

# Efficacy of Botanicals on the Management of Coconut Perianth Mite *Aceria guerreronis* (Keifer) Acari: Eriophyidae through Root Feeding

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**Abstract**—The present study investigated the efficacy of plant extracts on eriophyid mite *Aceria guerreronis* Keifer, Acari: Eriophyidae a serious threat to coconut plantations in Tamil Nadu. Two root feeding trials were carried out farmers field at, Chidambaram, Tamil Nadu during 2001. The results revealed that among different botanicals tested, phytolam 20ml+20ml water (33.64%, 27.75%), Neem azal 10ml+10ml water (25.01%, 24.75%), Neem oil (16.96%, 20.47%) and Neem seed kernel extract 15ml+15ml (15.23%, 19.10%) was found to be significantly superior in reducing the mite population. Whereas the least per cent reduction was observed in the treatment of Calotropis leaf extract 10ml+10ml (19.51%, 17.74%) and Nochi leaf extract 10ml+10ml (12.41% and 14.58%) per cent reduction of mite population 23 days after treatment

**Keywords:** Mite, *Aceria guerreronis*, Botanicals, Management

## 1. INTRODUCTION

The coconut palm, *Cocos nucifera* L. is one of the important plantation crops in the world. India is third largest coconut producing country. The crop covers an area of 1.9 million hectares with an estimated production of 12.8 billion nuts per annum, which account for about 22.36% of the world production. (Puspha and Nandhalli, 2010). It is primarily a small holder's crop supporting about 5 billion holdings distributed in 18 states and three union territories (Rajagopal and Aruraj 2005). Among the various non insect pests that have been reported on coconut palm eriophyid mite, *A. guerreronis* Keifer (Acari: Eriophyidae) is a serious one. This was first reported from coconuts of Guerrero State of Mexico (Keifer, 1965). The eriophyid mite was unknown in Indian subcontinent till 1984, when it was first recorded from Srivilliputhur area of Tamil Nadu. In India, the mite attained a major pest status in the three peninsular states of India viz., Kerala, Karnataka and Tamil Nadu and it is spreading towards north also (Sathiamma *et al.*, 1998). It has drawn national attention as a threat to the coconut plantation (Sathiamma *et al.*, 1998 and Mohana Sundaram *et al.*, 1999). On account the mites are seen in the floral bracts and the soft portion beneath the perianth. Appearance of elongated white streaks below the

perianth is the first external manifestation of mite infestation on young buttons. (Balaji and Thanga hemavathy, 2007). As the mites feed, the damage initially appeared as a triangular brownish patch at the base of perianth lobes. As the infestation advance, such brownish triangular patches ultimately lead to warting and longitudinal fissures on the nut. In extreme cases, sap draining from nuts resulted in reduction of nut size and kernel content and poor quality of husk. (Nandihalli, 2009). The economic loss due to the coconut mite in India has been reported as 34% on an average (Nair, 2000).

Reductions in copra yield from 15-40% (Herna'ndez Roque, 1977; Julia and Mariau, 1979, Muthiah and Baskaran, 2000; Nair and Koshy, 2000; Seguni, 2002). Due to extensive premature dropping of fruits have been reported from 60% in Colombia (Zuluaga and Sanchez, 1971), 70% in Venezuela (Doreste, 1968), and 10-100% (average 21%) in Tanzania (Seguni, 2002).

## 2. MATERIALS AND METHODS

Root feeding trials were conducted farmers field at Chidambaram, the first field trial was carried out during September-December 2001 and second from January-April 2002. In both trials the variety used was Tall x Dwarf of 15 years old. The inter and intra row spacing was 7x7m and 10x10m respectively. The experiment was laid out in a randomized block design with ten treatments with two palms in each treatment which was replicated thrice. The treatments consists of phytolam (20ml/palm), phytolam (10ml/palm), neem azal (10ml/palm), fortune aza (20ml/palm) neem seed kernel extract (10ml/palm), neem oil (15ml/palm), nochi leaf extract (15ml/palm) and calotropis leaf extract (10ml/palm). Phytolam a herbal product from Hi-Tech coconut corporation, Nagercoil, Tamil Nadu. It contains the extracts of the following herbs, Lantana, *Lantana camera* Linn., Custard apple, *Annona squamosa* Linn. Purple tephrosia, *Tephrosia purpurea* Linn., Kharanja, *Pongamia glabra* Linn., Crown plant, *Calotropis gigantea* Ait, Neem, *Azadirachta indica*

A.Juss., Garlic, *Allium sativum* Linn., Indian privet, *Vitex nugundo* Linn. and Camphor. Monocrotophos (15ml/palm) was used as treated check. The extracts were mixed with equal quantity of water. For root feeding, a pit was dug three feet away from the trunk in search of fresh roots. A freshly developed brick red coloured feeding root of pencil thickness was selected (Dey *et al*, 2001). A slanting cut was given to the root for exposure of vessels. A thick poly bag half litre capacity was filled with the above extract solution and the cut root was inserted into the polybag and tied air tightly with a thread to enable the cut portion to absorb the liquid. The next day morning all the liquid will be absorbed by the plant. The coconut water and kernel will be free from any residue of pesticide after 45 days of application From each of the selected palms, the third bunch was selected for the population assessment.

