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Evaluation of newer chemical insecticides against cotton thrips and leafhoppers through stem application method

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Abstract
The present investigation was conducted at Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola During 2014-15 to response of newer insecticides on thrips and leafhoppers of cotton through stem application method. The experimental material consist of insecticids *viz*. imidacloprid 48 FS, acephate 50 + imidacloprid 1-8 SP, 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 treatment tested, Maximum reduction of population of leafhoppers and thrips was noticed in treatments of acephate 50 + imidacloprid 1.8 SP @ 1:5While, the treatments with, acephate 50 + imidacloprid 1.8 @ 1:10 and imidacloprid 48 FS @ 1:5 were found next effective in the managements of leafhoppers and thrips.

Keywords: Insecticides, Cotton Thrips, Leafhoppers

Introduction
Cotton is a commercial crop that plays an important role in strengthening economy of 82 countries across the world. In india, apart from providing 60 per centof the fibre used in textile industries, the crop is also a source for 11-5 lakh tones of oil, 90 lakh tones of animal feed and about 200 lakh tones of cotton stalk that is used for fuel and value addition as particle boards (Kranti, 2011) [2]

In india area under cotton crop is about 126.55 lakh hectare with the production of 400 lakh bales and the productivity of 537 lint kg/ha. Maharashtra state contributing with production of 85 lakh bales with the productivity of 345 lint kg/ha occupying an area of 41.92 lakh hectare (Anoymous, 2015) [1]

Among insect pests aphids (Aphis gossypii (Glover)), leafhoppers (Amrasca biguttula biguttula (Ishida)), whiteflies (Bemisia tabaci (Genn.)) thrips (Thrips tabaci (Linde.) and boll worm complex *viz*. American boll worm (Helicoverpa armigera (Hub.)) tobacco caterpillar(Spodoptera litura (Boisd.)) and pink bollworm (Pectinophora gossypiella(Saund.) are considered to be the major constraints Hence cotton growers completely rely upon pesticides for the control on isect pests of cotton. Insecticides obviously brought a considerable protection to crop yield especially during the initial phase of their development. Indiscriminative usage of chemical pesticides on the long run resulted inefficacy. besides development of resistnace, resurgence of minor pests, and eradication of bioagents with adverse effect on human and beneficial organisms as well as environmental degradation (Prasad *et al*., 2009)

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.

Results and Discussion

Effect on thrips

At 20 DAE

The data on mean per cent reduction of thrips (Table-1) revealed that the treatments with acephate 50 + imidacloprid 1.8 SP @ 1:5 was emerged as most effective treatments in managing the pest population of thrips up to 78.96 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 @ 1:5 recording 66.08 per cent reduction of population and both treatments statistically similar in effectiveness.

The next effective treatments were, imidaclorids 48 FS @1:10, acephate 50 + imidacloprid 1.8 SP @ 1:10 clothianidin 50 WDG @ 1:5 and imidacloprid 70 WS @ 10 g/kg, which recorded, 56.88, 51.97, 46.83 and 43.98 per cent reduction of thrips, respectively. All these treatments found statically equal.

At 40 DAE

The data on mean per cent reduction of thrips (Tables-1) revealed that the treatments with acephate 50 + imidacloprid 1.8 SP @ 1:5 dilution was emerged as most effective treatments in managing the pest population of thrips to the tune of 78.41 per cent when applied at 40 days after emergence and observed at 5, 10, 15 and 20 days after treatments. This treatments was followed by imidaclorids 48 FS @1:5 recording, 66.78 per cent reduction of thrips and both treatments statically similar in effectiveness.

The next effective treatments were imidaclorids 48 FS @ 1:10 acephate 50 + imidacloprid 1.8 SP @ 1:10 and clothianidin 50 WDG @ 1:5 dilution, which recorded 57.03, 49.41 and 46.61 per cent reduction of thrips, respectively, over an untreated control and were statistically equal

The similar finding were also reported by, Kumar *et al*. (2012) [5] they found that stem application of imidacloprid 200 SL, imidacloprid 70 WS and clothian 50 WDG were superior over the untreated control in managing the pest population of thrips. While clothiandin 50 WDG @ 1:20, recorded most effective in managements of thrips.

Singh *et al*. (2011) [4] suggested that stem application and soil application of acephate @ 1:20 applied 30-40 DAS and 50-60 DAS for management thrips.

Thakare *et al*. (2009) [7] concluded that stem smearing with monocrotophos @ 1:4 and imidacloprid @ 1:20 dilution at 15:30 and 45 DAE was found effective against managements of thrips.

