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Bull. Univ. Osaka Pref.,
Ser. B. Vol. 9, 1959

# Some aphids related to *Nipponaphis* PERGANDE in Japan (Homoptera)

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(Received June 1, 1959)

The aphids of the genus *Nipponaphis* PERGANDE (Hormaphidinae) cause prominent galls on *Distylium racemosum* (Hamamelidaceae) in Japan. Some of these insects are holocyclic and heteroecious, migrating to the trees of Fagaceae. On the other hand several anholocyclic and monoecious aphids of related genera are found on the trees of Fagaceae and Lauraceae, which are here dealt with. These species were presumably associated with *Distylium* in the past era.

The specimens, upon which this report is based, were collected by me unless otherwise mentioned, and are preserved in my collection.

My acknowledgments are due to Prof. E. O. ESSIG and Dr. D. HILLE RIS LAMBERS for examining some of the species and for specimens sent for comparison.

**Lithoaphis** new genus.

Apterous female: Body convex on dorsum, strongly sclerotized. Prosoma (head, thorax and basal abdominal segment fused together) consolidated with 2nd–7th abdominal segments, without dorsal mosaic-like structures or papillae, but with many very small irregular translucent parts scattered over dorsum and on marginal perpendicular area; these translucent parts semilunar or narrow, mostly branched and curved, recognizable in well-cleared specimens. Mosaic-like structures present between antennae and around spiracles on marginal perpendicular area. Dorsal setae short, essentially 4 (spinal and marginal) on each thoracic and basal abdominal segment. Anterior fused part of abdomen (2nd–7th segments) with 6 submarginal setae on each side; 8th tergite with over 4 setae. Antennae short, with indistinct segments; 2 primary sensoria placed closely on subapical part. Rostrum short, 5th segment not distinct, ultimate segment with primary setae only. Cornicles present. Cauda constricted basally, much broader than long. Anal plate bilobed, each lobe broader than long. Legs short, exposed; tarsi 2-segmented, with well developed claws and normal setae.

Alate female: Similar to *Nipponaphis* PERGANDE, but cornicles much broadened basally, with many minute papilla-like structures in rows.

Genotype: *Lithoaphis shiiae* n. sp.

This genus is distinguished from *Nipponaphis* by the aptera strongly sclerotized, with the dorsum convex and with irregular translucent parts, but wanting mosaic-like structures, and by the shorter antennae with closely placed primary sensoria.

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**Lithoaphis shiiae** n. sp.

Apterous viviparous female: Black, shining. Body almost circular, strongly sclerotized, much convex and rounded on dorsum. Polygonal mosaic-like structures around thoracic spiracles and between antennae scarcely protuberant; many small rounded low pustules present on lower half of marginal perpendicular area. Dorsal setae of prosoma small, pointed, about 1.5 or 1.6 times as long as middle width of 3rd antennal segment; spinal setae sometimes duplicated; many similar fine setae scattered on marginal perpendicular area, which are not recognizable in some specimens. Anterior part of abdomen with about 25 small setae scattered besides 6 small submarginal setae on each side, 4 small setae near hind margin, a pair of groups of areolations on anterior part, and with

