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Study on the Tribe Blondeliini from Japan
(Diptera: Tachinidae)
II. Revision of the Genera *Trigonospila* POKORNY and
Lixophaga TOWNSEND from Japan

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Synopsis The Japanese species of *Trigonospila* POKORNY and *Lixophaga* TOWNSEND are revised. One species of each of the genera is described and illustrated as new to science. Keys to the Japanese species of both genera are presented.

Genus *Trigonospila* POKORNY

Trigonospila POKORNY, 1886, Wien. ent. Ztg. 5: 191. Type-species: *Trigonospila picta* POKORNY, 1886 (= *Tachina ludio* ZETTERSTEDT, 1848), by monotypy.

Succingulum PANDELLÉ, 1894, Rev. Ent. 13: 52.

Gymnamedoria TOWNSEND, 1927, Ent. Mitt. 16: 283.

This genus is widely distributed in Europe, Africa, Southeast Asia and Australia. In Australia 2 species of lepidopterous insects, belonging to the Oecophoridae and Gelechiidae, are known as the hosts of this genus (CROSSKEY, 1973). MESNIL (1962) recorded 2 species of this genus, *T. ludio* and *T. transvittata*, from Japan. An additional species of this genus is described here. The host insect of the Japanese species is not known as yet.

In general appearance, the black and white (or yellow) color pattern of this genus is characteristic. The following characters are used for distinguishing the genus in the tribe Blondeliini:

Gena narrow, 0.1–0.3 of eye-height; eye bare; occipital dilation occupying nearly the lower 1/3–1/2 of the gena; ocellar seta distinct, proclinate; reclinate orbital seta indistinct and proclinate orbital seta absent in male; female with 2 proclinate and 2–3 reclinate orbital setae; parafacial and facial ridge bare; face concave, epistoma not beyond vibrissal angle; occiput slightly bulged, with 2–3 irregular rows of black hairs on upper portion; arista with 3rd segment short pubescent, thickened on basal 1/5; propleuron, prosternum, barettæ and mediotergite bare; humeral callus with 1–3 setae; 1–3+2–3 *ac*; 3+3–4 *dc*; 1–2+1 *stpl*; sternopleuron with 1–3 rows of fine black hairs in front of mid-coxa; pteropleural seta rather fine but distinct; scutellum haired below laterally, with 3 pairs of marginal and 1 pair of discal setae; apical scutellar seta absent; basal node of wing vein R_{4+5} with 1–4 fine hairs dorsally and ventrally; legs elongate, mid-tibia without a ν seta; abdomen elongate, median discal setae present on intermediate terga.

In structure, the male genitalia of the Japanese species of this genus closely resemble each other. The shape of the 5th abdominal sternite, comparative lengths of the cerci and surstyli, the shape of the apex of the cerci and the apical structure of

the aedeagus are rather slightly different among the species. It is easier to distinguish the species by the thoracic chaetotaxy, comparative lengths of the gena and eye-height, ciliation of the wing costa and the chaetotaxy of the legs.

Trigonospila transvittata (PANDELLÉ)

Succingulum transvittatum PANDELLÉ, 1896, Rev. Ent. 15: 148.

This species is very characteristic among the Japanese species of this genus in its very small propleural seta, only 1 *p* seta on fore tibia, strongly upwardly-directed frontal setae and the black transverse band across the scutum extending between the wing bases. The 5th sternum of the male of this species is rather evenly widened posteriorly as in the following species, but the surstylus is slightly shorter than the cercus, and the membranous apex of the distiphallus is more slender and shorter (Figs. 1B, 2B, 2E, 3C and 3F).

Distribution. Japan (Honshu, Kyushu, Ryukyus); Europe, Formosa, India, Thailand, Melanesia.

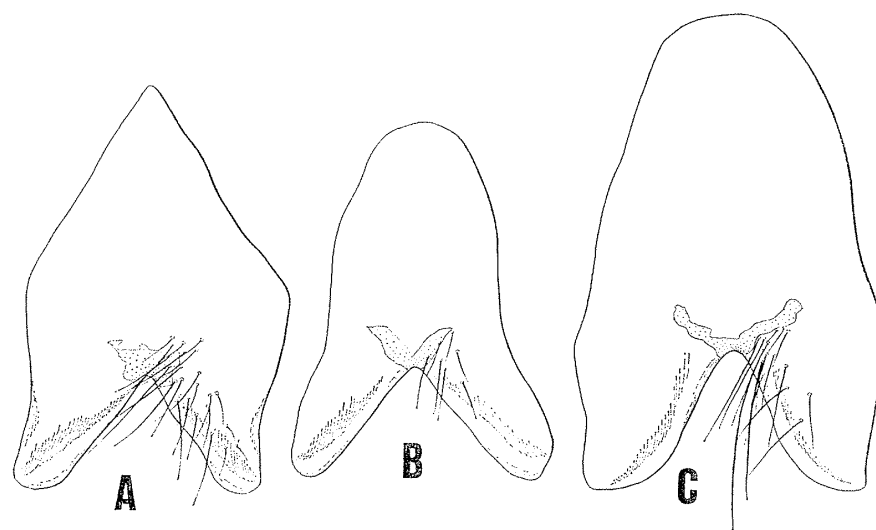


Fig. 1. Male 5th sterna in ventral view. A. *Trigonospila magna* sp. nov.; B. *T. transvittata* (PANDELLÉ); C. *T. ludio* (ZETTERSTEDT).

Specimens examined: Honshu 1 male, Shibayama, Shiraoka, Saitama Pref., 14. x. 1973, K. HARA; 1 male, Midoro-ike, Kyoto Pref., 13. v. 1964, K. BUEI, Kyushu 1 male, Mt. Ariake, Tsushima Is., 22. v. 1968, H. SHIMA; 1 female, Sasuna, Tsushima Is., 26. v. 1968, H. SHIMA; 1 female, Hitakatsu, Tsushima Is., 27. v. 1968, M. HONDA; 8 males, Mt. Hikosan, Nagasaki City, 8. vii. 1965 H. SHIMA & Y. IKEZAKI; 1 female, Uearata-cho, Kagoshima City, 16. iv. 1968, A. TANAKA; 1 male, Terayama Park, Kagoshima City, 10. v. 1966, A. TANAKA; 1 male, Sômuta-cho, Kagoshima City, 23. v. 1965, A. TANAKA; 1 male, Sata—Ôdomari, Kagoshima Pref., 29. iv. 1962, A. NAGATOMI; 1 female, Sata, Kagoshima Pref., 26. vi. 1965, R. ÔISHI; 1 female, Onoaida, Is. Yaku, 12. iv. 1967, H. SHIMA; 1 female, Kurio, Is. Yaku, 24. v. 1968, A. TAKANA; 1 female, Kurio, 4. x. 1968, K. KANMIYA, Ryukyus 1 male, Mt. Yui, Amami-Ôshima, 16. xi. 1971, H. SUZUKI; 1 male, Mt. Yuwan,

Amami-Ôshima, 19. xi. 1971, H. SUZUKI; 3 males, Sokaru, Setouchi, Amami-Ôshima, 17. iii. 1972, H. SUZUKI; 1 male, Edateku-jima, Uken, Amami-Ôshima, 19. ix. 1972, H. SUZUKI; 1 female, Funaura, Iriomote Is., 27-31. x. 1971, S. SHINONAGA; 1 female, Ôhara, Iriomote Is., 7-9. vii. 1974, S. SHINONAGA.

