



Bio-efficacy of Clofentezine 50SC against two spotted spider mite, *Tetranychus urticae* Koch on rose cv. First Red in polyhouse

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ABSTRACT : Bio-efficacy of Clofentezine 50 SC along with standard acaricides dicofol and abamectin was evaluated against *Tetranychus urticae* on rose cv. First Red under polyhouse conditions. Clofentezine 50 SC at the rate of 300 g a.i/ha was most effective in controlling *T. urticae* in rose during two consecutive seasons (October-November 2009 and March-April 2010). The efficacy of Clofentezine 50 SC was at par with the tested standard acaricide, abamectin (8.55 g.ai/ha) and superior over dicofol (231.25 g.ai/ha.) Clofentezine 50 SC was also found to be relatively safe to the natural enemies and was non-phytotoxic to rose.

Keywords : Clofentezine, rose, two spotted spider mite *Tetranychus urticae*

INTRODUCTION

Two spotted spider mite, *Tetranychus urticae* Koch (Acarina : Tetranychidae) is a devastating pest on rose grown in polyhouses. The mite damage starts during hot and dry seasons on lower surface of matured leaves causing symptoms of yellowing in patches on upper surface. In case of severe infestation, mite population spreads to entire plant including buds and flowers resulting in discoloration, webbing, drying and dropping of affected parts (Jhansi Rani and Sridhar, 2005). Clofentezine is an acaricide that is used in plant protection for the control of spider mites on a wide range of crops. It acts primarily as an ovicide, but it has some activity against early stages of mites (Renshaw and Moretto, 2005). Keeping in view the severity of the pest and large scale destruction of natural predatory complex of mites, there is a need to evaluate and use relatively safe and effective new world class acaricides for the management of mite on rose under polyhouse conditions. Thus, Clofentezine 50 SC, a recently introduced acaricide into India was evaluated for its efficacy against two spotted spider mite on rose under polyhouse conditions.

MATERIALS AND METHODS

The trial was conducted in a rose polyhouse at Indian Institute of Horticultural Research (IHR), Hessaraghatta,

Bangalore (latitude of 13°-58' N and longitude of 78°E) for two seasons during October-November 2009 and March-April 2010. The rose variety 'First Red' infested with two spotted spider mite was selected for the study. Clofentezine 50 SC (supplied by M/s Indofil Chemicals Company) was evaluated against the mite, *T. urticae* at three doses *i.e.* 200, 250 and 300 g ai/ha along with standard acaricides *viz.* dicofol 18.5 EC (231.25 g ai/ha) and Abamectin 1.9 EC (8.55 g ai/ha) and control (untreated) in Randomised Block Design with four replications. Various treatment details are presented in Table 1. Two sprays of the chemicals were given in each season, using spray volume of 750 L/ha. counts of all stages of mites (eggs, immature stages and adult mites) were recorded before and 3, 7, 14 and 21 days after spray in both the seasons on three randomly selected leaves per plant. Three plants per replication were used for calculation of mite mortality. The per cent mortality of various mite stages was converted to arcsine values before subjecting them to ANOVA using MSTATC package.

Phytotoxicity test

For doing the phytotoxicity test, rose plants were selected at random on 1, 5 and 10 days interval in all the treatments. For this purpose clofentezine 50 SC of

600 and 900 g a.i/ha is also included apart from the doses tested for the bioefficacy study. Phytotoxicity symptoms like epinasty, hyponasty, necrosis, wilting and chlorosis were assessed visually on 0-10 scale, where 0 = no phytotoxicity and 10 \geq 90 percent phytotoxicity.

