



## SCIENTIFIC NOTE

### First Report of the Red Palm Mite, *Raoiella indica* Hirst (Acari: Tenuipalpidae), in Brazil

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#### Abstract

The presence of the red palm mite, *Raoiella indica* Hirst, is reported for the first time in Brazil. This invasive mite was found in July 2009 infesting coconut palms and bananas in urban areas of Boa Vista, State of Roraima, in northern Brazil. Comments on the possible pathways of *R. indica* into the country, present and potential impact of its introduction and mitigating measures to prevent or to delay the mite spread in Brazil are presented.

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The red palm mite, *Raoiella indica* Hirst, is a notable and recent example of an invasive phytophagous mite. It was described from India infesting coconut palms (*Cocos nucifera*) (Hirst 1924) and was later reported in northeast Africa (Pritchard & Baker 1958), southern Africa (Moutia 1958), and the Middle East (Gerson *et al* 1983). Main host plants in these areas are coconut and date palm (*Phoenix dactylifera*) (Hirst 1924, Gerson *et al* 1983).

The introduction of the red palm mite to the New World appears to be a recent event (Dowling *et al* 2008). It was not found in a relatively extensive survey conducted in several French islands of the Caribbean area in late 1990's (Flechtmann *et al* 1999). However, it was found a few years later in Martinique (Flechtmann & Etienne 2004), and in several other Caribbean Islands afterwards (Kane *et al* 2005, Etienne & Flechtmann 2006, Rodrigues *et al* 2007).

The mite not only spread quickly, but also extended

greatly its host range in the new areas where it was found in the Americas. One of the main new hosts of the mite is banana (Musaceae). Other new hosts were tropical ornamentals in Heliconiaceae, Strelitziaceae and Zingiberaceae (Kane *et al* 2005, Etienne & Flechtmann 2006).

The red palm mite was detected in November 2007 in Florida, USA (FDACS 2007). It was also recently found in Mexico, in Cancun and Isla Mujeres, Quintana Roo (NAPPO 2009). In early 2007 it was found in South America, in the State of Sucre, in northeast Venezuela, infesting coconut palms, banana and royal palm, *Roystonea regia* (Vásquez *et al* 2008). That report alerted Brazilian researchers about the risk of its imminent entry in Brazil, stimulating a systematic survey for its presence in northern Brazil.

Roraima was as one of the most probable region where the pest could be first found in Brazil, given its extensive border with Venezuela and the frequent trade of

goods and movement of people between these countries. Surveys were initiated in May 2007 in Pacaraima, Boa Vista and Cantá municipalities. The first site is on the border of Brazil and Venezuela; the second, the capital of the State and about 220 km south from the border; the third, about 100 km southeast of the capital. Plants sampled were coconut, banana and the following native palms (Arecaceae) - *Euterpe oleracea*, *Oenocarpus bacaba*, *Mauritia flexuosa*, *Bactris gasipaes* and *Maximiliana maripa*. In 2008, the surveys were intensified and conducted at these same sites in April, August, September, November and December. In addition to those plants, samples of other 14 native and introduced Arecaceae (*Astrocaryum*, *Geonoma*, *Iriartella*, *Mauritia*, *Oenocarpus* and *Socratea*) as well as of *Heliconia* (Heliconiaceae) were collected. The red palm mite was not found in those surveys.

In July 2009, *R. indica* was found in a sample of coconut leaves from the urban area of Boa Vista (02° 51' 24.4" N and 60° 39' 37.1" W). The presence of this quarantine pest (listed as a regulated pest in IN 52 MAPA, published in 20.XI.2007) in the country was immediately communicated to the Brazilian Ministry of Agriculture following the regulations concerning records of new pests in the country. Subsequent samples showed the mite to be spread all over that municipality (02° 45' 28.5" to 02° 52' 53.0" N and from 60° 39' 46.6" to 60° 43' 50.4" W), on coconut and banana plants.

Attention has also been given to determine the possible mode of entry of the pest in Brazil, to apply the appropriate quarantine measures. The fact that the pest was not found in the surveys conducted in northern Roraima in 2007 and 2008 and that it was found for the first time in a place distant from the border suggests that the dispersal was not natural, but that the mite was probably transported by man.

The impact of the introduction of the red palm mite in Brazil is considered potentially high due to: 1) the invasive behavior of the mite in areas of the Caribbean Islands, North America and Venezuela where the mite reached dramatically high levels (Peña *et al* 2009, Welbourn 2010); 2) the socio-economic importance of its main host plants in the country (FAO 2007); 3) the potentially high yield losses (up to 75% in Trinidad & Tobago, according to Castillo 2008).

The first impact of the introduction of *R. indica* in Brazil was social. Immediately after the first detection, the Brazilian Ministry of Agriculture adopted a quarantine measure, prohibiting the transportation of propagation material or fresh products of host plants known to be attacked by the red palm mite from Roraima to the State of Amazonas. The impact was locally significant, given the importance of banana to the local growers, most of whom are small growers.

The eradication of *R. indica* from Brazil is not

considered possible due to its high disseminating capacity and the establishment and spread of the mite in Venezuela, a neighbor country. The red palm mite is polyphagous and its preferred hosts, the palm trees, are an important part of the natural vegetation of Roraima. Wide scale application of chemicals in the area as a strategy to reduce its dispersion would be economically and environmentally costly.

However, mitigating measures to inhibit the dispersal of *R. indica* are considered important. Quarantine procedures should be put in place in infested areas to prevent its dissemination through human activities. Thus, strict control of movement of host plant material from the infested area is crucial. Also, as much as possible, considerable effort should be dedicated to keeping the mite populations at low levels in infested areas, reducing the source of infestation to non-affected areas.

Additionally, control measures that mitigate mite damage should be put in place in Roraima, including the study of local predatory mites and insects. In the long run, the introduction and utilization of biological control agents, either with local natural enemies or through classical biological control, need to be considered as a possible strategy to control the red palm mite.

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