

Female Reproductive Organs of Lepturine Cerambycid Beetles from Japan, with Reference to their Taxonomic Significance (Part 2)

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Abstract In the second part of the study on female reproductive organs of lepturine cerambycid beetles, the Lepturini through the Necydalini are dealt with, and a general discussion on their taxonomic significance and references are given.

Tribe Lepturini

Grammoptera chalybeella BATES, 1884

(Fig. 25)

KUBOKI, 1980, *Kita-Kyûshû no Konchû*, Kokura, 27, pl. 7, fig. 7.

Collecting data of the material used. Sugenuma, Katashina-mura, Gunma Pref., 21–VII–1980, A. TAKASU leg.

Paraproct of moderate length, narrow, with baculi almost straight, thickened at base; valvifer indistinct; coxite baculi almost straight, more or less thick though thin posteriorly; coxite lobes hardly sclerotized, obtusely pointed at the apices, and bearing long tactile hairs; stylus abaxially articulated to the lateral face of coxite lobe, very narrow, lightly sclerotized, and with tactile hairs; dorsal baculi almost straight; proctiger baculi rather long and straight; vaginal plates narrow and more or less falciform, heavily sclerotized, fused to each other and forming a V-shaped plate; bursa copulatrix short, and not clearly distinguishable from the spermathecal duct; spermatheca rather narrow, strongly curved at middle, and with short duct, which arises in the lateral face of the base of capsule and enters into the apex of bursa copulatrix.

Alosterna tabacicolor (DE GEER, 1775)

(Fig. 26)

Collecting data of the material used. Horoka, Hokkaido, other data unknown.

Paraproct of moderate length, narrow, its baculi moderately arcuate and thickened anteriorly; valvifer indistinct; coxite baculi simple though slightly thickened at base; coxite lobes hardly sclerotized, obtusely pointed at apices, and bearing tactile hairs; stylus very narrow, lightly sclerotized, abaxially articulated to the lateral face of coxite lobe, and with tactile hairs; dorsal baculi feebly sinuate; proctiger baculi long and

straight; vaginal plates narrow and straight, heavily sclerotized, fused to each other and forming a V-shaped plate; vagina somewhat broadened anteriorly; bursa copulatrix short, and not clearly distinguishable from the spermathecal duct; spermatheca more or less narrow, well constricted at base, curved at middle and somewhat narrowed towards apex; spermathecal duct short and thin, entering into the apex of bursa copulatrix.

***Ohbayashia nigromarginata nigromarginata* (HAYASHI, 1953)**

(Fig. 27)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 7, fig. 6.

Collecting data of the material used. Mt. Amagi, Shizuoka Pref., other data unknown.

Paraproct of moderate size, each baculum feebly sinuate; valvifer indistinct; coxite baculi thick at the base, thinned towards the middle, with inwardly spread sclerotized part at apical third, and thinned again posteriorly; coxite lobes sclerotized at each inner part, with tactile hairs; stylus sclerotized except for the apex, and with tactile hairs; dorsal baculi feebly curved, and with a short inner branch near the divided portion of coxite; proctiger with curved baculum; vaginal plates very long, somewhat broad at the bases, and slightly narrowed towards obtuse apices; vagina strongly curved at base; bursa copulatrix short, abruptly narrowed at about middle, and then narrowed towards acute apex; spermatheca somewhat swollen near the base, curved at middle, somewhat falciform in apical half, narrowed towards obtusely pointed apex, and with the gland at the outer corner; spermathecal duct short, thickened at base, and widely entering into the middle part of bursa copulatrix.

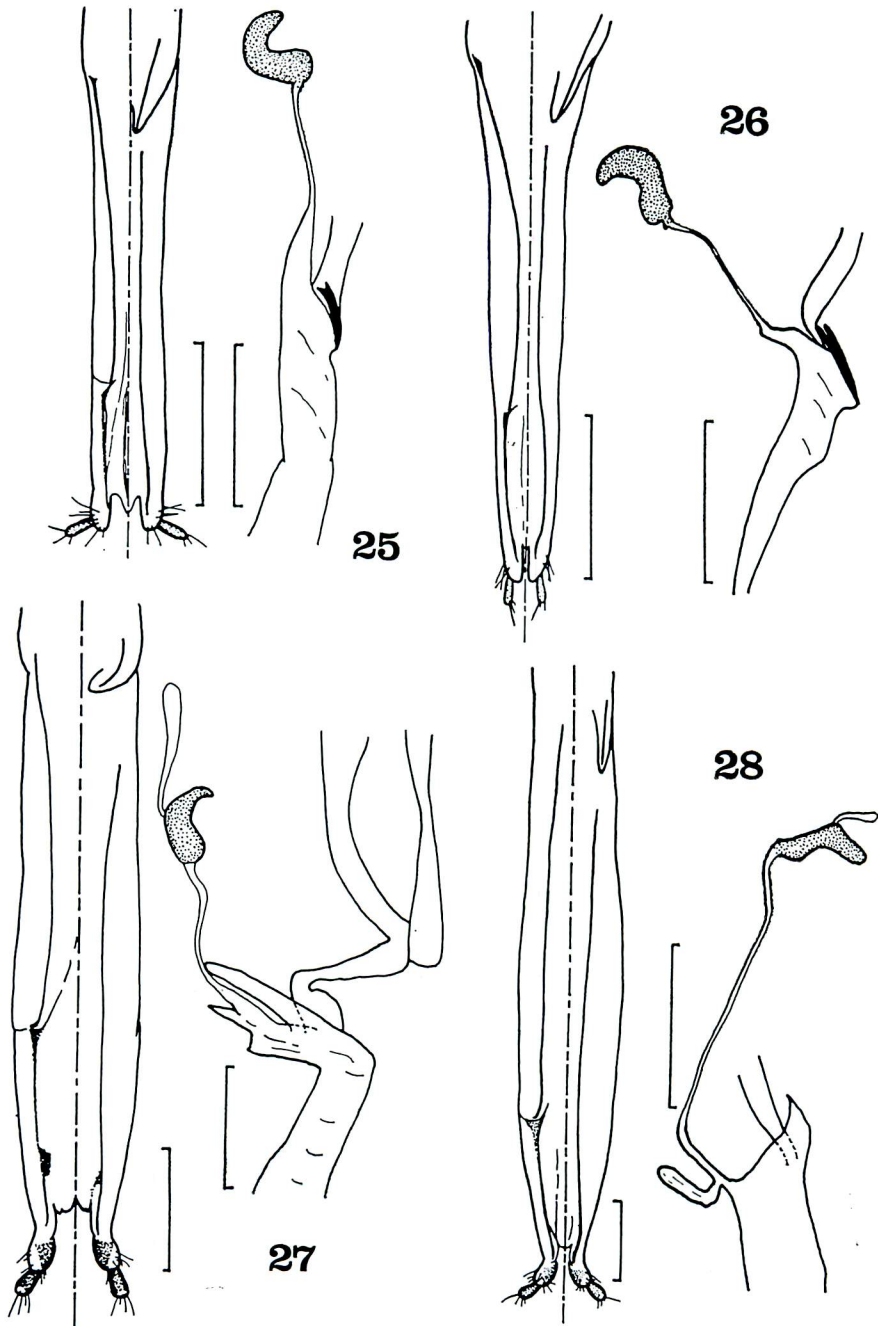
***Pyrrhona laeticolor laeticolor* BATES, 1884**

(Fig. 28)

Collecting data of the material used. Mt. Amagi, Shizuoka Pref., other data unknown.

Paraproct rather long, with baculi thin and slightly sinuate at apex; valvifer indistinct; coxite narrowed towards apical part, each baculum thickened and dilated anteriorly, with the sclerotized part reaching the side margin at base; each coxite lobe sclerotized at the inner side, and bearing tactile hairs; stylus of moderate size, with tactile hairs at apex; dorsal baculi long and slightly sinuate at the posterior part; proctiger baculi straight; vaginal plates wide at base and narrowed towards acute apices;

Figs. 25–28. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 25, *Grammoptera chalybeella*; 26, *Alosterna tabacicolor*; 27, *Ohbayashia nigromarginata nigromarginata*; 28, *Pyrrhona laeticolor laeticolor*. (Scale: 0.5 mm.)



bursa copulatrix short and narrow, distinctly separated from vagina, and strongly curved at basal third; spermatheca narrow, slightly swollen at the inner basal part, gently bent at middle, with the outer margin almost straight in basal half, and with gland at the outer corner; spermathecal duct simple, somewhat thickened at the base, joining bursa copulatrix near its base and entering into vagina.

Pachypidonia bodemeyeri (PIC, 1934)

(Fig. 29)

Collecting data of the material used. Mt. Tsurugi, Tokushima Pref., 12–VIII–1955, S. SHINONAGA leg.

Paraproct broad, each baculum thick and divided at the base, with the outer branch longer than one-third the inner one; valvifer indistinct; coxite well constricted at the posterior part, and somewhat uneven on the surface, each baculum divided at base, the outer branch extending to the apex, the inner one short, continuing posteriorly by a lightly sclerotized line and gradually approaching to the outer branch to join it at middle; coxite lobes very short and rounded, directed obliquely laterad, sclerotized except for the bases, with tactile hairs; stylus very small and ovoid, with tactile hairs; dorsal baculum thick and almost straight; proctiger baculi straight; vaginal plates long and broad, each almost parallel-sided and unequally bifid at the apex; vagina broadened anteriorly; bursa copulatrix finger-shaped, more or less broadened at base; spermatheca nearly sigmoidal, broadest at middle, narrowed towards both apex and base, with gland at the lateral face of the outer corner; spermathecal duct short, sinuate at middle, broadened in basal half, and entering into basal third of bursa copulatrix.

