



Effect of different insecticides on population of whitefly on cotton

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Abstract

Cotton is most important crop of Pakistan. Whitefly is one of the most disastrous insect, which is responsible for decreasing yield of cotton and become the source of viral disease transfer. To reduce the damage and deleterious effects caused by whitefly use of chemicals is very effective in controlling the population as compared to other control methods. An experiment was performed at Research area, University of Agriculture, Faisalabad, one variety FH-114 was sown on 30th May 2018 using Randomized Complete Block Design. The research was initiated to determine the effect of three different insecticides imidacloprid (Confidor 20%SL), thiamethoxam (Actara 25%WG) and acetamiprid (Diamond 20%SP) at their recommended doses. The effects of these treatments was compared with control. The data was taken one day before spray and then after 1,3,5,7 and 15 days after spraying. Data was collected by means of Zig zag method. At the end of research data collected from field was analyzed and results showed that all treatments were efficient in dropping of the whitefly population. Highest mortality rates were observed on plots treated with Imidacloprid and followed Acetamiprid and thiamethoxam also showed significant results.

INTRODUCTON

Cotton is recognized as 'white gold' and it is also called the king of natural fibers (Kadam *et al.*, 2014). Cotton is thought-out as strength of Pakistani economy because crop earns external exchange and also plays a key role in local textile industry. The most necessary parts of the cotton are the fiber and cotton seed. Among numerous aspects responsible for less output of cotton, insect pests are thought to be the devastating factor, which cause 30-40% losses in yield (Shivanna *et al.*, 2011). Cotton (*Gossypium hirsutum* L.) is also considered as Pakistan's "golden economy". Because of various reasons the production of cotton in Pakistan is low as compared to other cotton producing countries. Through an idea or estimate there are more than 200 species including various insect pests which attack on cotton during its multiple stages (Sarwar and Sattar, 2016; Luttrell *et al.*, 2015). Almost it is observed that every year the damage and losses caused by sucking pests are 35–50% in yield of cotton crop every year. Whitefly (Homoptera: Aleyrodidae) not only damages the cotton crop but also effects various economic crops. Nymph and adult destroy the plant by extracting the sap from the tissues of leaves and also passes various viruses causing low production. Population dynamics plays a significant part in IPM module (Fakhri *et al.*, 2012). The infestation and damages caused by *Bemisia tabaci* in Pakistan are very ancient. After insecticide application whitefly population comes back soon because eggs and nymph expand at foliage's basement and on the lower surface of leaves. Whitefly secretes a sugary material known as honey dew, it sucks the sap of cell and the area for photosynthesis is reduced due to which a black sooty mould occurs on the leaves which further lessens the yield, quality and also the worth of crop (Akram *et al.*, 2013). Every technique have its positive as well as negative perspectives. The main advantage of Bt is reduction in insecticides usage, improvement in the yield has also been noticed

(Sharma et al., 2016) but the development of resistance in whitefly against Bt toxin is increased day by day. So due to these reasons the use of insecticides is necessary for IRM. Three insecticides are commonly used namely Acetamiprid, thiomethoxam and Imidacloprid. Imidacloprid is known as the first neonicotinoid used for the treatment of seed and also to protect the seedlings against numerous injuries experienced by the attack of initial seasonal insects. Its also operative in governing various insects, including aphids, thrips, bugs, jassid and mites, while using as seed treatment and also as soil plus foliar applications. Thiamethoxam is one of the chief 2nd generation neonicotinoid. It can be helpful in controlling vast variety of important insect pests on number of different crops including barley, wheat, cotton, sorghum, corn and canola. Through applied as contact poison or by controlling the insects by stomach as well as systemic activity (Maienfisch *et al.*, 1999; Hofer and Brandl, 1999). The purpose of this experiment was to evaluate the effects of different insecticides to control the whitefly in cotton.

Materials and Methods

Experiment was conducted at Experimental Farm Square No.2, Block No.14 at University of Agriculture, Faisalabad. The land was prepared well and crop was sown on beds during the last week of May 2018. Cotton varieties FH-114 was used for the research purpose. In this experiment, there were three different insecticides were used and applied at their recommended doses. The dose rates and name of insecticides are mentioned below. There was also a control treatment and on that area no insecticide was sprayed just to compare the efficiency of these insecticides. For spraying purpose, hand knap sack sprayer was used.

Insecticides

Common name	Trade name	Dose
Acetamiprid	Diamond 20%SP	125gm
Imidacloprid	Confidor 20%SL	250ml
Thiamethoxam	Actara 25%WG	24gm

Experimental Design

In this experiment Randomized Complete Block design was used followed with three replications.

Data collection

From each plot data was recorded in the morning, 24 hours before spray and then 1, 3, 7 & 15days interval after the application of spray. After 15 days, test insecticides were repeated and application of the 2nd spray was done. For this purpose Zig zag method was used for pest scouting. In order to collect the data, Population was taken from top most leaf from the upper part of the first plant, second leaf from the middle part of the second plant, lower leaf of third plant and so on, from 6 plants.

