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BIO EFFICACY OF SPIROMESIFEN 240 SC AGAINST MITE PESTS IN CUCUMBER

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ABSTRACT
Field trial was conducted at Agricultural Research Station, Kawadimattii, during *kharif* 2012-13 and 2013-14 to evaluate the efficacy of Spiromesifen 240 SC at different dosage for the management of mite pests on cucumber. The standard acaricides *viz*., Dicofol, Propergite and Fenazaquin were used for comparison. Overall the field trials revealed that, Spiromesifen 240SC @ 120 g a.i/ha emerged as a best and optimum dose as it registered lowest number of mites (1.25/leaf) at 10 days after first spray and recorded highest yield of 22.61 q/ha. Whereas, Dicofol, Propergite and Fenzaquin recorded 4.46, 2.01 and 2.27 mite per leafat 10 days after first spray. The foregoing studies indicated that all the acaricides tested for mite pest were proved superiorover control and the performance of Spiromesifen 240 SC @ 120 g a.i/ha was superior to other dosages in terms of suppression of mite population and harnessing higher yield.

INTRODUCTION

Vegetable crops were found to be attacked by phytophagous mites almost throughout the year, the mite problem remained extremely severe during the summer months (Prasad, 2006).Two-spotted spider mite (TSSM), *Tetranychus urticae* Koch (Acari: Tetranychidae), is a polyphagous, parenchyma cell feeding mite with over 200 host plant species. These mites can cause considerable crop yield and quality losses, because they have short life span and under favorable conditions their populations quickly reach high abundance(Van Leeuwen*et al*., 2010). Bharma and Shantanujha (2013) observed that two spotted red spidermite occurred throughout the period of observations from first week of March to second week of September during each of the three years of study on pointed gourd.The decreased leaf productivity by *T. urticae* feeding caused biomass reduction and altered the pattern of dry matter partitioning in the cucumber plants; damaged plants accumulated more dry matter in leaf, and partitioning of dry matter to fruits was hindered (Park and Lee, 2005). They impose a great expense on green growers worldwide in terms of damage and control cost and are therefore globally considered an important agricultural pest.It has recently became a serious problem because of the extensive use of acaricides, resulting in resistance among the mite populations.There is a continual need for application of new acaricideswith novel biochemical modes of action, but their use to be optimized in order to prevent or delay the evolution of resistance and prolong their life span. Hence, there is always a need to evolve newer formulations. Therefore, efforts have been made in the present study to evaluate the efficacy and to find out the optimum dose of Spiromesifen 240 SC against mite pests in cucumber.

MATERIALS AND METHODS

Evaluations of the Spiromesifen 240SC against cucumber mites were undertaken in an experimental block, Agricultural Research Station, Kawadimatti during Kharif 2012-13 and 2013-14. The experiment was laid out in a randomized block design (RBD) with four replications. The test chemical, Spiromesifen 240 SC (supplied by Bayer Crop Science) was tested at three different concentration *viz*.,96,120 and 144 g a.i/ha for bio-efficacy. The test chemical, Spiromesifen 240 SC as compared with standard checks *viz*.,Dicofol 18.5 % SC @ 250 g.a.i/ha and Propergite @ 430 g a.i/ha against cucumber mites and untreated control. Treatments were imposed two times based on pest population exceeded recommended treatment thresholds *i.e.* 25-30 mites/leaf. (John and Dorie, 1997). All the agronomic packages were followed as per recommended package of practices of UAS Raichur. Methodology of Rachana (2004)was followed to record the incidence of mites. Observations recorded from five tagged plants per plot. Observations on cucumber mites and natural enemies were recorded on whole plant basis from five tagged plants / per plot. Observations on mites were recorded at day before 3, 7, 10, 14 and 21 days after each spraying. Yield was recorded per plot basis at harvest. The data collected from two sprays of two season were pooled and expressed on per plant basis. The yield data collected from the each plot was extrapolated on hectare basis. The treatments were subjected to statistical analysis by single factor ANOVA.

RESULTS AND DISCUSSION

Observations on mite population were recorded a day before application (DBS), 3 days after application (DAS), 7 DAS, 10 DAS, 14 DAS, 21 DAS. Natural enemies population and yield was also recorded and presented in Table 1 and 2.

Mite population

Spiromesifen240SC in different concentration were tested against cucumber mite, Spiromesifen 240 SC @120 and 144 g a.i/ha significantly reduced the mite population.Among the treatments Spiromesifen240SC @ 144 g a.i/ha was recorded significantly lowest mites (2.37/leaf) and was significantly on par with Spiromesifen240 SC @120 g.a.i/ha (2.98/leaf) at three days after first spray. Whereas untreated control recorded significantly highest mite population (8.99/leaf). Mite number fourteen days after first spray was significantly lower in Spiromesifen240SC @ 144g.a.i/ha (0.82/leaf) and was statistically on par with Spiromesifen 240SC @120 g a.i/ ha(1.28/leaf) and propergite @430 g a.i/ha (1.94/leaf), highest population was recorded in untreated control(11.11/ leaf).Similar trend was observed twenty one days after first spray.Mites number at twenty one days after second spray was significantly lower in Spiromesifen240SC @144 g.a.i/ha (2.90/leaf) and was significantly on par with Spiromesifen240SC @120 g.a.i/ha(3.16/leaf) and propergite @430 g.a.i/ha(3.67/leaf).Highest number of mites was recorded in untreated control(14.13/leaf)(Table 1).

