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A Revision of the Genus *Demotina* (Coleoptera, Chrysomelidae) from Japan, the Ryukyus, Taiwan and Korea, II¹⁾

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Abstract This is the latter part of the revisional study of the genus *Demotina* from Japan, the Ryukyus, Taiwan and Korea. *Demotina incostata* TAKIZAWA is raised to the species rank. Four species, viz., *D. sasakawai* NAKANE et KIMOTO, *D. bipunctata* JACOBY, *D. decoratella* CHÛJÔ and *D. elegans* CHÛJÔ et SHIRÔZU, are resurrected from the synonymic list. *Demotina inornata* NAKANE is synonymized with *D. bipunctata* JACOBY. A key to the 15 species including 4 members newly described in the former part of the study is presented. Several new records of distribution are also given. Males of *D. modesta* BALY are first discovered from Korea. The life history pattern, oviposition habit and reproduction mode of the species are also sketched.

Demotina alni CHÛJÔ

(Figs. 4, 7, 38)

Demotina alni CHÛJÔ, 1956, Philip. J. Sci., 85: 97–99. — KIMOTO, 1969, Esakia, (7): 15–16.

Specimens examined. [Taiwan] — Nantou: Meiyuan; Meifeng; Tsifeng.

Distribution. Taiwan.

Demotina incostata TAKIZAWA, stat. nov.

(Figs. 1, 8, 39)

Demotina major subsp. *incostata* TAKIZAWA, 1978, Kontyû, Tokyo, 46: 597.

Specimens examined. [Taiwan] — Taipei: Yangmingshan (one paratype). Taoyuan: Mt. Rarashan; Fuhsing. Nantou: Lushan; Tongpu (one paratype); Wushe. Chiayi: Tungpu (one paratype).

Distribution. Taiwan.

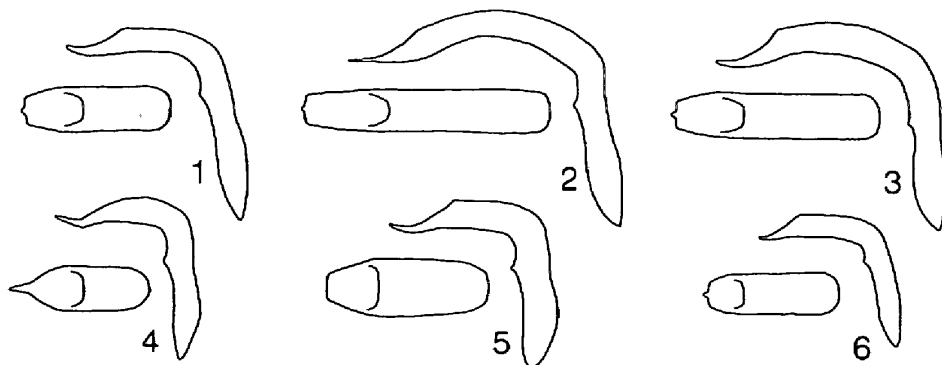
Demotina major CHÛJÔ

(Figs. 2, 9, 30, 40)

Demotina decoratella subsp. *major* CHÛJÔ, 1958, Mem. Fac. Liv. Arts & Educ., Kagawa Univ., 2: 6 (in part). — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144 (in part).

Demotina major: KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 255 (in part).

1) Part I: *Jpn. J. Ent.*, 58: 375–382 (1990).



Figs. 1–6. Dorsal and lateral views of male genitalia. — 1, *D. incostata* TAKIZAWA; 2, *D. major* CHÛJÔ; 3, *D. sasakawai* NAKANE et KIMOTO; 4, *D. alni* CHÛJÔ; 5, *D. modesta* BALY; 6, *D. decoratella* CHÛJÔ.

Specimens examined. [Ryukyus] — Okinoerabujima: Mt. Ôyama. Okinawajima: Mt. Terukubidake; Yona; Hentona; Mt. Yonahadake; Nago; Ginowan; Nakagusuku; Shuri; Tamagusuku.

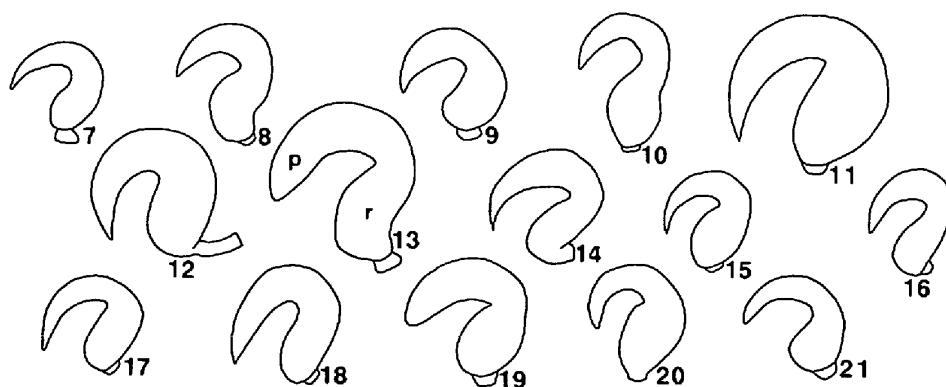
Distribution. Ryukyus (Okinoerabujima, Okinawajima). First record from Okinoerabujima.

