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THREE NEW SPECIES OF THE GENUS *LYSAPHIDUS* SMITH FROM JAPAN

(HYMENOPTERA : APHIDIIDAE)

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So far as I am aware, no species of the genus *Lysaphidus* Smith has been known to occur in Japan. In the following lines will be given the descriptions of three new species of this genus on the basis of the specimens reared from certain aphids in Japan. On this occasion I wish to express my sincere thanks to Prof. C. Watanabe of Hokkaido University for his continuous kind direction. Thanks are also due to Dr. V. F. Eastop of the British Museum (N. H.) for his kindness in identifying aphids.

Key to the three Japanese species of *Lysaphidus*

1. Antennae with 15 or 16 segments in female and with 16 to 18 in male; 1st flagellar segment more than 3 times as long as broad at apex. Thorax dark brown; pronotum yellowish brown. Legs yellow to yellowish brown. 1. *pleotrichophori*, sp. nov.
Antennae with 12 or 13 segments in female and with 14 to 16 in male; 1st flagellar segment less than 3 times as long as broad at apex. Thorax entirely dark brown. Legs brown to dark brown. 2
2. First abscissa of radius as long as breadth of stigma. Face 1.5 times as broad as long; clypeus 1.8 times as broad as long. Petiole a little less than 3 times as long as broad at spiracles, flat as seen laterally. 2. *matsuyamensis*, sp. nov.
First abscissa of radius 1.5 times as long as breadth of stigma. Face 2 times as broad as long; clypeus 1.5 times as broad as long. Petiole 3 times as long as broad at spiracles, weakly convex as seen laterally. 3. *callipterinellae*, sp. nov.

1. *Lysaphidus pleotrichophori*, sp. nov.

♀. Dark brown. Clypeus and mandibles (except apex) yellow; face, scapes, pedicels and pronotum yellowish brown. Abdomen brown; petiole yellow; second suture and apical segment yellowish brown. Wings hyaline; stigma and veins brown. Legs yellow to yellowish brown; apices of tibiae and tarsi somewhat dark.

Body 1.4–1.9 mm., antennae 1.0–1.5 mm. in length. Head transverse dorsally, broader than thorax at tegulae, smooth and shining, with sparse hairs; temples as long as dorsal length of an eye, very slightly converging posteriorly behind eyes. Ocelli round; distance between posterior ocelli 4 to 5 times as long as the diameter. Face sparsely haired laterally, 1.5 times as broad as long and about as long as frontal breadth of an eye; clypeus distinctly convex, 1.8 times as broad as long; malar space one-fourth as long as mandible at base. Antennae filiform, densely haired, with 15 or 16 segments [15 (17 ♀♀), 16 (2)], becoming stouter towards apex; 1st flagellar segment as long as the 2nd in length,

slightly more than 3 times as long as broad at apex and the 12th 1.5 times as long as broad. Thorax smooth and shining, with sparse hairs; notaulices obsolete, only at anterior one-fourth distinct. Propodeum (fig. 4) smooth and shining, scatteringly haired, usually completely areolated, with a narrow pentagonal areola just before petiole, though sometimes ante-median longitudinal and oblique carinae being faint or completely effaced. Abdomen lanceolate, longer than head and thorax together; petiole (fig. 1) distinctly more than 3 times as long as broad at spiracles and 2.5 times so at apex, somewhat rugose, weakly convex as seen laterally, the lateral margins being weakly curved outwardly beyond spiracular tubercles, which are situated just before the middle; 2nd and succeeding tergites smooth and shining, with sparse hairs. Genitalia (fig. 10): ovipositor sheath stout. Wings (fig. 7): stigma about 2 times as long as metacarp and 4 times as long as broad; 1st abscissa of radius 1.2-1.5 times as long as breadth of stigma. Legs of normal form.

♂. Similar to the female, but differs from the latter in the following points:— Body and legs darker in colour. Antennae 1.4-1.9 mm. in length, with 16 to 18 segments [16 (2♂♂), 17 (12), 18 (1)]. Body 1.5-1.9 mm. in length.

