Research Paper :

Assessment of crop loss due to brinjal pest complex

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SUMMARY

Brinjal pest complex reduced the number of leaves per plant by 22.98% on an average. Average per cent loss in number of branches per plant by brinjal pest complex was 15.54%. Pest infestation also affected number of buds per plant. Average per cent loss in number of buds was 16.58%. On an average, brinjal pest complex reduced the number of flowers by 32.99%. Average per cent loss due to brinjal pests in terms of number of fruits per plant was 40.35%. The loss in yield of brinjal due to brinjal pest complex was recorded to the tune of 23.49%.

Pest complex in brinjal is responsible for severe reduction in yield of brinjal. Shoot and fruit borer is considered to be the most destructive. The infestation on brinjal can be as high as 75 to 92% (Singh and Sindhu, 1988). Sucking pests suck the cell sap from the leaves and cause reduction in yield, as high as 15 to 20%. Shrinivasan and Krishnakumar (1983), Mote (1981) and Datar and Ashtaputre (1984) reported 48 – 57% losses in the yield of brinjal fruits due to infestation of *Leucinodes orbonalis* in Maharashtra. Per cent losses in terms of brinjal fruits and fruit weight loss were also estimated by Gangwar and Sachan (1981); Naresh *et al.* (1989); Islam and Quiniones (1990); Roy and Pande (1994). Most of the research work is carried on assessment of crop losses due to infestation of brinjal pest complex in terms of yield and yield components only. Therefore, present investigations were undertaken to assess the losses in brinjal due to pest complex in terms of biometric parameters as well as yield and yield components.

MATERIALS AND METHODS

The experiment was laid out in paired plot technique with two treatments (*i.e.* protected with recommended plant protection schedule and unprotected) each replicated thrice. The gross plot size was 5.2 x 3.75 m with net plot size 4.2 x 3 m. Row to row and plant to plant distance was 60cm. ABV – 1 variety was used. Le Clerg (1971) suggested paired plot experiments and multiple treatment experiments to know the increment of loss per unit increase of pest intensity and competitive or interaction effects of more than one pest on yield loss.

In this experiment, population of aphids, jassids, thrips, whiteflies, epilachna beetles and per cent infestation of shoot and fruit borer was recorded. For loss assessment, healthy fruits and fruits showing bore holes were kept separately and the extent of damage to the fruits was determined. Observations for the damage by shoot and fruit borer were recorded at each picking on the basis of number and weight of healthy and infested fruits. Plot wise yield of fruits was recorded at each picking from which yields in kg/ha and increase in yield over control were determined.

Judenko (1972) expressed the percentage yield loss per plant by the coefficient of harmfulness (C) :

$$C = \frac{(a - b) \times 100}{a}$$

where,

a = mean yield of unattacked plants

b = mean yield of attacked plants.

The same method was adopted to assess the losses.

RESULTS AND DISCUSSION

Data pertaining to population of aphids, jassids, thrips, whiteflies, epilachna beetles and per cent infestation of shoot and fruit borer are presented in Table 1. Population of aphids varied from 2.12 to 2.91 in unprotected plot. Population of the pest was significantly reduced in endosulfan treated plot and varied from 1.58 to 2.34. population of jassids varied from 2.12 to 2.73 and 1.87 to 2.54 per plant in untreated and treated plot,

respectively. Population of thrips varied from 2.54 to 3.08 and 2.12 to 2.73 per plant in untreated and treated plot, respectively. Population of white flies varied from 0.70 to 2.12 in untreated plot where as in treated plot, the population ranged from 0.70 to 1.87. Epilachna beetle was noticed only on three plants in untreated plot and on two plants in endosulfan treated plot. Per cent infestation of shoot and fruit borer varied from 30.00 to 46.15 and 26.57 to 38.06% in untreated and treated plots, respectively.

