

Field Efficacy of Newer Insecticides against Whitefly, *Bemisia tabaci* (Gennadius) In Brinjal

D.M. Jethva¹, K.L. Raghvani², D.V. Jadav³ and T. K. Balas⁴

^{1,2,3,4}Department of Entomology Junagadh Agricultural University Junagadh- 362 001, Gujarat
 E-mail: ¹dr_dharmraj@yahoo.co.in, ²entomology@jau.in,
³dharmeshjadav4@gmail.com, ⁴tusharbalas@gmail.com

Abstract—A field experiment was conducted to determine the efficacy of different insecticides against whitefly *Bemisia tabaci* (Gennadius) infesting brinjal in variety GJb-1 at Junagadh Agricultural University Junagadh during rabi season of 2011-12, 2012-13 and 2013-14. The pooled results showed that the bifenthrin 10% EC 0.02%, chlorantraniliprole 18.5% EC 0.002%, difenthiuron 50% WP 0.06%, buprofazin 25% SC 0.06% were found the most effective in reducing the whitefly population and damage in brinjal. The highest fruit yield of brinjal was obtained in the treatment of in bifenthrin 10% EC 0.02% (32698 kg/ha). The next better treatments were chlorantraniliprole 18.5% EC 0.002% (27368 kg/ha), difenthiuron 50% WP 0.06% (25898 kg/ha) and buprofazin 25% SC 0.06% (24985 kg/ha). The highest ICBR was obtained in the treatments of bifenthrin 10% EC 0.02% (1:46.01) followed by 0.05% (1:13.73), imidacloprid 17.8% SL 0.007% (1:12.39), difenthiuron 50% WP 0.06% (1:9.80), chlorantraniliprole 18.5% EC 0.002% (1:9.56) and buprofazin 25% SC 0.06% (1:8.77). So bifenthrin 10% EC 0.02% was found most effective insecticide for the control of whitefly in brinjal.

1. INTRODUCTION

Brinjal (*Solanum melongena* L.), an important vegetable crop is attacked by several insect pests of which the sucking pests viz, whitefly, *Bemisia tabaci* (Gennadius), leaf hopper, *Amrasca devastans* Distant and aphid, *Aphis gossypii* Glover are major importance and destructive pests causing about 70% loss in yield (Subratram and Butani, 1982 and Ghosh *et al*, 2004). Several conventional insecticides have been recommended for management of these sucking pests (Umapathy and Baskaran 1991, Palumbo, 2001 Berlinger 1986, Mohd Rasdi, 2005, Syed, 2000). However, some newer molecules were available and reported to be more effective as it provide longer protection against whitefly. Therefore, this trial was proposed.

2. MATERIALS AND METHOD

The field experiment on brinjal (GJb-1) was conducted at the entomology farm, Junagadh Agricultural University, Junagadh during Rabi 2011-12, 2012-13 and 2013-14. The crop was grown at 75 cm x 60 cm with 3 replication and 10 treatments including control (Table 1) in randomized block design. Seedling of brinjal was transplanted during rabi season. The

spraying of insecticides was done when whitefly population appeared. The observations on population of whitefly (Nymph and adults) was recorded at early in morning from 5 randomly selected plants of each treatment one day before spray and 3, 7 and 10 day of spray. The population of whitefly was counted from three leaves each from top, middle and bottom of the selected plant. Second and subsequent spraying of insecticides was applied on need base at 15 days interval. Yield of fruits was recorded at every picking from each treatment.

3. RESULTS AND INTERPRETATION

The pooled results showed that the difference in population of whitefly was found non significant before spray, but all the treatments were found significant in three spray over control. The significantly lowest population of whitefly (0.84 whitefly/3 leaves/ plant) was recorded in the treatment of bifenthrin 10% EC 0.02%

Table: 1 Effect of different insecticides on whitefly population after first spray in brinjal

