

The effect of insecticides on sucking pests and bollworms in cotton

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SUMMARY

The field investigations on the effect of plant protection on sucking pests and bollworms in cotton viz. aphids, jassids, thrips, whitefly, spotted bollworms, *Helicoverpa* and pink bollworms were carried out under rainfed conditions at the Research Farm, Department of Agronomy, Marathwada Agriculture University, Parbhani during *Kharif* 1999-2000 and 2000-2001. The plant protection with carbosulfan 25 STD @ 60 g/kg as seed treatment and foliar application of dimethoate, NSKE and endosulfan 35 EC a month after sowing showed significantly lower incidence of sucking pests as well as bollworm complex successfully over untreated check. However, plant protection treatment did not influence the yield significantly.

Key words :

Plant protection,
Sucking pests,
Bollworms, Yield
and cotton,
Insecticides

Pest management is one of the major factors to attain a higher sustainable production of cotton. Insects are very sensitive to nutritional changes in the host plants. These changes ensure from manures (KYW) through plants for particular interest in response to measures. A good knowledge on the effect of plant nutrients on pest incidence is necessary for loss assessment and formulation of pest management programme. The study was, therefore undertaken to determine the incidence of sucking pests as well as bollworms with different levels of manures (FYM) on cotton crop in retention of plant protection in Marathwada region of Maharashtra state at Parbhani.

MATERIALS AND METHODS

A field experiment was conducted during *Kharif* 1999-2000 and 2000-2001 at Research farm, Department of Agronomy, Marathwada Agricultural University Parbhani. The soil of the experimental field in both the years was well drained clayey soil, low in nitrogen (0.04 and 0.05 for the year 1999 and 2000, respectively), moderate in available phosphorus (0.002 - 0.0025 for the year 1999 and 2000, respectively) and high in available potash (0.63 and 0.64 for the year 1999 and 2000, respectively).

The cotton variety, NHH-44 was used for the study. Experiments were conducted in a split plot design with 16 treatment combinations

replicated thrice. Out of them, the treatments comprised of four levels of chemical fertilizers, two levels of manure treatments and two plant protection treatments viz., unprotected check (P0) and a plant protection treatment comprising seed treatment with carbosulfan, spraying of dimethoate, NSKE, endosulfan, quinalphos and cypermethrin as sub plot treatments.

The experimental field was thoroughly prepared by ploughing followed by two harrowings and subsequently cleaned by picking stubbles in summer. Before sowing, manure (FYM) was applied by broadcasting at the rate of 10 tonnes/ha and the field was subsequently harrowed for mixing FYM. During the initial stage of crop plant establishment, two hoeings and two weedings were carried out in treated and untreated plots. For sowing, marking was done by marker to maintain the spacing of 90 x 60 cm followed by sowing with dibbling method by placing two seeds per hill. Gap filling was done after 10 days followed by thinning after 30 days of sowing. During the initial stage of crop plant establishment, two hoeings and two weedings were carried out in treated and untreated plots.

For controlling the sucking pests and bollworm complex of cotton, seed treatment was carried out with carbosulfan 25 STD @ 60 g/kg in all plots with plant protection (p1) treatment at the time of sowing as well as spraying of diamethoate 30 EC 0.03 per cent

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on ETL and spraying with insecticides *viz.*, NSKE 5 % as well as cypermethrine 25 EC @ 0.007 % on ETL, respectively.

Observations on incidence of sucking pests were recorded on 5 plants, selected randomly from net plot area of each treatment. Methodology for separating different damaged bollworms as described by Patel *et al.* (1986) was followed in the present investigations for recording pest complex incidence.

RESULTS AND DISCUSSION

The data pertaining to incidence of sucking pests were significantly affected by plant protection treatment

(Table 1). However, aphids, jassids, whitefly and thrips, population was found significantly less in plots treated with plant protection (P_1) *i.e.* (37.92), (6.21) and (7.12) compared to the plots without plant protection (P_0) *i.e.* (40.63), (6.33) and (7.21), respectively, while in case of whitefly, population was higher in plant protection treatment (P_1) *i.e.* (11.78) as compared to without plant protection (P_0) *i.e.* (11.72) during 1999-2000. Similar trend was observed in 2000-2001. However, exceptions *viz.*, population of jassids and whiteflies was observed significantly higher in plot with plant protection (P_1) *i.e.* (5.89) and (10.90) as compared to without insecticides (P_0) *i.e.* (5.46) and (10.39) during 2000-2001, respectively.

