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TAXONOMIC STUDIES ON
THE LITHOCOLLETINAE OF JAPAN¹⁾
(LEPIDOPTERA : GRACILLARIIDAE)

Part I

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The subfamily Lithocolletinae is a rather small group of the family Gracillariidae, including about 450 described species in the world. In Japan only ten species of the genus *Lithocolletis* have been described fragmentally by Dr. S. Issiki (1930), Dr. S. Matsumura (1931), Mr. E. Meyrick (1935) and T. Kumata (1957 & 1958), and yet no general taxonomic work has been published. Since 1955 I have made taxonomic studies on the family Gracillariidae occurring in Japan. On this occasion there will be given the result of my work on the subfamily Lithocolletinae.

Most of the material used in this study are collected by myself, and the rest belong to the collections of Dr. H. Kuroko, Prof. S. Issiki and the National Institute of Agricultural Sciences, Tokyo. The types of the new species described in this paper are, unless otherwise specially stated, deposited in the collection of the Entomological Institute, Hokkaido University.

The technical terms used in the present paper are substantially the same as those ordinarily used by recent lepidopterists. Especially, the terms of genitalia are followed after the "Taxonomist's Glossary of Genitalia in Insects", Ed. S. L. Tuxen, 1956, but the terms of six fundamental parts of the valvae are not used, since the valvae are so simplified in the subfamily Lithocolletinae.

So far as their habits are known, the species of this subfamily appear to be the leaf-miners of various kinds of plants. They are, however, monophagous, attacking only one species or at most some species of plants which belong mainly to one genus or rarely to some genera of the same family. In the present part of my work are given the species attacking Salicaceae, Styracaceae, Juglandaceae, Tiliaceae, Betulaceae and Fagaceae. Furthermore, the taxonomic consideration of the whole species treated with the keys to the genera and species will be discussed in the last part of the publication.

I wish to express my cordial thanks to Professor Emeritus Toichi Uchida and Professor Chihisa Watanabe, both of the Hokkaido University, for their kind guidance and encourage-

1) This paper comprises part of a thesis submitted to the Hokkaido University in part fulfilment of the requirements for the degree of Doctor of Agriculture.

ment during the course of my study. I am especially obliged to Professor Emeritus S. Issiki of the Osaka Prefectural University, and Dr. H. Kuroko of the Hikosan Biological Laboratory, Kyusyu University, for the loan of many valuable specimens and the literature, and for their kind advice and helpful suggestions; to Prof. E. M. Hering of the "Zoologisches Museum der Humboldt-Universität", Berlin, Dr. F. Gregor and Dr. D. Povolný, both of the "Československá Akademie Věd", Brno, and Mr. J. F. Gate Clarke of the U. S. National Museum, Washington, for offering the valuable material and their papers. Many thanks are also due to Mr. M. Okada, Dr. M. Okano, Mr. T. Oku, Dr. S. Takagi and Dr. K. Kamijo for their kindness in offering many specimens or good suggestions in various ways. Last but not least I am much grateful to Professor Watanabe for his kindness in reading through this manuscript.

1. Species attacking Salicaceae

1*. *Lithocolletis pastorella* Zeller (Fig. 1)

Lithocolletis pastorella Zeller, 1846, Linn. Ent. 1: 250; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 693; Spuler, 1913, Schmett. Europas: 418; Peterson, 1927, Stett. Ent. Zeit. 88: 170, f. 64; Hering, 1957, Bestimm. Blattminen Europa 2: 807 & 922.

The examined specimens collected from Japan agree in most details with those from Europe, but it seems that this species is somewhat variable in colour and structure. The Japanese form differs from the European by the white tuft of the head, and by the thorax snow-white on which a few dark scales are found. Moreover, the specimens reared from *Salix* are characterized by the fore wings not dusted with fuscous scales, the brownish streaks being extremely clear like *L. chicanella* Staudinger, and the female from *Populus* by the cylindrically sclerotized sterigma apparently shoter than the seventh abdominal segment.

This species is rather common in Japan, its tentiform and ptychonomous mine being found on the leaves of some poplar- and willow-trees. The mine is rather large and elliptical, having only one rather strong fold on the loosened lower surface as stated by Hering.

Specimens examined: 3 ♂♂ & 6 ♀♀, Sapporo, Hokkaido, and 1 ♂, Osaka, Honsyu, on *Populus nigra*; 2 ♀♀, Zyôzankei, Hokkaido, on *Populus Sieboldi*; 1 ♂ & 1 ♀, Osaka, and 1 ♂, Tokyo, Honsyu, on *Salix babylonica*; 2 ♂♂, Ino, Koti-ken, Sikoku, on *Salix* sp.; 1 ♂, Morioka, Honsyu; 1 ♂ & 2 ♀♀ (determined by M. Hering as *L. pastorella* Zeller), Europe, on *Salix* sp.

Host plants: *Populus nigra* Linné, *Populus Sicoldi* Miquel and *Salix babylonica* Linné in Japan, and *Salix* spp. and *Populus* spp. in Europe.

Distribution: Japan (Hokkaido; Honsyu; Sikoku) and Europe.

2*. *Lithocolletis salictella* Zeller (Fig. 2)

Lithocolletis salictella Zeller, 1846, Linn. Ent. 1: 207, pl. 1, f. 1; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 675; Petersen, 1927, Stett. Ent. Zeit. 88: 141, f. 22; Benander, 1944, Opusc. Ent.: 106, f. 3x; Hering, 1957, Bestimm. Blattminen Europa 2: 922.

This species is easily distinguishable from any other known species attacking *Salix*

* The species marked by the asterisk is new to Japan.

by the following combination of the genital characters:—succus produced apically into a very long, narrow projection, which is more than five times as long as the succus itself; eighth segment of female very short, with several scales on the dorsum; lamella antevaginalis somewhat semicircular or fan-shaped, much sclerotized laterally.

This species is rather abundant in North Japan. Its mine occurs on the lower surface of the leaves of willow-trees. The mines observed in Japan agree with the description stated by Hering in Europe: the lower epidermis of the mine is strongly contracted by many weak folds.

Specimens examined: 2♂♂ & 2♀♀, Zyôzankei, 1♂ & 2♀♀, Teine, Hokkaido, and 1♂ & 3♀♀, Yatugadake (at 1600 m.), Nagano-ken, Honsyu, on *Salix* spp.

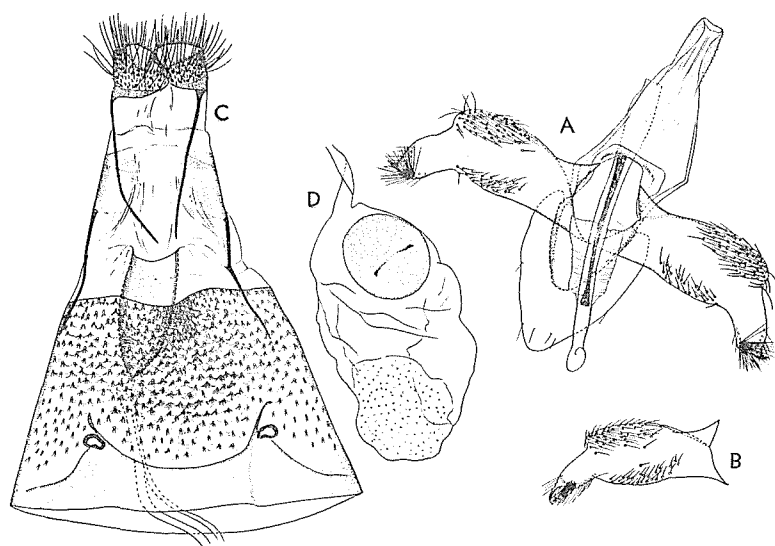


Fig. 1. *Lithocolletis pastorella* Zeller.

