



On the taxonomy of the genus *Metaceronema* (Homoptera: Coccinea: Coccidae)

К таксономии рода *Metaceronema* (Homoptera: Coccinea: Coccidae)

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Abstract. Taxonomy and nomenclature of the genus *Metaceronema* Takahashi, 1955 are discussed. *Metaceronema theae* (Green, 1900), **nom. resurr.** and *M. monticola* (Wang, 1976), **nom. resurr.** are resurrected from synonymy with *M. japonica* (Maskell, 1897), the type species of the genus. *Metaceronema theae* is redescribed and illustrated. An identification key for the species *M. japonica*, *M. theae*, and *M. monticola* (Wang, 1976) is provided for the first time. Additionally, a new total drawing of *M. japonica* is provided to clarify the morphology of this species.

Резюме. Обсуждается таксономия и номенклатура рода *Metaceronema* Takahashi, 1955. *Metaceronema theae* (Green, 1900), **nom. resurr.** и *M. monticola* (Wang, 1976), **nom. resurr.** восстановлены из синонимии *M. japonica* (Maskell, 1897), типового вида этого рода. *Metaceronema theae* переописан и проиллюстрирован. Впервые предлагается определительная таблица для видов *M. japonica*, *M. theae* и *M. monticola* (Wang, 1976). Дается новый тотальный рисунок *M. japonica* в целях прояснения морфологии этого вида.

Key words: scale insects, morphology, taxonomy

Ключевые слова: кокциды, морфология, таксономия

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Introduction

The Oriental soft scale genus *Metaceronema* Takahashi, 1955 was erected as monotypic for *Ceronema japonicum* Maskell, 1897. Until now, this genus has been considered as monotypic in the majority of coccidological papers and books. Meanwhile four other names of nominal species were placed under synonymy of *M. japonica* (Maskell, 1897) by different authors without proper justification.

The first name, *Eriochiton theae* Green, 1900, was synonymised with *M. japonica* by Borchsenius (1957: 197) without any explanations. Moreover, he did not see any specimens of *E. theae* or *M. japonica* and based his morphological consideration of the latter species on the description by Takahashi (1955) only. Yang (1982: 156) also considered *E. theae* as a junior synonym of *M. japonica* without any comments; probably, he simply copied this synonymy from Borchsenius (1957). To the contrary, Tao et al. (1983: 9–91) considered

E. theae as a distinct species, but within its initial genus *Eriochiton* Maskell, 1887, which is now generally accepted in coccidology as a member of other family, Eriococcidae. Hodgson (1994: 370) briefly discussed the possible status of *M. theae* as a distinct species, but did not provide any clear characters for its separation from *M. japonica*.

Lichtensia japonica Kuwana, 1909 was synonymised with *M. japonica* by Takahashi (1955: 27) without argumentation, but the original description and figure by Kuwana (1909: 152) clearly demonstrate that his nominal species does not have any differences from *M. japonica*. This synonymy has not been disputed till now.

Euphilippia aquifoliae Chen, 1937 was considered a junior synonym of *M. japonica* by Yang (1982: 156) without comments. The paper by Chen (1937) was published in a poorly known Chinese journal and is unfortunately unavailable for me. Moreover, the type material of *E. aquifoliae* was probably lost (according to the personal communication of F.T. Tang to Y. Ben-Dov in 1990). Till now, this synonymy has not been disputed.

Euphilippia monticola Wang, 1976 was considered a junior synonym of *M. japonica* by Yang (1982: 156) without argumentation. However, the figure of *E. monticola* in the original description shows that this species is very distinct from *M. japonica*.

During the preparation of old ethanol material from southern China, preserved in the collection of the Zoological Institute, Russian Academy of Sciences, I studied a series of soft scales that could be identified as *Metaceronema* but not *M. japonica*. After analysis of the taxonomic and nomenclatural information on *Metaceronema*, I concluded that this genus is not monotypic but comprises at least three morphologically very distinct species, whose names were erroneously placed under synonymy of *M. japonica* by different authors. These species are discussed and illustrated below.

