POPULATION FLUCTUATION AND TOXICITY OF SOME INSECTICIDES AGAINST ONION THRIPS (*THRIPS TABACI* LINDERMANN) UNDER FIELD CONDITION IN PESHAWAR

HUSSAIN ALI[1], *MUHAMMAD HAMAYOON[2], MUHAMMAD SHAKEEL[3], ADAM KHAN[4] AND MUHAMMAD ALAMGIR[5]

[1]Entomology Section Agriculture Research Institute Peshawar, Pakistan
[2]Ege University Izmir, Turkey
[3 &5]The University of Agriculture Peshawar, Pakistan
[4]Laboratory of Plants Ecology and Dendrochronology, Botany Department, Federal Urdu University, Karachi, Pakistan
Corresponding author email: entomologist170@yahoo.com

Abstract

Thrips tabaci Lindermann is a major pest of onion crop. Population fluctuation and efficacy of different insecticides were tested against thrips on onion bulb crop in 2011. Pest appeared in second week of February and reached to its peak in last week of April, 65 thrips/ plant. Four insecticides 1) Thiodan 35EC@ 800 ml/acre, 2) Confidor 20%SL @80 ml/acre, 3) Curacron 500EC @500 mL/ acre and 4) Actara 25 WG @ 50 g/acre were applied twice (March and April). The first application of insecticide was made when thrips reached to Economic threshold level (ETL) and second application was made of 25 days of the first application. Three insecticides showed significantly better results than untreated check in reducing pest population. In two spray applications Thiodan and Curacron were found best among the four insecticides. Minimum infestation was recorded in plot treated with Thiodan and Curacon as compared to control. However Actara 25 WG was not effective in reducing the pest population in both applications.

Introduction

Onion (*Allium cepa*) has a prominent place in Asian agriculture. It has been grown over an area of 129529 hectares with total production of 1704143 tonnes and in Kyhber Pakhtunkhwa it has been grown over an area of 12066 hectares with total production 136442 tonnes during 2008-09 (Minfal, 2008-09). Onion thrips (*Thrips tabaci* Lindermann) is one of the most injurious insect pests of onion (Hazara *et al.,* 1999). They attack leaves, buds, flowers and even fruits of the plants. Nymphs do more damage than adults because they are more in number and less mobile (Kawai, 1988).

Onion thirps (*Thrips tabaci* Lindermann) infestation starts in February and reaches to its peak during the last week of April. Later, the population declines towards the end of May as the crop starts to mature (Farman *et al*., 2010). The pest is very active at the time of flowering adversely affecting both the yield and viability of the seeds (Sing, 1984). Thrips are also implicated in the spread of diseases such as fire blight of peas, pod twist of bean, bud necrosis in peanut and several other diseases as well (Arantha, 1980). Adult and larval stages of *T. tabaci* feed on leaves and may reduce onion yield up to 50 % (Fournier *et al*., 1995 & Khokar *et al*., 2002).

Among different stages of the pest adults are more suitable and efficiently controlled by using insecticides as compared to larvae. Adult are more sensitive to chemicals than larvae (Mahmoud and Osman, 2007). Two to three chemical sprays are recommended for control of Thrips in onion crop (Farman *et al*., 2010). The trial was carried out to check the population fluctuation and to determine effectiveness of insecticides against onion Thrips at Agricultural Research Institute, Peshawar.

Material and Methods

During 2011 a trial was conducted at Agricultural Research Institute Tarnab, Peshawar Pakistan. Onion nursery of Swat 1 variety was transplanted on 03.02.2011 and crop was harvested on 10.06.2011. Randomized complete block design was followed having five treatments (blocks), replicated three times (*i.e* four insecticides and one control). The concentration of the insecticides employed for spray is given in Table 1. The plot size was 4x3 meter. All the recommended inter plant and inter row distances and followed standard agronomic practices were applied. Thrips population was observed carefully on weekly bases and insecticides were applied when it reached to the economic threshold level (ETL). The application of insecticides was repeated after 25 days of 1st spray. The efficacy was determined by counting the number of thrips on 5 randomly selected plants in each treated plots. The population fluctuation was observed on 5 randomly selected plants in the control plots on

weekly bases. Data were recorded after 24, 48, 72 hours and 7 days after application. Recorded data were analyzed statistically for analysis of variance to determine the significant difference among the treatments.

Results and Discussion

Infestation of thrips started in the second week of the growing season and remain on crop till harvest. The population fluctuate during the crop season. Population started from 1.5 thrips/plant and reached its peak on 26th of April. The highest recorded population was 65 thrips/plant. In May abrupt declined was observed in the population (Fig. 1). Farman *et al.,* (2010), Hussain *et al.* (1997) and Hyder and Shariff (1987) recorded similar results and reported that attack of thrips starts in month of February and reached its peak in April with the increase in temperature. Domiciano *et al.,* (1993) reported that typical condition which favored rapid increase in the thrips population were temperature (20.29°C) and the lack of rainfall in Brazil. Rueda *et al*., (2007) and Mo *et al*., (2009) also gave the same interpretation. The highest population of 65 thrips/plant was observed as shown in Fig.1, while some other worker observed 78.8 thrips/plant as a highest population (Farman *et al.,* (2010). The difference in the population fluctuation of trips might be variation in weather condition like humidity, rainfall, temperature and wind as explained by some previous worker (Ananthakrishnan, 1993, Kirk, 1997).

