Effect of organic amendments on the incidence of stem fly *Ophiomyia phaseoli* (Tryon) and pod borer *Lampides boeticus* (L.) on French bean

S. Irulandi*, A. Ravikumar, S. Srivara Buddhi Bhuvaneswari*, C. Chinniah** and Stephen D Samuel*****

ABSTRACT

Effect of organic amendments (farm yard manure, neem cake, mahuva cake) was studied on French bean (variety Sln9; Bush type) during 2006-2007 at Regional Coffee Research Station, Thandigudi. The treatment combination, farm yard manure (FYM) (25 tonnes/ha) + neem cake (NC) (22kg) + mahuva cake (MC) (22 kg) + P (100 kg/ha), FYM (25 tonnes/ha) + NC (45kg) + biofertilizers + P (100 kg/ha) with need based application of neem oil (2%) reduced (by 84.21 and 86.29%) the incidence of stemfly, *Ophiomyia phaseoli* (Tryon) and pod borer, *Lampides boeticus* (L.) (by 67.75 and 82.16%); also resulted in higher grain yields and better cost benefit ratios.

Key words: French bean, *Lampides boeticus*, *Ophiomyia phaseoli*, organic amendments, pod borer, stem fly

INTRODUCTION

French bean synonyms kidney bean, snap bean, haricot bean commonly known as *kuthu* beans in Tamil Nadu is an important legume. Pest incidence is the major factor responsible for yield reduction in French bean. Koonee and Chhabra (1980) listed 12 species of defoliators, pod borers, leaf hopper, aphids and stem borer as pests of beans in India. The indiscriminate use of pesticides results in pest outbreaks, environmental pollution and health hazards due to the presence of residues in vegetables. With the growing public preference for *Eco-Mark vegetables* (crop produce organically or without use of toxic chemicals), Integrated Pest Management (IPM) has become indispensable which holds the promise of providing solution to pest problems in an environment-friendly and sustainable fashion. Hence, the present investigation was taken up in lower Pulney hills to study the effect of organic amendments on the incidence of stemfly, *Ophiomyia phaseoli* Tryon and pod borer, *Lampides boeticus* L., on French bean.

MATERIALS AND METHODS

A field experiment was conducted for the management of major pests of French bean (bush type) during 2004-2005 at Regional Coffee Research Station, Thandigudi. The cultivar sln.9 was sown adopting the spacing of 30 x 20 cm. The plot size was 4 x 5 m (20 m^2). There were eight treatments including an untreated check with three replications. Randomized block design was adopted. The treatment details are as follows:

FYM (25 tones/ha) +Neem cake (45 Kg.) + Biofertilizer + P (100kg/ha) -T1; FYM (25 tones/ha) + Mahuva cake (45 Kg.) + Biofertilizer + P (100kg/ha) –T2; FYM (25 tones/ha) + Neem cake (22kg) + Mahuva cake (22kg) + P (100kg/ha) –T3; T1 + Neem oil 2% or NSKE 5% (Need based)-T4, T2 + Neem oil 2% or NSKE 5% (Need based) - T5; T3 + neem oil 2% or NSKE 5% (Need based) -T6; FYM (25 tones/ha) + 90kg N + 125kg P/ha-with Need based chemical application -T7 and untreated control - T8.

The treatments were imposed at basal (half dose) and the remaining half dose was applied on 25th day after sowing. Need based application of neem oil @ 2% was given on 57 days after sowing (DAS) against pod borer and stem fly using a high volume knap sack hand operated sprayer and the quantity of spray fluid used was 500 lit. per hectare. Teepol (1.0%) was added as emulsifier for better spread and adhesion. Stemfly damage in per cent was worked out by observations were recorded on 43, 50, 57 and 64 days after sowing (DAS); total and affected plants exhibiting wilting and drying symptoms due to stemfly attack from each plot were recorded. The pod damage by *L. boeticus* was recorded by counting the total number of pods and pods affected from five tagged plants per plot on 57th, 64th, 70th and 77th day after sowing. The data on green pods yield (kg per plot) were recorded at each harvest.

The data gathered from field experiments were subjected to statistical scrutiny after angular transformations for the per cent data following the methods of Gomez and Gomez (1984)

and the means were compared with Duncan Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Stemfly, *Ophiomyia phaseoli*

Incidence of stemfly on French bean in different treatments indicated ranged from 0.03 to 11.21 per cent compared to 3.55 – 26.39 per cent in UTC. Considering the mean per cent plant damage by the stemfly of all the periods, lesser incidence of stemfly was recorded in T6 followed by T4 which were on a par with each other and better than untreated check (UTC) (13.35%). The percent reduction in stemfly damage over UTC was higher in the treatment T6 followed by T4 (Table 1). The treatment, Mohan *et al.* (1987) indicated that *Azospirillum* applied in soil as seed inoculant reduced the sorghum shootfly damage through the enhancement of phenolics in the plants. The efficacy of this treatment is also in conformity with the observation of Thulaseetharan (1988) who associated 43.80 per cent reduction in whitefly population on bhendi with the supplemented application of neem cake with nitrogenous fertilizers. Further, the superiority of neem cake at 250 kg/ha supplemented with 25 kg N/ha to pungam, iluppai and castor cakes in reducing the incidence of aphid, leaf hopper and whitefly in bhendi is in line with the findings of Rajendran (1993).