RESULTS AND DISCUSSION

Season-I

First spray

The results indicated that all the three doses of clofentezine were effective against the mite and recorded 69.55 – 100 per cent mortality up to 21 DAS (days after spraying) (Table 1) as compared to standard acaricides, dicofol (33.34 – 97.86 %) and abamectin (99.63 -100 %). Three days after the first spray, all the treatments except dicofol (33.34 % mortality over control) have recorded significant mortality of various mite stages. Highest mortality of *T. urticae* was recorded in Abamectin treatment (100 %) followed by chlofentezine (92.71 %, 96.39 % and 99.30 % mortality 200 g.ai/ha, 250 g.ai/ha and 300 g.ai/ha, respectively) which were statistically at par with each other. Similarly, at 7 days after spraying, vertimec followed by chofentezine recorded highest efficacy by recording 100 per cent mortality over control. On 14th and 21st day after spraying also, clofentezine recorded 100 percent mortality at 300 g ai/ha, which is at par with that of Abamectin 8.5 g.ai/ha.

Second spray

In the second spray also the mortality due to clofentezine at all dosages (200 gai/ha, 250 gai/ha and 300 gai/ha) ranged from 96.76 – 100 per cent up to 14 days after the spray. Clofentezine consistently showed higher efficacy (100 %) along with that of abamectin of 8.55 g.ai/ha, and better than that of dicofol 231.25 g.ai/ha (91.15 %). The efficacy of higher dose of clofentezine 300 g.ai./ha consistently showed higher efficacy and recorded an average mortality of the mite up to (99.38%) as against (99.95%) with that of abamectin 8.55 g.ai./ha over two sprays.

Season-II

First spray

In the second season also, all the three doses of clofentezine and abamectin 8.55 g.ai./ha were highly effective against early motile stages of mite, *T. urticae* and recorded 86.49 -100 per cent mortality over control up to 21 DAS after first spray (Table 2) as compared to 86.64 -99.57 per cent in dicofol. Three days after first

spray, highest efficacy was recorded in abamectin followed by clofentezine 300 g.ai/ha. Seven days after the first spray, 100 per cent mortality of mite was recorded with both the treatments viz., clofentezine 300 g.ai/ha and abamectin 8.55 g.ai/ha. Similarly, after the second spray also, same trend in efficacy of three doses of Clofentezine, Abamectin and Dicofol was observed against the mite. Higher dose of Clofentezine at the rate of 300 g.ai./ha showed consistent efficacy throughout the observational period, which is at par with that of Abamectin 8.55 g.ai/ha except on 3 DAS after first spray. Highest average per cent mortality over control was observed over two spray at higher dose of Clofentezine 300 g.ai/ha showed consistent efficacy throughout the observational period, which is at par with that of abamectin 8.55 g.ai/ha. Highest average mortality of different stages of mite was observed in the treatments clofentezine 300 g.ai/ha (99.96 %) and abamectin (99.95%). Average mortality in other doses of clofentezine showed better efficacy over the treatment, dicofol (94.48 %).

Safety to predatory mite and Phytotoxicity

The incidence of the predators was less during the study period. However, Clofentezine was found to be relatively safe to indigenous predatory mite, *Amblyseius* sp. Phytotoxicity was not observed in any of the Clofentezine treated plants up to a dose of 900 g a.i/ha. Pang *et al.* (1991) reported that Apollo effectively kills summer eggs and young mites and was effective on fruit crops and its efficacy lasted for two months in the field. Sushma Bhardwaj *et al.* (2007) recorded that among the tested acaricides, clofentezine 0.01 per cent and 0.02 per cent gave very good control of motile and egg stages of *Panonychus ulmi* on apple.

Based on these studies, it can be concluded that Clofentezine 50 SC at 300 g.ai/ha can be used for the management mite, *T. urticae* in rose under polyhouse cultivation, as it is not only effective, but also non phytotoxic to rose plants. However, keeping in view the problem of resistance development in mites, judicious use of the chemical has to be followed.

ACKNOWLEDGEMENTS

Authors are grateful to The Director, Indian Institute of Horticultural Research for providing facilities and M/s Indofil Chemicals Co. for supplying the chemical for testing.