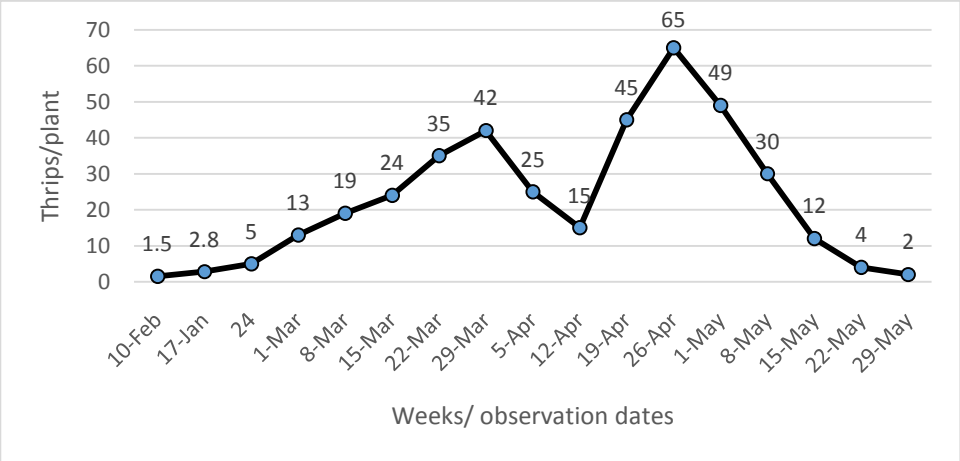

Fig 1. Thrips development on onion crop during 2011 at Peshawar valley.

Table 1. Insecticides with recommended doses.

Treatments	Insecticides	Active ingredient	Dose
T1	Thiodan 35EC	Endosulphan	800 ml
T2	Confidor 20%SL	Imidacloprid	80 ml
T3	Curacron 500EC	Profenophos	500 ml
T4	Actara 25WG	Thiamethoxam	50 gm
T5	Control	--------	-----

- These doses are recommended by the respective company of each pesticide.

Table 2. Population density of Thrips after the first spray.

	Mean population of thrips /plant after spray			
Insecticides	After 24 hours	After 48 hours	After 72 hours	After 7 days
Thiodan 35EC	2.90 c	1.92 c	4.52 c	5.15 c
Confidor 20%SL	11.00 b	13.50 b	15.90 b	17.90 b
Curacron 200SL	2.20 c	3.25 c	5.12 c	5.95 c
Actara 25WG	19.50 b	21.30 b	23.50 b	25.60 a
Control	26.30 a	28.20 a	29.20 a	35.20 a

* Means followed by the same letter in columns are non significant at 5% level of probability.

Table 3. Population density of Thrips after the second spray.

Insecticides	Mean population of thrips /plant after spray			
	After 24 hours	After 48 hours	After 72 hours	After 7 days
Thiodan 35EC	7.40 c	9.25 c	10.30 c	11.50 c
Confidor 20%SL	15.80 b	18.50 b	20.10 b	30.60 b
Curacron 200SL	9.80 c	7. 25 c	10.20 c	11.80 c
Actara 25WG	18.50 b	21.30 b	28.80 b	34.70 b
Control	38.5 a	42.20 a	48.90 a	57.40 a

***** Means followed by the same letter in columns are non significant at 5% level of probability.

The result in Table 2 shows the number of thrips/plant after the first spray. It shows that minimum population (mean number of thrips/plant) was in plots treated with Curacron (2.20) and Thiodan (2.90) after 24 hours, followed by Confidor (11.00) and Actara (19.5) respectively. Highest population of (26.30) thrips was recorded in check plots. After seven days the minimum number of thrips/plant was found in Thiodan and Curacron treated plots, followed by Confidor and Actara. Maximum number of thrips/plant were recorded in the check/ control plot. Significant differences were found among insecticide treated plots and control plots.

The results (Table 3) indicated that the mean number of onion thrips/plant by insecticides after 24 hours, 48 hours, 72 hours and one week intervals respectively of second spray showed significant results. Three insecticides were found best for controlling thrips population. After 24 hours of spray, minimum mean number of thrips/plant were found in plots treated with Thiodan (7.40) and Curacron (9.80). The recorded mean number of thrips/plant in plots treated with Confidor and Actara was (15.80) and (18.50) respectively. However the maximum mean number of thrips/plant, (38.5) was found in check plot. After one week minimum mean number of thrips/plant were recorded in plots treated with Thiodan and Curacron, while maximum was found in control plot.

According to our experiment Thiodan and Curacron were very effective in controlling thrips in onion crop. These findings are quite in conformity with the findings of Sadozai *et al., (*2009) and Farman *et al.,* (2010) who found Thiodan and Curacron as effective chemicals for the management of Thrips. They also reported that the pest appears in the month of February and remains for two to three months. Rao and Swami (1986) also reported that the application of carbofuran and endosulfan is very effective in controlling the incidence of *T. tabaci* on onion. It is important to mention that all insecticides, even when newly introduced, probably provide more than 90% mortality desired by growers (Buntin, 1986). Efficacy of actara in reducing thrips population was not satisfactory. The non-effectiveness of the Actara against the *T. tabaci* is also reported by Razzaq *et al*., (2003). This may due to the development of resistance by onion thrips to most commonly used insecticides (Martin *et al*., 2003; Shelton *et al*., 2003; MacIntyre-Allen *et al*., 2005; Shelton *et al*., 2006).

Conclusion

It is concluded from the experiment that infestation starts in February and reach to its peak in last week of April. Thiodon and Curacron gave best results than all other pesticides, therefore Thiodon @ 800 mL/acre and Curacron 500EC @ 500 mL/acre are recommended against thrips in Peshawar valley. Two sprays can gave very good results and can minimize the damage of thrips up to great extent.

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