Research Paper :

Influence of manure (FYM) on the incidence of sucking pests and bollworms in cotton

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SUMMARY

Investigations on the influence of manure (FYM) on the incidence of cotton pest complex *viz*., aphids, jassids, thrips, whitefly, spotted bollworm, *Helicoverpa* and pink bollworm were carried out under rainfed conditions at the Research Farm, Department of Agronomy, Marathwada Agriculture University, Parbhani during *Kharif* 1999-2000 and 2000-2001. Manuring of FYM showed significantly lower incidence of aphids as well as jassids and not signficant about thrips population than in unmanured plots. Numerically higher number of thrips were observed in manured plots than unmanured plots. In case of bollworms the incidence of spotted bollworms and *Helicoverpa* in squares and green bolls, the trend of infestation in locules indicated that manured plots were less susceptible to pink bollworm damage than unmannered plots. Manured crops gave significantly highest yield of cotton than unmanured crops.

Key words : Cotton, Manure, FYM, Sucking pests, Bollworms, Yield

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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 (FYM) through plants of particular interest in the 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 bollworm complex with different levels of manures (FYM) on cotton crop in retention of plant protection in Marathwada region of Maharahstra state at Parbhani.

MATERIALS AND METHODS

A field experiment was conducted during *Kharif* of 1999-2000 and 2000-2001 at Research Farm, Department of Agronomy, Marathwada Agril University Parbhani. The soil of the experimental field in both the years was well drained clayey soil. Soil was 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 two manure (FYM) treatments *viz*., M_0 (unmanured plot) and M_1 (Manure plot @ 10 tonnes /ha). Experiments were conducted in split plot design with treatments consisted manure (FYM) as main plots and plant protection as sub plots. The main plots of manure were without FYM and with FYM @ 10 tonnes /ha. Whereas sub plots consisted of without plant protection and with plant protection, *viz.*, seed treatment with carbonsulfan 25 STD @ 60 g/kg of seed, spraying of dimethoate 30 EC 0.03 per cent followed by NSKE 5 per cent Endosulfan 35 KC 0.07 per cent, quinolphos 25 EC 0.05 per cent and cypermethrin 25 EC 0.007 per cent).

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

and two hand weedings were carried out in treated and untreated plots.

For controlling the sucking pests and bollworms of cotton seed treatment was carried out with carbosulfan 25 STD @ 60 g/kg in all plots with plant protection (P_1) treatment at the time of sowing as well as spraying of diamethoate 30 EC 0.03 per cent on ETL and spraying with insecticides *viz*., NSKE 5 per cent as well as cypermethrin 25 EC @ 0.007 per cent 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 damaged different bollworms as described by Patel *et al.* (1986) was followed in the present investigations for recording bollworm incidence.

RESULTS AND DISCUSSION

The data pertaining to incidence of sucking pests were significantly affected by manures (Table 1). However, the aphids, jassids, whitefly population was significantly less in plots applied with manure *i.e.* (6.01) (2.51) and (3.30) compared to the plots without manure *i.e.* (6.25), (2.53) and (3.49), respectively during 1999-2000. Similar trend was observed in 2000-2001. However, lowest population of aphids, jassids and whitefly was observed (5.90), (2.35) and (3.18) with FYM applied (M_1) compared to (6.14), (2.39) and (3.38) without FYM, respectively. The results of the pooled data revealed

Table 1 : Effect of manure (FYM) treatments on per cent infestation of sucking pests in cotton

Pests	Years	Treatments		S.E.±	C.D. (P=0.05)
		M_0	M_1		
Aphids	1999-2000	40.80 (6.25)	37.75 (6.01)	0.023	0.071
	2000-2001	39.05 (6.14)	36.00 (5.90)	0.032	0.097
	Pooled	39.92 (6.19)	36.87 (6.00)	0.06	0.18
Jassids	1999-2000	6.30 (2.53)	6.24 (2.51)	0.006	0.019
	2000-2001	5.42 (2.39)	5.37 (2.35)	0.011	0.035
	Pooled	5.86 (2.46)	5.80 (2.43)	0.012	0.036
Thrips	1999-2000	7.12 (2.68)	7.22 (2.71)	0.020	NS
	2000-2001	6.24 (2.53)	6.34 (2.57)	0.019	NS
	Pooled	6.68 (2.60)	6.78 (2.64)	0.049	NS
Whitefly	1999-2000	12.17 (3.49)	10.88 (3.30)	0.010	0.033
	2000-2001	11.29 (3.38)	10.01 (3.18)	0.017	0.051
	Pooled	11.73 (3.01)	10.44 (2.93)	0.015	0.046

Table 2 : Effect of manure (FYM) treatments on per cent infestation of bollworms in cotton

