MANAGEMENT OF *THRIPS* IN MUNGBEAN CROP USING NEEM OIL (*AZADIRACHTA INDICA A. JUSS*) AND DIFFERENT INSECTICIDES

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ABSTRACT

A field study to test the comparative efficacy of synthetic insecticides (Confidar 200 SL @ 250 ml acre^{-1}, Mospilan 20 SP @ 250 ml acre^{-1}, Actara 25 WG @ 48 gm acre^{-1}) and neem oil concentrations (Neem oil 1%, Neem oil 2% and Neem oil 3%) against thrips in mungbean crop was conducted at Arid Zone Research Institute (AZRI), Bhakkar (Punjab) during the kharif season 2011. The Experiment was laid out in randomized complete block design (RCBD) with three replicates. Mospilan 20 SP treated plot comparatively showed least per infloresence population of thrips (5.08) followed but not significantly different to Actara 25 WG with 5.75 thrips per infloresence. Among neem oil concentrations tested, although, all the concentrations (1, 2 and 3%) showed comparatively low per infloresence population of thrips than control plot but neem oil 3% showed comparatively least per infloresence population of thrips (10.83). In case of percent population reduction of thrips over control, maximum population reduction of thrips (65.06%) was found in plots treated with Mospilan 20 SP followed but not significantly different to Actara 25 WG treated plot with 60.57% population reduction of thrips. Among neem oil concentrations tested, neem oil 3% showed comparatively more population reduction (25.51%) of thrips than other tested concentrations of neem oil.

Keywords: *Thrips, Management, Neem oil, Insecticides*

INTRODUCTION

Mungbean (Vigna radiata L.) commonly known as green gram, is an important pulse crop of many Asian countries including Pakistan. It ranks second to chickpea (Cicer arietinum) amongst grain legumes, from production point of view. It is a short duration crop and hence requires less water as compared to other summer crops. Moreover, it is drought resistant and can withstand adverse environmental conditions. It is successfully be grown in rain fed areas (Akbar, Hasan & Latif, 1996; Afzal, Sharif, Raza, Ahmad & Bashir, 2000; Anjum, Ahmed & Rauf, 2006;). Because of its high nutritive value, digestibility and non-flatulent

effect, it has an edge over other pulses (Haq, 1989; Deeba, Sarwar & Khuhro, 2006; Azam, Bhuyain, Uddin, Islam, & Kabir, 2008). Besides, being a rich source of protein (22-24%), it maintains soil fertility through biological nitrogen fixation in soil (AVRDC, 1998).

During 2009-10, mungbean was grown on an area of 183.3 thousand hectares with total production 118.7 thousand tons with the average production of 648 kg hac^{-1} in Pakistan. Production of mungbean crop for the year 2009-10 showed decrease of 9.5% over previous year, 2008-2009 (Anonymous, 2010). A number of factors are responsible for low yield of mungbean; however, losses caused by insect pests are one of the major factors and have become a limiting factor in the production of this crop. Among them sucking pest viz., whitefly (Bemisia tabaci Genn), Jassid (Amrasca devastans Dist,) and Thrips (Thrips tabaci Lind) inflict heavy yield loss in mungbean (Rao et al., 1990; Panchabhavi & Khadam1990; Sharma, Pandey & Singh, 1991; Bashir, Mughal & Malik, 1991; Rajnish, Ali & Rizvi, 2006). These insect pests not only reduce the vigor of the plant by sucking the sap but also transmit diseases and affect photosynthesis, as well.

Keeping in view the importance of the crop, it is of the essence to bring per hectare yield of mungbean at par to that of the developed countries. This goal can be achieved by promoting superior and valuable insect pest management techniques in addition to other modern cultivation techniques. To overcome the incidence of insect pests, a number of practices like varietal resistance, use of natural enemies and chemical control are commonly used. The use of resistant varieties is one important technique in integrated pest management (Dilawari & Dhaliwal, 1993; Shad, Mughal, Farooq & Bashir, 2006; Kooner & Cheema, 2007). However, sole dependence on resistant varieties cannot be sufficient due to different of environment. It should be integrated with chemical control to keep the pest population below the economic threshold level (Chhabra & Kooner, 1985; Shanker & Uthamasamy, 2005; Singh, Sharma, Swaminathan & Dashora, 2009). The present study was conducted to evaluate the efficacy of insecticides and neem oil against sucking insect pests.

