

SUPPOSED OVOVIVIPARITY AND VIVIPARITY IN THE COCONUT MITE, *ACERIA GUERRERONIS* KEIFER (PROSTIGMATA: ERIOPHYIDAE), AS A RESULT OF FEMALE SENILITY*

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ABSTRACT - Senescent females showing apparent ovoviviparity and/or viviparity in *Aceria guerreronis* Keifer are reported from Brazil, India and Sri Lanka populations; the phenomenon is explained.

Keywords - Acari, Eriophyidae, reproduction, embryonic development, Brazil, India, Sri Lanka.

INTRODUCTION

Eriophyoid mites are entirely oviparous. However, apparent ovoviviparity, in the sense of eggs being laid containing embryos in an advanced state of development with eclosion occurring soon after they are laid, or viviparity, when a female produces living young instead of eggs (Evans, 1992), has been reported. These reports are instances of misunderstanding of female senility; females just became too old and feeble to lay eggs. Some reports consider the species facultatively ovoviviparous or exclusively viviparous, based on observations of egg cleavage and embryo development into nymphs which hatch within females. "Ovoviviparity" had been reported in *Aceria caulobia* (Nalepa) (de Lillo, 1991), *Aceria chondriphora* Keifer (Briones and McDaniel, 1976), *Aceria stefanii* (Nalepa) (de Lillo, 1986), *Eriophyes laevis* (Nalepa) (Shevchenko, 1961), *Metaculus mangiferae* (Attiah) (Abou-Awad, 1981), *Phyllocoptruta oleivora* (Ashmead) (Hall, 1967), *Phytoptus avellanae* Nalepa (Nalepa, 1889; in de Lillo, 1991), and *Vasates quadripedes* Shimer (Hall, 1967). "Viviparity" had been reported in *Aculus ulae* Boczek and *Rhyncaphytoptus ulmivagrans* Keifer (Boczek, 1961; ChannaBasavanna, 1966). *Rhynca-*

phytoptus ficifoliae Keifer was reported to be an exclusively viviparous form, lacking the egg stage by Abou-Awad *et al.* (2000). These authors may have failed to observe the eggs which in some species are flattened against the leaf and are transparent. Amrine (1996, unpubl.) collected flattened, sculptured eggs of *Aculus ulae* on upper surfaces of *Carpinus betulus* leaves in Morgantown, WV.

The coconut mite *Aceria guerreronis* Keifer has moved from E. Africa to Sri Lanka and South India (Moore, 2000). It is a severe pest in these new territories causing severe drop of fruits. Several countries have extensive research programs on the coconut mite and we have been making confirmations of submitted specimens.

MATERIAL AND METHODS

During morphometric studies on the coconut mite *Aceria guerreronis* Keifer, specimens from 26 populations from nine countries in America, Africa and Asia - Benin, Brasil, Cuba, India, Mexico, Sri Lanka, Tanzania, USA and Venezuela - collected from coconut (*Cocos nucifera* L.) fruits and from San Diego, CA, USA, collected from *Syagrus romanzoffiana* (Cham.) Glassm. buds were studied. Specimens from Brazil were alive