A: caudal view of male genitalia (host: *Populus*); B: left valva (host: *Salix*); C: ventral view of female genitalia (host: *Populus*); D: corpus bursae (host: *Populus*).

Host plants: *Salix* spp. in Japan and Europe.

Distribution: Japan (Hokkaido; Honsyu) and Central and North Europe.

3*. *Lithocolletis salicicolella* Sircom (Fig. 3)

Lithocolletis salicicolella Sircom, 1848, Zoologist: 2271; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 679; Meyrick, 1927, Handb. Brit. Lep.: 777; Petersen, 1927, Stett. Ent. Zeit. 88: 140, f. 21; Pierce et Metcalfe, 1935, Genit. Tin. Brit.: 76, pl. 47; Benander, 1944, Opusc. Ent.: 107, f. 3y; Hering, 1957, Bestimm. Blattminen Europa 2: 921.

Lithocolletis capraella Nicelli, 1851, Stett. Ent. Zeit. 12: 42.

The present specimens from Japan agree well enough with those from Europe except that one pair of white median marks of the fore wing is narrowly separated by the ground colour near the costal margin. This species, on account of its colouration, genitalia and

mine, is very similar to the preceding species, from which it is distinguished by the following features:—White median marks of fore wing rather perpendicular, set close, appearing almost like a fascia (in *L. salictella* those being represented by a pair of very oblique streaks); apical projection of saccus about thrice as long as the saccus itself; right valva usually truncated at apex; lamella antevaginalis subpentagon-shaped and connected with much elongated eighth segment through short arms stretching from its sides.

Specimens examined: 2♂♂ & 2♀♀, Horokanai, Hokkaido, and 1♂ & 1♀, Otaki, Nagano-ken, Honsyu, on *Salix* spp.; 1♂ & 1♀ (determined by M. Hering as *L. salicicolella* Sircom), Berlin, Europe, on *Salix caprea*.

Host plants: *Salix* spp. in Japan and Europe.

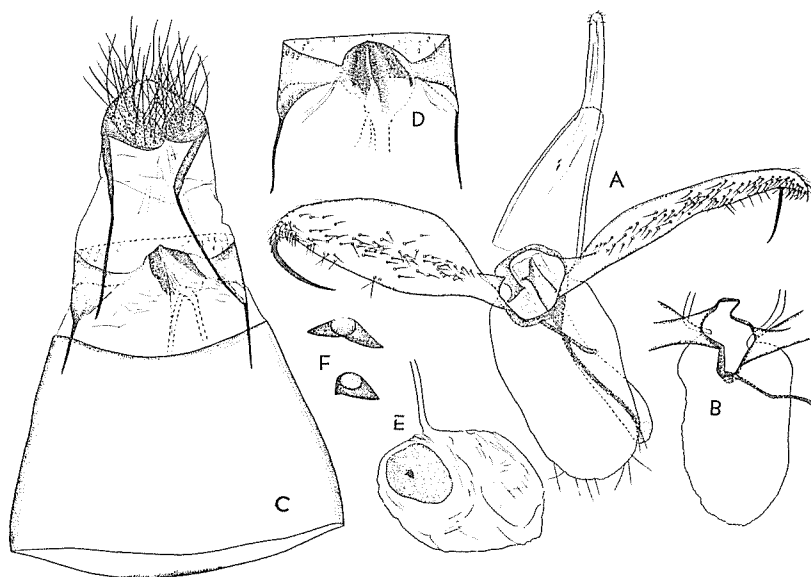


Fig. 2. *Lithocolletis salictella* Zeller.

A: caudal view of male genitalia; B: caudal view of male genitalia, uncus and valvae removed; C: ventral view of female genitalia; D: ventral view of eighth segment of female; E: corpus bursae; F: variations of sclerotized projections of signa.

Distribution: Japan (Hokkaido; Honsyu) and Europe.

2. Species attacking Styracaceae

4. *Lithocolletis styracis*, sp. nov. (Fig. 4)

♂♀. Face pure white; palpus whitish, apical segment clouded inside; tuft of head dark brown, mixed with some whitish scales in centre; antenna whitish, each segment with dark brown on almost whole surface of upper side. Thorax golden-brown, slightly irrorated with dark scales, with a narrow median and two lateral lines white. Legs blackish; all tibiae whitish inside; all tarsal segments narrowly ringed with white apically.

Fore wing blackish-brown, becoming paler towards apex, with very narrow, white mark-

ings, which shade externally and broadly into golden-ochreous colour. Medio-basal streak extending to basal 1/3, nearly straight, and sometimes reaching first fascia, which is very acutely angulated outwardly above middle across wing, with white scales on its dorsal 1/3 and on the angulated portion disappearing or being replaced by golden-ochreous scales in some specimens; second fascia placed at middle, angulated more sharply near costal margin of wing, and sometimes markedly produced from angulated portion to first costal streak. First costal streak placed at apical 1/3, very small, rather vertical; first dorsal streak placed just before tornus in opposite side of that of the first costal, oblique outwardly, and extending markedly beyond middle across wing; other two costal blotches and an indistinct dorsal one placed near apex of wing, wedge-shaped, and somewhat oblique inwardly. A blackish

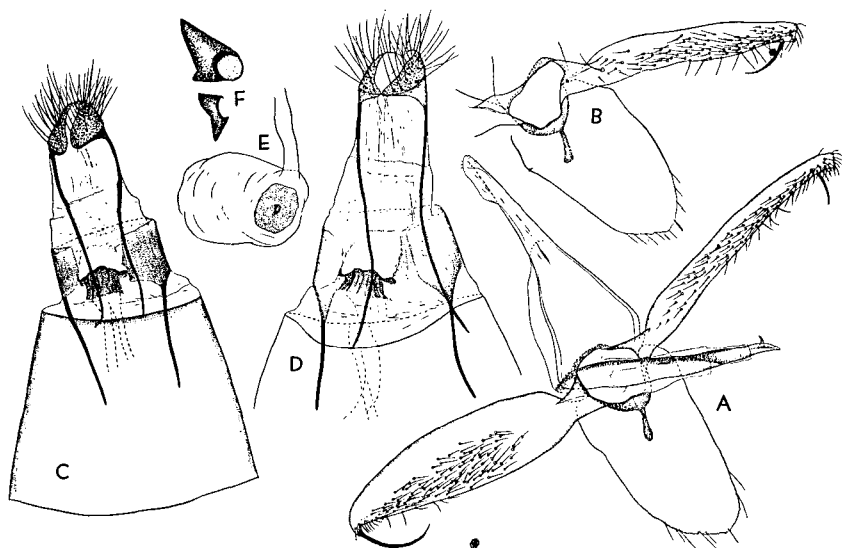


Fig. 3. *Lithocolletis salicicolella* Sircom.

A: caudal view of male genitalia; B: caudal view of male genitalia, uncus, left valva and aedeagus removed; C & D: ventral view of female genitalia; E: corpus bursae; F: variations of sclerotized projections of signa.

streak placed in disc near apex of wing. An ill-defined terminal line in cilia dark, running along apex of wing from last costal blotch to tornus; cilia pale ochre-grey. Hind wing grey, with cilia pale ochre-grey.

Expanse of fore wings, 7.0–8.0 mm.

