

Matsumuraja of Japan (Aphididae, Homoptera)

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It was reported that the genus *Matsumuraja* SCHUMACHER consisted of two species in Japan, i.e., *M. rubi* MATSUMURA, 1918 and *M. rubifoliae* TAKAHASHI, 1922. Recently we found four additional forms of the genus in the mountainous regions of the mainland of Japan.

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The material is preserved in the junior author's collection.

Key to Japanese species
(Apterous viviparous female)

- (1) Dorsal tubercles well developed and capitate setae distinctly long on body (2)
— Dorsal tubercles and capitate setae minute or lacking on 2nd to 5th or 6th abdominal segments (3)
- (2) Cornicles slender, distinctly imbricated (4)
— Cornicles swollen on distal part (5)
- (3) Tubercle on 1st antennal segment as long as, or a little shorter than, that segment; antennae blackish on distal halves of 3rd and 4th and on 5th segments; cornicles a little swollen on distal part, distinctly imbricated; dorsal setae on 6th-8th abdominal segments about 2.5 times as long as middle diameter of 3rd antennal segment....
..... *M. rubiphila* TAKAHASHI n. sp.
— Tubercle on 1st antennal segment about one-half as long as that segment; dorsal setae minute on 6th, about twice as long as middle diameter of 3rd antennal segment on 7th and 8th abdominal segments; cornicles distinctly swollen on distal part, a little imbricated on basal half; on *Rubus microphyllus* in summer
..... *M. rubifoliae* TAKAHASHI, Form
- (4) Dorsal tubercles on body very large especially spinal tubercles on 6th and 7th abdominal segments as long as, or a little longer than, 4th antennal segment; tubercle on 1st antennal segment about 1.3 times as long as that segment; cornicles about 1.8 times as long as 3rd antennal segment, blackish on distal part *M. rubi* MATSUMURA
— Dorsal tubercles on abdomen developed; dorsal capitate setae long, long setae about 4 times as long as middle diameter of 3rd antennal segment; tubercle on 1st antennal segment small, about one-third as long as that segment; 3rd antennal segment with 3 long capitate setae, long one about twice as long as middle diameter of segment; cornicles a little longer than 3rd antennal segment *M. rubea* SORIN n. sp.
- (5) Tubercle on 1st antennal segment very small, about two-fifths as long as that segment, with 2 capitate setae; dorsal setae of abdomen about twice as long as middle diameter

- of 3rd antennal segment, dorsal tubercles very small sometimes lacking; cornicles slightly imbricated on basal part, swollen on distal part, swollen part about 1.5 times as wide as flange at tip *M. sorini* TAKAHASHI n. sp.
- Antennae blackish on distal parts of 3rd to 5th and base of 6th segments; tubercle on 1st antennal segment about three-fifths as long as that segment, with 3 minute capitate setae; dorsal setae of abdomen about twice to thrice as long as middle diameter of 3rd antennal segment; cornicles almost deep brown, sclerotized and imbricated, sometimes a little swollen on distal part *M. rubifoliae* TAKAHASHI, sens. str.

Matsumuraja sorini TAKAHASHI n. sp.