No.	Treatments	No. of whitefly / 3 leaves / plant at first, second and third spray									
		Pooled of 2011-12, 2012-13 & 2013-14									
		Before spray	3 DAS			7 DAS			10 DAS		
	first spray	second spray	third spray	first spray	second spray	third spray	first spray	second spray	third spray		
1	Buprofazin 25% SC 0.06%	4.94 (23.89)	1.67 (2.27)	1.70 (2.39)	1.3 (1.30)	1.58 (1.98)	1.67 (2.30)	1.2 (1.08)	1.71 (2.42)	1.74 (2.53)	1.5 (1.92)
2	Imidacloprid 17.8% SL 0.007%	5.04 (24.91)	2.25 (4.55)	2.25 (4.58)	1.9 (3.29)	2.15 (4.13)	2.22 (4.44)	1.8 (3.02)	2.26 (4.61)	2.26 (4.62)	2.0 (3.85)
3	Acephate 75% SP 0.075%	4.87 (23.22)	1.83 (2.85)	1.85 (2.93)	1.5 (1.92)	1.76 (2.60)	1.81 (2.77)	1.4 (1.63)	1.88 (3.02)	1.87 (2.98)	1.6 (2.22)

4	Bifenthrin 10% EC 0.02%	5.12 (25.72)	1.16 (0.84)	1.33 (1.27)	1.1 (0.74)	1.07 (0.64)	1.27 (1.11)	3 (0.56)	1.23 (1.01)	1.37 (1.38)	4 (1.30)
5	Acetamiprid 20% SP 0.004%	5.02 (24.68)	2.46 (5.55)	2.48 (5.66)	2.0 (3.7)	2.38 (5.14)	2.45 (5.50)	2.0 (3.4)	2.45 (5.49)	2.48 (5.63)	7 (4.19)
6	Cartap hydrochlorid e 50% WP 0.05%	5.03 (24.79)	2.05 (3.72)	2.06 (3.74)	1.8 (2.9)	1.99 (3.47)	2.03 (3.62)	1.7 (2.6)	2.08 (3.81)	2.08 (3.82)	7 (3.37)
7	Difenthiuron 50% WP 0.06%	5.21 (26.69)	1.43 (1.54)	1.48 (1.68)	1.1 (0.9)	1.34 (1.29)	1.43 (1.55)	1.1 (0.73)	1.47 (1.67)	1.53 (1.84)	9 (1.43)
8	Thiamethoxa m 25%WG 0.0088%	5.02 (24.66)	3.15 (9.45)	3.14 (9.38)	2.3 (5.1)	3.07 (8.91)	3.10 (9.14)	2.3 (4.7)	3.13 (9.28)	3.11 (9.17)	6 (6.55)
9	Chlorantranil iprole 18.5% EC 0.002%	5.19 (26.46)	1.40 (1.45)	1.46 (1.64)	1.1 (0.8)	1.31 (1.21)	1.40 (1.45)	1.0 (0.6)	1.47 (1.66)	1.49 (1.73)	5 (1.31)
10	Control Untreated (Check)	5.10 (25.46)	3.69 (13.08)	3.73 (13.39)	2.7 (7.2)	3.64 (12.78)	3.69 (13.14)	4 (7.0)	3.71 (13.2)	3.69 (13.1)	4 (9.34)
S.Em.± for treatment		0.21	0.01	0.01	0.0	0.01	0.02	2	0.01	0.02	0.13
C.D. at 5 %± for treatment		NS	0.02	0.03	0.0	0.03	0.07	5	0.04	0.05	0.38
S.Em.± for year		0.00	0.00	0.01	0.0	0.01	0.01	1	0.01	0.01	0.07
C.D. at 5 % for year		0.00	0.01	0.02	0.0	0.02	0.04	3	0.02	0.03	0.21
S.Em.± year x treatment		0.22	0.12	0.14	0.1	0.15	0.15	6	0.16	0.16	0.5
C.D. at 5 % year x treatment		0.62	NS	NS	NS	NS	NS	NS	NS	NS	NS
C.V. %		7.59	9.71	11.47	15.12	12.78	12.62	16.90	13.09	13.03	13.23

*√X+0.5 transformation used. Data in parantheses are retransformed values

after 3days of first spray. The next best treatments were found chlorantraniliprole 18.5% EC 0.002% (1.45 whitefly/3 leaves/plant), difenthiuron 50% WP 0.06% (1.54 whitefly/3 leaves/plant) and buprofazin 25% SC 0.06% (2.27 whitefly/3 leaves/plant). While at 7 days after first spray, significantly the lowest population of whitefly was observed in bifenthrin 10% EC 0.02% (0.64 whitefly/3 leaves/ plant). The next best treatments were chlorantraniliprole 18.5% EC 0.002% (1.21 whitefly/3 leaves/ plant), difenthiuron 50% WP 0.06% (1.29 whitefly/3 leaves/ plant) and buprofazin 25% SC 0.06% (1.98 whitefly/3 leaves/ plant). Similar trend wasalso found at 10 days after first spraying. More or less similar trends in reducing the whitefly population were recorded in second and third spray.