Material and methods

The methods of scale insect preparation and study have been described many times previously, e.g., by Gavrilov-Zimin et al. (2021). All the material examined is deposited in the collection at the Zoological Institute of the Russian Academy of Sciences (ZIN RAS), St Petersburg, Russia.

The classification of higher taxa used here follows Gavrilov-Zimin (2018) and Gavrilov-Zimin et al. (2021).

Taxonomy

Order Homoptera

Suborder Coccinea

Family Coccidae

Genus *Metaceronema* Takahashi, 1955

Type species: *Ceronema japonica* Maskell, 1897, by monotypy.

Redescriptions of the genus have been published previously many times in the literature cited above. Therefore, only its brief diagnosis is given below.

Diagnosis. Adult female. Body comparatively flat, broadly oval, up to 5 mm long in mature female, with membranous cuticle. Mouthparts and spiracles of usual structure characteristic of Coccidae. Eyespots present, unclear. Antenna 8-segmented. Legs distinct; claw without a denticle; claw digitules enlarged. Anal apparatus of usual structure characteristic of Coccidae. Multilocular and quinquelocular pores usually present. Preopercular pores absent. So-called “dorsal tubercles”, being, in fact, compound tubular ducts with wide collar, present. Simple tubular ducts present. Peculiar, strongly sclerotised cylindrical wax glands (or ducts) and enlarged conical setae together forming sinuous submedial band on dorsum. Marginal setae forming continuous row along entire body margin. Stigmatic setae with blunt apices. Venter with several flagellate setae.

***Metaceronema theae* (Green, 1900), nom. resurr.**
(Fig. 1)

Eriochiton theae Green, 1900: 10.

Material examined. China, Yunnan Prov., Jingdong, on *Wendlandia* sp., 13.III.1957, N.S. Borchsenius leg., 7 adult females (ZIN RAS; K 1875).

Redescription. Adult female. Mature female enclosed in grey felt-like wax sac, excluding of median part of dorsum, which covered with plate of white dense wax. Body comparative-