Male genitalia distinctly asymmetrical, especially in valvae. Left valva bag-shaped, and about 1.7 times as wide as right, which is rather bar-shaped, with a specific small process of ampulla at about basal 1/3 of inner surface; left filament-like seta originating from produced top of sacculus, very long, strong, and suddenly bent upwardly at middle; right filament-like seta shorter, rather straight, and originating from top of a small process of sacculus, which is placed rather near base of valva than the process of ampulla. Flap of

ninth sternite somewhat rectangular, truncated or somewhat sinuate on its apical margin. Aedoeagus slender, becoming narrower towards apex, with a small, T-shaped apical berb.

Female genitalia distinctly asymmetrical. Ninth segment very elongate, with a process produced from base of each postapophysis and the left process about twice as long as the right. Antapophysis absent. Ductus bursae opened at left side of ventrum.

Holotype: ♂ (host: *Styrax japonica*), Hikosan, Kyusyu, 24. X, 1954, H. Kuroko leg. Paratypes: 2♂♂ & 2♀♀ (host: *S. japonica*), Hikosan, Kyusyu, 27. X, -1. XI, 1954, H. Kuroko leg. Holotype is deposited in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Styrax japonica* Siebold et Zuccarini.

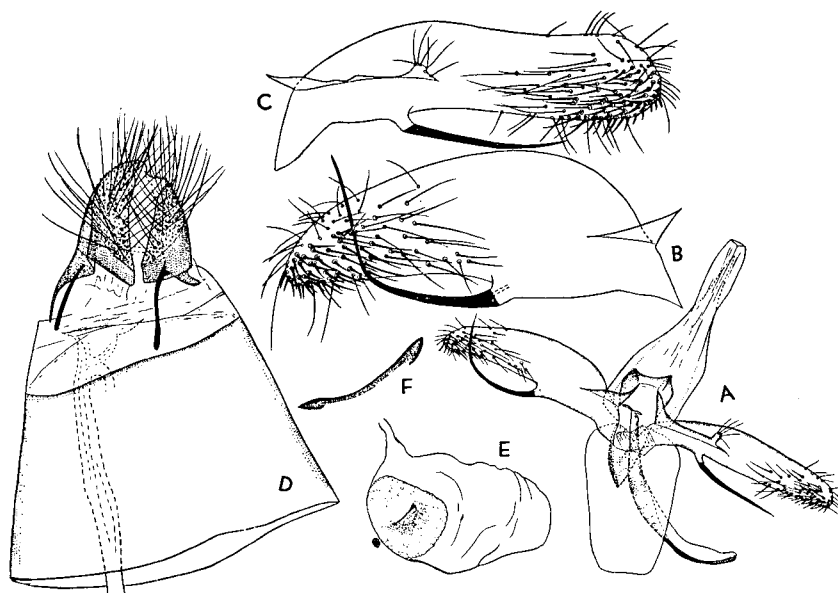


Fig. 4. *Lithocolletis styracis*, sp. nov.

A: caudal view of male genitalia; B: left valva; C: right valva; D: ventral view of female genitalia; E: corpus bursae; F: sclerotized projections of signum.

Distribution: Japan (Kyusyu).

Mine: Ptychonomous, on the upper surface of leaves.

Remarks: This species, on account of its peculiar asymmetrical genitalia of both sexes, is easily distinguishable from any other known species. It is especially characterized by the fact that the process of ampulla is present on the right valva alone at about basal 1/3 of the inner surface, and that the process produced from the base of the left postapophysis is twice as long as that of the right. On account of the absence of antapophysis, it is somewhat related to *L. hancola* Kumata, but differs from the latter in the details of the genitalia and in the markings of the fore wing.

3. Species attacking Juglandaceae

5. *Lithocolletis juglandis*, sp. nov. (Fig. 5)

♂♀. Face pure white; palpus whitish, clouded inside; tuft of head golden-brown, mixed with many white scales in centre; antenna whitish, spotted above with dark brown. Thorax golden-ochreous, with two rather broad, white stripes along inner margins of tegulae, and a minute, white spot on posterior angle. Legs whitish; fore tibia blackish inside; mid tibia with three narrow, oblique, black streaks outside; hind tibia slightly clouded outside; fore and mid tarsi with two rather broad, black rings; hind tarsus with a black median ring.

Fore wing golden-ochreous, slightly tinged with red, with white markings, which are

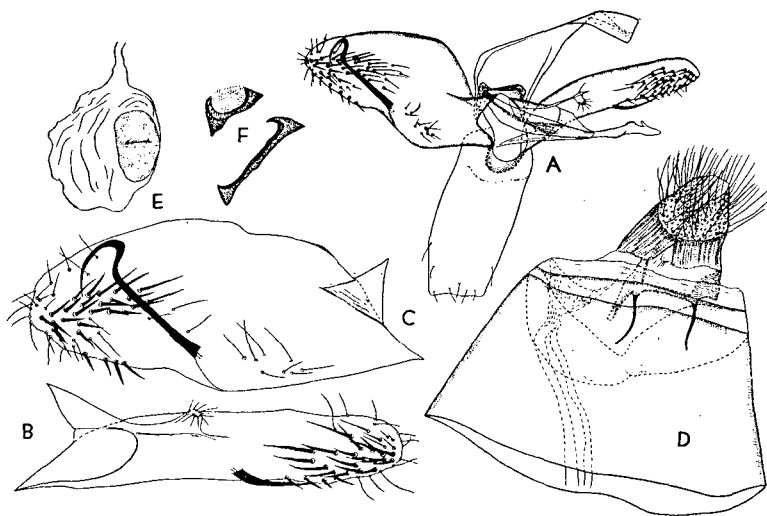


Fig. 5. *Lithocolletis juglandis*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: left valva; D: ventral view of female genitalia; E: corpus bursae; F: variations of sclerotized projections of signa.

margined with dark scales internally. Medio-basal streak very narrow, short, merely extending to basal 1/5, without any dark marginal scales. First fascia placed at basal 1/3, very narrow, acutely angulated outwardly near costa, and sometimes interrupted on the angulated portion. Second fascia placed at middle, broader, straight or gently arched outwardly. First dorsal blotch placed on tornus, triangular, very large, rather oblique outwardly, and produced towards costa just beyond middle across wing; first costal blotch placed opposite first dorsal one, much smaller, wedge-shaped, and rather vertical; in a few specimens first costal blotch slightly fused with opposite dorsal one. Two costal blotches and a dorsal one placed near apex of wing, somewhat indistinct, and margined with only a few dark scales. A black-irradiated apical streak very short and minute. A very narrow, dark line running around apex of wing; cilia pale yellowish-grey. Hind wing grey, with cilia pale yellowish-grey.

Expanse of fore wings, 6.5–8.0 mm.

The genitalia of this species are closely similar to those of the preceding species, *L. styracis*, but are distinct by the features given in the following lines:—

Male: Left valva twice as wide as right; left filament-like seta curved circularly at apical third; right filament-like seta originating slightly near apex of valva than process of ampulla; aedoeagus swollen at apical 1/6 of upper side, with a small subapical barb.

Female: Ductus bursae opened at left side of dorsum.

Holotype: ♂ (host: *Juglans ailantifolia*), Sapporo, Hokkaido, 29. III, 1958, T. Kumata leg. Paratypes: 1 ♂, Sapporo, Hokkaido, 3. V, 1956, T. Kumata leg.; 1 ♂, Hokkaido, 14. V, 1957, K. Kamiyo leg.; 2 ♂♂ (host: *J. ailantifolia*), Sapporo, Hokkaido, 28.–29. III, 1958, T. Kumata leg.; 5 ♂♂ & 5 ♀♀ (host: *J. ailantifolia*), Sapporo, Hokkaido, 21. VII, 1959, T.