MATERIAL AND METHODS

For the management of thrips of mungbean field studies was conducted at Arid Zone Research Institute (AZRI), Bhakkar (Punjab) during the kharif season 2011. Comparative efficacy of synthetic insecticides and neem oil was tested in trial against thrips in mungbean. For this purpose seven treatments including control

viz., Confidar 200 SL (Imidacloprid) @ 250 ml acre^{-1}, Mospilan 20 SP (Acetamiprid) @ 250 ml acre^{-1}, Actara 25 WG (Thiomethoxam) @ 48 gm acre^{-1}, Neem oil 1%, Neem oil 2% and Neem oil 3% was tested in randomized complete block design with three replicates.

Neem oil was extracted by crushing the neem seed in an electric expeller. Its concentrations were prepared by adding 10ml, 20ml and 30ml of neem oil in one liter of water each to make 1%, 2% and 3% neem oil concentrations, respectively. Little amount of detergent was also be added to make the suspension homogenous. For this purpose mungbean variety AZRI-2006 was sown using hand drill during kharif season, 2011 in the experimental plots (5X2.4 m^2) by keeping row to row distance 30cm and replications were 60cm apart from each other. Recommended dose of synthetic fertilizers was applied. All agronomic practices were maintained constant when needed.

All insecticides were sprayed at their recommended doses whenever the population of insect pests reached the economic threshold level (ETL). The ETL for thrips was considered as 8-10 adults or nymphs (Ahmad, Yadava & Lal, 1998). The application of all the insecticides was made with hand operated knapsack sprayer having 20 liters capacity with hollow cone nozzle. In case of thrips, nine infloresence were carefully examined from each plot. Then the numbers of thrips were recorded Data was recorded 24, 48, 72 and 120 hours after the application of insecticides. The final data was then statistically analyzed with analysis of variance (ANOVA) and means were separated using least significant difference (LSD) test at 5% level of significance (Steel & Torrie, 1982).

RESULTS AND DISCUSSION

Comparative efficacy of synthetic insecticides and neem oil is presented in table. It is evident from the results that Mospilan 20 SP showed excellent results as it showed comparatively least population of thrips (0.67 infloresence^{-1}) 24 hours after spray followed but not significantly different to Confider 200 SL which showed 3.33 thrips per infloresence. Maximum and statistically similar per infloresence population of thrips was found in plots treated with neem oil 1% (21.67) and control plot (20.33). Per infloresence population of thrips found in plots treated with neem oil 2% (16.33) and neem oil 3% (17.67) were remained statistically similar 24 hours after spray.

48 hours after spray results showed that maximum per infloresence population of thrips (8.33) was found in plots treated with neem oil 2% followed but significantly different to neem oil 1% with 6.33 per infloresence population of thrips. However, neem oil 1% (6.33 thrips per infloresence) and neem oil 2% (5.33 thrips per inflorescence) were remained statistically similar. Comparatively minimum per infloresence population of thrips (1.00) was found in plots treated with Mospilan 20 SP followed but not significantly different to Confidar 200SL with 2.33 thrips per infloresence. Also per infloresence population of thrips found on Confidar 200SL treated plots (2.33) was not significantly different to Actara 25 WG treated plots (4.00) 48 hours after spray.

When data recorded 72 hours after spray, minimum per infloresence population of thrips (2.67) was found in plots treated with Mospilan 20 SP followed but significantly different to Actara 25 WG with 4.00 thrips per infloresence. Neem oil treated plots behaved somewhat different 72 hours after spray as maximum per infloresence population of thrips was found in plots related with neem oil 2% (12.33) followed but significantly different neem oil 1% with 10.00 thrips per infloresence. Neem oil 3% remained comparatively better and significantly different than other neem oil concentrations tested as it showed less (8.00) per infloresence population of thrips. Actara 25 WG comparatively showed least per infloresence population of thrips (10.33) than other treatments followed but significantly different to neem oil 3% treated plots with 12.33 thrips per infloresence 120 hours after spray. Similarly, maximum per infloresence population of thrips (16.00) was found in plots treated with Mospilan 20 SP and Confidar 200 SL after control plot (17.67 thrips per infloresence).