Table 1 : Effect of plant protection on per cent infestation of sucking pests in cotton

Spraying pests	Years	Treatments		S.E. \pm	C.D. (P=0.05)
		P_0	P_1		
Aphids	1999-2000	40.63 (6.22)	37.92 (6.05)	0.041	0.12
	2000-2001	38.88 (6.11)	36.17 (5.93)	0.039	0.11
	Pooled	39.75 (6.16)	37.04 (5.99)	0.05	0.16
Jassids	1999-2000	6.33 (2.54)	6.21 (2.51)	0.008	0.026
	2000-2001	5.46 (2.40)	5.89 (2.34)	0.014	0.044
	Pooled	5.89 (2.47)	5.77 (2.42)	0.017	0.051
Thrips	1999-2000	7.21 (2.70)	7.12 (2.69)	0.012	NS
	2000-2001	6.33 (2.57)	6.25 (2.53)	0.017	NS
	Pooled	6.77 (2.63)	6.68 (2.61)	0.037	NS
Whitefly	1999-2000	11.72 (3.38)	11.78 (3.41)	0.008	0.026
	2000-2001	10.39 (3.25)	10.90 (3.31)	0.016	0.049
	Pooled	10.83 (3.31)	11.34 (3.36)	0.017	0.051

NS- Non-significant

Table 2 : Effect of plant protection on per cent infestation of bollworms in cotton

Bollworms	Years	Treatments		S.E. \pm	C.D. (P=0.05)
		P_0	P_1		
Spotted bollworms in square	1999-2000	7.82 (15.65)	7.17 (15.12)	0.11	0.36
	2000-2001	8.42 (16.24)	7.77 (15.74)	0.08	0.24
	Pooled	8.12 (15.94)	7.47 (15.43)	0.10	0.30
Spotted bollworm in green boll	1999-2000	6.65 (14.24)	6.17 (13.85)	0.090	0.27
	2000-2001	6.95 (14.74)	6.29 (14.03)	0.069	0.20
	Pooled	6.80 (14.49)	6.23 (13.94)	0.18	0.54
Pink bollworm in locule	1999-2000	27.25 (30.15)	24.60 (28.89)	0.10	0.30
	2000-2001	26.38 (29.60)	23.72 (28.27)	0.11	0.33
	Pooled	26.81 (29.87)	24.16 (28.58)	0.26	0.78
Helicoverpa in square	1999-2000	23.46 (28.09)	21.51 (27.03)	0.082	0.24
	2000-2001	21.71 (26.95)	19.76 (25.71)	0.10	0.32
	Pooled	22.58 (27.52)	20.63 (26.37)	0.073	0.219
Helicoverpa in green boll	1999-2000	8.33 (16.26)	7.68 (15.72)	0.03	0.11
	2000-2001	7.45 (15.39)	6.81 (14.68)	0.06	0.19
	Pooled	7.89 (15.82)	7.24 (15.20)	0.20	0.61

Table 3 : Effect of plant protection on average yield of seed cotton (kg/ha)

Parameters	Years	Treatments		S.E.±	C.D. (P=0.05)
		P ₀	P ₁		
Yield	1999-2000	815.88	843.38	19.07	NS
	2000-2001	837.75	874.62	19.27	NS
	Pooled	826.81	859.00	19.21	NS

NS-Non significant

The results of the pooled data also revealed significant effects. However, plant protection (P₁) showed significantly lesser sucking pests population *viz.*, aphid, jassids and thrips *i.e.* (37.04), (5.77) and (6.68) and (11.34) over untreated check (P₀) *i.e.* (39.75), (5.89) and (6.77), respectively, except whitefly population increased with plant protection (P₁) *i.e.* (11.34) over untreated check (P₀) *i.e.* (10.83). The results are also in accordance with the findings of Gahukar (2000) and Jackson *et al.* (1973).

The infestation of bollworm complex significantly differed with plant protection treatment. However, the spotted bollworm in squares and green bolls, pink bollworm in locules, *Helicoverpa* in squares and green bolls was significantly lower in sprayed plots (P₁) *i.e.* (7.17), (6.17), (24.60), (21.51) and (7.68) as compared to unsprayed plots (P₀) *i.e.* (7.82), (6.65), (27.25), (23.46) and (8.33), respectively during 1999-2000 (Table 2). Similar trend was observed during 2000-2001. Significant lower infestation was observed in plant protection treatment (P₁) than untreated check (P₀). The result of the pooled data was also significant. The plant protection treatment (P₁) for spotted bollworm in squares and green bolls, pink bollworm in locule, *Helicoverpa* in squares and green bolls were found effective in reducing damage *i.e.* (7.47), (6.23), (24.16), (20.63) and (7.24) over untreated check (P₀) *i.e.* (8.12), (6.80), (26.81), (22.58) and (7.89). Similar results were obtained by Singh *et al.* (1995) and Simwat and Dhawan (1996).

The difference in yield was non-significant among the plant protection treatments. The insecticidal sprayings over unprotected treatment (815.88 kg/ha) during 1999-2000. While in 2000-2001 the yield of seed cotton was not influenced by the plant protection treatments. However, numerically higher yield was obtained in protected plots (874.62 kg/ha) than unprotected plots (837.75 kg/ha). However, the result of pooled data was found non-significant. Numerically, it was higher with plant protection (P₁) *i.e.* (859.00 kg/ha) over untreated check (P₀) *i.e.* 826.81 kg/ha. Supporting findings were made by Nimbalkar *et al.* (1996) and Sharma (1993).

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