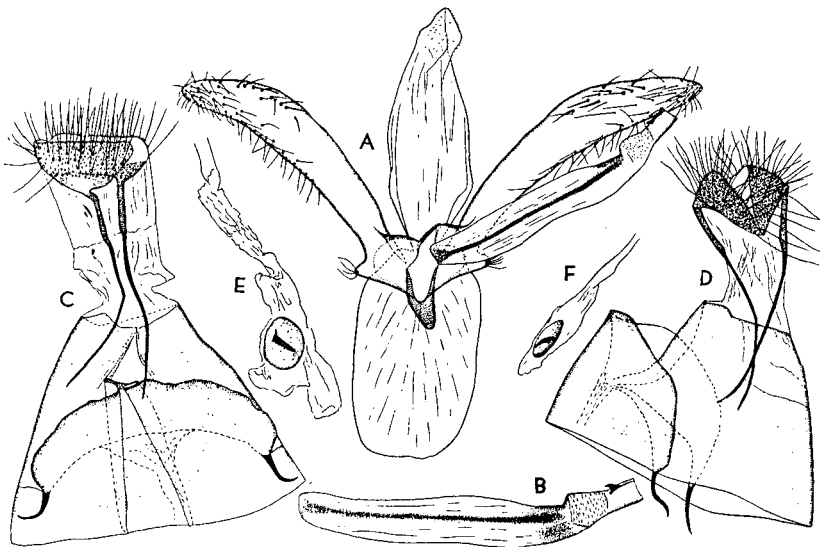


Fig. 6. *Lithocolletis pterocaryae*, sp. nov.

A: caudal view of male genitalia; B: aedoeagus; C: ventral view of female genitalia; D: lateral view of female genitalia; E & F: corpus bursae.

Kumata leg.; 5 ♂♂ & 12 ♀♀ (host: *J. ailantifolia*), Teine, Hokkaido, 28. III,–24. IV, 1959, T. Kumata leg.; 2 ♂♂ & 1 ♀ (host: *Pterocarya rhoifolia*), Gamusi, Hiyama, Hokkaido, 3.–11. IV, 1959, T. Kumata leg.

Host plants: *Juglans ailantifolia* Carrière and *Pterocarya rhoifolia* Siebold et Zuccarini.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, situated between two veins or rarely along the margin of the lower surface of leaves.

Remarks: In the genital structure this species is very closely related to *L. styracis*, but differs from the latter not only by the details of the genital characters stated above but also by the colouration as follows:—ground colour of fore wing clearly golden-ochreous, without dark dust; white median fascia of fore wing rather straight; thorax without a

white median line.

6. *Lithocolletis pterocaryae*, sp. nov. (Fig. 6)

♂♀. Face and palpus snow-white, with palpus lined with black inside; tuft of head golden-ochreous, mixed with a few whitish scales in centre; antenna whitish, each segment widely ringed with black apically. Thorax reddish-brown, tinged with golden reflections, with two narrow, white lines along inner margins of tegulae. Legs whitish; mid tibia lined with three oblique, black streaks outside; hind tibia clouded outside; all tarsal segments ringed with black apically.

Fore wing very elongate, with costal margin nearly parallel to dorsal margin, reddish-brown, heavily tinged with golden reflections; white, extremely narrow markings margined with black irrorations internally. Medio-basal streak placed on fold, almost straight, reaching about basal $1/4$, and slightly margined with black. Three dorsal streaks situated at about equal distances from each other and from base of wing, the basal two being oblique outwardly and almost extending to shorter, opposite costal streaks at about costal $1/3$ across wing, and the other being more oblique outwardly, nearly reaching an apical blotch of black irrorations or sometimes united with fourth costal streak, which is placed at about apical $1/8$, very minute, and oblique inwardly. Third costal streak shorter than either of the first and second, placed at apical $1/3$, vertical or slightly oblique inwardly. A whitish blotch hardly visible beneath the blackish apical blotch, and not extending to cilia. A dark marginal line in cilia running along apex of wing from fourth costal streak to third dorsal streak; cilia whitish-grey. Hind wing grey, with cilia whitish-grey.

Expanse of fore wings, 5.0–6.0 mm.

Male genitalia symmetrical. Valva bar-shaped, slightly arched upwardly, with a wart-shaped sacculus slightly produced from basal $1/5$ of hind margin, the sacculus bearing a few weak setae. Flap of ninth sternite spatular, rounded apically. Aedoeagus much thickened wholly, slightly constricted at apical $1/5$, with a small, hook-shaped barb near apex.

Female genitalia symmetrical. Antapophysis very short. Sternite of seventh segment widely produced over ostium bursae into a flap which is semicircular on its caudal margin. Sclerotized sterigma absent; signum sclerotized in an oval or circular plate which bears a single, large, cone-shaped projection inside.

Holotype: ♂ (host: *Pterocarya rhoifolia*), Gamusi, Hiyama, Hokkaido, 22. IX, 1958, T. Kumata leg. Paratypes: 6 ♂♂ (host: *P. rhoifolia*), Gamusi, Hiyama, Hokkaido, 18.–25. IX, 1958, T. Kumata leg.; 1 ♀ (host: *Juglans ailantifolia*), Zyôzankei, Hokkaido, 17. IX, 1958, T. Kumata leg.

Host plants: *Pterocarya rhoifolia* Siebold et Zuccarini and *Juglans ailantifolia* Carrière.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, situated between two veins of the upper surface of leaves.

Remarks: This peculiar species is easily distinguished from any other known species of the genus by the following combination of the genital characters:—Valva without a costal process, provided with wart-shaped sacculus on the hind margin, the sacculus bearing a

few very weak setae instead of filament-like seta; aedoeagus very much thicker in whole; signum bearing uniquely a single, large, cone-shaped projecton.

4. Species attacking Tiliaceae

7. *Lithocolletis issikii*, sp. nov. (Fig. 7)

This species is represented by the aestival and autumnal forms, which are different in colour.

Aestival form: ♂♀. Face and palpus white; tuft of head golden-ochreous, mixed with a few white scales in centre; antenna fuscous-white, annulated with black above. Thorax golden-ochreous, with three narrow, white stripes, two of which run along inner

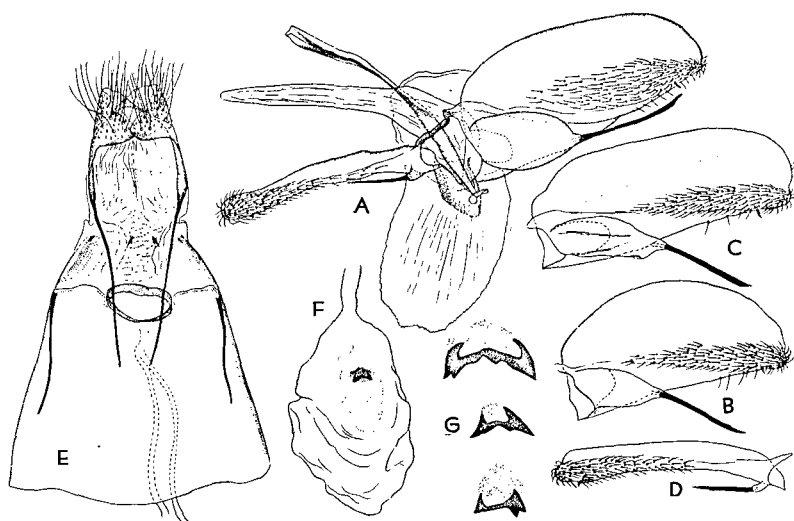


Fig. 7. *Lithocolletis issikii*, sp. nov.