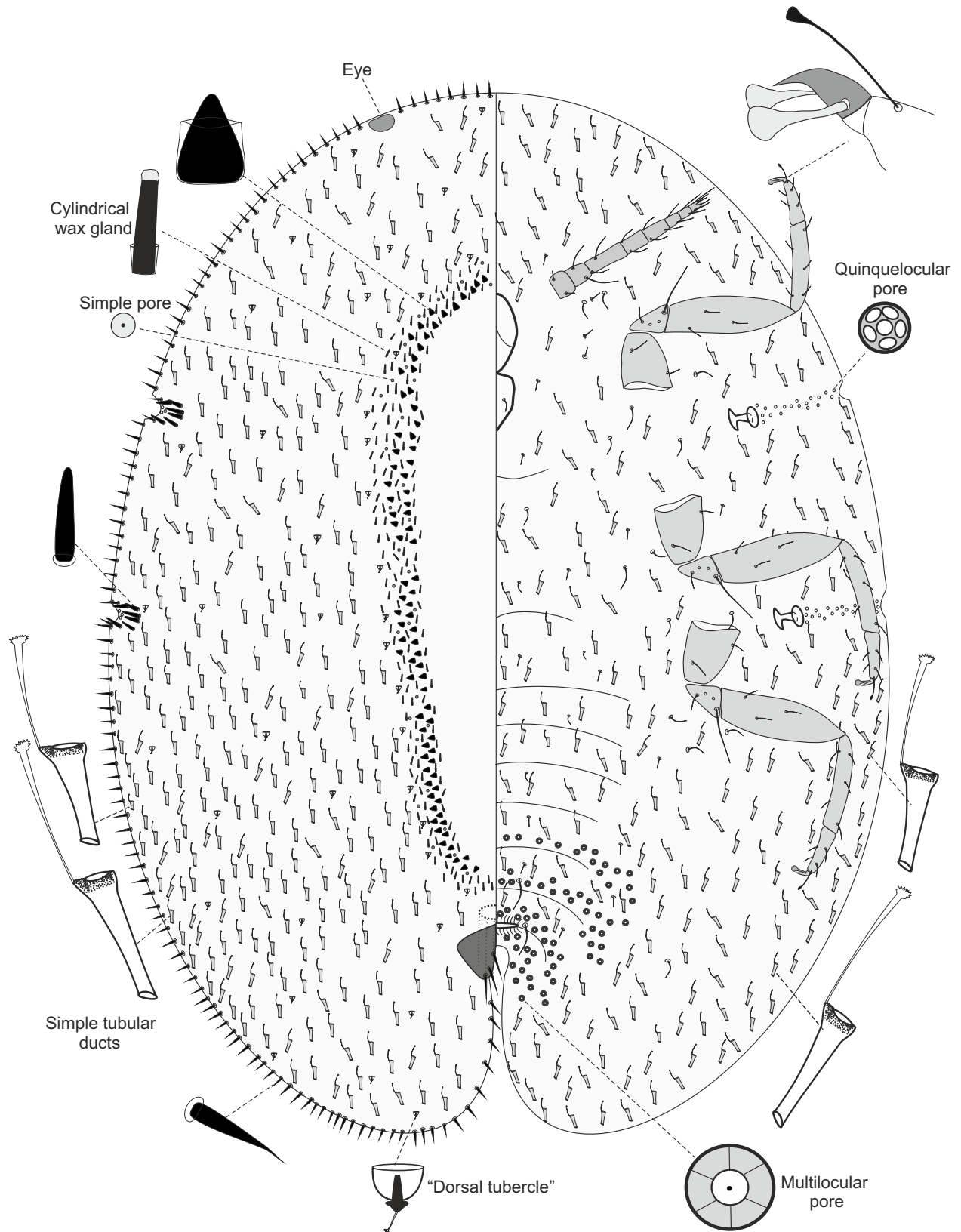


Fig. 1. *Metaceronema theae* (Green, 1900), **nom. resurr.**, adult female, China(Yunnan).

ly flat, broadly oval, up to 5 mm long in mature female, with membranous cuticle. Mouthparts and spiracles of usual structure characteristic of Coccidae. Eyespots present, unclear. Antenna 8-segmented, about 400 µm long. Legs distinct, without tibio-tarsal sclerotisation; claw without a denticle; claw digitules enlarged, with large apical knobs (Fig. 1). Anal apparatus of usual structure characteristic of Coccidae, with sclerotised ring, bearing pores and six flagellate setae, each about four times as long as diameter of anal ring; anal plates with robust setae on inner margin. Multilocular pores, each about 5 µm in diameter, with six or seven peripheral loculi, forming transverse bands on four posterior abdominal sternites. Quinquelocular pores, each about 4 µm in diameter, forming wide band in each spiracular furrow. Preopercular pores absent. So-called "dorsal tubercles", being, in fact, compound tubular ducts with wide collar, numerous, scattered on all dorsal surface of body; its collar about 5 µm wide. Simple tubular ducts varying in size, each about 12–17 µm long, scattered on both body surfaces, excluding median part of dorsum. Peculiar, strongly sclerotised cylindrical wax glands (or ducts), each about 12 µm long, and enlarged conical setae together forming sinuous submedian band on dorsum; these setae each about 10 µm long and 10 µm wide, with blunt apices and deep collars. Marginal setae, each about 12–25 µm long, with attenuate apices, forming continuous row along entire body margin. Stigmatic setae with blunt apices, similar in length with marginal setae, numbering 8–10 in each stigmatic cleft. Several flagellate setae present on venter; largest ones scattered in its median part.

Males and morphology of larvae unknown.

Comments. The species clearly differs from its congeners in the presence of a submedian band of large, strongly sclerotised cylindrical wax glands and in the spiracular setae, which are similar in size to the marginal setae.

Metaceronema japonica (Maskell, 1897)
(Fig. 2)

Ceronema japonicum Maskell, 1897: 243.
Lichtensia japonica Kuwana, 1909: 152.
Euphilippia aquifoliae Chen, 1937: 383.

