

# Spider Mites of Sugar Cane in Eastern Asia (Acarina : Tetranychidae)\*

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Spider mites have been known as being considerably injurious to sugar cane in eastern Asia. But, there is little information about the sugar cane mites of this area. This taxonomic paper of spider mites is based on specimens collected on sugar cane in Kyushu proper, Tanegashima Island, Amami-ôshima Island, Okinawa Island, Taiwan, the Philippines, and Java. The following five species are treated in this paper:

1. *Schizotetranychus celarius* (Banks)
2. *Oligonychus orthius* Rimando
3. *Oligonychus kadarsani* n. sp.
4. *Oligonychus shinkajii* Ehara
5. *Oligonychus exsiccator* (Zehntner)

*O. kadarsani* n. sp. is here described, and its holotype is retained in the Biological Institute, Faculty of Education, Tottori University.

## Key to the Tetranychid Species of Sugar Cane in Eastern Asia

1. Opisthosoma with a pair of para-anal setae; empodium clawlike, with three pairs of proximoventral hairs (empodium I of male with a pair of proximoventral spurs); tarsi I and II gradually declivate distally..... 2
- . Opisthosoma with two pairs of para-anal setae; empodium clawlike and bifid; tarsi I and II truncate distally..... *Schizotetranychus celarius*
2. Aedeagus with a terminal knob..... 3
- . Aedeagus without a terminal knob..... 4
3. Knob of aedeagus very large, about one half as long as dorsal margin of shaft; axis of knob forming a slight angle with axis of shaft..... *Oligonychus exsiccator*
- . Knob of aedeagus small, about one-fourth to one-third as long as dorsal margin of shaft; axis of knob parallel to that of shaft..... *O. shinkajii*
4. Aedeagus with dorsally directed part obviously sigmoid..... *O. orthius*
- . Aedeagus with dorsally directed part barely sigmoid..... *O. kadarsani* n. sp.

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### 1. *Schizotetranychus celarius* (Banks)

*Stigmaeopsis celarius* Banks, 1917, p. 196, pl. 15, Figs. 9, 11.

*Schizotetranychus celarius*, McGregor, 1950, p. 308, pl. 19; Pritchard & Baker, 1955, p. 249, Figs. 205-207; Ehara, 1957, p. 18, Figs. 13-24.

*Schizotetranychus celarius* is readily recognized by the dorsoventrally depressed body, and by having the dorsal body setae of various lengths, and tarsi I and II short and abruptly declivate distally. The adult mites are pale greenish yellow to pale green. Mites of this species form restricted colonies and live between the under surfaces of host leaves and a dense spinning canopy. Within the scope of the canopy the mites feed on the under surfaces of the leaves, and the whitish feeding scars can be found on the upper surfaces of the leaves.

*S. celarius* is known from Japan proper (Hokkaido, Honshu, Shikoku, Kyushu), Okinawa Island, and U. S. A. (Florida, Georgia, California), and it is a common pest of bamboo and sasa bamboo in Japan. Recently it was recorded from sugar cane, *Ficus*, and *Miscanthus* in Okinawa Island by the author (Ehara, 1966). This mite is a species primarily infesting bamboo and sasa bamboo, and so it is probable that the mite is not a serious pest of sugar cane in this island. Previously it was also recorded from rice in Nagano Prefecture, Honshu (Ehara and Miyashita, 1962).

*Specimens examined.* One ♀ & nymphs, Nakijin, Okinawa Id., 25-IV-1966 (K. Miyara leg.), on sugar cane.

### Genus *Oligonychus* Berlese

The four species of *Oligonychus* here treated, *orthius*, *kadarsani*, *shinkajii* and *exsicicator*, are assigned to the Pratensis species group defined by Pritchard and Baker (1955). Mites belonging to the Pratensis group are pale greenish yellow, and they are recognized by having the male empodium I with a pair of proximoventral spurs and by the dorsally bent aedeagus. Females of the Pratensis group are provided with tibia I carrying nine tactile setae. The dorsal hysterosomal striae of these females are transverse, but the striae are longitudinal between and caudad of the inner sacral setae. The females are very similar, and they cannot be distinguished from one another in most cases. The males of the Pratensis group, however, are distinguished from one another by the shape of the aedeagus. Mites of this group feed on the undersides of host leaves.

Females of *O. orthius*, *O. kadarsani*, and *O. shinkajii* are common in having the palpal terminal sensillum slightly longer than wide, and in having the peritremes nearly straight distally, though in *orthius* it usually more or less bends at the distal end. In short, the females of the three species are indistinguishable from one another. Females of *O. exsicicator* are not available for this study. In addition, the subgenus *Reckiella* was recently proposed for the species of the Pratensis group and for some species of the Pritchardi group (Tuttle and Baker, 1968).

## 2. *Oligonychus orthius* Rimando

(Figs. 1-3, 13)

*Oligonychus orthius* Rimando, 1962, p. 22, Fig. 11 (in part); Ehara, 1966, p. 13, Figs. 22-30; Lo, 1968, p. 122, Figs. 19-26.

*Tetranychus exsicicator* (nec Zehntner), Kishida, 1959, p. 382.

