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Studies on the Bunch Preference by Coconut Eriophyid Mite *Aceria guerreronis* Keifer (Acari : Eriophyidae) in Tamil Nadu

Key words : Bunch, Coconut, Eriophyid, Mite

The coconut palm, *Cocos nucifera* L., is one of the important plantation crops in the world, extensively grown in about 93 countries of the world with total production of 56,360 million nuts annually. The productivity of the crop is highest in India with 7,572 nuts/ha. In Tamil Nadu coconut is grown in an area of 3.2 lakh ha with total production of 3,816 million nuts. Although 9 species of eriophyid mites have been reported to attack coconut leaves and nuts (Amrine, Jr. and Stansy, 1994) *Aceria guerreronis* Keifer (Acari: Eriophyidae) feeding on tender nuts cause heavy damage. This pest was first reported from Ernakulam district of Kerela State during 1998 (Sathiamma *et al*, 1998), a major coconut growing state, the pest has appeared almost simultaneously in adjoining states. Because of its sudden outbreak this mite causes concern throughout India. A yield loss up to 31.54%was reported from St. Lucia by Moore *et al*., (1989). In Venezuela the damage of crop was recorded to the tune of 70 per cent. The estimated loss of copra was 30-80 per cent in Mexico Olivera Fonseca, 1986), 10 per cent in Benin and 16 per cent in Ivory Coast (Julia *et al*., 1979). Ramaraju *et al*., (2000) estimated an average loss in copra yield to the tune of 27.5 per cent in Tamil Nadu. A reduction in copra yield ranging from 18-42 per cent was observed when severe symptoms were seen on more than 50 per cent of the surface area of infested nuts (Malik *et al*., 2003). On coconut the mites are seen in the floral bracts and the soft portion beneath the perianth. The infestation by the mites follows immediately after pollination. Appearance of elongated white streaks below the perianth is the first external manifestation of mite infestation on young buttons. Further these white streaks form triangular yellow patches. Draining of sap by the feeding activity of the colony results in drying of the tissues causing browning of the affected portion (Nair *et al*., 2005). Preference for colonization by the mites was reported to vary with the age of nuts. Moore and Alexander (1987) found that the mites were not seen in unfertilized flowers but were present within a few weeks of fertilization, but build up rapidly to a peak on buttons of third bunch from the top and then dropped. It appeared that bunches of one to four weeks old were the most susceptible to colonization. Malik *et al*., (2003) observed that five months old nuts lodged the highest population of mites and in older age group of nuts showed declining tendency. Sathiamma *et al*. (1998) observed that nuts up to nine months of age harbored the mite, but fully mature nuts never contained any stage of mites. Colonies of mites comprising of eggs, first nymph, second nymph, males and females were detected on nuts of six weeks age and mite population showed a rapid increase during this period. This trend continued during progressive development of nuts up to the age twelve weeks followed by steep reduction during subsequent weeks and the population receded to a minimum level on nuts of the age of 22 weeks. Such difference in the duration of infestation may be due to varietal or age difference of palms or other ecological factors (Haq, 1999).

Population of mites was supposed to vary with the age of nuts. In order to identify the most preferred stage of nuts by mites, a field experiments was conducted at farmer's field at Kadavasal village, Chidambaram, Tamil Nadu having during 2003. Uniform management practices were followed. Ten palms of 15 years of age Tall x dwarf variety were selected at random from block. The experiment was laid out in a randomized block design and replicated thrice. From each palm, the nuts were selected randomly from the nine bunches at the rate of one nut per bunch, taking the youngest bunch as bunch number one. The flower bunch before; this was numbered as bunch zero. From this both male and female flowers were collected to check the presence of mites. Collected nuts were brought to the laboratory and population of mites was determined by slightly modifying the "Cello tape embedding technique" to assess the population of mites for more accuracy (Girija *et al*., 2001). In this technique, the perianth was removed from the button mechanically. A cello tape of one inch with was taken and 8 mm^2 areas were marked on the cello tape by using permanent marker pen. Then the cello tape was embedded on mite colonies on nut surface.

Population of mites was counted immediately after removing the perianth without disturbing the colony. Cello tape with embedded mite colonies was pasted on the separately on glass slides. Mites were counted to arrive at the total population mites in 8 mm^2 area.

The results of the present study are furnished in the (Table.1) the results revealed that the mites were not found in male flowers of any inflorescence. Studies of Ranjith *et al.* (2000) also showed that the absence of mites in male flowers. This may be due to the absence of soft tissues in the male flowers where mites can feed. Besides, the development cycle of these mites extend more than 10 years (Mariau, 1977) and by that time the male flowers fall off hence an unsuitable site for infestation. There were no mites in unfertilized female flowers. Moore and Alexander (1987) and Ranjith *et al*. (2000) also reported that the absence of mites in unfertilized female flowers. The absence of mites from unfertilized female flowers may reflect the tight adpression of bracts to the nuts (Hall *et al*., 1979). In female flowers, the meristematic tissue were the mites usually feed was well procted inside the perianth. Since the perianth was tightly ad pressed the gap between the perianth and the flower was very less and the mite cannot enter the meristematic tissue. As per the results of the present study, when the female flowers (buttons) open up for pollination, the attachment between the perianth and the button become less tight and loosened giving entry for the minute sized mite and made it easy to entered in to the interspaced between perianth and button. This was in accordance with the results of Nadarajan *et al* (2000) who observed that there was also disproportionate growth between the perianth parts nut proper, so that entry of the mite was facilitated. Moore and Alexander (1987) reported that 20 per cent of nuts of first bunch were found to be containing mites. The present studies established the absence of mites in the first fully opened the flower bunch consisting tender nuts. These findings are in conformity with the reports of Ranjith *et al* (2001). The results of present study revealed that the infestation was observed from the second bunch onwards. The number of mites gradually increased and reached peak on third bunch and thereafter decreased. A few numbers of mites were noticed even on ninth bunch. The present study showed that the meristematic tissues of the third, fourth and fifth bunches were very soft, so that mites can feed easily. Most probably the colonization starts either from the second or third bunches. The inflorescence opens at the rate of one per month. So at every month bunch number changes i.e. bunch two in one month. Bunch two in one month becomes bunch three in next month. The mites took approximately 10 days for their development (Mariau, 1977). They develop at an average of two to three number of mites that enter the buttons of second and third bunch may be only a few, but within one month, after interrupted multiplication, become enormous. In the present study, higher number of mites was noticed in the third or fourth bunches depending on whether the initial colonization was on second or third bunches. This was in agreement with the findings of Ranjith *et al.* (2001). As per the results of the present study, it was noted that when the buttons get older, the merisematic tissues gets hardened and it would be difficult for the mites for feeding and fifth bunch onwards a reduction in the number of mites was noticed. The mites were found to be less in second bunch when it was at the initial stage of development, whereas in eighth and ninth bunches, it was the remnants of previous stage mite population was observed. Similar observations were made by Ranjith *et al.* (2001). The present study revealed that 2^{nd}, 3^{rd}, 4^{th} and 5^{th} bunches were more preferred by mites for colonization. But maximum number of mites were noticed in buttons of third bunches. Hence the third bunch was fixed as index bunch and further observations were restricted to these bunches only.

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