

## Study on Insect Pest Succession of Brinjal Crop Ecosystem in Western Region of Uttar Pradesh, India

Raveesh Kumar Gangwar<sup>1\*</sup> D. V. Singh<sup>12</sup>

1. Department of Entomology, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, (U.P.) India-250110 raveeshgangwar@ahoo.com

2. Assistant Professor, Department of Entomology, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, (U.P.) India-250110-

\*raveeshgangwar@ahoo.com

### Abstract

The present investigation was carried out during *Kharif*, 2011 at Crop Research Centre (CRC) of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.). During the studies on the insect-pests succession revealed that a total of eight insect species were found associated with brinjal crop at different crop growth stages. The first attack on the crop appeared in the one week after transplantation and continued up to till crop harvested. pests were found attacking on the crop were jassids (*Amrasca biguttula biguttula*), aphids (*Aphis gossypii*), white fly (*Bemisia tabaci*), leaf roller (*Eublemma olivaceae*), shoot and fruit borer (*Leucinodes orbonalis*), epilachna beetle (*Epilachna vigintioctopunctata*), leaf webber (*Psara bipunctalis*) and grass hopper (*Chrotogonus spp.*). Among them, brinjal shoot and fruit borer (*L. orbonalis*) was recorded as major pest. Jassids (*A. biguttula biguttula* Ishida), aphid (*A. gossypii* Glov.) and epilachna beetle (*E. vigintioctopunctata* F.) were found to damage the crop moderately. Other insects pests recorded on the crop were of less importance and extent of damage caused by them was found without much economic loss.

**Keywords;** Pest succession, *Leucinodes orbonalis*, *Solanum melongena*, damage,

### INTRODUCTION:

Brinjal (*Solanum melongena*) is an important commercial vegetable crop grown throughout the year over the country (Pareet, 2009). It is a versatile vegetable and one of the three most popular and economically important vegetable among small-scale farmers and low income consumers of North-India. Hence, it is subjected to attack by number of insect-pests right from nursery stage till harvesting which affects crop cultivation and act as a limiting factor in the profitable cultivation of brinjal crop. Nayar *et al.* (1995) listed 53 insects where as Butani and Verma (1976) listed 36 insects attacking on brinjal.

Eggplant fruit and shoot borer *L. orbonalis* Guenee (Lepidoptera: Pyraustidae) is considered to be the most serious pest of brinjal in all parts of India (Mote, 1976; Tripathy, M.K. and Senapati, B.1998). A thorough knowledge of seasonal activity of insect-pest helps in developing efficient pest management strategies in a particular set of climatic conditions. Since no much information available from Western region of Uttar Pradesh, studies were taken up to ascertain the succession of insect pest on this crop.

### METHOD AND MATERIAL

The experiment was conducted at Chirori farm, Crop Research Centre (CRC) of Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh. Randomly five plants from three central rows in each plot were tagged and an observation on population of insect pests of brinjal was recorded in the morning hour at weekly interval right from germination till harvest of crop. The nature and extent of damage caused by various insect pests was also recorded to assess the economic status of the pests. The insect-pests were collected and reared up to adult stage wherever necessary. Adult insect were preserved and identified.

### RESULTS

#### Pest succession in brinjal crop

The insect pest species associated with brinjal crop along with their nature of damage, seasonal incidence, damaging stage and economic status have been studied and shown in table 1. Eight insect species were found attacking the brinjal crop at different stage of crop growth at Modipuram, Meerut of Uttar Pradesh. These were brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee (Pyralidae:Lepidoptera), whitefly, *Bemisia tabaci* Gennadius (Aleyrodidae:Hemiptera), Jassid, *Amrasca biguttula biguttula* Ishida (Cicadellidae:Hemiptera); aphid, *Aphis gossypii* Glover (Aphididae:Hemiptera) grasshopper, *Chrotogonus sp.* (Acrididae:Orthoptera), Leaf roller, *Eublemma olivaceae* W. (Noctuidae:Lepidoptera), leaf webber, *Psara bipunctalis* (Pyralidae:Lepidoptera) The epilachna beetle, *Epilachna vigintioctopunctata* (Coccinellidae:Coleoptera).

#### Lepidoptera

**Brinjal shoot and fruit borer:** *Leucinodes orbonalis* (Guenee) is an important pest causing severe damage to the brinjal fruits. The incidence of the pest on kharif crop started from the last week of August and

remained till last week of December, thus this pest was found infesting the crop throughout the crop season. **Singh et al. (2000)** reported peak shoot infestation 86.66% due to *L. orbonalis* in the third week of September with an intensity of 2.09/plant. The extent of apparent losses of the borer was only 21.3%, but the total losses in production were as high as 48.3%. **Atwal .A. S. (1976)** reported the abundance of *L. orbonalis* e during monsoon period. **Mehto et al., (1980)** also observed this pest round the year on the brinjal crop. **Pawar et al., (1986)** reported incidence of this pest during kharif crop and summer season.

**Leaf webber:** *Psara bipunctalis* is also associated with brinjal crop. The presence of this pest is found on brinjal crop from last week of August to last week of October. Newly caterpillar attack on brinjal crop and scrape and feeding on epidermal tissues, later feed on ventral surface of leaves, skeletonizing completely them.