Trigonospila ludio (ZETTERSTEDT)

Tachina ludio ZETTERSTEDT, 1848, Dipt. Scand. 8: 3233.

This species resembles the following species in its normal-sized propleural seta, many forwardly-directed frontal setae and the transverse band on the scutum restricted to the region between the intra-alar setae. This species differs from the following one as follows: Size smaller; 2nd costal sector of the wing haired ventrally; gena, parafacial and vertex narrower; mid-dorsal excavation of abdominal syntergum 1+2 not extending to the hind margin.

The male cercus of *ludio* is slightly longer than the surstylus, rather than equal to it as in *magna* sp. nov., and the apex of the distiphallus is rather short (Figs. 2C, 2F, 3B and 3E).

This seems to be the commonest species of *Trigonospila* in Japan.

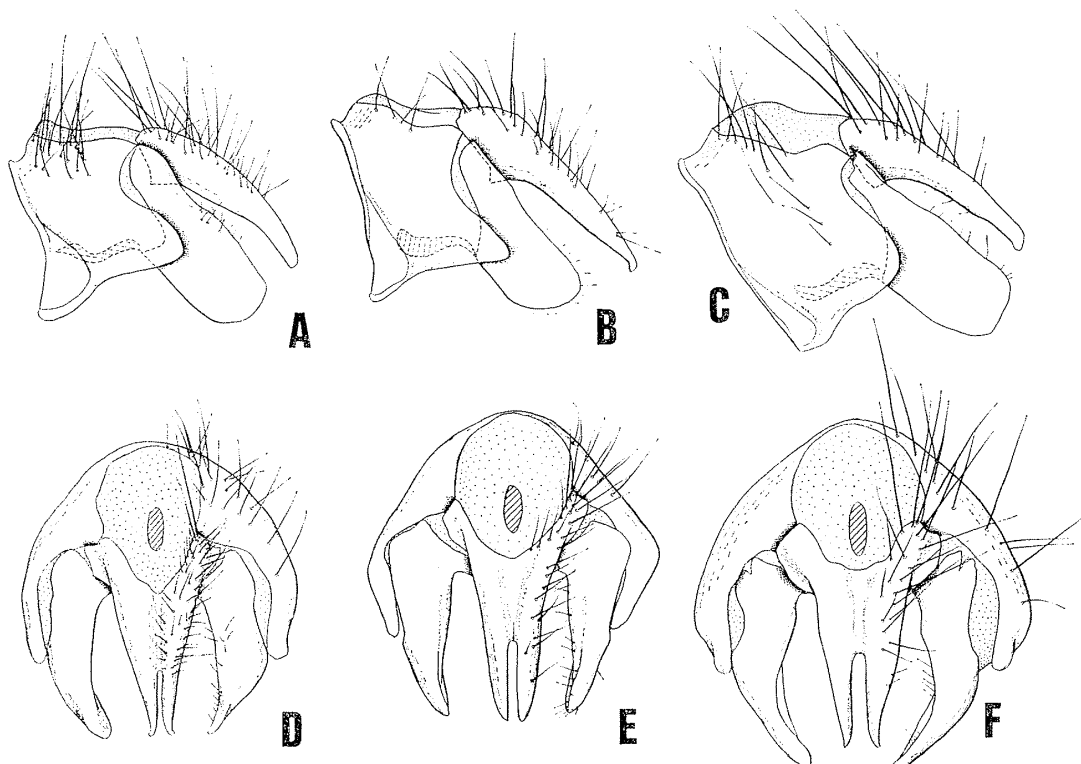


Fig. 2. Male genitalia. A, B, C. Epandria, cerci and surstyli in lateral view; D, E, F. same in dorsal view. A, D. *Trigonospila magna* sp. nov.; B, E. *T. transvittata* (PANDELLÉ); C, F. *T. ludio* (ZETTERSTEDT).

Distribution. Japan (Hokkaido, Honshu, Kyushu); Europe, Burma, India.

Specimens examined: Honshu 3 males, Mt. Haguro, Gassan, Yamagata Pref., 25. v. 1972, K. SHIRAHATA; 1 male, Murakami, N-Echigo, Niigata Pref., 30. v. 1967, K. BABA; 5 males, Mt. Atema, Niigata Pref., 14. vii. 1971, M. HONDA; 17 males, Mt. Atema, 27–29. vii. 1971, M. HONDA; 1 male, Kawamata—Mizuba, Otaki, Saitama Pref., 31. vii. 1973, K. HARA; 4 males, Chichibu-ontake, Otaki, Saitama Pref., 16. vi. 1974, K. HARA; 1 male, Minato, Mitsumine, Saitama Pref., 16. viii. 1972, K. HARA; 1 male, Ryokami, Saitama Pref., 30. viii. 1973, K. HARA; 1 male, Uranomura, Tanba, Hygo Pref., 5. vii. 1951, A. NAGATOMI; 1 male, Sasayama, Tanba, 9. v. 1952, K. IWATA; 1 male, Sasayama, 28. v. 1953, M. MIKI; 1 male, Sasayama, 17. vi. 1952, K. IWATA; 1 male, Ryuzoji, Tanba, 13. vi. 1952, K. NOHARA, Kyushu 2 males, Mt. Hiko, Fukuoka Pref., 26. vi. 1966, H. SHIMA; 1 male, Kyusukei, Mt. Kujû, Ôita Pref., 14. v. 1971, M. HONDA; 12 males 18 females, Ôhata-ike, Mts. Kirishima, Kagoshima Pref., 7–9. vi. 1964, H. SHIMA, A. TANAKA & K. HASHIMOTO; 3 males, Hayashida—Ônamiike, Mts. Kirishima, 31. v. 1964, A. TANAKA; 1 male, Ônamiike, Mts. Kirishima, 31. v. 1964, H. SHIMA; 1 male, Kirishimajingu—Yunono, Mts. Kirishima, 5. vi. 1965, S. ÔGA; 4 males, Mt. Wanizuka, Miyazaki Pref., 23. v. 1966, A. TANAKA; 4 males, Mt. Eboshi, Kagoshima Pref., 17. iv. 1965, A. TANAKA & H. SHIMA; 2 males, Mt. Eboshi, 3. v. 1964, A. TANAKA; 2 males, Mt. Eboshi, 9. v. 1964, K. HASHIMOTO; 1 male, Mt. Eboshi, 17. v. 1964, A. TANAKA; 6 males, Mt. Inao, Kagoshima Pref., 22–24. vii. 1965, K. HASHIMOTO & S. ÔGA.