Table 1. Effect of Clofentezine 50% SC on *T. urticae* on rose (I season)

Treatments	Dose (g ai/ha)	Dose (ml/ha)	Per cent mortality over control				Per cent mortality over control				Average mortality (%)
			Days after I spray*				Days after II spray*				
			3	7	14	21 [§]	3	7	14 [§]	21 [§]	
Clofentezine 50% SC	200	400	92.71 (75.64) ^a	69.55 (56.85) ^c	95.26 (77.49) ^d	98.88 (83.94) ^b	98.04 (81.94) ^b	97.27 ^c (80.58)	96.76 (79.78) ^b	92.63	
Clofentezine 50% SC	250	500	96.39 (79.97) ^a	99.57 (86.74) ^{ab}	100.0 (90.00) ^a	87.50 (70.28) ^c	97.05 (80.00) ^c	99.09 (84.55) ^b	99.25 (75.00) ^b	96.98	
Clofentezine 50% SC	300	600	99.30 (85.33) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	99.88	
Dicofol 18.5% EC	231.25	1250	33.34 (31.25) ^b	97.86 (81.68) ^b	97.04 (80.43) ^c	87.50 (69.33) ^c	91.15 (76.05) ^d	97.33 (80.55) ^c	99.25 (75.00) ^b	86.21	
Abamectin 1.9% EC	8.55	450	100.0 (90.00) ^a	100.0 (90.00) ^a	99.63 (86.54) ^b	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	99.95	
Control	-	-	0.00 (0.00) ^c	0.00 (0.00) ^d	0.00 (0.00) ^c	0.00 (0.00) ^d	0.00 (0.00) ^e	0.00 (0.00) ^d	0.00 (0.00) ^c	0.00	
SE(m)±			4.99	1.79	0.29	1.62	0.21	0.40	1.74		
CD (P=0.05)			15.06	5.14	0.87	4.87	0.63	1.21	10.23		

* Mean of 4 replications

** Figures in parenthesis are arcsine transformed values

§ 21 days after the spray, the population came down naturally, hence no observations were recorded.

Table 2. Effect of Clofentezine 50% on *T. urticae* on rose (II season)

Treatments	Dose (g ai/ha)	Dose (ml/ha)	Per cent mortality over control						Average mortality (%)	
			Days after I spray*			Days after II spray*				
			3	7	14	21 [§]	3	7		14 [§]
Clofentezine 50% SC	200 g	400	98.70 (83.68) ^b	98.80 (80.71) ^c	97.34 (79.61) ^c	96.66 (83.59) ^c	98.15 (83.68) ^b	97.95 (63.52) ^c	80.00 (83.59) ^c	95.37
Clofentezine 50% SC	250	500	92.26 (73.79) ^d	96.56 (79.33) ^c	86.49 (68.45) ^d	95.55 (77.86) ^d	97.00 (73.79) ^d	97.54 (79.33) ^c	100.0 (90.00) ^d	95.06
Clofentezine 50% SC	300	600	99.73 (87.02) ^b	100.00 (90.00) ^a	100.00 (90.00) ^a	100.00 (90.00) ^a	100.0 (87.02) ^b	100.00 (90.00) ^a	100.00 (90.00) ^a	99.96
Dicofol 18.5% EC	231.25	1250	86.64 (68.58) ^e	93.52 (74.76) ^d	99.57 (86.24) ^b	96.38 (79.12) ^c	96.20 (68.58) ^e	99.02 (74.76) ^d	90.00 (72.13) ^b	94.48
Abamectin 1.9% EC	8.55	450	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	99.66 (86.70) ^b	100.0 (90.00) ^a	100.0 (90.00) ^a	100.0 (90.00) ^a	99.95
Control -	-	0.00	0.00 (0.00) ^f	0.00 (0.00) ^e	0.00 (0.00) ^e	0.00 (0.00) ^e	0.00 (0.00) ^f	0.00 (0.00) ^e	0.00 (0.00) ^e	
SE(m)±			0.23	0.36	0.35	0.34	1.23	0.12	1.18	
CD (P=0.05)			0.64	0.90	1.05	1.01	3.72	0.52	3.57	

* Mean of 4 replications

** Figures in parenthesis are arcsine transformed values

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MS Received : 28 January 2012
MS Accepted : 20 February 2012