Nivellia sanguinosa (GYLLENHAL, 1827)

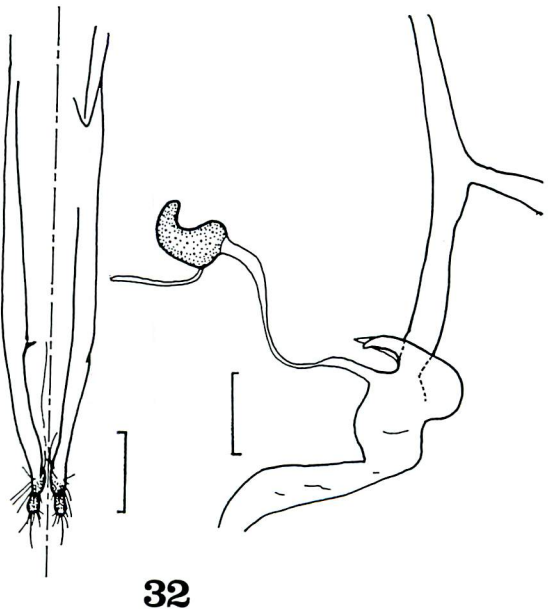
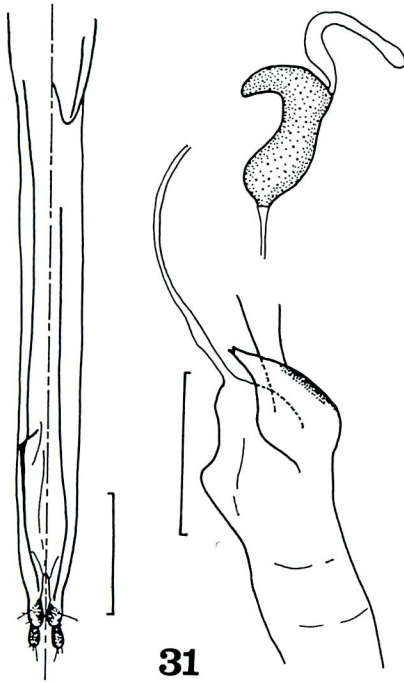
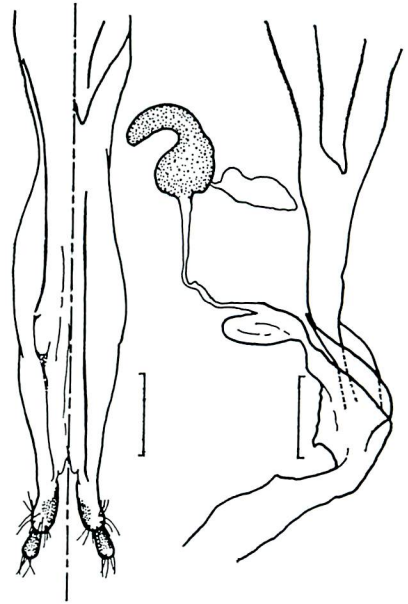
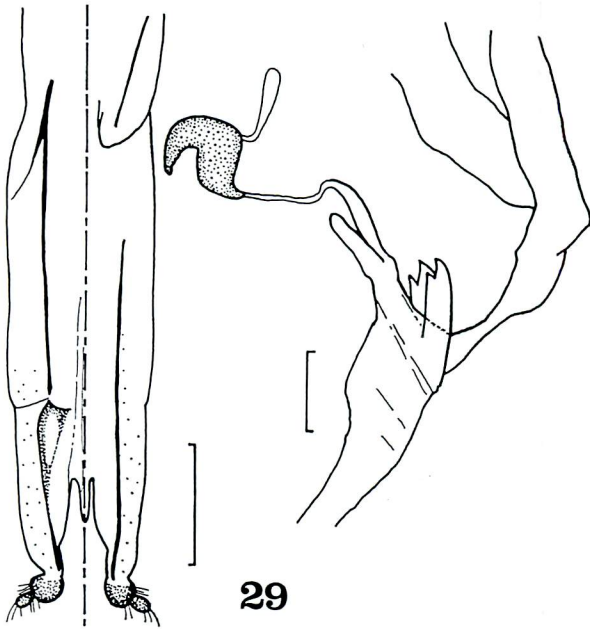
(Fig. 30)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, p. 102, pl. 7, fig. 5.

Collecting data of the material used. Mt. Rausudake, Hokkaido, 16–VII–1980, T. SHIMOMURA leg.

Paraproct constricted near middle, baculi lightly arcuate; valvifer indistinct; coxite gradually narrowed towards the apical part, baculi inwardly divided at proximal end and also at basal fourth, the former branch being very short, and the latter extending anteriad for a short distance; coxite lobes long, subcylindrical, and bearing long tactile hairs; stylus sclerotized except for apex, with long tactile hairs; dorsal baculi almost straight; proctiger baculi slightly curved; vaginal plates broad at bases, and narrowed towards acute apices; vagina bent and broadened anteriorly; bursa copulatrix con-

Figs. 29–32. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 29, *Pachypidonia bodemeyeri*; 30, *Nivellia sanguinosa*; 31, *Judolia japonica*; 32, *Judolia cometes*. (Scale: 0.5 mm.)



stricted near the middle, and oval in apical half; spermatheca globose in basal half, narrowed and strongly bent at middle, and curved and almost parallel-sided in apical half, with the gland near its base; spermathecal duct short, imperfectly coiled at middle, and entering into the middle of the oval apical part of bursa copulatrix.

***Judolia japonica* (TAMANUKI, 1942)**

(Fig. 31)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 7, fig. 11.

Collecting data of the material used. Mt. Daibosatsu, Yamanashi Pref., 19–VII–1978, A. TAKASU leg.

Paraproct narrow, its baculi thin and feebly curved; valvifer indistinct; coxite gradually narrowed towards apex behind middle, with slightly curved baculi which are thick anteriorly; coxite lobes sclerotized at each inner side, and with tactile hairs; stylus sclerotized, and with tactile hairs; dorsal baculi feebly sinuate and slightly longer than paraproct baculi; proctiger baculi almost straight; vaginal plates very broad at middle, then rapidly narrowed towards apices, and somewhat sclerotized along the outer margins, apex of each plate slightly cleft; vagina more or less broadened anteriorly; bursa copulatrix not defined; spermatheca relatively narrow, abruptly bent at apical third, narrowed towards apex, and well constricted at base, with the gland at the outer corner; spermathecal duct directly entering into vagina at its end.

***Judolia cometes* (BATES, 1884)**

(Fig. 32)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 7, fig. 12.

Collecting data of the material used. Kohsawa, Katashina-mura, Gunma Pref., 26–VII–1979, A. TAKASU leg.; Marunuma, Katashina-mura, Gunma Pref., 21–VII–1980, A. TAKASU leg.

Paraproct rather short and broad, with its baculi almost straight; valvifer indistinct; coxite gradually narrowed towards apex, its baculi thin and feebly sinuate, slightly thickened and with a very short inner branch at the base; coxite lobes lightly sclerotized at each inner side, and bearing long tactile hairs; stylus lightly sclerotized, with long tactile hairs; dorsal baculi feebly curved at the posterior part, almost as long as the paraproct ones; proctiger baculi straight; vaginal plates widely protruding at bases, and narrowed towards apices; vagina abruptly bent near the anterior end; bursa copulatrix absent; spermatheca suddenly bent at middle, gradually narrowed towards apex, and with the gland at the lateral face near base; spermathecal duct sinuate, and directly entering into vagina at the end.

Note. Besides the two preceding species, the bursa copulatrix is not defined in *J. sexmaculata* (LINNÉ), either. This feature can be regarded as being characteristic

of *Judolia*.

***Judolia bungi* (PIC, 1902)**

(Fig. 33)

Collecting data of the material used. Sugenuma, Katashina-mura, Gunma Pref., 21-VII-1980, M. HARADA leg.

Paraproct short, its baculi almost straight; valvifer indistinct; coxite baculi fairly thick and inwardly bent near the anterior end with an angle, and thinned posteriorly; coxite lobes slightly sclerotized at each inner side, and bearing tactile hairs; stylus slightly sclerotized and with long tactile hairs; dorsal baculum slightly sinuate; proctiger baculi almost straight; vaginal plates broad at bases, abruptly curved at middle, and sharply narrowed towards acute apices; vagina gently broadened anteriorly, weakly sclerotized at the portion to which the vaginal plates attach; bursa copulatrix indefinite; spermatheca broadest near base, abruptly bent at the apical third, and gradually narrowed towards apex, with the gland opening at the broadest part; spermathecal duct thick and widely curved, and directly entering into the vagina at its end.

***Pseudallosterna misella* (BATES, 1884)**

(Fig. 34)

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 24-VII-1978, A. TAKASU leg.; same locality, 25-VII-1979, A. TAKASU leg.

Paraproct of moderate length, narrow, its baculi almost straight; valvifer indistinct; coxite baculi simple, slightly arcuate; coxite lobes hardly sclerotized, blunt at apices, and with tactile hairs; stylus very short and narrow, lightly sclerotized, abaxially articulated to the lateral face of coxite lobe, and with tactile hairs; dorsal baculi almost straight, and starting from near the posterior edge of proctiger; proctiger baculi extremely long, and almost straight; vaginal plates rather broad at bases, well sclerotized along the outer margins, fused to each other, and forming a V-shaped plate; bursa copulatrix short finger-shaped; spermatheca nearly C-shaped, with narrowed apex and small protruding basal part; spermathecal duct very short, arising from the lateral face of the base of capsule, and entering into the middle part of bursa copulatrix.

Note. The two species, *Alosterna tabacicolor* and *Grammoptera chalybeella*, and this species are very similar to one another in the following characteristic features of the female reproductive organs: the paraproct is narrow; the coxite lobes are obtusely pointed and hardly sclerotized; the stylus is very narrow and articulated to coxite lobes abaxially; the vaginal plates are well sclerotized, fused to each other, and form a V-shaped plate; the spermatheca is narrow, with the duct arising from the lateral face of its base.

Kanekoa azumensis (MATSUSHITA et TAMANUKI, 1942)

(Fig. 35)

Collecting data of the material used. Kotozura, Okutama, west of Tokyo, 17-IV-1979, A. TAKASU leg.

Paraproct rather short, its baculi feebly sinuate; valvifer indistinct; coxite gradually narrowed towards apex, its baculi simple and slightly sinuate; inner distal part of each coxite lobe sclerotized, and bearing some tactile hairs; stylus subcylindrical, and with tactile hairs at the apex; dorsal baculi slightly sinuate; proctiger baculi almost straight; vaginal plates broad at base and gradually narrowed towards apices; vagina broadened anteriorly; bursa copulatrix tubular, rather long and narrow; spermatheca strongly curved near the middle, and narrowed towards the apex; spermathecal duct thin, entering into the middle part of bursa copulatrix.

Anoploderomorpha monticola NAKANE, 1955

(Fig. 36)

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 23-VII-1978, A. TAKASU leg.

