

Efficacy of certain chemical insecticides and neem oil against stem borer (*Chilo partellus* Swin) on maize (*Zea mays* L.)

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Abstract

A field experiment was conducted to study the efficacy of certain chemical insecticides and Neem oil against stem borer (*Chilo partellus*) on Maize during kharif season of 2012-2013. The experiment was conducted in the Research field of Sam Higginbottom Institute of Agriculture Technology and Science, Deemed-to-be-University Allahabad. Total two sprays were applied to protect the crop from *C. partellus* using randomized block design with three replications. Carbofuran 3 G, Quinalphos 25 EC, Fipronil 0.3 G, Neem oil, Spinosad 45 SC, Cypermethrin 25 EC were evaluated for their efficacy against *Chilo partellus* damage Maize. The observations on larvae of *Chilo partellus* 24 hours before (Pre-treatment) and 3th, 7th and 14th day after spacing (Post-treatment) were recorded for computing the percent larvae reduction. The data were subjected to statistical analysis after appropriate transformation for interpretation. The treatment with recommended insecticide Carbofuran 3 G was of the most effective treatment followed with and Spinosad 45 SC, Quinalphos 25 EC, Cypermethrin 25 EC, Fipronil 0.3 G and Neem oil. The treatments with Quinalphos 25 EC and Cypermethrin 25 EC, Conc. also performed well against this pest. Fipronil 0.3 G and Neem oil were found less effective against *Chilo partellus*. Carbofuran (1:3.33) followed by Spinosad (1:2.87), Cypermethrin (1:2.73), Quinalphos (1:2.60), Fipronil (1:2.10) and Neem oil (1:1.59) untreated control (1:1.34). Among the treatments the highest cost benefit ratio (C:B) of 1:3.33 was obtained with of Carbofuran 3 G.

Key words: Chemical Insecticides, *Chilo partellus*, cost benefit ratio, Efficacy, Neem oil, yield, *Zea mays* (L.).

1. Introduction

Maize (*Zea mays* L.) is one of the most important gramineae kharif season crop in India. During the

year 2008-09 it was cultivated in an area of 8.17 mha with a production of 19.73 mt. (Ramana rao, 2011), and year 2011 it was cultivated in an area of 8.49 mha with a production of 21.73 mt. (Anonymous, 2011). Maize grain contains about 10% protein, 4% oil, 70% carbohydrate 2.3% crude fiber, 10.4% aluminizes, 1.4% ash. Maize protein Zein" is in tryptophan and lysine two essential amino acids (Singh, 2008). The main limiting factor for lowering the productivity of maize is the pest disease problems among which Lepidoptera insect pest especially stem borer (*Chilo partellus*) maize stem borer, *Chilo partellus* (Swinhoe) (Singh et al., 1993) are the most destructive ones. Almost 75% damage of the crop occurs due to attack of maize stem borer (Latif et al., 1960). It is the most serious pest of maize. from 25-40 per cent of the young plants are destroyed and around Solan (Himachal Pradesh) up to 90 per cent of the plant have been found infested (Atwal and Dhaliwal 2010). The use of chemical insecticides such as Carbofuran and Cypermethrin, Fipronil, Spinosad (Ahmed et al., 2003), and Quinalphos (Amjad et al., 2001) for the control of *Chilo partellus* in maize was recommended

2. Materials and Method

The present investigation entitled "efficacy of certain chemical insecticides and Neem oil against stem borer (*chilo partellus* swin) on maize (*zea mays* l.)" was planned to carry out the studies on the effect of certain chemical insecticides and Neem oil against *Chilo partellus*, under the field conditions at the central research field, Sam Higginbottom Institute of Agriculture, Techonology and Sciences, Allahabad during the kharif season 2012-2013. Five chemicals insecticides and one botanical were evaluated against the Stem borer (*Chilo partellus*). The treatments were imposed by using hand sprayer @ 0.5 litres of spray solution /4 m² depending on crop growth stages. The

crop received two sprays, the first given at before flowering stage (i.e. 32 days after sowing) when the population crossed economic threshold while, the second spray was imposed 15 days after first spray. The experiment was carried out using Randomized Block Design (RBD) method using three replications. Two sprays were done and the reduction population of per plant was recorded on 3rd, 7th, 14th days after each spray.