The aedeagus is sigmoid, gradually tapering to a truncate tip, and shorter than the dorsal margin of the shaft. The peritremes of the female usually more or less bend at the distal end, but are not U-shaped. Tarsi IV of both sexes have nine tactile and one sensory setae.

*O. orthius* was originally described from sugar cane and *Imperata* in the Philippines. Recently this mite was recorded from Okinawa Island on sugar cane and Para grass (Ehara, 1966), and from Taiwan on sugar cane and banana (Lo, 1968). Specimens that the present author has studied are from Okinawa Island, Taiwan, and the Philippines.

*Specimens examined.* Six ♂♂ & 20 ♀♀, Naha (in greenhouse), Okinawa Id., 27-IV-1966 (S. Ehara leg.), on sugar cane; 2 ♂♂, Naha, 11-VII-1966 (K. Tsudome leg.), on sugar cane; 2 ♂♂ & 5 ♀♀, Ginowan, Okinawa Id., 8-VII-1966 (K. Tsudome leg.), on sugar cane; 6 ♂♂ & 27 ♀♀, Tamagusuku, Okinawa Id., 22-IV-1966 (K. Miyara et al. leg.), on Para grass; 1 ♂, Tainan, Taiwan, 7-IX-1966 (Y.-S. Pan leg.), on sugar cane; 1 ♂ (holotype\*), Victorias, Negros Occidental, the Philippines, 11-V-1955 (J. G. Matthyse leg.), on sugar cane.

## 3. *Oligonychus kadarsani* n. sp.

(Figs. 4-6, 15-16)

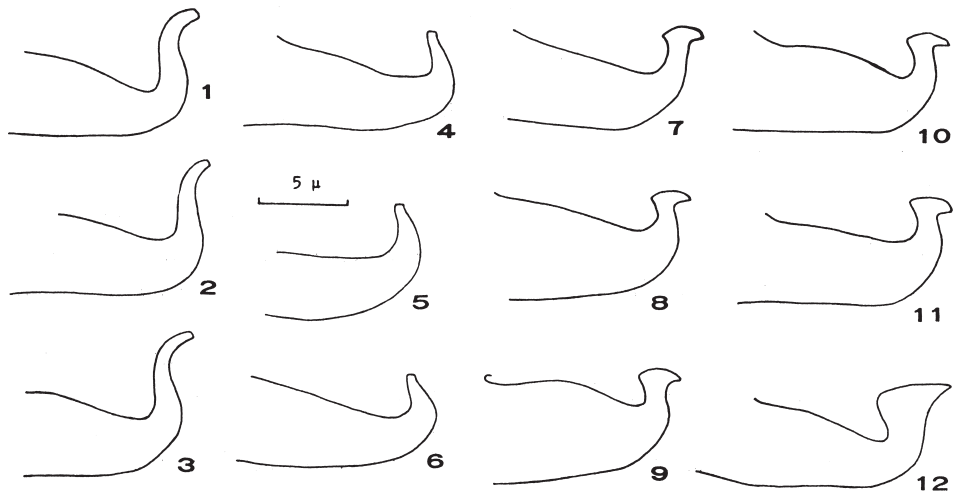
*Female.* Typical for the Pratensis group of the genus. It is indistinguishable from most of the other females of this group. Body, including rostrum, 450  $\mu$  long, 245  $\mu$  wide. Peritreme straight distally, terminating in a simple end. Terminal sensillum of palpus slightly longer than wide. Tarsus IV with nine tactile and one sensory setae.

*Male.* Typical for the Pratensis group. Body, including rostrum, 320  $\mu$  long, 160  $\mu$  wide. Terminal sensillum of palpus more than twice as long as wide, subequal in length to dorsal sensillum. Tarsus IV with nine tactile and one sensory setae. Aedeagus dorsally bent at an acute angle to shaft; the upturned part tapering to a truncate tip, barely sigmoid, much shorter than shaft.

*Type-series.* Holotype: ♂, Pasuruan, Java, Indonesia, 6-VIII-1966 (staff at the Central Sugar Research Station, Pasuruan), on sugar cane. Paratypes: 11 ♂♂ & 28 ♀♀, data same as for holotype.

*Remarks.* The aedeagus of *O. kadarsani* n. sp. closely resembles that of *O. digitatus*

\* Borrowed from the U. S. National Museum.



Figs. 1-12. Aedeagi. 1-3, *Oligonychus orthius*. 4-6, *O. kadarsani* n. sp. 7-11, *O. shinkajii*. 12, *O. exsiccator*.

Davis, 1966 (eastern Australia), but the dorsally bent part gradually tapers to a truncate tip, whereas in *O. digitatus* it is abruptly narrowed by a sharp inturning of the posterior margin to form a short, bluntly pointed tip. This new species is named in honor of Dr. S. Kadarsan, Museum Zoologicum Bogoriense, Bogor, Indonesia.

#### 4. *Oligonychus shinkajii* Ehara

(Figs. 7-11, 14)

*Oligonychus shinkajii* Ehara, 1963, p. 228, Figs. 1-10.

