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A Revision of the Genus *Demotina* (Coleoptera, Chrysomelidae) from Japan, the Ryukyus, Taiwan and Korea, I

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Abstract This is the former part of the revisional study of the genus *Demotina* from Japan, the Ryukyus, Taiwan and Korea. Four new species, viz., *D. imasakai*, *D. ser-riventris*, *D. squamosa* and *D. vernalis*, are described.

Introduction

The genus *Demotina* contains about 70 species distributed in Asia, India, Ceylon, Melanesia and Polynesia. Up to the present, 10 species, one subspecies and one variety have been fragmentarily recorded from Japan and the Ryukyus (BALY, 1874; JACOBY, 1885; CHÛJÔ, 1958, 1961; CHÛJÔ & KIMOTO, 1960; CHÛJÔ & SHIRÔZU, 1955; NAKANE, 1958; NAKANE & KIMOTO, 1959; OHNO, 1960). Japanese members of the genus are commonly encountered in oak and pasania forests (ISONO *et al.*, 1986; ISONO, 1988). KIMOTO (1964) revised the Eumolpinae in this district and recognized 5 good species belonging to the genus. From Taiwan CHÛJÔ (1956) first described 4 species, two of which were recently regarded as synonyms (KIMOTO, 1969). TAKIZAWA (1978) added one species and one subspecies to the Taiwanese faunal list of the genus. From Korea only one species has hitherto been reported (CHÛJÔ & KIMOTO, 1961).

In spite of the efforts of many taxonomists, there remains some confusion on the concept of certain species. *Demotina modesta* BALY and *D. bipunctata* JACOBY from Japan; *D. elegans* CHÛJÔ et SHIRÔZU, *D. inornata* NAKANE from Yakushima; *D. aurosquama* CHÛJÔ from Amami-Oshima; *D. decoratella* CHÛJÔ from Taiwan and *D. piceonotata* PIC from China closely resemble each other in their appearance, and their morphological separations are difficult. KIMOTO (1964, 1969, 1980) regarded all of them as a single species, *D. modesta* BALY. On the other hand, NAKANE (1963) recognized at least *D. modesta* BALY and *D. bipunctata* JACOBY as distinct, and OHNO (1971) treated all of the species described from Japan and the Ryukyus to be different. Furthermore, KIMOTO (1964) stated that *D. modesta* BALY might be a complex of several species. Through his investigation on the life history pattern, oviposition behavior and habitat preference of *Demotina* species in Japan, ISONO (1988) revealed that *D. modesta* BALY and *D. bipunctata* JACOBY behaved as good species. Moreover, he found several specimens of which the capture season was unexplainable in comparison with the

life history pattern of *D. modesta* BALY in spite of their morphological resemblance.

In the present series of papers, the members of the genus *Demotina* from Japan, the Ryukyus, Taiwan and Korea will be revised. *Demotina modesta* BALY, *D. bipunctata* JACOBY, *D. elegans* CHÛJÔ et SHIRÔZU and *D. decoratella* CHÛJÔ, all of which have been doubtfully treated as different species, are recognized as distinct except *D. inornata* NAKANE, which is synonymized with *D. bipunctata* JACOBY. *Demotina major* subsp. *incostata* TAKIZAWA is elevated to species rank. *Demotina sasakawai* NAKANE et KIMOTO is resurrected from synonymic list. Three new species, of which emergence seasons are unique in comparison with *D. modesta* BALY, are discovered. One species resembling *D. tuberosa* CHEN is also described as new to science. The life history pattern, oviposition habit and reproduction mode of the species studied are also sketched.

The abbreviations used in the text are as follows: HT-H. TAKIZAWA collection, Hadano; MC-M. CHÛJÔ collection deposited by M. SATÔ, Nagoya Women's Univ., Nagoya; MI-M. ISONO collection, Kobe; MM-M. MINAMI collection, Tokyo; NSMT-National Science Museum (Nat. Hist.), Tokyo; OMNH-Osaka Museum of Natural History, Osaka; SI-S. IMASAKA collection, Shimabara; YK-Y. KOMIYA collection, Tokyo; YT-Y. TAKAKURA collection, Tagawa.

Demotina imasakai sp. nov.