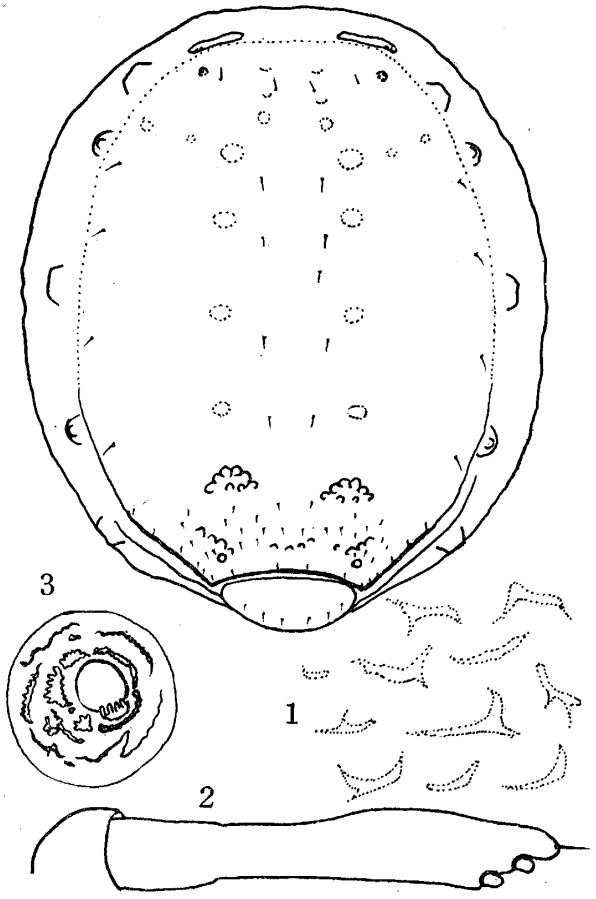


Fig. 1. *Lithoaphis shiiae* n. sp. Aptera (legs and setae on marginal perpendicular area not shown).
(1) Dorsal paler parts of prosoma. (2) Antenna. (3) Cornicle of alata.

some areolations in front of cornicles; 8th tergite darker, with many transverse striates except on posterior part, with 5 or 6 short setae. Antennae distinctly longer than fore tibiae, reaching to level of eye, smooth; 3rd segment not distinctly defined from 2nd, somewhat narrowed on basal part, with 2 protuberant primary sensoria on subapical part, which are not surrounded by setae; distance between antennae about 1.5 times as long as antenna. Ultimate segment of rostrum about twice as long as 2nd segment of hind tarsus. Cauda dusky, short, narrower than anal lobe, with long setae. Anal plate dusky, with long setae. Legs pale, femora constricted at base, tibiae with a few short setae on distal part. Body 1.2–1.5 mm. in length.

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Described from specimens taken at Taishi, Osaka Prefecture (21. III. 1927, M. SORIN leg.).

Alate viviparous female: Yellow, dusky on head, antennae and thorax; wings almost hyaline, stigma pale (colour notes taken from young adult). Head with 4 or 5 dorsal setae near hind margin, 2 pairs of setae on median area anteriorly, a pair on front, and one or none seta on each side of venter; dorsal setae about 2.5 or 3 times as long as width of constricted base of 3rd antennal segment. Antennae twice as long as width of head across eyes, a little longer than half length of dody; 2nd segment broader than long, corrugated, with 1 or 2 setae; 3rd slightly broadened near basal part, stouter than fore tibia, slightly shorter than hind tibia; primary sensoria a little broadened or not differentiated; secondary sensoria annular, 21–23 on III, 10–11 on IV, 8–11 on V; relative length of segments about as follows: III–20, IV–10, V–9. Rostrum not reaching middle coxae, ultimate segment slightly longer than 2nd segment of hind tarsus, about twice as long as wide; clypeus with a pair of setae, mandibular laminae without setae as usual in this group. Abdomen without marginal sclerites, 8th tergite somewhat sclerotic, with 4–6 long setae which are 4 times as long as basal width of 3rd antennal segment; 7th pale, with 2 setae (submarginal); 6th with 0–3 setae between cornicles and a marginal one laterad of cornicle; 7th sternite with 2 setae, 6th with 4 setae, Spiracles 4 on each side of abdomen. Cornicles very short, small, broadent towards base, with many irregular minute designs, some of which appear to be papillae that are much longer than wide and rounded at tip. Cauda short, somewhat constricted at base, much broader than long, with about 8 long setae. Anal plate dusky, divided, with 8 long setae on each lobe. Genital plate large, pale brownish, with about 10 long setae. Rudimentary gonapophyses 2, each with 5–6 setae in a row. Tibiae with minute spinules in rows over whole length, with some long flagellate setae which are a little longer than width of tibia, and with a few shorter setae on distal part; hind tibiae with about 10 long setae; tarsi with a few rows of minute spinules, with 3 setae on 1st segment in fore and middle pairs, but only 2 very long capitate setae on that segment in hind pair; 2 pairs of apical setae very long, capitate, equal in size; hind tarsi slightly shorter than ultimate segment of rostrum, much shorter than 5th antennal segment. Fore wings about 2.3 times as long as wide, stigma not elongated, anal stouter than, and united basally with, cubitus; media once branched, with long stem; radial sector somewhat curved; hind wings with media and cubitus a little divergent. Body about 1.4 mm. in length.

Described from specimens taken at Amanosan, Osaka Prefecture (3. V. 1957).