Trigonospila magna sp. nov.

(Figs. 1A, 2A, 2D, 3A and 3D)

Male. Head black in ground color; gena and narrow anterior portion of parafacial reddish brown; epistoma pale yellow; interfrontal area brown-black; parafacial densely yellowish pollinose; gena with rather thin white pollinosity; occiput whitish pollinose, upper 1/3 blackish; antenna and arista black; palpus black. Vertex 0.20–0.22 of head width; interfrontal area widened anteriorly, about 2× as wide as parafrontal at middle; parafacial narrowed below, about 2× as wide as 3rd antennal segment at middle-height; face about 2/5 × as wide as long; gena 0.27–0.28 of eye-height; occiput rather flattened. Inner vertical seta very fine, directed outwards, slightly stronger than occipital setae of upper portion, and about 0.25 of eye-height; 2 postocellar setae and sometimes slightly shorter additional setae present, postocellar seta slightly shorter than inner vertical seta; 2–3 postvertical setae on each side; ocellar seta slightly stronger than frontal setae; reclinate orbital seta indistinguishable from 18–20 fine frontal setae; upper 4–6 of frontal setae somewhat reclinate and others proclinate; lowest frontal seta level with middle of 2nd antennal segment; parafrontal with only 5–6 fine hairs among row of frontal setae. Second antennal segment 0.32–0.33 × as long as 3rd; 3rd segment 0.18–0.20 × as wide as long, and falling short of lower margin of face by about 1/3 length of 3rd antennal segment. Arista slightly longer than antenna; 1st segment very short; 2nd segment wider than long. Palpus rather cylindrical, slightly shorter than 3rd antennal segment (5/6), with rather long hairs.

Thorax black in ground color; dorsum with dense yellowish white pollinosity; prescutum with 3 median longitudinal black vittae and 2 rather long lateral black spots, the former fused into a broad transverse band on anterior portion; middle vitta of prescutum narrow and continuous with black portion of scutum; lateral black spots of prescutum about 2× as long as wide; scutum with broad transverse black band along posterior side of transverse suture, which is extending to anterior 1/2 of scutum between each row of intra-alar setae; pleuron with rather thin whitish pollinosity; scutellum black in ground color, with very thin whitish pollinosity on its apex. Hairs on dorsum short erect and sparse, pleuron with rather long hairs; 3 humeral setae, middle one set forwards; 3+3 *ac*; 3+4 *dc*, sometimes 2nd postsutural *dc* seta very fine; 1+3 *ia*; 1 strong presutural seta; propleural seta 1/2–2/3 × as long as prostigmatic seta; 2+1 *stpl*, hindmost one stronger and lower one

fine; pteropleural seta slightly shorter than lower *stpl* seta; basal scutellar seta about $2 \times$ as long as scutellum; lateral scutellar seta about $2/3 \times$ as long as basal one; subapical scutellar seta subequal in length to basal one; preapical scutellar seta fine and suberect, subequal in length to scutellum; apical scutellar seta absent; distance between 2 subapical scutellar setae about $0.5 \times$ as long as that between basal and subapical ones of same side.

Wing hyaline, very slightly tinged with brown; calypter pale brownish white; halter pale reddish yellow, apex paler. Wing narrow and long in shape. Costa setulose from base nearly to basal $1/2$ of 4th costal sector; 2nd costal sector bare ventrally; lengths of 2nd, 3rd and 4th costal sectors approximately in the ratio of 2: 5: 2; length of vein M_1 from discal crossvein to its bend about $4/7 \times$ as long as that from the bend to apex of vein M_1 , and about $2 \times$ as long as distance between the bend and wing margin; r-m crossvein ending on basal $4/7$ of discal cell; discal crossvein about $2 \times$ as long as ultimate section of vein M_3 .

Legs very long, entirely black; pulvillus dull yellowish. Fore tibia with 4 *p* setae; mid-tibia with 1 rather strong *ad* and 5 *pd* setae; hind tibia with rows of *ad* and *pd* setae and with 2 preapical *d* setae, without *pv* apical seta; fore claw and pulvillus longer than 5th tarsomere.

Abdomen black, with whitish pollinosity; syntergum 1+2 almost black, narrowly whitish pollinose on its hind margin; 3rd tergum with whitish pollinosity on its anterior $2/3$ dorsally, posterior black portion extending triangularly to posterior $2/3$ of its dorsomedian portion; 4th tergum black on its posterior $1/2$, black portion extending slightly triangularly to middle of dorsum; 5th tergum black on its posterior $1/3$; 1st sternum and venter of 1+2 to 5th terga with grayish white pollinosity, the pollinosity on venter of each tergum appearing as a pair of dark spots when directly illuminated and viewed from behind. Abdomen elongate, about $2.5 \times$ as long as wide; syntergum 1+2 elongate, mid-dorsal excavation usually extending to median marginal setae; lengths of 3rd, 4th and 5th terga approximately in the proportions of 10: 9: 7. Hairs on dorsum erect and rather sparse; denser and finer on syntergum 1+2 and 3rd tergum, and becoming sparse and strong on posterior terga, rather dense, fine and long on venter; 2nd tergum with 2 strong median marginal setae and 1 strong latero-marginal seta; 3rd tergum with 2 pairs of median discal setae, 2 strong median marginal setae, 1 weak laterodiscal seta and 1 strong lateromarginal seta, anterior pair of median discal setae shorter than posterior one; 4th tergum with 2 pairs of median discal setae, a row of marginal setae and 1 laterodiscal seta, anterior pair of median discal setae shorter than posterior one; 5th tergum with irregular row of discal setae and a row of marginal setae, discal setae mixed with strong and erect hairs; 5th sternum abruptly widened from base to middle and nearly parallel-sided on its posterior $1/2$, posterior lobe with rather fine dense hairs.

Male genitalia: Cerci in dorsal view narrowed posteriorly, their inner margins separated on posterior $2/3$, apices slightly separated from each other, in lateral view weakly curved ventrally; surstylus subequal in length to cercus, in lateral view broad, with fine hairs on its upper side; basiphallus with a long and strong dorsal process; distiphallus with strong dorsally curved slender membranous apical portion; pregonite with a few hairs on its posterior margin.

Female. Differing from male as follows: Pollinosity on parafrontal more whitish; vertex $0.27-0.29$ of head width; interfrontal area $1-1.2 \times$ as wide as parafrontal at middle; gena $0.29-0.31$ of eye-height; inner vertical seta strong, about $0.6 \times$ as long as eye-height; outer vertical seta about $1/2$ length of inner one; ocellar seta slightly shorter than outer vertical seta; 1 reclinate orbital seta, subequal in length to outer vertical seta; 2 proclinate orbital setae, slightly shorter than inner vertical seta; 9-11 frontal setae, upper 2-3 weakly reclinate; 2nd antennal segment $0.28-0.30 \times$ as long as 3rd segment, 3rd segment $0.23-0.24 \times$ as wide as long; middle vitta of prescutum terminative before transverse suture; 3+3 *dc*, if 4 postsutural *dc* setae present, then second one weak; fore tibia with 2-3 *p* setae; fore claw and pulvillus shorter than 5th tarsomere; 3rd abdominal tergum pollinose on posterior $1/2$, posterior black band not extending anteriorly; 4th abdominal tergum with whitish pollinosity on posterior $1/3$; hairs on abdomen recumbent; 3rd and 4th terga each with a pair of median discal setae, laterodiscal setae indistinct; 5th abdominal tergum nearly conical.