Material examined. **Japan**, Shikoku I., Ehime Prefecture, Matsuyama, on *Ilex integra*, 27.IV.1961, T. Tachikawa leg., 3 adult females (ZIN RAS; 142-61).

Comments. The species was redescribed by Hodgson (1994: 367–370), but unfortunately, his illustration was rather equivocal, because he figured the dorsal conical setae as large pores, whereas the distribution of tubular ducts on the dorsum was unclear at all. In view of this, I provide here my own new figure based on the material mentioned above.

The species clearly differs from its congeners in the presence of only one submedian row of dorsal conical setae, which have acute apices.

Metaceronema monticola (Wang, 1976), **nom. resurr.**
(Fig. 3)

Euphilippia monticola Wang, 1976: 342.

Comments. According to the description and figure in Wang (1976), the species clearly differs from its congeners in the presence of dorsal conical setae in a band of four setae wide and in the presence of simple tubular ducts mainly along the body margin. Unfortunately, I have no material on this species and cannot check the accuracy of Wang's figure. Moreover, according to the personal communication of San-an Wu (China, Beijing), the type specimens of *M. monticola* were probably lost.

Key to the species of the genus *Metaceronema*

- 1(4). Median part of dorsum fringed by band/row of conical setae and minute, weakly sclerotised cylindrical wax glands; they shorter than dorsal conical setae. Stigmatic conical setae more than two times as long as neighboring marginal conical setae. . . . 2
- 2(3). Dorsal conical setae with blunt apices, forming band of four setae wide. Simple tubular ducts present mainly along body margin; multilocular pores absent. ***M. monticola*, nom. resurr.**
- 3(2). Dorsal conical setae with acute apices, forming a row of one seta wide. Simple tubular ducts scattered on all body, excluding only median part of dorsum; multilocular pores present. ***M. japonica***
- 4(1). Median part of dorsum fringed by band of conical setae and large, strongly sclerotised cylindrical wax glands, being longer than dorsal conical setae. Stigmatic conical setae similar in size to marginal conical setae. ***M. theae*, nom. resurr.**