Demotina sasakawai NAKANE et KIMOTO

(Figs. 3, 10, 27–28, 31, 41)

Demotina sasakawai NAKANE et KIMOTO, 1959, Sci. Rept. Saikyo Univ., (A), 3: 67 (in part). — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144 (in part).

Demotina major: KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 255 (in part).



Figs. 7–21. Spermatheca (p: pump, r: receptacle). — 7, *D. alni* CHÛJÔ; 8, *D. incostata* TAKIZAWA; 9, *D. major* CHÛJÔ; 10, *D. sasakawai* NAKANE et KIMOTO; 11, *D. fasciculata* BALY; 12, *D. tuberosa* CHEN; 13, *D. imasakai* ISONO; 14, *D. serriventris* ISONO; 15, *D. decoratella* CHÛJÔ; 16, *D. bipunctata* JACOBY; 17, *D. decorata* BALY; 18, *D. elegans* CHÛJÔ et SHIRÔZU; 19, *D. squamosa* ISONO; 20, *D. vernalis* ISONO; 21, *D. modesta* BALY.

Specimens examined. [Ryukyus] — Amami-Ôshima: Yuwangama, Mt. Yuwandake; Marubatake; Hatsuno.

Distribution. Ryukyus (Amami-Ôshima).

Demotina fasciculata BALY

(Fig. 11)

Demotina fasciculata BALY, 1874, Trans. ent. Soc. Lond., 1874: 162. — GRESSITT & KIMOTO, 1961, Pacif. Ins. Mon., 1A: 25 — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144. — KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 255.

Specimens examined. [Japan] — Saitama: Mt. Kasayama. Tokyo: Mt. Takaosan; Narusedani and Aihara in Machida City. Kanagawa: Yokohama, Atsugi, Kaneda, Mt. Kyogadake, Mt. Sekiroyama, Mt. Ôyama, Manazuru. Ishikawa: Mt. Kuragatake in Kanazawa City. Yamanashi: Daibosatsu, Mt. Ogiyama. Shizuoka: Umegashima, Shirada, Inatori, Mt. Amagisan, Ohdaru, Iruma, Kanaya, Gantsuji. Aichi: Chiiwakyô. Gifu: Nakatsugawa City; Gifu City; Neomura; Motosu-chô; Mt. Ikedayama; Kamiishizu-chô. Shiga: Mt. Hirasano; Korachô; Mt. Ryôzen. Osaka: Mt. Kongôsan, Mt. Iwawakisan, Ushitaki in Kishiwada City. Nara: Kashiwara City. Hyôgo: Hamasaka-chô; Tsukuhara and Taisanji in Kobe City. Wakayama: Tomogashima. Oshima: Oshima-kôen. Mikurajima: Sato. Hachijôjima: Mt. Miharayama. Tokushima: Todorokitaki in Kaifu-gun; Iwakura in Awa City. Kagawa: Ôtaki. Ehime: Omogokei; Iwamatsu. Kôchi: Engyoji in Kôchi City; Sainohama; Ashizurimisaki. Fukuoka: Kitakyushu City; Mt. Hômanzan. Nagasaki: Mt. Yashirodake in Sasebo City. Miyazaki: Mt. Sobosan. Kagoshima: Satamisaki; Eboshidake; Mt. Kurinodake; Nakakoshiki in Koshikijima. Tsushima: Kamitsushima; Izuhara; Mt. Ariakeyama. Yakushima: Mt. Mocchomodake; Shiratani.

Distribution. Japan (Honshu, Oshima, Mikurajima, Hachijôjima, Shikoku, Kyushu, Tsushima, Yakushima), S. China. First records from Oshima and Mikurajima.

Demotina tuberosa CHEN

(Fig. 12)

Demotina tuberosa CHEN, 1935, Sinensia, 6: 354, fig. 33. — CHÛJÔ & KIMOTO, 1960, Niponius, Takamatsu, (1): 3. — GRESSITT & KIMOTO, 1961, Pacif. Ins. Mon., 1A: 252. — KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 255. — KIMOTO & GRESSITT, 1982, Esakia, (18): 82, fig. 24 c. *Demotina japana* OHNO, 1960, Trans. Shikoku ent. Soc., 6: 65.

Specimens examined. [Japan] — Kanagawa: Mt. Kurinodake. Gifu: Nakatsugawa City; Kuze-mura; Suhara in Mino City; Mt. Ikedayama. Nara: Mt. Obakogatake. Osaka: Mt. Iwawakisan. Kyoto: Hanase. Tokushima: Todorokitaki in Kaifu-gun. Fukuoka: Mt. Hikosan. Saga: Hiratani. Kumamoto: Gokanoshô.

