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Ecological and control of brinjal insect pests from Rewa region

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Abstract
Brinjal *Solanum melongela* L. is an important vegetable crop of subtropics and tropic with fuel, nutritional and ayurvedic medicinal value. In India it is cultivated in almost all states. Therefore, ecology and control of insect pests have been studied from Rewa region of India. A total of 12 species of insect pests, namely *Leucidonus orbonalis* Guen, *Euzophera perticella* Rag., *Epilachna vigintioctopunctata* (Fab.), *Urentius sentis* Diast., *Amrasca bigutulla biguttula* Dist., *Bemisia tabaci* Genn., *Aleurodicus dispursus* (Rus.), *Lipaphis erysimi* Kalt., *Aspidoitus destructor* Sign., *Aonidiella auranti* (Maskell), *Thrips palmi* Karny and Ants have been recorded damaging Brinjal crop. Out of which *L. orbonalis, A. bigutulla bigutulla, A. dispersus, A. destructor, L. erysimi* and Ants were found throughout the year.

Keywords: brinjal, insect-pests, ecology, natural enemies, control

1. Introduction
The brinjal is of much importance in the warm areas of Far East, being grown extensively in India, Bangladesh, Pakistan, China and the Philippines. It is also popular in Egypt, France, Italy and United States. In India, it is one of the most common, popular and principal vegetable crops grown throughout the country except higher altitudes. It is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. It is a perennial but grown commercially as an annual crop. A number of cultivars are grown in India, consumer preference being dependent upon fruit color, size and shape.

The term "free living" is assigned to plant pollutants that are able to survive, without direct human assistance, over long term in competition with the native flora. This is a general ecological category that includes plants that colonize open, disturbed prime habitat that is either under human control (weedy populations) or natural disturbed areas such as river banks and sand bars(wild populations). There are no such free living populations of brinjal in India.

The prominent species of Brinjal refer to *S. melongena, S. aethiopicum* and *C. macrocarpon* are interfertile with their respective wild ancestors (Daunay, *et al.* 1991) [1]. In India, it is widely cultivated in 8 states, practically on all soils from light sand to heavy clay and in almost all eight vegetable growing zones including Maharashtra- Madhya Pradesh (Zone - VII). Although several varieties of brinjal are cultivated, the expected yield of the crop is not achieved so far because of the crop damage caused by the insect pests. Insect pests are most limiting factor for accelaring crop yield. The Brinjal is attacked by varieties of insect pests such as fruit and stem borers, defoliators, cell sap suckers, stem girdlers, etc. Review of literature indicates Lall (1964) [2], Patel *et al.* (1988) [3], Mall *et al.* (1992) [4], Roy *et al.* (1995) [5], Shrinivasan (2009) [6], Sidhu & Datta (2007) [7], Sathe & Chougule (2014) [8], Sathe & Gangate (2015) [9], Sathe & Oulkar (2010) [10], Sathe *et al.* (2015) [11] etc. worked on insect pest management on egg plant and some other crops. Ecological pest control strategy has great importance in ecofriendly control. The present work will add great relevance in integrated pest management of Brinjal insect pests.

2. Materials and Methods
The present study was carried out from Rewa region of Madhya Pradesh during the years 2014-15. The Rewa district is located between 81-15. East longitude and 24-42 North latitude and is situated on the Vindhya Plateau at the height of 318 m above MSL. Rewa is synonyms of holy river Narmada. Narmada flows in a larger part of Rewa-Khand hence the name Rewa was adopted. The town is situated on the confluence of Bihar and Bichhia river. Rewa is connected by National Highway 7 and many other state highways pass through the town. The collected insects were identified by consulting appropriate literature. The observations were continued throughout the year at weekly interval. Natural enemies have been recorded by spot observations and also by collecting various immature stages of pests from field and later rearing these stages on their natural food plant for screening parasitoids. The microbes from field collected pest stages have been isolated (Sathe & Oulkar, 2010) [10] and identified for making the records. Observations were also taken on the abundance of pests with respect of rainfall, temperature and humidity. A twig of 1 ft length was selected for noting the insects for seasonal abundance. The pests have also been surveyed on other crops and identified consulting appropriate literature

3. Results & Discussion
The seasonal abundance of important insect pests is given in Table-1. As a part of ecofriendly control of brinjal pests, natural enemies have been allowed to work against pest species reported in the study area. Pesticidal use have been avoided when natural enemies were in active stage on the crop. Spray of 0.15% carbaryl or Azadirachtin or 0.05% malathion was found effective against the insect pests.

