EFFICACY OF DIMEHYPO AND MONOMEHYPO AGAINST SPOTTED BOLLWORM ON OKRA CROP.

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Abstract

Field studies were conducted for the determination of efficacy of different carbamate pesticides against spotted bollworm on okra crop at the agriculture and agribusiness department, university of Karachi. Seeds of okra crop were planted in March 2011 in a complete randomized block design along with 3 replicates. The crop was sprayed four times during the experimental period with a time interval of seven days. The results revealed that both the tested pesticides reduced the population of spotted bollworm as compared to the untreated control plot. The data indicated that the Dimehypo provided the best results followed by Monomehypo in reduction of the pest population. It may be concluded that the carbamate pesticides including dimehypo and monomehypo were effective for controlling the spotted bollworm population damaging the okra and causing minimum losses to pollinators, predators and other non targeted beneficial insects. Moreover, still better results could be obtained by applying these systemic pesticides in combination with the contact foliar pesticides.

Introduction

Okra *"Abelmoschus esculentus,* a common summer vegetable which is grown in different areas of Sindh during the months of Feb-March. A distance of 22.5-37.5 cm is maintained in between plant to plant. The okra plants usually grow up to 5 feet height and start fruiting 60 days after sowing. Okra fruits containing protein, iodine, minerals, amino acids and vitamin A, B & C grow with fast growth hence fruit picking is done on daily or alternate day basis (Anon, 2005).

Insects including jassid, white fly, aphids, thrips and spotted bollworm are major pests damaging the okra crop (*Abelmoschus esculentus*). A huge loss in marketable fruits of okra is suffered because of the pests' infestations (Biswas *et al,* 2009). Usage of synthetic chemical insecticides is a quick and cheap way for controlling the pest's infestations on okra crop. Different researchers have tested different insecticides against the pests of okra. (Kumar *et al, 2001*) tested imidachloprid and thiamethoxn against white fly and leaf hopper infesting the okra. (Prabhaker and Toscano 2002) reported that the minimum losses to predators, pollinators, natural enemies/beneficial insects and the mammalians was observed in fields treated with the granular insecticides because these pesticides are usually applied through the soil. (Kisha, 1978) reported that systemic insecticides remain effective comparatively for a longer period. (He Wenxiang, 2006) reported that dimehypo was found effective in reducing the activities of alkaline and acidic phosphatase increasing the soil pollution. Moreover it was found favorable for neutral phosphatases and less toxic to soil ecology.

During the present studies monomehypo and dimehypo belonging to the carbamate group were tested against the spotted bollworm infesting okra crop.

Materials and Methods

For study purposes, plots comprising three replicates and designed in a randomized complete block design was selected in Karachi University. While a plot without any treatment was managed for observing the differences. The plot size was kept 4 X3 meters. Plant to plants distance was managed 22 cm, while row to row distance was 60 cm and a distance of 3 meters between plot to plot was managed. To maintain differences in between each plot, the Pigeon pea was sown in between all plots. Ten randomly selected plants from each plot were pre-fixed for observing the pest population. Treatments applied were Dimehypo and Monomehypo. The pesticides were applied at the dose of 2.5 kg/plot, data presented for four sprays with a time interval of seven days through the soil application during the entire period of experiment. The pretreatment observations were recorded at 24 hour before spray, while, the post-treatment observations were taken after 1, 2, 3,4,5,6 and 7 days of treatment. The damage caused by the spotted bollworm to the stems, leaves, flowers and fruit was assessed by visual observation. The insect's population data was taken early in the morning on daily basis from randomly selected plants of every plot. Handerson-Tilton formula was used for analyzing the data for measuring the effectiveness of the tested insecticides against spotted bollworm.

Treatments

Treatments	Chemicals	Recommended doses by the manufacturers	Dose applied on subplots (60X40fts)
T_1	Dimehypo 4%	20 kg/acre	2.5 Kg
T_2	Monomehypo 3.6%	20 kg/acre	2.5 Kg
T_3	Control		No application

Results

It reveals that difference in mean population at different time intervals i.e. before spray and after spray (1 to 7 days after spray) during 1st spray was significant (Table 1). Decline in pest population during post-treatment observations showed that the performance of all the tested pesticides against the pest were effective. Maximum decline in population of spotted bollworm was observed in the plot treated with dimehypo which was followed by monomehypo. Pest population was observed more than double in control plot.