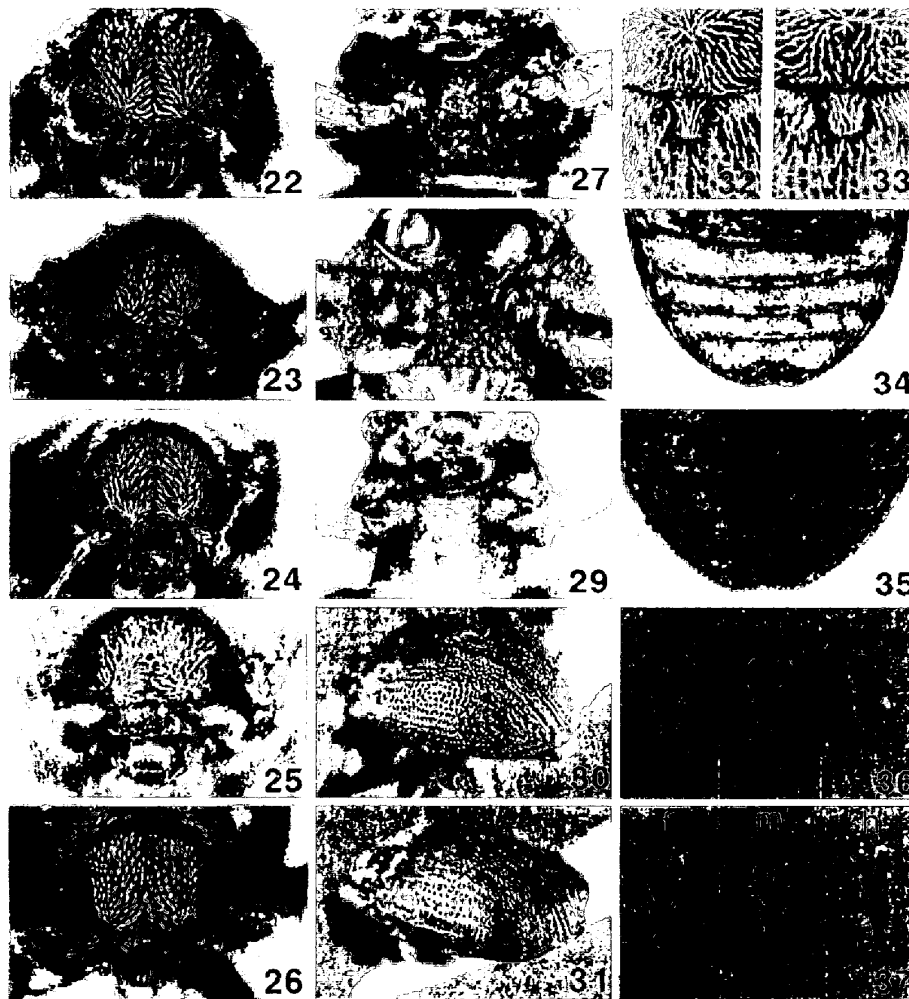
Distribution. Japan (Honshu, Shikoku, Kyushu, Tsushima), S. China, Vietnam, Laos.

Demotina decoratella CHÛJÔ

(Figs. 6, 15, 23, 44)

Demotina decoratella CHÛJÔ, 1956, Philip. J. Sci., 85: 96.

Demotina modesta: KIMOTO, 1969, Esakia, (7): 15 (in part).



Figs. 22–37. — 22–26. Head; 22, *D. serriventris* ISONO; 23, *D. decoratella* CHÛJÔ; 24, *D. bipunctata* JACOBY; 25, *D. squamosa* ISONO; 26, *D. elegans* CHÛJÔ. — 27–29. Prosternum; 27, *D. sasakawai* NAKANE et KIMOTO (male); 28, same species (female); 29, *D. vernalis* ISONO. — 30–31. Dorsoposterior views; 30, *D. major* CHÛJÔ; 31, *D. sasakawai* NAKANE et KIMOTO (female). — 32–33. Scutellum; 32, *D. vernalis* ISONO; 33, *D. modesta* BALY. — 34–35. Abdomen; 34, *D. serriventris* ISONO; 35, *D. bipunctata* JACOBY. — 36–37. Tarsi (f: front, m: mid, h: hind); 36, *D. elegans* CHÛJÔ et SHIRÔZU; 37, *D. modesta* BALY.

Specimens examined. [Taiwan] — Taipei: Yangmingshan. Taoyuan: Palin in Fushing. Nantou: Nanshanchi; Wushe; Hotso; Lienhwachi; Jiuyuethan; Tongpu. Chiayi: Tungpu. Kaoshiung: Liukuei.

Distribution. Taiwan.

Demotina bipunctata JACOBY

(Figs. 16, 24, 35, 45)

Demotina bipunctata JACOBY, 1885, Proc. zool. Soc. Lond., 1885: 204. — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 143 (in part).

Demotina inornata NAKANE, 1958, Sci. Rept., Saikyo Univ., (A), 2: 304.

Demotina modesta: KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 252 (in part).