Overall it is obvious from the results that all the treatments tested behaved significantly different from the control plot against thrips. Mospilan 20 SP treated plot comparatively showed least per infloresence population of thrips (5.08) throughout the study period followed but not significantly different to Actara 25 WG with 5.75 thrips per infloresence. Per infloresence population of thrips found in Actara 25 WG (5.75) and Confidar 200 SL (6.75) treated plots was found statistically similar with each other. Among neem oil concentrations tested, although, all the concentrations (1, 2 and 3%) showed comparatively low per infloresence population of thrips than control plot but neem oil 3% showed comparatively least per infloresence population of thrips (10.83). Neem oil 1% (13.25) and 2% (13.08) showed maximum and statistically similar per infloresence population of thrips after control plot (14.58).

In case of percent population reduction of thrips over control, it is evident from the table that all the treatments reduced the per infloresence population of thrips to significant level over untreated plot. Maximum population reduction of thrips (65.06%) was found in plots treated with Mospilan 20 SP followed but not significantly different to Actara 25 WG treated plot with 60.57% population reduction of thrips. Per infloresence population reduction at Actara 25WG treated plot (60.57%) was found none significantly different to Confidar 200 SL treated plot (53.59%). Among neem oil concentrations tested, neem oil 3% showed comparatively more population reduction (25.51%) of thrips than others. Percent population reduction of thrips found on the plots treated with neem oil 2% (10.22%) and neem oil 1% (9.13%) was found statistically similar with each other.

Table: Comparative efficacy of synthetic insecticides and neem oil against thrips

Treatments	24 HAS 26-8-2011	48 HAS 27-8-2011	72 HAS 29-8-2011	120 HAS 2-9-2011	Overall infestation	% Population Reduction Control
Neem Oil 1 %	21.67 A	6.33 C	10.00 B	15.00 B	13.25 B	9.13 D
Neem Oil 2 %	16.33 C	8.33 B	12.33 A	15.33 B	13.08 B	10.22 D
Neem Oil 3 %	17.67 BC	5.33 CD	8.00 C	12.33 C	10.83 C	25.51 C
Confidar 200 SL	3.33 DE	2.33 EF	5.33 D	16.00 AB	6.750 D	53.59 B
Mospilan 20 SP	0.67 E	1.00 F	2.67 F	16.00 AB	5.083 E	65.06 A
Actara 25 WG	4.67 D	4.00 DE	4.00 E	10.33 D	5.750 DE	60.57 AB
Control	20.33 AB	11.00 A	9.33 B	17.67 A	14.58 A	-----
LSD Value	2.905	1.715	1.317	1.998	1.210	8.452

Each value is a mean of three replications. Means followed by common letters are not significantly different from each other at $\alpha = 0.05$.

Our results are in line with the Shah, Ahmad, Hussain, Yousaf & Ahmad, (2007) who reported that imidacloprid gave better results in case of pods per plant and yield. Also reported that reatments including seed treatment with imidacloprid and other management approaches significantly reduced insect infestation (Prodhan, Hossain, Kohinur, Mollah & Rahman, 2009), (Khalil, Elseedi, Saleh, Salama & Hamed, 2010) and (Abbas, Khattak, Abbas, Aslam, Khokhar & Malik, 2011) reported similar results as we achieved in our studies.

Although neem oil performed less than other chemicals tested but remained intermediate and effective against whitefly as compared to control plot. It is supported by the (Khattak, Ali & Chishti, 2006) who reported that neem oil at 2%

and neem seed water extract at 3% significantly reduced the population of whitefly, jassids and thrips on cotton up to 168 hours after spray.

CONCLUSION

Mospilan 20 SP and Actara 25 WG treated plot comparatively showed least per infloresence population of thrips (5.08 and 5.75, respectively) and also showed maximum population reduction of thrips (65.06% and 60.57%, respectively) as compared to control plot. Among neem oil concentrations, Neem oil 3% showed comparatively least per infloresence population of thrips (10.83) and 25.51% population reduction of thrips over control.

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