Effects on leafhoppers

At 20 DAE

The data on mean per cent reduction of leafhoppers (Tale-1) revealed that the treatments with acephate 50 + imidacloprid 1.8 SP @ 1:5 was emerged at most effective treatments in managing the pest population of leafhoppers to the tune of 85.72 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 acephate 50 + imidacloprid 1.8 SP @ 1:10 clothianidin 50 WDG @ 1:5 and imidacloprid 70 WS @ 10 g/kg. recording 75.62, 72.38 and 67.10 per cent reduction of leafhoppers, respectively.

The next effective treatments were imidaclorids 48 FS @ 1.5, imidaclorids 48 FS @ 1:10 acephate 50 + imidaclorids 1.8 SP @ 1:20 clothianidin 50 WDG @ 1:10 recording, 66.75, 59.52, 53.95 and 51.91 per cent reduction of population, respectively, over an untreated control.

At 40 DAE

The data on mean per cent reduction of leafhoppers (Table-1) revealed that the treatments with acephate 50 + imidacloprid 1.8 SP @ 1:5 was emerged as most effective treatments in managing the pest population of leafhoppers to the tune of 80.24 per cent when applied at 40 days after emergence and observed at 5, 10, 15 and 20 days after treatment. This treatments was followed by acephate 50 + imidacloprid 1.8 SP @ 1:10 and acephated 50 + imidacloprid 1.8 SP @ 1:20, recording, 69.19 and 65.34 per cent reduction of leafhoppers, respectively. All these treatments statically similar.

The next effective treatment were clothianidin 50 WDG @ 1:5 imidacloprids 48 FS @ 1:20 recording, 58.69, 54.28, 51.30, 50.86 and 74.86 per cent reduction of population, respectively, over an untreated control.

The similar findings are also reported by Kumar *et al*. (2012) [5] revealed that stem application of imidacloprid 200 SL, imidacloprid 70 WG, clothianidin 50 WDG @ 1:20 found effective in managing the pest population of leafhoppers. Prasad *et al*. (2011) [3, 4] also reported the effectiveness of stem smearing with imidacloprids @ 1:20 for against leafhoppers. While, Singh *et al*. (2011) [4] suggested stem application and soil application of dimethoate or acephate @ 1:20 at 30-40 DAS and 50-60 DAS for management leafhoppers.

Table 1: Effects of treatment on per cent reduction of Thrips and leafhoppers applied at 20 and 40 DAE

Treatment	Per Cent reduction over Control			
	Thrips at		Leafhopper at	
	20 DAE	40 DAE	20 DAE	40 DAE
T_1 Clothiandin 50% WDG @ 1:5 (I:W)by stem smearing	46.87 (43.16)	45.61 (43.04)	72.38 (58.69)	58.69 (50.13)
T_2 Clothiandin 50% WDG @ 1:10 (I:W)by stem smearing	31.67 (33.74)	30.61 (33.47)	51.91 (46.14)	51.30 (45.72)
T_3 Clothiandin 50% WDG @ 1:20 (I:W)by stem smearing	20.14 (26.26)	19.20 (25.25)	29.56 (32.48)	38.29 (37.97)
T_4 Acephate 50%+ Imidacloprid 1.8 @SP @ 1:5 (I:W) by stem smearing	78.96 (62.75)	78.41 (62.69)	85.72 (68.79)	80.24 (64.38)
T_5 Acephate 50%+ Imidacloprid 1.8% SP@ @ 1:10 (I:W) by stem smearing	51.97 (46.49)	49.71 (44.48)	75.62 (60.85)	69.19 (57.21)
T_6 Acephate 50%+ Imidacloprid 1.8% SP@ @ 1:10 (I:W) by stem smearing	32.94 (34.79)	39.05 (38.53)	53.95 (47.36)	65.34 (54.48)
T_7 Imidaclorid 48% FS @ 1:5 (I:W) by stem smearing	66.08 (54.73)	66.78 (55.16)	53.95 (55.02)	65.34 (47.65)
T_8 Imidaclorid 48% FS @ 1:10 (I:W) by stem smearing	56.88 (48.98)	57.03 (49.10)	59.52 (50.52)	50.86 (45.45)
T_9 Imidaclorid 48% FS @ 1:20 (I:W) by stem smearing	34.58 (35.89)	45.85 (42.56)	47.05 (43.28)	47.84 (43.74)
T_{10} Imidaclorid 70% WS @ 10g/kg by seed treatment	43.98 (41.49)	26.57 (30.82)	67.10 (55.30)	43.36 (41.06)
T_{11} Untreated control	0.13 (2.06)	0.69 (1.72)	0.01 (1.74)	0.12 (1.82)
' F ' test	Sig	Sig	Sig	Sig
Se(m) I	4.13	3.22	4.17	3.58
CD at (5%)	12.20	7.70	12.32	10.57
CV (%)	18.35	14.27	15.33	13.91

Figures in parentheses are arc shine values, (0 values=0+(1/4*n) and 100=100- (1/4*n) where n= no. of insects in control plot. DAE= Days after emergence, I:W= insecticides: Water

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