(Fig. 1)

Body oblong, subparallel-sided. Dorsum reddish brown, lateral areas of pronotum blackish, elytra with irregular blackish markings; underside pitchy black; legs reddish brown, femora with blackish markings at base and on apical half excluding extreme apex, tibiae also with blackish markings on median and sub-apical portions.

Dorsum, and lateral areas of thorax and abdomen clothed with scales, which are golden, adpressed and spindle-like shaped; pronotum and elytra additionally with setae; elytral epipleura with fine scales arranged in a longitudinal row; abdomen with silvery hairs in central area; femora with scales on apical half; tibiae with adpressed hairs dorsally.

Head moderately convex; vertex longitudinally rugose; frons with a faint longitudinal sulcus; clypeus subtrapezoidal, about 1.7 times as broad as long, feebly broadened anteriorly at lateral margins, shallowly emarginate at anterior margin, feebly delimited from frons by an arched depression at basal margin, sparsely and shallowly punctured and shagreened on surface; antenna rather slender, about a half as long as body, 1st segment robust, 2nd ovate, 3rd to 6th slender, 7th to 11th thickened. Pronotum 1.4 times as broad as long; broadest behind middle; surface reticulately punctured; dorsum strongly raised in center; with a broad transverse depression and a pair of shallow lateral depressions before

and behind middle, respectively; lateral margins bluntly serrated; anterior and posterior corners strongly projecting laterally. Scutellum subtrapezoidal. Elytra about 1.3 times as long as broad; strongly and densely punctured; furnished with several pairs of tubercles behind middle, two distinct and the others obscure; basal areas markedly convex; subapical area largely flattened; humeri well raised and followed by an lateral costa, which reaches subapical area. Prosternum subtrapezoidal, almost 1.0 times as long as broad. Last visible sternite of abdomen finely serrated at lateral margin. Legs stout, femora armed with a small tooth on underside. Ovipositor slender; stylus prominent, blackish brown; terminal segment much longer than broad, less sclerotized; subapical segment membranous, with a slender rod ventrally. Spermatheca unciform, receptacle less swollen, pump rather thick and bluntly pointed at apex.

Length: 4.2–4.5 mm.

Holotype: 1 ex. Gokanoshô, Izumi-mura, Kumamoto Pref., 16. VI. 1984, S. IMASAKA leg. (OMNH).

Paratypes: 4 exs., same data as holotype (SI); 4 exs., same locality as holotype, 4. VIII. 1984, S. IMASAKA leg. (SI).

Distribution. Japan (Kyushu).

The present new species is closely allied to *D. fasciculata* BALY and *D. tuberosa* CHEN, but can be distinguished from the latter by the larger body size, the plural pairs of elytral tubercles, the marking pattern of femora, and the apex of spermatheca bluntly pointed.

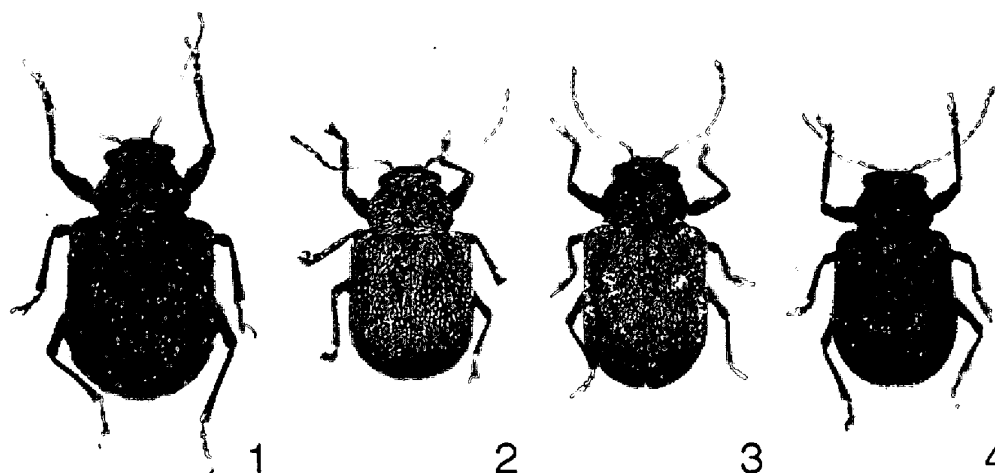
Demotina serriventris sp. nov.