**Leaf roller:** *Eublemma olivacae* remained active on brinjal from the first week of August to mid November. During this period the caterpillar of the pest feed inside the leaves by folding with the help of white resinous secretion and skeletonize by this activity reducing photosynthesis which have indirect effect on fruit yield.

#### **Coleoptera.**

**The epilachna beetle:** *Epilachna vigintioctopunctata*. The activity of this pest was noticed in kharif season August to mid December. During this period, the grubs and adults feed upper and lower surface of leaves. **Natekar (1990)**, however, reported its activity on summer brinjal for a short period, but on kharif crop up to August with the population level of 136grubs/ 150 plants.

#### **Homoptera**

**Jassid:** *Amrasca biguttula biguttula* Ishida, commonly known as cotton leafhopper is a polyphagus pest comes under order Hemiptera (Homoptera); it is a sucking pest, causes considerable damage to brinjal crop. Both nymphs and adults of this pest suck the sap from the lower surface of leaves and growing tips. The incidence of this pest was observed during August to December i.e. the population appeared in the first week after transplanting and its population continued building up throughout the crop growth. **Dhamdhare et al., (1995)** observed peak population of jassid in the third week of September. **Prakash., O. (1978)** observed highest population during late September to mid November.

**Aphid:** *Aphis gossypii* Glover is important pest of brinjal crop. It is a polyphagus pest, having wide host range. The nymphs and adults suck sap from leaves and tender shoots. The brinjal plant infested by *A. gossypii* became weak, pale and stunted in growth which consequently results in reduced fruit size. The infestation of aphid was reduced from August to last week of December. **Ghose, et al. (2006)** also reported that *A. gossypii* is an important pest of brinjal crop.

**Whitefly:** *Bemesia tabaci* was also recorded as important pest of brinjal. The small sized fly and their nymph are mostly seen in cluster on underside of the leaves. They feed on the leaves by sucking the cell sap. Warm and moist weather favors the development and multiplication of these insect. The occurrence of this pest was recorded from last week of July to mid December. **Natekar et al., (1987)** reported considerably high population level of this pest.

#### **Orthoptera:**

**Grasshoppers:** *Chrotogonus sp.* recorded on brinjal crop from last week of July to last week of December. The grasshoppers camouflage easily on plants due to their green or brownish color. These insects cut irregular cuts and punctures on leaves. Tender shoots too are eaten. Their droppings are like tiny pieces of charcoal. As they hop from plant to plant, grasshoppers may be or may not be present on the damaged plant.

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**Table 2. Pest succession on brinjal crop at Modipuram, Meerut during Kharif-2011**

S.No	Common name	Scientific name	Order and Family	Damaging Stage of the pest	Nature of damage	Period of activity	Economic status
1	2	3	4	5	6	7	
1	Brinjal shoot and fruit borer	<i>Leucinodes orbonalis</i> Guenee	Pyralidae Lepidoptera	Larvae	Caterpillar bores into tender shoots and developing fruit and hole plugged with excreta,	August end to December	High
2	Whitefly	<i>Bemesia tabaci</i> Gennadius	(Aleyrodidae) Homoptera	Nymph and Adults	Sucking the sap from undersurface of leaves	July end to mid December	Low
3	Jassid	<i>Amrasca biguttula biguttula</i> Ishida	Cicadellidae Homoptera	Nymph and Adults	Sucking the sap by hoppers lead to curling and crinkling of leaves.	August to end December	Low
4	Aphid	<i>Aphis gossypii</i> Glover	Aphididae Homoptera	Nymph and Adults	Crinkling and curling downward movement leaves due to sucking the sap undersurface of leaves.	August to December end	Low
5	Grasshopper	<i>Chrotogonus sp.</i>	Acrididae Orthoptera	Nymph and adults	Eating the leaves of plants and cause damage to newer leaves.	July end to December End	Low
6	The epilachna beetle	<i>Epilachna vigintioctopunctata</i> ;	Coccinellidae Coleoptera	Grub and Adults	Grub and adults feeding on the upper and lower surface of leaves.	July end to mid December	Low
7	Leaf roller	<i>Eublemma olivaceae</i> W.	Noctuidae Lepidoptera	Larvae	Caterpillars fold leaves from tip and feed inside by scarping them	August to mid November	Low
8	Leaf Weber	<i>Psara bipunctalis</i>	Pyralidae Lepidoptera	Larvae	Newly hatched caterpillar scrape and feeding on epidermal tissues, later feed on ventral surface of leaves, skeletonizing completely.	August end to October end	Low

Insect pests	Figur.3. Insect pest succession on brinjal crop											
	July		August		September		October		November		December	
	First fortnight	Second fortnight	First fortnight	Second fortnight	First fortnight	Second fortnight	First fortnight	Second fortnight	First fortnight	Second fortnight	First fortnight	Second fortnight
Brinjal shoot and fruit <i>Leucinodes orbonalis</i>												
Whitefly <i>Bemesia tabaci</i>												
Jassid <i>Amrasca biguttula biguttula</i>												
Aphid <i>Aphis gossypii</i>												
Grasshopper <i>Chrotogonus sp.</i>												
The epilachna beetle <i>Epilachna vigintioctopunctata;</i>												
Leaf roller <i>Eublemma olivaceae</i>												
Leaf weeber <i>Psara bipunctalis</i>												

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