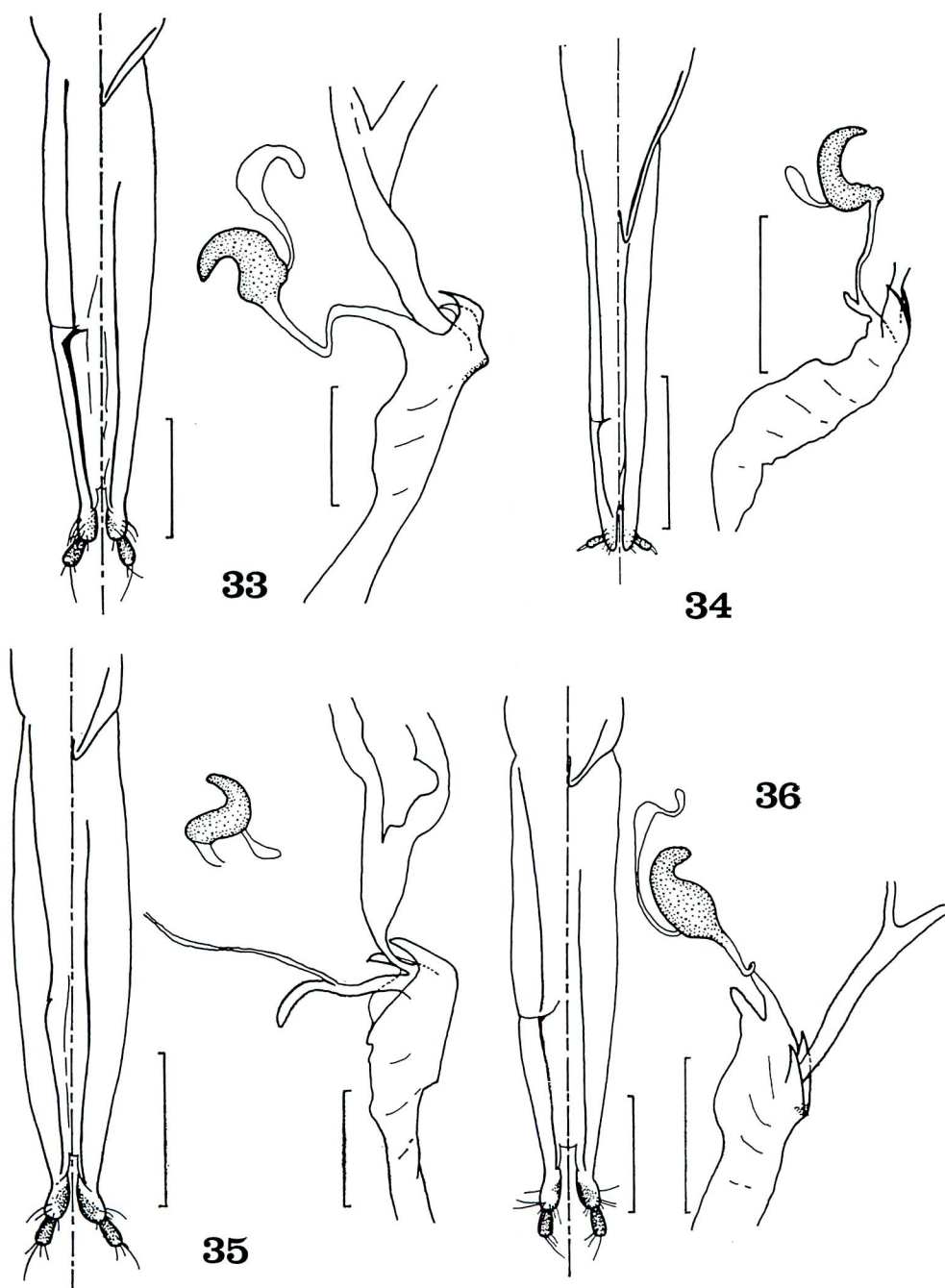
Paraproct of moderate length, baculi almost straight; valvifer indistinct; coxite gradually narrowed towards the apical part, baculi simple and straight; coxite lobes subcylindrical, sclerotized at the inner part, and with rather long tactile hairs; stylus moderately sclerotized and bearing rather long tactile hairs; dorsal baculi very slightly sinuate; vaginal plates very short, narrowed towards acute apices, and slightly sclerotized at bases; vagina broadened anteriorly; bursa copulatrix short and narrow, somewhat broadened at base; spermatheca subovoid at the basal two-thirds, bent at the apical third, with obtuse apex, the gland attaching to the lateral face near base; spermathecal duct thick and very short, coiled once at middle, and directly entering into vagina.

Brachyleptura pyrrha (BATES, 1884)

(Fig. 37)

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 23-VII-1978, A. TAKASU leg.

Paraproct long, its baculi feebly sinuate, and briefly divided at the anterior end; valvifer indistinct; coxite gradually narrowed towards apex, baculi thickened and very briefly branched off inwards at the base, extending towards apex in straight lines, though feebly sinuate before apical division; coxite lobes rather long, sclerotized at each inner part, and bearing tactile hairs; stylus moderately sclerotized, with tactile hairs; dorsal baculi long and almost straight; proctiger baculi slightly curved; vaginal plates broad at bases, but narrowed towards acuminate apices; vagina with small protrusion behind



Figs. 33–36. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 33, *Judolidia bangi*; 34, *Pseudallosterna misella*; 35, *Kanekoa azumensis*; 36, *Anoploderomorpha monticola*. (Scale: 0.5 mm.)

bursa copulatrix which is very narrow and tubular; spermatheca rather broad, strongly curved at the apical third, with the gland attaching to the lateral face near base; spermathecal duct short and thick, imperfectly coiled at middle, and entering into the basal portion of bursa copulatrix.

Anastrangalia scotodes scotodes (BATES, 1873)

(Fig. 38)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, p. 102, pl. 7, fig. 9.

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 21-VII-1978, A. TAKASU leg.

Paraproct rather long, with baculi feebly sinuate; valvifer indistinct; coxite slightly narrowed posteriad, its baculi simple and feebly sinuate; coxite lobes moderately sclerotized at each inner part, and with tactile hairs; stylus somewhat long, bearing tactile hairs; dorsal baculi long and slightly sinuate; proctiger baculi straight; vaginal plates somewhat broad at bases, and narrowed towards acuminate apices; vagina more or less swollen anteriorly and lightly sclerotized behind bursa copulatrix, which is short, weakly constricted at the base, and narrowed towards apex; spermatheca broadest near base to which the gland attaches, narrowed at middle, abruptly curved and forming a hook-shape apically; spermathecal duct short, almost straight, and entering into the middle part of bursa copulatrix.

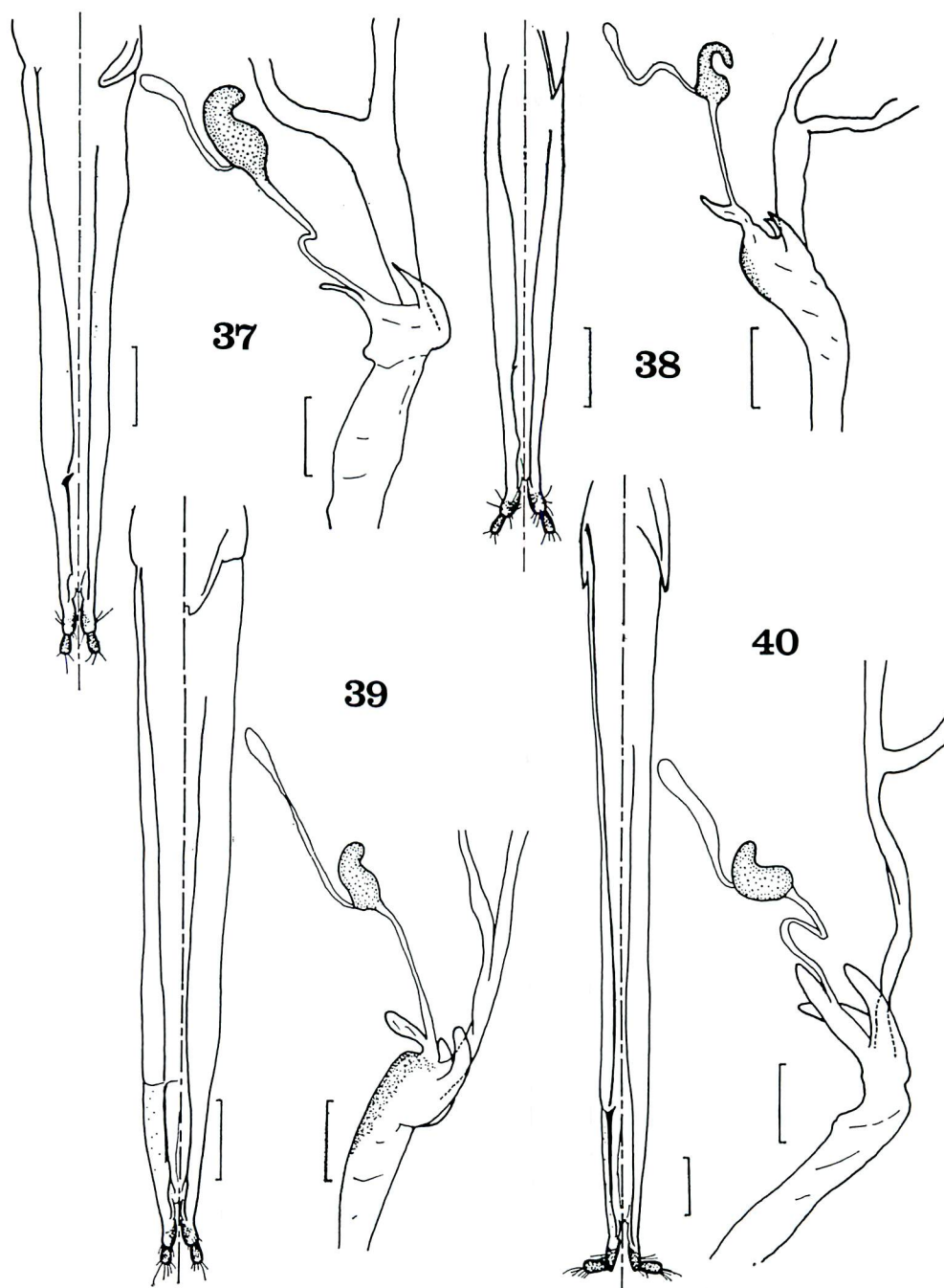
Corymbia succedanea (LEWIS, 1879)

(Fig. 39)

Collecting data of the material used. Nishizawa-keikoku, Yamanashi Pref., 13-VIII-1979, M. SAKAI leg.

Paraproct very long, with almost straight baculi; valvifer indistinct; coxite somewhat uneven on the surface in basal half, its baculi more or less thick, divided at the apical third, the inner branch briefly extending posteriad, the outer one reaching coxite lobe and feebly sinuate; coxite lobes moderately sclerotized at each inner part, and with tactile hairs; stylus of moderate size, with tactile hairs; dorsal baculi almost of the same length as the paraproct ones, divided just before reaching coxite lobes as in the case of coxite baculi; proctiger baculi almost straight; vaginal plates more or less arcuate, almost parallel-sided and with rounded apices; vagina somewhat widened anteriorly, and with widely sclerotized part behind bursa copulatrix which is short and tubular; spermatheca gently curved at apical third, and with the gland near the base; spermathecal duct relatively thick, straight, and entering into the base of bursa copulatrix.

Note. In the other two Japanese species of the genus, *C. variicornis* (DALMAN) and *C. igai* (TAMANUKI), the paraproct is also very long. Perhaps these features can



Figs. 37–40. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 37, *Brachyleptura pyrrha*; 38, *Anastrangalia scotodes scotodes*; 39, *Corymbia succedanea*; 40, *Konoa granulata*. (Scale: 0.5 mm.)

be regarded as being characteristic of *Corymbia*.

***Konoa granulata* (BATES, 1884)**

(Fig. 40)

Collecting data of the material used. Etanbetsu, Asahikawa, Hokkaido, 2–VIII–1978, T. MATSUMOTO leg.; Kensetsudaira, Katashina-mura, Gunma Pref., 24–VII–1980, A. TAKASU leg.

