



Asian Journal of Plant Sciences

ISSN 1682-3974

science
alert

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Protecting Cotton Crop from Sucking Pests in the Early Growing Stage

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Abstract: Two insecticides [Confidor 70 WS (imidacloprid) and Temik 15G (aldicarb)] were tested for their efficacy against white fly and jassids during 1997 and 1998. Results indicated that both insecticides were good in controlling the jassids and white fly in both seasons. In imidacloprid treated plots jassids remain below economic threshold level (ETL) up to seven weeks after sowing (WAS) while both insecticides kept the white fly below ETL till five WAS sowing being aldicarb significantly better. Cotton leaf curl virus incidence increased to 90% 8 WAS in 1997 and 100% 6 WAS in 1998 as the white fly population developed.

Key words: Cotton, insecticides, cotton leaf curl virus

Introduction

Protection of cotton crop from the sucking pests at its early growing stage is very important because it is a proven fact that a good plant stand at initial stage results in good produce (Ratchford and Burris, 1985; Parker and Huffman 1991). As cotton crop is attacked by a number of sucking pests during its early growing stage (Ahmed, 1996), lot of broad spectrum insecticides, with a comparatively longer residual effect, are being sprayed, as a common practice of the farmers (Mabbett, 1996). This practice wipes off the useful fauna from the field and leads the farmers to complex pest problem and flare up of one pest occurs after the other. In such situation there is need in the cotton fields (Waite 1983). Seed treatment and dressings are the method of application, which makes a systemic insecticide, selective and thus has least effect on beneficials. Present studies have made a designed to demonstrate the efficacy and residue of imidacloprid and aldicarb for the management of sucking pests (white fly and jassids) and impact on CLCV disease incidence.

Goddard and Leser (1997) reported that yield increase and improved plant vigor were seen with seed treatment over the untreated check. Woolfenbarer and Cook (1996) reported that imidacloprid significantly reduced the egg and adult population of white fly. Granular formulation of fungicides significantly controlled the white fly and lower the disease incidence in mothbean (Satuavir 1985). Ratchford and Burris (1985) stated that the application of selected insecticides (acephate, aldicarb and disulfoton) in the early stage of cotton crop control the sucking pests (lygus, thrips, aphids, tetanychids and cotton leafhopper). This also demonstrated a beneficial effect on better stand, faster growth, earlier maturity and higher yield, Khalil and Watson. (1983) also proved in Egypt that all the granular insecticides (Furadan 10% [carbendazim], Temik 15 and 10% [aldicarb] and Miral 10% [isazofos]) controlled the aphids on cotton during early growing season.

Materials and Methods

The trial was conducted at Government seed farm Karor, Layyah during 1997 and 1998. Cotton variety CIM 240 was sown on June 10, 1997 and May 25, 1998 by tractor mounted cotton seed drill. All the treatments received uniform cultural practices during both seasons. The experiment was laid out in Complete Randomized Block Design and consists of two insecticidal treatment and an untreated check and replicated four times. Plot size was 25x6 m² with 30cm inter plant and 75cm inter row distances. The detail of the treatment is given in Table 1

Table 1: Details of the treatment given to cotton crops.

Treatments	Common name	Dose ha ⁻¹	a.i per ha
Confidor 70 WS	imidacloprid	150g	105g
Temik 15G	aldicarb	7.41Kg	1.1Kg
Untreated check	--	--	--

Imidacloprid was dissolved in 1.05 liter of water and the paste was coated on seed and air dried seeds were sown, as recommended by the manufacturer. Aldicarb was pre mixed with seed and sown. The seed drill was pre adjusted to drop additional 7.41Kg insecticide in a hectare. No foliar application was made during the course of experiment. The data was recorded, for three central rows of each plot, at weekly interval starting from

the second week of sowing till eight weeks after sowing. Twenty-one randomly selected leaves representing lower, middle and upper plant-canopy, were observed for white fly (adults and nymphs) and jassids. For cotton leaf curl virus (CLCV) diseased incidence studies, twenty plants from each plot were observed and marked as diseased plant if at least one leaf showed visual CLCV. The experiment was terminated after eight weeks after sowing (WAS), and uniform plant protection measures were adapted thereafter, to save the produce. The pest population data subjected to statistical analysis and means were separated using Least significance difference (LSD) test using a computer software MSTATC (MSTATC, Michigan State University MI, USA).

Results and Discussions

Effect of seed treatment on white fly mortality in 1997: Results indicated in Table 2 shows significantly lower white fly population in the treated plots right from the germination till the seven WAS, however it reached above economic threshold level from the germination till the WAS. Although imidacloprid suppressed the pest population below ETL till six WAS but aldicarb remain significantly better throughout this period.

Effect of seed treatment on white fly mortality in 1998: Data presented in Table 3 also depict that the white fly population was significantly affected by the insecticidal treatments than of untreated check the seven WAS. Pest population was quite low during first four WAS and the statistical model employed could not detect the differences efficiently and some erratic results were observed after three and four WAS. Aldicarb treated plots proved significantly effective than imidacloprid after five and six WAS and both the treatments were at par after seven weeks of sowing (Table 2). It can be stated that both insecticides help in keeping white fly below ETL somewhat between five to six WAS, and comparing two of them, aldicarb proved significantly better insecticide in respect of white fly management. It has been observed that both insecticide treated plots had good stand and vigorous plant growth. Woolfenbarer and Cook (1996) also support the efficacy of imidacloprid for the management of white fly. The findings are also in conformity with Satuavir (1985) and Ratchford and Burris (1985).