Natural enemies population and yield

The predator coccinellid beetles were observed in cucumber ecosystem during cropping season. One day before spray coccinellid beetle population were found non-significant in all treatments it indicates that predator population was uniformly distributed in all the treatments. However 10 DAS, significantly lowest predators were noticed in all the chemical treated plots (ranged from 1.61 to 42.61 coccinellids/plants) compared to untreated control (3.96coccinellids/ plant) (Table 2).The highest marketable fruit yield was recorded in Spiromesifen240SC @ 144 and 120 g a.i/ha (23.98 and 22.61 q/ha respectively) (Table 2).

Based on the above results, it can be concluded that Spiromesifen 240 SC @120 g.a.i/ha provided effective control of cucumber mites and recorded higher fruit yield (22.11t/ha) and further, Spiromesifen 240 SC @ 120 g.a.i/ha was safe to coccinellid beetles and showed no observable phytotoxicity to cucumber plants even at the highest dosage tested. Hence, Spiromesifen 240 SC @ 120 g.a.i/ha can be recommended for the effective management of cucumber mite and also for realizing higher fruit yield. Results are in similar with the findings of Mousad Arababi *et al.* (2014) and Srinivasredddy*et. al.* (2014) who reported the hundred per cent mortality of two spotted spider mite in Spiromesifen treated plants compared to forty five per cent and seventy three per cent mortality in Dicofol and Propargite treated plants respectively. The results of Kavita *et al.* (2006) and Fanigliulo *et al.* (2010) also proved the superiority of Spiromesifen against mites in chilli ecosystem.

Table 1: Bio efficacy of Spiromesifen240SC against mites in cucumber(Pooled data of two years).

Treatments	Dosage	No. Of Mites/Leaf(1st Spray)						No. Of Mites/Leaf(2nd Spray)					
		1DBS	3DAS	7DAS	10DAS	14DAS	21DAS	1DBS	3DAS	7DAS	10DAS	14DAS	21DAS
Spiromesifen	96	8.92(2.94)	4.82(2.16)	3.86(1.91)	3.74(1.87)	3.69(1.72)	6.71(2.55)	11.64(3.36)	5.44(2.27)	3.80(1.91)	3.26(1.80)	3.15(1.75)	5.66(2.33)
Spiromesifen	120	7.98(2.81)	2.98(1.70)	1.24(1.09)	1.25(1.12)	1.28(0.88)	4.03(2.00)	12.22(3.46)	2.12(1.44)	1.26(1.09)	0.9(0.86)	1.19(1.05)	3.16(1.77)
Spiromesifen	144	7.83(2.79)	2.37(1.52)	0.72(0.82)	0.86(0.92)	0.82(0.60)	3.33(1.81)	11.19(3.33)	1.86(1.33)	0.74(0.77)	0.6(0.76)	0.79(0.82)	2.90(1.70)
Propergite	430	7.88(2.80)	3.94(1.98)	2.09(1.43)	2.01(1.40)	1.94(1.30)	5.60(2.35)	10.18(3.16)	3.12(1.69)	1.70(1.27)	1.89(1.37)	1.94(1.38)	3.67(1.88)
Dicofol	250	9.56(3.08)	4.91(2.20)	5.01(2.21)	4.46(2.10)	4.41(1.97)	6.53(2.54)	11.46(3.36)	5.91(2.42)	4.51(2.09)	4.21(2.03)	4.37(2.03)	6.84(2.58)
Fenazaquin	100	7.42(2.72)	4.44(2.09)	2.38(1.53)	2.27(1.50)	2.20(1.30)	4.62(2.14)	11.02(3.24)	3.55(1.85)	2.26(1.50)	1.84(1.35)	1.90(1.36)	3.68(1.90)
Untreated check	-	8.14(2.83)	8.99(2.94)	9.49(3.40)	10.03(3.15)	11.11(3.00)	13.81(3.68)	11.94(3.42)	14.33(3.76)	14.44(3.73)	12.11(3.40)	12.57(3.47)	14.13(3.73)
Sem.			0.16	0.16	0.12	0.13	0.14		0.17	0.13	0.14	0.1	0.15
CD@5%			0.51	0.49	0.39	0.39	0.43		0.53	0.39	0.44	0.31	0.47

Figures in the parentheses are angular transformed values DBS = Days Before Spray, DAS = Days After Spray

Table 2: Bio-efficacy of Spiromesifen240SC against natural enemies and yield (Pooled data of two years)

Treatments	Dosage	Coccinellids beetles		Yield(Q/ha)
		1DBS	10 DAS	
Spiromesifen 240SC	96	3.585	2.61(1.53)	19.44
Spiromesifen 240SC	120	3.075	2.52(1.55)	22.61
Spiromesifen 240SC	144	4.155	2.34(1.49)	23.98
Propergite 570EC	430	3.44	1.83(1.29)	21.80
Dicofol 18.5%EC	250	3.495	1.61(1.23)	20.42
Fenazaquin10% EC	100	3.505	1.92(1.31)	20.67
Untreated check	-	3.785	3.96(1.95)	15.08
Sem.			0.08	0.995
CD @ 5%			0.28	3.02

Figures in the parentheses are angular transformed values. DBS = Days Before Spray, DAS = Days After Spray

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