Specimens examined. [Japan] — Shizuoka: Ônabe-rindô in Izu. Gifu: Motosu-chô; Mt. Kinkazan in Gifu City; Mt. Ikedayama. Mie: Mt. Asamayama in Futami. Osaka: Ushitaki in Kishiwada City; Higashinose-mura. Hyôgo: Tsukuhara, Taisanji and Tairyûji in Kobe City; Hamasaka-chô. Tokushima: Todorokitaki in Kaifu-gun. Nagasaki: Tashirobaru in Mizuho-chô; Tanoo in Ohmura City; Mt. Yashirodake in Sasebo City. Tsushima: Nita-Meboro; Izuhara; Kamitsushima. Yakushima: Yudomari (one syntype of *D. inornata* NAKANE, NSMT); Mt. Mocchomodake.

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

Notes. Body color is seasonally changing: Adults newly emerged are pale yellowish brown, changing through the autumn to reddish brown with or without blackish markings. *Demotina inornata* NAKANE was probably described based on young specimens of *D. bipunctata* JACOBY, of which the basic coloration is yellowish brown.

Demotina decorata BALY

(Fig. 17)

Demotina decorata BALY, 1874, Trans. ent. Soc. Lond., 1874: 163. — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144. — KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 255–256.

Specimens examined. [Japan] — Aichi: Chiiwakyô. Gifu: Mt. Kinkazan in Gifu City; Mt. Ikedayama. Hyôgo: Tsukuhara in Kobe City. Tokushima: Todoroki-taki in Kaifu-gun. Ehime: Iwamatsu. Kôchi: Sainohama. Nagasaki: Tanoo in Ômura City. Tsushima: Mt. Ariakeyama.

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

Demotina elegans CHÛJÔ et SHIRÔZU

(Figs. 18, 26, 36, 46)

Demotina elegans CHÛJÔ & SHIRÔZU, 1955, Sieboldia, Fukuoka, 1: 239.*Demotina elegans* var. *futamom* NAKANE, 1958, Sci. Rept., Saikyo Univ., (A), 2: 306.*Demotina modesta*: CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144 (in part). — KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 256 (in part).

Specimens examined. [Japan] — Fukushima: Aono in Samegawa-mura. Fukui: Mt. Kumotaniyama. Gifu: Mt. Kinkazan in Gifu City; Mt. Ikedayama. Hyôgo: Taisanji in Kobe City. Wakayama: Mt. Gomadansan. Mikurajima: Sato. Hachijôjima: Mihara-rindô. Fukuoka: Ikejiri in Kawasaki-chô; Tsuiki-chô; Iwakuma in Katsuyama-chô; Yamaguchi in Kanda-chô; Toyotsu-chô. Ôita: Hiasi in Usa City. Nagasaki: Tashirobaru in Mizuho-chô; Mt. Iwatosan in Kazusa-chô; Tanoo in Ohmura City. Kumamoto: Amakusa-chô in Amakusa Is. Yakushima: Kosugidani (one holotype of *D. elegans* var. *futamom* NAKANE, NSMT); Mt. Mocchomudake. [Ryukyus] — Amami-Ôshima: Yuwan. Okinawajima: Mt. Yonahadake; Yona. Ishigakijima: Mt. Bannadake. Iriomotejima: Komi. [Taiwan] — Nantou: Nanshanchi.

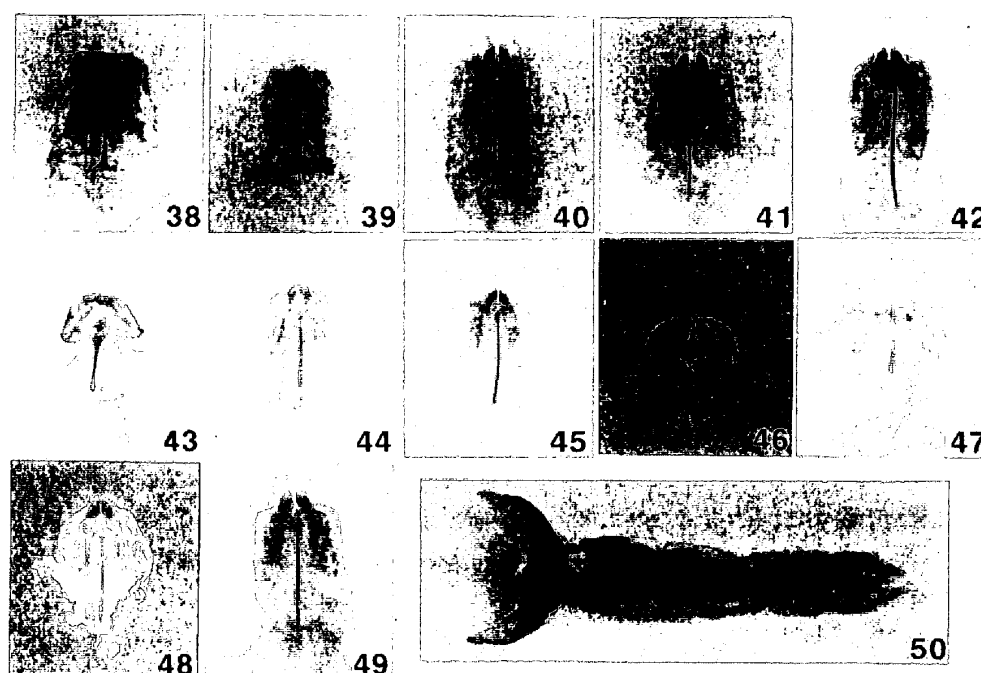
Distribution. Japan (Honshu, Mikurajima, Hachijôjima, Kyushu, Yakushima), Ryukyus (Amami-Ôshima, Okinawajima, Ishigakijima, Iriomotejima), Taiwan. First records from the regions other than the type locality, Yakushima.

