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Short Communication

Evaluation of new molecules against scarlet mite, *Raoiella indica* Hirst in arecanut

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Scarlet mite *Raoiella indica* Hirst (Acari: Tenuipalpidae) is an important sucking pest on young arecanut palms during dry weather in areca growing tracts. The registered insecticides that provide adequate control of the pests need repeated application in higher doses which result in adverse effects on the environment and health. In order to circumvent the problems, replacement of conventional insecticides with new powerful molecules at lower dose is necessary. Hence, a replicated field experiment was conducted at five different locations for two consecutive years (2008/2009 and 2009/2010). Two sprays each of the new molecules fenazaquin (10EC at 1.5 ml/L), diafenthiuran (50WP at 1.2 g/L) and propargite (57EC at 0.5 ml/L) were compared with wettable sulphur (80% WDG at 2.5 g/L), dicofol (20EC at 2.5 ml/L), azadirachtin1300 ppm (0.03% at 3 ml/L) and untreated control. Pooled results showed that five days after spray, all the treatments recorded significantly less number of mites (per cm^2 leaf) as against control. Propargite and diafenthiuran were on par with each other and were significantly superior over dicofol and wettable sulphur by registering the lowest number of mites. Fenazaquin was on par with dicofol and wettable sulphur with less number of mites. However, the botanical azadirachtin recorded maximum number of mites. Results suggested that the new molecules, propargite (57EC at 0.5 ml/L) or diafenthiuran (50WP at 1.2 g/L) can be used for effective management of mites in arecanut. Further, fenazaquin (10EC at 1.5 ml/L) can also be used as an alternative to existing conventional insecticides.

Key words: *Raoiella indica Hirst*, arecanut mite management.

INTRODUCTION

The arecanut palm, *Areca catechu* L. (Palmae) is the source of arecanut commonly referred to as betelnut or supari in India. Since time immemorial, it is being used in masticatory (chewing), religious and social ceremonies (Murthy, 1968). Arecanut is largely cultivated in the plains and foothills of Western Ghats and North Eastern regions of India. Karnataka, Kerala and Assam account for over 90% of area and production. Less labour intensive and good price in the last two decades forced the farmers to cultivate the crop with improved varieties in changed agro-climatic conditions. Although arecanut has been an

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Table 1. Response of arecanut mites to different insecticidal sprays.

Treatment	Number of mites per cm^2 leaf in a plant								
	PTC			5 DAT					
				I			II		
	2008	2009	Pooled	2008	2009	Pooled	2008	2009	Pooled
Wettable Sulphur (2.5 g/L)	9.06	9.13	9.09	4.07	4.2	4.14	1.9	1.9	1.9
	(3.06)*	(3.15)	(3.09)	(2.03)	(2.19)	(2.15)	(1.88)	(1.84)	(1.55)
Azadaractin (0.03%; 4 ml/L)	9.12	9.10	9.13	4.12	4.21	4.15	4.1	4.6	4.31
	(3.18)	(3.14)	(3.17)	(2.28)	(2.35)	(2.16)	(2.16)	(2.10)	(2.22)
Fenazaquin (10 EC; 1.5 ml/L)	9.06	9.13	9.07	1.20	1.2	1.20	1.5	1.6	1.52
	(3.09)	(3.15)	(3.17)	(1.77)	(1.73)	(1.30)	(1.64)	(1.59)	(1.43)
Diafenthiuron (50 WP; 1.2 g/L)	9.06	9.10	9.09	1.01	1.43	1.21	1.02	1.3	1.13
	(3.01)	(3.12)	(3.09)	(1.19)	(1.40)	(1.33)	(0.99)	(1.6)	(1.30)
Propargite (57 EC; 0.5 ml/L)	9.13	9.13	9.13	1.10	1.43	1.25	1.0	1.4	1.2
	(3.12)	(3.15)	(3.10)	(1.29)	(1.43)	(1.34)	(1.18)	(1.33)	(1.32)
Dicofol (20 EC; 2.5 ml/L)	9.2	9.2	9.2	1.4	1.50	1.43	1.6	1.7	1.61
	(3.27)	(3.18)	(3.12)	(1.97)	(1.89)	(1.40)	(1.89)	(1.93)	(1.47)
Control	9.30	9.21	9.26	9.06	9.8	9.03	9.40	9.02	9.21
	(3.28)	(3.17)	(3.11)	(3.06)	(3.0)	(3.17)	(3.39)	(3.01)	(3.10)
CV (%)	6.5	2.50	0.15	13.74	13.33	1.91	5.81	17.34	2.42
CD at 5%	0.31	0.12	0.01	0.40	0.40	0.06	0.16	0.48	0.08

