Evaluation of new insecticide molecules against cotton jassid, *Amrasca bigutulla bigutulla* (Ishida) on okra under mid-hill conditions of Himachal Pradesh

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ABSTRACT

Investigations were carried out during Kharif season of 2011-2013 at Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh to evaluate some new insecticide molecules against *Amrasca bigutulla bigutulla* (Ishida) on okra cv P-8. All the treatments resulted in lower jassid population as compared to control. The application of thiamethoxam (0.35 g/l) was found to be superior in suppression of jassids (1.51 jassids/plant) which was statistically at par with spiromesifen (0.8 ml/l, 1.62 jassids/plant) followed by dimethoate (2 ml/l, 1.66 jassids/plant) and thiacloprid (0.5 ml/l, 1.67 jassids/plant). Significantly highest seed yield (1.18 tonnes/ha) was also recorded with the treatment of thiamethoxam.

Keywords: Jassid; *Amrasca bigutulla bigutulla*; okra; evaluation; insecticide

INTRODUCTION

Okra, *Abelmoschus esculentus* (L) Moench is an important vegetable crop in Himachal Pradesh grown over an area of 1728 ha with annual production of 19659 tonnes (www.indiastat.com2005-06). Productivity in okra is adversely affected by many species of insect pests including jassids, fruit borers, aphids etc and phytophagous mites (Sivakumar et al 2003, Singh et al 2005, Anitha and Nandihalli 2009).

Among the insect pests the cotton jassid, *Amrasca bigutulla bigutulla* (Ishida) is one of the serious pests the nymphs as well as adults of which suck sap from the foliage resulting in reduced vigour and consequently poor yield (Jotwani et al 1966, Verma and Kanwar 2009).

Besides the jassid also acts as vector of a number of virus diseases. The attack starts in the seedling stage and continues up to fruit setting of the crop during Kharif season. There is a need to replace ineffective chemicals and include newer chemicals with low doses to minimize the adverse effects of pesticides. With this view some new formulations of systemic insecticides were evaluated for cotton jassid control on okra crop grown for seed production under mid-hill conditions of Himachal Pradesh.

MATERIAL and METHODS

The field study was conducted on okra cultivar P-8 for three years (2011-2013) at Nauni, Solan, Himachal Pradesh. The trial was laid out in randomized block design with three replications in plot size of 5 x 3 m.

The crop was raised by following the recommended agronomic practices (Anon 2005). There were seven treatments viz T_1 (Imidacloprid 0.3 g/l), T_2 (Thiamethoxam 0.35 g/l), T_3 (Spirimesifen 0.8 ml/l), T_4 (Thiacloprid 0.5 ml/l), T_5 (Diafenthiuron 1 g/l), T_6 (Dimethoate 2 ml/l), T_7 (Control). The population of jassid was recorded as per the method of Krishnaiah et al (1979) on 3-leaf sample basis (second, third and

Table 1. Effect of different insecticides on cotton jassid, *Amrasca bigutulla bigutulla* (Ishida) on okra during 2011-13

Treatment	Pre-count	Number of Jassids/plant at indicated days								Overall mean	Reduction in population	Seed yield (tonnes/ha) over control
		1st spray				2nd spray						
		3 days	7 days	10 days	Mean	3 days	7 days	10 days	Mean			
Imidacloprid	7.67	3.86	2.13	1.69	2.56	1.66	1.23	0.74	1.21	1.85	65.09	1.14
0.3 g/l (T_1)	(2.84)*	(2.08)	(1.62)	(1.46)	(1.72)	(1.46)	(1.31)	(1.10)	(1.29)	(1.51)		
Thiamethoxam	6.89	2.83	2.04	1.31	2.06	1.39	0.96	0.52	0.96	1.51	71.51	1.18
0.35 g/l (T_2)	(2.70)	(1.82)	(1.59)	(1.34)	(1.58)	(1.37)	(1.20)	(1.05)	(1.21)	(1.39)		
Spiromesifen	6.97	3.34	1.89	1.46	2.23	1.38	1.04	0.63	1.02	1.62	69.43	1.04
0.8 ml/l (T_3)	(2.72)	(1.96)	(1.54)	(1.39)	(1.63)	(1.36)	(1.23)	(1.06)	(1.22)	(1.43)		
Thiacloprid	7.43	3.30	2.29	1.47	2.35	1.58	0.86	0.54	0.99	1.67	68.49	1.10
0.5 ml/l (T_4)	(2.81)	(1.94)	(1.66)	(1.39)	(1.67)	(1.44)	(1.15)	(1.07)	(1.22)	(1.44)		
Diafenthiuron	6.99	3.52	1.72	1.67	2.30	1.59	1.13	0.72	1.15	1.73	67.36	1.13
1 g/l (T_5)	(2.72)	(1.98)	(1.49)	(1.45)	(1.64)	(1.44)	(1.27)	(1.09)	(1.27)	(1.45)		
Dimethoate	7.37	3.67	2.07	1.30	2.34	1.63	0.81	0.49	0.98	1.66	68.68	1.11
2 ml/l (T_6)	(2.79)	(2.03)	(1.59)	(1.33)	(1.65)	(1.45)	(1.81)	(1.04)	(1.22)	(1.44)		
Control (T_7)	7.34	8.34	6.47	4.73	6.52	4.39	4.04	3.68	4.04	5.30	-	0.84
	(2.77)	(2.96)	(2.63)	(2.28)	(2.63)	(2.20)	(2.12)	(2.03)	(2.12)	(2.37)		
Mean	7.24	4.12	2.66	1.96	2.91	1.94	1.44	1.05	1.48	2.19		1.08
	(2.77)	(2.11)	(1.73)	(1.52)	(1.79)	(1.53)	(1.35)	(1.21)	(1.36)	(1.58)		

$CD_{0.05}$

Treatment= 0.04, Spray x treatment= 0.06, Spray x days x treatment= 0.11, Days x spray= 0.04, Yield= 0.02, Pre-count= 0.05

fourth leaf from top) and mentioned as the mean population per plant. Samples were drawn at 3, 7 and 10 days after spray from five randomly marked plants in each plot starting from appearance of the pest. Per cent protection over control was calculated in respect of overall mean jassid infestation in insecticidal treatments. The seed yield was recorded in each plot and later converted to tonnes/ha.