3. Results and Discussion

The data (Table 1.1 and 1.2) indicated that all the insecticidal treatments were significantly superior over control in reducing the *Chilo partellus* recording at 3rd, 7th, 14th days after insecticidal application. The treatment with Carbofuran 3G was found significantly superior as compared to other insecticides. The highest larva reducing percentage 52.81, 90.04, 44.85 and 100 % was recorded at 3rd, 7th and 14th days after application. As regards grain yield, the yield of 50 q/ha. was obtained in this treatment. The next promising treatment was Spinosad 45 SC which recorded larvae reduction of 46.67, 84.94, 38.78 and 100 % the grain yield was 39.30 q/ha. both these treatments were found to be par with each other as regards to larvae reduction and grain yield.

Table 1.1: Effect of certain chemical Insecticides and Neem oil against stem borer, *Chilo partellus* (Swin.) on maize during Kharif 2012-2013 (1st spray).

	Treatments	Before	3 DAS	7 DAS	14 DAS
T ₁	Carbofuran	4.53	49.16	64.42	44.85
T ₂	Quinalphos	4.87	36.72	50.98	29.67
T ₃	Fipronil	5.33	24.29	40.71	16.07
T ₄	Neem oil	5.33	18.45	33.19	13.18
T ₅	Spinosad	4.87	42.73	58.49	38.78
T ₆	Cypermethrin	5.33	29.12	44.05	23.60
T ₀	Control	5.40	0.00	0.00	0.00
	Overall Mean	5.10	28.64	41.69	23.74
	F- test	NS	S	S	S
	S. Ed. (±)	0.831	2.150	3.182	3.907
	C. D. (P = 0.05)	1.761	4.557	6.747	8.283

Further, the treatment with Spinosad 45 SC and Quinalphos 25 EC were equally effective in reducing larval 39.12 and 73.16% up to two weeks after application and yield recorded was 39.30 and 36.72 q/ha. Respectively, Khan and Amjad (2000) also reported effectiveness of various chemicals against major insect pests of maize indicated highest larval reduction per cent in the treatment with Carbofuran

as whorl treatment at 0.75 kg a.i./ha after 25 and 45 days of sowing reduced infestation of pyralid *C. partellus* to 6.77 % and resulted in highest yield and highest cost benefit ratio in comparison with other methods of application.

Table .1.2: Efficacy of certain Chemical Insecticides and Neem oil against Stem borer, *Chilo partellus* (Swin.) on maize during kharif 2012-2013 (2nd spray).

	Treatments	Before	3 DAS	7 DAS	14 DAS
T ₁	Carbofuran	2.47	79.17	90.95	100.00
T ₂	Quinalphos	3.13	62.50	72.86	84.12
T ₃	Fipronil	3.73	52.08	61.43	57.93
T ₄	Neem oil	3.87	52.08	61.43	57.93
T ₅	Spinosad	2.73	72.92	81.90	100.00
T ₆	Cypermethrin	3.40	58.33	72.86	84.12
T ₀	Control	4.47	0.00	0.00	0.00
	Overall Mean	2.98	47.14	55.18	60.51
	F- test	NS	S	S	S
	S. Ed. (±)	0.599	1.818	1.448	3.392
	C. D. (P =0.05)	1.271	3.855	3.069	7.192

Conclusion

In this study, it was concluded that the treatment, Carbofuran 3G showed maximum reduction of *Chilo partellus*. The grain yield obtained was also highest (50q/ha) in this treatment. The treatment Carbofuran and Spinosad at on par with each other.

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