Paraproct exceedingly long, its baculi slightly thickened at the anterior end and almost straight; valvifer indistinct; coxite slightly narrowed towards apex, each baculum fairly thick, briefly forked at the anterior end, thinned and feebly sinuate posteriorly; each coxite lobe narrow and relatively pointed at apex, sclerotized except for basal half, and bearing tactile hairs; stylus relatively large, abaxially articulated to the lateral face of coxite lobe, with tactile hairs; dorsal baculi thin, slightly sinuate, shorter than the paraproct ones, their anterior ends being widely distant from proctiger; proctiger baculi almost straight; median oviduct long; vaginal plates broad at bases, gently arcuate, and narrowed towards blunt apices; vagina abruptly bent at the base; bursa copulatrix tubular, rather long and broad; spermatheca broad in basal two-thirds, almost rectangularly bent at apical third, and gradually narrowed towards apex, with the gland attaching to the outer corner; spermathecal duct thick, sigmoidally curved, and entering into the middle part of bursa copulatrix.

***Leptura (Leptura) mimica* BATES, 1884**

(Fig. 41)

KUBOKI, 1981, Elytra, Tokyo, 9, p. 61, fig. 4 [*arcuata*]; MAKIHARA & SAITO, 1985, Elytra, Tokyo, 12 (2), pp. 5–8, figs. 24–25, 28–29.

Collecting data of the material used. Kohsawa, Katashina-mura, Gunma Pref., 23–VII–1980, A. TAKASU leg.

Paraproct rather short, baculi slightly thickened anteriorly, and slightly sinuate; valvifer indistinct; coxite broad, narrowed from before the divided part, each baculum thickened and briefly branched off inwards at the base, and divided before the apical lobe, the inner branch briefly extending to gonopore, the outer one feebly sinuate and reaching coxite lobe which is moderately sclerotized at the inner part with tactile hairs; stylus sclerotized except for apex, and bearing tactile hairs; dorsal baculi very slightly sinuate posteriad; proctiger baculi almost straight; vaginal plates long, straight, and gradually narrowed towards blunt apices; vagina with small protrusion behind bursa copulatrix, the latter finger-shaped, arcuate and clearly separated from vagina; sper-

Figs. 41–44. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 41, *Leptura (Leptura) mimica*; 42, *Leptura (Leptura) ochraceofasciata ochraceofasciata*; 43, *Leptura (Nakanea) vicaria vicaria*; 44, *Leptura (Pedostrangalia) variicornis*. (Scale: 0.5 mm.)



matheca well constricted at base, broadest near base, narrowed towards the middle, and strongly curved in apical third, with the gland attaching to the outer basal corner; spermathecal duct short and broad, curved at middle, joining with bursa copulatrix and then entering into vagina.

Leptura (Leptura) ochraceofasciata ochraceofasciata

(MOTSCHULSKY, 1861)

(Fig. 42)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, p. 102, pl. 9, figs. A-L; 1981, Elytra, Tokyo, 9, pp. 61-62, fig. 5.

Collecting data of the material used. Nishizawa-keikoku, Yamanashi Pref., 13-VIII-1979, M. SAKAI leg.

Paraproct rather long and narrow, with arcuate baculi; valvifer indistinct; coxite gradually narrowed towards the apical part, its baculi not rod-like in basal three-fifths but rather heavily sclerotized, rod-like and feebly sinuate in apical two-fifths, and with a short inner branch, which extends to gonopore; coxite lobes sclerotized at each inner part, and with some tactile hairs; stylus moderate in size, with long tactile hairs; dorsal baculi long and feebly sinuate; proctiger baculi inwardly curved at the distal portion; vaginal plates broad, somewhat curved, and narrowed towards apices; vagina more or less swollen anteriorly, slightly sclerotized at the swollen portion behind bursa copulatrix which is short; spermatheca somewhat reflexed at base, suddenly broadened at basal third, then moderately curved, and gradually narrowed towards apex, with the gland attaching to the lateral face of the broadest portion; spermathecal duct thin, extremely long, intricately coiled, somewhat thickened at the end, and entering into bursa copulatrix.

Notes. Besides the two species described above, I have examined the female reproductive organs of other six species belonging to the subgenus *Leptura*. They are diversified in the length of paraproct as follows: it is very long in *L. latipennis* (MATSUSHITA); fairly long in *L. duodecimguttata duodecimguttata* FABRICIUS, *L. ochraceofasciata ochraceofasciata*, *L. o. amamiana* HAYASHI, *L. kusamai* OHBAYASHI et NAKANE and *L. yakushimana* (TAMANUKI); moderate in *L. dimorpha* BATES, *L. mimica* and *L. subtilis* BATES. In *L. ochraceofasciata ochraceofasciata*, *L. o. amamiana* and *L. kusamai*, the spermathecal duct is extremely long and intricately coiled; this feature is peculiar to the two species among the Japanese lepturines.

***Leptura (Nakanea) vicaria vicaria* (BATES, 1884)**

(Fig. 43)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 8, fig. 18.

Collecting data of the material used. Kohsawa, Katashina-mura, Gunma Pref.,

23-VII-1979, A. TAKASU leg.

Paraproct long, each baculum thickened anteriorly; valvifer indistinct; coxite narrow, gradually narrowed posteriad, its baculi thick and briefly branched off inwards at the anterior end, thin and sinuate posteriorly; coxite lobes sclerotized at each inner part, and with tactile hairs; stylus moderately sclerotized, and bearing tactile hairs at the apex; dorsal baculi shorter than paraproct baculi, slightly sinuate; proctiger baculi long, more or less arcuate; median oviduct very long; vaginal plates narrow, narrowed towards apices; vagina curved proximally; bursa copulatrix small, tubular in apical half, and broadened in basal half; spermatheca small, rectangularly curved at middle, not narrowed towards apex, which is rounded, and with the gland at the outer corner; spermathecal duct thin, imperfectly coiled once, and entering into the middle portion of bursa copulatrix.

Leptura (Pedostrangalia) variicornis (MATSUSHITA, 1933)

(Fig. 44)

Collecting data of the material used. Rusha, Shiretoko-rindô, Hokkaido, 18-VII-1980, T. SHIMOMURA leg.

Paraproct rather long, its baculi slightly sinuate; valvifer indistinct; coxite gradually narrowed posteriad, its baculi thickened anteriorly, thin and feebly sinuate posteriorly; coxite lobes rather broad, moderately sclerotized at each inner part, and bearing tactile hairs; stylus sclerotized except for apex, with tactile hairs; dorsal baculi slightly shorter than the paraproct ones, and feebly sinuate posteriad; proctiger baculi long and almost straight; median oviduct very long; vaginal plates slightly arcuate, and gradually narrowed towards blunt apices; vagina broadened anteriorly; bursa copulatrix tubular; spermatheca abruptly broadened near base, gently bent at apical fourth; spermathecal duct thick, somewhat wavy, and entering into the apical part of bursa copulatrix.

Leptura (Pedostrangalia) femoralis (MOTSCHULSKY, 1860)

(Fig. 45)

Collecting data of the material used. Mt. Hotaka, Katashina-mura, Gunma Pref., 25-VII-1978, A. TAKASU leg.

Paraproct of moderate size, with thick and rather strongly arcuate baculi; valvifer indistinct; coxite slightly narrowed towards apical lobes, its baculi thick anteriorly and sinuate posteriorly; coxite lobes very broad, sclerotized at the inner part, and bearing short tactile hairs; stylus moderate in size, sclerotized except for apex, and with tactile hairs; dorsal baculi thin and feebly sinuate, with somewhat roughened field inwards, whose posterior edge is obliquely folded; proctiger baculi almost straight; vaginal plates broad at bases, narrowed at middle, and almost parallel-sided in apical halves, and weakly sclerotized throughout; vagina somewhat dilated near the anterior end;

bursa copulatrix narrow and tubular; spermatheca broadest and strongly bent at middle, almost straight at the outer side of basal half, and narrowly rounded at the apex, with the gland attaching to the outer corner; spermathecal duct thick, wavy, and entering into the basal portion of bursa copulatrix.

***Leptura (Megaleptura) regalis* (BATES, 1884)**

(Fig. 46)

Collecting data of the material used. Odamiyama, Ehime Pref., 2–VIII–1970, Y. KUSUNOKI leg.

Paraproct very long, its baculi slightly sinuate; valvifer indistinct; coxite well narrowed towards the divided portion, its baculi thick anteriorly and sinuate posteriorly; coxite lobes sclerotized at the inner part, with long tactile hairs; stylus sclerotized except for apex, and bearing long tactile hairs; dorsal baculi very long, and almost straight; proctiger baculi almost straight; vaginal plates very broad, hardly narrowed towards apices, which are not pointed; vagina somewhat swollen anteriorly; bursa copulatrix tubular; spermatheca weakly constricted near base, bent at apical third, and pointed at the apex; spermathecal duct very thick, widely entering into the basal part of bursa copulatrix.

***Oedecnema dubia* (FABRICIUS, 1781)**

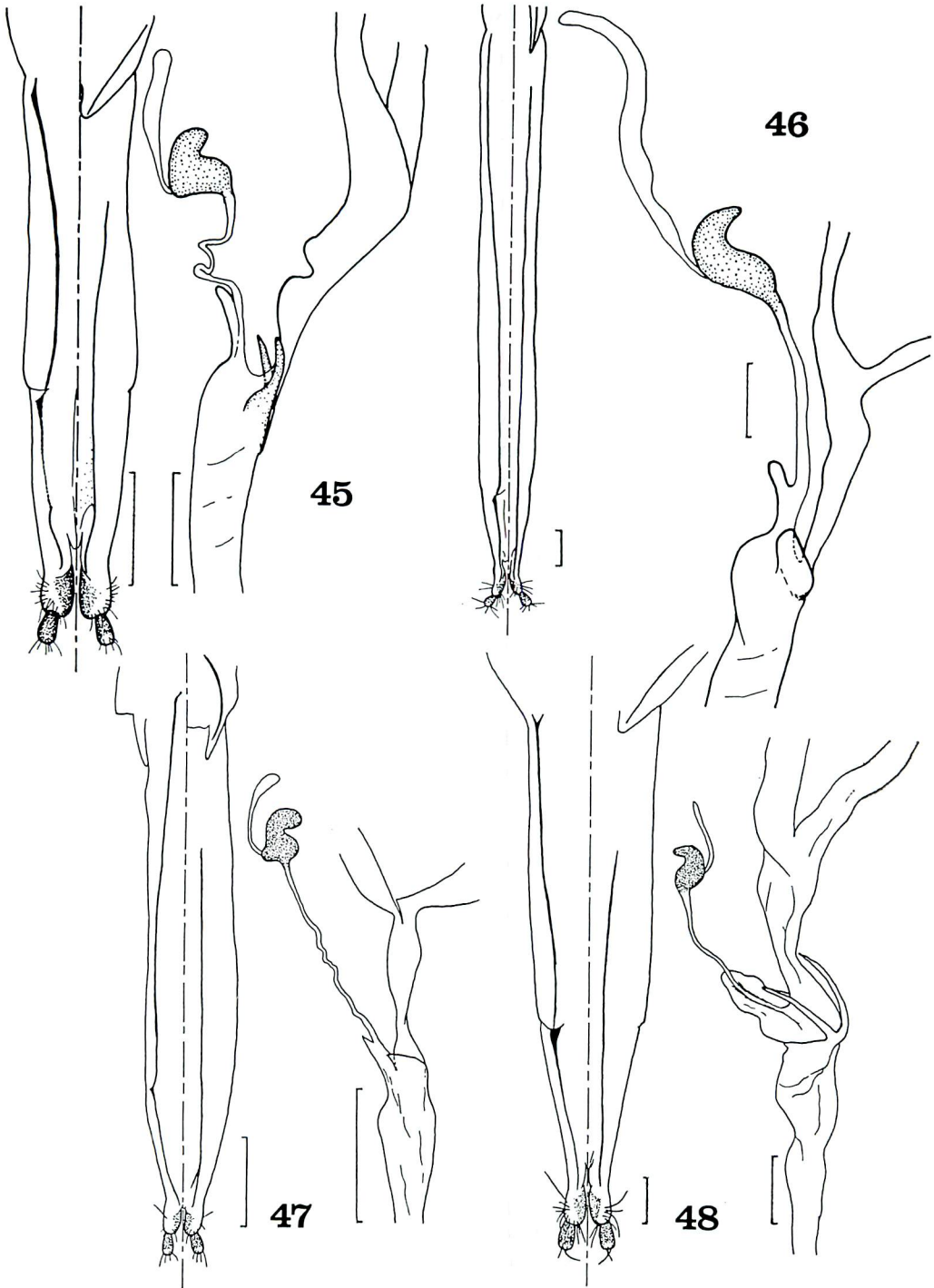
(Fig. 47)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 7, fig. 14.