Host plant: *Shiia cuspidata.*

The apterae are found on the branches, but the nymphs of alatae on the lower surface of the foliage along the midribs. This species was common at Amanosan, Osaka Prefecture, in 1957 and 1958, and a few apterae were taken at Anjyo, Aichi Prefecture (25. X. 1957).

## **Paranipponaphis** new genus.

Apterous female: Body not strongly sclerotized, flattened, with venter a little expanded. Prosoma not distinctly defined at hind end of dorsum, densely with distinct mosaic-like structures or low pustules, with short dorsal setae (spinal and marginal), without a pair of setae close to hind end. Anterior fused part of abdomen (2nd–7th tergites) with 6 submarginal setae on each side; 8th tergite with 4 setae. Antennae short, 3-segmented, tapering on distal part, with 2 primary sensoria which are distinctly

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apart from each other. Cornicles entirely wanting. Cauda constricted basally, much broader than long. Anal plate bilobed, each lobe much broader than long. Legs short, exposed; tarsi 2-segmented, with well developed claws; tarsal chaetotaxy as usual for this group of Hormaphids. Rostrum also normal.

Genotype: *Paranipponaphis takaoensis* n. sp.

This genus is closely related to *Nipponaphis*, but differs in the absence of cornicles and of a pair of dorsal setae close to hind end of prosoma, and in the more reduced antennae.

**Paranipponaphis takaoensis** n. sp.

Apterous viviparous female: Blackish brown, not blackish on marginal area and at dorsal depressed markings ("Muskelplatten") when cleared. Body subcircular, nearly symmetrical or somewhat asymmetrical, with venter a little expanded outwards. Dorsal pustules polygonal, low, broadly rounded at apex; similar pustules present on marginal perpendicular area, those around spiracles much smaller, not elongated; such smaller papillae present in a band on dorum across anterior thoracic spiracles, the band about 5–7 papillae wide on submarginal area, sometimes not distinct. Anterior part of abdomen (2nd–7th tergites) not distinctly defined from prosoma, but with a transverse thickening near anterior end, with polygonal mosaic-like structures; 8th tergite with similar, but more irregular designs except on wrinkled marginal zone. Dorsal setae short, pointed, not duplicated, nearly as long as basal width of 3rd antennal segment, shorter than diameter of largest dorsal pustules, wanting on median area of anterior part of abdomen. Antennae 3-segmented, a little longer than hind tibia, somewhat corrugated, tapering and a little imbricated on distal part; 2nd segment as long as, or longer than, wide; 3rd sometimes somewhat narrowed basally; distance between antennae about 1.5 times — twice as long as antenna. Ultimate segment of rostrum about twice — 2.3 times as long as 2nd segment of hind tarsus, about 2.3 times as long as wide at midlength, nearly as

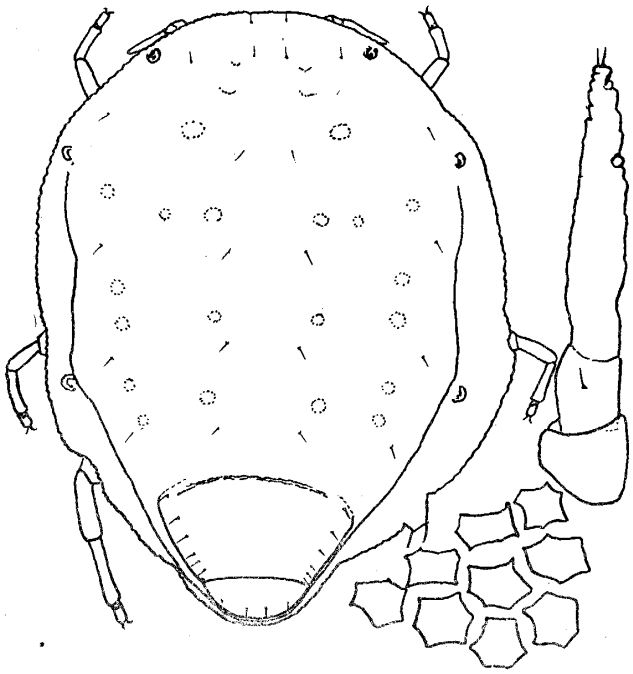

Fig. 2. *Paranipponaphis takaoensis* n. sp. Aptera and its antenna and dorsal mosaic-like structures.