3.1 Yield

The pooled data was found significant in all the treatments over control. However, significantly the highest fruit yield of brinjal was obtained in the treatment of in bifenthrin 10% EC 0.02% (32698 kg/ha). The next best treatments was chlorantraniliprole 18.5% EC 0.002% (27368 kg/ha), difenthiuron 50% WP 0.06% (25898 kg/ha) and buprofazin 25% SC 0.06% (24985 kg/ha).

3.2 ICBR

The highest ICBR was obtained in the treatments of bifenthrin 10% EC 0.02% (1:46.01) followed by acephate 75% SP 0.075% (1:29.48), acetamiprid 20% SP 0.004% (1:16.96) and cartap hydrochloride 50% WP 0.05% (1:13.73), imidacloprid 17.8% SL 0.007% (1:12.39), difenthiuron 50% WP 0.06% (1:9.80), chlorantraniliprole 18.5% EC 0.002% (1:9.56) and buprofazin 25% SC 0.06% (1:8.77).

Table 2: Effect of different treatments on yield of brinjal

N o.	Treatments	Yield (kg/ha)	
		Pooled of 2011-12, 2012-13 & 2013-14	
1	Buprofazin 25% SC 0.06%	24985	
2	Imidacloprid 17.8% SL 0.007%	23856	
3	Acephate 75% SP 0.075%	24757	
4	Bifenthrin 10% EC 0.02%	32698	
5	Acetamiprid 20% SP 0.004%	23235	
6	Cartap hydrochloride 50% WP 0.05%	23981	
7	Difenthiuron 50% WP 0.06%	25898	
8	Thiamethoxam 25%WG 0.0088%	22612	
9	Chlorantraniliprole 18.5% EC 0.002%	27368	
10	Control Untreated (Check)	22229	
S.Em.± for treatment		192	
C.D. at 5 %± for treatment		572	
S.Em.± for year		105	
C.D. at 5 % for year		313	
S.Em.± year x treatment		1764	
C.D. at 5 % year x treatment		5004	
C.V. %		12.14	

Table 3: Yield and economics of different treatments for the control of brinjal whitefly

N o.	Treatmen t	No . of sp rary	Yiel d incre ase over cont rol	Gr oss inc om e (Rs.)	Qua ntity of wate r (L)	Insect icides (Kg-Lit/ha)	Expenditu re / Cost (Rs.)		Total Expen diture (Rs.)	Net Ret urn (Rs.)	IC BR
							Insect icides	Lab our			
1	Buprofazi n 25% SC 0.06%	3	2756	55120	1552	3.725	5594	690	6284	48836	1:8.77

2	Imidacloprid 17.8% SL 0.007%	3	1627	32540	1552	0.605	1936	690	2626	29914	1:1 2.3 9
3	Acephate 75% SP 0.075%	3	2528	50560	1552	1.552	1025	690	1715	48845	1:2 9.4 8
4	Bifenthrin 10% EC 0.02%	3	10469	209380	1552	3.104	3861	690	4551	204829	1:4 6.0 1
5	Acetamiprid 20% SP 0.004%	3	1006	20120	1552	0.310	496	690	1186	18934	1:1 6.9 6
6	Cartap hydrochloride 50% WP 0.05%	3	1752	35040	1552	1.552	1862	690	2552	32488	1:1 3.7 3
7	Difenthiuron 50% WP 0.06%	3	3669	73380	1552	1.862	6800	690	7490	65890	1:9 80
8	Thiamethoxam 25%WG 0.0088%	3	383	7660	1552	0.546	1475	690	2165	2495	1:3 54
9	Chlorantraniliprole 18.5% EC 0.002%	3	5139	102780	1552	0.737	10060	690	10750	92030	1:9 56
10	Control Untreated (Check)	-	-	-	-	-	-	-	-	-	-

1. Labour charges was calculated Rs. 23. 00/ hrs.
2. Market price of brinjal fruit was calculated Rs. 20/kg
3. Spray solution was used 618 liter per hectare (Avg. of first, second and third spray)
4. Quantity of water used in first, second and third spray (556, 648 and 648 lit/ha)

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