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EFFICACY OF ACARICIDES AGAINST RED SPIDER MITE *TETRANYCHUS URTICAE* INFESTING YARD LONG BEAN

Rajashekharappa K*, Ambarish S, Ramesh M Maradi and Onkarappa S

Department of Agricultural Entomology, College of Agriculture, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga 577204, Karnataka, India
*Email: rajashekarappak@uahs.edu.in (corresponding author): ORCID ID: 0000-0001-7469-0946

ABSTRACT

Field experiments were carried out at Zonal Agricultural and Horticultural Research Station, Navile, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka India during kharif 2020 and 2021. A total of seven acaricides were evaluated, and the results revealed that spiromesifen 22.9SC @ 0.8 ml/ l was the most effective in reducing mites (87.21% reduction) followed by diafenthiuron 50WP @ 1.0 gm/ l (84.49%). Maximum marketable pod yield was obtained with spiromesifen 22.9SC (21.36 t/ ha) and it was closely followed by diafenthiuron 50WP (20.15 t/ ha). Maximum cost benefit ratio was observed with these, and thus spiromesifen 22.9SC @ 0.8 ml/ l and diafenthiuron 50WP @ 1.0 g/ l can be recommended against mites in yard long bean.

Key words: Cost economics, diafenthiuron 50WP, efficacy, spiromesifen 22.9SC, mite, *Vigna unguiculata sesquipedalis*, yield

Yard long bean (*Vigna unguiculata* subsp. *sesquipedalis* L.) is an important leguminous delicious vegetable crop. In India, Kerala state contributes a major share, accounting for nearly 90%, followed by Karnataka and Tamil Nadu. It is a highly nutritive vegetable containing a good amount of digestible protein (23.5- 26.3%) both in pods and in leaves (Ano and Ubochi, 2008). Its cultivation faces various problems including pests (Rashid, 1993), and about 150 species of insect pests are known, of which about 25 species are serious (Srivastava, 1987). In Karnataka, *Spodoptera litura* (F); *Maruca vitrata* (F); *Liriomyza trifolii* (Burgess); *Aphis fabae* (Scopoli) and a mite *Tetranychus urticae* (Koch) had been reported by Manjesh et al. (2017). Yard long bean is especially attractive to many sucking pests viz., *Aphis craccivora* (Koch); A*phis gossypii* (Glover); green stink bug *Nezara viridula* (L) and red spider mite (*Tetranychus* spp.) occur from sowing to harvest (Grubben, 1993). Among these red spider mites cause serious damage in open field, shade net and polyhouse conditions (Manjesh et al., 2017). The present study evaluates the efficacy of spme acaricides against these mites.

MATERIALS AND METHODS

Two field experiments were conducted during kharif 2020 and 2021 at the Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences (KSNUAHS), Shivamogga, Karnataka, India (75.35°E, 13.58°N, 588 masl). The station is located in the Southern Transition zone (Zone-7) of Karnataka. Yardlong bean variety, Arka Mangala was used and the crop was sown by dibbling method with a spacing of 120 x 30 cm. The crop was raised following a package of practices released by KSNUAHS, Shivamogga. Commercial formulations of chlorfenapyr 10EC (Interprid), fenazaquin 10EC (Magister), spiromesifen 22.9SC (Oberon), diafenthiuron 50WP (Pegasus), azadirachtin 10,000ppm (Econeem), propargite 57EC (Omite), and dicofol 18.5EC (Colonel-S) were procured from the local vendors. The experiment was laid out in a randomized block design with eight treatments and three replications. The treatments were imposed at 55 and 70 days after sowing when the crop was uniformly infested with mites. Knapsack sprayer fitted with a hollow cone nozzle was used for spraying. Incidence of mites was observed from top, middle and bottom canopy leaves collected from ten randomly selected plants. The leaf samples were collected separately in polythene bags (16x 18 cm) and brought to laboratory for examination under stereozoom microscope. Total number of mites (eggs, nymphs and adults) from each sample were counted and expressed in No./ cm^2. Observations were made a day before spraying and 3, 7, 10 and 14 days after the first and second sprays. The mean values were subjected to square root

Table 1. Efficacy of acaricides against *T. urticae* in yardlong bean (pooled data, 2020, 2021)