Apterous viviparous female: Whitish yellow in life. Head with some granules on anterior and lateral marginal areas and over venter; frontal tubercles very small; anterior capitate setae of head about 1.6 times as long as middle diameter of 3rd antennal segment; posterior lateral setae of head about twice as long as middle diameter of 3rd antennal segment; venter of antennal tubercles with 2 capitate setae which are about 1.3 times as long as middle diameter of 3rd antennal segment; venter of head with 2 or 3 capitate setae. Antennae about 0.8 times as long as body length; tubercle on basal segment very small, about two-fifths as long as that segment, a little longer than middle diameter of 3rd antennal segment, with 2 capitate setae which are about 1.3 times as long as middle diameter of 3rd antennal segment; 2nd segment with 3 setae; 3rd distinctly shorter than width of head across eyes, with 5 setae which are a little shorter than middle diameter of segment, distal part pale brown; 4th with 3 setae, distal part pale brown; 5th a little imbricated, distal part brown; processus terminalis about 3.6 times as long as basal part; relative length of segments as follows: III-20, IV-13, V-14, VI-8+29. Clypeus rounded, well developed anteriorly, with 2 pairs of pointed setae which are twice as long as middle diameter of 3rd antennal segment; mandibular laminae with 3 pointed setae; rostrum reaching beyond hind coxae, ultimate segment as long as 2nd segment of hind tarsus, with a pair of secondary setae. Cornicles about 3 times as long as 2nd segment of hind tarsus, about 4 times as long as cauda, a little longer than width of head across eyes, slightly imbricated on basal part, swollen on distal part, swollen part about 1.5 times as wide as flange at tip, pale brown on distal part when cleared. Cauda longer than width, with 2 pairs of setae. Genital plate larger than width of anal plate, with 10 short setae along hind margin and 2 anterior long setae. Gonochaetae in 3 clusters, median cluster with 4 setae, lateral one with 2 setae. Anal plate with about 12 setae. Hind tibiae without spinules (very spinulose in larvae), with blunt and pointed setae, long seta as long as middle diameter of tibia, with 7-8 blunt sound pegs on basal half of inner side; tarsi slightly imbricated, with 3, 3, 2 setae on 1st segment, 2nd segment of hind tarsus with a pair of secondary setae on upper side, with or without these setae on lower side. Dorsal tubercles on abdomen very small, sometimes lacking, one-half as long as middle diameter of 3rd antennal segment, with long capitate setae which are about twice as long as middle diameter of 3rd antennal segment; ventral setae of abdomen variable in length, long setae about 1.5 times as long as middle diameter of 3rd antennal segment. Ventral surface of abdomen slightly striated on region beneath each cornicle. Basal 2 abdominal spiracles on each side distinctly separated. Body 1.7-1.8 mm. in length.

Host plant: *Rubus peltatus*.

Described from cotypes taken at Oda, Iitaka, Mie Prefecture (27. VII. 1959, M. SORIN leg.); also collected in Mt. Odaigahara, Nara Prefecture (16. VIII. 1956).

This species is distinguished from *M. rubifoliae* TAKAHASHI (sens. str.) by the following points: Tubercle on 1st antennal segment very small, about two-fifths as long as that segment, a little longer than middle diameter of 3rd antennal segment, with 2 capitate setae. Cornicles slightly imbricated at basal part, swollen on distal part, swollen part about 1.5 times

as wide as flange at tip, pale brown on distal part when cleared.

