



Insect pests of Eggplant (Brinjal) *Solanum melongena*. L and their bio control agents in Ajitmal, Auraiya (U.P.)

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Absract

Field fixed plot survey was conducted during rabi 2021-22 to investigate the insect pests and bio control agents of brinjal in the Experimental Farm, Department of Agri. Entomology, Janta Mahavidyalaya Ajitmal, Auraiya. During the course of the investigation a total of six insect species under three order and six families viz., aphid, *Aphis gossypii* (Glover); leafhopper, *Amrasca biguttula biguttula* (Ishida); Brinjal Shoot and Fruit Borer (BSFB), *Leucinodes orbonalis* (Guenee); epilachna beetle, *Henosepilachna vigintio-punctata* (F.); leaf roller, *Antoba (Eublema) olivaceae* (Walker) and flea beetle, *Monolepta signata* (Olive) were recorded. On the other hand, a total of four predators viz., coccinellid beetle, hover flies (*Episyrphus balteatus* De Geer), green lacewing (*Chrysoperla carnea* Stephens) and spider (*Oxyopes* sp.) were recorded as major natural enemies on insect pests of brinjal. However, 5 species of coccinellid predators viz., *Coccinella transversalis* (Fab.), *Harmonia dimidiata* (Fab.), *Adalia bipunctata* (L.) *Cheilomenes propinqua* (Muls.), and *Brumoides* sp. (Fab.) were observed out of which, *C. transversalis* was dominant and considered as major predators of aphids and leafhoppers.

Introduction

Eggplant (Brinjal) (*Solanum melongena* L.) is a solanaceous vegetable also known as “King of vegetables”. Being a major vegetable crop in India, brinjal is cultivated in about 7.44 Lakh hectares with an annual production of 127.68 Lakh tonnes during 2021-22[1]. In Uttar Pradesh, brinjal is extensively cultivated in all the districts as a major cash crop in an area of 0.0275 Lakh hectares with an annual production of 0.322 Lakh tonnes during 2021-22[1]. However, kitchen garden cultivation of brinjal is also a common practice in each and every household of Assam [8]. But the production of the crop is regulated by different biotic and abiotic factors and amongst those factors, insect pests plays a pivotal role for lowering the yield of brinjal, by attacking the crop right from the nursery stage to till harvesting [3]. Generally farmers are depending on synthetic chemical pesticides to control insect pests which leads to the

development of resistance by target pests with also a negative impact on natural enemies [6]. Therefore, identification and conservation of bio control agents to control insect pests is very much essential. Therefore present investigation was carried out to record the insect pests and bio control agents fauna of brinjal ecosystem. The brinjal is attacked by more than 70 number insect species [20], of which BSFB (*L. orbonalis* Guen), leafhopper (*A. biguttula biguttula* Ishida), aphid (*A. gossypii* Glover), stem borer (*Euzophera perticella* Ragonotl), epilachna beetle (*H. vigintioctopunctata* Fab.), white fly (*Bemisia tabaci* Gennadius), lacewing bug (*Urantitus hystricellus* Distant) with non-insect pest red spider mite (*Tetranychus macfurlanei* Baker) were the major pests. From another experiment, it was revealed that 80-90% yield loss had been recorded due to attack of BSFB [10,13,17].

Materials and Methods

The study was conducted to survey the diversity of insect pests and their bio control agents at weekly interval starting from 15 days after transplanting of the brinjal crop at Experimental Farm, Department of Agri. Entomology, Janta Mahavidyalya Ajitmal, Auraiya during rabi 2021-22. The experimental site is situated at 26°59' latitude and 79°26'E longitude at an altitude of 144.24m above mean sea level. A suitable and uniform site of organic farm was selected for the fixed plot survey. Different species of insect pests and bio control agents were photographed and collected by hand picking, using aspirator, pit fall trap, pheromone trap and insect collecting net. After killing the arthropods were preserved in 70 per cent alcohol in glass vials for small and soft bodied insects. However, pinning was done for comparatively large insects. The preserved specimens were sent to National Bureau of Agricultural Insects Resources (NBAIR), Bangalore and other expert taxonomist for appropriate identification.

Results and Discussion

During the course of present investigation a total of six insect species (Table 1) under three orders and six families viz., aphid, *A. gossypii* (Glover); leafhopper, *A. biguttula biguttula* (Ishida); BSFB, *L. orbonalis* (Guenee); epilachna beetle, *H. vigintio-punctata* (F.); leaf roller, *A. (Eublema) olivaceae* (Walker) and flea beetle, *M. signata* (Olive) were recorded as insect pests of brinjal crop. Out of six insect pests attacked the brinjal, BSFB, aphid, leafhopper were dominant and considered as major insect pests of brinjal whereas the flea beetle was occurred in a negligible manner and it was considered as minor pest of brinjal. In present investigation, among different insect pest encountered in the brinjal field, *A. gossypii* showed the highest occurrence followed by *A. biguttula biguttula*. Moreover the major insect pest were observed frequently during each observation period, but minors were observed only one or two times. Total of four predators (Table 2) viz., coccinellid beetle, hover flies (*E. balteatus* De Geer), green lacewing (*C. carnea* Stephens) and spider (*Oxyopes* sp.) were recorded as major natural enemies on insect pests of brinjal. Five species of coccinellid predators' viz., *C. transversalis* (Fab.), *H. dimidiata* (Fab.), *A. bipunctata* (L.) *C. propinqua* (Muls.), and *Brumoides* sp. (Fab.) were recorded out of which, *C. transversalis* was dominant and considered as major predators of aphids and leafhoppers. Earlier, several workers from different regions of India reported a number of insect pests attacking the brinjal crop during different growth stages. Mote [14] from Maharashtra,