PTC= Pretreatment count, DAT= Days after treatment; *figures are $\sqrt{x+0.5}$ transformed values.

important commercial crop, due to lack of scientific knowledge and ignorance by the culti-vators on agronomic aspects, pest and diseases, considerable crop losses were encountered in fields. An array of insect and non- insect pests infests all parts of the palm, such as stem, leaves, inflorescence, roots and nuts in one or other stage of the crop growth. As many as 102 insect and non-insect pests have been reported to be asso-ciated with arecanut palm (Nair and Daniel, 1982). Among them, mites are the serious pests in young areca plantation on leaves which are active after the onset of hot weather (Patel and Rao, 1958). The two major species of foliage feeding mites are the cholam mite/white mite (*Oligonychus indicus* Authority) and the palm mite/ red mite (*Raoiella indicia* Hirst). Both nymphs and adults of *R. indica* live in colonies on lower surface of leaves by de-sapping, leading to the formation of yellowish speckles on the lamina which later coa-lesces, become bronze coloured and the leaves

wither away. Suggested chemicals against foliage mites, such as wettable sulphur (Bhat et al., 1957; Puttarudriah and Channabasavanna, 1957), dicofol, dimethoate and phosphamidon (Devasahayam and Nair, 1985) that are in vogue, needs to be replaced with safe and efficient molecules.

MATERIALS AND METHODS

A multi location field trial in three districts (five locations) was conducted for two consecutive seasons, during 2008/2009 and 2009/2010 in randomized block design with seven treatments and three replications (Table 1). Two insecticidal sprays were given at an interval of 15 days. The spray fluid was applied to the lower surface of leaves at the rate of 500 L/ha with a knapsack sprayer. Ten plants were randomly selected in each plot by tying with luggage labels. Observations on number of mites/cm^2 on top, middle and bottom leaves of selected plants were recorded a day before spraying (pre-treatmental count, PTC) and 5 days after treatment. The efficacy was computed as reduction in number of mites compared to control. The data on the (average of top, middle and bottom leaf of each plant) mean of three replications were considered for statistical analysis after square root transformation.

RESULTS AND DISCUSSION

The results with respect to mite population were significant, indicating differential efficacy of the treatments imposed. Pooled data of two years in all the locations showed significant treatment differences for number of mites/cm^2 leaf/plant. Least number of mites (1.30 and 1.32 mites/cm^2 leaf/plant) was observed after 2^{nd} spray on the areca palm treated with diafenthiuron and propargite respectively and was significantly superior over rest of the treatments. The level of mite population in standard check dicofol (1.47 mites/cm^2 leaf/plant) was on par with fenazaqin and wettable sulphur (1.43 and 1.55 mites/cm^2 leaf/plant, respectively). However, the plant based azadirachtin displayed moderate level of control (2.22 mites/cm^2 leaf/plant) and was significantly different from the unsprayed control which recorded the highest population of 3.10 mites/cm^2 leaf/plant.

The reduction in mite population was due to the efficacy of newer molecules such as diafenthiuron, propargite and fenazaquin which are target oriented. Literature on these molecules against scarlet mite was meager. However, minimum population of mites observed in present findings in dicofol and wettable sulphur treated plots were in confirmation with the results reported earlier by Bhat et al. (1957), Puttarudriah and Channabasavanna (1957), Kanth et al. (1963), Ponnuswamy (1966), Anonymous (1967) and Devasahayam and Nair (1985).

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