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. COMPARATIVE EFFICAC;Y OF SOME INSECTICIDES AGAINST COTTON WHITE FLY *(Bemisia tabaei* Genn.)

Munir Ahmad, Muhammad Aslam' & M. Amjad Aulukh'
Departments of Agri, Entomology and 2Horticulture, University of Agriculture. Faisalabad
and 'University College of Agriculture, B.Z. University,- Multan

Comparative effect of four insecticides viz. sweep (phenpropethrin+buprofezin) 250 EC @ 1500 ml/ha, Pride (buprofezin) 25 WP r0l, 1225 g/ha, endosulfan 35 EC @ 1750 ml/ha and methamidophos 60 SL @ 1000 mVha was determined on whitefly population during 1998 cotton crop. Sweep 250 EC provided the best control by maintaining the whitefly population below economic threshold level (ETL) up to 15 days. Pride 25 WP lowered the population mainly by suppressing the nymph population up to 10 days. Endosulfan 35 EC also provided a good early control and maintained it below ETL up to 7 days. Methamidophos provided the least control while maintaining the population up to 7 days below ETL.

Key words: *Bemisia tabaci* Genn., cotton, efficacy of insecticides

INTRODUCI10N

Cotton .*(Gos.~vpium hirsutum* L.) is the most important cash crop of Pakistan. About 35% foreign exchange is earned annually from the export of raw cotton and its finished products. It provides food in the form of edible oil for humans, seed cake for animals and fuel for domestic use. Over the years, the area under cotton has increased from 1237 thousand hectares in 1947 to 2959 thousand hectares during 1998. The yield in the corresponding years increased from 166 kg/ha to 528 kg/ha (Anonymous, 1998). The increase in yield may be attributed to the use of improved cotton varieties, availability of good quality seed, better agronomic practices and adequate plant protection measures. A large number of insect pests feed on cotton during growing season. Among them. the sucking insect pests especially cotton whitefly *Bemisia tabaei* Genn. is very damaging. It sucks the plant sap resulting in stunted growth and transmits cotton leaf curl virus (CLCV), depletes vigour and ultimately results in poor growth.

Conventional insecticides are the only choice for quick knockdown of the insects but their injudicious use results in a lot of problems. such as development of resistance, increase in production cost, pollution etc. Different workers have tested different spray schedules and individual sprays for its control, and obtained different results. Ali and Wahla (1993) and Afzal et al. (1995) observed tamaron 60 SL (methamidophos) as an effective insecticide. whereas Parveez et al. (1995) and Hussain (1997) concluded that endosulfan is the best for the control of cotton whitefly. Buprofezin, a chitin synthesis inhibitor. suppressed egg hatch after 24 hr exposure while complete progeny suppression was observed after treating cotton with 250 mgIL up to 14 days (Yasui et al., 1990 and De Cock et al., 1990). Phenpropethrin with buprofezin has also been used to supplement the adult control programme (Morris, 1990: Bae et al.. 1994). The objective of this study was to compare conventional insecticides such as endosulfan and methamidophos with new ones such as phenpropethrin and buprofezin for effective control of this cotton pest.

MATERIAL AND METHODS

Four insecticides viz. sweep 250 EC (phcnpropethrin + buprofezin) *(ii)* 1500 ml/ha, pride 25 WP (buprofezin) @ 1225 g/ha, endosulfan 35 EC @ 17?" ml/ha and methamidophos 60 SL @ 1000 ml/ha were tested on whitefly under field conditions. The trial was laid out in a randomized complete block design with three replications. The plot size was 15 x 20 m. The plant to plant and row to row distance was 0.3 m and 117.'i m respectively of the cotton cultivar CIM-446. Whitefly population was counted from each plot between 6.011 and 7.10 am. Data were recorded 24 hr before application and 24. 48, 72, 168, 240 and 360 hr after application of insecticides. Population was recorded from 32 plants by altering upper, middle and lower leaves on plains each time by visual leaf turn method in each plot. Insecticides were applied three times in July and mid August at 15 days interval with Knapsack hand-sprayer . The difference in mean population of the pest was calculated and level of significance among treatments was sorted out using DMRT at 0.05 probability level (Steel and Tome. 1984).

RESULTS AND DISCUSSION

Table 1. Efficacy of some insecticides against cotton whitefly, *Bemisia tabaci* **up** to 360 **hr**

Treatment	Dose	Inc. or Dec. in mortality of whitefly (Ufi.)					
	(ml/ha)	24hr	48hr	72hr	16Rhr	240hr	~Whr
Sweep 250 EC	15tX)	72a	54b	63b	69a	60a	~()a
Pride 25 WP	1225	35b	26c	3&	33b	17b	-7h
Endosulfan 35 EC	1750	74a	79a	76a	39b	-7c	-.ne
. Mcthamidophos 60 SL	l<XX)	15c	20e	22d	lOe	-41d	-<)(1(\
Control	———	-5d	-17d	-23d	-97d	-203d	-,:,-ki

*Means within a column not sharing a letter in common are significantly different (P=0.05. DMRT)

Whitefly population mortality data are presented in Table 1. For the comparison up to 168 hr, it appeared that endosulfan 35 EC and sweep 250 EC provided good control. whereas endosulfan 35 EC was the best up to 72 hr and caused about 75% mortality as compared to sweep 250 EC which ranked second. causing 65 % mortality. But mortality decreased to about 40 % one week after the application of endosulfan 35 EC. whereas it was about 70 % in the plots treated with sweep 250 EC. Pride 25 WP. on the other hand. caused about D 'Yo mortality up to 7 days and maintained the whitefly population below threshold level up to 10 days as compared to endosulfan 35 EC which decreased mortality up to 7 %. Overall. sweep 250 EC was considered the best providing control over 360 hr and maintaining the whitefly population below the economic threshold level (ETL) up to 15 days. This was also proved by Morris (1990) and Bae et al. (1994). who observed that buprofezin along with phenpropethrin completely suppressed the whitefly population up to 14 days in treated cotton crop. These results are in partial accordance with those of Yasui et al. (1990) and De Cock et al. (1990). They stated that buprofezin helped check whitefly population for 14 days and caused suppression of egg laying behaviour and moulting in whitefly. It was found that pride 25 WP provided almost similar results up to two weeks but the adult population was not suppressed up to the required level. Present results concerning endosulfan 35 EC. also partially confirmed those of Parveez et al. (1995) who found it the best up to one week but he compared it with other organophosphates. However. sweep 250 ECprovided much better control than endosulfan 35 EC. Present results differed significantly from those of Ali and Wahla (1993) and Afzal et al. (1995) who observed mcthamidophos 60 SL as an effective insecticide against whitcfly. Contrarily. it was observed that it caused only I:;-2{;1 'X, mortality up to one week while whitefly population was almost double after two weeks.

It may be stated from the above results that sweep 250 EC was the best providing two week control of whitefly population whereas endosulfan provided one week control. Pride 25 WP proved to be a good nymphal population suppressor but it needs to he mixed with some adult control insecticide for better results as in the case of sweep 250 EC.

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