Pod borer, *Lampides boeticus*

FYM + NC + MC + P + NO (2%) was superior to other treatments in recording less pod borer damage (0.88%) followed by in FYM + MC + BF + P + NO (2%) (1.07%) as compared to in UTC (7.17%). The corresponding percent reduction in pod borer damage over UTC was higher in T6 and T5 (Table 2). This is line with the findings of Godase and Patel (2001) and Kavitha and Rajendran (2004) who reported that the application of FYM or poultry manure and in combination with biofertilizers and neem cake was found to be effective in reducing the incidence of brinjal shoot and fruit borer damage and the foliage feeders *viz.*, *Epilachna* beetle and ash weevil damage. Further decreased leaf hopper population with the soil application of neem cake @ 250 kg/ha reported by Krishnamoorthy *et al.* (2001) is in close agreement with the present investigation.

Grain yield

All the organic amendments recorded higher yields compared to untreated check.. Yields in FYM + NC + MC + P + NO (7000 kg/ha) and FYM + NC + BF + P + NO (6500) kg/ha were equal among themselves but higher (by 86.41 and 73.18 per cent respectively) than that in untreated check (3750 kg/ha); cost benefit ratios were also higher (1:3.57 and 1:3.02 respectively).

REFERENCES

Gautam, R. D., Subhash chander and Jeyaraj, J. 1998. IPM in vegetable crops. **In:** *Potential IPM Tactica* (Prasad, D.

Table 1. Effect of organic amendments on the incidence of stemfly, *O. phaseoli*

Treatment	Mean per cent plant damage					Reduction over untreated control (%)
	Days after sowing					
	43	50	57	64	Mean	
FYM (25 tones/ha) +Neem cake (45 Kg/ha) + Biofertilizer + P (100kg/ha) – T1	2.16 f	3.29 e	7.27 bc	9.71 d	5.60 c	62.05
FYM (25 tones/ha) + Mahuva cake (45 Kg/ha) + Biofertilizer + P (100kg/ha) – T2	1.75 e	3.33 f	7.33 bc	8.56 d	5.24 c	64.75
FYM (25 tones/ha) + Neem cake (22kg/ha) + Mahuva cake (22kg) + P (100kg/ha) – T3	0.92 d	1.68 c	2.69 ab	4.05 bc	2.33 b	84.21
T1 + Neem oil 2% or NSKE 5% (Need based) – T4	0.59 c	0.86 a	2.30 a	3.71 b	1.86 ab	86.29
T2 + Neem oil 2% or NSKE 5% (Need based) – T5	0.08 b	1.72 d	2.94 ab	4.87 c	2.40 b	83.02
T3 + Neem oil 2% or NSKE 5% (Need based) – T6	0.03 a	1.06 b	2.03 a	2.69 a	1.45 a	90.14
FYM (25 tones/ha) + 90kg N + 125kg P/ha- with Need based chemical application – T7	2.78 g	4.11g	9.31 c	11.21 e	6.85 d	48.69
Untreated control – T8	3.55 h	9.21 h	14.26 d	26.39 f	13.35 e	-

Means followed by a common letter are not significantly different by DMRT (P=0.05)

Table 2. Effect of organic amendments on the incidence of pod borer, *L. boeticus*

Treatment	Pod borer damage (%)					Reduction over untreated control (%)
	Days after sowing					
	57	64	70	77	Mean	
FYM (25 tones/ha) +Neem cake (45 Kg)/ha + Biofertilizer + P (100kg/ha) – T1	2.16 e	3.98 f	5.12 f	7.67 e	4.73 e	39.31
FYM (25 tones/ha) + Mahuva cake (45 Kg/ha) + Biofertilizer + P (100kg/ha) – T2	1.92 d	3.61 e	4.72 e	6.32 d	4.14 d	47.12
FYM (25 tones/ha) + Neem cake (22kg/ha) + Mahuva cake (22kg) + P (100kg/ha) – T3	0.74 c	1.86 d	2.78 d	4.92 c	2.57 c	67.75
T1 + Neem oil 2% or NSKE 5% (Need based) – T4	0.62 b	0.86 c	1.68 c	2.30 b	1.36 b	82.16
T2 + Neem oil 2% or NSKE 5% (Need based) – T5	0.0 a	0.72 b	1.46 b	2.10 b	1.07 a	86.17
T3 + Neem oil 2% or NSKE 5% (Need based) – T6	0.0 a	0.56 a	1.13 a	1.86 a	0.88 a	88.14
FYM (25 tones/ha) + 90kg N + 125kg P/ha- with Need based chemical application – T7	2.41 f	4.12 g	5.46 g	8.12 f	5.62 f	29.03
Untreated control – T8	2.65 g	5.31 h	8.33 h	12.41g	7.17 g	-