A: caudal view of male genitalia; B & C: right valva; D: left valva; E: ventral view of female genitalia; F: corpus bursae; G: variations of sclerotized projections of signa.

margins of tegulae. Legs fuscous-white; fore femur and tibia blackish inside; fore tarsus broadly ringed with black; mid tibia with three oblique, black streaks outside; mid and hind tarsi broadly ringed with black.

Fore wing very elongate, lanceolate, golden-ochreous, with white markings. Medio-basal streak nearly extending to middle of wing, slender, sinuate, without any dark marginal scales; in some specimens (collected at Kamikôti, Honsyu) the medio-basal streak slightly margined with dark scales on upper edge. A pair of opposite costal and dorsal streaks placed on middle, very oblique outwardly, very slender, margined with dark irrorations internally, the dorsal streak being about thrice as long as the costal and originating nearer to base of wing than the costal. Three costal streaks placed near apex of wing, set very closely, vertical or slightly oblique inwardly, wedge-shaped, and slightly margined with dark irrorations internally. Second dorsal streak placed a little before tornus in parallel with

the first dorsal, about 2/3 as long as the first dorsal, and margined with dark irrorations internally. An ill-defined dorsal blotch placed just beyond tornus, sometimes fused with the second dorsal, without dark marginal scales. Discal area near apex of wing irregularly irrorated with dark scales. A dark marginal line in cilia running around apex of wing from last costal streak to tornus; cilia yellowish-white. Hind wing pale grey, with cilia pale yellowish-grey.

Expanse of fore wings, 7.0–7.5 mm.

Male genitalia conspicuously asymmetrical, especially in valvae and costal processes. Right valva very wide, somewhat ellipsoidal in shape, with a spine-like seta at apical 1/8 of hind margin and with many slender setae on inner surface; costal process ellipsoidal, about 1/6 as large as the valva itself, with filament-like seta rather thick and straight. Left valva very slender, bar-shaped, with two types of setae as in the right; costal process very minute, with filament-like seta shorter. Flap of ninth sternite spatular, with apical margin somewhat dentate. Aedoeagus slender in whole, with a small, oval barb at apex.

Female genitalia symmetrical. Antapophysis very slender. Sterigma ring-shaped, placed on the ventrum near caudal margin of seventh segment.

Autumnal form: It is like the aestival form in structure, differing by the following colouration:—

♂♀. Tuft of head black, mixed with white scales in centre, or wholly white in some specimens. Thorax dark brown, with three white stripes disappearing owing to many white scales dusted on the whole surface. Ground colour of fore wing appearing grey owing to the presence of many white and blackish-brown scales mixed on the whole surface; blackish-brown scales occurring thickly on basal portion of costal half between base and first costal streak and on discal area of apical half, forming somewhat blackish blotches or streaks.

Holotype: ♂ (host: *Tilia Maximowicziana*), Sapporo, Hokkaido, 3. VII, 1956, T. Kumata leg. Paratypes: 1 ♀ (host: *T. japonica*), Nopporo, Hokkaido, 2. VII, 1956, T. Kumata leg.; 2 ♂♂ & 3 ♀♀ (host: *T. Maximowicziana*), Sapporo, Hokkaido, 2.–11. VII, 1956, T. Kumata leg.; 1 ♀ (host: *T. japonica*), 29. VI, 1956, T. Kumata leg.; 9 ♂♂ & 5 ♀♀ (host: *T. Maximowicziana*), Sapporo, Hokkaido, 10.–25. IX, 1957, T. Kumata leg.; 1 ♂ (host: *T. japonica*), Sapporo, Hokkaido, 30. VIII, 1958, T. Kumata leg.; 3 ♂♂ & 5 ♀♀ (host: *T. japonica*), Sapporo, Hokkaido, 11.–17. IX, 1958, T. Kumata leg.; 2 ♂♂ & 1 ♀ (host: *T. Maximowicziana*), Sapporo, Hokkaido, 17. VII, 1959, T. Kumata leg.; 1 ♂ & 2 ♀♀ (host: *T. Maximowicziana*), Zyôzankei, Hokkaido, 23.–25. VII, 1956, T. Kumata leg.; 3 ♂♂ & 3 ♀♀ (host: *T. japonica*), Zyôzankei, Hokkaido, 21.–27. VII, 1956, T. Kumata leg.; 1 ♀ (host: *T. Maximowicziana*), Zyôzankei, Hokkaido, 5. X, 1957, T. Kumata leg.; 1 ♂ & 5 ♀♀ (host: *T. japonica*), Zyôzankei, Hokkaido, 9. IX, 1958, T. Kumata leg.; 1 ♀ (host: *T. Maximowicziana*), Zyôzankei, Hokkaido, 17. IX, 1958, T. Kumata leg.; 2 ♂♂ (host: *T. japonica*), Zyôzankei, Hokkaido, 2.–5. VII, 1959, T. Kumata leg.; 1 ♀ (host: *T. japonica*), Gamusi, Hiyama, Hokkaido, 26. IX, 1958, T. Kumata leg.; 1 ♂ & 3 ♀♀ (host: *Betula platyphylla*) (determined by S. Issiki as *L. corylifoliella* Haworth), Kamikôti, Honsyu, 29. IX, –2. X, 1954, T. Yasuda leg.; 1 ♂ (host: *Tilia kiusiana*), Hikosan, Kyusyu, 11. VIII, 1954, H. Kuroko leg. The paratypes collected by Mr. T. Yasuda are deposited in Dr. S. Issiki's

collection, and one paratype collected at Hikosan, Kyusyu, is in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Tilia japonica* Simonkai, *Tilia Maximowicziana* Shirasawa, *Tilia kiusiana* Makino et Shirasawa, and *Betula platyphylla* Sukatchev.

Distribution: Japan (Hokkaido; Honsyu; Kyusyu).

Mine: Ptychonomous, rather large, circular to elliptical, on the lower surface of leaves, with the lower epidermis of the mine wholly smooth or bearing a number of micro-ridges on the whole surface.

Remarks: In the colouration of the aestival form, this species much resembles *L. corylifoliella* Haworth, but differs clearly from the latter in the peculiarly asymmetrical

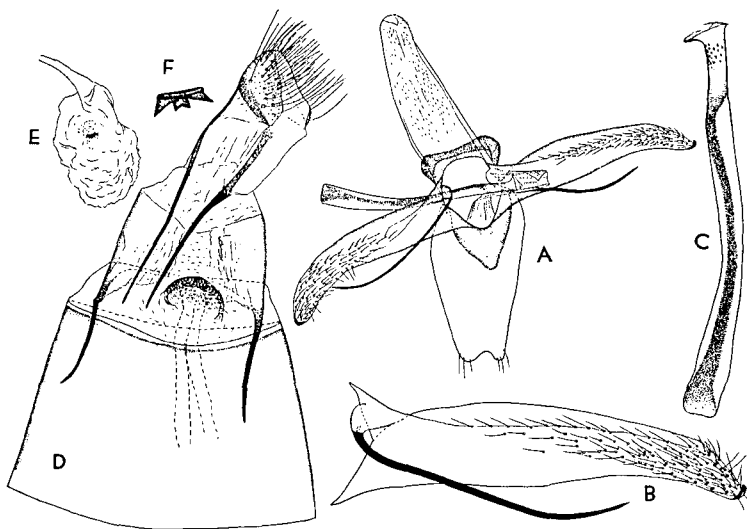


Fig. 8. *Lithocolletis strigulatella* Zeller.

A: caudal view of male genitalia; B: right valva; C: aedoeagus;
D: ventral view of female genitalia; E: corpus bursae; F: sclerotized projections of signa.

male genitalia.