Demotina modesta BALY

(Figs. 5, 21, 33, 37, 49–50)

Demotina modesta BALY, 1874, Trans. ent. Soc. London, 1874: 164. — CHÛJÔ, 1941, Trans. nat. Hist. Soc. Formosa, 31:65. — GRESSITT & KIMOTO, 1961, Pacif. Ins. Mon., 1A: 251. — CHÛJÔ & KIMOTO, 1961, Pacif. Ins., 3: 144. (in part). — KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 256 (in part).

Specimens examined. [Japan] — Ibaraki: Ami-chô. Chiba: Edogawa near Matsudo City. Tokyo: Mt. Takaosan. Kanagawa: Noborito in Kawasaki City; Fujisawa City; Hadano City. Fukui: Mt. Saihôngatake in Tsuruga City, Mt. Benzaiten, Shijûdani; Tonokuchi in Sabae City; Mikuni in Oshima Is. Gifu: Kagamihara City; Shôrai-chô and Mt. Kinkazan in Gifu City. Mie: Mt. Gozaishodake. Osaka: Sugihara in Nose-chô; Nagai Park. Hyôgo: Hamasaka-chô; Kaibara-chô; Yamato and Sasabe in Kawanishi City; Tsukuhara and Karasuhara in Kobe City. Okayama: Shô in Kurashiki City. Miyakejima: Tsubota. Mikurajima: Sato. Hachijôjima: Kashidate; Mihara-rindô. Tokushima: Muya-chô in Naruto City. Kagawa: Mt. Mineyama in Takamatsu City. Ehime: Nakadote in Matsuyama City. Kôchi: Kuroson. Fukuoka: Shiratori in Tagawa City; Tokunaga, Nagai and Nyûkaku in Yukuhashi City; Agano in Akaike-chô; Kamimine in Ôtô-chô; Ataka and Ikejiri in Kawasaki-chô; Chûganji,



Figs. 38–50. Ventral views of ovipositor (38–49: retracted, 50: protoracted). — 38, *D.alni* CHÛJÔ; 39, *D.incostata* TAKIZAWA; 40, *D.major* CHÛJÔ; 41, *D.sasakawai* NAKANE et KIMOTO; 42, *D.imasakai* ISONO; 43, *D.serriventris* ISONO; 44, *D.decoratella* CHÛJÔ; 45, *D.bipunctata* JACOBY; 46, *D.elegans* CHÛJÔ et SHIRÔZU; 47, *D.squamosa* ISONO; 48, *D.vernalis* ISONO; 49–50, *D.modesta* BALY.

Shinjô and Soeda in Soeda-chô; Nagaura in Hôjyô-chô; Hinago in Shiida-chô; Iwakuma in Katsuyama-chô; Yamaguchi in Kanda-chô; Shimokitara and Taniyama in Saigawa-chô; Toyotsu-chô. Ôita: Hiashi in Usa City; Yoake in Hita City. Nagasaki: Nomozaki; Mt. Iwatosan in Kazusa-chô; Tashirobaru in Mizuho-chô; Shinyama in Shimabara City. Kumamoto: Amakusa-chô in Amakusa Is. Tsushima: Kamiagata. [Korea] — Mt. Palkonsan and Don Moeng in Taegu. Chejudo Is.

Distribution. Japan (Honshu, Shikoku, Kyushu, Miyakejima, Mikurajima, Hachijôjima), Korea, Chejudo Is. First record from Chejudo Is.

Demotina aurosquama CHÛJÔ

Demotina aurosquama CHÛJÔ, 1961, Publ. ent. Lab. Univ. Osaka Pref., (6): 84.

Demotina modesta: KIMOTO, 1964, J. Fac. Agr., Kyushu Univ., 13: 256 (in part).

Distribution. Japan (Hachijôjima), Ryukyus (Amami-Ôshima).

Demotina montana CHÛJÔ*Demotina montana* CHÛJÔ, 1956, Philip. J. Sci., 85: 99.*Distribution.* Taiwan.*Demotina punctata* TAKIZAWA*Demotina punctata* TAKIZAWA, 1978, Kontyû, Tokyo, 46: 597.*Distribution.* Taiwan.