reported leafhopper, *A. biguttula biguttula* and BSFB, *L. orbonalis* were the serious pests of brinjal. Subbarathnam and Butani [20], recorded 70 insect pests on brinjal, of which the major ones were the *L. orbonalis* Guen, *A. biguttula biguttula* Ishida, *A. gossypii* Glover, *E. perticella* Ragonotl, *H. vigintioctopunctata* Fab., *B. tabaci* Gennadius, *U. hystricellus* Distant and *T. macfurlanei*. Bhadauria et al. [3] from Madhya Pradesh, recorded 13 species of insect pests on brinjal during the summer and kharif season. Similarly, from Himachal Pradesh, Patial et al. [18] reported that, 27 insect pest species were associated with brinjal crop during different stages of crop growth in an overlapping manner. All the insect pests recorded in the field during the present investigation were also reported by different workers from India, as insect pests of brinjal crop [14,20,5,16]. A number of insect pests of brinjal were reported from Uttar Pradesh which included *A. biguttula biguttula* Ishida, *H. vigintio-punctata* (F.), *A. scutellatus* Baly, *D. flavocincta* (Hope), *M. signata* Olive, *A. cyanea* (Webber), *P. bretteinghami* Baly, *T. indicus* (Faust), *A. ipsilon* (Hfn.), *L. orbonalis* Guen., *A. olivacea* (Walker), *P. bipunctalis* (F.), *A. gossypii* Glover, *T. neocaledonicus* Andre [8, 9, 15, 22]. During the present investigation, the 5 species of coccinellid predators viz., *C. transversalis* (F.), *H. dimidiata* (F.), *A. bipunctata* (L.), *C. propinqua* (Muls.) and *Brumoides* sp. (Fab.) in addition to these, syrphid fly (*E. balteatus* (De Geer), green lacewing (*C. carnea* Stephens) and spider, *Oxyopes* sp. (Hentz) were recorded as predators on insect pests of brinjal. NCIPM [2] also conducted field trial in a farmer's field and recorded the natural enemies like *C. carnea*, *C. septumpunctata*, *C. sexmaculatus*, Syrphid flies, spiders and praying mantis when brinjal intercropped with cowpea and coriander. Elanchezhyan and Muralibaskaran [7] from TNAU, Tamilnadu, recorded the predators like coccinellids, syrphids and spiders from the intercropping system of brinjal + cluster bean (4:1) and brinjal + onion (4:1). However, the recorded species of coccinellids in the present experiment were also reported from Assam, as natural enemies associated with sucking pests of brinjal [4, 11].

Table 1: Insect pest complex associated with brinjal.

Common name	Scientific name	Order: Family	Feeding site	Status
Brinjal Shoot and Fruit Borer	<i>Leucinodes orbonalis</i> (Guenee)	Lepidoptera: Pyralidae	Shoot and Fruit	+++
Aphid	<i>Aphis gossypii</i> (Glover)	Homoptera: Aphididae	Leaf	+++
Leafhopper	<i>Amrasca biguttula biguttula</i> (Ishida)	Homoptera: Cicadellidae	Leaf	+++
Epilachna beetle	<i>Henosepilachna vigintioctopunctata</i> (F.)	Coleoptera: Coccinellidae	Leaf	+++
Leaf roller	<i>Antoba (Eublema) olivacea</i> (Walker)	Lepidoptera: Noctuidae	Leaf	+
Flea beetle	<i>Monolepta signata</i> (Olive)	Coleoptera: Chrysomelidae	Leaf	+

+ observed 1 or 2 times/ +++ observed frequently almost all time

Table 2: List of natural enemies (predators) of insect pests of brinjal.

Species	Order	Family	Prey	Prey stage
<i>Coccinella transversalis</i> (Fab.)	Coleoptera	Coccinellidae	<i>A. gossypii</i> and <i>A. biguttula biguttula</i>	Nymph and adult
<i>Harmonia dimidiata</i> (Fab.)	Coleoptera	Coccinellidae	<i>A. gossypii</i>	Nymph and adult
<i>Adalia bipunctata</i> (L.)	Coleoptera	Coccinellidae	<i>A. gossypii</i>	Nymph and adult
<i>Cheilomenes propinquuq</i> (Muls.)	Coleoptera	Coccinellidae	<i>A. gossypii</i>	Nymph and adult
<i>Brumoides</i> sp. (Fab.)	Coleoptera	Coccinellidae	<i>A. gossypii</i>	Nymph and adult
<i>Episyrphus balteatus</i> (De Geer)	Diptera	Syrphidae	<i>A. gossypii</i>	Nymph and adult
<i>Chrysoperla carnea</i> (Stephens)	Neuroptera	Chrysopidae	<i>A. gossypii</i>	Nymph and adult
<i>Oxyopes</i> sp.	Araneae	Oxyopidae	<i>A. gossypii</i>	Nymph and adult

Conclusion

From the present investigation, it can be concluded that, the BSFB, *L. orbonalis*; aphid, *A. gossypii*; leafhopper, *A. biguttula biguttula* and flea beetle, *M. signata* were recorded as insect pests of brinjal found abundantly on crop right from transplanting till harvesting of the crop. These insects were the actual key pests in the reduction of the brinjal yield in all over nation. Various efforts have been made to manage these serious pests by applying many conventional insecticides which in turn results in the creation of various problems like environment pollution, development of pest resistance against insecticides, pest outbreak, pest resurgence and unacceptable higher level of pesticide residue on the crop besides human health risk. Therefore, conservation of bio control agent in order to reduce the use of chemical pesticides in brinjal.

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