I.J.S.N., VOL. 2(4) 2011: 888-889 ISSN 2229 – 6441

INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

Short Communication

BIO-EFFICACY OF SYNTHETIC CHEMICALS, BOTANICALS AND MICROBIAL DERIVATIVES AGAINST SCALE *COCCUS HESPERIDUM* IN ARECANUT

[1]Shivanna, B.K., [2]Gangadhara Naik, B.,[3]Nagaraja, R., [4]Krishna Naika, R., & Gayathridevi[5] S.

[1]Department of Agricultural Entomology, UAS, AINRP(T),ZARS, Shimoga -577204, Karnataka,India,

[2]Department of Plant Pathology, UAS, College of Agriculture, Shimoga -577204, Karnatak,India

[3]Department of Agricultural Microbiology, [4]Department of computer Science, [5]Department of Agricultural Entomology College of Agriculture, Shimoga -577204 Karnataka.

ABSTRACT

Ignorance of plant protection in areca palms at early stages cause considerable loss from the sucking pests particularly, *Coccus hesperidum* Linn. (Hemiptera :Coccidae) during unfavorable weather conditions. In order to overcome this, replicated field trials at five different locations were conducted during 2008-09 and 2009-10. Synthetic chemicals (chlorpyriphos 20 EC 2.5ml/l, endosulfan 35 EC 2ml/l, bufrofezin 25 SC 1ml/l and methomyl 40SP 2g/l), Azadirachtin 0.03% 3ml/ (botanical group) and spinosad 45 SC 0.5ml/l (microbial derivative) including an untreated check were imposed twice at an interval of 15 days. Treatment effects were assessed five days after spray in 2 cm^2 leaf. Pooled results indicated that all the treatments were significantly superior over control by recording the lowest population of scales. Spinosad and bufrofezin were significantly superior and were on par with methomyl by registering lowest number of scales. Methomyl was on par with ruling insecticide endosulfan and was significantly different from standard check chlorpyriphos with a minimum population of scales. Azadirachtin recorded maximum scale population than other treatments. Microbial derivative spinosad and bufrofezin were effective against arecanut scales than other treatments and can be used in managing arecanut scales.

KEY WORDS: Arecanut, *Coccus hesperidum,* Botonicals, Population

INTRODUCTION

Arecanut is largely cultivated in the plains and foothills of Western Ghats and north eastern regions of India. Area and production in different states indicate that Karnataka, Kerala and Assam account for over 90 per cent. The arecanut palm, *Areca catechu* L. (Aracaceae) has been an important commercial crop and is the source of arecanut commonly referred as betelnut or supari in India. Since from time memorial, it is being used in masticatory (chewing), religious and social ceremonies (Murthy 1968), Lack of scientific knowledge and ignorance by the cultivators 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 *viz.,* 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 associated with arecanut palm (Nair and Daniel 1982). Many species of scale insects infests the areca leaves. Among them *C. hesperidum* Linn (coccidae:Hemiptera), a scale insect is severe on undersurface of the leaves. Colonized feeding on under surface of the leaves by both nymphs and adults results in the production of yellow patches on the leaves, which under severe infestation cover the entire leaf (Rao and Bavappa 1961). The honeydew secreted by this insect invites the sooty mould, which interfered with the photosynthesis of the palm. Heavy colonization in young seedlings results in severe blotching and drying of leaves (Daniel 2003). Suggested neem formulations against against foliage feeding *C. hesperidium, viz.,* nimbicidine and mulineem *(*Daniel 2003) are in vogue needs efficient molecules for the management of scales.

MATERIALS AND METHODS

A multi location field trial in three districts (five locations) was conducted for two consecutive seasons during 2008-09 to 2009-10 in randomized block design with seven treatments and three replications. Seven treatments replicated thrice were as follows. 1) Chlorpyriphos 20 EC 2.5 ml/l, 2) Spinosad 45SC 0.5ml/l (microbial group), 3) Endosulfan 35 EC 2ml/l, 4) Azadirachtin 0.03% 3 ml/l (botanical group), 5) Buprofezin 25 SC 1ml/l, 6) Methomyl 40 SP 2g/l and 7) control. 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 liters per hectare with a knapsack sprayer. Ten plants were randomly selected in each plot by tying with luggage labels. A day before spraying *ie.,* pretreatment count (PTC) and 5days after treatment, observations on number of scales/2cm^2leaf on top, bottom and middle leaves of selected plants were recorded. The efficacy was computed as reduction in number of scales compared to control. The data on the (average of top, bottom and middle leaf of each plant) mean of three replications were considered for statistical analysis. Data were square root transformed and analyzed statistically.