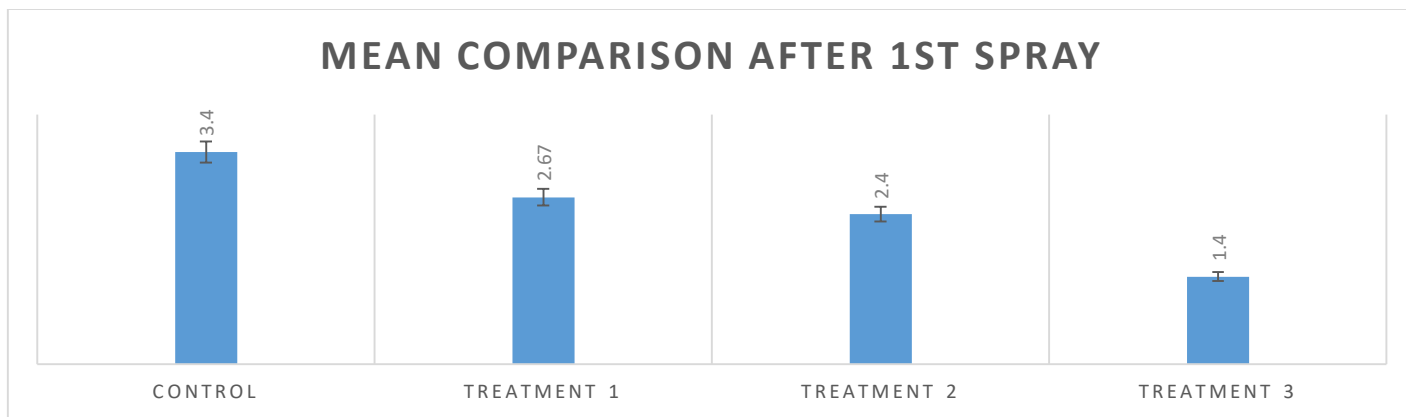
Statistical Analysis

Data of population reduction was analyzed with ANOVA to know hypothesis testing and means were compared by post hoc comparison.

Results and discussions

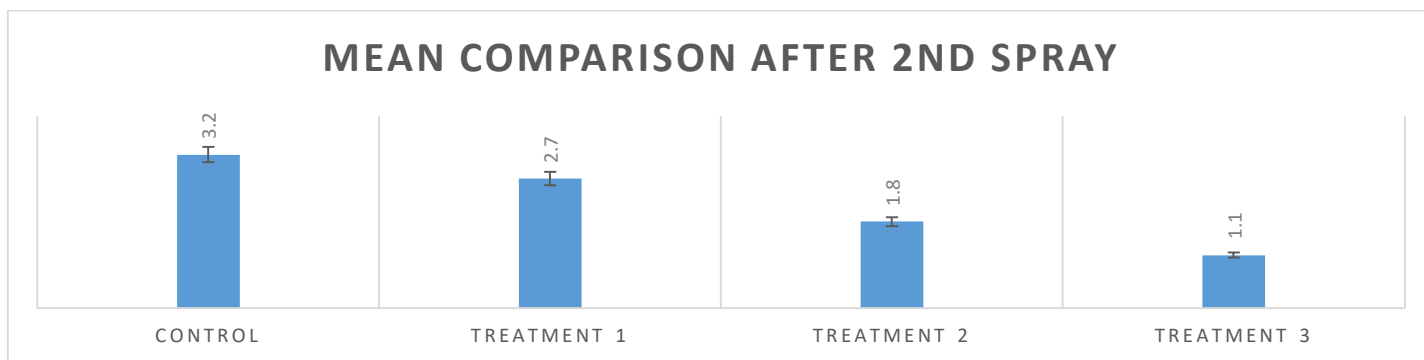
Groups	Mean comparison after 1 st spray	Mean comparison after 2 nd spray	Mean comparison after 3 rd spray	Mean comparison after 4 th spray	Mean comparison after 5 th spray
Control	3.40a	3.2a	3.90a	2.00a	3.67a
Treatment 1	2.67ab	2.70b	2.20b	1.90ab	2.00b
Treatment 2	2.40b	1.80ab	1.50ab	1.80c	1.67c
Treatment 3	1.40bc	1.10c	1.20c	1.50bc	1.00c

