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## Triazophos efficacy against stem borer of maize under field conditions

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### Abstract

In the present study, Triazophos efficacy against stem borer of Maize under field conditions was evaluated at Faisalabad during 2017. Triazophos was used at three different concentrations low, standard and high against stem borer in TT-60 hybrid of maize as compared to control. Low concentration was 1 ml, standard was 2 ml, and high was 3 ml/ liter of water. Triazophos was sprayed under field conditions against stem borer of maize in Faisalabad district. Three replication for each concentration was used in different fields. Results showed that infestation of stem borer was low in the fields of high sprayed concentration of 3ml/liter which was 25%, while infestation of stem borer was medium at standard sprayed concentration fields which was about 45%. Stem borer infestation was high in lower sprayed concentration fields which was 75%. These results showed that triazophos was having efficacy at recommended concentration under field conditions. These results can be helpful to further decide the spraying concentration of triazophos in maize cropping system in future, which in turn will boost the maize production.

**Keywords:** Triazophos, hybrid maize, stem borer, efficacy

### 1. Introduction

Edible flour for the use of human beings has been made from the maize and also be used for food for the animals as well. Due to cholesterol free nature of maize oil, it is very value able for the heart patients [1]. In Pakistan, the maize is cultivated at 944000 hectare that was covered 4.28% from the total land. In Balochistan, 0.15% of area that was occupied by maize from the total area of the country [2].

The time for the growth of the maize is not much long which gives importance to the maize crop and large scale productivity obtained from the maize crop as well. The 4.6% of total cereals yields obtained from the maize worldly [3]. There are different types of the insect pest which damaged the grain crop like maize [4, 5]. There are different types of the stem borer insect species are records which cause the serious destruction to the maize crops, *Chilo partellus* is one of them [6].

The productivity of the maize crop is largely affected by the attack of the *Chilo partellus* insect pest. This insect is considering important mainly in Asian and African countries [7]. About 15 - 60% loss is occurred by the attack of the stem borer insect pest alone. In Peshawar valley, there was about 10-50% of the loss occurred by this insect pest. There was 80% of the destruction occurred by this insect in Africa. The 18% of the damage found in the Kenya by the attack of the stem borer [4]. There are different insect pests of maize e.g., maize stem borers, aphids, grasshopper, flea beetle and shoot fly which cause the destruction of the maize crop in Pakistan [8]. *Chilo partellus* is major insect for low yield of maize crop and damage [9]. The yield of the maize has been lowered due to the attack of the of the stem borer (*Chilo partellus*), greatly throughout the world .On the other hand there is also decrease in yield of the maize crop by infestation of other insect [10]. With respect to occurrence of stem borer those areas which are located below the level of the sea have great number of this insect while at high elevation it is taking great importance [11]. Stem borer is considered as dangerous insect pest of the cereals in various parts of Asia and Africa [12]. There are different methods to control the population of the insect pests; to use the pesticides is method one of them. There are various pesticides which are used to control the insect pest attack of maize crop as well. In present study the effect of triazophos insecticide was evaluated against *Chilo partellus*.

**2. Materials and methods**

**2.1 Research conducted area**

The present experiment was conducted in the experimental fields of Entomological research area, Young Wala, University of Agriculture Faisalabad during April 2017.

**2.2 Maize sowing method and planning of land**

The land was prepared firstly, and then the seedbed was prepared for sowing of seeds. The manual hand method was use to sowing of crop. There were four varieties with three repetition of each was sown. Tracks and bunds were prepared to facilitate the irrigation process and further monitoring of the crop to avoid any pest problem.

**2.3 Study design**

The area of plot was 1 acre and the area covered by 1 replication was of 40 sq ft. Space was kept between replication to other replication for proper monitoring process .There was 4 feet distance between the repetition and plant to plant distance was of 20 cm. After 20 days of seed emergence first two irrigations were given and thinning was carried out to maintain the required plant to plant spacing. Throughout the growing season of the crop normal agronomic practices were carried out

**2.4 Application of triazophos**

Different concentrations of the triazophos insecticide were made to check the effectiveness of the appropriate concentrations of the triazophos. There were three concentration used to spray the ten different randomly selected plants that were tagged also to distinguish from the other non spray plants. High, standard and low concentration of the triazophos was made for spray the plants. For high treatment of triazophos 3ml of triazophos was used in 1000ml water while for the standard treatment there was use of 2ml of triazophos was used in 1000ml water and for the low concentration of the treatment there was 1ml of triazophos was used in 1000ml water.

**2.5 Data collection**

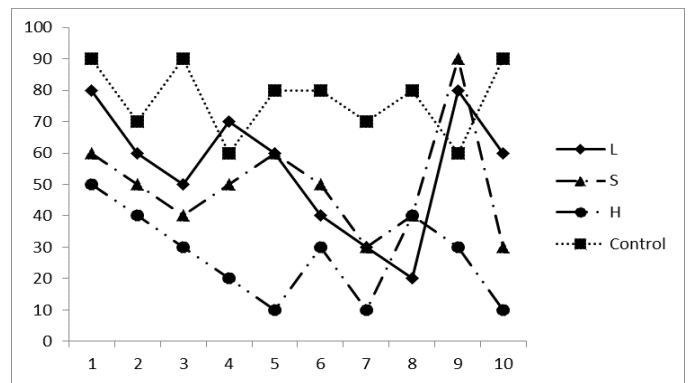
The infestation of stem borer was recorded on four varieties of maize. For recording data, ten plants from each replication that were tagged already were chosen. Stem borer population (both adults & nymphs) were recorded from damaging signs of stem, by observing the exit hole made by stem borer.