Collecting data of the material used. Peipan, Hokkaido, 15–VII–1974, collector unknown.

Paraproct long with feebly sinuate baculi; valvifer indistinct; coxite narrowed towards apical lobe, its baculi slightly thickened anteriorly; coxite lobes weakly sclerotized at each inner part, and with tactile hairs; stylus sclerotized except for apex, and bearing tactile hairs; dorsal baculi almost straight, and a little shorter than the paraproct ones, with a short inner branch near the apical end; proctiger baculi distinctly arcuate; vaginal plates short though wide at base, with acuminate apices; vagina more or less broadened anteriorly; bursa copulatrix short and narrow, acute at the apex; spermatheca, basally with a lateral protrusion to which attaches the gland, strongly bent at middle, and not narrowed towards blunt apex; spermathecal duct rather long, finely wavy, and entering into bursa copulatrix.

Figs. 45–48. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 45, *Leptura (Pedostrangalia) femoralis*; 46, *Leptura (Megaleptura) regalis*; 47, *Oedecnema dubia*; 48, *Eustrangalis distenioides*. (Scale: 0.5 mm.)



Eustrangalis distenioides BATES, 1884

(Fig. 48)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 7, fig. 15.

Collecting data of the material used. Mt. Daibosatsu, Yamanashi Pref., 18-V-1970, S. SAITO leg.; same locality, 28~29-V-1983, A. SAITO leg.

Paraproct of moderate length, each baculum rather thick and briefly forked at the anterior end; valvifer indistinct; coxite rapidly narrowed towards coxite lobes, which are rather long and bear many long tactile hairs, coxite baculi inwardly thickened at the anterior end and almost straight; stylus of moderate size, sclerotized except for apex, and bearing tactile hairs; dorsal baculi rather thick, slightly curved, and a little longer than the paraproct ones; proctiger baculi thin and almost straight; vaginal plates very narrow; bursa copulatrix short, with depressed anterior face; spermatheca without distinct constriction at base, with subovoid basal part, and abruptly bent at apical third; spermathecal duct thin and simple, joining bursa copulatrix at its apical portion, though continuing to the base of bursa copulatrix.

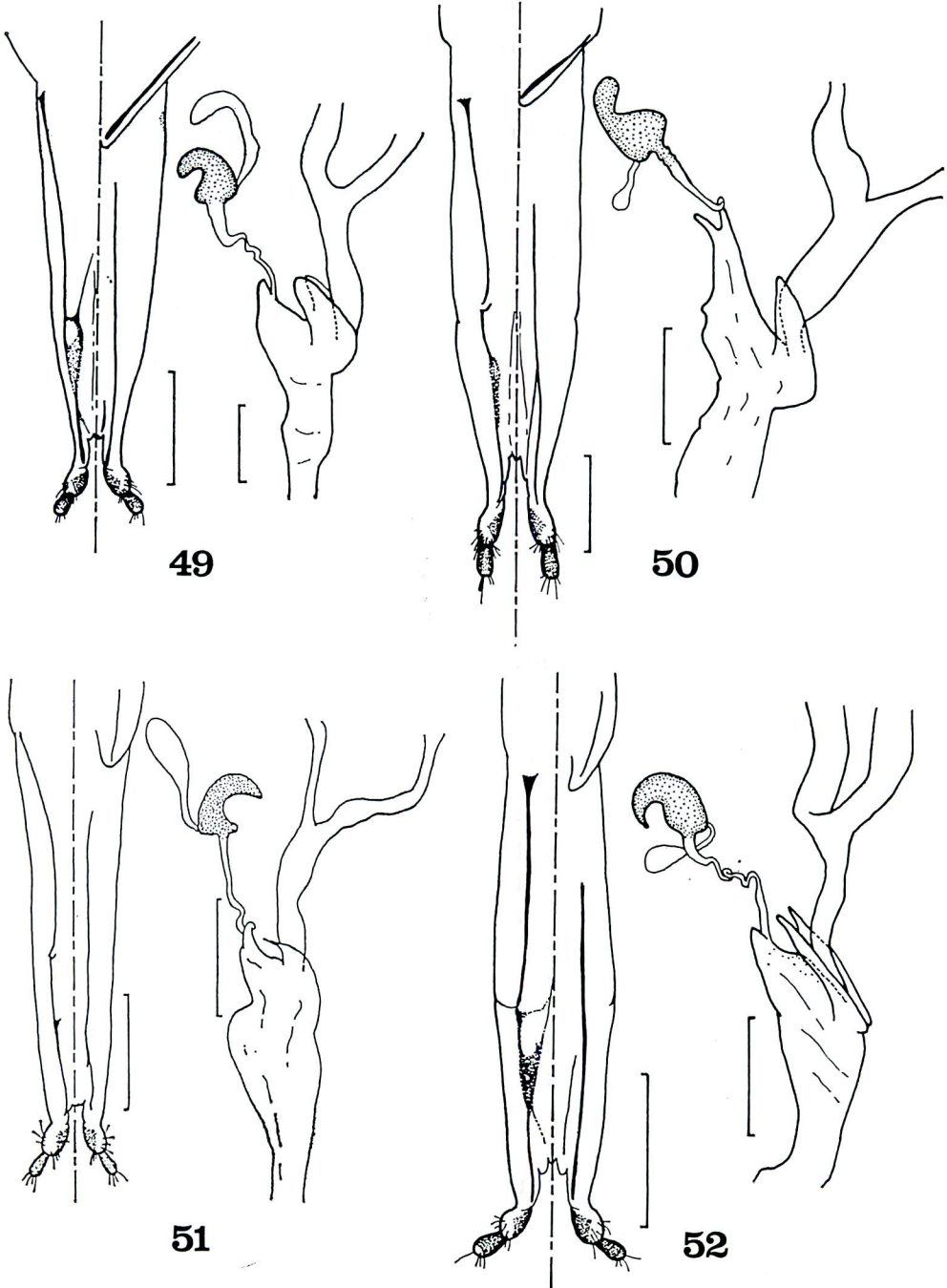
Japanostrangalia dentatipennis (PIC, 1901)

(Fig. 49)

Collecting data of the material used. Kohsawa, Katashina-mura, Gunma Pref., 26-VII-1979, A. TAKASU leg.

Paraproct very short, its baculi thickened at the anterior end; valvifer indistinct; coxite narrowed towards apical divided portion, each baculum longitudinally twofold at the base, forming a wide sclerotized part before middle, almost straight in apical half; coxite lobes narrow, sclerotized at each inner part, and bearing short tactile hairs; stylus small, sclerotized except for apex, and with short tactile hairs; dorsal baculi almost straight, longer than the paraproct ones, slightly thickened at the posterior end; proctiger baculi thick, very long, and straight; vaginal plates very broad, narrowed towards rounded apices; vagina somewhat broadened anteriorly; bursa copulatrix widely opening to vagina; spermatheca well constricted at base, narrowed towards middle, then abruptly bent, and blunt at the tip, with the gland attaching to the lateral face near base; spermathecal duct short, very thick posteriorly, wavy, and entering into the apical portion of bursa copulatrix.

Figs. 49-52. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 49, *Japanostrangalia dentatipennis*; 50, *Strangalomorpha tenuis aenescens*; 51, *Parastrangalis (Parastrangalis) lesnei*; 52, *Strangaliella shikokensis*. (Scale: 0.5 mm.)



Strangalomorpha tenuis aenescens BATES, 1884

(Fig. 50)

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 23-VII-1978, A. TAKASU leg.; Sugenuma, Katashina-mura, Gunma Pref., 23-VII-1980, A. TAKASU leg.

Paraproct very short, its baculi thickened at the anterior end; valvifer indistinct; coxite narrowed posteriad, its baculi thickened at median third; coxite lobes rather long and narrow, weakly sclerotized at each inner part, with tactile hairs; stylus more or less long, sclerotized except for apex, and bearing tactile hairs; dorsal baculi thin, longer than the paraproct ones, and slightly curved, with vague longitudinal wrinkles inside; proctiger baculi rather thick, almost straight; vaginal plates broad and triangularly protruding at bases, and narrowed towards pointed apices; bursa copulatrix broad at base, widely connected with vagina, and with very narrow apical portion; spermatheca constricted several times at the base, broadest near the base, strongly narrowed towards apical third, and then slightly broadened again at the apical part, with the gland attaching to the lateral face of the subbasal broadest portion; spermathecal duct very short, coiled once near the end, and entering into the apical portion of bursa copulatrix.

Parastrangalis (Parastrangalis) lesnei (PIC, 1901)

(Fig. 51)

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 24-VII-1978, A. TAKASU leg.