Release of *Trichogramma chilonis* with 1.00 to 1.5 lakh/ha was found effective against *Lepidopteraous pests*, *L. orbonalis* and *E. perticella*. The use of NPV 250 LE as microbial control was also found suitable for Lepidopterans.

According to Mall *et al.* (1992) [4] *S. melongena* was infected by a number of insect pests including jassid *A. biguttula biguttula* ; *Aphid aphis*, *Gossypii glover*; *Epilachna beetle*, *E. vigintioctopunctata* and shoot and fruit borer *L. orbonalis* during different stages of its growth in most of the tropical countries including India. The losses caused by these pests vary from season to season depending upon environmental factors (Patel *et al.*, 1988) [3]. Seasonal incidence of jassid, aphid, epilachna beetle and shoot and fruit borer were more prevalent during vegetative phase of the crop upto the 3rd week of September when the average temperature and humidity were more than 28°C and 80% respectively. These conditions were more conducive for *Epilachna beetle* and shoot and fruit borer. At the initiation of fruiting stage in October, the intensity of jassid and aphid was increased along with the shifting of borer infestation from shoots to fruits at average temperature and humidity ranging between 20-25°C and 50-72% respectively were responsible for multiplication of jassid and aphid while, rainfall played negative role for these pests. Fruit infestation was maximum at the initial stage of fruiting which declined slowly with the advent of winter during December (Mall *et al.* 1992) [4].

Table 1: Seasonal abundance of insect pests on Brinjal *S. melongena*

S. No.	Pest Species	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	*L.orbonalis*	1	2	2	3	2	1	1	1	2	3	2	3
2.	*E. perticella*	-	-	-	1	2	3	4	3	3	4	-	-
3.	*E. vigintioctopunctata*	-	-	11	24	27	25	21	20	17	10	-	-
4.	*U. sentis*	27	25	20	31	32	-	-	-	-	-	19	33
5.	*A.bigutulla higutulla*	4	4	7	7	6	5	5	7	10	11	12	11
6.	*B. tabaci*	-	3	7	7	7	8	5	6	8	9	10	7
7.	*A. disperus*	6	4	5	6	6	7	7	9	12	13	13	13
8.	*L. erysimi*	13	17	15	27	31	39	42	52	59	49	27	28
9.	*A. destructor*	12	18	22	27	23	28	33	36	35	36	38	30
10.	*Ant.*	7	11	13	12	19	27	28	42	40	43	38	29
	Total spp.	7	8	9	10	10	9	9	9	9	9	8	8