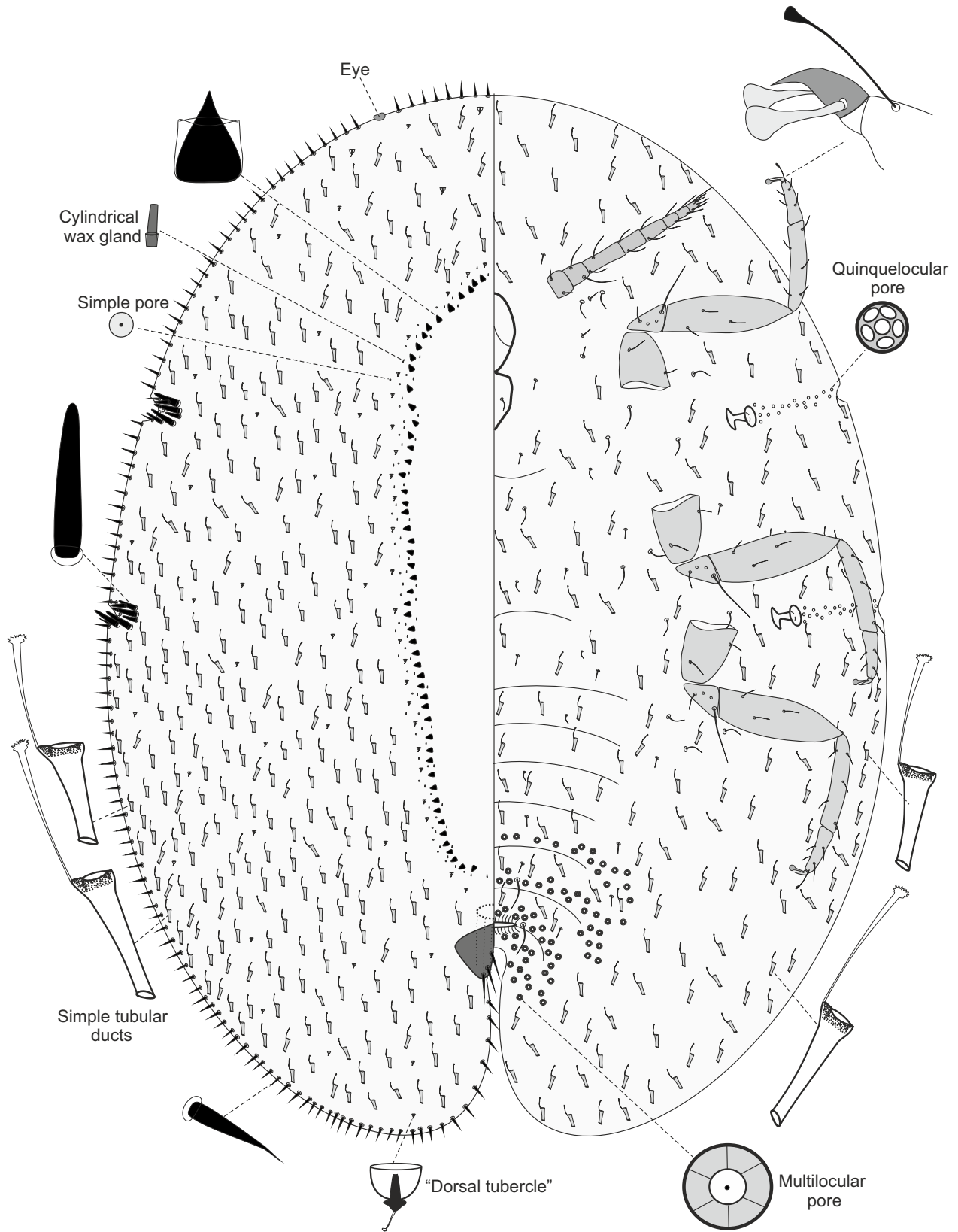


Fig. 2. *Metaceronema japonica* (Maskell, 1897), adult female, Japan.

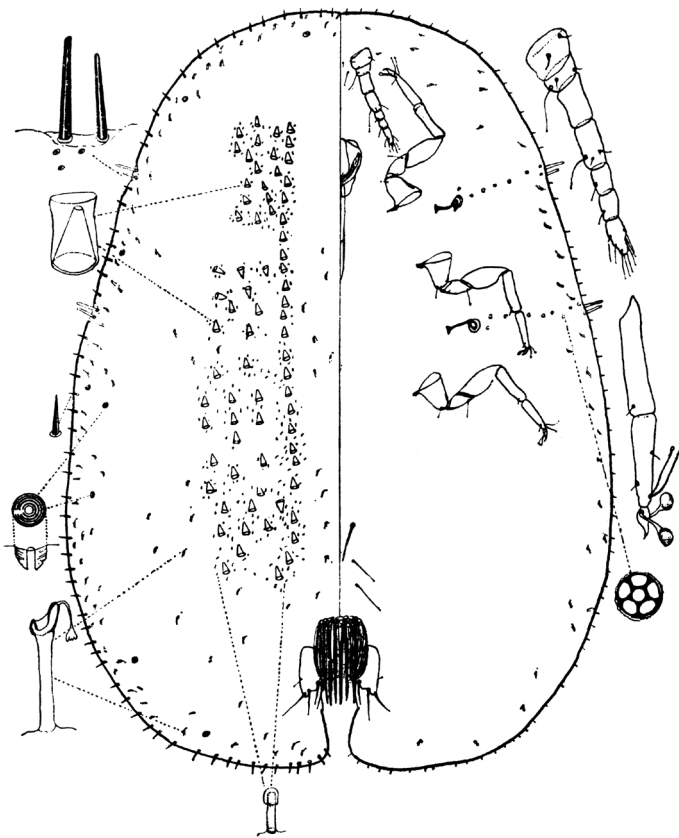


Fig. 3. *Metaceronema monticola* (Wang, 1976), **nom. resurr.**, adult female. After Wang (1976), with minute changes.

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