

# First Report of *Raoiella indica* Hirst (Acari: Tenuipalpidae) in Tunisia

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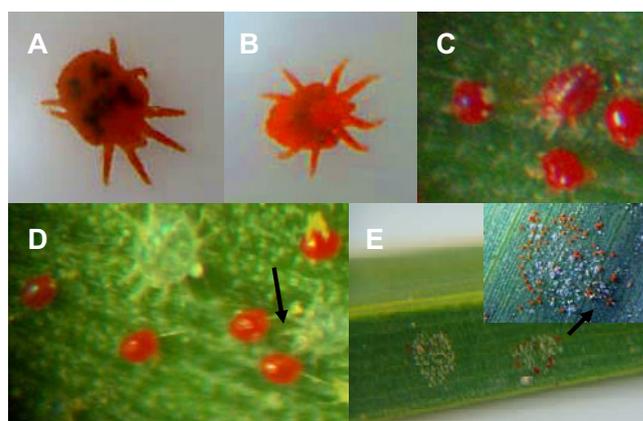
## ABSTRACT

*Raoiella indica* Hirst was encountered for the first time in 2010 on date palm in the Nefzawa oasis. Then, it was recorded in different areas of the Djerid oasis such as Tozeur, Degache and Nafta. Some morphological and biological aspects of this insect are described in this paper.

**Keywords:** date palm, oasis, red mite

*Raoiella indica* Hirst, the red palm mite, belongs to the class Arachnida, order Acari and family Tenuipalpidae. This species is typically characterized by its smooth dorsal integument (Moutia 1958). Adult female red palm mites are red, typically with dark patches on the body, and about 0.32 mm long (Fig. 1A). Males are smaller than females and triangular in form (Fig. 1B). Dorsal setae are present in both sexes. The body of the red palm mite does not have striae. The first pair of dorsocentral hysterosomal setae is longer than the others; the fourth pair of dorsosublateral setae is shorter than the first pair. All dorsal body setae are slightly clublike and serrate. The nymphal stages (Fig. 1C) are slightly smaller than the adults and exhibit a smoother integument that lacks the projecting setal bases that are apparent in the adults, and they also have distinctly shorter dorsal and lateral setae. The eggs (0.09 mm × 0.12 mm) are oblong smooth and red and attached to the abaxial leaf surface by a slender stipe, or tether that is about twice as long as the egg (Fig. 1D), in patches of 100-300 eggs. All these characteristics are described on specimens collected in Tunisia (at least 15 specimens from each development stage or sex were examined). Photos were taken with a stereomicroscope (optech) equipped with a digital camera (UTHSCSA Image Tool 3.00 digital camera USB). Photos of eggs and Larva (Figs. 1C, 1D) were taken directly on infested leaves with mite colonies (magnification 45x). Photos of male and female of *Raoiella indica* Hirst (Figs. 1A, 1B) were taken on specimens conserved in alcohol (70%).

The biology of *R. indica* was studied in India by Nagesha-Chandra and Channabasavanna (1984). Developmental ranges are influenced by temperature, relative humidity RH and host plant (Gerson *et al.* 1983). At temperatures between 24-26°C and 60% RH, females completed their development in 24.5 days and males in 20.6 days; adult longevity was 30 days for females and 21.6 days for males. Fertilized females produced an average of 22 eggs and virgin females 18.4 eggs. The time for development of each life stage is: egg, 6.1-6.5 days; larva, 5.7-9.5 days; protonymph, 5.4-6.5 days; and deutonymph 4.1-10.5 days. The time required to complete the life cycle is 21-33 days (Jepson *et al.* 1975). The red palm mite establishes colonies on the abaxial sides of leaves (Fig. 1E), usually along the midrib, where they feed on cellular contents of the leaves accessed through the leaf stomata. Feeding mites, especially



**Fig. 1** (A) Female of *Raoiella indica*. (B) Male of *Raoiella indica*. (C) Larva of *Raoiella indica*. (D) Eggs of *Raoiella indica* with tethers fixing eggs to the surface of the leaf. Arrow showing tethers. (E) Symptoms of *Raoiella indica* on leaf of date palm. Arrow showing a mite colony.

at high mite densities, cause localized yellowing of the leaves followed by tissue necrosis (Rodríguez *et al.* 2007).

According to Mendonça *et al.* (2005), *R. indica* is widely distributed in India, Pakistan, Russia, Iran, Israel, Oman, Pakistan, Egypt, Sudan and Mauritius. It has been reported from several Caribbean islands, including Martinique (Flechtmann and Etienne 2004), Saint Lucia and Dominica, Guadeloupe and Saint Martin (Etienne and Flechtmann 2006), Puerto Rico and Culebra Island (Rodríguez *et al.* 2007), Haiti and Jamaica.

*R. indica* can attack several palm species (32 species), in particular: *Cocos nucifera*, *Phoenix dactylifera*, *Areca catechu*, and ornamental species such as *Dictyosperma album*, *Syagrus ramanzoffiana*, *Veitchia merrillii* followed by plants within the Musaceae (banana), Zingiberaceae and a few other monocots (Etienne and Flechtmann 2006). Inspection of several plants (*Citrus* spp., caladium, dracaena, periwinkle, tropical almond) located under infested coconuts in Trinidad showed that females sometimes fall onto these plants, but no eggs or immatures appear to develop on them.

In Tunisia, we observed *R. indica* Hirst for the first time on date palm (var. 'Deglet Nour') during July 2010 in the Nefzawa oasis. This mite was later encountered in other locations of the Djerid oasis such as Degache, Tozeur and Nafta on Deglet Nour. This mite was also observed on three individual date palm varieties: (var. 'Gondi', 'Gasbi' and 'Iksbah') located in the experimental station of the Regional Research Center on Oasis Agricultural.

Welbourn (2006) indicated that *R. indica* is dispersed by wind currents. Kane and Ochoa (2006) emphasize that dispersal could happen through the female stage. Mendonça *et al.* (2005) stated that one of the most common ways of dispersal is through human activity, where persons will come in contact with palms and transport infested plants or leaves from one region to another.

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