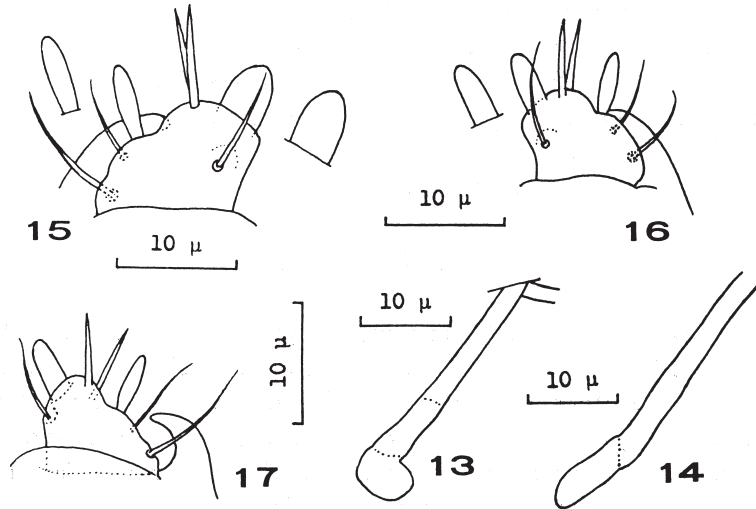
The terminal knob of the aedeagus is about one-fourth to one-third as long as the dorsal margin of the shaft, and about twice as wide as the stem of the knob. The anterior projection of the knob is bluntly angulate, while the posterior projection is longer, weakly sclerotized, blunt, sometimes truncate. The axis of the knob is parallel to the axis of the shaft. Tarsi IV of both sexes are provided with nine or ten tactile setae and one sensory seta.

The aedeagus of *O. pratensis* (Banks, 1912), from the United States is similar to that of *O. shinkajii*, but the former differs from the latter in that the axis of the knob forms a distinct angle with the axis of the shaft (Pritchard and Baker, 1955).

*O. shinkajii* was previously known from corn and rice in greenhouses of Kanagawa Prefecture, Honshu. Now it is first recorded from Kyushu proper (greenhouse), Tanegashima Island, Amami-oshima Island, and Taiwan on sugar cane.

*Specimens examined.* In addition to the type-series (Hiratsuka, Kanagawa Pref., Honshu, on corn and rice in greenhouse) the following specimens have been studied: 6 ♂♂ & 5 ♀♀, Chikugo (in greenhouse), Fukuoka Pref., Kyushu, 1-II-1965 (Y.

Ōuchi leg.), on sugar cane; 4 ♂♂ & 9 ♀♀, Nishino-omote, Tanegashima Id., 9-XI-1964 (T. Sameshima leg.), on sugar cane; 6 ♂♂ & 22 ♀♀, Naze, Amami-ōshima Id., 24-IV-1964 (M. Sakae leg.), on sugar cane; 13 ♂♂ & 21 ♀♀, Tainan, Taiwan, 7-IX-1966 (Y.-S. Pan leg.), on sugar cane.



Figs. 13-14. Peritremes (dorsal view). 13, *Oligonychus orthius* (♀). 14, *O. shinkajii* (♀). Figs. 15-17. Distal segments of palpi. 15, *Oligonychus kadarsani* n. sp. (♀). 16, *O. kadarsani* n. sp. (♂). 17, *O. exsicicator* (♂).

### 5. *Oligonychus exsicicator* (Zehntner)

(Figs. 12, 17)

*Tetranychus exsicicator* Zehntner, 1897, p. 572; Zehntner, 1901, p. 193.

*Oligonychus exsicicator*, Pritchard & Baker, 1955, p. 347, Fig. 301.

The aedeagus is abruptly upturned posteriorly, and the terminal knob is very large, about one half as long as the dorsal margin of the shaft, and about twice as wide as the stem of the knob. The anterior projection of the knob is broadly rounded, and the posterior projection is acute. The axis of the knob forms a slight angle with the axis of the shaft.

*O. exsicicator* was originally described from Java on sugar cane in 1897, but, up to the present the status of this species has remained in doubt. A single male specimen of this species that the author has examined was taken in Java together with many males and females of *O. kadarsani* n. sp. The present identification of *exsicicator* is based on Zehntner's figure (1901) of aedeagi that are inadequately oriented.

In addition, this species has been recorded from Hawaii on sugar cane by a few workers, but the Hawaiian mite is not conspecific with *O. exsicicator*.

*Specimen examined.* One ♂, Pasuruan, Java, Indonesia, 6-VIII-1966 (staff at the

Central Sugar Research Station, Pasuruan), on sugar cane.

### Summary

Five species of spider mites are recognized to infest sugar cane in eastern Asia. These species and their occurrence on sugar cane are: *Schizotetranychus celarius* (Banks) (Okinawa Id.), *Oligonychus orthius* Rimando (Okinawa Id., Taiwan, the Philippines), *O. kadarsani* n. sp. (Java), *O. shinkajii* Ehara (Kyushu proper, in greenhouse; Tanegashima Id., Amami-ôshima Id., Taiwan), and *O. exsiccator* (Zehntner) (Java). *O. kadarsani* n. sp. is described.

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