Treatments	Dosage (ml/ g/ l)	No. of mites/ cm^2									Mean	% reduction over control	Yield (t/ ha)	C:B ratio
		First spraying					Second spraying							
		DBS	3 DAS	5 DAS	7 DAS	14 DAS	3 DAS	5 DAS	7 DAS	14 DAS				
Chlorfenapyr 10EC	1.5	15.95 (4.06)	8.42 (2.99)^{de}	7.18 (2.77)^{de}	3.98 (2.12)^{e}	7.94 (2.91)^{d}	5.11 (2.37)^{e}	3.42 (1.98)^{de}	2.82 (1.82)^{d}	2.69 (1.79)^{d}	5.19	79.67	19.65	1: 3.80
Fenazaquin 10EC	2.0	16.26 (4.09)	9.25 (3.12)^{cde}	8.02 (2.92)^{d}	6.03 (2.55)^{d}	9.17 (3.11)^{cd}	6.34 (2.61)^{de}	3.94 (2.11)^{cd}	3.14 (1.91)^{cd}	3.27 (1.94)^{cd}	6.14	75.95	18.34	1: 3.55
Spiromesifen 22.9SC	0.8	16.48 (4.12)	6.91 (2.72)^{e}	5.68 (2.49)^{e}	1.86 (1.53)^{f}	3.67 (2.04)^{e}	3.00 (1.87)^{f}	2.38 (1.70)^{e}	1.38 (1.37)^{f}	1.27 (1.33)^{e}	3.27	87.21	21.36	1: 4.27
Diafenthiuron 50WP	1.0	15.76 (4.03)	7.51 (2.83)^{e}	6.15 (2.58)^{e}	2.66 (1.78)^{f}	4.32 (2.20)^{e}	3.58 (2.02)^{f}	3.03 (1.88)^{e}	2.44 (1.71)^{e}	2.01 (1.58)^{e}	3.96	84.49	20.15	1: 4.01
Azadirachtin 10,000ppm	2.0	15.70 (4.02)	12.58 (3.62)^{b}	11.34 (3.44)^{b}	7.94 (2.90)^{b}	12.24 (3.57)^{b}	10.01 (3.24)^{b}	6.80 (2.70)^{b}	6.00 (2.55)^{b}	6.24 (2.60)^{b}	9.14	64.21	16.95	1: 3.56
Propargite 57EC	2.0	15.81 (4.04)	10.73 (3.35)^{bcd}	8.79 (3.05)^{cd}	6.35 (2.62)^{cd}	10.23 (3.28)^{bc}	7.80 (2.88)^{cd}	5.10 (2.37)^{bc}	4.16 (2.16)^{c}	4.06 (2.14)^{bc}	7.15	72.01	18.72	1: 3.80
Dicofol 18.5EC	2.5	16.54 (4.13)	11.73 (3.50)^{bc}	10.13 (3.26)^{bc}	7.46 (2.82)^{bc}	11.45 (3.46)^{b}	9.28 (3.13)^{bc}	6.16 (2.58)^{b}	5.49 (2.45)^{b}	5.44 (2.44)^{b}	8.39	67.16	17.68	1: 3.73
Control	-	15.79 (4.04)	16.28 (4.10)^{a}	20.22 (4.55)^{a}	22.23 (4.77)^{a}	25.92 (5.14)^{a}	26.94 (5.24)^{a}	29.31 (5.46)^{a}	31.01 (5.61)^{a}	32.50 (5.74)^{a}	25.55	0.0	12.31	1: 2.96
	CD (p=0.05)	NS	0.41	0.33	0.25	0.32	0.33	0.30	0.21	0.32	-	-	-	-
	CV	6.36	7.31	6.06	5.54	5.70	6.49	6.33	5.07	5.70	-	-	-	-

Means followed by a common letter in a column not significantly different; DBS- Day before spraying; DAS- Days after spraying; Market price of yard long bean Rs. 10/ kg; Total cost of production/ ha 45,000; C: B ratio= GR/Cost of cultivation; Cost of protection (for two sprays/ ha) - Chlorfenapyr 10EC Rs.6675; Fenazaquin 10EC Rs. 6728; Spiromesifen 22.9SC Rs. 5072; Diafenthiuron 50WP Rs. 5274; Azadirachtin 10,000 ppm Rs. 2576; Propargite 57EC Rs. 4328; Dicofol 18.5EC Rs. 2420

transformation, before statistical analysis in ICAR WASP (Web Agri Stats Package) 2.0 software (p=0.05).

RESULTS AND DISCUSSION

The pooled mean data of mites did not significantly vary at one day before spraying (DBS) (15.70 to 16.54/ cm^2). There was significant reduction in incidence up to 14 days of first and second sprays; least No. of mites/ cm^2 was observed with spiromesifen 22.9SC @ 0.8 ml/ l, found to be on par with diafenthiuron 50WP @ 1.0 g/ l; and the least reduction was in azadirachtin 10000ppm @ 2.0 ml/ l followed by dicofol 18.5EC @ 2.5 ml/ l. The mites cm^2 during first and second sprays indicated that spiromesifen 22.9SC @ 0.8 ml/ l (3.27), followed by diafenthiuron 50WP @ 1.0 g/ l (3.96) were comparatively superior, giving 87.21 and 84.49% reduction, respectively over untreated control, while azadirachtin 10000 ppm @ 2.0 ml/l (64.21 %) followed by dicofol 18.5EC @ 2.5 ml/ l (67.16 %) were inferior. Maximum marketable pod yield of yard long beans was obtained with all the acaricides treated plots (16.95 to 21.36 t/ ha); maximum C: B ratio (1: 4.27) was observed with spiromesifen 22.9SC @ 0.8 ml/ l which was found to be on par with the diafenthiuron 50WP @ 1.0 g/ l (1: 4.01) (Table 1). Thus, spiromesifen 22.9SC @ 0.8 ml/ l and diafenthiuron 50WP @ 1.0 g/ l were equally effective. These results are conformity with those Sekh et al. (2007) that spiromesifen 240 SC @ 0.7 ml/ l rprovides effective control of two spotted spider mite on brinjal giving maximum fruit yield. Kavya et al. (2015) also observed spiromesifen reduced the incidence of mites significantly increasing yield of brinjal. Results of earlier workers in vegetables Varghese and Mathew (2013). Baladhiya et al. (2018) and Singh et al. (2020) corroborate with the present results.

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