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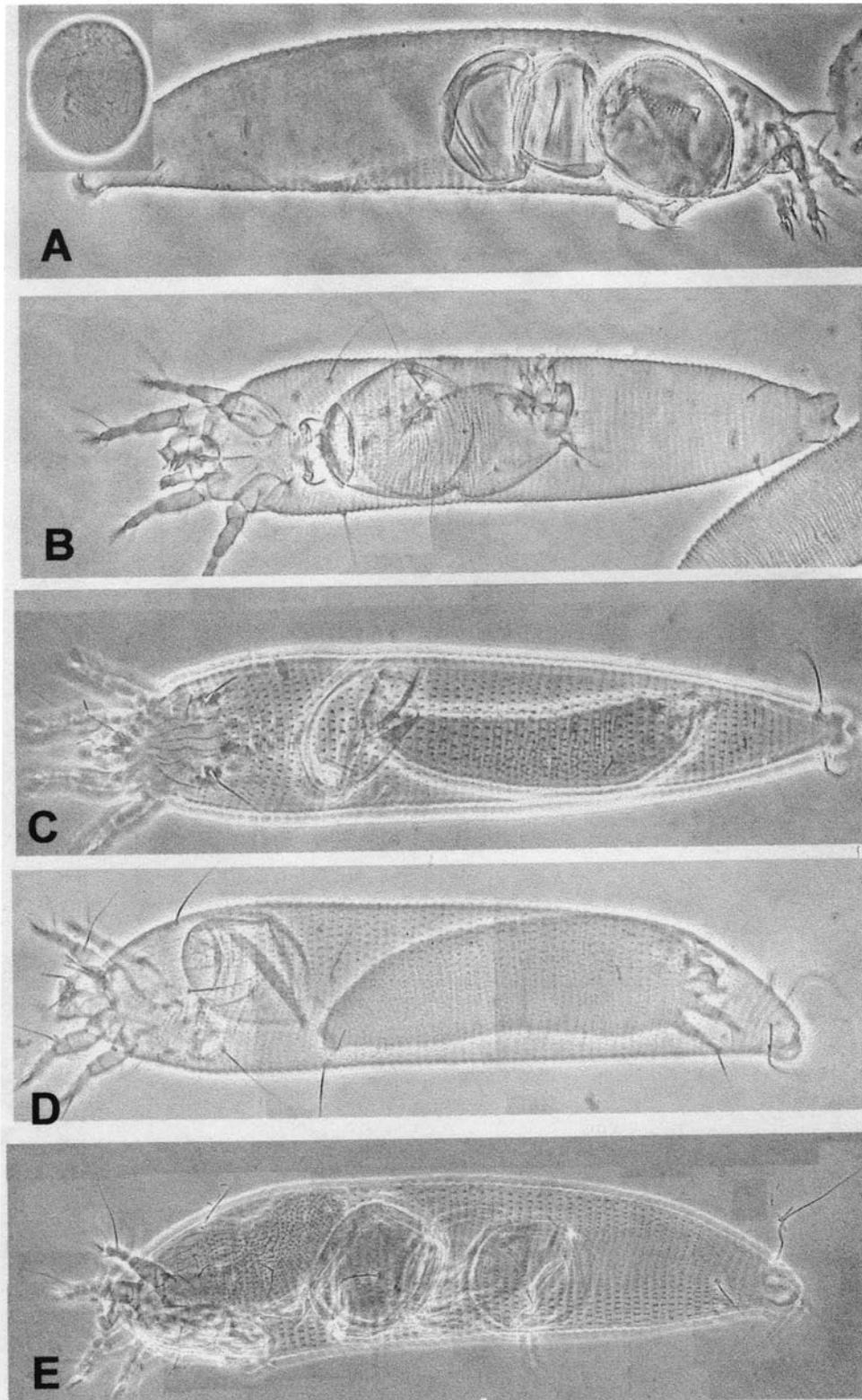


Fig. 1. Phase-contrast micrographs of *Aceria guerreronis* reproducing females - A. Chorions within a female and an anterior egg containing a formed larva; B, C and D. larva eclosing inside a female directed toward the posterior part of her body and ruptured chorion; E. larva eclosing inside a female directed toward the anterior part of her body with ruptured chorions and/or developing eggs.

when mounted; specimens from other countries were in 70% ethyl alcohol. About 50 specimens from each population were mounted in modified Berlese medium and observed with a phase contrast microscope.

RESULTS

Signs of supposed ovoviviparity were observed in about 5-10% of specimens from the States of Alagoas and Bahia, Brazil; Kerala, India; and Kalpitiya, Madampe and Madurankuliya, Sri Lanka. Eggs in advanced stage of embryonic development; chorions and larvae were observed inside senescent female bodies (Fig. 1). Some larvae had the gnathosoma directed toward the posterior part of the mother (Figs. 1b, c, d) while others had the gnathosoma directed toward the anterior (Fig. 1e). It is possible that in the case of individuals containing chorion remnants (Figs. 1a, e), the larvae may have emerged through the mother's genital opening without harming her as reported in *A. caulobius* by de Lillo (1991).

DISCUSSION

Jeppson *et al.* (1975) proposed several hypotheses to explain the occurrence of ovoviviparity or viviparity in mites. However conditions influencing this reproductive strategy is not well known. Filipponi and Francaviglia (1964) have shown that in some species of *Macrocheles* Latreille the length of time the eggs are retained in the female reproductive tract is influenced by availability of food; plentiful food favored oviparity whereas a shortage of food produced larviparity through the longer retention of the egg in the female genital tract. However, in *Spinturnix* Heyden (Spinturnicidae), a chiropteran parasite, it occurs in the presence of plentiful food, which is probably essential for the maintenance of high nutritional status in the female during the extended period of embryonic development (Evans, 1992). De Lillo (1991) tried unsuccessfully to establish a relationship between apparent ovoviviparity in *A. caulobius*, a gall-forming eriophyid mite living on stems of *Suaeda fruticosa* Forsk., and bioecological factors as density of the gall population, the growth of the galls or the migration of the mites.

Our report here indicates that senescent females may show apparent ovoviviparity and/or apparent viviparity in *A. guerreronis*. It should be noted, however, that there is no true ovoviviparity or viviparity in eriophyid mites and previous reports of such occurrences in eriophyid mites should be considered erroneous.

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