Table 1. Mean percent reduction in spoted bollworm population after first spray.

Days after 1st prays	Monomehypo		Dimehypo		Control	
	Mean %reduction	Standard deviation	Mean %reduction	Standard Deviation	Mean %reduction	Standard deviation
1	29.5033	10.4780	31.23	1.9749	-26.403	0.4536
2	39.6233	4.4913	50.1733	1.2589	-44.15	0.2722
3	56.0433	2.9906	67.3733	5.02809	-58.866	0.36221
4	67.65	5.98671	79.66	7.722907	-79.22	1.364954
5	75.8633	5.23862	84.7433	5.58575	-103.02	0.63908
6	89.87	5.98671	93.333	3.41078	-114.71	0.09073
7	82.156	9.7300	85.8	5.45555	-141.54	2.72921

Note: The negative sign shows increments in pests' population after treatment.

Table 2. Mean percent reduction in spoted bollworm population after 2nd spray.

Days after 2nd prays	Monomehypo		Dimehypo		Control	
	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation
1	30.55667	7.396961	31.83667	1.379468	-22.3433	6.326597
2	42.29333	7.210925	54.17333	8.125677	-49.29	4.519768
3	59.65333	5.358818	68.71	1.535676	-62.0633	8.134324
4	68.33	4.435437	79.32333	1.992846	-84.41	14.46631
5	77.5	6.655051	84.06333	6.654655	-109.353	18.37273
6	91.80333	4.067153	93.44667	1.976976	-127.92	20.48937
7	83.12667	4.990534	84.06333	6.654655	-149.673	23.50135

Note: The negative sign shows increments in pests' population after treatment.

The data revealed that all the tested pesticides caused a decline in the population of spotted bollworm during 2nd spray (Table 2). All the pesticides provided more effective control against the targeted pest. Overall performance showed that dimehypo was the most effective and was followed by monomehypo. The maximum population of pest was observed in untreated plot.

Table 3. Mean percent reduction in spoted bollworm population after 3rd spray.

Days after 3RD prays	Monomehypo		Dimehypo		Control	
	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation
1	32.38333	5.656857	33.12333	1.035584	-25.1733	4.890208
2	45.77	0.353836	55.62	0.350286	-51.22	3.043797
3	63.19667	2.032298	70.46333	5.102552	-77.26	1.192099
4	72.17333	4.418431	81.71333	5.793275	-90.5	1.418591
5	81.15333	6.803715	89.37	2.422457	-113.237	2.611328
6	92.06667	3.801478	94.68333	1.213439	-129.783	5.876328
7	86.08667	2.209216	89.37	2.422457	-152.517	7.073714

Note: The negative sign shows increments in pests' population after treatment.

The results revealed that all of the carbamate pesticides were found effective in reducing spotted bollworm population during 3 rd spray. Dimehypo provided the maximum control with minimum pest population which was followed by monomehypo. The highest pest population was observed in untreated control plot (Table 3).

Table 4. Mean percent reduction in spoted bollworm population after 4th spray.

Days after 4th prays	Monomehypo		Dimehypo		Control	
	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation	Mean %reduction	Standard deviation
1	32.14667	3.312859	36.40667	3.364882	-14.6767	2.994768
2	47.73	2.109479	56.85667	2.945511	-28.9667	2.994768
3	63.80333	3.762783	72.4	3.990125	-48.7267	1.202678
4	74.36	3.91455	81.23667	5.872396	-66.3433	4.791496
5	82.14667	3.312859	90.19	2.940935	-77.6933	4.197444
6	92.7	3.459248	95.09333	1.467799	-92.3767	7.192874
7	84.41667	1.203384	90.19	2.940935	-109.6	7.786264

Note: The negative sign shows increments in pests' population after treatment.

