

Effect of organic amendments and inorganic fertilizers against the cotton leafhoppers

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ABSTRACT

The field experiments were conducted during 2002-03 and 2003-04 rabi season at Regional Research Station, Aruppukottai with M.C.U 10 cotton to study the influence of organic amendments and inorganic fertilizers on the sucking pests with twelve treatments in three replications. The two years study the basal application of neem cake 250 kg ha⁻¹ recorded the low mean population of leafhoppers (0.62 and 1.27 nos./leaf on 45 and 60 DAS respectively), as compared to 1.29 and 2.22 in the basal application of 40:20:0 kg NPK ha⁻¹. The basal application of enriched farmyard manure @ 750 kg ha⁻¹ recorded the highest mean seed cotton yield of 518 kg ha⁻¹ against the mean seed cotton yield of 339 kg ha⁻¹ in the application of 40:20:0 kg NPK ha⁻¹. The cost benefit ratio also shown that the application of enriched farmyard manure @ 750 kg ha⁻¹ (1:5.58 and 1:2.01 during 2002-03 and 2003.04 respectively) as compared to other treatments. In general the CB ratio was high in the organic amendments application than the in the inorganic fertilizers in both years.

Key words : Organic farming, Leafhopper, Cotton

INTRODUCTION

Though 1326 species of insects have been recorded on cotton in India, 134 species have been reported as pests (Sohi, 1964). Out these, the key early season pests will differ according to where the cotton is grown, but leafhoppers are more important in cotton growing areas of Tamil Nadu. Thrips and aphids can attack young seedlings especially in the more temperate regions. Shelke *et. al.*, (1988) reported that the sucking pests and bollworms are highly destructive to about 50 - 70 per cent loss in seed cotton yield under unprotected conditions. Recent trends in pest management practices emphasises the need for restricted use of pesticides in order to avoid the possible complications and hazards which may result an account of excessive and discriminate use of pesticides. It is, therefore, absolutely imperative that fresh approach to pest control be under taken especially studying its population fluctuation in relation to agro-eco-factors, which would essentially provide opportunity to face the pest challenge by manipulating the manageable ecological parameter in the form of appropriate application of organic amendments and inorganic fertilizers for better yield by avoiding pest population.

Jayaraj and Venugopal (1964) reported that the application of inorganic fertilizers along with organic amendments reduced the incidence of sucking pests on several field crops including cotton. Similar findings were also reported by Rajmohan *et. al.*, (1974) in sunflower. Thulaseetharan (1988) found that neem cake when supplemented with nitrogenous fertilizers reduced the incidence of *Amrasca devastans* Ishhida, *Aphis gossypii* Glover, *Bemisia tabaci* Gennudius and *Tetranychus cinnabarinus* L. on cotton. Rajandran (1993) reported that the use of organic amendments in the pest management is considered an ecologically viable proposition which avoids environmental pollution and economically feasible. Hence, the present investigation was take-up to find out the influence of few amendments against cotton leafhoppers under dry farming condition.

MATERIALS AND METHODS

The field experiments were conducted during 2002-03 and 2003-04 rabi season at Regional Research Station, Aruppukottai with M.C.U 10 cotton to study the influence of organic amendments and inorganic fertilizers on the sucking pests with twelve treatments in three replications. Treatments include the application of neem cake 250 kg ha⁻¹, neem cake 250 kg + 30:20:20 NPK ha⁻¹, poultry manure 2.5 ton ha⁻¹, poultry manure 2.5 ton + 30:20:20 NPK ha⁻¹, sheep manure 7.5 ton ha⁻¹, sheep manure 7.5 ton + 30:20:20 NPK ha⁻¹, composted coir pith 12.5 ton ha⁻¹, composted coir pith 12.5 ton + 30:20:20 NPK ha⁻¹, enriched farmyard manure 750 kg ha⁻¹, enriched

farmyard manure 750 kg + 30:20:20 NPK ha⁻¹, 40:20:20 NPK ha and 40:20:0 NPK ha⁻¹. Observations on the number of leafhopper population *Amrasca biguttulla biguttulla* (Ishida) per/plant were made on 45 and 60 days after sowing. Finally yield data were also recorded in each picking. The data were analysed and presented in the table.

RESULTS AND DISCUSSION

The two years observation revealed that the application of organic manure's was found to be better in reducing the population of leafhoppers in cotton and increased yield as compared to the full dose of inorganic fertilizers alone. In the present study, it was found that the basal application of neem cake 250 kg ha⁻¹ recorded the low mean population of leafhoppers (0.62 and 1.27 nos./leaf on 45 and 60 DAS respectively), as compared to 1.29 and 2.22 in the basal application of 40:20:0 kg NPK ha⁻¹. This finding was in accordance with the findings of Thulaseetharan (1988) and Rajendran (1993) who also reported that the application of neem cake 250 kg ha⁻¹ with 20 kg of N ha⁻¹ reduced the population of carmine spider mite, leafhopper, aphids and whitefly in okra.

