
Incidence of *Dolichotetranychus floridanus* (Acari: Tenuipalidae) on Arecanut Plantation

Prabheena, P.* and Ramani, N.

Division of Acarology, Department of Zoology, University of Calicut Kerala, India-673635.

Prabheena, P. and Ramani, N. (2015). Incidence of *Dolichotetranychus floridanus* (Acari: Tenuipalidae) on Arecanut plantation. International Journal of Agricultural Technology 11(5):889-893.

Abstract *Areca catechu* Linn. is one of the most important plantation crops cultivated in Northern districts of Kerala. The kernel obtained from the areca-nut used in many countries for chewing, in tender, ripe or processed form. Reports indicated that several arthropod pests associated with arecanut palm and cause major economic loss. Recently phytophagous mites have been recognized as serious pests of Areca palm especially young palms, assuming high populations after the onset of hot weather. In the present study, attention has been focused on the incidence and damage symptoms of a tenuipalpid mite of the genus *Dolichotetranychus floridanus* infesting the Areca palms of various localities of Malappuram, Thrissur and Kozhikode districts of Kerala. Various life stages of this mite were found inhabiting inside the inner whorls of the perianth of tender nuts, feeding on the epicarp and causing considerable damage to the developing fruits. The initial symptoms of attack included the development of brown patch at the base of the young nut at the level of the perianth. Later these patches were enlarged and the epidermis developed cracks and occasionally deep fissures. In severe cases, nut got shriveled, resulting in fall. Infested plantations revealed the presence of varying numbers of such fallen nuts, which on observation under the microscope revealed the presence of eggs, nymphs and adult stages of the mite.

Keywords: *Areca catechu*, Tenuipalpidae, *Dolichotetranychus floridanus*

Introduction

The areca nut palm is the source of common chewing nut, popularly known as betel nut or Supari and usage of areca nut is indigenous to India, Sri Lanka, Maldives, Bangladesh, Myanmar, Taiwan and numerous islands in South Pacific. It is also popular in parts of Thailand, Indonesia, Malaysia, Cambodia, Vietnam, Philippines, Laos, China. Reports indicates that use of areca nut is strongly interwoven into local art and craft, folklore, social customs, religious practices and cultural rituals of populations resident in South and East Asia. India is the largest producer of areca nut and at the same time largest consumer also. In India it is extensively used by large

* **Corresponding author:** Prabheena, P.; **Email:** p.prabheena@gmail.com

sections of people and is very much linked with religious practices. Arecanut is also one of the important cash crops of India. The tree as well as the nut has a never-ending list of uses like i.e. for chewing purposes, as vegetable, as medicine, as stimulant, timber, fuel wood, clothing, wrapping, lubricant, tannin etc.. However, India produces annually 1, 50,000 tonnes of arecanut from an area of 18, 34,000 hectares. Arecanut is consumed both as a raw nut, as dried ripe nut and as semi mature nut and processed varieties. There are over 150 trade types differing in maturity, processing conditions and varying in their taste characteristics. In India, about 90% of the area and 95% of the production are concentrated in the three states, Kerala, Karnataka and Assam. Arecanut palm is infested by many insect and non insect pests. *D.floridanus* belongs to the family Tenuipalpidae (false spider mites) are usually associated with agricultural and horticultural crops. The *D. floridanus* (pineapple red mite) is the largest mite found on pineapple (Rohrbach and Johnson, 2003). Banks (1900) provided information on the *D. floridanus* for the first time in pineapple from Florida. This mite attacks plants of all ages, but causes greater damage to young plants. The mites feed primarily on the soft white tissue at the base of the leaves causing rust like lesions and allowing rot organisms to invade the dead tissue. Severely infested pineapple plants may remain small, bearing no fruits (Janardan Singh and Mahadevan raghuram, 2011). Flechtmann and Fernando recorded the *Dolichotetranychus* mite on coconut inflorescence in Sree Lanka. But the studies of *D. floridanus* on arecapalms are limited. Hence this paper incorporates some of the observations made on the seasonal incidence and damage symptoms of *D. floridanus* on arecanut palms in Kerala, India.

Materials and methods

Samples of fallen nuts were collected from various arecanut plantations of Kozhikode and Malappuram and Thrissur districts of Kerala state, India between June 2013 and September 2013. The collected samples were carefully placed in polythene bags and transported to the laboratory for subsequent microscopic observation under a Zeiss Stemi DV4 Stereo Zoom Microscope (Carl Zeiss, International) for recording the presence of mites. In the laboratory the tepals of the infested nuts were separated and carefully examined under the microscope for describing the mite. Mites from the infested nuts were isolated with the help of a camel hair brush and released into fresh tepals. Such tepals were placed over water soaked cotton in a petridish and kept covered by black paper over them so as to provide a concealed habitat to the developing mite. Regular observation was carried out under the microscope to record the development of feeding symptoms on the tepals. Samples were taken from 10 sites along the main roads of three districts of North Kerala.

Results

The arecanut palm produces a large number of female flowers in each inflorescence but not all of them develop into mature fruits. Most of the shed nuts show a characteristic reddish discolouration of the area near the perianth. Pineapple mite, *D. floridanus* (Acarina: Tenuipalpidae) are slender, orange coloured and seen colonized inside the concealed niches of perianth of tender nuts. Feeding imparts a characteristic discolouration to the damaged parts. The mites infestation is noticed extensively in areas around Malappuram in North Kerala. Inner face of the tepals, showed the presence of longitudinal reddish, blister like, deformed corky tissue in the form of irregular and small cracks due to feeding by the mites. Each blotch harboured a large number of mites (eggs, immature stages and adults) Fig. 1A. They were soft bodied and soon desiccated when exposed to bright light. Large sized colonies were found on the affected nuts. It feeds on the sap of the epicarp around the point of attachment of the nut. The first symptom of attack is a brown patch at the base of the young nut at the level of the perianth Fig. 1B. At this stage, when the perianth is lifted up, several aggregation of orange coloured mites, at all stages of development can be seen Fig. 2A. Later these patches enlarge, the epidermis cracks, and occasionally deep fissures develop Fig.2B. Malformation of nuts, or immature nut drop, occurs if the infestation is severe.