(Fig. 2)

Body oblong, somewhat broadened posteriorly. General color fulvous to reddish brown, pronotum and elytra partly infuscated in some cases.

Dorsum, lateral areas of thorax and abdomen, and legs clothed with scales which are whitish, less adpressed, stout and spindle-like shaped; elytra sometimes with a pair of whitish spots consisting of a mass of scales on subbasal areas; head and pronotum bear both slender and smaller scales additionally; elytral epipleura with fine scales arranged in a longitudinal row.

Head moderately convex; clypeus subquadrate, about 2.5 times as broad as long, feebly broadened anteriorly at lateral margins, transversely depressed behind, shallowly emarginate at anterior margin, weakly shagreened and shallowly punctured on surface; antenna slender, about a half as long as body, 1st segment robust, 2nd ovate, 3rd to 6th slender, 7th to 11th thickened. Pronotum 1.4 times as broad as long, broadest behind middle; dorsum moderately convex; lateral margins bluntly serrated; anterior and posterior corners less projecting laterally. Scutellum lingiform. Elytra about 1.3 times as long as broad; densely and strongly punctured; humeri prominent; subbasal area transversely and lightly depressed;



Figs. 1–4. Holotypes. — 1, *Demotina imasakai* sp. nov.; 2, *D. serriventris* sp. nov.; 3, *D. squamosa* sp. nov.; 4, *D. vernalis* sp. nov.

subapical area somewhat flattened; apical angle of elytron about 90 degrees. Prosternum subtrapezoidal, nearly 1.0 times as long as broad. Apical three visible sternites of abdomen serrated at lateral margin. Legs stout, femora armed with a small tooth on underside. Ovipositor rather short; stylus prominent, yellowish brown; terminal segment broader than long, strongly sclerotized; subapical segment membranous, with a stout rod ventrally. Spermatheca unciform, receptacle moderately swollen, pump sharply pointed at apex.

Length: 2.5–3.2 mm.

Holotype: 1 ex., Lienhwachi, Nantou Hsien, Taiwan, 9–10. V. 1978, T. NIISATO leg. (OMNH).

Paratypes: [Japan] — 2 exs., Mt. Hikosan, Fukuoka Pref., 8. IX. 1946, Y. TAKAKURA leg. (MC & MI); 1 ex., Tanoo, Ohmura City, Nagasaki Pref., 20. V. 1980, S. IMASAKA leg. (SI); 2 exs., same locality, 16. IX. 1980, S. IMASAKA leg. (SI); 2 exs., same locality, 5. IV. 1983, S. IMASAKA leg. (SI); 1 ex., Mt. Yashirodake, Sasebo City, Nagasaki Pref., 21. IV. 1981, J. OKUMA leg. (YK); 2 exs., Mt. Mochomudake, Yakushima, 2. I. 1965, I. HIURA leg. (OMNH); 1 ex., Shiratani, Yakushima, 22. VII. 1975, H. AKIYAMA leg. (YK). [Ryukyus] — 1 ex., Koniya, Amami-Oshima, 22. VII. 1962, Y. KOMIYA leg. (YK); 1 ex., Mt. Terukubidake, Okinawajima, 6. IV. 1987, H. HAYAKAWA leg. (MM); 1 ex., Mt. Omotodake, Ishigakijima, 30. III. 1973, T. MIKAGE leg. (SI); 1 ex., same locality, 4. VI. 1973, T. HATAYAMA leg. (SI); 1 ex., same locality, 17. VI. 1973, T. HATAYAMA leg. (SI); 1 ex., same locality, 14. VII. 1973, H. TAKIZAWA leg. (HT); 2 exs., same locality, 16. II. 1974, S. IMASAKA leg. (SI); 4 exs., same locality, 17. II. 1974, S. IMASAKA leg. (SI); 1 ex., same locality, 6. VII. 1974, H. TAKIZAWA leg. (HT); 1 ex., Mt. Bannadake, Ishigakijima, 21. V. 1973, T. NAKANE leg. (NSMT); 1 ex., same locality, 24. V. 1973, T. NAKANE leg. (NSMT); 1 ex., same locality, 12. VII. 1973, H.