It is evident from Table 2 that brinjal pest complex reduced the number of leaves per plant by 22.98% on an average. Average per cent loss in number of branches per plant by brinjal pest complex was 15.54%. Pest

Table 1 : Population of different pest complex of brinjal											
Pl. No.	Untreated						Treated				
	A	J	T	WF	EB	%SB	A	J	T	WF	EB	%SB
1.	6*	5*	8*	0*	0*	40#	4*	3*	6*	2*	0*	25#
	(2.54)	(2.34)	(2.91)	(0.70)	(0.70)	(39.23)	(2.12)	(1.87)	(2.54)	(1.58)	(0.70)	(30.00)
2.	7	6	9	1	0	45	5	4	7	1	0	30
	(2.73)	(2.54)	(3.08)	(1.22)	(0.70)	(42.13)	(2.34)	(2.12)	(2.73)	(1.22)	(0.70)	(33.21)
3.	6	7	7	2	0	50	3	4	5	0	1	32
	(2.54)	(2.73)	(2.73)	(1.58)	(0.70)	(45.00)	(1.87)	(2.12)	(2.34)	(0.70)	(1.22)	(34.45)
4.	5	5	8	0	0	38	5	4	6	1	0	28
	(2.34)	(2.34)	(2.91)	(0.70)	(0.70)	(38.06)	(2.34)	(2.12)	(2.54)	(1.22)	(0.70)	(31.95)
5.	4	6	8	1	0	36	4	5	7	3	0	25
	(2.12)	(2.54)	(2.91)	(1.22)	(0.70)	(36.87)	(2.12)	(2.34)	(2.73)	(1.87)	(0.70)	(30.00)
6.	7	5	6	0	1	42	5	3	5	2	0	35
	(2.73)	(2.34)	(2.54)	(0.70)	(1.22)	(40.40)	(2.34)	(1.87)	(2.34)	(1.58)	(0.70)	(36.27)
7.	6	6	8	2	0	50	3	5	7	1	0	20
	(2.54)	(2.54)	(2.91)	(1.58)	(0.70)	(45.00)	(1.87)	(2.34)	(2.73)	(1.22)	(0.70)	(26.57)
8.	7	6	7	1	0	45	4	3	6	0	0	32
	(2.73)	(2.54)	(2.73)	(1.22)	(0.70)	(42.13)	(2.12)	(1.87)	(2.54)	(0.70)	(0.70)	(34.45)
9.	6	5	9	2	1	40	5	4	6	1	0	28
	(2.54)	(2.34)	(3.08)	(1.58)	(1.22)	(39.23)	(2.34)	(2.12)	(2.54)	(1.22)	(0.70)	(31.95)
10.	8	4	8	3	0	48	3	5	5	0	0	35
	(2.91)	(2.12)	(2.91)	(1.87)	(0.70)	(43.85)	(1.87)	(2.34)	(2.34)	(0.70)	(0.70)	(36.27)
11.	5	5	7	2	0	40	3	5	5	0	0	20
	(2.34)	(2.34)	(2.73)	(1.58)	(0.70)	(39.23)	(1.87)	(2.34)	(2.34)	(0.70)	(0.70)	(26.57)
12.	6	6	8	4	0	50	4	4	6	1	1	25
	(2.54)	(2.54)	(2.91)	(2.12)	(0.70)	(45.00)	(2.12)	(2.12)	(2.54)	(1.22)	(1.22)	(30.00)
13.	4	4	6	1	0	36	2	3	4	0	0	30
	(2.12)	(2.12)	(2.54)	(1.22)	(0.70)	(36.87)	(1.58)	(1.87)	(2.12)	(0.70)	(0.70)	(33.21)
14.	5	5	9	2	0	38	3	4	5	1	0	28
	(2.34)	(2.34)	(3.08)	(1.58)	(0.70)	(38.06)	(1.87)	(2.12)	(2.34)	(1.22)	(0.70)	(31.95)
15.	6	6	7	3	1	42	3	4	6	2	0	32
	(2.54)	(2.54)	(2.73)	(1.87)	(1.22)	(40.40)	(1.87)	(2.12)	(2.54)	(1.58)	(0.70)	(34.45)
16.	5	5	7	1	0	25	4	6	4	0	0	25
	(2.34)	(2.34)	(2.73)	(1.22)	(0.70)	(30.00)	(2.12)	(2.54)	(2.12)	(0.70)	(0.70)	(30.00)
17.	6	4	6	3	0	35	5	3	5	1	0	30
	(2.54)	(2.12)	(2.54)	(1.87)	(0.70)	(36.27)	(2.34)	(1.87)	(2.34)	(1.22)	(0.70)	(33.21)

Contd.. Table 1

Table 1 contd...