**2.6 Statistical Analysis**

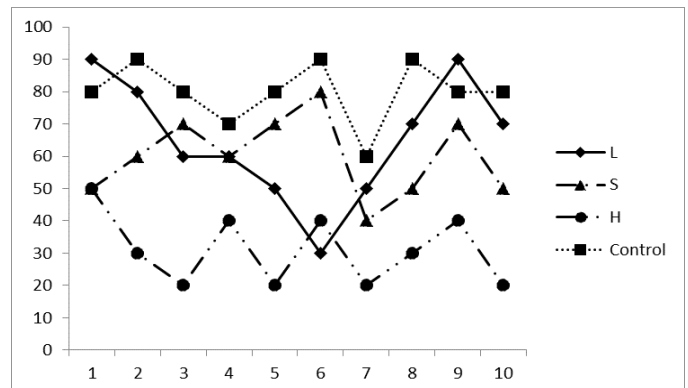
Analysis of variance of all the collected data will be computed using the appropriate statistical software. Means of significant treatments will be compared using two way ANOVA.

**3. Results**

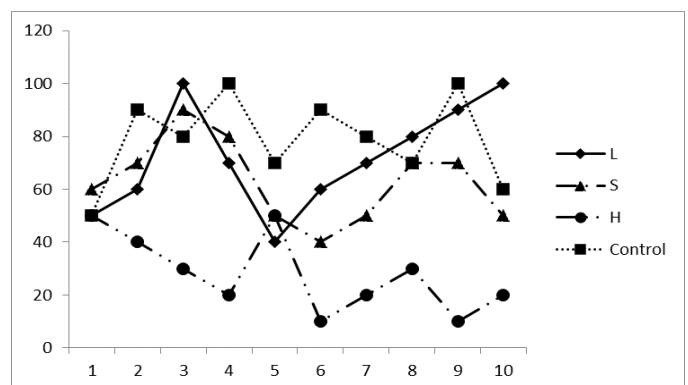
From Fig. 1, it is evident that there was no significant difference of control from various applied concentrations i.e. low, standard and high. As ( $df=3, f=18.94, P=8.0957$ ). Control showed no significant difference from the different applied concentration of triazophos i.e. low, standard and high ( $df= 3, f=25.93, P=4.155$ ) (Fig. 2). The Fig. 3 indicated that there was significant difference of the control from the three different applied concentrations i.e. low, standard and high ( $df=3, f=17.33, P=0.000017$ ).



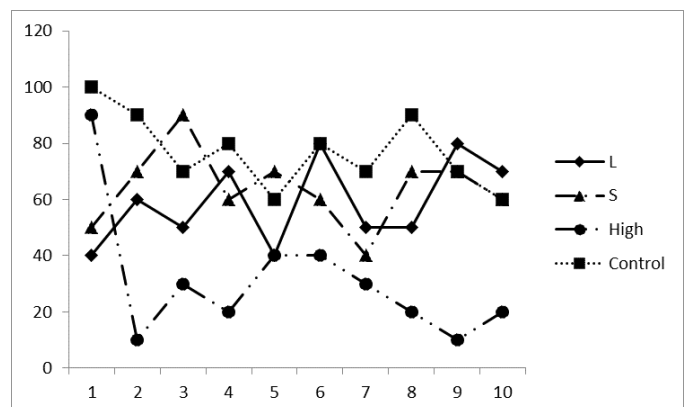
**Fig 1:** First time data after spray of triazophos in three different concentrations i.e. low, standard and high.



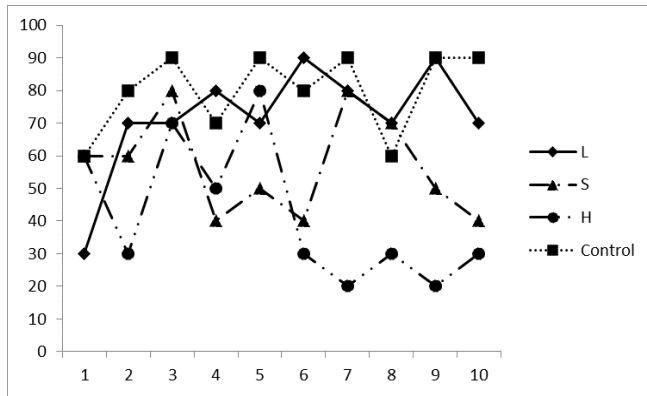
**Fig 2:** Second time data was taken after application of three different concentrations of triazophos i.e. low, standard and high.