Figure 1. Large number of mites (eggs, immature stages and adults) in the tepal (A), the first symptom of attack (B)

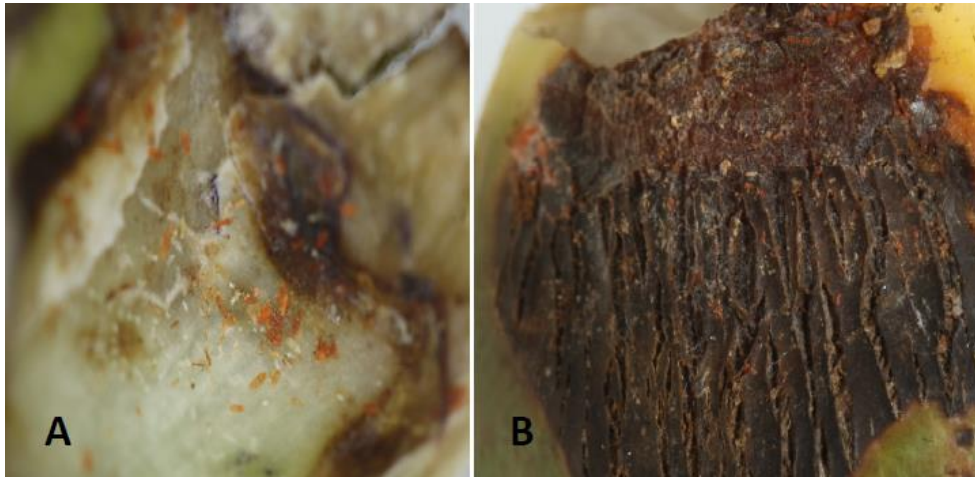


Figure 2. Several aggregations of orange coloured *D. floridanus* mites (A), Brown patches enlarges and the epidermis crackd(B)

Discussion

The feeding activity of the mite showed great resemblance to that of another species of the genus viz., *D. vanderghooti* in arecanut palms by Mariamma and Kumar and coconut palms reported by Sathiamma (1996). When feeding in large numbers on the peduncle, *D. vanderghooti* cause button nut shedding and drying up of the inflorescence. They harbour inside the inner whorls of calyx perianth of tender nuts and suck the sap. Colonise inside the perianth resulting in discolouration of nut surface. As a resulting of the feeding activity, the nuts shrivells and later on fall off resulting up to 10% crop loss. The pineapple red mite *D. floridanus*, is the largest mite found on pineapple (Rohrbach and Johnson, 2003) and these feeding on the epidermal tissue cause it to dry and crack. These cracks then allow the entrance of fungal and bacterial plant pathogens causing tissue rot (Jeppson *et. al.*, 1975; Sanches and Zem, 1978). These lesion when dry cause major scarring and tissue deformation.

Previously *D. floridanus* (Banks, 1900), an important mite pest of pineapple in the world, was reported to occur in Japan by Baker and Pritchard (1956). Since no thorough study about the seasonal population dynamics, feeding potential of the false spider mite *D. floridanus* associated with areca nut. In the Malappuram, Kozhikode and Thrissur districts, *D. floridanus* mites cause damage at all stages of production of areca nuts. The false spider mite does not appear to have any preference for a particular variety of areca nut; affecting all varieties equally. It is reported first time in India to affect areca nut trees.

Acknowledgement

The authors are grateful to Prof. Mohanasundaram, Coimbatore for the identification of the pest mite affecting areca nut.

References

- Banks, N. (1900). The red spiders of the United States (Tetranychus and Stigmaeus). U.S. Department of Agriculture, Division of Entomology Technical Services. pp. 65-77.
- Baker, E. W. and Pritchard, A. E. (1956). False spider mites of the genus *Dolichotetranychus* (Acarina: Tenuipalpidae). *Hilgardia* 24:357-380.
- Flechtmann, C. H. W. and Fernando, L. C. P. (2000). *Dolichotetranychus cocos* n.sp. from the perianth of coconut in Sri Lanka (Acari:Tenuipalpidae). *International journal of Acarology* 26:145-153.
- Kanagaratnam, P., Pinto, J. L. J. G. and Sinnathamby, S. V. (1981). Some minor pests of coconut: New Record for Sri Lanka. *Ceylon Cocon. Q.* 32:93-95.
- Lever, R. J. A. W. (1969). Pests of the coconut palm. Rome: FAO Agricultural Studies.
- Jeppson, L. R., Keifer, H. H. and Baker, E. W. (1975). Mites injurious to economic plants. Berkeley, California, USA: University of California Press. 614 pp.
- Mariamamma, D. and Kumar, P. T. (1976). Pests of arecanut. *Journal of Plantation Crops* 4:68-77.
- Rohrbach, K. G. and Johnson, M. (2002). Pests, diseases and weeds. In Bartholomew, D. P., Paull, R. and Rohrbach, K. G. (Eds.), *The Pineapple: Botany, Production and Uses*. Wallingford: CABI Publishing. pp. 203-251.
- Sathiamma, B. (1996). Observation on the mite fauna associated with the coconut palm in Kerala, India. *Journal of plantation crops* 24:92-96.

(Received: 1 February 2015, accepted: 30 April 2015)