J. bio-sci. 16: 105-108, 2008 **ISSN 1023-8654**
http://www.banglajol.info/index.php/JBS/index

EFFICACY OF SOME SYNTHETIC INSECTICIDES AND NEEM SEED OIL FOR THE MANAGEMENT OF THRIPS OF MUNGBEAN *VIGNA RADIATE* (L.) WILEZEK

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Abstract

Field study was carried out at Bangladesh Agricultural Research Institute (BARI) farm during March to August 2005 to find out the most appropriate management practices against thrips of mungbean. The experiment consisted of seven treatments of various management practices. It was laid out in Randomized Complete Block Design (RCBD) with four replications. The incidence of this pest was first noticed during vegetative and flowering stage. The infestation rate was highest in reproductive stage. Application of Furadan 5G as a seed treatment gave the maximum yield (950.5 kg^{-ha}). On the other hand, minimum yield was found in control treatment. Two times application of Shobicron 425 EC also gave the satisfactory result but it was not economically viable. Neem oil with Trix gave the significant result in comparison with other treatments and it may be environmentally friendly.

Key words: Efficacy, Synthetic and botanical insecticides, *Megalurothrips distalis*, Yield.

Introduction

Mungbean [*Vigna radiate* (L.) Wilezek] is one of the most important pulse crops in tropics and subtropics. It is one of the important sources of protein for both human being and domestic animals. It ranks fifth both in acreage and production and contributes 6.5% of the total pulse production in Bangladesh (Anon. 1998). Mungbean is considered as a poor man's meat because it is a good source of protein. It is a popular crop in Bangladesh not only as a food crop but also as a fodder crop. Several insect pests have been reported to infest mungbean and damage the seedlings, leaves, stems, flowers, buds, pods causing considerable losses (Sehgal and Ujagir 1988, Rahman 1988, Husain 1993). The most damaging insect pests of mungbean recorded so far are stem fly (Rahman 1987, Lal 1985, Agarwal and Pandey 1961), whitefly (Rahman *et al.* 1981, Srivastava and Singh 1976) and thrips (Rahman *et al.* 1981). Thrips is associated mostly with the damage of tender buds and flowers of mungbean (Chabra and Kooner 1985, Lal 1985). Chemical control is generally being advocated for the management of insect pests of mungbean. Soil application of Furadan 3G @ 1.5 g a.i. ha^{-1} just prior to sowing followed by foliar application of Azodrin 40 EC @ 0.07% at 50% flowering protected the crop ensured higher yield (Rahman 1988). In this study, an effort was made to find out the most effective insecticide in controlling thrips of mungbean. The present study was undertaken to fulfill the following objectives a) to document the abundance and damage severity of thrips in mungbean, and b) to find out the most economical doses for the management of these pests in mungbean.

Materials and Methods

Field trials were carried out at the experiment farm of the Entomology Division of Bangladesh Agricultural research Institute (BARI), Gazipur, Bangladesh during March 2005 to June 2005. The experiment consisted

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of seven treatments of various management practices viz. i) seed treatment by Furadan 5G (Carbofuran) @ 4% before sowing ii) seed treatment by Cruiser 70 WS (Imidaclorpid) @ 4% before sowing iii) neem seed oil @ 10 ml of water + Trix @ 5 ml/L of water at 20 DAS and following spray at an interval of 10 days and continued up to the maturity of the crop iv) spraying of Cymbush 10 EC (Cypermethrin) @ 1 ml/L of water at 20 DAS and at 35 DAS v) spraying of Ekalux 25 EC (Quinalphos) @ 2 ml/L of water at 20 DAS and at 35 DAS vi) Spraying of Shobicron 425 EC (Propenphos + Cypermethrin) @ 20 ml/L of water at 20 DAS and at 35 DAS and vii) control. Insecticides were procured from local market. Neem seed oil was collected from the Division of Entomology, BARI. Furadan, Cruiser, Neem seed oil, Cymbush, Ekalux and Shobicron were sprayed in assigned plots with the dosages by using Knapsack sprayer. At each application the spray mixture was freshly prepared. The experiment was laid out in a Randomized Complete Block Design (RCBD) with four replications in the field. The whole field was divided into four equal blocks having 1 m space between the blocks and each block was again sub-divided into 7 plots (3m × 3m each) as treatment plots with 0.6 m space between them. The spacing was 30 cm between rows and 10 cm between plants. The mungbean seeds (BARI mug-5) were collected from Pulse Research Centre, BARI, Joydebpur, Gazipur. All the seeds were subjected to germination test before sowing. In all cases, the rate of germination was found to be more than 90%. Seeds of mungbean were sown on 8 March, of 2005. After sowing, a light irrigation was given. Subsequent irrigations were applied in all the plots whenever required. Thinning, weeding in the plots was done at regular interval upto the flowering stage. The soil of the experimental land was clay loam texture, p^H range 5.2 to 5.7, organic matter 1.12% and belongs to the Grey Terrace soils (AEZ-28). During experimentation maximum and minimum temperature, relative humidity and rainfall were recorded at an interval of 10 days.