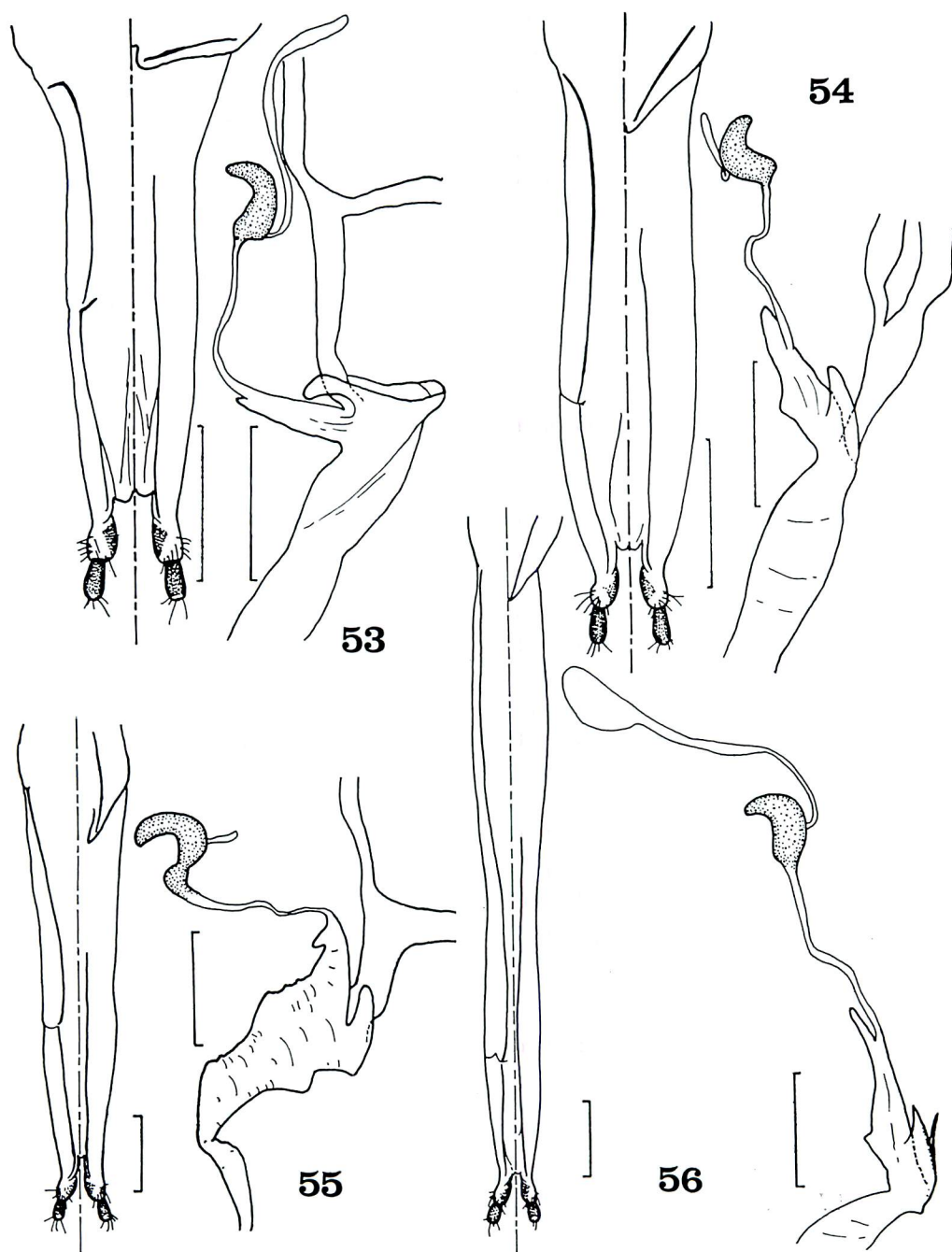
Paraproct of moderate length, its baculi thin and arcuate; valvifer indistinct; coxite slightly narrowed posteriad, each baculum somewhat thickened at middle and with a very short inner branch; coxite lobes sclerotized at each inner part, and bearing tactile hairs; stylus of moderate size, sclerotized except for apex, with tactile hairs; dorsal baculi thin and feebly sinuate; proctiger baculi almost straight; vaginal plates broad at the bases, narrowed towards acuminate apices; vagina dilated anteriorly; bursa copulatrix very short but widely open to vagina; spermatheca well constricted at the base, widest at the basal part, strongly curved, and gradually narrowed towards apex; spermathecal duct short, thick, perfectly coiled near the end and imperfectly so before that part, and entering into the apical part of bursa copulatrix.

Strangaliella shikokensis (MATSUSHITA, 1935)

(Fig. 52)

Collecting data of the material used. Mt. Tsurugi, Tokushima Pref., 1~3-VIII-1979, T. SHIMOMURA leg.

Paraproct short, its baculi thick throughout and further thickened at the anterior



Figs. 53–56. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 53, *Strangaliella nymphula*; 54, *Idiostrangalia contracta*; 55, *Strangalia attenuata*; 56, *Mimosrangalia kurosonensis*. (Scale: 0.5 mm.)

ends, and almost straight; valvifer indistinct; coxite slightly narrowed posteriad, each baculum divided at the base, the short inner branch reaching the centre of coxite, the outer one sinuously extending to the apical divided portion and with subtriangular sclerotized part at middle; each coxite lobe well constricted at base, sclerotized at the inner part, and bearing short tactile hairs; stylus of moderate size, sclerotized except for apex, and bearing tactile hairs; dorsal baculi longer than the paraproct ones, thick and feebly curved; proctiger baculi almost straight; vaginal plates long and narrow, with subulate apical portions; vagina dilated anteriorly; bursa copulatrix short, broad at base, and widely connected to vagina; spermatheca broad in basal half, with strongly arcuate apical part which is acuminate; spermathecal duct short, coiled several times, and entering into the apical portion of bursa copulatrix.

***Strangaliella nymphula* (BATES, 1884)**

(Fig. 53)

Collecting data of the material used. Mt. Daibosatsu, Yamanashi Pref., 5–VIII–1978, A. TAKASU leg.; Marunuma, Katashina-mura, Gunma Pref., 24–VII–1980, M. HARADA leg.

Paraproct very short, its baculi thin and laterally extending for a short distance in basal part; valvifer indistinct; coxite baculi thin and feebly sinuate, with a short inner branch at the anterior end, and with several vague longitudinal wrinkles inside; each coxite lobe rather broad, sclerotized at the inner part, and bearing short tactile hairs; stylus relatively long, sclerotized except for apex, and with tactile hairs; dorsal baculi, which are almost one and a half times as long as the paraproct ones, thin and almost straight, with vague longitudinal wrinkles inside; proctiger baculi almost straight; vaginal plates broad at the bases, narrowed towards middle, then broadened again and curved in apical portions; bursa copulatrix tubular; spermatheca fairly broad at the base, bent at the middle, and gently narrowed towards apex which is acuminate, with the gland attaching to the lateral face near base; spermathecal duct short, widely entering into the apical portion of bursa copulatrix.

***Idiostrangalia contracta* (BATES, 1884)**

(Fig. 54)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, p. 102, pl. 8, fig. 22 [*Strangalia*].

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 23–VII–1978, A. TAKASU leg.; Hirogawara, Ashiyasu-mura, Yamanashi Pref., 31–VII–1980, A. TAKASU leg.

Paraproct relatively short, each baculum curved outwards in the anterior portion and almost reaching the lateral margin; valvifer indistinct; coxite broad and narrowed towards apical lobes, its baculi thin and feebly sinuate; coxite lobes sclerotized at each

inner part, and with tactile hairs; stylus moderately sclerotized, and with tactile hairs; dorsal baculi thin and slightly sinuate, almost as long as the paraproct ones; proctiger baculi straight; vaginal plates short, broad at each base, and narrowed towards apex; vagina more or less narrowed at the anterior end; bursa copulatrix relatively broad and narrowed towards blunt apex; spermatheca with protruding basal part, almost parallel-sided in basal half, bent at the middle, and narrowed towards blunt apex; spermathecal duct somewhat wavy, entering into the apical third of bursa copulatrix.

Strangalia attenuata (LINNÉ, 1758)

(Fig. 55)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 8, fig. 19.

Collecting data of the material used. Rikubetsu, Hokkaido, 22-VII-1980, T. SHIMOMURA leg.

Paraproct of moderate size, with feebly curved baculi; valvifer indistinct; coxite gradually narrowed posteriad, its baculi straight though feebly curved near the posterior end; coxite lobes weakly sclerotized at each inner part, and with tactile hairs; stylus sclerotized except for apex, and bearing tactile hairs; dorsal baculi almost straight, slightly shorter than the paraproct ones; proctiger baculi long and slightly curved; vaginal plates short, broad at each base, and gently narrowed towards rounded apex; vagina narrow though remarkably broadened anteriorly; bursa copulatrix broad at base, widely connected with vagina, and strongly bent in apical portion; spermatheca sigmoidally curved, without visible constriction at base, though lightly constricted at basal third, and somewhat broad at middle; spermathecal duct gently sinuate, and entering into bursa copulatrix at its apical part.

Note. In the three other Japanese species of the genus, *S. koyaensis* (MATSUSHITA), *S. takeuchii* MATSUSHITA et TAMANUKI and *S. gracilis* GRESSION, the dorsal baculi are also short and the proctiger baculi are long. Perhaps these features can be regarded as being characteristic of *Strangalia*.

Mimostrangalia kurosonensis (OHYASHI, 1936)

(Fig. 56)

Collecting data of the material used. Kuroson, Kôchi Pref., 28-VII-1954, Y. SHUTO leg.

Paraproct extremely long, its baculi long and feebly sinuate; valvifer indistinct; coxite baculi feebly sinuate, each with a vague inner fold at its apical part; coxite lobes moderate in size, sclerotized at each inner part, and bearing tactile hairs; stylus sclerotized except for apex, and with tactile hairs; dorsal baculi very slightly sinuate, and much shorter than the paraproct ones; proctiger baculi almost straight; vaginal plates very short, broad at each base, and abruptly narrowed towards acuminate apex;

vagina bent at the anterior part; bursa copulatrix rather narrow, tubular; spermatheca weakly constricted at base, bent at middle, and narrowed towards apex; spermathecal duct lightly wavy, and entering into apical fourth of bursa copulatrix.

Tribe Eroschemini

Formosopyrrhona satoi (HAYASHI, 1957)

(Fig. 57)

Collecting data of the material used. Marubatake-rindô, Amami-Oshima Is., Kagoshima Pref., 11-IV-1974, T. SHIMOMURA leg.

Paraproct very long with almost straight baculi; valvifer indistinct; coxite well narrowed towards the apical part, its baculi almost straight though feebly sinuate posteriorly, with a short inner branch at its apical part; each coxite lobe rather long, sclerotized at the inner part, and bearing tactile hairs; stylus rather long, with long tactile hairs; dorsal baculi slightly longer than the paraproct ones, and feebly sinuate near the apices; proctiger baculi almost straight; vaginal plates rather short and narrow; vagina bent and dilated anteriorly; bursa copulatrix small and narrow, tubular, joining spermathecal duct which is wavy and thickened at middle, and entering into vagina at the top of its dilated portion but continuing into it for some distance; spermatheca clearly distinguishable from the duct, not arcuate but short and almost parallel-sided throughout, weakly depressed at middle, and with the gland attaching to its top.