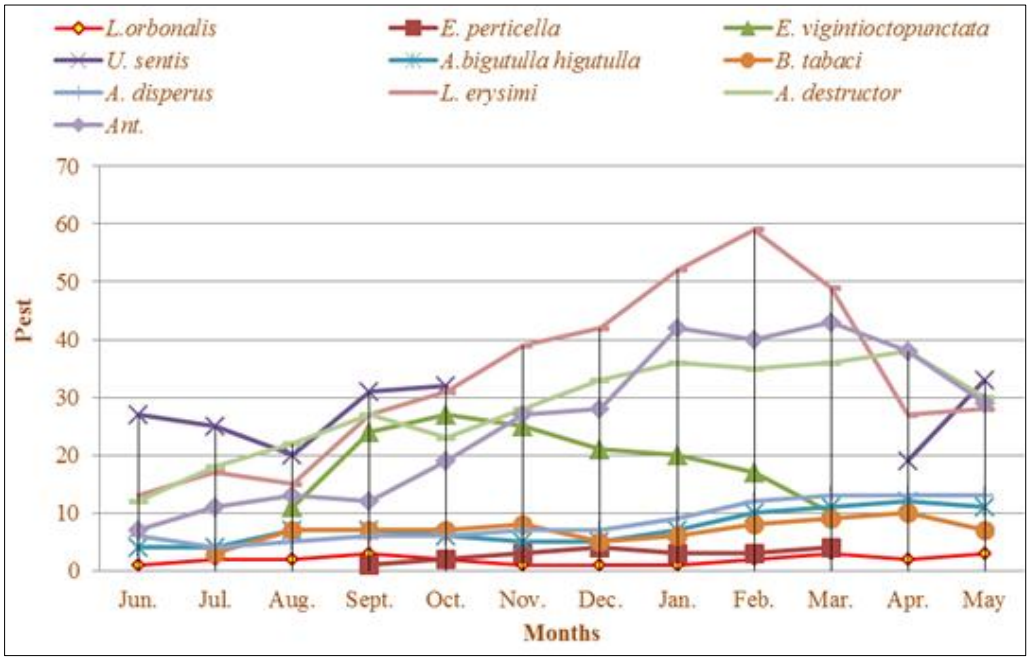

Fig 1: Graphics analysis of Seasonal abundance of insect pests on Brinjal *S. melongena*

Their report indicated that the above crops were attacked by cabbage butterfly *Pieris brassicae* (Linn.), cabbage aphid *Brevicoryne brassicae* (Linn.), *Mustard aphid* L. erysimi, cutworm *Agrotis ipsilon* Root. and *A. flammatra* S.M., cabbage looper *Plusia orichalcea*, *Trichoplusia* sp. and diamond back moth *Plutella xylostella* (Linn.), *P. brassicae* was found throughout the year with maximum activity during February to October. Cabbage aphid was next to cabbage butterfly in damaging the crop and active from November to April while cutworm showed more activity during July to November. In the present study, jassids, fruit borer and scale insects were found through the year on brinjal while jassids, aphids, epilachna beetle, shoot and fruit borers were prevalent during the vegetative phase of the brinjal crop.

According to Mishra (1993) [12] based on the pest control ability, fruit yield and cost: benefit ratio cypermethrin / fenvalerate 0.05 kg.a.i./ha were the best suitable insecticides for control of brinjal fruit and shoot borers.

Biotic factors play an important role in ecofriendly pest control (Sathe & Oulkar, 2010) [10]. The parasite pupated

easily in the rearing petridishes under laboratory conditions. The minimum 9.21% parasitism was noted with the first picking and was increased in subsequent pickings.

According to Dogra *et al.* (2001) [13] the peak population of *L.erysimi* and *B. brassicae* was recorded during second week of March with maximum and minimum temperature of 22.5°C and 10.3°C and no rainfall was recorded during the same period. The maximum population of *Myzus persicae* (Sulzer) was observed during the last week of January with maximum temperature of 4°C, relative humidity 58% and no rainfall.

Singh and Arya (2001) [17] studied insecticidal activity of petroleum ether extract of mustard seeds against mustard aphid, *L. erysimi*. The extract they tested was found very effective which caused 100% mortality in the pest. Application of phorate or carbofuran along with seed followed by need based application of Carbaryl 0.2% or malathion 0.1% or quinolphos 0.05% were effective in controlling.

Sathe and Gangate (2015) [9] reported the occurrence of *A. dispersus* on Brinjal from Kolhapur region, throughout the year. However, its population was found increased in hot months and declined in monsoon months. The same trend was confirmed in the present study. According to Wright and Diez (2005) [15] there were distinct seasonal variations in A. destructor numbers on bananas in Hawaii and varietal differences in population densities and proportions of plants infested. The population was found increased during the months from October to February on Cavendish and apple.

