose Scented' which recorded 44.30, 36.30 and 36.50 percent infestation, respectively against the pests. Whereas the litchi cultivar 'Deshi' and 'Kasba' were least preferred for the major pests of litchi recording 22.30 and 25.30 percent mite incidence, 18.20 and 20.70 percent fruit borer incidence and 17.00 and 27.00 percent leaf roller incidence during the years of infestation. The other cultivars 'China', 'Dehrrrose', 'Mandrajji', and 'Early Bedana' were found comparatively more susceptible to the pest incidence in comparison to the litchi cultivars 'Deshi' and 'Kasba'.

**Keywords:** Litchi (*Litchi chinensis*), litchi mite (*Aceria litchii* Keifer), litchi fruit borer (*Conopomorpha cramerella* Snellen), litchi leaf roller (*Dudua aprobola*), varietal reaction

**1. Introduction**

Litchi (*Litchi chinensis* Sonn.) is an excellent fruit and native to Southern china. India is the 2nd largest producer in the world after china with production of 5, 80,000 mt. from an area of 82,700 hectares [8]. The commercial cultivation of litchi is mainly concentrated to Bihar, West Bengal, Uttaranchal, Uttar Pradesh, Himachal Pradesh, Assam, Tripura, Punjab and Jharkhand, Bihar is the leading litchi producing state in India and producing 2,25,430 mt from an area of 31,280 ha [8]. There are more than 54 insect and mite pests known to attack litchi tree and its fruits [11] but only a few, namely litchi mite (*Aceria litchii* Keifer), litchi fruit borer (*Conopomorpha cramerella* Snellen) and litchi leaf roller (*Dudua aprobola* Meyrick) causing serious damage to the crop in Bihar [7, 3]. The extent of damage to fruits ranges between 24 to 49 percent, while leaf infestation varies from 7.2 to 72.5 percent due to the pests [9]. The litchi erineum mite is one of the most destructive pests of litchi in all litchi producing countries of the world. As a result of its feeding, under surface of the infested leaves show abnormal growth of epidermal cells in the form of hair – like velvety growth of chocolate brown colour [5]. The litchi fruit borer (*Conopomorpha cramerella* Snellen) causes severe damage to litchi fruits and leaves [6]. The pest has now established itself as one of the major pests of litchi in India particularly in Bihar and Uttar Pradesh. The newly hatched larvae of litchi fruit borer mine into the newly emerged litchi leaves as leaf miner and then make a tunnel inside the tender shoots and when fruits appear during April – May, the larvae bore into the fruits and feed on their pulp. Infested fruits become unfit for domestic consumption as well as export, resulting in severe losses [7, 3]. Litchi leaf roller, *Platyepplus aprobola* (Meyer) causing severe damage to litchi foliage [10]. The leaf injured by the leaf roller varies between 16.70 to 71.60 percent while tree infestation varies from 12.88 to 53.54 percent during August to February [5]. The litchi fruits are mostly consumed in raw conditions, they are more vulnerable to contamination with plant protection chemicals. The present study was mainly undertaken to explore the possibilities of screening of prominent litchi cultivars against the major pests of litchi keeping in view of the recent changes in climatic conditions as the information available on the subject so far is scanty and scattered.

**Correspondence****Rajeev Ranjan**

Department of Entomology  
Dr. Rajendra Prasad Central  
Agricultural University, Pusa,  
Samastipur, Bihar, India

## 2. Materials and Methods

In order to evaluate the prominent litchi cultivars, eight litchi cultivars (aged 12 years) viz; Shahi, Rose Scented, Deshi, China, Dehrrarose, Kasba, Early Bedana and Mandraji were evaluated for their comparative resistance / susceptibility to major pests of litchi under natural infestation condition at the Dr. RPCAU Research Farm of Birauli (Samastipur), Bihar during 2012 to 2013. These cultivars were grown and maintained in field gene bank of the fruit Research Farm, Birauli. The experiment was laid out in randomized block design. Each treatment (cultivars) comprised of two plants. The planting distance between two trees was kept at 10 x 10 meters. For estimating the mean percent leaf infestation, 10 litchi twigs were collected randomly from each side of the tree at the time of peak period of infestation in both the years. The total numbers of healthy and infested leaves were counted from each twig and finally mean percent leaf infestation was computed accordingly. Further, at the time of fruit harvest, 50 ripened fruits were randomly collected from each tree of each cultivar from each replication for recording the data on number of healthy as well as infested fruits. Finally the mean percent fruit infestations were worked out for the major pests of litchi. The observations regarding fruit yield were recorded separately for each of the cultivar in Kg / tree. The data so obtained with regard to different parameters were statistically analyzed by using randomized block design.