18.	6	6	8	1	0	40	3	4	6	0	0	35
	(2.54)	(2.54)	(2.91)	(1.22)	(0.70)	(39.23)	(1.87)	(2.12)	(2.54)	(0.70)	(0.70)	(36.27)
19.	5	5	7	2	0	45	4	3	5	1	0	28
	(2.34)	(2.34)	(2.73)	(1.58)	(0.70)	(42.13)	(2.12)	(1.87)	(2.34)	(1.22)	(0.70)	(31.95)
20.	7	6	6	0	0	50	4	4	4	2	0	32
	(2.73)	(2.54)	(2.54)	(0.70)	(0.70)	(45.00)	(2.12)	(2.12)	(2.12)	(1.58)	(0.70)	(34.45)
21.	5	4	7	4	0	40	3	4	5	0	0	28
	(2.34)	(2.12)	(2.73)	(2.12)	(0.70)	(39.23)	(1.87)	(2.12)	(2.34)	(0.70)	(0.70)	(31.95)
22.	7	6	6	2	1	42	5	3	5	1	0	30
	(2.73)	(2.54)	(2.54)	(1.58)	(1.22)	(40.40)	(2.34)	(1.87)	(2.34)	(1.22)	(0.70)	(33.21)
23.	6	5	8	1	0	50	4	6	4	0	0	32
	(2.54)	(2.34)	(2.91)	(1.22)	(0.70)	(45.00)	(2.12)	(2.54)	(2.12)	(0.70)	(0.70)	(34.45)
24.	6	5	6	3	0	38	4	3	4	0	0	25
	(2.54)	(2.34)	(2.54)	(1.87)	(0.70)	(38.06)	(2.12)	(1.87)	(2.12)	(0.70)	(0.70)	(30.00)
25.	6	6	9	0	0	40	4	4	5	2	0	20
	(2.54)	(2.54)	(3.08)	(0.70)	(0.70)	(39.23)	(2.12)	(2.12)	(2.34)	(1.58)	(0.70)	(26.57)
26.	7	5	8	2	0	46	3	6	6	0	0	35
	(2.73)	(2.34)	(2.91)	(1.58)	(0.70)	(42.71)	(1.87)	(2.54)	(2.54)	(0.70)	(0.70)	(36.27)
27.	5	6	7	4	0	52	5	3	6	1	0	38
	(2.34)	(2.54)	(2.73)	(2.12)	(0.70)	(46.15)	(2.34)	(1.87)	(2.54)	(1.22)	(0.70)	(38.06)
28.	6	5	6	2	0	36	3	4	5	0	0	28
	(2.54)	(2.34)	(2.54)	(1.58)	(0.70)	(36.87)	(1.87)	(2.12)	(2.34)	(0.70)	(0.70)	(31.95)
29.	5	4	8	3	0	45	4	5	6	3	0	25
	(2.34)	(2.12)	(2.91)	(1.87)	(0.70)	(42.13)	(2.12)	(2.34)	(2.54)	(1.87)	(0.70)	(30.00)
30.	6	3	7	1	0	35	5	4	5	1	0	30
	(2.54)	(1.87)	(2.73)	(1.22)	(0.70)	(36.27)	(2.34)	(2.12)	(2.34)	(1.22)	(0.70)	(33.21)

* Figures in parenthesis are $\sqrt{x + 0.5}$ values.   # Figures in parenthesis are AT values

A = Aphids,   J=Jassids,   T=Thrips,   WF = White flies,   EB=Epilachna beetle

Table 2 : Per cent crop losses due to brinjal pest complex					
Sr. No.	Characters	Per cent loss			
		Plot-I	Plot-II	Plot-III	Average
1.	**Biometric parameters**				
	No. of leaves	20.72	22.84	25.40	22.98
	No. of branches	15.68	18.42	12.52	15.54
2.	**Yield and yield components**				
	No. of buds	22.22	14.65	12.87	16.58
	No. of flowers	36.85	29.62	32.50	32.99
	No. of fruits	40.12	35.27	45.68	40.35
	Yield (kg/ha)	24.65	22.48	23.36	23.49

infestation also affected number of buds per plant. Average per cent loss in number of buds was 16.58%. On an average, brinjal pest complex reduced the number of flowers by 32.99%. Average per cent loss due to brinjal pests in terms of number of fruits per plant was 40.35%. The loss in yield of brinjal due to brinjal pest complex was recorded to the tune of 23.49%.

Thus, it is evident from the foregoing discussion that per cent crop losses due to brinjal pest complex were maximum in terms of number of fruits and fruit weight loss as compared to other biometric parameters and yield components.

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