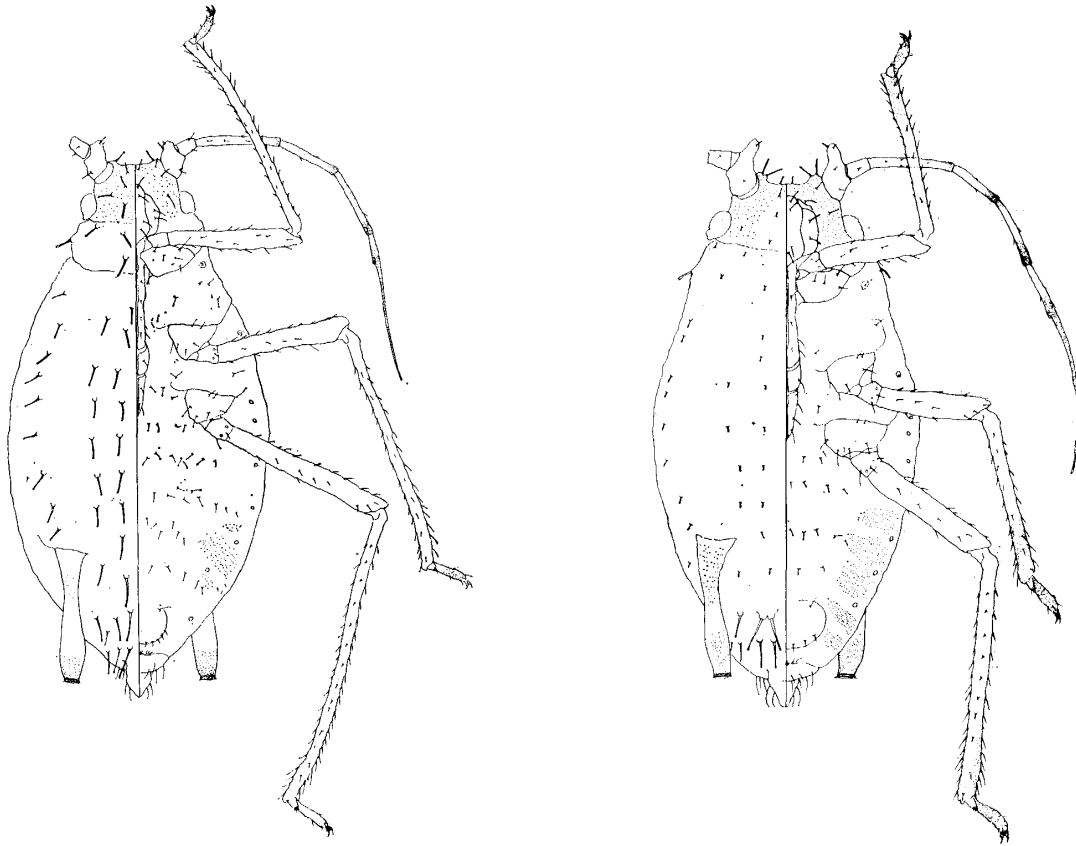


Fig. 1. *Matsumuraja sorini* TAKAHASHI n. sp. Fig. 2. *Matsumuraja rubifoliae* TAKAHASHI, Form.

***Matsumuraja rubifoliae* TAKAHASHI, sens. str.**

Neophorodon rubi TAKAHASHI, Proc. Ent. Soc. Washington, 24, p. 204 (1922); Dept. Agr. Gov., Res. Inst., Formosa, Rept. no. 4, p. 17, 84 (1923); Ibid., Rept. no. 10, p. 35, 105 (1924); Trans. Nat. Hist. Soc. Formosa, XX, p. 321 (1930).

Matsumuraja rubifoliae TAKAHASHI, Dept. Agr. Gov., Res. Inst., Formosa, Rept. no. 53, p. 78 (1931); MORITSU, Bull. Fac. Agr., Yamaguchi Univ., 8, p. 633 (1957); TAKAHASHI, Trans. Shikoku Ent. Soc. 6, p. 55 (1959).

Host plants: *Clethra barbinerbis* (primary host); *Rubus palmatus*, *R. hirsutus*, *R. sp.* (secondary hosts).

Specimens examined: Many apterae and alatae taken in Mt. Rokko, near Kobe, Hyogo Pref. (10. VI. 1956), Amanosan, near Kawachi-Nagano, Osaka Pref. (1. VI. 1957), Mt. Myoken, Osaka Pref. (10. VIII. 1957), Izumi, Osaka Pref. (9. II. 1958), Mt. Kongo, Osaka Pref. (17. V. 1959), Mt. Iwawaki, Osaka Pref. (30. VII. 1960), Amanosan, near Kawachi-Nagano, Osaka Pref. (19. XI. 1961), and Kobuka, near Kawachi-Nagano, Osaka Pref. (27. XII. 1961); all specimens collected by M. SORIN.

***Matsumuraja rubifoliae* TAKAHASHI, Form**

Apterous viviparous female: Different from *M. rubifoliae* TAKAHASHI (sens. str.) as follows: Frontal tubercles distinct, with 1-2 capitate setae which are as long as middle diameter of 3rd antennal segment; dorsal setae of head minute, about one-fifth as long as

middle diameter of 3rd antennal segment. Antennae about 0.7 times as long as body length; tubercle on basal segment small, about twice as long as middle diameter of 3rd antennal segment, with 3 capitate setae, long one about half middle diameter of 3rd antennal segment; 3rd segment with 7 minute capitate setae which are about one-fifth as long as middle diameter of segment, distal part white or pale brown; 4th with 3 setae, distal part brown; relative length of segments as follows: III-13, IV-8, V-9, VI-6+21. Cornicles about 4 times as long as hind tarsus or cauda, a little imbricated on basal two-thirds, brown on distal part when cleared, swollen on distal part, swollen part about 1.3-1.5 times as wide as flange at tip. Genital plate with 6 short setae along hind margin and 2 anterior long setae. Gonochaetae in 3 clusters, median cluster with 4 setae, lateral one with 2 setae. Hind tibiae without spinules (very spinulose at distal half in larva), with 8-9 blunt sound pegs on basal two-thirds of inner side, with blunt and pointed setae, long seta a little shorter than middle diameter of tibia; tarsi slightly imbricated, 2nd segment of hind tarsus with a pair of secondary setae on upper side. Dorsal tubercles on anterior 6 abdominal segments lacking, with minute setae which are about one-fifth of middle diameter of 3rd antennal segment; tubercles on 7th and 8th tergites small, with capitate long setae which are about thrice as long as middle diameter of 3rd antennal segment. Ventral setae of abdomen about three-fifths of middle diameter of 3rd antennal segment; ventral surface of abdomen distinctly striated on region beneath each cornicle. Body 1.3 mm. in length.