Effect of seed treatment on jassids mortality in 1997: During crop seasons, 1997 jassid population significantly affected by the both insecticidal treatments i.e., imidacloprid and aldicarb till the eight WAS (Table 3). Imidacloprid treated plots performed significantly better than aldicarb after six and seven WAS and kept the pest below ETL even some weeks of sowing, where as it raised ETL in aldicarb treated plots.

Effect of seed treatment on jassids mortality in 1998: The jassids incidence during 1998 was more than that of 1997. Results in the Table 3 depicts that both insecticides proved significantly better in controlling jassids till six WAS and had as many jassids as in untreated plots thereafter. Comparing two insecticides, imidacloprid proved better than aldicarb some where between four and five WAS. It can be generalized that both insecticides affectively suppressed the jassid population below ETL till some what about 6-7 weeks after sowing. Imidacloprid proved significantly better than of aldicarb. Management of jassids also brought a good lush green look during early growing stage. The observation in present studies are in accordance with

Table 2: Effect of different treatment on the population buildup of white fly on cotton

Treatment	Dose ha ⁻¹	Number of white fly per leaf						
		2-WAS	3-WAS	4-WAS	5-WAS	6-WAS	7-WAS	8-WAS
1997								
Confidor 70WS (imidacloprid)	150g	0.35b	0.56b	0.83b	4.41b	8.92b	15.76b	19.32a
Timik 15G (aldicarb)	7.41kg	0.16c	0.25c	0.35c	2.45c	6.16c	13.46c	19.10a
Untreated check		0.66a	0.96a	1.60a	5.9a	10.45a	18.10a	19.58a
Co-efficient of deviation 1%		0.16	0.22	0.27	0.85	0.65	0.46	1.05
1998								
Confidor 70WS (imidacloprid)	150g	0.20b	0.50ab	0.71a	2.55b	8.20b	15.12b	27.42a
Timik 15G (aldicarb)	7.41kg	0.15b	0.21a	0.31b	0.40c	5.89c	14.96b	26.06b
Untreated check		0.40a	0.65a	0.99a	3.86a	9.88a	17.90a	27.63a
Co-efficient of deviation 1%		0.10	0.44	0.18	0.05	1.07	1.08	1.03

Table 3: Effect of different treatment on the population buildup of Jassids on cotton

Treatment	Dose ha ⁻¹	Number of white fly per leaf						
		2-WAS	3-WAS	4-WAS	5-WAS	6-WAS	7-WAS	8-WAS
1997								
Confidor 70WS (imidacloprid)	150g	0.01a	0.28b	0.28ab	0.09b	0.36c	0.76c	1.36b
Timik 15G (aldicarb)	7.41kg	0.03a	0.31a	0.31a	0.11b	0.45b	1.31b	1.65b
Untreated check		0.06a	0.41a	0.43a	0.90a	1.66a	1.70a	1.99a
Co-efficient of deviation 1%	**	0.05	0.13	0.09	0.10	0.06	0.31	0.29
1998								
Confidor 70WS (imidacloprid)	150g	0.09ab	0.11a	0.15c	0.51b	0.51b	2.12Aa	2.87a
Timik 15G (aldicarb)	4.41	0.15a	0.20a	0.25b	0.63b	1.62b	2.16a	2.96a
Untreated check		0.17a	0.27a	0.56a	1.02a	2.15a	2.35a	3.00a
Co-efficient of deviation 1%		0.06	0.18	0.06	0.30	0.34	0.42	0.22

Table 4: Effect of different treatment on the cotton leaf curl virus (CLCV)

Treatment	Dose ha ⁻¹	Number of white fly per leaf						
		2-WAS	3-WAS	4-WAS	5-WAS	6-WAS	7-WAS	8-WAS
1997								
Confidor 70WS (imidacloprid)	150g	00.00	00.00	00.50	05.25	11.25	13.25	17.00
Timik 15G (aldicarb)	7.41kg	00.00	00.00	00.25	03.25	08.00	09.75	18.00
Untreated check		00.00	00.00	00.25	06.50	10.25	13.75	16.25
1998								
Confidor 70WS (imidacloprid)	150g	01.50	07.00	12.25	18.25	20.00	20.00	20.00
Timik 15G (aldicarb)	7.41kg	01.75	16.75	12.50	18.75	20.00	20.00	20.00
Untreated check		02.00	05.00	14.25	18.50	20.00	20.00	20.00

the results of Anonymous (1999), who stated seed treatment with imidacloprid increased white flowers and squares after 60 days, at three locations and improved the plant height as well. Similar findings were obtained by Goddard and Leser (1997). Ratchford and Burris (1985) obtained good control of sucking during early growing stage of cotton with selected insecticides (acephate, aldicarb and disulfotond) and got better stand and good yield. The findings of the present studies also supported by the results of Khalil and Watson (1983).

Cotton leaf curl virus (CLCV): Cotton leaf curl virus (CLCV) data in Table 4 shows disease affected up 90% of observed plants 8 WAS in 1997 and 100% 6 WAS in 1998. Management of white fly become more important after the introduction of CLCV in the country. Although some good resisted varieties are out there but still some farmers choose moderately resistant for their good potential. In such situation, protection from white fly is very necessary during early growing of the crop, when delicate plant is more susceptible to this disease. Looking into the disease incidence, it grew with the population buildup of white fly in the area. Since white fly is active and good flyer insect the impact of the these insecticides can not be demonstrated in small plots. However in large acreage, management of white fly will automatically shows a low incidence of disease.

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