After root feeding, one nut was taken from each palm and observations on number of mites 8mm<sup>2</sup> area at three places were recorded under stereo binocular microscope and mean population was assessed. Observation on mite incidence were taken at (7,15 and 23 days) after root feeding.

**Table. 1: Bioefficacy of botanical pesticides against coconut perianth mite *A. gurreronis***

S.No	Treatments	* Mean percent reduction of mite population over control (Mean of three root feeding)					
		Root feeding Trial I			Root feeding Trial II		
		7DAS	15DAS	23DAS	7DAS	15DAS	23DAS
1	Phytopalm 10ml+10 ml	11.68 (18.78) c	14.28 (21.38) cd	19.60 (25.63) de	15.14 (26.03) b	17.27 (29.35) cf	20.34 (30.73) bcd
2	Phytopalm 20ml+20 ml	22.45 (26.67) b	27.23 (31.09) b	33.64 (34.93) b	24.53 (32.82) a	26.41 (32.98) b	27.75 (33.98) b
3	Neem azal 10ml+10 ml	15.82 (23.21) bc	20.74 (26.81) bc	25.01 (29.69) c	17.76 (30.06) c	21.86 (31.87) bc	24.75 (33.19) bc
4	Fortune Aza 15ml+15 ml	14.30 (21.57) bc	17.73 (24.49) cd	20.79 (26.43) bc	15.76 (28.90) de	20.53 (31.12) bcd	23.50 (3.41) b c
5	Neem seed kernel extract 10ml+10 ml	10.34 (18.24) c	13.71 (21.27) cd	15.23 (22.87) de	14.13 (27.08) f	17.83 (30.04) cde	19.10 (30.43) bcd
6	Neem oil 15 ml+15ml	10.95 (18.63) c	13.68 (20.80) cd	16.96 (24.27) cd	15.47 (28.02) d	16.17 (28.76) def	20.47 (30.75) bcd

7	Nochi leaf extract 15ml+15 ml	4.06 (11.24) d	5.73 (13.52) e	12.41 (20.27) f	10.75 (25.67) )	13.19 (27.33) f	14.58 (28.12) d
8	Calotropis leaf extract 10ml+10 ml	9.30 (17.65) c	10.99 (19.32) cd	19.51 (23.24) f	12.41 (26.0) d	14.58 (28.11) ef	17.74 (29.64) cd
9	Monocrotophos 15ml+15 ml	30.42 (32.79) a	40.80 (39.46) a	56.09 (48.47) a	40.14 (35.51) a	43.30 (39.36) a	44.93 (39.92) a
10	Control	-	-	-	-	-	-
	S.D	2.91	3.19	3.17	1.93	1.39	2.04
	C.D (0.05%)	5.86	6.41	6.38	3.88	2.80	4.11

Values in parentheses are arcsine transformed values  
Mean values with different alphabets differ significantly

### 3. RESULTS AND DISCUSSION

The results presented in the Table1 revealed that on the 7 days after root feeding maximum per cent reduction was observed in monocrotophos 15ml/palm (30.42% and 40.14%) in both the trials. Among the botanicals, phytopalm 20ml/palm, Neem azal 10ml/palm, Fortune Aza 15ml/palm were significantly superior treatments and recorded (22.45%, 24.53%),(15.82%, 24.75%),( 20.79% and 23.50%) reduction of mites and they were statistically on par with each other. Fifteenth and twenty third day after root feeding, the same trend was observed in phytopalm 20ml/palm,( 27.23% ,26.41%), (33.64% 27.75%), Neem azal 10ml/palm,(20.74%, 21.86%) and Fortune Aza 15ml/palm (17.73%, 20.53%),(20.79%,23.50%) reduction of mite population and significantly at par with each other. All other treatments were also effective in reducing mite population. The results of the above studies are in line with the earlier reports of

Ramaraju (1999), Mohanasundaram *et al.*, 1999,Ramaraju *et al.*, (2000) and Sreeramkumar and Singh (2000) they reported that monocrotophos 20ml/palm was found to be most effective treatment in reducing the mite population of 61.57 and 73.55 per cent respectively. Nair *et al* (1999) Muthiah and Baskaran *et al.*,(1999) and Subaharan *et al* (2001) reported that root feeding of monocrotophos 10ml+10ml water recorded 81.10, 32.80 and 81.05 per cent reduction in infestation and Dey *et al.*, (2001) observed that root feeding of monocrotophos 10ml+10ml recorded 62.62per cent reduction of mite population on 8 days after treatment which was conformity with the present study. Of the selected botanicals, tested phytopalm 20ml+20ml water registered better control at 23 days after root feeding (Balaji and Hariprasad, 2003)

Superiority of the neem product compared to other botanicals may be due to its azadirachtin content, which exhibited high ovicidal, antifeedent and toxic properties resulting in suppression of mite population. Neem cake contains 2 per cent of terpenoids mainly azadirachtin which is responsible for the antifeedant, antiovipositional, growth disruption, fecundity and fitness reducing properties on insects. Pest suppressing activity of neem cake may be attributed primarily to certain phenolic compounds released during decomposition (Alam *et al.*, 1979). Apart from stimulatory effect on root growth which helped profuse growth of roots and absorbed nutrients easily (Sarkar, 2011).

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