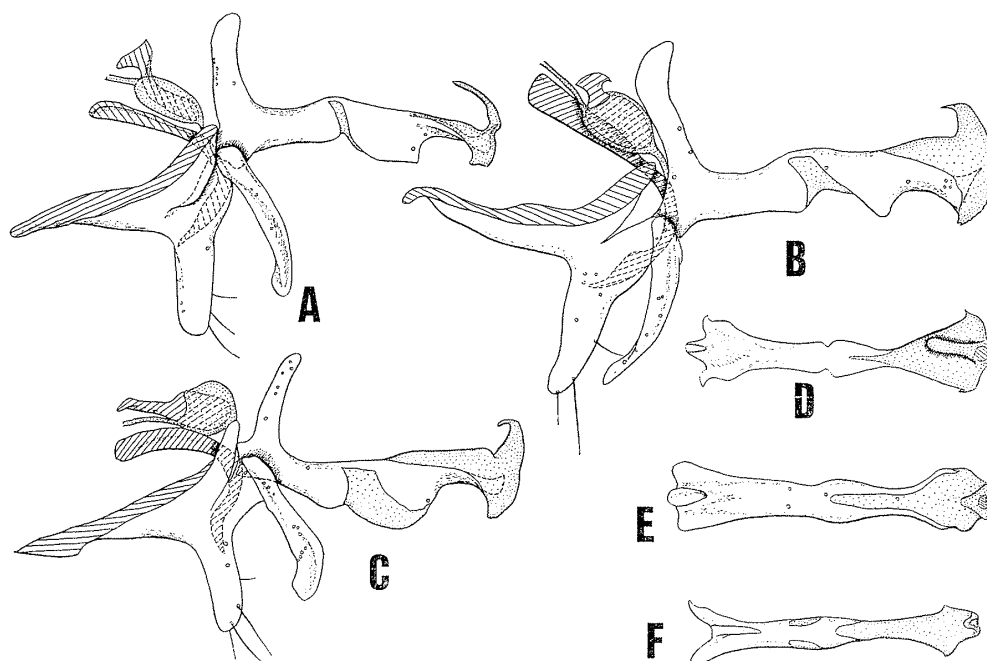


Fig. 3. Male genitalia. A, B, C. Hypandria, pregonites, postgonites and aedeagus in lateral view. D, E, F. Male aedeagus in dorsal view. A, D. *T. magna* sp. nov.; B, E. *T. ludio* (ZETTERSTEDT); C, F. *T. transvittata* (PANDELLÉ).

Body length: 11.0–12.4 mm., wing length: 8.2–11.2 mm.

Holotype: Male, Mt. Takachiho, Kagoshima Pref., Kyushu, 7. vi. 1966, H. SHIMA; preserved in the collection of the Biological Laboratory, College of General Education, Kyushu University.

Paratypes: 1 female, Onumadaira, Towada City, Aomori Pref., 20. viii. 1977, K. MORI; 1 male, Kurokawa, Echigo, Niigata Pref., 7. viii. 1954, K. BABA; 1 male, Uratakao, Tokyo, 18. viii. 1973, R. KANO; 1 female, Mt. Katsuragi (720 m), Kaizuka City, Osaka, 7. vi. 1968, Y. MIYATAKE; 1 male, Ichinotorii, Myoken, Osaka, 29. vii. 1966, K. M.; 1 male, Nose, Hatsutani, Osaka, 8. vi. 1967, Y. MIYATAKE.

Distribution. Japan (Honshu & Kyushu).

Remarks. In general appearance this species resembles *ludio*, but may be differentiated by its larger size and by the other characters mentioned under that species. The male genitalia are different from the preceding 2 species as follows: Fifth sternum of this species abruptly widened posteriorly from base to middle, but those of *ludio* and *transvittata* rather evenly widened posteriorly from base to apex (Figs. 1A, 1B and 1C); in this species surstylus subequal in length to cercus, whereas in *ludio* surstylus slightly longer than cercus and in *transvittata* slightly shorter (Fig. 2); dorsally curved apex of distiphallus of this species slender and long but those of the preceding 2 species rather broad and short (Fig. 3).

Key to the Japanese species of *Trigonospila*

1. Fore tibia with more than 2 *p* setae; frontal setae directed forwards, except for several upper ones;

- scutum with black portion between each row of intra-alar setae; propleural seta longer than 1/2 length of prostigmatic seta.....2
- Fore tibia with only 1 *p* seta; all frontal setae strongly directed upwards; black band on scutum transverse between bases of wings; propleural seta very small, less than 1/2 length of prostigmatic seta; 3+3 *dc*; mid-dorsal excavation of abdominal syntergum 1+2 extending to median marginal setae; gena 0.11–0.13 of eye-height; 2nd costal sector bare ventrally [Japan: Europe, India, Thailand, Melanesia] *T. transvittata* (PANDELLÉ)
2. Parafacial subequal in width to 3rd antennal segment at middle-height; gena 0.17–0.20 of eye-height; mid-dorsal excavation of abdominal syntergum 1+2 not extending to median marginal setae; 2nd costal sector haired ventrally [Japan; Europe, Burma, India] . . *T. ludio* (ZETTERSTEDT)
- Parafacial about 2 × as wide as 3rd antennal segment at middle-height; gena 0.27–0.31 of eye-height; mid-dorsal excavation of abdominal syntergum 1+2 usually extending to median marginal setae; 2nd costal sector bare ventrally..... *T. magna* sp. nov.

Genus *Lixophaga* TOWNSEND

Lixophaga TOWNSEND, 1908, Smithsn. Inst., Smithsn. Misc. Collect. 51: 86. Type-species: *Lixophaga parva* TOWNSEND, 1908, by original designation.

The genus *Lixophaga* TOWNSEND is mainly distributed in the New World. There are 12 species known to occur in North America, one of which was introduced from South America, and 7 species in Central and South America (SABROSKY et ARNAUD, 1965; GUIMARÃES, 1973). From Eurasia, 1 Mongolian and 2 Japanese species are described as belonging to this genus. There are also 2 species known to occur in New Guinea, *L. sphenophori* (VILLENEUVE) and an undescribed species; the former was introduced into Queensland, Fiji and Hawaii (CROSSKEY, 1973).

