International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2018; 6(3): 1889-1891

Received: 01-03-2018
Accepted: 04-04-2018

AS Khandare
Student, Department of Entomology, post graduate institute, Dr. PDKV, Akola, Maharashtra, India

SM Thakare
Associate professor, Department of Entomology, post graduate institute, Dr. PDKV, Akola, Maharashtra, India

DN Mohod
Student, Department of Entomology, post graduate institute, Dr. PDKV, Akola, Maharashtra, India

PA Lahane
Student, Department of Entomology, post graduate institute, Dr. PDKV, Akola, Maharashtra, India

Correspondence
AS Khandare
Student, Department of Entomology, post graduate institute, Dr. PDKV, Akola, Maharashtra, India

Response of chemical insecticides against cotton aphid and whiteflies by using stem smearing technique

AS Khandare, SM Thakare, DN Mohod, PA Lahane

Abstract
This investigation was conducted at Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2014-15 to evaluate the effect of newer insecticides through stem smearing on aphids and whiteflies of cotton. The experimental material consist of insecticides *viz*. imidacloprid 48 FS, acephate 50 + imidacloprid 1.8 SP, clothianidin 50 WDG used for stem smearing at three different concentrationof 1:5, 1:10 and 1:20 applied at 20 and 40 days after emergence with the help of stem smearing bottle and imidacloprid 70 WS used as seed treatments @ 10g/kg. Amongst the treatments tested stem smearing of imidacloprid 48 FS @ 1:5 dilution applied at 20 and 40 days after emergence was found most promising against managements of aphids and whiteflies population, followed by stem smearing with imidacloprids 48 FS @ 1:10 and acephate 50 + imidacloprid 1:8 SP@ 1:5 dilution.

Keywords: Aphid, whiteflies, sucking pest, hemipterans, cotton

Introduction
Cotton (Gossypium sp.) is the leading natural fibre and oil seed crop which plays a key role in Indian economy with global position of second in production after China and offering livelihood security for the Indian farming community. It also plays a dominant role in the industrial and agricultural economy of the nation and has a unique place in social affairs. Many allied activities like ginning, fabric production, textile processing, garment manufacture and their marketing etc. provides employment about 6 million people. It also provides 65 percent raw material to textile industry and contributed 1/3rd of total foreign exchange earning of India (Mayee and Rao, 2002) [6].

India accounts for about 32 per cent of the global cotton area and contributes to 21% of the global cotton produce. Cotton contributes about 65 per cent of the total raw material needs of textile industry in India. Cotton and Textile exports account for nearly one-third of total foreign exchange earnings of India. Cotton provides employment and sustenance to a population of nearly 42 M people, who are involved directly or indirectly in cotton production, processing, textiles and related activities (Kranthi, 2011) [4].

Sucking pests are deleterious to the process of cotton growth and development. While direct effects of sucking pests during early season are visualized in terms of poor crop stand and yield reduction, their late season attack (especially aphids and whiteflies) indirectly decreases cotton fiber quality due to deposits of honey dew on lint. In addition to lint contamination, whiteflies transmit leaf curl virus disease (Vennila *et al*., 2008) [10].

Insect pest problems in agriculture have shown a considerable shift during first decade of twenty-first century due to ecosystem and technological changes. The global losses due to insect pests have declined from 13.6 per cent in post-green revolution era to 10.8 per cent towards the beginning of this century. In India, the crop losses have declined from 23.3 per cent in post-green revolution era to 17.5 per cent at present. In terms of monetary value, the Indian agriculture currently suffers an annual loss of about Rs 8, 63, 884 million due to insect pests (Dhaliwal *et al*. 2010) [3].

The pest scenario in cotton ecosystem is changing fast and is assailed by multitude of pests as it evolves through various production levels. Adoption of Bt cotton has not only changed the cultivation profile, but also the pest scenario. While there is a decline in the pest status of bollworms, the sap feeders, *viz*. aphids, leafhoppers, mirids and mealy bugs are emerging as serious pests (Vennila, 2008) [10].

Material and methods

Field experiment was conducted by using variety PKV-Rajat at the experimental field of Department of Entomology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth,Akola during kharif 2014-15 the newer group of insecticides *viz*., imidacloprid 48 FS, acephate 50+ imidacloprid 1.8 SP, clothianidin 50 WDG used for stem smearing at three different concentration of 1:5, 1:10 and 1:20 applied at 20 and 40 days after emergence with the help of stem smearing bottle and imidacloprid 70 WS used as seed treatment @ 10 g/kg.

The observation on the population of aphids and whiteflies were recorded from 5, 10, 15 and 20 days after the treatments on three leaves (top, middle and bottom) per plant by randomly selecting five plants from each net plot and calculate per cent reduction over control. The mean data subjected to analysis in randomized block design.