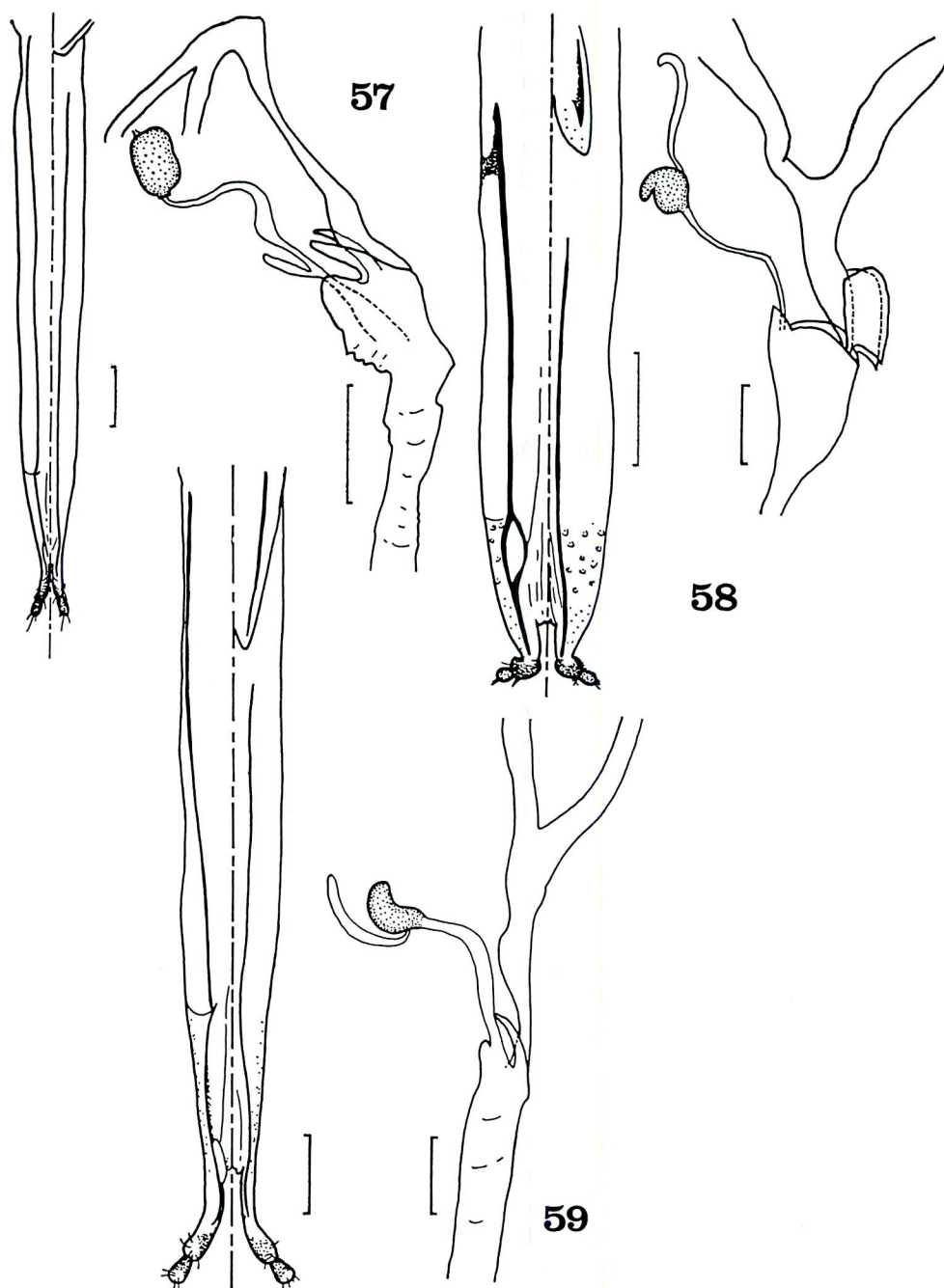
Corennys sericata BATES, 1884

(Fig. 58)

KUBOKI, 1980, Kita-Kyûshû no Konchû, Kokura, 27, pl. 8, fig. 24.

Collecting data of the material used. Marunuma, Katashina-mura, Gunma Pref., 23-VII-1978, A. TAKASU leg.

Paraproct rather long, each baculum very thick, almost straight, and with a well sclerotized part expanding to lateral margin near its base; valvifer indistinct; coxite with rough surface, strongly constricted at the apical part, each baculum thick, divided at the base though the two branches meet again at the middle, and straightly extending to apical lobe; coxite lobes small, directed laterad, sclerotized except for bases, and with short tactile hairs; stylus very small, articulated to the apex of coxite lobe, and bearing short tactile hairs; dorsal baculi thick, almost as long as the paraproct ones, and slightly curved, with longitudinal wrinkles inside; proctiger baculi thick, thickened posteriorly, and sharply lanceolate at the end; vaginal plates very broad and subquadrate, each with very narrow base and sharply pointed outer basal angle, obliquely subtruncate at apex though the outer apical angle is rounded; vagina broadened anteriorly; bursa copulatrix existing only as a small protrusion, the apex of which is subacuminate; spermatheca subglobular, transversely folded near apex, with the gland attaching to



Figs. 57–59. Ovipositor (left half: ventral view; right half: dorsal view) and internal reproductive organ (ventral view). — 57, *Formosopyrrhona satoi*; 58, *Corennys sericata*; 59, *Necydalis harmandi*. (Scale: 0.5 mm.)

the lateral face; spermathecal duct thin, entering into bursa copulatrix at its base.

Notes. It is of particular interest that the present species is very similar to *Pachypidonia bodemeyeri* (Fig. 29) in the features of the female reproductive organs, although these two species belong to different tribes. Their ovipositors are very peculiar among the Japanese lepturines in the following points: all the baculi are thick, the coxite has rough surface and is strongly constricted at the apical part, the coxite lobes are directed laterad and sclerotized except for the bases, and the stylus is very small.

So far as concerned with the female reproductive organs, there is nothing in common between this species and *Formosopyrrhona satoi*, both of which have been currently placed in the tribe Eroschemini.

Tribe Necydalini

Necydalis harmandi PIC, 1902

(Fig. 59)

Collecting data of the material used. Mt. Hotaka, Katashina-mura, Gunma Pref., 25-VII-1978, A. TAKASU leg.

Paraproct long, with slightly curved baculi; valvifer indistinct; coxite not clearly constricted at the apical part though somewhat narrowed posteriorly, with baculi slightly thickened at the median part and extending onto coxite lobes beyond the middle; each coxite lobe very narrow and externally arcuate, weakly sclerotized at the inner part, and with tactile hairs; stylus rather short though broadened at the apex, weakly sclerotized, and bearing tactile hairs; dorsal baculi feebly sinuate, and slightly longer than the paraproct ones; proctiger baculi very long and almost straight; vaginal plates narrow and more or less curved; vagina narrow, almost parallel-sided; bursa copulatrix rudimentary; spermatheca weakly constricted at base, gently curved at middle, and with broad apical part; spermathecal duct very thick, and entering into vagina.

Note. The bursa copulatrix is also rudimentary in the other species of the genus, *N. gigantea gigantea* KANO and *N. solida* BATES.

Discussion

It seems appropriate to examine taxonomic importance of the female reproductive organs of lepturine cerambycid beetles according to their different components.

First to be considered is the ovipositor which is roughly distinguished into the paraproct, valvifer, coxite and styli. The paraproct with its baculi is usually simple, but still shows peculiarities in certain genera. It is especially long in the three Japanese species of *Corymbia*, *Konoa granulata*, *Leptura* (*Megaleptura*) *regalis*, *Mimostrangalia kurosonensis*, and *Formosopyrrhona satoi*. All but the last one of them belong to the Lepturini, while the last-named is currently placed in the Eroschemini. As was already

Table 1. Diagnostic features of female reproductive organs in Japanese lepturine cerambycid beetles.

Tribe	Species name	Paraproct	Valvifer	Bursa copulatrix	Stylus	Remarks
Xylosteini	<i>Caraphia lepturoides</i>	short	distinct	absent		
Encyclopini	<i>Encyclops olivacea</i>	short	indistinct	middle		
Rhagiini	<i>Rhagium japonicum</i>	rather long	indistinct	large		
	<i>Enoploderes bicolor</i>	short	indistinct	absent		
Stenocorini	<i>Sachalinobia rugipennis</i>	long	indistinct	large		dorsal baculi short
	<i>koltzei</i>					
	<i>Stenocorus coeruleipennis</i>	long	indistinct	large		dorsal baculi short
	<i>Toxotinus reini</i>	very short	indistinct	large		baculi absent except for proctiger ones
	<i>Pachyta lamed</i>	rather long	indistinct	large		dorsal baculi short
	<i>Brachyta punctata</i>	short	imperfectly separated	large	abaxially articulated	spermatheca unevenly sclerotized; proctiger very long
	<i>B. bifasciata japonica</i>	short	imperfectly separated	large	abaxially articulated	spermatheca unevenly sclerotized; proctiger very long
	<i>Evodinus borealis</i>	short	distinct	large	abaxially articulated	proctiger very long
	<i>Gaurotes (Paragaurotes) doris</i>	very short	indistinct	very large		spermatheca narrow
	<i>G. (Carillia) atripennis</i>	short	indistinct	large		vaginal plates sclerotized at bases; spermatheca narrow
	<i>Lenura nishimurai</i>	very short	indistinct	large		spermatheca U-shaped
	<i>L. decipiens</i>	very short	indistinct	large		spermatheca U-shaped
	<i>L. rufithorax</i>	very short	indistinct	large		spermatheca U-shaped
	<i>Dinoptera minuta</i>	very short	indistinct	large		vaginal plates sclerotized at bases; spermatheca narrow
	<i>Acnaeops septentrionis</i>	short	indistinct	large		vaginal plates sclerotized throughout; spermatheca narrow
	<i>Macropidonia (Macropidonia) ruficollis</i>	short	indistinct	middle		
	<i>M. (Pseudosieversia) japonica</i>	short	indistinct	small		
	<i>Pidonia (Pidonia) spp.</i>	moderate	indistinct	small	abaxially articulated	

Table 1. Continued.