It seems curious that a genus so widely distributed in America is not found in Europe, but occurs in Japan, Mongolia and New Guinea. The geographical distribution of the genus seems to raise the question of whether the Japanese, Mongolian and New Guinea species should correctly be assigned to the New World genus *Lixophaga*. But I have not examined the New World species, so that I follow MESNIL (1962) and describe an additional species as belonging to the genus.

The known host insects of this genus are larvae of Coleoptera and Lepidoptera, but the hosts of the Japanese species are unknown.

The main characters of the Japanese *Lixophaga* are as follows:

Vertex wide, more than 0.20 of head width in male; gena wide, 0.25–0.43 of eye-height; ocellar setae strong, proclinate; 2 strong reclinate orbital setae; proclinate orbital seta absent in male (in some American and New Guinea species proclinate orbital setae are present in male); parafacial bare; facial ridge bare, except for some fine hairs immediately above vibrissa; face concave; epistoma produced forwards, not beyond vibrissal angle; occiput bulged, with 2–3 rows of black hairs on its upper portion; antenna long, 3rd segment more than 3 × as long as 2nd; arista bare or at most with very minute hairs, 2nd segment at most as long as wide, 3rd segment thickened at most on its basal 1/3; palpus reddish yellow; eye bare; prosternum rather densely haired on each side; propleuron and mediotergite bare; barettie at most with a few hairs on its anterior portion; 3+3 *ac*; 2–3+3 *dc*; 1+3 *ia*; 3–4 humeral setae, the 3 basal ones set triangularly; 2nd supra-alar seta stronger than prealar seta; 2+1 *stpl*; scutellum bare below; basal scutellar seta strong; lateral scutellar seta finer than basal one; apical scutellar seta very fine; wing hyaline, tegula and basicosta black; basal node of

vein R_{4+5} with a few hairs dorsally and ventrally; 2nd costal sector bare ventrally (haired in New Guinea species); fore tibia with 1 *p* seta; mid-tibia with 1 *ad*, 2 *pd* and 1 *v* setae; abdomen long ovate, syntergum 1+2 not excavated to its posterior margin; intermediate abdominal terga with median discal setae; male 5th sternum with a strong seta and with several fine hairs on posterior lobe; 6th tergum weakly sclerotized, divided into 2 hemitergites or narrowed at middle. Male genitalia: Cerci separated at middle and approximated at apex; surstylus not longer than cercus; distal arm of hypandrium strongly projecting posteriorly; pregonite with only a few hairs on its posterior margin; epiphallus present. Female terminalia: Sixth spiracle on intersegmental membrane between 5th and 6th segments; 7th spiracle on posteroventral portion of 6th tergum; each of 6th and 7th terga longitudinally divided into 2 hemitergites; 8th sternum present; 9th tergum absent.

Lixophaga cinctella (MESNIL)

Lomatacantha cinctella MESNIL, 1957, Mém. Soc. R. ent. Belg. 28: 24.

This species was originally described from a female specimen obtained at Obihiro, Hokkaido. I examined 4 males and 2 females from Honshu, most characters of which correspond well to the original description. Dr. D. M. WOOD kindly compared one female of these specimens with MESNIL's type specimen and taught me that it is conspecific with *cinctella*. As the male of this species is unknown and the female terminalia are not described, I present the description of the male and the female terminalia in the following lines.

Male. Head black in ground color (so little ground color is visible on the holotype — by personal communication from Dr. D. M. WOOD), gena and narrow anterior margin of parafacial reddish yellow; epistoma pale yellow; interfrontal area brown-black; antenna black, base of 3rd segment slightly reddish; arista brown-black; parafrontal and parafacial with dense golden yellow pollinosity; gena yellowish white pollinose; face with dense whitish pollinosity; occiput densely grayish white pollinose, upper portion blackish. Vertex about 0.29 of head width; interfrontal area slightly narrowed posteriorly, subequal in width to parafrontal at middle; parafacial narrowed below, slightly narrower than 3rd antennal segment at middle-height (5: 7); gena 0.36–0.43 of eye-height; face about $1.6 \times$ as long as wide between vibrissae. Inner vertical seta strong, about $3/4 \times$ as long as eye-height; outer vertical seta very fine but distinct, about $1/4 \times$ as long as inner one; 2 postocellar setae; 2 postvertical setae on each side; 2 reclinate orbital setae, anterior one stronger; ocellar seta subequal in length to anterior reclinate orbital seta; 7–8 frontal setae strong, lowest one inserted at the level slightly below base of arista; parafrontal with 2–3 irregular rows of very fine hairs; vibrissa strong, inserted at the level of lower margin of face; genal dilation occupying lower $1/2$ of gena, with dense and fine hairs. Antenna long, 2nd segment about $0.16 \times$ as long as 3rd; 3rd segment 2.3 – $2.7 \times$ as long as wide, reaching almost to lower margin of face. Arista subequal in length to combined length of 2nd and 3rd antennal segments; 2nd segment as long as wide; 3rd segment thickened on basal $1/4$. Palpus slightly clavate, with long hairs, 0.57 – $0.67 \times$ as long as 3rd antennal segment.

Thorax black in ground color, postalar callus brownish; dorsum with dense golden yellow pollinosity; scutellum with grayish yellow pollinosity, which is blackish on basal $1/3$ – $1/2$; 4 longitudinal vittae present on prescutum and scutum, middle pair terminative at anterior $1/3$ of scutum and lateral vitta interrupted at transverse suture; pollinosity on pleuron thin and more whitish; the pollinosity on posterior portion of mesopleuron and upper portion of sternopleuron denser and yellowish. Hairs on dorsum dense, fine and erect, longer and sparser on pleuron; $3+3$ *dc*; basal scutellar seta subequal in length to subapical one, and about $2 \times$ as long as scutellum; lateral scutellar seta about $1.5 \times$ as long as scutellum; apical scutellar setae very fine, hair-like, divergent or crossing at apex;

preapical scutellar seta rather fine, subequal in length to scutellum; distance between 2 subapical scutellar setae about $0.75 \times$ as long as that between basal and subapical ones of same side.

Wing hyaline, very slightly tinged with brown along veins; calypter yellowish white. Lengths of 2nd, 3rd and 4th costal sectors approximately in the ratio of 4: 8: 5; length of vein M_1 from discal crossvein to its bend $0.71-0.80 \times$ as long as that from the bend to apex of vein M_1 , and $1.2-1.5 \times$ as long as distance between the bend and wing margin; ultimate section of vein M_3 about $0.86 \times$ as long as discal crossvein.

Legs black; pulvillus yellowish. Fore tibia with a row of rather fine *ad* setae on upper portion; hind tibia with sparse row of *ad* setae, middle one strongest, a row of *pd* setae on upper portion and 3-4 *v* setae; 3 preapical *d* setae present on hind tibia, of which posterodorsal one fine; fore claw and pulvillus long, subequal in length to 5th tarsomere.