After my own examinations of the specimens determined by Issiki¹⁾ as *L. corylifoliella*, I have been convinced that they are, in reality, referable to the present new species. Furthermore, I have reared this species exclusively from *Tilia*-species, although Issiki has recorded it as a *Betula*-feeder and, indeed, I have examined his specimens with the label "Sirakaba" (*Betula platyphylla*).

5. Species attacking Betulaceae

8*. *Lithocolletis strigulatella* Zeller (Fig. 8)

Lithocolletis strigulatella Zeller, 1846, Isis: 300; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 684; Spuler, 1913, Schmett. Europas: 413; Petersen, 1927, Stett. Ent. Zeit. 88: 132, f. 12; Hering, 1948, Rev.

1) Issiki, S., 1957, Icon. Heteroc. Jap. Color. Natur. 1: 37, pl. 4, f. 99.

Franc. Lép. (L'Amat. Pap.) 11: 320; Gregor & Povolný, 1950, Ent. listy 13: 130, fs. 7 & 36-42.

It should be mentioned that in the specimens examined the sterigma is not constricted by a distinctly sclerotized plate or tube, but is provided with many acutely angulated, small thorns which are circularly arranged on the ventrum between the seventh and eighth abdominal segments.

This species is rather rare in Japan, its ptychonomous mine occurring upon the lower surface of leaves.

Specimens examined: 1 ♀, Horokanai, 1 ♀, Bantainosawa, Kamikawa, and 1 ♂, Sapporo, Hokkaido, on *Alnus hirsuta*.

Host plants: *Alnus hirsuta* Turczaninow in Japan, and *Alnus* spp. and *Ulmus* sp. in

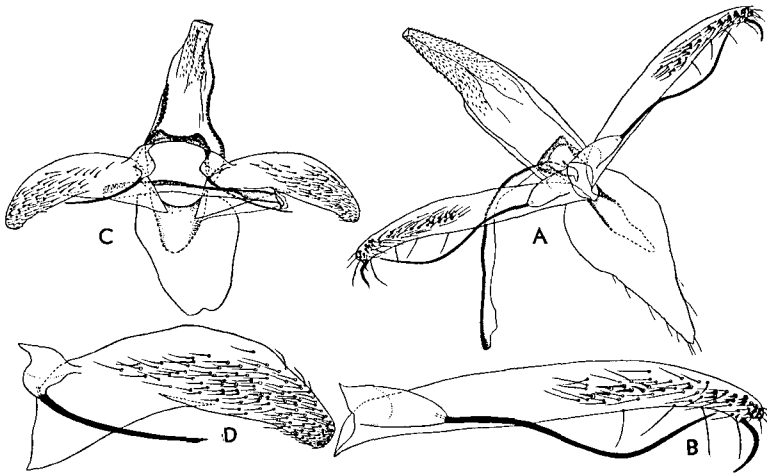


Fig. 9. A & B: *Lithocolletis rostrispinosa*, sp. nov.;
C & D: *Lithocolletis maculata*, sp. nov.

A & C: caudal view of male genitalia; B & D: right valva.

Europe.

Distribution: Japan (Hokkaido) and Europe.

9. *Lithocolletis maculata*, sp. nov. (Fig. 9, C & D)

♂. Face leaden-metallic; palpus whitish; tuft of head black; antenna blackish, apical nine segments white. Thorax leaden-metallic, darker than face. Legs brilliant fuscous; fore tibia and tarsus blotched with dark brown inside; basal halves of mid and hind tarsi also dark brown on upper surface.

Fore wing pale orange-yellow, tinged with golden reflections, with a black basal blotch and nine white spots which are surrounded by black scales. The black basal blotch triangular, rather large, its external margin oblique inwardly from costa. A white linear spot placed on fold near base of wing, its basal 1/3 extending into the black basal blotch. Three pairs of white opposite costal and dorsal spots, first pair being placed at basal 1/5, second a little before middle, and the other just beyond basal 3/5, all semicircular or oval

in shape, nearly half as large as black basal blotch, the dorsal spots being placed slightly nearer to base of wing than opposite costal spots respectively. A white spot placed in centre of wing, circular, and smallest. Another white, linear spot placed on discal area near apex of wing, about $1/7$ as long as wing, its apical edge most widely margined with black scales. Termen of wing distinctly and broadly darker; cilia dark grey. Hind wing brownish-grey, with cilia dark grey.

Expanse of fore wings, 5.5 mm.

Male genitalia symmetrical. Valva moderately wide and long, slightly arched upwardly, and rounded apically; costal process very short, slightly curved inwardly, with filament-like seta about half as long as valva, slightly arched downwardly. Flap of ninth sternite spatular, sinuate apically. Aedoeagus about as long as valva, obliquely truncated apically, with a minute hook at apex.

Holotype: ♂ (host: *Alnus hirsuta*), Sapporo, Hokkaido, 12. VII, 1956, T. Kumata leg.

Host plants: *Alnus hirsuta* Turczaninow.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, occurring upon the lower surface of leaves.

Remarks: In colouration, this species is somewhat similar to *L. irmella* Palm described from Sweden and *L. dorinda* Meyrick from India, but differs distinctly from the latter two by the presence of a small, white spot in the centre of fore wing and by the features of the genitalia. On account of the structure of the male genitalia, the new species is similar to *L. rajella* (Linné) and *L. strigulatella* Zeller, both leaf-miners of *Alnus*, but is distinguished from the latter two by the colour-pattern of the head, thorax and fore wing, and by the details of the genital structure.

10. *Lithocolletis hancola* Kumata

Lithocolletis hancola Kumata, 1958, Ins. Mats. 21: 135, f. 2.

This is the commonest species of the *Alnus*-feeders in Japan. It is quite distinct from any other species by the white median fascia dislocated on the fold of the fore wing, by the three triangular barbs placed on the apical $1/5$ of the aedoeagus, and by the fact that the ninth abdominal segment of the female is 4 times as long as the papillae anales, and that the antapophysis is absent.

Specimens examined: Types of *hancola*; 1 ♂, Misuzuko, and 2 ♂♂ & 3 ♀♀, Otaki, Nagano-ken, Honsyu, on *Alnus hirsuta*.

Host plants: *Alnus hirsuta* Turczaninow and *Alnus japonica* Steudel.

Distribution: Japan (Hokkaido; Honsyu).

11. *Lithocolletis longispinata* Kumata

Lithocolletis longispinata Kumata, 1958, Ins. Mats. 21: 132, f. 1.

Having examined further specimens, I have found that the juxta of the male genitalia is moderately sclerotized.

Specimens examined: Types of *longispinata*; 6 ♂♂ & 1 ♀, Sapporo, Hokkaido, on *Alnus japonica*; 4 ♀♀, Zyôzankei, Hokkaido, on *Alnus hirsuta*.

Host plants: *Alnus japonica* Steudel and *Alnus hirsuta* Turczaninow.

Distribution: Japan (Hokkaido).

12. *Lithocolletis takagii*, sp. nov. (Fig. 10)

♂♀. Face and palpus silvery-white; tuft of head wholly ochre-yellow; antenna dark grey, apical nine segments pure white. Thorax orange-yellow, tinged with golden reflections, with tegula silvery-white. Legs silvery-white; all tibiae clouded outside; basal half of hind tarsus with a dark line on upper side.