TAKIZAWA leg. (HT); 1 ex., same locality, 2. IV. 1976, K. KUSAMA leg. (YK); 1 ex., same locality, 6. VII. 1979, J. OKUMA leg. (YK); 1 ex., Komi, Iriomotejima, 15. V. 1973, T. NAKANE leg. (NSMT); 3 exs., same locality, 30. V. 1974, H. TAKIZAWA leg. (HT); 1 ex., Ohtomi, Iriomotejima, 19. III. 1985, K. NEMOTO leg. (YK). [Taiwan] — 1 ex., same locality as holotype, 12. V. 1975, S. IMASAKA leg. (SI); 5 exs., same data as holotype (YK); 1 ex., Jiuyuehtan, Nantou Hsien, 15. IV. 1975, S. IMASAKA leg. (SI). [Nepal] — 2 exs., Rani-Ban, Royal forest, Kathmandu, 5. X. 1981, M. SAKAI leg. (NSMT).

Distribution. Japan (Kyushu, Yakushima), Ryukyus (Amami-Oshima, Okinawajima, Ishigakijima, Iriomotejima), Taiwan, Nepal.

The present new species very closely resembles *D. modesta* BALY, but can be distinguished from the latter by the female abdomen being serrated at lateral margin, rather short ovipositor, and the different shape of spermatheca.

This species usually cloths with stout scales on body and legs. However, the scales are rather slender in some specimens collected in Kyushu and the Ryukyus.

Demotina squamosa sp. nov.

(Fig. 3)

Body oblong, subparallel-sided. General color yellowish brown.

Dorsum, and lateral areas of thorax and abdomen clothed with scales, which are golden, adpressed and spindle-like shaped; elytra much densely covered with scales; pronotum bears both slender and smaller scales additionally; elytral epipleura with fine scales arranged in two irregular longitudinal rows on basal half, and in a regular row on apical half; femora and tibiae with both slender and smaller scales; dorsum and lateral areas of thorax usually furnished with white powderly hairs, which form a pair of obscure spots on subbasal area of elytra.

Head moderately convex; frons with a faint longitudinal sulcus; clypeus rather flat, trapezoidal, about 1.8 times as broad as long, strongly broadened anteriorly at lateral margins; feebly delimited from frons by an arched depression, emarginate at anterior margin, weakly shagreened and shallowly punctured on surface. Pronotum about 1.4 times as broad as long, broadest behind middle, dorsum moderately convex and reticulately punctured; lateral margins not serrated; anterior and posterior corners less projecting laterally. Scutellum subquadrate. Elytra about 1.4 times as long as broad; moderately punctured; humeri prominent; subbasal area transversely and lightly depressed, subapical area somewhat flattened; apical angle of elytron about 90 degrees. Prosternum subquadrate, nearly 1.0 times as long as broad. Abdomen simply fringed at lateral margin. Legs stout, femora armed with a minute but well panted tooth on underside. Ovipositor rather short; stylus prominent, yellowish brown; terminal segment much broader than long, strongly sclerotized; subapical segment membranous, with a stout rod ventrally. Spermatheca unciform, receptacle ovate, pump rather thick and bluntly

pointed at apex.

Length: 2.9–4.2 mm.

Holotype: 1 ex., Ikejiri, Kawasaki-chô, Fukuoka Pref., 26. VI. 1986, Y. TAKAKURA leg. (OMNH).