Abdomen shining black; anterolateral portion of 3rd tergum slightly reddish brown; syntergum 1+2 without pollinosity on dorsal portion; dorsum of 3rd and 4th terga with rather thin whitish, somewhat yellowish, pollinosity on anterior 1/3; the pollinosity thinner and more yellowish on 4th tergum; 5th tergum with thin dull yellowish pollinosity on anterior 1/3-1/4 of dorsum, dorsomedian longitudinal vitta distinct on 3rd to 5th terga; venter of 2nd to 4th terga with very thin whitish pollinosity on medioventral portion of anterior 2/3-3/4 of each tergum; venter of 5th tergum whitish pollinose on anterior 3/4. Third tergum subequal in length to 4th, and about $1.3 \times$ as long as 5th. Hairs on dorsum dense, rather strong and recumbent, finer on venter; 2nd tergum with 2 latero-marginal and 2 median marginal setae; 3rd tergum with 2 median discal setae (sometimes 1-2 additional shorter setae present), 2 median marginal setae, 1-3 irregular laterodiscal setae and 2 latero-marginal setae; 4th tergum with 2 median discal setae, a row of marginal setae and 2-3 laterodiscal setae; 5th tergum with rows of discal and marginal setae; 5th sternum strongly narrowed posteriorly, anterior margin sharply concave at middle, posterior lobe with a very strong seta and dense fine hairs; 6th tergum weakly sclerotized, strongly divided into 2 hemitergites at middle, each with or without a long hair.

Male genitalia: Cerci in lateral view weakly curved dorsally, in dorsal view separated from each other at apical 1/2 and approximated at apex; surstylus very slightly shorter than cercus, in lateral

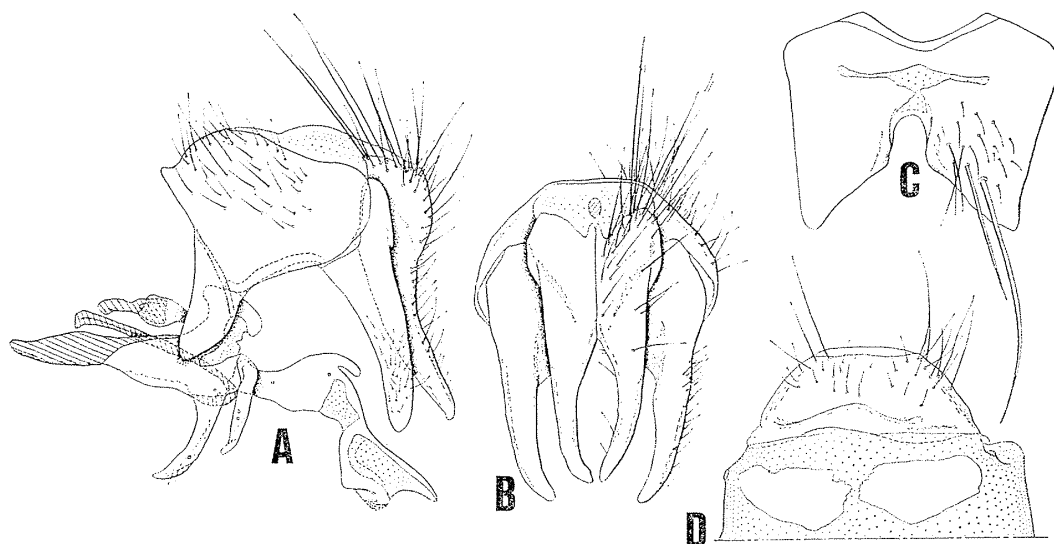


Fig. 4. Male hypopygium of *Lixophaga cinctella* (MESNIL). A. Male genitalia in lateral view; B. same in dorsal view; C. 5th sternum in ventral view; D. 6th tergum and syntergum 7+8 in dorsal view.

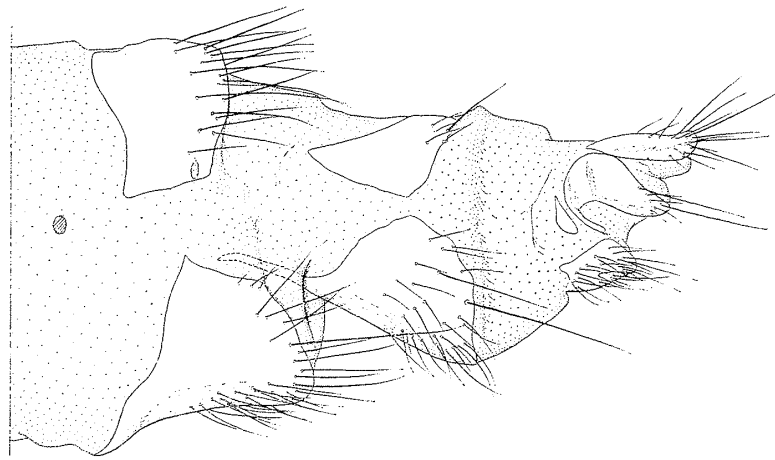


Fig. 5. Female terminalia of *Lixophaga cinctella* (MESNIL) in lateral view.

view gently curved ventrally, with dense fine hairs; pregonite narrow, pointed at apex with several minute hairs on its posterior margin; postgonite long, curved ventrally at apical 1/3, rounded at apex; epiphallus short, directed posteriorly, pointed at apex.

Female terminalia: Sixth hemitergite with many hairs on posterior 1/2; 6th sternum widened posteriorly, somewhat triangular form, with many hairs on posterior 1/2; 7th hemitergite with a row of several fine hairs on posterior margin; 7th sternum strongly widened at anterior 1/5, with many fine hairs; 8th tergum divided into 2 very small hemitergites, without a hair; 8th sternum distinct, with many fine hairs; cercus short and broad, with many hairs.

Body length: 8.4–9.8 mm., wing length: 7.0–7.4 mm.

Specimens examined: Honshu 1 male, Doroyu spa, Akita Pref., 25–27. viii. 1969, K. KANEKO & R. KANO; 1 male, Mt. Hakuba, Nagano Pref., 16–17. viii. 1970, S. SHINONAGA; 1 female, Mt. Asama, Nagano Pref., 16. viii. 1974, R. KANO; 1 female, Nagahinata, Karuizawa, Nagano Pref., 12. vii. 1966, H. SHIMA; 1 male, Mt. Ibuki, Shiga Pref., 5. vii. 1964, N. NAKAMURA; 1 male, 13. vii. 1962, Y. MIYATAKE.

Distribution. Japan (Hokkaido & Honshu).

Lixophaga fallax MESNIL

Lixophaga fallax MESNIL, 1963, Bull. Inst. R. Sci. nat. Belg. 39: 32.

This species was originally described by MESNIL from a male specimen obtained at Toyama, Honshu. I have examined 12 males from several localities in Honshu, one of which was compared by Dr. D. M. WOOD with the type specimen.