Ten plants per plot were tagged randomly from 6 inner rows leaving 15 cm from the corner. These plants were used for taking data on thrips. Thrips was counted *in situ* from five fully unfolded top leaves of the plant. Data was recorded at an interval of 10 days commencing from first incidence and continued up to the maturity of the crop. Overall, percentage of population reduction over control was calculated: The yield data (kg^{-ha}) were recorded form treated and untreated plots. The difference between the seed yield in treated and untreated plots was considered as loss. The avoidable losses or percent increase in yield over untreated control was calculated.

All data were analyzed by MSTAT software for analysis of variance (ANOVA). The percent data were transformed into square root wherever needed. Treatment means were separated by applying Least Significant Difference (LSD) test (Gomez and Gomez 1984).

Results and Discussion

Effect of different treatments on the incidence of Thrips: The treatments also showed significant influence on the incidence of thrips (Table 1).The results indicated that the T_6 (Spraying of Shobicron 425 EC @ 20 ml/L of water at 20 DAS and at 35 DAS) (57.42%) treatment had the lowest number of thrips (2.5 per 5 leaves) whereas the highest number of thrips (5.2 per 5 leaves) was recorded from untreated control which was statistically dissimilar from other treatments. Similarly, T_6 treatment ensured the highest reduction of thrips infestation over control followed by T_1 (seed treatment by Furadan 5G @ 4% before sowing) (46.15%) over control. Similar performance of Furadan 5G against thrips was reported by Olowe *et al.* (1987). They reported the lowest number of thrips from Furadan treated plots and also 46% population reduction over control. The reduction of thrips infestation (40.72%) from spraying of Cymbush 10 EC over control was also reported by Anon. (2000).

Effect of different treatments on seed yield of mungbean:

Seed yield of mungbean also differ significantly by the different treatments (Table 1). It is evident from the table that the highest seed yield (950.50 kg/ha) was recorded from T_1 (Seed treatment by @ 4% before sowing) treatment which was statistically similar with T_6 (Spraying of Shobicron 425 EC @ 20 ml/L of water at 20 DAS and at 35 DAS) (915.2 kg/ha). The lowest seed yield was recorded from the untreated control and it was statistically different from other treatments. The highest rate of increasing seed yield (60.87%) over control was obtained from T_1 (Furadan 5G) treatment followed by T_6 (Shobicron 425 EC) (54.91%) treatment. The third and fourth highest increase (38.85% and 35.57 %) was recorded from the application of T_4 (Spraying of Cymbush 10 EC @ 1 ml/L of water at 20 DAS and at 35 DAS) and T_3 (Neem seed oil @ 10 ml of water + Trix @ 5 ml/L of water at 20 DAS and following spray at an interval of 10 days and continued up to the maturity of the crop) treatments respectively. There was strong negative linear regression (y= 1219.1 – 127.7x) was found between the number of thrips and yield for different treatments, which indicated that higher number of thrips conversely lower the total yield. The correlation coefficient (r) was – 0.91 and the contribution of the regression (R^2) were 0.82. Anon. (2001) reported spraying of Cymbush 10 EC provided better yield of mungbean.

Table 1. Effect of different treatments on the incidence of thrips attacking mungbean and seed yield during kharif 2005 (March-June) at Gazipur.

Treatments	Number of thrips per 5 leaves	Population reduction over control (%)	Seed yield of Mungbean (Kg $^{-ha}$)
T_1	2.8b	46.15	950.5a
T_2	3.36b	35.38	772.8b
T_3	3.25b	37.50	800.3b
T_4	2.95b	43.27	820.2b
T_5	3.60b	30.77	712.3c
T_6	2.50b	57.42	915.2a
T_7	5.20b	-	590.3d
$LSD_{0.05}$	1.375		45.85
$LSD_{0.01}$	1.884		62.81
CV (%)	27.39		3.88

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