Key to the Species

1. Prosternum distinctly longer than broad (Figs. 27-28) 2
- Prosternum nearly as long as broad (Fig. 29) 5
2. Male genitalia bent before middle (Figs. 1, 4) 3
- Male genitalia bent behind middle (Figs. 2-3) 4
3. Pronotum much narrower than elytra; last abdominal sternite with a hump in female but simple in male; male genitalia projecting anteriorly in apical area (Fig. 4) *D. alni* CHÛJÔ
- Pronotum not very much narrower than elytra; last abdominal sternite simple in both sexes; male genitalia truncated at apex and with a prominent tooth in center (Fig. 1) *D. incostata* TAKIZAWA
4. Elytron with an obsolete lateral costa (Fig. 30); elytra subparallel-sided on basal 4/6 in both sexes; spermatheca not elongate (Fig. 9) *D. major* CHÛJÔ
- Elytron with a distinct lateral costa, the costa reaching nearly to apex (Fig. 31) elytra subparallel-sided on basal 5/6 in female but 4/6 in male; spermatheca elongate (Fig. 10) *D. sasakawai* NAKANE et KIMOTO
5. Tibiae with blackish markings on subapical and subbasal portions 6
- Tibiae without such markings 8
6. Elytra with a pair of oblique whitish markings consisting of a mass of scales on subapical area; scales on dorsum bicolor, whitish and brownish *D. fasciculata* BALY
- Elytra without such markings; scales on dorsum unicolorous 7
7. Elytra with a pair of longitudinal ridge behind middle; femora without a blackish marking at base; spermatheca sharply pointed at apex (Fig. 12) *D. tuberosa* CHEN
- Elytra with several pairs of tubercles behind middle, two distinct and others obscure; femora with a blackish marking at base; spermatheca bluntly pointed at apex (Fig. 13) *D. imasakai* ISONO
8. Female with apical three sternites of abdomen serrated at lateral margin (Figs.

- 34-35) 9
- Female with abdomen not serrated at lateral margin 11
9. Clypeus much broader than long, about 2.5 times as broad as long (Fig. 22); terminal segment of ovipositor broader than long (Fig. 43) *D. serriventris* ISONO
- Clypeus about 1.7 times as broad as long (Figs. 23-24); terminal segment of ovipositor much longer than broad (Figs. 44-45) 10
10. Elytra covered with stout scales; clypeus rather flat and feebly shagreened on surface; stylus yellowish brown; receptacle of spermatheca swollen (Fig. 15) *D. decoratella* CHÛJÔ
- Elytra covered with slender scales; clypeus convex and shagreened on surface; stylus blackish brown; receptacle of spermatheca less swollen (Fig. 16) *D. bipunctata* JACOBY
11. Second segment of antenna shorter than third *D. decorata* BALY
- Second segment of antenna longer than third 12
12. Third segment of front and mid tarsi larger than hind one (Fig. 36); clypeus strongly sloping downward just before antennal socket (Fig. 26); subapical segment of ovipositor sclerotized (Fig. 46) *D. elegans* CHÛJÔ et SHIRÔZU
- Third tarsal segment of each leg similar in size (Fig. 37); clypeus rather flat, not sloping downward just before antennal socket (Fig. 25); subapical segment of ovipositor membranous (Figs. 48-49) 13
13. Elytra thickly covered with scales; clypeus strongly broadened apically (Fig. 25); elytral epipleura with fine scales arranged in two irregular rows on basal half and in a regular row on apical half; terminal segment of ovipositor broader than long (Fig. 47) *D. squamosa* ISONO
- Elytra moderately covered with scales; clypeus not strongly broadened apically (Fig. 22); elytral epipleura with fine scales arranged in a regular row; terminal segment of ovipositor longer than broad (Figs. 48-49) 14
14. Scutellum subtrapezoidal, much broadened basally (Fig. 32); apical angle of elytron less than 90 degrees; stylus blackish brown; spermatheca with a short pump and a large receptacle (Fig. 20) *D. vernalis* ISONO
- Scutellum linguiform, not broadened basally (Fig. 33); apical angle of elytron about 90 degrees; stylus yellowish brown; spermatheca with a slender pump and a small receptacle (Fig. 21) *D. modesta* BALY

Ecology

1. *Life history pattern*

Two distinct types are recognized in seasonal activity of *Demotina* beetles, viz., one lasting for short term during spring or summer, and the other throughout the warm season (Fig. 51).