This species seems to be closely related to *cinctella* and the male genitalia of these species closely resemble each other. In its general appearance *fallax* is well differentiated from *cinctella* by the following characters:

Male vertex narrower (0.21–0.23 of head width); male 3rd antennal segment shorter (3.3–3.8 × as long as 2nd in this species, in *cinctella* about 6 × as long as 2nd); gena narrower (0.27–0.31 of eye-height); parafacial subequal in width to 3rd antennal segment at middle-height; 7–10 frontal setae, lowest one nearly level with base of arista; pollinosity on parafacial whitish; thorax with dense yellowish to yellowish white pollinosity on dorsum, pleuron whitish pollinose on mesopleuron and

on sternopleuron; posterodorsal preapical *d* seta on hind tibia very fine and hair-like; pollinosity on abdominal dorsum denser, 3rd and 4th terga with whitish pollinosity on anterior 1/2–1/3, 5th tergum with whitish pollinosity on anterior 1/2.

Among the specimens examined there seem to be 2 forms differing in the distribution of the pollinosity on the abdominal dorsum. One of them has denser pollinosity on the anterior 2/3 of the 3rd and 4th abdominal terga, while the other has thinner pollinosity on 1/2–2/3 of the 3rd and 4th terga. The former seems to correspond more closely to MESNIL's original description, but there are no other distinctive characters to differentiate these two forms. They are here considered to be variations within the same species.

The male genitalia of this species are almost the same in their structure as those of the preceding species. Only slight differences have been observed as follows:

Fifth sternum nearly parallel-sided, at most weakly narrowed posteriorly; 6th tergum narrowly divided into 2 hemitergites or only narrowed at middle, sometimes without a hair (at most with a pair of weak hairs); cercus in lateral view more weakly curved dorsally; surstylus in lateral view nearly straight or very slightly curved ventrally; pregonite more strongly curved anteriorly at apical 1/3; epiphallus longer than in the preceding species.

I have not examined the female of this species.

Body length: 8.6–12.5 mm., wing length: 6.3–9.2 mm.

Specimens examined: Honshu 1 male, Mt. Takao, Tokyo, 30. ix. 1962, S. SHINONAGA; 9 males, Mt. Asama, Nagano Pref., 12–14. vii. 1974, K. NISHIDA; 1 male, Mt. Asama, 21. vii. 1971, R. KANO; 1 male, Mt. Ibuki, Shiga Pref., 30. vi. 1963, K. BUEI.

Distribution. Japan (Honshu).

Lixophaga latigena sp. nov.

(Fig. 6)

Male. Head black in ground color, gena slightly brownish; facial ridge and epistoma reddish yellow; parafrontal, parafacial and gena with dense pale grayish-yellow pollinosity; face and facial ridge with dense whitish pollinosity; occiput grayish white pollinose; interfrontal area brown-black; antenna black, apices of 1st and 2nd segments and base of 3rd segment narrowly reddish; arista brownish. Vertex 0.25–0.26 of head width; interfrontal area widened anteriorly, slightly wider than parafrontal at middle (7: 5); parafacial slightly narrowed below, 1.4–1.5 × as wide as 3rd antennal segment at middle-height; facial ridge strongly bulged, visible in profile; face very slightly widened below, 2.0–2.3 × as long as wide between vibrissae; gena wide, 0.39–0.41 of eye-height; genal dilation occupying lower 1/2 of gena, with very short and fine black hairs. Inner vertical seta rather fine, subequal in length to anterior reclinate orbital seta, less than 1/2 length of eye-height; outer vertical seta indistinct; 2 postocellar setae; 1 postvertical seta on each side; 2 reclinate orbital setae, anterior one stronger; ocellar seta subequal in length to anterior reclinate orbital seta; 9–10 frontal setae, lowest one at the level of base of arista; parafrontal with 2–3 irregular rows of very fine and short hairs; vibrissa inserted well above level of lower margin of face. Second antennal segment 0.19–0.20 × as long as 3rd; 3rd segment 4.5–4.8 × as long as wide. Arista slightly longer than combined length of 2nd and 3rd antennal segments; 2nd segment as long as wide; 3rd segment thickened on basal 1/4. Palpus nearly cylindrical, 0.61–0.65 × as long as 3rd antennal segment.

Thorax black in ground color, postalar callus slightly brownish; dorsum with dense pale grayish-yellow pollinosity; scutellum with whitish gray pollinosity on apical 1/3, basal portion black; pleuron with rather dense whitish gray pollinosity; prescutum and scutum with 4 longitudinal vittae, inner

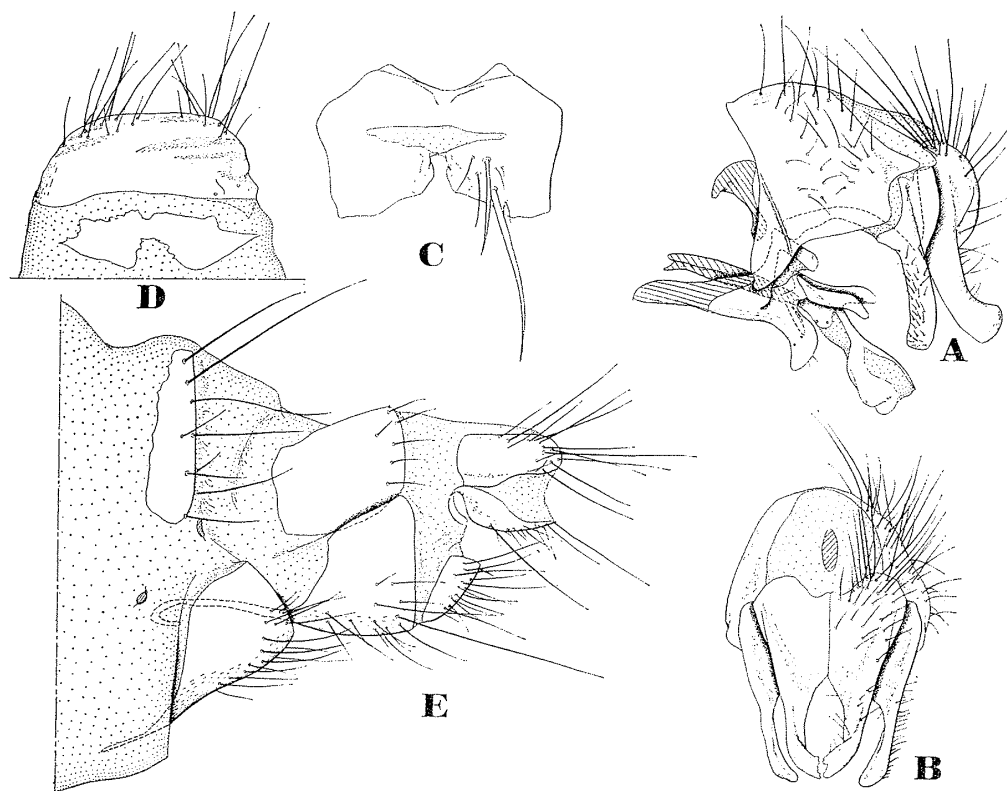


Fig. 6. Male and female terminalia of *Lixophaga latigena* sp. nov. A. Male genitalia in lateral view; B. same in dorsal view; C. male 5th sternum in ventral view; D. male 6th tergum and synsternum 7+8 in dorsal view; E. female terminalia in lateral view.

pair terminative anterior $1/2$ of scutum and outer pair interrupted at transverse suture. Hairs fine short and suberect on dorsum, longer on pleuron, and longer and stronger on scutellum; 3 humeral setae; 2+3 *dc*; basal scutellar seta subequal in length to subapical one, and $2 \times$ as long as scutellum; apical scutellar setae very fine, suberect and crossing each other; preapical scutellar seta fine, subequal in length to scutellum; distance between 2 subapical scutellar setae about $0.4 \times$ as long as that between basal and subapical ones of same side.