Holotype ♀ and paratypes 16 ♀♀, 12 ♂♂: 30-iv-65, Matsuyama, Ehime-ken. Paratypes: 8 ♀♀, 3 ♂♂, 2-v-65, Kure, Hiroshima-ken, 3 ♀♀, 2 ♂♂, 9-vi-65, Fukuoka, Fukuoka-ken. All the specimens were reared from *Pleotrichophorus glandulosus* on *Artemisia* spp. by H. Takada. The types are deposited in the collection of the Entomological Institute, Hokkaido University.

Hosts: *Pleotrichophorus glandulosus* (Kaltenbach).

Distribution: Japan (Honshu, Shikoku and Kyushu).

Parasitized aphids are attached solitarily to the leaves of host plants, the empty skin becoming pale yellowish brown.

This species is closely allied to *Lysaphidus schimitscheki* Starý, 1960, of Europe and *L. adelocarinus* (Smith), 1944, of North America, but differs from both those species in having the propodeum which is usually completely areolated.

2. *Lysaphidus matsuyamensis*, sp. nov.

♀. Dark brown. Clypeus, mandibles except apex and palpi yellow to yellowish brown; base of first flagellar segment and lower half of face medially somewhat pale. Abdomen brown; petiole yellow to yellowish brown; apical segment somewhat pale. Wings hyaline; stigma and veins pale brown. Legs brown to dark brown; trochanters and bases of tibiae somewhat pale.

Body 1.3-1.6 mm., antennae 0.8-1.0 mm. in length. Head transverse dorsally, broader than thorax at tegulae, smooth and shining, with sparse hairs; temples as long as dorsal length of an eye, parallel behind eyes. Ocelli round; distance between posterior ocelli 4 times as long as the diameter. Face sparsely haired laterally, 1.5 times as broad as long and 1.2 times as long as frontal breadth of an eye; clypeus distinctly convex, 1.8 times as broad as long; malar space one-fourth as long as mandible at base. Antennae filiform, densely haired, with 12 or 13 segments [12 (8♀♀), 13 (4)], becoming slightly stouter towards apex; 1st flagellar segment as long as the 2nd in length, a little less than 3 times as long as broad at apex and the 9th 2 times as long as broad. Thorax smooth and shining, with sparse hairs; notaulices obsolete, only at anterior one-fourth distinct. Propodeum (fig. 5) smooth and shining, scatteringly haired, usually incompletely

areolated, with only two divergent carinae on posterior surface, but in a few specimens completely areolated by very faint ante-median longitudinal and oblique carinae. Abdomen lanceolate, longer than head and thorax together; petiole (fig. 2) a little less than 3 times as long as broad at spiracles and 2 times so at apex, somewhat rugose, flat as seen laterally, the lateral margins being moderately divergent from spiracular tubercles which are situated just before the middle; 2nd and succeeding tergites smooth and shining, with sparse hairs. Genitalia (fig. 11): ovipositor sheath stout. Wings (fig. 8): stigma about 2 times as long as metacarp and a little less than 4 times as long as broad; 1st abscissa of radius as long as breadth of stigma. Legs of normal form.

♂. Closely resembles the female, from which it differs in the following aspects:—Body and legs darker in colour. Antennae 1.1–1.3 mm. in length, with 14 or 15 segments [14 (2♂♂), 15 (4)]. Body 1.3–1.5 mm. in length.

Holotype ♀ and paratypes 9♀♀, 4♂♂: 30–iv–65, Matsuyama, Ehime-ken. Paratypes: 2♀♀, 2♂♂, 7–vi–65, Hikosan, Fukuoka-ken. All the specimens were reared from *Colorado* sp. on *Artemisia* spp. by H. Takada. The types are deposited in the collection of the Entomological Institute, Hokkaido University.

Hosts: *Colorado* sp. on *Artemisia* spp.

Distribution: Japan (Shikoku and Kyushu).

Parasitized aphids are attached solitarily to the leaves of host plants, the empty skin becoming pale yellowish brown.

In the wing venation and the number of the antennal segments this species resembles the European species, *Lysaphidus arvensis* Starý, 1960, from which it is readily distinguished by the following points:—(1) First flagellar segment less than 3 times as long as broad at apex. (2) Propodeum usually incompletely areolated. (3) Thorax entirely dark brown. (4) Genae, basal halves of antennae and legs brown to dark brown, not yellowish.

3. *Lysaphidus callipterinellae*, sp. nov.