RESULTS AND DISCUSSION

The results with respect to scales population (Table 1) 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 scales/2cm^{2}leaf/plant. Least number (1.48 and 1.44 scales/2cm^{2}leaf/plant) scales were observed in IInd spray on the areca palm treated with bufrofezin and spinosad respectively and are significantly superior over rest of the treatments. The level of scales population in standard check methomyl (1.72 scales/2cm^2 leaf/plant) was on par with spinosad, bufrofezin and endosulfan. However the plant based azadirachtin displayed moderate level of control (2.17 scales /2cm^{2}leaf/plant) and was significantly different from the unsprayed control which recorded the highest population of 4.14scales/2cm^2 leaf/plant.

The reduction in scale population was due to the efficacy of newer molecules *viz.,* bufrofezin and spinosad. Literature on these molecules (bufrofezin and spinosad) against scales was meager. However, minimum population of scales observed in azadirachtin treated plots was in confirmation with the results reported earlier by Daniel 2003 and Nair and Menon 1963.

.

TABLE 1. Effect of different insecticides on control of Arecanut scales *Coccus hesperidum linn* (Coccidae: Hemimptera)

Sl. No	Treatments	Number of scales per 2 cm^2 leaf in a plant								
		PTC			5 DAT					
					I			II		
		2008	2009	pooled	2008	2009	pooled	2008	2009	pooled
1	Chlorpyriphos 20 EC 2.5 ml/l	15.21 (4.92)*	16.20 (4.55)	15.90 (4.05)	4.13 (2.53)	4.20 (2.48)	4.13 (2.16)	4.1 (20.9)	4.2 (2.12)	4.12 (2.16)
2	Spinosad 45SC 0.5ml/l	15.11 (4.80)	16.20 (4.59)	15.60 (4.00)	1.53 (1.40)	1.2 (1.40)	1.31 (1.34)	1.6 (1.24)	1.6 (1.41)	1.6 (1.44)
3	Endosulfan 35 EC 2ml/l	15.43 (4.55)	16.12 (4.32)	15.71 (4.05)	4.4 (2.39)	4.2 (2.36)	4.3 (2.18)	4.2 (2.04)	1.8 (1.73)	3.0 (1.73)
4	Azadaractin 0.03% 4 ml/l	14.9 (4.33)	16.21 (4.52)	15.21 (4.03)	4.30 (2.50)	4.30 (2.52)	4.3 (2.19)	4.3 (2.37)	4.2 (2.17)	4.28 (2.17)
5	Buprofezin 25SC 1ml/l	14.8 (4.27)	16.21 (4.41)	15.50 (4.03)	2.0 (1.58)	1.80 (1.92)	1.9 (1.54)	1.52 (1.46)	1.8 (1.84)	1.53 (1.48)
6	Methomyl 40 SP 2g/l	16.1 (4.25)	16.31 (4.38)	16.3 (4.09)	4.16 (2.34)	4.20 (2.39)	4.15 (2.16)	4.10 (2.10)	1.8 (1.85)	2.86 (1.72)
7	Control	16.2 (4.65)	16.40 (4.49)	16.30 (4.10)	16.20 (4.20)	10.40 (3.48)	13.10 (3.56)	16.21 (4.71)	16.21 (4.71)	16.21 (4.14)
	CV %	6.30	5.17	0.88	15.70	17.26	7.68	5.66	17.18	8.16
	CD @ 5%	0.43	0.41	0.06	1.11	1.14	0.29	0.24	0.69	0.33

PTC= Pretreatment count, **DAT**= Days after treatment ***** Figures in parenthesis are √x+0.5 transformed values

REFERENCES

Daniel M, 2003. NATP Final report on Development of IPM packages for plantation crops. CPCRI, Kasargod, Pp.184

Murthy KN, 1968. Areca nut growing in north east India. *Indian Farming,* 18:21.

Nair RB, Menon R.1963. Major and minor pests of arecanut crop. *Areca catechu* Linn. *Arecanut journal,* 14 :139-147

Nair CPR, Daniel M. 1982. Pests. In: *The Arecanut palm.* (Bavappa KVA, Nair MK, Prem Kumar T, editors). CPCRI. Kasaragod, Pp. 151-184.

Rao KSN, Bavappa KVA.1961. Nursery diseases and pests of arecanut and their control. *Arecanut Journal,* 12 :136.