

# Honey Bee Tracheal Mite, *Acarapis woodi* (Rennie) (Arachnida: Acari: Tarsonemidae)<sup>1</sup>

H. A. Denmark, H. L. Cromroy and M. T. Sanford<sup>2</sup>

*The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.*

## Introduction

In October 1984, the honey bee tracheal mite, *Acarapis woodi* (Rennie), was found in Florida. Although it was first described by Rennie in 1921, the mite was not found in the United States until 1984. Rennie described the mite from bees on the Isle of Wight and associated it with the “Isle of Wight” disease. Symptoms of this infestation were described as “bees crawling about unable to fly, and with wings disjointed; dwindling and mortality of colonies have been said to occur rapidly with colonies dying within a month.” It was later shown that the tracheal mite was not the cause of the “Isle of Wight” disease (Bailey 1964), and later reports (Bailey 1968, Morse 1978) indicate that *Acarapis woodi* is not as serious a pest of honey bees as previously thought. In combination with other adverse conditions, however, heavy mite infestations may cause a reduction in bee activity.

## Distribution

With the exception of Australia, New Zealand, Scandinavia, and Canada, *Acarapis woodi* has been found wherever

honey bees are found (Delfinado 1963). In the United States, it was first found in Weslaco, Texas, in July 1984, in New Iberia, Louisiana, in August 1984, and in Florida, North Dakota, South Dakota, New York, and Nebraska, in October 1984.

## Description

### Female

Length 140 to 175 microns, width 75 to 84 microns. Idiosoma ovoid or nearly pyriform; dorsal shield and plates faintly sclerotized, with indistinct punctures. Propodosoma lacking pseudostigmatic sensilla; two pairs of long, attenuate setae, verticals V1 and scapulars Sc. V1 setae shorter than Sc, about ¼ longer than distance between bases of setae Sc. Ventral apodemes I forming Y-shaped structure with anterior median apodeme (a conspicuous transverse band crossing the thorax in front of the scutellum), not joining transverse apodeme. Apodemes III weakly extending laterad to bases of trochanters III. Apodemes IV extending to bases of trochanters IV. Posterior median apodeme rudimentary, sometimes as faintly formed Y-shaped structure. Leg I robust with single hooked claw. Legs II and III each with paired claws. Leg IV stubby, widely spaced; femur-genu and tibiotarsus functioning as one segment; tibiotarsus IV two times as long as broad; femur-genu broader than long, with three setae unequal length; tibiotarsus abruptly narrowed, almost straight, about two

1. This document is EENY-172, one of a series of the Department of Entomology and Nematology, UF/IFAS Extension. Original publication date November 2000. Revised July 2014, March 2021, and October 2024. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication.

2. H. A. Denmark, Florida Department of Agriculture and Consumer Services, Division of Plant Industry; H. L. Cromroy and M. T. Sanford, Department of Entomology and Nematology; UF/IFAS Extension, Gainesville, FL 32611

times as long as broad. For a more complete description see Delfinado-Baker and Baker (1984).

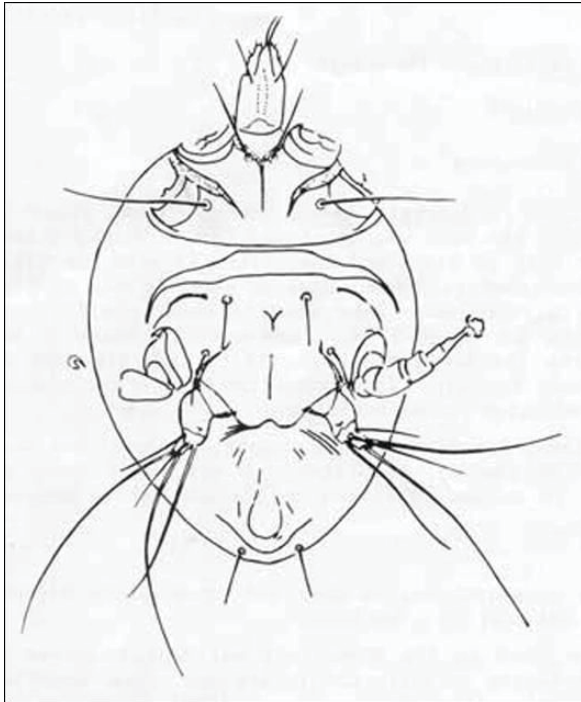


Figure 1. Adult female honey bee tracheal mite, *Acarapis woodi* (Rennie).

Credits: Division of Plant Industry

## Male

Length 125 to 136 microns, width 60 to 77 microns. Similar to female except for sexual differences. Apodemes III to IV not developed, barely discernible. Posterior median apodeme indistinct, sometimes forming weak Y-shaped structure. Apodemes V present as weakened transverse apodeme barely discernible. Leg I more robust than others. Leg IV short, about  $\frac{3}{4}$  as long as leg III, without claw; trochanter large, slightly longer than wide, with seta; femur-genu slightly more than two times as long as wide, without flanges, three setae of unequal length; tibiotarsus nearly straight, slightly shorter than femur-genu; apical with slender pointed solenidion and 1 very long seta. Males and nymphs are difficult to separate from other known species.

## Life Cycle

### Host

It is probably specific to the honey bees.

## Economic Importance

Although it has been shown that a mite infestation does not cause acute disease and devastating losses, the life of the infested bee may be shortened, but only by a few days.