Paratypes: 2 exs., Kamitara, Kamiishizu-chô, Gifu Pref., 13. VI. 1979, M. ISONO leg. (MI); 1 ex., Gifu City, 19. VI. 1979, M. ISONO leg. (MI); 1 ex., Mt. Kinkazan, Gifu City, 20. VI. 1979, M. ISONO leg. (MI); 1 ex., same locality, 21. VII. 1981, M. ISONO leg. (MI); 1 ex., Kôra-chô, Shiga Pref., 5. VI. 1979, M. ISONO leg. (MI); 1 ex., Sasabe, Kawanishi City, Hyogo Pref., 5. VI. 1971, G. NAKATA leg. (OMNH); 1 ex., Taisanji, Kobe City, 20. VI. 1982, M. ISONO leg. (MI); 1 ex., Mihara-rindô, Hachijôjima, 2. VII. 1978, J. OKUMA leg. (YK); 1 ex., Kashidate, Hachijôjima, 3. VII. 1978, J. OKUMA leg. (YK); 1 ex., Bôei-dôro, Hachijôjima, 5. VII. 1978, J. OKUMA leg. (YK); 1 ex., Muya-chô, Naruto City, Tokushima Pref., 10. VI. 1948, M. CHÛJÔ leg. (MC); 4 exs., Hirabaru, Tagawa City, Fukuoka Pref., 15. VI. 1985, Y. TAKAKURA leg. (YT); 3 exs., Ohtani, Yukuhashi City, Fukuoka Pref., 4. VI. 1985, Y. TAKAKURA leg. (YT); 4 exs., Nyûkaku, Yukuhashi City, Fukuoka Pref., 28. VII. 1986, Y. TAKAKURA leg. (YT); 6 exs., Ohkubo, Akaike-chô, Fukuoka Pref., 10. VI. 1986, Y. TAKAKURA leg. (YT); 6 exs., Ichiba, Akaike-chô, Fukuoka Pref., 20. VI. 1986, Y. TAKAKURA leg. (YT); 1 ex., Ohkuma, Itoda-chô, Fukuoka Pref., 19. VI. 1986, Y. TAKAKURA leg. (YT); 1 ex., Shimoimatô, Ohtô-chô, Fukuoka Pref., 4. VII. 1986, Y. TAKAKURA leg. (YT); 3 exs., Ataka, Kawasaki-chô, Fukuoka Pref., 2. VII. 1986, Y. TAKAKURA leg. (YT); 3 exs., same data as holotype (YT); 1 ex., same locality as holotype, 25. VII. 1986, Y. TAKAKURA leg. (YT); 5 exs., Soeda, Soeda-chô, Fukuoka Pref., 1. VII. 1986, Y. TAKAKURA leg. (YT); 1 ex., Chûganji, Soeda-chô, Fukuoka Pref., 2. VII. 1986, Y. TAKAKURA leg. (YT); 1 ex., Kakibaru, Kawara-chô, Fukuoka Pref., 19. VI. 1986, Y. TAKAKURA leg. (YT); 1 ex., Yoneyama, Shinyoshitomi-mura, Fukuoka Pref., 2. VI. 1985, Y. TAKAKURA leg. (YT); 1 ex., Iwakuma, Katsuyama-chô, Fukuoka Pref., 27. VII. 1986, Y. TAKAKURA leg. (YT); 2 exs., Yamaguchi, Kanda-chô, Fukuoka Pref., 6. VIII. 1986, Y. TAKAKURA leg. (YT); 1 ex., Kiibaba, Saigawa-chô, Fukuoka Pref., 8. VI. 1985, Y. TAKAKURA leg. (YT); 1 ex., Fushimaru, Toyotsu-chô, Fukuoka Pref., 9. VI. 1985, Y. TAKAKURA leg. (YT); 16 exs., Mt. Konpirasan, Nagasaki City, 6. VI. 1987, M. NODA leg. (SI); 1 ex., Tashirobaru, Mizuho-chô, Nagasaki Pref., 21. VII. 1976, S. IMASAKA leg. (SI); 3 exs., Mt. Iwatosan, Kazusa-chô, Nagasaki Pref., 14. VII. 1980, S. IMASAKA leg. (SI); 3 exs., Tanoo, Ohmura City, Nagasaki Pref., 15. VII. 1980, S. IMASAKA leg. (SI); 1 ex., same locality, 16. IX. 1980, S. IMASAKA leg. (SI); 1 ex., Mt. Wakamatsuyama, Gotô Is., Nagasaki Pref., 30. VII. 1979, Y. IKEZAKI leg. (SI); 3 exs., Mt. Ariakeyama, Tsushima, 25–28. VII. 1986, M. MINAMI leg. (MM).

Distribution. Japan (Honshu, Hachijôjima, Shikoku, Kyushu, Tsushima).

The present new species closely resembles *D. modesta* BALY and the allies, but can be distinguished from the latter by the clypeus being broadened anteriorly,

the elytra densely covered with scales, the arrangement of fine scales on elytral epipleura, and the different shape of ovipositor and spermatheca.

Demotina vernalis sp. nov.

(Fig. 4)

Body oblong, somewhat broadened posteriorly. General color yellowish brown; pronotum, elytra and ventral surface partly infuscated in some cases.