Tribe	Species name	Paraproct	Valvifer	Bursa copulatrix	Stylus	Remarks
Stenocorini	<i>P. (Cryptopidonia) spp.</i>	very short	indistinct	small		
	<i>P. (Munon) spp.</i>	short	indistinct	small		dorsal baculi short
	<i>P. (Omphalodera) spp.</i>	short	indistinct	small		
Lepturini	<i>Grammoptera chalybeella</i>	moderate	indistinct	small	abaxially articulated	vaginal plates sclerotized and V-shaped
	<i>Alosterna tabacicolor</i>	moderate	indistinct	small	abaxially articulated	vaginal plates sclerotized and V-shaped
	<i>Ohbayashia nigrumarginata</i>	moderate	indistinct	small		
	<i>Pyrrhona laeticolor</i>	rather long	indistinct	small		
	<i>Pyrrhona laeticolor</i>		indistinct	small		
	<i>Pachypidonia bodemeyeri</i>	moderate	indistinct	small	very small	coxite well constricted
	<i>Nivellia sanguinosa</i>	moderate	indistinct	small		
	<i>Judolia japonica</i>	rather long	indistinct	indefinite		vaginal plates sclerotized along the outer margins
	<i>J. cometes</i>	rather short	indistinct	absent		
	<i>J. sexmaculata</i>		indistinct	indefinite		
	<i>Judolia bangi</i>	short	indistinct	indefinite		
	<i>Pseudallosterna misella</i>	moderate	indistinct	small	abaxially articulated	vagina weakly sclerotized vaginal plates sclerotized and V-shaped; proctiger long
	<i>Kanekoa azumensis</i>	rather short	indistinct	small		
	<i>Anopleromorpha monticola</i>	moderate	indistinct	small		vaginal plates sclerotized at bases
	<i>Brachyleptura pyrrha</i>	long	indistinct	small		
	<i>Anastrangalia scotodes</i>	rather long	indistinct	small		vagina lightly sclerotized
	<i>scotodes</i>					
	<i>Corymbia succedanea</i>	very long	indistinct	small		vagina sclerotized
	<i>C. varicornis</i>	very long	indistinct	small		
	<i>C. igai</i>	very long	indistinct	small		
	<i>Konoa granulata</i>	exceedingly long	indistinct	small	abaxially articulated	
	<i>Leptura (Leptura) minica</i>	long	indistinct	small		
	<i>L. (L.) dimorpha</i>	moderate	indistinct	small		

<i>L. (L.) subtilis</i>	moderate	indistinct	small	spermathecal duct extremely long; vagina weakly sclerotized spermathecal duct extremely long
<i>L. (L.) yakushimana</i>	fairly long	indistinct	small	
<i>L. (L.) ochraceofasciata</i> subsp.	fairly long	indistinct	small	
<i>L. (L.) kusamai</i>	fairly long	indistinct	small	
<i>L. (L.) duodecinguttata</i> <i>duodecinguttata</i>	fairly long	indistinct	small	vaginal plates weakly sclerotized throughout
<i>L. (L.) latipennis</i>	very long	indistinct	small	
<i>L. (Nakane) vicaria vicaria</i>	long	indistinct	small	
<i>L. (Pedostrangalia)</i> <i>varicornis</i>	rather long	indistinct	small	
<i>L. (P.) femoralis</i>	moderate	indistinct	small	
<i>L. (Megaleptura) regalis</i>	very long	indistinct	small	
<i>Oedecnema dubia</i>	long	indistinct	small	
<i>Eustrangalis distenoides</i>	moderate	indistinct	small	
<i>Japanostrangalia</i> <i>dentatipennis</i>	very short	indistinct	small	
<i>Strangalomorpha tenuis</i> <i>aenescens</i>	very short	indistinct	small	
<i>Parastrangalis</i> <i>(Parastrangalis) lesnei</i>	moderate	indistinct	small	
<i>Strangaliella shikokensis</i>	short	indistinct	small	
<i>S. nymphula</i>	very short	indistinct	small	dorsal baculi short; proctiger baculi long
<i>Idiostrangalia contracta</i>	short	indistinct	small	
<i>Strangalia attenuata</i>				
<i>S. koyaensis</i>				
<i>S. takeuchii</i>	moderate	indistinct	small	
<i>S. gracilis</i>				
<i>Mimostrangalia kurosonensis</i>	extremely long	indistinct	small	
<i>Eroschemini</i>				
<i>Formosopyrrhona satoi</i>	very long	indistinct	small	coxite well constricted
<i>Coremys sericata</i>	rather long	indistinct	small	
<i>Necydalini</i>				
<i>Necydalis harmandi</i>	long	indistinct	rudimentary	
<i>N. solida</i>	long	indistinct	rudimentary	proctiger long
<i>N. gigantea gigantea</i>	long	indistinct	rudimentary	

pointed out in the "Notes" following the description of *Corennys sericata*, the two Japanese species of the Eroschemini have markedly different female genitalia. It is quite possible that they belong to two different tribes, and that *Formosopyrrhona* may have a closer affinity to the Lepturini. In *Sachalinobia rugipennis koltzei*, *Stenocorus coeruleipennis* and *Pachyta lamed*, all belonging to the Stenocorini, the paraproct is fairly long but has short dorsal baculi. In other stenocorine genera, the paraproct is short or very short, and in *Toxotinus reini*, it is very short, broad and devoid of baculi, a strange condition never found in all the other lepturine cerambycids. Short paraproct with short dorsal baculi is also found in the subgenus *Mumon* of the genus *Pidonia*. In the subgenus *Leptura*, the paraproct considerably varies in length according to species or species-groups. However, length of the paraproct is correlated with length of the ovipositor, which seems to be concerned with egg-laying habits. The valvifer is distinct only in the two species, *Caraphia lepturoides* and *Evodinus borealis*, the former belonging to the Xylosteini and the latter to the Stenocorini. In *Brachyta punctata* (Stenocorini), it is imperfectly separated from the coxite. *Brachyta* is also peculiar in possessing very long proctiger baculi, straight inner edges of coxite lobes, and unevenly sclerotized spermatheca. In all the other lepturines studied, the valvifer is not defined. The presence or absence of defined valvifer may be regarded as an indication of phylogenetic difference, but on the other hand, it may have been derived secondarily.

The two species, *Pachypidonia bodemeyeri* and *Corennys sericata*, are peculiar in the fact that the coxite is strongly constricted at the apical part, roughened on the surface, and laterally directed at the terminal lobes, which are surmounted with very small styli. They also have other characters in common, and as a whole, have very similar ovipositors. Such a similarity as this cannot be considered to have resulted from a mere convergence, though they have been currently placed in two different tribes, Lepturini and Eroschemini, respectively.

Each stylus is abaxially articulated to the coxite lobe in *Brachyta* spp., *Evodinus borealis*, *Pidonia* (*Pidonia*) spp., *Grammoptera chalybeella*, *Alosterna tabacicolor*, *Pseudallosterna misella* and *Konoa granulata*. In all the others, it is almost adaxially articulated to the coxite lobe. The dorsal baculi are absent in only one species, *Toxotinus reini*. The proctiger is very long in the two species of *Brachyta*, *Evodinus borealis*, *Pseudallosterna misella* and *Necydalis harmandi*. These peculiarities are useful for reinforcing current classification at the generic or lower levels, and with a few exceptions, accord well with the latter.

The vaginal plates are much diversified in development and configuration. They are usually thin and hyaline, but poorly sclerotized in such stenocorines as *Gaurotes* (*Carillia*) *atripennis*, *Dinoptera minuta* and *Acmaeops septentrionis*, and such lepturines as *Judolia japonica*, *Anoploderomorpha monticola* and *Leptura* (*Pedostrangalia*) *femoralis*, and strongly sclerotized in *Grammoptera chalybeella*, *Alosterna tabacicolor* and *Pseudallosterna misella*, all of which belong to the Lepturini. In the latter three, the two plates are fused to each other at the base and form a V-shaped plate. It is difficult to

find out phylogenetic meaning in the variation of the vaginal plates, but they are very useful for discriminating species of the Lepturinae.

The vagina is rather a simple muscular tube, varying in length and proximal dilatation according to species. In certain lepturines, it is partly sclerotized, that is, in *Judolia bangi*, a small portion near the attachment of the vaginal plates is poorly sclerotized, and in *Anastranglia scotodes*, *Corymbia succedanea* and *Leptura* (*Leptura*) *ochraceofasciata ochraceofasciata*, it is sclerotized behind the bursa copulatrix. However, these features do not seem to have any phylogenetic meaning, but may have resulted from parallel specialization.

Generally speaking, the bursa copulatrix is well developed in such lower tribes as the Encyclopini, Rhagiini and Stenocorini, and is either small or absent in such higher tribes as the Lepturini, Eroschemini and Necydalini. In such lepturines as *Grammoptera chalybeella* and *Alosterna tabacicolor*, it is not only small but indistinguishable from the spermathecal duct. The bursa copulatrix is useful for grouping tribes or genera. However, exceptions occur rather frequently. In the Stenocorini, *Macropidonia* (*Pseudosieversia*) *japonica japonica* and all the species belonging to the genus *Pidonia* have small bursa copulatrix. More unexpected is that it is completely absent in *Caraphia lepturoides* and *Enoploderes bicolor*, which belong to the lower tribes Xylosteini and Rhagiini, respectively. At least, *Rhagium* and *Enoploderes* may not belong to the same tribe.

As has been known for some time, the spermatheca furnishes a useful character for classifying species and/or subgenera of lepturine cerambycids. A well known example is the genus *Pidonia*, in which subgeneric classification is largely based upon difference of spermathecal conformation. It is also useful for classifying species and species-groups of this difficult genus. However, the spermathecal capsule varies to some extent in shape both individually and geographically, so that it is necessary to examine as many specimens as possible for determining its value in the taxonomy of lepturine species.

Thus, the female reproductive organs are important and useful for the taxonomy of the Lepturinae, though they have been almost always neglected by previous workers. The spermatheca furnishes specific and/or subgeneric characters, the ovipositor provides subgeneric or generic ones, and the bursa copulatrix can be used for classifying genera or tribes. Since the present study is limited to Japanese forms, no action is taken for revising current classification of genera and tribes according to the result obtained. However, it seems obvious to me that certain important changes will be needed for the classification of the Lepturinae when more comprehensive investigations are made in the future. It is to be hoped that investigations similar to the present study will be made throughout the family and will establish the higher classification of cerambycid beetles on a sound basis.

要 約

齊藤明子：日本産ハナカミキリ亜科の雌交尾器とその分類学的重要性。—— カミキリムシ科甲虫類の分類は、観察の容易な外部形態の比較に基づいて行われていたが、ようやく最近になって、雄交尾器を用いた種の認識が重視されるようになってきた。しかし、雌交尾器に関する報告はきわめて少なく、わずかに形態学的な少数の報文と、フトカミキリ亜科の分類学的な検討に関する中国での研究などがあるにすぎない。そこで筆者は、日本産のハナカミキリ亜科 44 属に含まれる 57 種について、雌交尾器を記載、図示し、一部の種についてはそれ以外の近縁種についても検討して、雌交尾器の各形質が分類学的にどのような重要性をもつかを調べた。

その結果、産卵管 (paraproct, valvifer, coxite, stylus, proctiger, dorsal baculum) の形態は属あるいは亜属段階の分類に、また交尾嚢 (bursa copulatrix) は族や属段階の分類に有効な形質であるらしい、ということがわかった。一方、受精嚢 (spermatheca) は、その付属腺 (spermathecal gland) や受精嚢管 (spermathecal duct) とともに、さらに低い段階、つまり亜属や種の段階での分類に際して重要な形質になる。雌交尾器の検討結果から想定される分類体系は、外部形態のみに基づく分類体系と大筋で一致するが、なかには大きく相違するものもみつかった。このような事例については記載のあとに注記したが、その分類学的な取扱いについては将来のより広汎な研究に残した。

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