The results are shown that the application of nitrogenous fertilizers increased the leafhopper population in all treatments. The increased incidence of the sucking pests in plots applied with higher levels on nitrogen might be due to increased auxin content of the plants under heavy nitrogenous manuring as mentioned by Venugopal and Perumal, 1971. The population density, in general increased with an increase in the level of nitrogen and decrease with an increase level of potassium as reported with whitefly, *Bemisia tabaci* (Gennudius) by Reddy and Rao (1982), Natarajan (1986) Natarajan *et. al.*, (1986) and Jayaraj *et. al.*, (1986) in cotton. Chelliah (1985) also observed the positive reduction in pest damage with increased in potassium level in sucking pests like pea aphid, legume aphid, cowpea aphid, bean mite and soybean mite.

The basal application of enriched farmyard manure @ 750 kg ha⁻¹ recorded the highest mean seed cotton yield of 518 kg ha⁻¹ against the mean seed cotton yield of 339 kg ha⁻¹ in the application of 40:20:0 kg NPK ha⁻¹. The yield difference between the application of organic fertilizers and inorganic fertilizers were clearly indicated that the application organic fertilizers will improve the moisture holding capacity, which will reflect on the yield. The cost benefit ratio also shown that the application of Enriched farmyard manure @ 750 kg ha⁻¹ (1:5.58 and 1:2.01 during 2002-03 and 2003.04 respectively) as compared to other treatments. In general the CB ratio was high in the organic amendments application than the in the inorganic fertilizers in both years. It is also reasonable to conclude that organic amendments improved the soil condition and enhance the uptake of nutrients as suggested by Van der Leen (1956) and Ramachandran (1986).

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Table : Effect of Organic amendments and inorganic fertilizers on the incidence of leafhopper and yield in cotton for two years

Treatment	Leafhopper population/leaf						Yield Kgs/ha			CB ratio	
	45 DAS			60 DAS			I Year	II Year	Mean	I year	II year
	I Year	II Year	Mean	I Year	II Year	Mean					
Neem cake 250 kg ha-1	0.86 a	0.39 a	0.62 a	2.32 a	0.21 a	1.27 a	751 abc	188 a	469 b	1 : 3.29	1 : 1.62
Neem cake 250 kg + 30:20:20 NPK/ha	0.93 ab	0.40 a	0.66 a	2.39 a	0.22 ab	1.30 a	765 abc	175 a	470 b	1 : 1.65	1 : 0.61
Poultry manure 2.5 ton/ha	1.32 bc	0.46 b	0.89 cd	2.54 ab	0.25bc	1.40 ab	753 abc	171 ab	462 b	1 : 4.79	1 : 1.75
Poultry manure 2.5 ton + 30:20:20 NPK/ha	1.23 bc	0.46 b	0.84 bcd	2.49 a	0.27 cd	1.38 ab	768 abc	171 ab	469 b	1 : 1.95	1 : 0.66
Sheep manure 7.5 ton/ha	1.32 bc	0.50 bcd	0.91 bcd	2.89 abc	0.27 cd	1.58 bcd	817 a	188 a	503 a	1 : 4.16	1 : 1.53
Sheep manure 7.5 ton + 30:20:20 NPK/ha,	1.03 ab	0.51 bcd	0.77 b	3.13 bc	0.27 cd	1.70 cde	833 a	187 a	510 a	1 : 2.14	1 : 0.72
Composted coir pith 12.5 ton/ha	1.09 ab	0.50 bcd	0.79 bc	2.53 ab	0.27 cd	1.40 ab	827 a	181 a	504 a	1 : 1.96	1 : 0.62
Composted coir pith 12.5 ton + 30:20:20 NPK/ha	1.54 c	0.48 bcd	1.01 e	2.82 ab	0.28 cd	1.55 bc	837 a	189 a	513 a	1 : 1.38	1 : 0.48
Enriched farm yard manure 750 kg ha-1	1.14 bc	0.44 b	0.79 bc	2.63 ab	0.27 cd	1.45 ab	842 a	193 a	518 a	1 : 5.58	1 : 2.01
Enriched farm yard manure 750 kg + 30:20:20 NPK/ha	1.24 bc	0.47 bc	0.85 bcd	3.50 cd	0.26 cd	1.88 de	802 ab	170 ab	486 b	1 : 3.14	1 : 0.90
40:20:20 NPK/ha	1.12 ab	0.46 b	0.79 bc	4.13 e	0.39 e	2.26 f	562 bc	131 bc	347 c	-	-
40:20:0 NPK/ha	1.96 d	0.61e	1.29 f	4.02 cd	0.41 e	2.22 f	557 c	121 c	339 c	-	-
SE	0.14	0.01	0.03	0.29	0.01	0.07	113	15	11	-	-
CD	0.41	0.04	0.07	0.61	0.04	0.21	235	43	31	-	-

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Received : October, 2005; Accepted : April, 2006