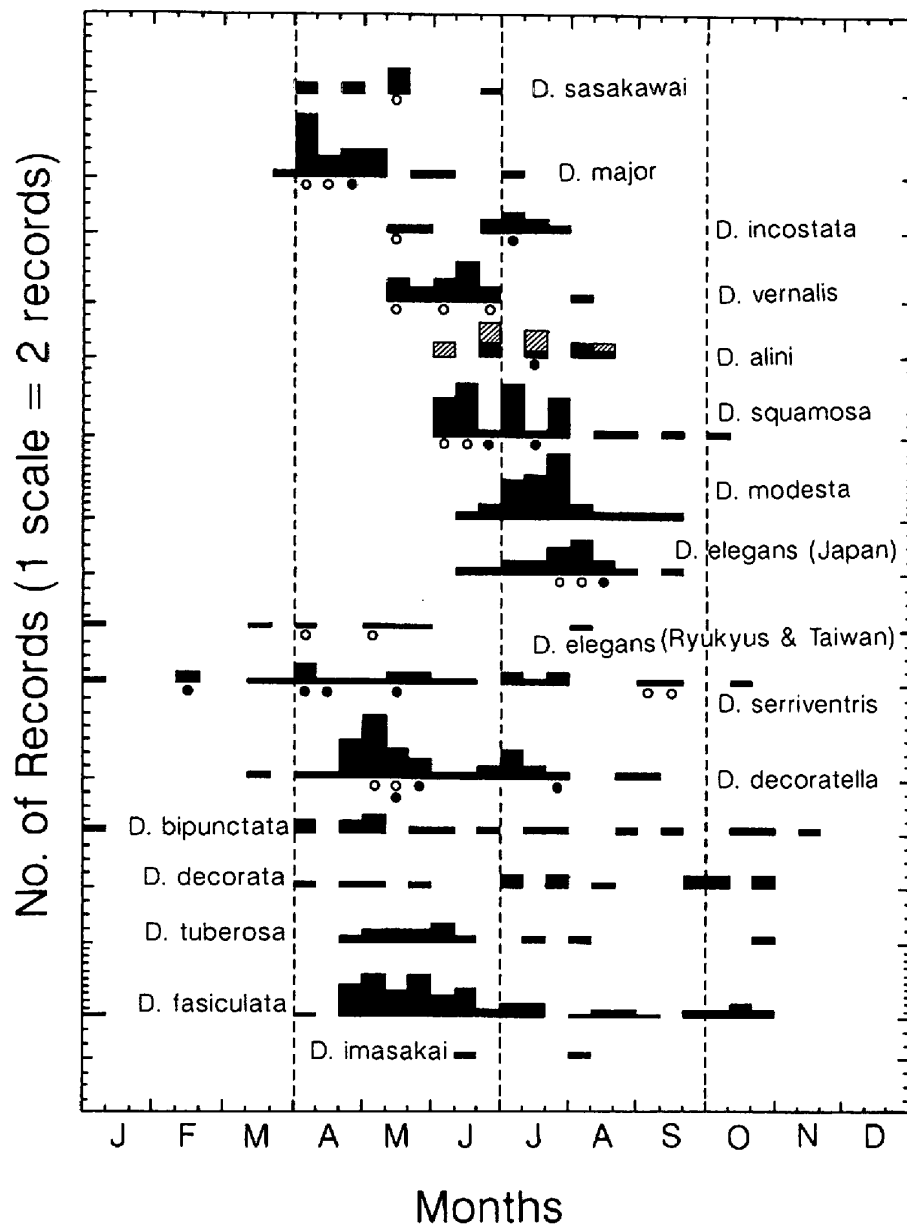


Fig. 51. Seasonal capture patterns of *Demotina* specimens examined in this study. Several specimens are dissected to determine the reproductive maturity after soaking in water for several hours. Immature specimens, which are discriminated by pale coloration, fragility of chitin, immature internal organs, etc., are shown by open circles. Females with mature eggs are shown by solid circles. The records cited from KIMOTO (1969) are also shown by shaded bars.

Demotina modesta BALY from Japan is reported as a summer breeder (ISONO, 1988). *Demotina elegans* CHÛJÔ et SHIRÔZU was also captured in summer and autumn in Gifu, central Japan, when their ovaries were mature (Table 1). These

Table 1. Seasonal abundance and ovarian development of *Demotina elegans* CHÛJÔ et SHIRÔZU in deciduous oak and evergreen forests, Gifu, Japan. The total number of beetles captured in 100 beating samples is shown with the number of females having mature eggs (in parenthesis). See ISONO *et al.* (1987) for details of the survey.

Mt. Kinkazan			Mt. Ikedayama			
Date	CC	PD	Date	QSI	QSII	QM
May 27	0	0	May 30	0	0	0
June 6	0	0	June 16	0	0	0
June 17	0	0	June 29	0	0	0
July 7	0	0	July 14	0	0	0
July 21	3 (3)	1 (0)	July 23	0	0	0
Aug. 6	3 (3)	3 (3)	Aug. 10	1 (1)	4 (4)	4 (1)
Aug. 24	3 (2)	2 (2)	Aug. 25	0	3 (3)	3 (2)
Sept. 7	0	4 (4)	Sept. 28	0	2 (2)	3 (3)
Sept. 20	0	0	Oct. 10	0	0	2 (2)
Oct. 7	0	1 (1)	Oct. 27	0	0	0
Oct. 20	0	1 (1)	Nov. 4	0	0	—
Nov. 11	0	0	Nov. 29	0	—	—
Nov. 28	0	0	Dec. 17	0	—	—
Dec. 16	0	—				

Abbreviations as follows; CC: *Castanopsis cuspidata* forest; PD: *Pinus densiflora* forest mixed with deciduous oak trees; QSI and QSII: *Quercus serrata* forest; QM: *Q. mongolica* var. *grosserrata* forest.

facts indicate that the latter species is also a summer breeder, but the southern populations from the Ryukyus and Taiwan show an inconsistent pattern in the activity. *Demotina alni* CHÛJÔ, *D. incostata* TAKIZAWA from Taiwan, *D. sasakawai* NAKANE et KIMOTO and *D. major* CHÛJÔ from the Ryukyus, *D. vernalis* ISONO and *D. squamosa* ISONO from Japan, emerge continuously from late March through June, and likely reproduce soon after the emergence.