Dorsum and lateral areas of thorax clothed with golden and adpressed scales, which are somewhat arranged in longitudinal rows on elytra, elytral epipleura with fine hairs arranged in a longitudinal row, abdomen clothed with hairs, femora with scale-like hairs dorsally, tibiae clothed with strongly adpressed and scale-like hairs dorsally, thorax furnished with white powdery hairs laterally in a few case.

Head moderately convex; vertex and frons reticulately punctured, with a faint longitudinal sulcus on frons; clypeus rather flat, subpentagonal, about 1.8 times as broad as long, weakly broadened anteriorly at lateral margins, delimited from frons by a shallow and V-shaped depression, emarginate at anterior margin, less shagreened and shallowly punctured on surface. Pronotum 1.4 times as broad as long; broadest behind middle; dorsum reticulately punctured and moderately convex; lateral margins less serrated; anterior and posterior corners less projecting laterally. Scutellum subtrapezoidal, strongly broadened on basal half. Elytra about 1.3 times as long as broad; moderately punctured; humeri prominent, sub-basal area transversely and lightly depressed; subapical area somewhat flattened; lateral margins shallowly emarginate near apex; apical angle of elytron less than 90 degrees. Prosternum subquadrate, nearly 1.0 times as long as broad. Abdomen simply fringed at lateral margin. Legs stout, femora armed with a minute denticle on underside. Ovipositor rather long; stylus prominent, blackish brown; terminal segment much longer than broad, less sclerotized; subapical segment membranous, with a slender rod ventrally. Spermatheca unciform, receptacle well swollen, pump rather short.

Length: 2.8–3.3 mm.

Holotype: 1 ex., Jinmuji, Zushi City, Kanagawa Pref., 20. VI. 1981, S. TSUYUKI leg. (OMNH).

Paratypes: 1 ex., Mt. Hayachinesan, Iwate Pref., 4. VIII. 1968, Y. KUROSAWA leg. (NSMT); 1 ex., Marumori, Miyagi Pref., 20–21. VI. 1980, Y. KUROSAWA leg. (NSMT); 1 ex., Mt. Odayama, Monden-mura (=Aizuwakamatsu City), Fukushima Pref., 7. VI. 1948, K. HAYASHI leg. (NSMT); 2 exs., same locality, 22. VI. 1948, Y. KUROSAWA leg. (NSMT); 2 exs., Matsuzawa, Nagaino-mura (=Aizutakada-chô), Fukushima Pref., 25. VI. 1949, Y. KUROSAWA leg. (NSMT); 1 ex., Numata, Gunma Pref., 5. VII. 1951, T. TAKEI leg. (MC); 1 ex., Gyôda City, Saitama Pref., 9. VII. 1955, Y. KOMIYA leg. (YK); 1 ex., Kashiwa-chô (=Kashiwa City), Chiba Pref., 5. VI. 1966, K. EMOTO leg. (SI); 1 ex., Murayama Park, near

Tokyo, 22. V. 1936, Y. YANO leg. (OMNH); 1 ex., Mt. Takaosan, Tokyo, 31. V. 1967, H. TAKIZAWA leg. (HT); 2 exs., same data as holotype (YK); 1 ex., Manazuru, Kanagawa Pref., 15. V. 1964, Y. KOMIYA leg. (YK); 1 ex., Kadono, Matsuzaki-chô, Shizuoka Pref., 12. V. 1980, J. OKUMA leg. (YK); 3 exs., Ohgusu, Shizuoka Pref., 11. V. 1980, J. OKUMA leg. (YK); 1 ex., Mt. Monjhu, Fukui Pref., 22. VI. 1986, T. SAKAI leg. (MI); 2 exs., Kôra-chô, Siga Pref., 5. VI. 1979, M. ISONO leg. (MI); 1 ex., Mt. Iwawakisan, Osaka Pref., 18. V. 1957, Y. SHIBATA leg. (OMNH); 1 ex., Shimanotani, Kawachinagano City, Osaka Pref., 12. VI. 1962, I. HIURA leg. (OMNH).

Distribution. Japan (Honshu).

The present new species closely resembles *D. modesta* BALY and the allies, but can be distinguished from the latter by the coloration of stylus, the scutellum broadened basally, the apical angle of elytron being less than 90 degrees, the abdomen without scales, and the different shape of spermatheca.

[Note] The literature cited in the present paper will be shown in the latter part of the series.