Wing hyaline, very slightly tinged with brown along veins; calypter pale brownish. Lengths of 2nd, 3rd and 4th costal sectors approximately in the ratio of 4: 10: 5; length of vein M_1 from discal crossvein to its bend about $0.8 \times$ as long as that from the bend to apex of vein M_1 , and $1.5 \times$ as long as distance between the bend and wing margin; ultimate section of vein M_3 about $0.75 \times$ as long as discal crossvein.

Legs black, pulvillus dull yellowish. Fore tibia with 4-5 *ad* setae on upper portion; hind tibia with a row of *ad* setae, middle one strongest, 2-3 *pd* and 2 *v* setae, and with 2 preapical *d* setae; fore claw and pulvillus longer than 5th tarsomere.

Abdomen shining black, anterolateral portion broadly reddish yellow; dorsum of syntergum 1+2 without pollinosity; dorsum of 3rd tergum with rather dense whitish pollinosity on its anterior $1/2-2/3$, 4th tergum on anterior $1/3-1/2$, and 5th tergum on $1/2-3/5$; the pollinosity thin on dorsomedian portion; narrow median longitudinal vitta distinct on 3rd and 4th terga; venter evenly clothed with thin whitish pollinosity, on ventrolateral portion of 3rd and 4th terga black spots appearing with direction of light. Third tergum subequal in length to 4th and about $1.4 \times$ as long as 5th. Hairs on dorsum rather sparse and strong, recumbent to suberect, finer on venter; 2nd tergum with 1 strong

lateromarginal seta on each side and 2 median marginal setae; 3rd tergum with 2-3 rather weak laterodiscal setae, 2 strong lateromarginal setae, 4 rather weak suberect median discal setae and 2 strong median marginal setae; 4th tergum with 3-4 rather strong laterodiscal setae, 2-3 suberect to erect median discal setae and a row of strong marginal setae; 5th tergum with rows of strong discal and marginal setae; 5th sternum widened at middle; 6th tergum weakly sclerotized, strongly narrowed at middle, without a hair.

Male genitalia: Cerci in dorsal view short and rather wide, separated at middle and approximated at apex, in lateral view strongly curved dorsally and swollen at apex; surstylus slightly shorter than cercus, in lateral view slightly curved ventrally, with dense hairs on its ventral portion; pregonite short, curved ventrally, with a few fine hairs on its posterior margin; postgonite rather short, weakly pointed at apex; epiphallus weakly curved posteriorly; distiphallus in lateral view rather short; ejaculatory apodeme strongly widened on anterior portion.

Female. Differing from male as follows: Vertex 0.29-0.32 of head width; parafacial about $2 \times$ as wide as 3rd antennal segment at middle-height; face 1.7-1.9 \times as long as wide between vibrissae; inner vertical seta stronger, longer than $1/2$ length of eye-height; outer vertical seta distinct, about $1/2 \times$ as long as inner one; ocellar seta slightly finer than anterior reclinate orbital seta; 2 proclinate orbital setae, anterior one stronger, and subequal in length to anterior reclinate orbital seta; 6-8 frontal setae; 2nd antennal segment about 0.24 \times as long as 3rd, 3rd segment about 4 \times as long as wide; fore claw and pulvillus shorter than 5th tarsomere; 3rd abdominal tergum without distinct laterodiscal seta; intermediate abdominal terga with short recumbent or at most suberect median discal setae.

Female terminalia: Sixth hemitergite short, weakly sclerotized, with a row of long hairs on posterior margin; 6th sternum short and broad, medioventral portion broadly extended anteriorly, with many hairs on its posterior $1/2$; 7th hemitergite with a row of fine hairs on its posterior margin; 7th sternum triangularly extended anteriorly, with fine and rather sparse hairs on its posterior $1/2$; 8th tergum entirely absent; 8th sternum distinct, with many hairs; cercus short and broad, with many long hairs on its posterior $1/2$.

Body length: 6.6-9.2 mm., wing length: 5.6-7.2 mm.

Holotype: Male, Asahigaoka, Tokunoshima Is., Ryukyus, 7. xi. 1966, Y. MIYATAKE; preserved in the collection of the Biological Laboratory, College of General Education, Kyushu University.

Paratypes: 1 male 10 females, same data as holotype; 2 females, Mt. Inokawa, Tokunoshima Is., 10. xi. 1971, S. SHINONAGA.

Distribution. Japan (Ryukyus).

Remarks. This species is very characteristic in its wide vertex and parafacial. Judging from the structures of the terminalia, this species seems to be related to the preceding 2 species, but more specialized such as in the strongly curved male cerci, very short and weak female 6th tergum and the absence of the female 8th tergum.

Key to the Japanese species of *Lixophaga*

1. Antenna long, 3rd segment of male more than $5 \times$ as long as 2nd segment, in female more than $4 \times$ as long; vertex wide, more than 0.25 of head width in male; gena more than 0.35 of eye-height; parafacial narrower or wider than 3rd antennal segment. 2
- 3rd antennal segment at most $4 \times$ as long as 2nd in male; vertex 0.21-0.23 of head width in male; gena 0.27-0.31 of eye-height; parafacial subequal in width to 3rd antennal segment at middle-height; abdomen with whitish pollinosity at least on its anterior $1/2$ of 3rd to 5th terga; 3+3 *dc* [Honshu] *L. fallax* MESNIL
2. 3+3 *dc*; 3rd antennal segment $6 \times$ as long as 2nd in male; head and thorax with dense golden

- yellow pollinosity; abdomen with thin whitish yellow pollinosity at most on its anterior 1/3 of 3rd to 5th terga; parafacial slightly narrower than 3rd antennal segment at middle-height; facial ridge normal, not much bulged [Hokkaido & Honshu].....*L. cinctella* (MESNIL)
- 2+3 *dc*; 3rd antennal segment 5 × as long as 2nd in male; pollinosity whitish gray-yellow on head and thorax; abdomen with whitish pollinosity on anterior 1/2–2/3 of 3rd, 1/3–1/2 of 4th and 1/2–3/5 of 5th terga; parafacial 2 × as wide as 3rd antennal segment at middle-height; facial ridge strongly bulged as in *Pexopsis*.....*L. latigena* sp. nov.

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