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long as proximal segment and 3rd antennal segment, with 3 pairs of subapical setae. Cauda blackish, broader than anal lobe, with 10 long setae. Anal plate blackish, with 7 long setae on each lobe. Gential plate blackish, with many long setae. Legs pale. Body 1.5–2 mm. in length.

Host plant: *Quercus* sp., attacking the branch.
Many apterae were collected in Mt. Takao, Tokyo District (30. VII. 1949).

**Metanipponaphis** new genus.

Closely related to *Lithoaphis*, differing, however, in the following characters of aptera:

Prosoma flattened on dorsum, with numerous distinct dorsal pustules which are circular or subcircular, slightly protuberant, and of ring-like appearance; 8th tergite with a pair of setae.

Distinguished from *Nipponaphis* by the strongly sclerotized body, with ring-like dorsal designs, the reduced antennae, and by the 8th tergite with a pair of setae only.

Genotype: *Metanipponaphis rotunda* n. sp.

**Metanipponaphis rotunda** n. sp.

Apterous viviparous female: Black, strongly sclerotized, black on marginal zone even when cleared. Body almost circular, depressed, flattened. Prosoma not well defined from anterior fused part of abdomen; dorsal papillae subcircular or oval, never polygonal, a little variable in size, slightly protuberant, absent on marginal area of dorsum of prosoma except on hind end, but present on anterior small part of anterior fused part of abdomen. Marginal area of dorsum of prosoma prominently corrugated, with 5 clusters of many irregular or polygonal protuberant sculptures on each side. Anterior fused part of ab-

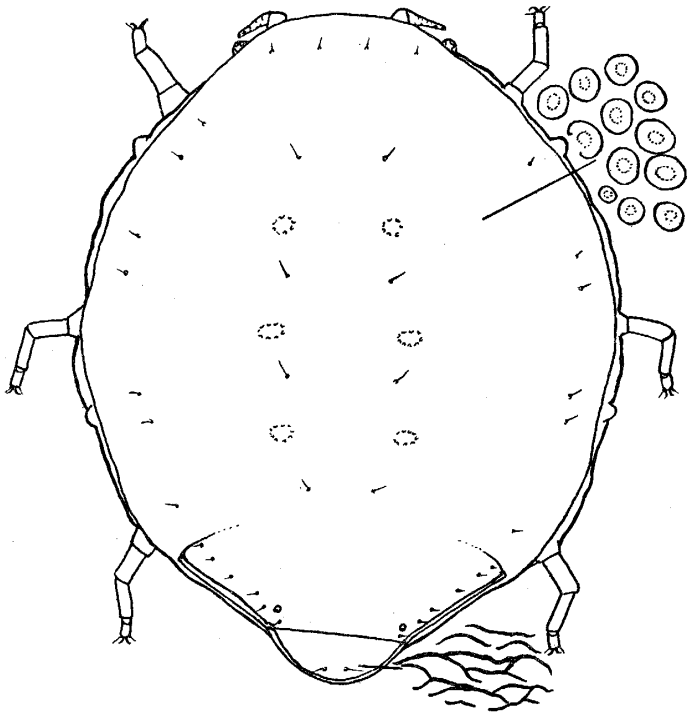

Fig. 3. *Metanipponaphis rotunda* n. sp.
Aptera.

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domen with many transverse irregular linear sculptures on posterior half, with 6 minute submarginal setae in an irregular row on each side, wanting setae on median area; 8th tergite transversely corrugated or with transverse linear markings, with a pair of short setae. Marginal perpendicular area with prominent corrugations, without rounded pustules. Dorsal setae of prosoma very short, pointed; thoracic marginal dorsal setae single or duplicated. Antennae short, nearly reaching eyes, nearly as long as fore femur, appearing to be 2-segmented; basal segment large, dark; 2nd pale, a little apart from body margin, imbricated or smooth, tapering, but blunt at apex; 2 primary sensoria a little, but distinctly apart from each other; distance between antennae about twice as long as antenna. Rostrum short, ultimate segment about 1.6 times as long as 2nd segment of hind tarsus. Cauda pale, constricted at base, much broader than long, with about 8 setae. Anal plate pale, with 5 long setae on each lobe. Legs pale, tarsi with usual setae. Mesosternal apodemes very short, much apart from each other. Body 1.0–1.3 mm. in length.

Described from specimens taken at Tokyo (21. VI. 1950).