Means followed by a common letter are not significantly different by DMRT at 5% level

Table 3. Green pod yield

Treatment	Green pod (Kg/ha)	Increase in yield of green pods over untreated check (Kg/ha)	Cost of produce (Rs./ha)	Cost of plant protection (Rs./ha)	Profit (Rs./ha)	Cost benefit ratio
FYM (25 tones/ha) +Neem cake (45 Kg.) + Biofertilizer + P (100kg/ha) – T1	4875	1125	22500	14185	8315	1:1.58
FYM (25 tones/ha) + Mahuva cake (45 Kg.) + Biofertilizer + P (100kg/ha) – T2	4750	1000	20000	14275	5725	1:1.40
FYM (25 tones/ha) + Neem cake (22kg) + Mahuva cake (22kg) + P (100kg/ha) – T3	5500	1750	35000	14200	20800	1:2.46
T1 + Neem oil 2% or NSKE5% (Need based) – T4	6500	2750	55000	18185	36815	**1:3.02**
T2 + Neem oil 2% or NSKE5% (Need based) – T5	6250	2500	50000	18225	31725	1:2.73
T3 + Neem oil 2% or NSKE5% (Need based) – T6	7000	3250	65000	18200	46800	**1:3.57**
FYM (25 tones/ha) + 90kg N + 125kg P/ha- with Need based chemical application – T7	4650	900	18000	14580	3420	1:1.23
Untreated control – T8	3750	-	-	-	-	-

and Gautam, R. D. eds.) Westvill Publishing House, New Delhi. 337-360 **PP**.

Godase, S. K. and Patel, C. B. 2001. Studies on the influence of organic manures and fertilizer doses on the intensity of sucking pests, jassid (*Amrasca biguttula biguttula* Ishida) and aphid (*Aphis gossypii* Glover) infesting brinjal. *Plant Protection Bulletin*, **53** (3&4): 10 - 12.

Gomez, K. A. and Gomez, A. A. 1984. Statistical Procedures for Agricultural Research, Second edition. Wiley Inter Science, New York. 680 **P**.

Kavitha, Z. and Rajendran, R. 2004. Studies on induced resistance in brinjal to major insect pests. *Ph.D. Thesis*, Tamil Nadu Agricultural University, Madurai, India. 275 **P**.

Kooner, B. S. and Chhabra, K. S. 1980. Pests of pulse crops and their control. In: *Breeding Methods for Improvement of Pulse crops*. (Gill, K. S. ed.). Punjab Agricultural University, Ludhiana, India, 132-141 **PP.**

Krishnamoorthy, P. M., Krishnakumar, N. K. and Edward Raja, M. 2001. Neem and *pongamia* cakes in the management of vegetable pests. In: *Proceedings of the Second National Symposium on Integrated Pest Management (IPM) in Horticultural Crops: New Molecules, Biopesticides and Environment*, Bangalore, 74-75 **PP**.

Mohan, S., Jayaraj, S., Purusothaman, D. and Rangarajan, A. V. 1987. Can the use of *Azospirillum* biofertilizer control sorghum shootfly. *Current Science*, 723-725.

Rajendran, M. 1993. Studies on the management of pests on bhendi (*Abelmoschus esculentus* L.). *M.Sc. (Ag.) Thesis*, Tamil Nadu Agricultural University, Madurai, India. 136 **P**.

Thulaseetharan, V. 1988. Studies on the management of nematodes on bhendi. *M.Sc. (Ag.) Thesis*, Tamil Nadu Agricultural University, Coimbatore. 156 **P.**

S. Irulandi*, A. Ravikumar, S. Srivara Buddhi Bhuvaneswari*, C. Chinniah** and Stephen D Samuel*****

* Krishi Vigyan Kendra,TNAU, Pechiparai – 629 161

** Agricultural College and Research Institute, TNAU, Madurai – 625 104

***Regional Coffee Research Station, TNAU, Thandigudi-624 216, Dindigul District, Tamil Nadu.

Mobile: 9487081943, E-mail: ksirulandi@gmail.com

Received: November 8, 2011 Revised: February 6, 2012 Accepted: March 3, 2012