On the other hand, *D. tuberosa* CHEN, *D. decorata* BALY, *D. fasciculata* BALY and *D. bipunctata* JACOBY have a long activity period throughout the seasons. They emerge in autumn as new adults, but their reproduction is postponed until next spring (ISONO, 1988). The reproductive diapause distinguishes them from the other members of the genus. *Demotina decoratella* CHÛJÔ and *D. serriventris* ISONO also show a similar form. However, their life histories differ from the species mentioned above because new adults of *D. decoratella* CHÛJÔ were captured in May, and a sexually matured specimen of *D. serriventris* ISONO was found in February.

2. Ovipositor and oviposition habit

The ovipositor is composed of the 8th and 9th segments of abdomen, intersegmental membrane between the 7th and 8th segments and the one between the 8th and 9th segments. It is usually retracted within the abdominal cavity (Figs.

38–49) and extended telescopically when the insect oviposits (Fig. 50). The movement is probably regulated by the protractor and the retracor muscles that attach to an apodeme of the 8th sternite.

Most species of the genus *Demotina* have a long ovipositor and bear a slender chitinized rod on the subapical segment ventrally (Figs. 38–42, 44–45, 48–49). However, *D. serriventris* ISONO, *D. elegans* CHÛJÔ et SHIRÔZU and *D. squamosa* ISONO are exceptional in having the rather short ovipositor with a stout rod (Figs. 43, 46–47). Furthermore, *D. elegans* CHÛJÔ et SHIRÔZU, is the only species in the genus which has the 8th tergite strongly sclerotized (Fig. 46).

The oviposition behavior may be closely related to the shape of ovipositor; long and telescopic one likely suits to lay eggs in crevices of trees or on surface of soil, whereas short one does not. Two types of oviposition behavior have been known in two Japanese species (ISONO, 1988): *Demotina bipunctata* JACOBY lays exposed egg masses in soil. *Demotina modesta* BALY lays eggs singly on leaf under-surface and subsequently cover each egg with its excrement. The both species have the long type ovipositors which may predict that the species having the short type ovipositors lay eggs in the different manners. Enlarged tarsal segments of *D. elegans* CHÛJÔ et SHIRÔZU (Fig. 36) also seems to be related to her oviposition behavior.

3. Reproduction mode

Demotina beetles breed in two modes in relation to the geographic range.

Males have been limitedly known in endemic species to the Ryukyus or Taiwan, viz., *D. major* CHÛJÔ, its allies (*D. sasakawai* NAKANE et KIMOTO, *D. alni* CHÛJÔ, *D. incostata* TAKIZAWA) and *D. decoratella* CHÛJÔ (NAKANE & KIMOTO, 1959; CHÛJÔ, 1956; TAKIZAWA, 1972). In fact, dissection of some specimens proved the presence of their males (Table 2). These species probably reproduce

Table 2. The sex ratio in *Demotina* species.

Species	Male	Female
<i>D. alni</i> CHÛJÔ	1	2
<i>D. sasakawai</i> NAKANE et KIMOTO	6	3
<i>D. major</i> CHÛJÔ	6	5
<i>D. incostata</i> TAKIZAWA	2	1
<i>D. imasakai</i> ISONO	0	1
<i>D. serriventris</i> ISONO	0	8
<i>D. decoratella</i> CHÛJÔ	3	4
<i>D. elegans</i> CHÛJÔ et SHIRÔZU	0	55
<i>D. squamosa</i> ISONO	0	15
<i>D. modesta</i> BALY ¹⁾	2	8
<i>D. vernalis</i> ISONO ²⁾	0	3

1) Population in Korea.

2) Of the other 21 specimens not dissected, 16 were females judging from the exposed ovipositor.

bisexually in the islands.

On the other hand, telytokarous reproduction likely prevails in all members of Japanese species. ISONO (1988) reported that no males were found in *D. tuberosa* CHEN, *D. fasciculata* BALY, *D. decorata* BALY, *D. modesta* BALY and *D. bipunctata* JACOBY from Japan, and SUZUKI (1988) supported it. I newly recorded the following 5 species from Japan in this study; *D. serriventris* ISONO, *D. vernalis* ISONO, *D. squamosa* ISONO, *D. imasaki* ISONO and *D. elegans* CHÛJÔ et SHIRÔZU, and all the specimens were females (Table 2). Mature eggs taken from ovary of *D. modesta* BALY successfully developed on a wet filter paper.

Some Japanese species are distributed in other regions. *Demotina modesta* BALY is the only species also distributed in Korea, where the males were first recorded in this study (Table 2), which shows that the species breed in different reproductive modes between Korea and Japan. As far as I have examined, no males of *Demotina serriventris* ISONO and *D. elegans* CHÛJÔ et SHIRÔZU were collected from the Ryukyus and Taiwan, though CHÛJÔ and SHIRÔZU (1955) reported a male specimen from Yakushima in the latter species. *Demotina tuberosa* CHEN and *D. fasciculata* BALY are also distributed in China, where GRESSITT and KIMOTO (1962) reported the presence of male in the former species.

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