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NOTE

Impact of different Insecticides used for Bollworm Control on the Population of Jassid and Whitefly in Cotton

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The impact of insecticides used for controlling bollworms was evaluated on sucking pests such as jassid and whitefly. Imidacloprid was found to be the most effective insecticide in suppressing jassid population up to next spray, whereas, its continuous use invited more whitefly population. The population reduction of jassid was also better in monocrotophos and endosulfan treated plots. Neem treated plots recorded relatively less whitefly population, whereas, continuous use of cypermethrin induced 10-fold resurgence. Recommended schedule maintained both jassid and whitefly below economic threshold level.

KEY WORDS : Jassid, whitefly, cotton, insecticides

The population explosion of sucking pests particularly whitefly after the introduction of synthetic pyrethroids is not a good sign. Cotton crop is damaged by multiple insect pests. The insecticides recommended for controlling bollworms have different effect on sucking pests. During later stage of the crop growth, it is not advisable to take separate control measures for sucking pests. To evaluate these problems, the insecticidal schedules for bollworm complex were designed carefully and their impact was studied on sucking pests.

Materials and Methods

Field layout : The experiments were laid out at Indian Agricultural Research Institute, New Delhi, during *Kharif* 1995. A newly developed upland cotton variety Pusa 8-6 (*Gossypium hirsutum*) was taken as the test variety. Field trial was laid out in a randomized block design with three replications and seven treatments. The plot size was 26.25 m^2 with a spacing of 75 × 30 cm. All agronomic practices were followed as per the recommendations for raising the crop under irrigated condition in northern India. The details of the spray schedule are given in Table 1. First spray was done on August 14th, 1995 (at 50 % flowering) and subsequent three sprays were given at an interval of 15 days. The quantity of spray fluid required was calculated at each stage of the crop by applying a known quantity of water, sprayed on the control plot.

Sampling : The nymphal population of jassid, *Amrasca biguttula* (Ishida), and adults of whitefly, *Bemisia tabaci* (Gennadius) was recorded from three leaves per plant randomly. Totally 10 plants per plot were screened at regular intervals both in treated and control plots. Observations were made in the morning hours between 7.00 and 9.00 A.M. The figures were converted into suitable transformations for statistical analysis.

Results and Discussion

Jassid : It is evident from Table 2, that three sprays with imidacloprid followed by etofenprox at 15 d interval combat the jassid population very effectively as compared to control. The population of jassid was very low in T_1 even before the commencement of foliar spray, which shows that effect of imidacloprid as seed treatment still persisted. Similar results have earlier been reported. All other insecticide schedules were more effective as compared to control. Among that monocrotophos and endosulfan sprays were effective against jassid up to two weeks. These findings are in agreement with the results obtained by various authors[1-3].

Whitefly : The first two sprays of imidacloprid were effective in checking the population of whitefly, whereas, the subsequent sprays were not found to be effective in checking the whitefly (Table 3). Similar results were obtained earlier[4]. The neem formulation was effective against whitefly up to 7-11 d, whereas, continuous application of cypermethrin after monocrotophos resurged the population to the tune of 10 fold. Similar effect due to the use of synthetic pyrethroids were reported[5-7].

Conclusion

It could be concluded that the insecticidal schedules recommended for controlling bollworm complex have different effect on jassid and whitefly population. The continuous

Table 1. Details of spray schedules

Treatment	Details of treatments	Concentration of insecticides	Dosage a.i. ha^{-1} (g)
T_1	Imidacloprid seed treatment	70% WS	5 g kg^{-1} seed
	Imidacloprid 3 sprays	20% EC	40
	+		
	Etofenprox 1 spray	10% EC	100
T_2	Neem (Nethrin) 4 sprays	-	5 ml litre^{-1} water
T_3	Monocrotophos 1 spray	36% WSC	500
	+		
	Cypermethrin 3 sprays	25% EC	60
T_4	Endosulfan 4 sprays	35% EC	750
T_5	Ethion 4 sprays	50% EC	750
T_6	Recommended schedule (each 1 spray)		
	i) Neem (Nethrin)	-	5 ml litre^{-1} of water
	ii) Cypermethrin	25% EC	60
	iii) Endosulfan	35% EC	750
	iii) Triazophos	40% EC	600
T_7	Control (untreated check)		

Days of spray

1st	-	August 14, 1995
2nd	-	September 1, 1995
3rd	-	September 18, 1995
4th	-	October 5, 1995