Alate viviparous female: Blackish. Head with 4–6 dorsal setae in an irregular row between eyes, 2 or 3 pairs of setae anteriorly, and a pair at front, 1–3 or none setae on venter on each side; dorsal setae about 1.7–2.3 times as long as width of constricted base of 3rd antennal segment, a little shorter than width of that segment excluding sensoria at middle. Antennae about 1.6 times as long as width of head across eyes, distinctly shorter than half of body length, about twice as long as hind femur; basal 2 segments corrugated, 3rd as long as hind femur, gradually narrowed on base, broadened near basal part, on apical part nearly as stout as fore tibia; setae 2 on basal 2 segments, absent on 3rd and 4th; annular sensoria thin, wanting on basal narrowing part of 3rd, usually about 17–23 on III, 7–10 on IV, 6–10 on V; primary sensoria not differentiated; relative length of segments about as follows: III–21, IV–8, V–7.5. Rostrum reaching beyond fore coxae, ultimate segment shorter than 2nd segment of hind tarsus, about twice as long as wide at midlength, with usual primary setae; clypeus with a pair of setae and mandibular laminae without setae as usual for this group of Hormaphids, Abdomen without marginal sclerites, with 4 spiracles on each side; 8th tergite sclerotic, with a pair of long setae, which are rather closely placed, about 3 or 4 times as long as basal width of 3rd antennal segment, and distinctly longer than middle diameter of that segment excluding sensoria; 7th faintly sclerotic, 5th–7th with a long marginal seta, without dorsal ones; a pair of long dorsal setae present on at least basal 2 segments, these setae a little longer than middle diameter of 3rd antennal segment. Cornicles small, a little broadened towards base, shorter in diameter at apex than middle width of 3rd antennal segment excluding sensoria; marginal seta of 6th abdominal segment usually at basal margin of cornicle. Cauda short, much broader than long, constricted at base, with 5 pairs of long setae. Anal plate deeply bilobed, each lobe much broader than long, with 8 long setae. Genital plate pale brownish, with 3–7 long setae along hind margin on each side and 2 anterior pairs. Femora and tibiae imbricated, but not distinctly on basal parts; tibial setae sparse, flagellate, a little shorter or longer than narrowest width of tibia; tarsi somewhat imbricated, short; 2nd segment of hind tarsus less than thrice as long as wide, about 1.3 times as long as ultimate segment of rostrum; tarsal chaetotaxy as usual for this group of Hormaphids, apical upper and middle setae very long, capitate, equal in size. Fore wings dusky, clouded along anal and cubitus; anal stouter, almost connected basally with cubitus; media once branched, with a long stem; radial sector a little curved, stigma dusky; hind wings with media and cubitus present. Body about 1.7 mm. in length.

Described from material taken at Shionomisaki, Wakayama Prefecture (7. IV. 1958, M. SORIN leg.).

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Host plants: *Shiia* spp., attacking the lower sides of the leaves.

This species is related to *Thoracaphis lithocarpicola* TAKAHASHI recorded from Formosa, which may be included in the present genus, but differs from that species chiefly in wanting elongated marginal papillae and in the dorsal papillae more densely scattered in the aptera. The apterae are common through the year, the alatae emerging in April near Tokyo. Widely distributed in the southern part of Japan.

**Metanipponaphis shiicola** n. sp.

Apterous viviparous female: Black, strongly sclerotized, black on marginal zone even when cleared. Body longer than wide, not much depressed. Dorsal papillae very small, circular or oval, well spaced, not distinct on lateral marginal areas of prosoma, but present on anterior area of anterior fused part of abdomen, which is not defined from prosoma except on lateral small parts; posterior one of 6 minute submarginal setae on each side of anterior fused part of abdomen located behind cornicle; 8th tegite black when