Result and Discussion

Effects on Aphids

At 20 DAE

the treatment of imidacloprid 48 FS @1:5 dilution was emerged as most effective in managing the pest population of aphids to the tune of 95.12 per cent when applied at 20 days after emergence and observed at 5, 10, 15 and 20 days after treatments. This treatment was followed by acephate 50 + imidacloprid 1.8 SP @ 1:5 dilution and imidaclorids 48 FS @ 1:10 dilution, recording, 86.38 and 82.40 per cent aphids reduction.

The treatments of, imidacloprids 48 FS @ 1:20 dilution, acephate 50 + imidacloprid 1.8 SP @ 1:10 and imidacloprid 70 WS @ 10 g/kg, recorded, 79.50, 73.99 and 62.46 per cent reduction of aphids population over an untreated control, respectively, and were next superior.

The similar finding were also reported by,Prasad *et al*. (2011) [8] they found that seed treatments with imidacloprid 10 g/kg and stem smearing with imidacloprid @ 1:20,wereproved effective against aphids.

At 40 DAE

the treatments with imidacloprid 48 FS @1:5 dilution was emerged as most effective treatments in managing the pest population of aphids to the tune of 86.17 per cent when applied at 40 days after emergence and observed at 5, 10, 15 and 20 days after treatments. This treatment was followed by imidaclorids 48 FS @ 1:10 and acephate 50 + imidacloprid 1.8 SP @ 1:5 dilution, recording, 74.63 and 72.24 per cent reduction of aphids.

The next effective treatments were, imidacloprids 48 FS @ 1:20 dilution, acephate 50 + imidacloprid 1.8 SP @ 1:10 and acephate 50 + imidacloprid 1.8 SP @ 1:20, recording, 67.55, 59.66 and 48.85 per cent reduction of aphids population, respectively, over an untreated control.

The similar finding were also reported by, Bheemanna and Patil (2003) [2] they found that imidacloprid 17.8 SL + water (1 ml and 20 ml) treatment proved to be best in reducing the early sucking insect pests like aphids.

Thakare (2006) concluded the effectiveness of stem smearing of insecticides on sucking pests of cotton with use of monochrotophos @ 1:1, 1: 20 and imidachloprid @ 1:20, 1:40 (I:W). All treatments of stem smearing recorded lower population of aphids up to 60DAE than the control.

Effects on whiteflies

At 20 DAE

The treatments with imidacloprid 48 FS @ 1:5 was proved as most effective treatments in managing the population of whiteflies to the extent of 91.57 per cent when applied at 20 days after emergence and observed at 5, 10, 15 and 20 days after treatments. This treatments was followed by imidaclorids 48 FS @ 1:10, imidaclorids 48 FS @ 1:20 and imidacloprid 70 WS @ 10 g/kg, recording, 86.26, 75.06 and 74.85 per cent reduction of whiteflies, respectively. Whereas first two and last two treatments found statistically similar in effectiveness.

The next effective treatment were acephate 50 + imidacloprid 1.8 SP @ 1:5 and acephate 50 + imidacloprid 1.8 SP @ 1:10 were found next effective, recording, 60.53 and 48.51 per cent reduction of whiteflies over an untreated control, and both treatments found statistically equal.

The similar finding also reported by Bhakare (2007) [1] he found that imidacloprid 70 WS @ 10 g/kg as seed treatments and stem smearing with imidacloprid 70 WS @ 1:20 were most effective in managements of whiteflies population.

At 40 DAE

The treatments with imidacloprid 48 FS @ 1:5 was emerged as most effective treatments in managing the pest population of whiteflies to the tune of 76.44 per cent when applied at 40 days after emergence and observed at 5, 10,15 and 20 days after each treatments. This treatments was followed by imidaclorids 48 FS @ 1:10 recording, 65.96 per cent reduction of whiteflies, respectively, Whereas both treatments found statistically similar in effectiveness.

The next effective treatments were imidaclorids 48 FS @ 1:20 acephate 50 + imidacloprid 1.8 SP @ 1:5 and clothianidin 50 WDG @ 1:5, recording, 55.77, 49.64 and 38.85 per cent reduction of whiteflies over an untreated control Whereas first two treatments found statically equal.

Similar finding also reported by Prasad *et al*. (2009) [7] reported seed treatment with imidacloprid 70 WS @ 5 g/kg and stem application with imidacloprid (200 SL) at 1:20 dilution at 40 DAS and 60 DAS was found effective in management of whiteflies. Prasad *et al*. (2011) [8] also stated that the incidence of whiteflies is found lowest in the seed treatments with imidacloprids 10 g/kg and stem smearing with imidacloprids @ 1:20 Whereas, Kumar *et al*. (2012) [5] reported that, stem application of imidacloprid 200 SL @ 1:20 was found effective against whiteflies which conform present finding.