Alate viviparous female (gynoparae): Frontal tubercle with 2 short blunt setae which are a little shorter than diameter of 3rd antennal segment at its constricted base; dorsal setae of head subequal in length, about one-half of basal diameter of 3rd antennal segment; venter of head with 2 setae which are three-fourths as long as basal diameter of 3rd antennal segment. Antennae with 32 transversely oval sensoria on 3rd segment, about 9 on 4th, 6 on 5th all around segments, 3rd a little shorter than width of head across eyes. Swollen part of cornicle about 1.5 times as wide as flange at tip. Tarsi with 3, 3, 2 setae on 1st segment; 2nd segment of hind tarsus with a pair of secondary setae on upper side. Dorsal setae of abdomen variable in length, about twice as long as basal diameter of 3rd antennal segment on 8th tergite; ventral setae of abdomen subequal in length, as long as, or a little longer than basal diameter of 3rd antennal segment; ventral surface of 3rd to 6th abdominal segments distinctly striated on lateral part. Body about 1.3 mm. in length.

Alate male: Similar to gynopara but differs in the following points except for genitalia: Body about 1.5 mm. in length with faint or broken dorsal patches on abdomen; antennae as long as, or a little longer than body length, with about 58 sensoria on 3rd segment, about 23 on 4th, and about 13 on 5th. Claspers with about 12 setae which are subequal in length; basal sheath of penis about 1.5 times as long as wide and as cauda, setae without on distal half, with some short setae on base; anal plate with about 12 dorsal setae.

Host plant: *Rubus microphyllus*.

Specimens examined: Many apterae and some alatae taken in Mt. Maya, near Kobe, Hyogo Pref. (21. VIII. 1958), Kobuka, near Kawachi-Nagano, Osaka Pref. (31. VII. 1961), Mt. Omine, Nara Pref. (VII. 1961, 4. VIII. 1961), Osugidani, Mie Pref. (11. VIII. 1961), Mt. Kongo, Osaka Pref. (20. VIII. 1961), and Chihaya, Osaka Pref. (30. VIII. 1964, 3. XI. 1964), all specimens collected by M. SORIN.

This form is very common on *Rubus microphyllus* in summer in the mountainous regions along the southern coast of the mainland of Japan, while in autumn some long haired apterous viviparous female appear, and alate gynoparae and alate males appear from late October to early November.

This form is similar to *M. rubiphila* TAKAHASHI n. sp., but differs in the following points: Tubercle on 1st antennal segment about one-half as long as that segment; antennae pale brown on distal parts of 3rd to 5th antennal segments; dorsal setae minute on head, thorax and anterior 6 abdominal segments; cornicles distinctly swollen on distal part, a

little imbricated on basal half.

Matsumuraja rubiphila TAKAHASHI n. sp.