The carbamate insecticides decreased the pest population during 4th spray. Minimum pest population was observed in Dimehypo treated plot. Monomehypo followed dimehypo treated plots. The maximum number of spotted bollworm was observed in untreated plots (Table 4).

Discussions

The results indicated that both of the tested insecticides were effective for controlling the spotted bollworm damaging the okra crop. Moreover, it was found that loss to the predators, pollinators, and other non targeted beneficial insects was minimum. Because of less infestation by the insects, a healthy, quick and vigorous growth of plants was observed during the experiment. Though both of the tested insecticides were found effective over the control plot but the dimehypo was found as the best with the minimum infestation, followed by monomehypo. (Ashfaque *et al*, 2006) reported that carbofuran (Advantage 20EC) at the rate of 375 gram active ingredients / hector with knapsack sprayer proved to be the best against sucking pests of cotton including jassids, thrips and white fly. **(**Hussain 2002) found the Unihypo (monomehypo) 3.6 G and Dimehypo (dimehypo) 4G effective for controlling the rice borers but their effectiveness was observed less than the Furadan (carbofuran) 3G, Padan (cartap) 4G, Advantage (carbosulfon) 20 EC. (Kisha 1978) described that the granular insecticides were found as not only effective against the pest of okra but the systemic pesticides applied at the time of sowing remain effective for a longer period of time although the time duration for effectiveness is dependent over the type, amount and the method applied for usages of insecticides. (Suryawanshi *et al*, 2000) described that the combination of carbofuran 5% for seed treatment + monocrotophos 0.04%, disulfoton 1 kg/ha + carbaryl 0.2% applied after 40, 50, 60 and 70 days of plant germination was found as the best solution for managing the okra insect pests including aphids, jassid and fruit borers. (Gupta and Singh, 1990) also

reported the successesive results of carbamate including Phorate, mephosfolan, disulfoton, carbofuran and aldicarb tested against *Empoasca kerri* in green gram (*Vigna radiata*) in India.

References

Ashfaque, M., Manzoor, J. and Afzal, M. (2006). Comparative studies on the efficacy of electrodyn sprays system with different flow rates and application techniques against insect pests of cotton. *Pak. Entomol*. 28(2).

Biswas, S., Das, K. and Ghosh, S.K. (2009). Field efficacy of different insecticides and neem against *Earias vittela* (Fab.) on okra. *Journal of Entomological Research* 33(4): 331-333.

Gupta, P.K. and Singh, J. (1990). Comparative efficacy of some granular insecticides against green jassids in green gram. *Indian Journal of Entomology* 52(3): 418-422.

Hussain, S.S. (2002). Toxicity of different insecticides against rice stem borers (*Scirpophaga incertulas* Wlk. and *Scirpophaga innotata* Wlk.) AGRIS, Record number PK 2007 000876.

Kisha, J.S.A. (1978). Foliar Sprays and Disulfoton Granules for the Control of *Aphis gossypii* on Okra. *International Journal of Pest Management* 24(2): 114 - 120.

Kumar, N.K.K., Mooratht, P.N.K. and Reddy, S.G.E. (2001). Imidachloprid and thiamethoxan for the control of okra leaf hopper and *Bemmisia tabaci*. *Pest Management Hoet. Eco*. 7:117-23.

Prabhaker, N. and Toscano, N.C. (2002). Systemic Insecticides, Encyclopedia of Pest Management, 1(1) DOI: 10.1081/E-EPM-120009918.

Suryawanshi, D.S., Pawar, V.M. and Borikar, P.S. (2000). Effect of insecticides on fruit yield and pest caused losses in Okra, *Journal of Maharashtra Agricultural Universities* 25(2): 161-164.

Wenxiang, H.E., Xin, J., Maoxu, Z.H.U. and Yongrong, B. (2002). Toxic effects of dimihypo on soil phosphate activity. *Chinese Journal of Applied and Environmental Biology* vol.6 DOI CNKI: SUN: YYHS.0.2002-06-019.