Bollworms	Years	Treatments		S.E.±	C.D. (P=0.05)
		M_0	M_1		
Spotted bollworms in	1999-2000	8.60 (16.75)	6.39 (14.62)	0.05	0.18
square	2000-2001	9.20 (17.25)	6.94 (14.74)	0.10	0.31
	Pooled	8.90 (17.00)	6.69 (14.38)	0.14	0.43
Spotted bollworm in	1999-2000	7.47 (15.51)	5.34 (12.58)	0.078	0.23
green boll	2000-2001	7.72 (15.75)	5.52 (13.02)	0.085	0.26
	Pooled	7.59 (15.63)	5.43 (12.80)	0.20	0.60
Pink bollworm in	1999-2000	30.32 (32.86)	21.53 (26.18)	0.16	0.50
locule	2000-2001	29.45 (32.26)	20.65 (25.61)	0.17	0.54
	Pooled	29.88 (32.56)	21.09 (25.89)	0.42	1.27
Helicoverpa in square	1999-2000	25.80 (30.10)	19.17 (25.02)	0.11	0.33
	2000-2001	24.15 (28.86)	17.42 (23.80)	0.13	0.42
	Pooled	24.97 (29.48)	18.29 (24.41)	0.10	0.30
Helicoverpa in green	1999-2000	9.10 (17.29)	6.91 (14.69)	0.05	0.17
boll	2000-2001	8.22 (16.33)	6.04 (13.74)	0.07	0.22
	Pooled	8.66 (16.81)	6.47 (14.21)	0.19	0.59

Table 3 : Effect of manure (FYM) treatments on average yield of seed cotton (kg/ha)

Parameters	Years	Treatments		S.E.±	C.D. (P=0.05)
		M_0	M_1		
Yield	1999-2000	796.50	862.75	17.95	54.39
	2000-2001	822.75	889.62	18.51	56.07
	Pooled	809.62	876.18	21.05	63.18

significant effects. The population of aphids, jassids and whitefly was (6.00), (2.43) and (2.93) with manure (M_1) (FYM) whereas it was (6.19), (2.46) and (3.01) without manure, respectively. These observations derived have been supported by the findings of Appa Rao *et al.* (1995) and Godse and Patel (1959).

However, influence of manure treatment on thrip population was not significant. It was lower (2.68) in unmanured (M_0) plots than the highly (2.71) manured plots (M_1) during 1999-2000. The trend of infestation was similar as observed in first year during 2000-2001 *i.e.* lower (2.53) in unmanured plots than higher (2.57), in manured plots. The results of the pooled data indicated that the thrip population was non-significant with manure treatment. *i.e.* higher number of thrips (2.64) was observed with manured (M_1) than without manured plots (2.60) (Table 1). Similar findings have been reported by Balsubramanian and Murlibaskaran (2001).

The data pertaining to incidence of bollworms were significantly affected by manures. it was observed that spotted bollworm in square, spotted bollworms in green bolls, pink bollworms in locules, *Helicoverpa* in squares, and *Helicoverpa* in green bolls population was significantly less (14.62), (12.58), (26.18), (25.02) and (14.69) with manure (M_1) compared to high (16.75), (15.51), (32.86), (30.10) and (17.29) without manure (M_0) during 1999-2000, respectively. Significant difference was also observed during 2000-2001 with manure (FYM) treatment. However, spotted bollworm in square spotted bollworm in green boll, pink bollworm in locules, *Helicoverpa* in squares and *Helicovepra* in green bolls observed lower damage (14.74), (13.02), (25.61), (23.80) and (13.74) with FYM (M_1) and higher damage (17.25), (15.75), (32.26), (28.86) and (16.33) without FYM (M_0), respectively (Table 2). These findings are supported by Bishara (1968) and Chamy *et al.* (1974).

The statistical analysis of pooled data indicated that the per cent infestation of bollworms differed significantly in both the years. Application of manure recorded significantly lower infestation about spotted bollworm in squares and green bolls, pink bollworm in locule *Helicoverpa* in squares and green bolls *i.e.* (14.38), (12.80), (25.89), (24.41) and (14.21), respectively than without application of manure recorded significantly higher infestation *i.e.* (17.00), (15.63), (32.56), (29.48) and (16.81), respectively (Table 2). Similar results had been obtained by Bishra (1968).

The difference in yield was found significant among the manure treatments. M_1 recorded significantly highest yield (862.75 kg/ha) during 1999-2000. While significantly higher yield (889.62 kg/ha) was recorded with manured plots than the without manured plots (822.75 kg/ha). The result of the pooled data indicated that the yield of the seed cotton was significantly higher (876.18 kg/ha) with the manure (FYM) (M_1) plots (Table 3). These results collaborate with the findings of Blaise *et al* (2005) and Jairaj and Venugopal (1964).

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