Fore wing orange-yellow, heavily tinged with golden reflections, with silvery-white and black markings. A small, triangular, black spot placed on base of costa, and dorsal area beneath this spot occupied by a small, ill-defined, silvery-white spot. Two silvery-white fasciae, one being placed at basal $1/5$ and the other just before middle, straight or slightly

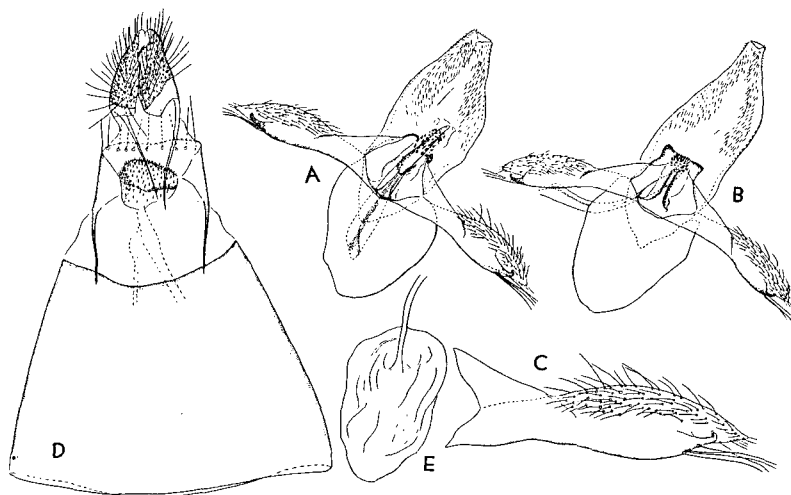


Fig. 10. *Lithocolletis takagii*, sp. nov.

A & B: caudal view of male genitalia; C: right valva; D: ventral view of female genitalia; E: corpus bursae.

arched outwardly, and conspicuously margined with black internally; black margins of those fasciae usually broadened near costal and dorsal margins of wing, especially dorsal half of black margin of second fascia broadest and forming a triangular, black blotch. Two silvery-white costal blotches, one being placed at about basal $3/5$ and the other at about basal $4/5$, triangular, very small, and sometimes margined with black irrorations internally. A silvery-white dorsal streak originating from tornus, nearly running in parallel with termen, extending to a black subapical bar, and internally adjacent to a small, triangular, black blotch. Marginal line in cilia dark brown, rather broad, and running around apex of wing; cilia pale yellowish-grey. Hind wing pale grey, with cilia pale yellowish-grey.

Expanse of fore wings, 5.5–6.0 mm.

Hind wing pale grey, with cilia pale yellowish-grey.

Male genitalia symmetrical. Valva rather small, somewhat fusiform, with a hook-shaped projection at apical $1/5$ of hind margin, and with a tuft of three to five long setae on base

of the hook-shaped projection. Flap of ninth sternite spatular, evidently rounded apically. Aedoeagus with a very small subapical barb. Juxta markedly very elongate, with many acute spines near apical area.

Female genitalia symmetrical. Eighth segment bearing eight to ten setae on caudal margin of tergite. Sterigma consisting of lamella antevaginalis alone, sclerotized in a rather large, fan-shaped plate, with many acute micro-spines on outer surface. Corpus bursae wholly membranous, without signa.

Holotype: ♂ (host: *Alnus japonica*), Toyama, Honsyu, 26. IX, 1958, S. Takagi leg. Paratypes: 2♂♂ & 8♀♀ (host: *A. japonica*), Toyama, Honsyu, 26.-30. IX, 1958, S. Takagi leg.

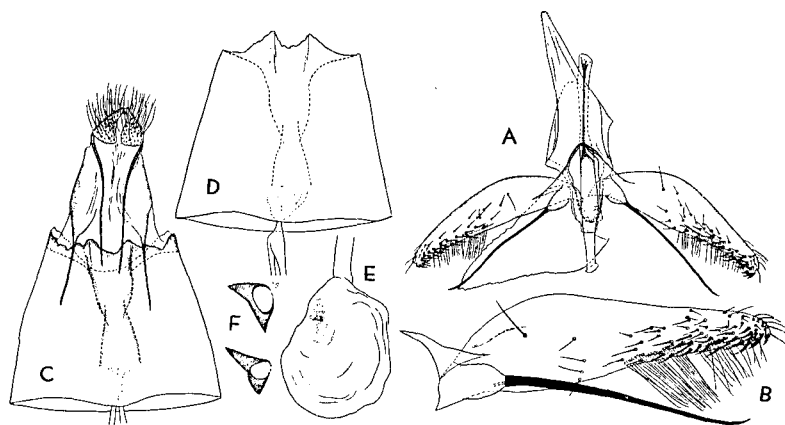


Fig. 11. *Lithocolletis carpini*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: ventral view of female genitalia; D: ventral view of seventh segment of female; E: corpus bursae, F: variations of sclerotized projections of signa.

Host plant: *Alnus japonica* Steudel.

Distribution: Japan (Honsyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves.

Remarks: In the female genitalia, apart from the corpus bursae without any sclerotized signum, this species is very like to *L. longispinata*, but differs immediately from the latter in the male genitalia and the colour-pattern of the fore wing. The most distinguishable characters are as follows:—juxta with many acute spines near apex; valva fusiform, with a distinctly sclerotized, hook-shaped projection at apical 1/5; fore wing with a triangular, black basal spot, and with two silvery-white fasciae, one being placed at basal 1/5 and the other just before middle.

13. *Lithocolletis carpini*, sp. nov. (Fig. 11)

This species is represented by the aestival and autumnal forms, which are distinctive in colour.

Aestival form: ♂♀. Face and palpus white; tuft of head white, slightly mixed with ochreous scales laterally; antenna whitish-fuscous, annulated with brown. Thorax golden-

ochreous, with three narrow white lines, two of which run along inner margins of tegulae. Legs whitish; fore tibia blackish inside; all tarsi spotted with black on upper sides.

Fore wing narrowly lanceolate, golden-ochreous, with white markings. Medio-basal streak very narrow, nearly extending to basal half of wing, slightly bent upwardly at its apical $1/3$, and sometimes margined with dark scales on upper edge. Dorso-basal streak narrower and shorter than the medio-basal, and conspicuously widened at the apex. A linear costal blotch longitudinally placed at basal $1/4$, smallest among the white markings. A pair of opposite costal and dorsal streaks placed at middle of wing, long, narrow, very oblique outwardly, margined with dark irrorations internally, the dorsal being much longer, commencing nearer to base of wing than the costal, and reaching apical $1/3$ of wing. Three costal streak placed near apex of wing, set equidistantly, rather short, vertical or slightly oblique inwardly, and margined with dark irrorations internally. A large dorsal blotch at tornus produced along termen of wing, and margined with dark irrorations internally. Discal area near apex of wing irregularly irrorated with dark scales. A marginal line in cilia dark brown, running along apex of wing; cilia greyish-white. Hind wing pale grey, with cilia greyish-white.

Expanse of fore wings, 5.5–6.5 mm.

Male genitalia symmetrical. Valva moderately elongate, tapering towards apex, with many inwardly curved, short, spine-like setae near apex, and with a row of many long, slender setae on apical half of hind margin; costal process slightly longer than wide, with filament-like seta rather straight. Flap of ninth sternite widest near base, then suddenly tapering and pointed apically. Aedoeagus straight, slender, with a round barb at apex.

Female genitalia symmetrical. Caudal margin of seventh sternite much sclerotized, sometimes dentate; sterigma tubular, reaching cephalic $1/4$ of seventh segment, and constricted at its middle.

Autumnal form: This is like the aestival form in structure, differing by the following colourations:—

♂♀. White tuft of head mixed with darker scales laterally; antenna more clearly annulated with black. All tarsi more widely and clearly ringed with black. Fore wing so densely scattered with dark brown scales on the whole surface that the dorso-basal streak disappearing, the medio-basal streak and first dorsal one being irregularly interrupted with those dark scales, and all costal streaks and tornal blotch sometimes becoming indistinct.