♀. Dark brown. Clypeus, mandibles except apex and palpi yellowish brown to brown; propodeum somewhat pale; petiole yellow to brown. Wings hyaline; stigma and veins pale brown. Legs brown to dark brown; trochanters, bases of tibiae and tarsi somewhat pale.

Body 1.3–1.6 mm., antennae 0.8–0.9 mm. in length. Head transverse dorsally, broader than thorax at tegulae, smooth and shining, with sparse hairs; temples as long as dorsal length of an eye, parallel behind eyes. Ocelli round; distance between posterior ocelli 4 to 5 times as long as the diameter. Face sparsely haired laterally, 2 times as broad as long and 1.2 times as long as frontal breadth of an eye; clypeus distinctly convex, 1.5 times as broad as long; malar space one-third as long as mandible at base. Antennae filiform, densely haired, with 13 segments [13 (29♀♀)], becoming stouter towards apex; 1st flagellar segment as long as the 2nd in length, a little less than 3 times as long as broad at apex and the 9th 1.5 times as long as broad. Thorax smooth and shining, with sparse hairs; notaulices obsolete, only at anterior one-fourth distinct. Propodeum (fig. 6) smooth and shining, scatteringly haired, usually completely areolated, with a narrow pentagonal areola just before petiole, though sometimes ante-median longitudinal and oblique carinae being faint or completely effaced. Abdomen lanceolate, longer than head and thorax together; petiole (fig. 3) 3 times as long as broad at spiracles and at

apex, somewhat rugose, weakly convex as seen laterally, the lateral margins being weakly curved outwardly beyond spiracular tubercles which are situated just before the middle; 2nd and succeeding tergites smooth and shining, with sparse hairs. Genitalia (fig. 12): ovipositor sheath stout. Wings (fig. 9): stigma about 2 times as long as metacarp and 4 times as long as broad; 1st abscissa of radius 1.5 times as long as breadth of stigma. Legs of normal form.

♂. Similar to the female, but differs from the latter in the following characters:— Body and legs darker in colour. Antennae 0.9–1.1 mm. in length, with 15 or 16 segments [15 (13 ♂♂), 16 (14)]. Body 1.3–1.4 mm. in length.

Holotype ♀ and paratypes 7 ♀♀, 11 ♂♂: 26–vii–65, Sapporo, Hokkaido. Paratypes: 1 ♀, 25–vi–62, 1 ♀, 28–vi–63, 5 ♀♀, 2 ♂♂, 23–viii–64, 9 ♀♀, 5 ♂♂, 27–viii–64, 6 ♀♀, 9 ♂♂, 30–vii–65, Sapporo. All the specimens were reared from *Callipterinella calipterus* on *Betula* spp. by H. Takada. The types are deposited in the collection of the Entomological Institute, Hokkaido University.

Hosts: *Callipterinella calipterus* (Hartig).

Distribution: Japan (Hokkaido).

Aphids attacked by the parasite are found solitarily on the leaves of host plants, the empty skin becoming whitish brown.

The present species resembles the preceding species, *Lysaphidus matsuyamensis*, but is easily differentiated from the latter by the wing venation, by the petiole, etc. as described in the above mentioned key. Furthermore, it comes near the European species, *L. erysimi* Starý, 1960, from which it is readily distinguishable by the antennae with more segments and by the darker colouration.

Explanation of plates

Plate XXXII. Petiole of female (Fig. 1, 2, 3); propodeum of female (Fig. 4, 5, 6). Figs. 1 & 4, *Lysaphidus pleotrichophori*; Figs. 2 & 5, *L. matsuyamensis*; Figs. 3 & 6, *L. callipterinellae*.

Plate XXXIII. Fore wing of female (Fig. 7, 8, 9); genitalia of female (Fig. 10, 11, 12). Figs. 7 & 10, *Lysaphidus pleotrichophori*; Figs. 8 & 11, *L. matsuyamensis*; Figs. 9 & 12, *L. callipterinellae*.

DISCOVERY OF BINODOXYS CONFUCIUS IN JAPAN. On the basis of the present specimens (2♀♀, 21–iii–64, Shinokawa, Amami-Ōshima, Ryukyu, H. Takada leg.) is given Japan as a locality of *Binodoxys confucius* Mackauer. According to Mackauer (Entomophaga 7: 37, 1962) this species has been known to occur as a parasite of an aphid on citrus in Hongkong.

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