## 3. Results and Discussion

In a varietal screening trial, eight prominent litchi cultivars viz; Rose-Scented, Deshi, China, Shahi, Early Bedana, Dehrrarose, Kasba and Mandraji were evaluated in the natural field conditions against major pests of litchi viz; litchi mite (*Aceria litchii* Keifer), litchi fruit borer (*Conopomorpha cramerella* Snellen) and the litchi leaf roller (*Dudua aprobola* Meyrick). The findings revealed that the reaction of these cultivars differed significantly against these pests. The prominent litchi cultivar cv. Deshi recorded lowest pest incidence against the all three major pests of litchi i.e. litchi mite, litchi fruit borer and litchi leaf roller with the infestation percentage of 22.30, 18.20 and 17.00 percent, respectively, followed by cv. Kasba with the infestation percentage of 25.30, 20.70 and 27.00 percent, respectively against these pests. The litchi cultivar cv. Shahi was found most favorable for the attack of pest with the infestation percentage of 53.10, 49.70 and 39.90 percent followed by cv. Rose-cented (44.30,

36.30 and 36.50 percent), cv. China (39.40, 41.30 and 30.80 percent), cv Dehrrarose (41.10, 38.70 and 33.50 percent), cv. Mandraji (35.90, 33.20 and 30.00 percent) and cv. Early Bedana (35.10, 35.00 and 28.00 percent) against these pests (Table-1 & Fig.1).

The marketable fruit yield (kg / tree) also differed significantly due the incidence of these pests (Table -1). The litchi cultivar cv. Deshi recorded maximum fruit yield (105 kg / tree) followed by cv. China (91.60 kg / tree) and lowest in Kasba (65.60 kg / tree). The other cultivars viz; Rose Scented (88.40 kg / tree), Shahi (83.20 kg / tree), Early Bedana (76.50 kg / tree), Dehrrarose (69.30 kg / tree) and Mandraji (75.10 kg / tree) also recorded comparatively lower marketable fruit yield due to pest incidence though, the cv. Shahi, Rose scented, China and Mandraji are recognized as high yielding varieties producing higher yield in proper management conditions recording yield to the tune of cv. Rose Scented (117.00 kg / tree), cv. Shahi (121.00 kg / tree), cv. China (121.75 kg / tree) and Mandraji (105.38 kg / tree) [1]. It is obvious from the study that varietal reaction against major pests differed significantly during the years of study, but no significant effect of year varietal performance interaction both against the pest incidence and fruit yield as these differences (Variety x Year) were statistically non-significant (Table.1).

The present findings are in close conformity with the results of earlier workers. Lall and Rahman (1975) [5] observed that cv. 'Shahi' was more susceptible than cv. 'China' and cv. 'Longia'. Somchoudhary *et al.* (1987) [12] observed that the litchi cultivar 'Bedana' as highly susceptible against the incidence of litchi mite (*A. litchii*) as compared to 'Muzaffarpur Early', 'Bombay', 'Deshi' and 'Piazi'. Several litchi cultivars were tested earlier for their reaction against litchi fruit borer, *C. cramerella*. Lall and Sharma (1976) [6] recorded maximum fruit damage (34.69%) in cv. 'Shahi' and lowest (11.73%) in cv. 'Longia' due to the incidence of litchi fruit borer, *C. cramerella*. Whereas, Chakraborty and Samanta (2005) [2] found that cv. 'Muzaffarpur' had more damage (55.00%) than to 'McLean' and 'Kasba', 24.80 and 27.50 percent, respectively. Lall and Mallik (1976) [4] observed that Litchi cultivar cv. 'Shahi' was more susceptible to the incidence of litchi leaf roller, *P. aprobola* with leaf infestation of 64.97 percent and cv. 'Longia' was comparatively less susceptible and recorded lowest leaf infestation (5.38%).