MEAN COMPARISON AFTER 1ST SPRAY



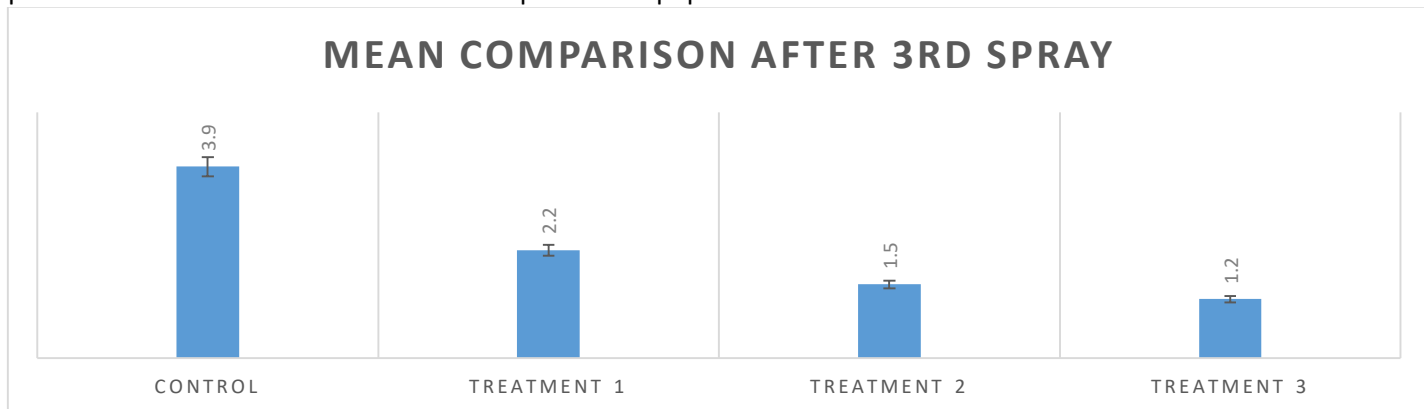
All the chemicals have negative effects on population of whitefly. All treatments showed less population of whitefly as compared to control. After doing comparison of 1st spray of 3 treatments, results showed that plots treated with Treatment 1 showed 2.67 mean population of whitefly, treatment 2 exhibited 2.40 and least population was observed on plots treated with treatment 3 i.e Imidacloprid where population was 1.40.

MEAN COMPARISON AFTER 2ND SPRAY



All the chemicals have negative effects on population of whitefly. All treatments showed less population of whitefly as compared to control. After doing comparison of 2nd spray of 3 treatments, results showed that plots treated with Treatment 1 had 2.7 mean population of whitefly similarly Treatment 2 gave 1.80 and least population was observed on plots treated with Treatment 3 i.e Imidacloprid where population was 1.10.

MEAN COMPARISON AFTER 3RD SPRAY



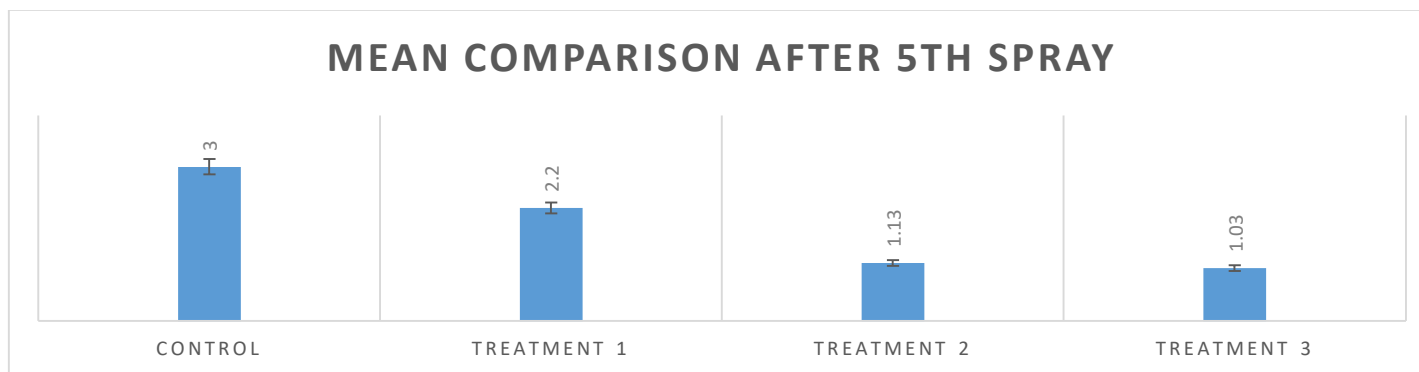
All the chemicals have negative effects on population of whitefly. All treatments showed less population of whitefly as compared to control. After doing comparison of 3rd spray of all 3 treatments, results showed that plots treated with Treatment 1 had 2.20 mean population of whitefly similarly Treatment 2 gave 1.50 and least population was observed on plots treated with Treatment 3 i.e Imidacloprid where population was 1.20.

MEAN COMPARISON AFTER 4TH SPRAY



All the chemicals have negative effects on population of whitefly. All treatments showed less population of whitefly as compared to control. After doing comparison of 4th spray of 3 treatments, results showed that plots treated with Treatment 1 had 1.90 mean population of whitefly similarly Treatment 2 gave 1.80 and least population was observed on plots treated with Treatment 3 i.e Imidacloprid where population was 1.50.

MEAN COMPARISON AFTER 5TH SPRAY



All the chemicals have negative effects on population of whitefly. All treatments showed less population of whitefly as compared to control. After doing comparison of 5th spray of all 3 treatments, results showed that plots treated with Treatment 1 had 2.20 mean population of whitefly similarly Treatment 2 gave 1.13 and least population was observed on plots treated with Treatment 3 i.e Imidacloprid where population was 1.03.

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