Table1: Effects of treatment on per cent reduction of Aphids and whiteflies applied at 20 and 40 DAE

Treatment	Per Cent reduction over Control			
	Aphids at		whiteflies at	
	20 DAE	40 DAE	20 DAE	40 DAE
T_1 Clothiandin 50% WDG @ 1:5 (I:W)by stem smearing	43.66 (41.17)	44.57 (41.68)	42.53 (40.63)	38.85 (38.42)
T_2 Clothiandin 50% WDG @ 1:10 (I:W)by stem smearing	29.19 (32.38)	23.82 (28.70)	32.67 (34.58)	27.96 (31.79)
T_3 Clothiandin 50% WDG @ 1:20 (I:W)by stem smearing	21.46 (26.45)	22.49 (27.89)	24.61 (29.58)	20.21 (26.50)
T_4 Acephate 50%+ Imidacloprid 1.8 @SP @ 1:5 (I:W) by stem smearing	86.38 (68.72)	72.27 (59.69)	60.53 (51.16)	49.64 (44.79)
T_5 Acephate 50%+ Imidacloprid 1.8% SP @ 1:10 (I:W) by stem smearing	73.99(59.61)	59.66(50.97)	48.51 (44.13)	34.18 (35.64)
T_6 Acephate 50%+ Imidacloprid 1.8% SP @ 1:20 (I:W) by stem smearing	60.69(51.42)	46.85 (43.00)	41.92 (40.30)	28.48 (31.98)
T_7 Imidaclorid 48 % FS @ 1:5 (I:W) by stem smearing	95.12 (78.67)	86.17 (69.44)	91.57 (74.71)	76.44 (61.18)
T_8 Imidaclorid 48 % FS @ 1:10 (I:W) by stem smearing	82.40 (65.89)	74.63 (60.65)	84.26 (67.81)	65.96 (54.52)
T_9 Imidaclorid 48 % FS @ 1:20 (I:W) by stem smearing	79.50 (63.24)	67.55 (55.73)	75.06 (60.44)	55.77 (48.35)
T_{10} Imidaclorid 70 % WS @ 10g/kg by seed treatment	62.46(52.31)	35.21(36.07)	74.85(60.77)	23.14(28.51)
T_{11} Untreated control	0.06(1.38)	0.14(2.13)	0.17(2.32)	0.11(1.72)
' F ' test	Sig	Sig	Sig	Sig
Se(m) I	3.76	4.26	3.03	2.90
CD at (5%)	11.16	12.58	8.95	8.56
CV (%)	13.34	17.29	11.48	13.74

References

1. Bhakare RB. Effect of systemic insecticides through seed treatment and stem smearing on sucking pests and natural enemies on cotton. Master of Science Thesis (unpub). Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) India, 2007.
2. Bheemanna M, Patil BV. Imidacloprid smearing, a new technique to Control early sucking insect pests of cotton. Proc. of world cotton Res. Conf., -Cape Town, South Africa. 2003; 3: 1036-1038.
3. Dhaliwal GS, Vikas Jindala, AK Dhawan. Insect pest problems and crop losses: changing trends. Indian J Ecol. 2010; 37(1):1-7.
4. Kranthi KR. CICR- Vision 2030, Central Institute for Cotton Research, Nagpur. 2011, http://www.cicr.org.in/pdf/cicr_vision_2030.pdf
5. Kumar Rishi S, Kranthi M, Nitharwal SL Jat, D Monga. Influence of pesticides and application methods on pest and predatory arthropods associated with cotton. Springer Science + Business Media BV. 2012. http://www.researchgate.net/profile/Shravan_Haldhar2/publication/235897411_Influence_of_pesticides_and_application_methods_on_pest_and_predatory_arthropods_associated_with_cotton/links/02bfe513ebfc553406000000.pdf
6. Mayee CD, Rao MRK. Current cotton production and protection scenarios including G.M. Cotton. Agrolook, April-June, 2002, 14-20.
7. Prasad NVVSD. MSR Krishna V, Chinna Babu Naik. Area wide implementation of insecticides resistance management. Bt cotton – a case study in India, Journal of plant protection research. 2009; 49(2):162-166.
8. Prasad NVVSD, GMV Prasad Rao, V Chenga Reddy. Gambit of IPM for insect resistant transgenic cotton. World cotton research conference on technologies for prosperity. 2011, 239-243. https://www.icac.org/meetings/wcrc/wcrc5/Session_2.pdf
9. Thakare SM. Effects of stem smearing on pests defenders and yield of cotton. Training programme report on integrated crop management (unpub). 21st june- 22 Nov at Akola, Maharashtra, 2006, 50-53.
10. Vennila S. Pest management for cotton ecosystem management for cotton production? Curr. Sci. 2008; 94(11):1351-1352.