**Table 1:** Reaction of litchi cultivars against major pests of litchi and fruit yield (Pooled)

Treatments		Mean% leaf infestation due to <i>A. litchii</i>	Mean% fruit infestation due to <i>C. cramerella</i>	Mean% leaf infestation due to <i>D. aprobola</i>	Yield (kg/tree)
T <sub>1</sub>	Rose-scented	44.30 (41.50)	36.30 (37.00)	36.50 (37.20)	88.40
T <sub>2</sub>	Deshi	22.30 (27.80)	18.20 (24.90)	17.00 (24.20)	105.40
T <sub>3</sub>	China	39.40 (38.50)	41.30 (39.90)	30.80 (33.50)	91.60
T <sub>4</sub>	Shahi	53.10 (46.70)	49.70 (44.80)	39.90 (39.10)	83.20
T <sub>5</sub>	Early Bedana	35.10 (36.00)	35.00 (36.30)	28.00 (31.80)	76.50
T <sub>6</sub>	Dehrrarose	41.10 (40.20)	38.70 (38.40)	33.50 (35.10)	69.30
T <sub>7</sub>	Kasba	25.30 (30.00)	20.70 (26.90)	27.00 (31.20)	65.60
T <sub>8</sub>	Mandraji	35.90 (36.60)	33.20 (35.00)	30.00 (33.10)	75.10
CD ( = 0.05)		9.20	8.92	8.09	15.49
CV		12.65	12.85	12.47	9.66
Year x Treatment		NS	NS	NS	NS

Values in parenthesis ( ) are angular values.

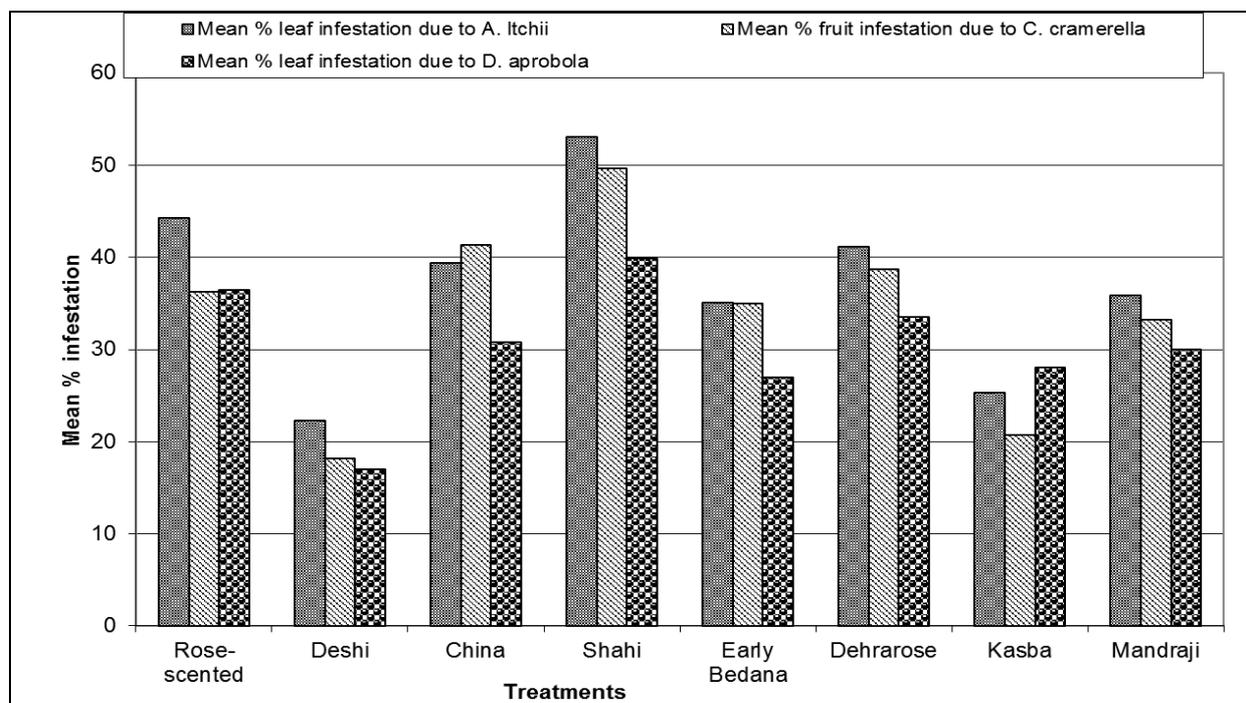


Fig. 1: Varietal reaction against the major pests of Litchi (*Litchi chinensis* Sonn.)