According to Sinha *et al.* (1989) [16] *L. erysimi* was found to appear and establish on *Brassica spp*. in the third week of December. It built its population in January-February reaching the peak on 8th and 18th February in 1980 and 1981, respectively. They further noted that none of ecological parameters alone was responsible for the multiplication and growth of the aphid and consequently its incidence on the crop. While in the present *L. erysimi* was associated with brinjal throughout the year and very prominently recorded from December to March but, declined in monsoon season due to rains. Similarly, *L. orbonalis, A. bigutulla bigutulla*, ants and scale insects were found throughout the year on brinjal. The scale insects, ants and fruit borers caused severe infestation in Rewa region. The pests of brinjal can be controlled by adopting above suggested control measures. However, biological control is ecofriendly and safer to humans on edible crops hence, more emphasis should be given on biological and natural control (Sathe, 2014) [17].

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5. References

1. Daunay MC, Lester RN, Laterrot H. The use of wild species for the genetic improvement of brinjal *Solanum melongena* and tomato *Lycopersicon esculantum*. In Solanaceae-III : Taxonomy, chemistry, evolution (eds. Hawkers, J.G., Lester R.N.; *Nee, M.* and *Erstrader*, N. Royal Botanic garden, Kew, Richmond, U.K. 1991, 380-412.
2. Lall BS. Vegetable pests In. Entomology in India. The Ent Soc. India, New Delhi. 1964, 182-211.
3. Patel JR, Korat DM, Patel VD. Incidence of shoot and fruit borer *Leucinodes orbonalis* Guen and its effect on yield of brinjal. Indian J. Pl. Prot. 1988; 16(2):143-145.
4. Mall NP, Pandey RS, Singh SV, Singh SK. Seasonal incidence of insect pests and estimation of the losses caused by shoot and fruit borer on Brinjal. Indian J. Ent. 1992; 54(3):241-247.
5. Roy DC, Pande YD. Damage to Brinjal by Lepidoptera Pyraustidae and economics of its insecticidal control. Indian J. Agric. Res. 1995; 28:110-120.
6. Shrinivasan R. Insect and mite pests on egg plant. AVRD, The World Vegetable center. 2009.
7. Sidhu AS, Dhatt AS. Current status of Brinjal Reserch in India. Acta Horticulturae. 2007; 752:243-248.
8. Sathe TV, Chougale TM. Hymenopterous biopesticides and their preliminary biocontrol potential from Western Maharashtra including Ghats. Biolife. 2014; 2(4):1254-1261.
9. Sathe TV, Gangate VS. Host plants for a white fly *Aleurodicus dispersus* from Kolhapur region India. Int. Nat. J. Recent Sci. Res. 2015; 6(2):2817-2820.
10. Sathe TV, Jyoti M. Oulkar. Insect pest management - Ecological concepts. Daya Publi. House, New Delhi. 2010, 1-235.
11. Sathe TV. Anna Gophane and Nilam Sendage. Colour attractivity and occurrence of some cell sap sucking pests of crop plants. Biolife, 2015; 3(2):540-546.
12. Mishra HP. Chemical control of brinjal fruit and shoot borer *Leucinodes orbonalis* (Guen.) Indian J. Ent. 1993;5 5(1):89-90.
13. Dogra I, Nirmala Devi, Desh Raj. Population build up of aphid complex (*Lipaphis erysimi* Kalt, *Brevicoryne brassicae* Linn. and *Myzus persicae* Sulzer on rape seed *Brassica campestris* var. brown sarson vis-à-vis impact of biotic factors. J. Ent. Res. 2001; 25(1):21-25.
14. Sathe TV. Recent trends in Biological Pest Control. Astral Int. Nat. Pvt. Ltd., New Delhi. 2014, 204.
15. Wright MG, Diez JM. Coconut scale *Aspidoitus destructor* (Hemiptera: Diaspididae) seasonal occurrence, dispersion and sampling on banana in Hawaii. Int. Nat. J. Trop. Ins. Sci. 2005; 25(2):80-85.
16. Sinha RP, Yazdani SS, Verma GD. Population dynamics of mustard aphid *Lipaphis erysimi* Kalt. in relation to ecological parameters. Indian J. Ent. 1989; 51(3):334-339.
17. Singh K, Arya H. Insecticidal activity of petroleum ether extract of mustard seeds against mustard aphid *Lipaphis erysimi* Kalt. J. Ent. Res. 2001; 25(3):235-238.