RESULTS and DISCUSSION

The effects of insecticidal treatments are presented in Table 1. Pre-count jassid population did not vary significantly among the treatments. Data indicate that after two sprays overall mean jassid population was recorded minimum (1.51 jassids/plant) with thiamethoxam (0.35 g/l) which was statistically at par with spiromesifen (0.8 ml/l, 1.62 jassids/plant) followed by dimethoate (2 ml/l, 1.66 jassids/plant). All the treatments were superior over control (6.52 and 5.30 jassids/plant) in respect of reducing jassid population count after both sprays respectively.

After second spray minimum jassid population recorded with thiamethoxam (0.35 g/l, 0.96 jassids/plant) was statistically at par with rest of the treatments and significantly superior over control. Similarly after first spray the minimum jassid population was recorded with thiamethoxam (0.35 g/l, 2.06 jassids/plant) which was statistically at par with spiromesifen (0.8 ml/l) as well as diafenthiuran (1 g/l) and superior over rest of the treatments. After first spray the minimum jassids were recorded with dimethoate (2 ml/l, 1.30 jassids/plant) on day-10 which was statistically at par with thiamethoxam (0.35 g/l, 1.31 jassids/plant), spiromesifen (0.8 ml/l) and thiacloprid (0.5 ml/l) on the same day. After second spray also minimum jassids (0.49 jassids/plant) were recorded in dimethoate (2 ml/l) on day-10 which was statistically at par with all the treatments (except control) on day-10 as well as thiacloprid (0.5 ml/l, 0.86 jassids/plant) on day-7. After first spray irrespective of treatments the number of jassids (1.96 jassids/plant) was observed to be significantly minimum on day-10 as compared to day-3 and day-7. Similarly after second spray the number of jassids decreased from day-3 (1.94 jassids/plant) to day-10 (1.05 jassids/plant).

Thiamethoxam was considered as the best effective insecticidal treatment with 71.51 per cent protection over control followed by spiromesifen (69.43%) and dimethoate (68.68%).

The present findings are in conformity with earlier works of Misra (2002), Acharya et al (2002), Kencharaddi and Balikai (2012) and Ghosal et al (2013) who reported thiamethoxam to be effective against jassids in okra. Highest seed yield (1.18 tonnes/ha) was also recorded with thiamethoxam (0.35 g/l) which differed significantly with rest of the treatments.

Therefore spray of thiamethoxam (0.35 g/l) was the best treatment that resulted in maximum control of jassids on okra as well as higher seed yield under mid-hill conditions of Himachal Pradesh.

REFERENCES

Acharya S, Mishra HP and Dash D 2002. Efficacy of insecticides against okra jassid, *Amrasca bigutulla bigutulla* (Ishida). Annals of Plant Protection Sciences **10(2):** 230-232.

Anitha KR and Nandihalli BS 2009. Bioefficacy of newer insecticides against leafhopper and aphid in okra. Karnataka Journal of Agricultural Sciences **22(3):** 714-715.

Anonymous 2005. Package of practices for vegetable crops. Directorate of Extension Education, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India.

Ghosal A, Chatterjee ML and Bhattacharya A 2013. Bioefficacy of neonicotinoids against *Aphis gossypii* Glover of okra. Journal of Crop and Weed **9(2):** 181-184.

Jotwani MG, Sarup P, Sircar P and Singh DS 1966. Control of jassid (*Empoasca devastans* Dist) on okra (*Abelmoschus esculentus*) seedlings by treatment of seeds with different insecticides. Indian Journal of Entomology **28:** 477-481.

Kencharaddi AV and Balikai RA 2012. Effect of imidacloprid and thiamethoxam-treated stored seeds on sucking pests in sunflower. Annals of Plant Protection Science **20:** 107-113.

Krishnaiah K, Ramachander PR, Jaganmohan N and Wahi SD 1979. Sampling technique for estimation of jassid population on okra. Indian Journal of Entomology **41(2):** 200-202.

Misra HP 2002. Field evaluation of some newer insecticides against aphids (*Aphis gossypii*) and jassids (*Amrasca*

biguttula biguttula) on okra. Indian Journal of Entomology **64:** 80-84.

Singh S, Chaudhary DP, Mathur YS and Sharma HC 2005. Efficacy of two nitroguanidine insecticides against the jassid, *Amrasca bigutulla bigutulla* (Ishida) on okra. Pest Management and Economic Zoology **13(1):** 135-139.

Sivakumar R, Nachiappan RM and Selvanarayanan V 2003. Field evaluation of profenophos (Curacron) against selected pests of okra. Pestology **27(1):** 7-11.

Verma SC and Kanwar HS 2009. Efficacy of different insecticides as seed treatment against the cotton jassid, *Amrasca bigutulla bigutulla* (Ishida) okra. Pest Management and Economic Zoology **17(1):** 25-28.

www.indiastat.com2005-06.