#### 4. Conclusion

Though, the present study categorized litchi cultivars Deshi and Kasba as less susceptible to the pest incidence and the other cultivars, Shahi, China, Dehrrrose, Mandraji, and Early Bedana as susceptible to the pest incidence but such categorization seems to be only of academic importance because these cultivars have their own fruit quality characters like, taste, fragrance, fruit size, seed size, aril and skin. The cv. Shahi is known for its specific fruit taste, fragrance, size of fruit in national and international markets like wise cv. China known as high yielders while cv. Early Bedana is for smaller seeds and Rose Scented for its fragrance. Hence, the pest incidence could not be the only criterion for acceptance of the cultivars but the information can be exploited through better management strategies. It is evident that present findings are of more importance than the earlier works done on these aspects as the cultivars evaluated against the pests are more prominent and widely accepted in the major litchi growing areas of Bihar. Therefore the present study has no doubt added valuable information on varietal performance against the major pests of litchi under natural infestation conditions.

#### 5. Acknowledgement

The research findings are the part of the research work of P. hd. Programme of the first author submitted to the Department of Entomology, Dr. Rajendra Prasad Central Agricultural University (Erstwhile. RAU, Pusa), Pusa, Samastipur, Bihar, India.

#### 6. References

- Anonymous. Biennial Report, (2007-2009) AICRP on Sub-tropical Fruits, RAU, Pusa (Bihar), 2009, 23-24.
- Chakraborty, Kalyan, Samanta, Arunava. Evaluation of litchi germplasms based on biochemical parameters along with incidence of leaf roller (*Platyepala aprobola* Meyer.) and fruit borer (*Conopomorpha cramerella* Snellen). Annals of Plant Protection Sciences. 2005; 13(2):338-342.
- Hameed SF, Sharma DD, Agarwal ML. Studies on the management of litchi pests in Bihar. R.AU Journal of Research. 1999; 9(1):41-44.
- Lall BS, Mallik SN. Bionomics and control of litchi leaf roller (*Platyepala aprobola* Meyrick) Lepidoptera: Tortricidae. Proceedings of the National Academy of Sciences, India, 1976, 22-23.
- Lall BS, Rahman MF. Studies on the bionomics and control of Erionose mite, *Eriophyes litchi* Keifer, Acarina: Eriophyidae, Pesticides. 1975; 9(11):49-54.
- Lall BS, Sharma DD. Studies on the bionomics and control of cacao moth, *Acrocercops cramerella* Snell. (Lepidoptera: Gracillariidae). Proceedings of the National Academy of Sciences, India, 1976, 22-23.
- Lall BS, Sharma DD. Studies on the bionomics and control of the cacao moth, *Acrocercops cramerella* Snellen Lepidoptera: Gracillariidae, Pesticides. 1978; 12(12):40-42.
- NHB (National Horticulture Board), Indian Horticulture data base. www.nhb.gov.in, 2013, 86-87
- Ranjan R, Mukherjee U. Influence of weather factors on the incidence of litchi shoot and fruit borer, *Conopomorpha cramerella* Snellen (Lepidoptera: Gracillariidae) in Bihar. Pest Management in Horticultural Ecosystem. 2008; 14(2):177-180.
- Singh MP. Occurrence of *Platyepala aprobola* Meyrick (Tortricidae: Lepidoptera) on litchi in north Bihar. Indian Journal of Entomology. 1971; 33:98.
- Singh HS, Rai Mathura, Nath Vishal. Status and Management of Insect Pests and Mites In: litchi, Genetic Resources, Production, Protection and Post-harvest management (eds.) Mathura Rai, Vishal Nath and Pradip Dey, 2001, 73-80.
- Somchoudhary AK, Sarkar PK, Singh P, Mukherjee AB. Bio-efficacy of some pesticides against *Aceria litchii* Keifer (Acarina: Eriophyidae). Proceedings of 1<sup>st</sup> National Seminar on Agricultural Acarology, Kalyani, 1987, 48.