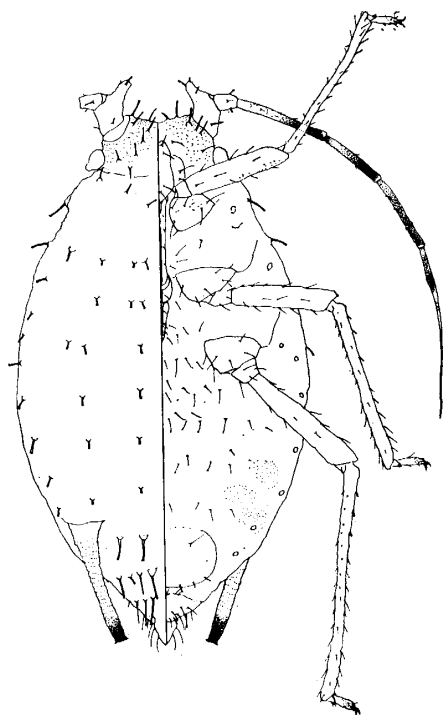
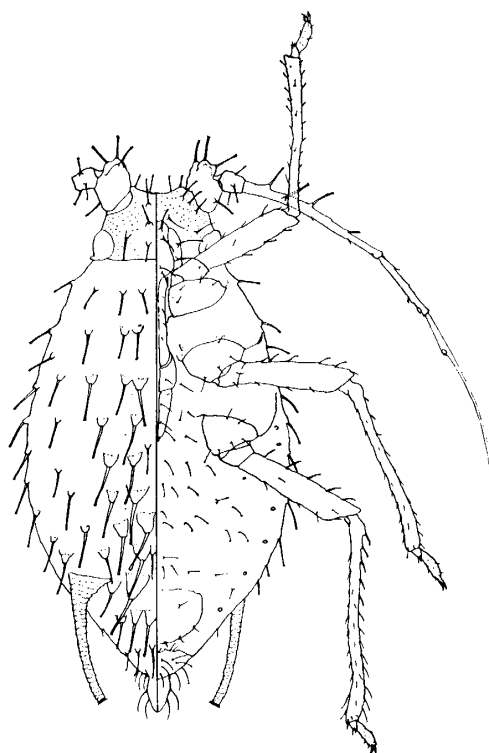
Apterous viviparous female: Yellow in life. Head with distinctly granules on anterior and lateral marginal areas and over venter; frontal tubercle small, with one or 2 capitate setae which are about 1.7 times as long as middle diameter of 3rd antennal segment; frontal setae a little shorter than middle diameter of 3rd antennal segment; posterior dorsal setae of head 0.5-0.7 times as long as middle diameter of 3rd antennal segment; venter of head with 2 blunt setae which are about 1.4 times as long as middle diameter of 3rd antennal segment. Antennae about 0.8 times as long as body length; black on distal halves of 3rd and 4th and on 5th segments, sometimes pale brown on basal part of 4th-6th when cleared; 3rd-6th slightly imbricated; 3rd with 7 blunt setae which are about 0.3 times as long as middle diameter of segment; relative length of segments as follows: III-18, IV-11, V-13, VI-8 + 25. Clypeus rounded anteriorly, with 2 pairs of capitate or blunt setae, long setae about 1.3 times as long as middle diameter of 3rd antennal segment; mandibular laminae with 2 capitate or blunt setae; rostrum reaching hind coxae, ultimate segment a little longer than hind tarsus, as long as penultimate segment, with a pair of secondary setae. Cornicles imbricated about 4.5 times as long as hind tarsus, about 3.2 times as long as cauda, sometimes scarcely swollen at distal part, middle width a little shorter than flange at tip, deep brown on distal part when cleared. Cauda about 1.6 times as long as middle width, with 2 pairs of long setae. Genital plate distinctly wider than anal plate, with 8 short setae along hind margin and 2 anterior long setae. Gonochaetae in 3 clusters, median cluster with 4 setae, lateral one with 2 setae. Hind tibiae without spinules (very spinulose in larvae), with 8-9 blunt sound pegs on basal two-thirds of inner side, with blunt and pointed setae, long one a little shorter than middle diameter of tibia; tarsi with 3, 3, 2 setae on 1st segment, 2nd segment of hind tarsus with a pair of secondary setae on upper side, with a secondary setae on lower side. Basal 2 abdominal spiracles on each side distinctly separated; 1st to 5th abdominal segments without dorsal tubercles, with minute capitate setae which are about three-fifths of middle diameter of 3rd antennal segment; dorsal tubercles on 6th to 8th abdominal segments developed, especially spinal, with long capitate setae, long one about 2.7 times as long as middle diameter of 3rd antennal segment on 8th tergite; ventral setae of abdomen variable in length, about 1.2 times as long as middle diameter of 3rd antennal segment on anterior part; ventral surface of abdomen slightly striated on region beneath each cornicle. Body about 1.5 mm. in length.

Host plant: *Rubus palmatus*.

Described from cotypes taken in Mt. Omine, Nara Pref. (31. VII. 1957), also collected in Mt. Ikoma, Osaka Pref. (18. IX. 1955), Mt. Kongo, Osaka Pref. (25. IX. 1955), Mt. Omine, Nara Pref. (VII. 1961, 4. VIII. 1961), Osugidani, Mie Pref. (11. VIII. 1961), Mt. Kongo, Osaka Pref. (20. VIII. 1961), and Amanosan, near Kawachi-Nagano, Osaka Pref. (12. XI. 1961), all specimens collected by M. SORIN.

This species is distinguished from *M. rubifoliae* TAKAHASHI (sens. str.) by the following points: Dorsal setae of head about 0.5-0.7 times as long as middle diameter of 3rd antennal segment; antennae black on distal halves of 3rd and 4th and on 5th segments, sometimes pale brown on basal parts of 4th to 6th, when cleared; tubercle on 1st antennal segment as long as that segment; dorsal setae of abdomen short except on 6th to 8th tergites, dorsal short setae about 0.6 times as long as middle diameter of 3rd antennal segment; ventral setae of abdomen variable in length, 0.6-1.2 times as long as middle diameter of 3rd antennal segment; genital plate with 6-8 short setae along hind margin and 2 anterior long setae.