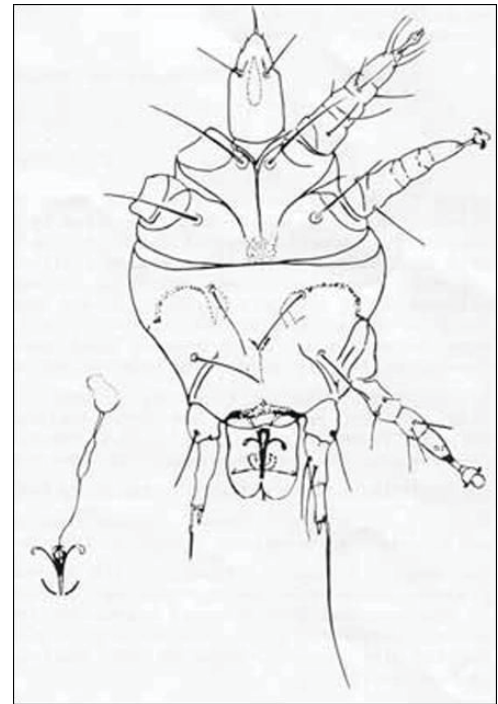


Figure 2. Adult male honey bee tracheal mite, *Acarapis woodi* (Rennie). Credits: Division of Plant Industry

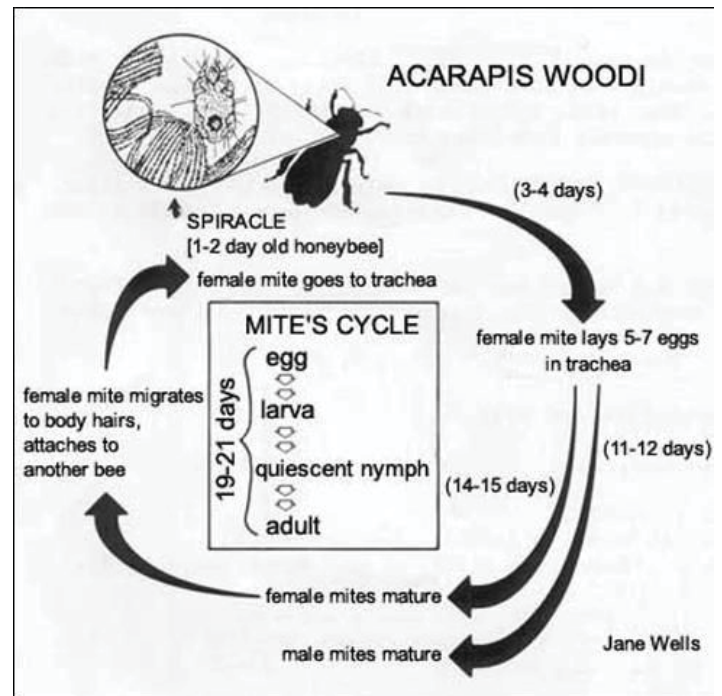


Figure 3. Life cycle of the tracheal mite of the honey bee.

The mites puncture the tracheal wall of young bees and feed in the hemolymph but do not appear to transmit diseases during this process. Infested bees may behave normally or as described in the introduction until they die. Infested queens can live for many years (Fyg 1964). Morse (1978) estimated a five percent reduction in the population of a colony of infested bees. Honey production and pollen collecting are also reduced. Colonies that develop severe

infestations usually do so in late summer and die in late winter.

Some British bees and some North American strains show a certain amount of resistance to the mites (Bailey 1965). American bees are somewhat less resistant than the British bees.

## Survey and Detection

A close examination of the trachea is required to determine mite infestation. Occasionally adult mites are found on the external surface of the bee. The gravid female mite crawls to the tip of a hair and attaches to a young bee. Generally, heavy infestations will show up as a darkened trachea; healthy tracheae without mites are clear to white under the microscope.

## Management

Acaricides that have been tested in Europe and Mexico are Acarol, Menthol, and Folbex Forte. Currently, no decision has been made to use these controls in the United States. For further information see Guzman-Novoa and Zozaya-Rubio (1984). Formic acid has recently been approved under the name Apicure.

## Selected References

Bailey, L. 1964. The Isle of Wight disease: The origin and significance of the myth. *Bee World* 45: 32–37, 18.

Bailey, L. 1965. The effect of *Acarapis woodi* on honey bees from North America. *Journal of Apicultural Research* 4: 105–108.

Bailey, L. 1968. Honey bee pathology. *Annual Review of Entomology* 13: 191–212.

Definado, M.D. 1963. Mites of the honey bee in Southeast Asia. *Journal of Apicultural Research* 2: 113–114.

Definado-Baker, M., and E.W. Baker. 1984. Notes on honey bee mites of the genus *Acarapis* Hirst (Acari: Tarsonemidae). *International Journal of Acarology* 8: 211–266.

Fyg, W.W. 1964. Anomalies and diseases of the queen honey bee. *Annual Review of Entomology* 9: 207–224.

Guzman-Novoa, E., and A. Zozaya-Rubio. 1984. The effects of chemotherapy on the level of infestation and production of the honey in colonies of honey bees with acariosis. *American Bee Journal* 124: 669–672.

Morse, R.A. 1978. Arachnids: Acarina (mites and ticks), p. 197–209. *In* Morse, R.A., ed. Honey bee pests, predators, and diseases. Cornell University Press, Ithaca. 430 pp.

Rennie, J. 1921. Isle of Wight disease in hive bees—Acarine disease: The organism associated with the disease *Tarsonemus woodi*, n. sp. *Transactions of the Royal Society of Edinburgh* 52: 768–779.