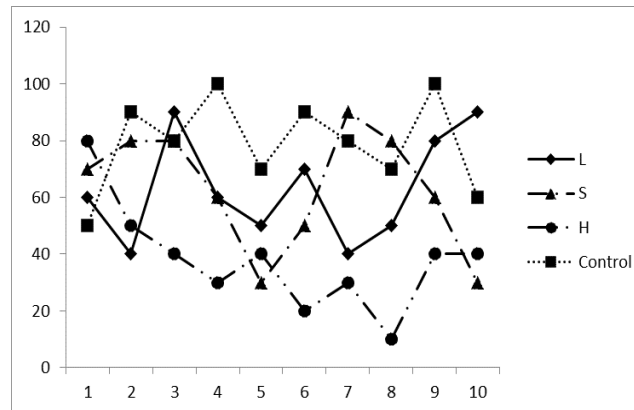
**Fig 3:** Recording of third time data after the spray of triazophos in different concentrations i.e. low, standard and high.



**Fig 4:** Forth time data was taken after application of different concentrations of triazophos i.e. low, standard and high.



**Fig 5:** Data was observed fifth time after the spray of different concentration of triazophos i.e. low, standard and high.



**Fig 6:** Sixth time data recorded after application of treatment of triazophos i.e. low, standard and high.

Fig. 4 indicated that there was a significant difference in control from the three concentrations of triazophos i.e. low standard and high. ( $df = 3, f = 11.57, P = 0.0004$ ). It is clear from Fig. 5 that there was a significant difference of control from the applied concentrations of triazophos i.e. low, standard and high ( $df = 3, f = 9.228, P = 0.0002$ ). It is shown in Fig. 6 that control had significantly different from the three applied concentration of triazophos i.e. low, standard and high ( $df = 3, f = 7.262, P = 0.001$ ).

#### 4. Discussion

The present study was carried out to observe the resistance in *Chilo partellus* which attack maize crop, against triazophos insecticide. In current research it was found that high concentration was most suitable than the standard and medium concentrations. As the *Chilo partellus* attack on maize plants is more obvious in control where none of the treatment was applied. The low infestation of *Chilo partellus* was recorded when high concentration of triazophos was applied as compared to standard and low concentration.

The relative efficacy of different insecticide formulation was evaluated as seed dressers, foliar formulations and granules against the maize Stem borer in maize field. There was 50% reduction of maize Stem borer was observed by using different insecticides [13]. Their results are in agreement with our results as we also found insecticide effective against maize Stem borer.

In another study the effect of different insecticides was observed against the *Chilo partellus*. They concluded that synthetic insecticides are the best as compare to the neem based insecticides for management of the maize stem borer [14]. These results also supports our findings because we also observed the application of insecticide significant against

*Chilo partellus*. In another experiment, chemical control combined with the varietal resistance against insect pest of maize and termites. The borer infestation was lowest in variety that was treated with chemical [15]. These findings are in agreement with our findings where we found application of insecticide was significant against maize Stem borer.

In another study, the efficacy of some new insecticides was observed against Yellow Stem Borer of rice and they concluded that there was average increase in productivity of rice with average Stem borer infestation [16]. These findings support our findings because we also observed insecticides effective against Stem borer of maize.

In another study the efficacy of selected insecticides was evaluated to checked out the best one against the *Chilo partellus* on maize. According to the results the insecticides treatments were superior over the control [17]. These results also in accordance with our results as we also observed insecticide treatment best over the control. In an experiment bio-efficacy of some new insecticides was conducted against the maize Stem borer and they found all treatments of insecticides were significantly increased the yield of maize with reduction in the *Chilo partellus* infestation [18]. These findings also support our findings because we also found insecticide effective against the *Chilo partellus*. The effect of new synthetic and bio insecticides was evaluated against Stem borer, *Chilo partellus*. They found insecticides effective to control the infestation done by the *Chilo partellus* [19]. Their results are also in confirmatory of our findings we also observed that the insecticide have important role to control the infestation of *Chilo partellus*.

In an experiment, the effect of biorational insecticide against yellow stem borer (*Scirpophaga incertulas*) in Boro rice was evaluated and they observed that there was decrease in number of damaged symptoms and also yield of rice was increased [20]. These observations are in agreement of our results where insecticide application was also found effective against Stem borer.

In the study that was carried out to checked the effectiveness of three plants extracts including the tobacco, akando and neem and two insecticides were also used against the yellow rice stem borer. They found that the neem based insecticide was more effective against *Scirpophaga incertulas* (walk) [21]. These findings are also in confirmatory with our findings; we also found application of insecticide effective against Stem borer.

In another experiment, that was conducted to observe the effectiveness of insecticides in decreasing the attack of rice stem borer under the field conditions. They found that use of insecticides has significantly reduce the rice stem borer with increase in productivity of rice [22]. These results resemble with our outcomes to significantly reduced the infestation of stem borers by using insecticides.

#### 5. Conclusion

As conclusion it can be affirmed that triazophos showed efficacy in controlling maize stem borer at all concentrations however the standard dose can be recommended to avoid any resistance development in insect against triazophos. But further research at biochemical and molecular level is required to observe mechanism involved in triazophos mode of action in maize stem borer.

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