Differs from *M. rubifoliae* TAKAHASHI (form) in the following points: Antennae black on distal halves of 3rd and 4th and on 5th segments, sometimes pale brown on basal parts

Fig. 3. *Matsumuraja rubiphua* TAKAHASHI n. sp.Fig. 4. *Matsumuraja rubea* SORIN n. sp.

of 4th to 6th when cleared; dorsal setae long on 6th abdominal segment; cornicles imbricated, sometimes scarcely swollen on distal part, middle width a little shorter than flange at tip.

Matsumuraja rubi MATSUMURA

Acanthaphis rubi MATSUMURA, Trans. Sapporo Nat. Hist. Soc. 8, p. 15 (1918).

Matsumuraja SCHUMACHER, Zool. Anz., LIII, p. 176 (1921).

Matsumuraja ribi SNINJI, Monogr. Japan. Aphid., p. 888 (1941).

Host plants: *Rubus crataegifolius*, *R. microphyllus*, *R. sp.*

Specimens examined: Many apterae taken in Mt. Kongo, Osaka Pref. (10. VIII. 1958), Mt. Maya, near Kobe, Hyogo Pref. (21. VIII. 1958), Mt. Omine, Nara Pref. (4. VIII. 1961), Osugidani, Mie Pref. (11. VIII. 1961), near Lake Shikotsu, Hokkaido (23. IX. 1962) and Chihaya, Osaka Pref. (30. VIII. 1964), all specimens collected by M. SORIN.

Matsumuraja rubea SORIN n. sp.

Apterous viviparous female: White; antennae and cornicles white. Head with a little granules on lateral marginal areas and over venter; frontal tubercle very small, with two long capitate setae which are about 2.4 times as long as middle diameter of 3rd antennal segment; dorsal capitate setae of head about 2.6 times as long as middle diameter of 3rd antennal segment; antennal tubercle with 2 setae on venter. Antennae 5 segmented, about 0.8 times as long as body length; tubercle on basal segment, small, about one-third as long as that segment, with 3 long capitate setae which are about 1.5 times as long as middle diameter of 3rd antennal segment; 3rd segment a little shorter than cornicle, with 3 long capitate setae, long one about twice as long as middle diameter of segment; 4th with 4 blunt setae which are about half middle diameter of 3rd antennal segment; 6th imbricated; relative length of segments as follows: III-22, IV-10, V-7 + 18. Clypeus with 2 pairs capitate setae which are about twice as long as middle diameter of 3rd antennal seg-

ment; mandibular laminae with 2 setae; rostrum reaching hind coxae, ultimate segment about 1.3 times as long as hind tarsus, as long as penultimate segment, with a pair of secondary setae. Cornicles long, slender, cylindrical, but much expanded at base, a little longer than 3rd antennal segment, very imbricated, scarcely curved. Cauda a little constricted near base, distinctly longer than middle width, with 2 pairs of setae. Genital plate with 6 setae along hind margin and 2 anterior long setae. Hind tibiae, with few capitate setae which are about 1.5 times as long as middle width of tibia without spinules and sound pegs, long setae a little shorter than middle width of tibia; tarsi with 3, 3, 2 setae on 1st segment, 2nd segment of hind tarsus with a secondary seta on lower side. Basal 2 abdominal spiracles on each side distinctly separated. Dorsal tubercles and capitate setae long, especially spinal tubercles about 2-3 times as long as middle diameter of 3rd antennal segment on 1st-6th abdominal segments; anterior 5 abdominal segments with 8 capitate setae, 6th with 4, 7th-8th with 6, long one about 4 times as long as middle diameter of 3rd antennal segment. Body about 1.2 mm. in length.

Host plant: *Rubus* sp.

Described from holotype taken in Mt. Omine, Nara Pref. (31. VII. 1957, M. SORIN leg.).

This species is distinguished from *M. rubi* MATSUMURA by the following points: White; antennae and cornicles white; antennae 5 segmented; tubercle on 1st antennal segment small, about one-third as long as that segment; 3rd antennal segment a little shorter than cornicle, with 3 long capitate setae, long one about twice as long as middle diameter of segment; dorsal capitate setae long, about 4 times as long as middle diameter of 3rd antennal segment; and hind tibiae without spinules and sound pegs, with few long capitate setae which are about 1.5 times as long as middle width of tibia.

Differs from the description of *M. formosana* TAKAHASHI in the tubercle on 1st antennal segment small and setae of 3rd antennal segment very long.