Table 2. Impact of different insecticides on jassid population

Treatments	Average number of jassid nymphs 30 leaves^{-1}											
	After 1st spray			After 2nd spray			After 3rd spray			After 4th spray		
	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS
T_1	1.5	0.0	0.7	0.0	0.3	1.7	1.0	0.0	0.3	0.7	0.0	0.0
	(1.3)	(1.0)	(1.3)	(1.0)	(1.1)	(1.6)	(1.3)	(1.0)	(1.1)	(1.0)	(1 0)	(1.0)
T_2	20.0	20.3	32.3	11.0	21.7	14.7	9.0	7 0	1.7	1.7	1.3	1.3
	(4.6)	(4.6)	(5.8)	(3.5)	(4.8)	(3.9)	(3.2)	(2.8)	(1.6)	(1.6)	(1.5)	(1 5)
T_3	6.7	6 0	6.7	1.7	30.0	13.0	3 3	13.0	1.0	0.0	0.0	0.0
	(2.8)	(2.6)	(2.6)	(1.6)	(5.6)	(3.7)	(2.1)	(3.7)	(1.4)	(1.0)	(1.0)	(1.0)
T_4	7.0	9.0	16.3	1.7	11.0	11.0	2.0	3.7	2.7	0.0	0.0	0 3
	(2.8)	(3.2)	(4.2)	(1.6)	(3.5)	(3.5)	(1.7)	(2.1)	(1.9)	(1.0)	(1.0)	(1.1)
T_5	18.3	20.3	24.0	19.7	4.7	10.0	4.7	8.7	5.7	1.3	1.0	0.3
	(4.4)	(4 6)	(5 0)	(4 5)	(2.4)	(3.3)	(2 4)	(3.1)	(2.6)	(1.5)	(1.4)	(1.1)
T_6	20.3	19.3	15.3	12.7	2.0	28.0	10.7	6.3	3.3	0 0	1.0	1 0
	(4.6)	(4 5)	(4.0)	(3.7)	(1.7)	(5.4)	(3.4)	(2.7)	(2.1)	(1.0)	(1 4)	(1.4)
T_7	70.7	64.7	53.3	46.0	27.3	20.7	10.7	10.3	8.0	1.7	1.3	0 0
	(8.5)	(8.1)	(7.4)	(6.9)	(5.3)	(4.7)	(3.4)	(3.4)	(2.9)	(1.6)	(1 5)	(1 0)
SE(d)	(0.10)	(0.05)	(0.11)	(0.12)	(0 13)	(0.12)	(0 11)	(0.13)	(0.18)	(0.09)	(0.07)	(0.12)
C.D. 5%	(0.22)	(0.12)	(0.25)	(0.27)	(0 28)	(0.26)	(0 25)	(0.29)	(0.39)	(0.21)	(0.16)	(0.26)

DAS : Days after spraying

Figures in parentheses are $\sqrt{x + 1}$ transformed values

Table 3. Impact of different insecticides on whitefly population

Treatments	Average number of whitefly adults 30 leaves^{-1}											
	After 1st spray			After 2nd spray			After 3rd spray			After 4th spray		
	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS	1 DAS	7 DAS	13 DAS
T_1	4.0	5.0	1.0	1 0	8 3	10.3	2.7	84.3	54.0	12 3	18.3	30.0
T_2	10.0	8 3	6.3	2.7	11.7	9.7	1.0	26.0	32.7	28.0	29.7	18.7
T_3	8.0	10.7	4.7	2.3	42.3	21.3	6.7	104.0	324.3	195.0	305.0	76.3
T_4	8.3	7.7	2.3	1.7	22.0	14.0	1.7	58.0	76.0	20.7	60.7	24.3
T_5	11 0	1 0	12.7	1.3	8.7	15.7	2.0	22.7	43.0	14.0	34.3	21 0
T_6	9.0	7.3	16.7	1.7	12.0	24.0	3.3	48.0	53.7	40.3	58.3	19 0
T_7	9.0	10.7	21.3	5.7	12.7	8.3	3.7	26.7	34.0	28.7	44.7	26.3
SE(d)	1.34	0.75	1.03	0.60	0.76	0.75	0.41	0.87	0.86	0.74	0.92	0 77
C.D. 5%	2.93	1.63	2.25	1.31	1 65	1.63	0.90	1.90	1.88	1.61	2.11	1 68

DAS . Days after spraying

application of same insecticide should be avoided. Even though the repeated use of imidacloprid proved effective against jassid, but totally ineffective against bollworms. The recommended schedule should be followed for effective management of all insects pests.

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