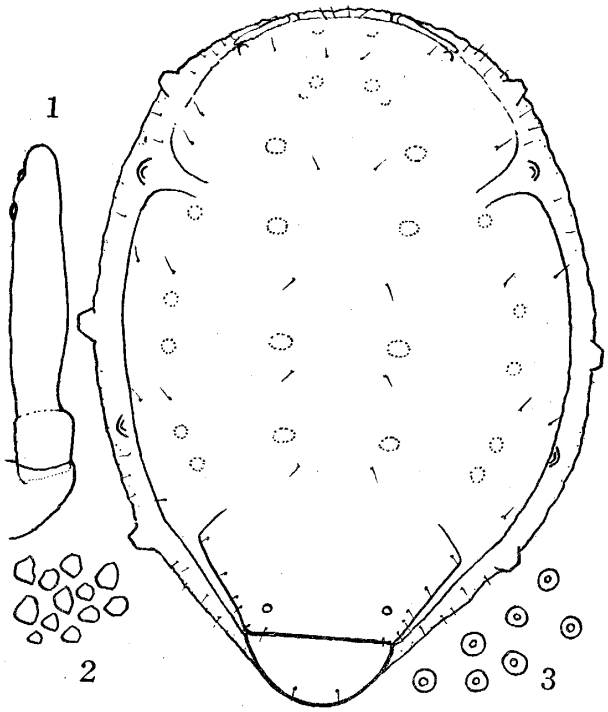


Fig. 4. *Metanipponaphis shiicola* n. sp. Aptera (legs removed).
(1) Antenna. (2) Papillae around spiracle. (3) Dorsal papillae.

cleared, with a pair of setae. Marginal perpendicular area corrugated, with a few or many fine setae scattered, which are much longer than tarsi, as long as half of antennal length, and sometimes not discernible; polygonal low papillae present around thoracic spiracles, clusters of anterior spiracles extending to submarginal area of dorsum, 3 or 4 papillae wide; these papillae larger or smaller than dorsal circular ones. Dorsal setae of prosoma small, pointed, not longer than width of 3rd antennal segment; marginal dorsal setae of thorax duplicated. Antennae short, reaching level of eye, smooth; 3rd segment almost fused with 2nd, somewhat narrowed on basal part, with 2 sensoria a little apart from each other; distance between antennae 1.1–1.4 times as long as antenna. Rostrum short, ultimate segment about 1.7 times as long as wide at midlength, about 1.8 times as long as 2nd segment of fore tarsus. Cornicles small. Cauda dusky, much broader than

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long, distinctly constricted at base, with over 10 long setae. Anal plate dusky, divided, with 4 or 5 long setae on each lobe. Legs pale. Body 1.1–1.5 mm. in length.

Host plant: *Shiia cuspidata*, on the lower sides of the foliage along basal parts of midribs.

Described from specimens taken at Taishi, Osaka Prefecture (21. III. 1957, M. SORIN leg.). Collected also at Amanosan, Osaka Prefecture (3. V. 1957), and at Anjyo, Aichi Prefecture (25. X. 1957).

This species is differentiated from the foregoing species by the oval body not so depressed, the marginal area of the dorsum of prosoma not distinctly corrugated, the anterior clusters of polygonal sculptures of spiracles extending to the submarginal area of dorsum, the presence of fine setae on the marginal perpendicular area, and by the antennae narrowed on the basal part of the 3rd segment.

**Euthoracaphis** Takahashi.

This genus was originally proposed as a subgenus of *Thoracaphis* VAN DER GOOT (Tenthredo, II, 1938, p. 14), but is here elevated to generic rank. Related to *Nipponaphis*, but differs in the following characters of aptera:

Body with numerous fine setae on dorsum and on marginal perpendicular area, dorsal mosaic-like structures or papillae not well developed, indistinct; dorsum of prosoma at full maturity divided by distinct sutures into a large quadrangular median area, and an anterior and 2 lateral marginal parts; anterior fused part of abdomen distinctly defined from prosoma, 8th tergite with a pair of setae.

Genotype: *Thoracaphis umbellulariae* ESSIG.

**Euthoracaphis umbellulariae** (ESSIG).

*Thoracaphis umbellulariae* ESSIG, Univ. Calif. Pub., Ent., VI, p. 1 (1932); TAKAHASHI, Lingnan Sc. Jl., XIV, p. 140 (1935).

*Thoracaphis cinnamoniae* SHINJI, Monogr. Japan. Aphid., p. 1133 (1941).

Host plants: *Cinnamomum japonicum*, *C. pedunculatum*, on the lower surface of the foliage along ribs.

Many apterae were collected at Enoshima (8. VIII. 1950), Kawachi-Nagano, Osaka Prefecture (11. XI. 1956), Wakayama (26. I. 1958, M. SORIN leg.), and at Uwajima (30. IV. 1956, T. TACHIKAWA leg.).

Prof. E. O. ESSIG kindly compared the Japanese specimens of apterae with the original material and did not find difference between them.

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