Holotype: ♂ (host: *Carpinus laxiflora*), Nopporo, Hokkaido, 6. VII, 1956, T. Kumata leg. Paratypes: 2 ♂♂ & 1 ♀ (host: *C. laxiflora*), Sapporo, Hokkaido, 16. VII, 1956, T. Kumata leg.; 1 ♂ & 1 ♀ (host: *C. laxiflora*), Sapporo, Hokkaido, 21. VII, 1959, T. Kumata leg.; 5 ♂♂ & 5 ♀♀ (host: *C. laxiflora*), Sapporo, Hokkaido, 22.–30. IX, 1958, T. Kumata leg.; 1 ♀ (host: *C. laxiflora*), Gamusi, Hiyama, Hokkaido, 25. IX, 1958, T. Kumata leg.

Host plants: *Carpinus laxiflora* Blume.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, very elongate, nearly occupying whole area between two veins of the lower surface of leaves, with lower epidermis of the mine bearing a strong wrinkle.

Remarks: This species is closely related to *L. tenerella* Joannis (= *tenella* Zeller) in

the structure of the male genitalia and in the feature of the mine, but may be distinctive from the latter by the symmetrical costal processes of the valvae and by the markings of the fore wing. On account of the markings of the fore wing, it is similar to *L. coryli-foliella* Haworth, from which it is clearly distinguished in the structure of the genitalia of both sexes.

14. *Lithocolletis ostryae*, sp. nov. (Fig. 12)

This species is represented by the aestival and autumnal forms, which are distinctive in colour. It is very closely related to the preceding species, *L. carpini*, but differs from the latter by the following features:—

Aestival form: ♂♀. Tuft of head golden-ochreous, mixed with only a few white hairs

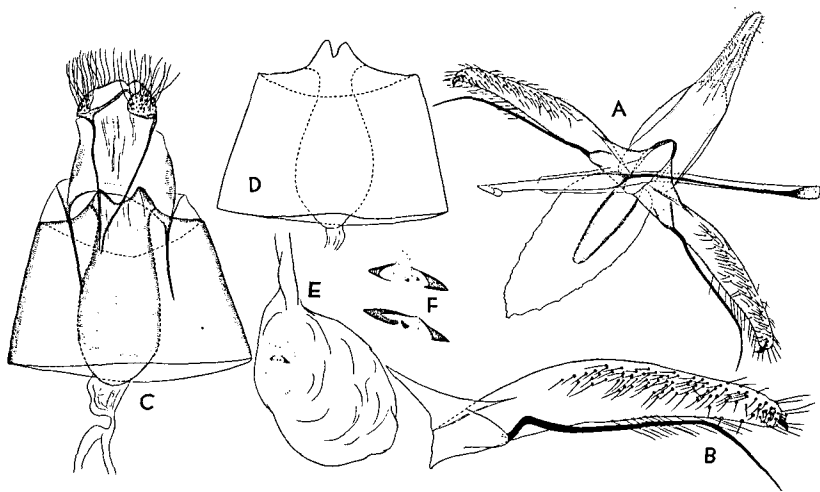


Fig. 12. *Lithocolletis ostryae*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: ventral view of female genitalia; D: ventral view of seventh segment of female; E: corpus bursae; F: variations of sclerotized projections of signa.

in centre. A white costal spot at basal 1/4 of fore wing indistinct, rather linear, and longitudinally placed on costal margin of wing.

Expanse of fore wings, 5.5–6.5 mm.

Male genitalia: Valva more slender, with an inwardly curved, short, spine-like seta present at apex; filament-like seta partially convex upwardly near base, and then bent downward at about apical 1/4. Saccus more elongate; flap of ninth sternite slightly convex on the lateral margin.

Female genitalia: Sterigma slightly produced beyond cephalic margin of seventh segment, conspicuously dilated, and somewhat fusiform.

Autumnal form: This differs from the aestival form by the darker fore wing as in *carpini*. It is distinguished from the autumnal form of *carpini* by the fore wing without a white costal spot at the basal 1/4.

Holotype: ♂ (host: *Ostrya japonica*), Sapporo, Hokkaido, 30. IX, 1957, T. Kumata

leg. Paratypes: 1 ♂ (host: *O. japonica*), Sapporo, Hokkaido, 10. VIII, 1957, T. Kumata leg.; 1 ♂ (host: *O. japonica*), Sapporo, Hokkaido, 17. VII, 1959, T. Kumata leg.; 6 ♂♂ & 1 ♀ (host: *O. japonica*), Sapporo, Hokkaido, 24. IX, -7. X, 1957, T. Kumata leg.; 3 ♂♂ & 7 ♀♀ (host: *O. japonica*), Sapporo, Hokkaido, 17.-25. IX, 1958, T. Kumata leg.

Host plants: *Ostrya japonica* Sargent.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, occurring along the margin of the lower surface of leaves.

15. *Lithocolletis hikosana*, sp. nov. (Fig. 13)

This species is represented by the aestival and autumnal forms differing in colour as in the preceding two species.

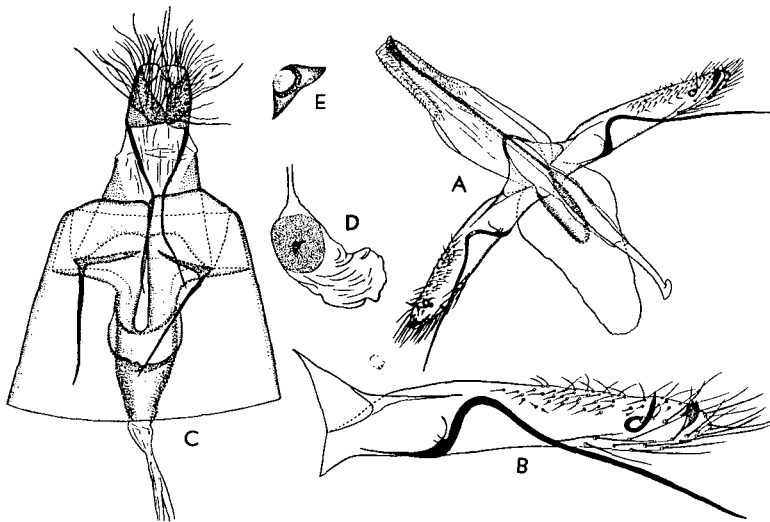


Fig. 13. *Lithocolletis hikosana*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: ventral view of female genitalia; D: corpus bursae; E: sclerotized projections of signum.

In the both forms, I have failed to find any obvious characters in the colour-markings to distinguish the new species from the preceding one, *L. ostryae*. Nevertheless, in the genitalia the new species represents quite particular characters as follows:—

Male genitalia: Valva rather slender, with an apically dentate, short thorn near apex of inner surface, with a basally spiraled, long, spine-like seta situated more basally than the thorn, and with many slender, long setae on inner surface and along apical margin; costal process somewhat papillate in form, with filament-like seta partially convex upwardly near base. Aedoeagus straight, with a small, ovate barb at apex.

Female genitalia: Seventh segment strongly sclerotized in whole, with a long rift on ventrum; a circular area around cephalic end of this rift bearing dense, slender scales; sterigma cylindrical, tapering cephalad, with its cephalic top ending at the cephalic margin

of seventh segment.

Holotype: ♂ (host: *Carpinus Tschonoskii*), Hikosan, Kyusyu, 4. VI, 1957, T. Kumata leg. Paratypes: 1 ♂ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 3. VI, 1957, T. Kumata leg.; 1 ♂ & 1 ♀ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 19. VII, 1954, H. Kuroko leg.; 1 ♂ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 9. XI, 1956, H. Kuroko leg. The paratypes collected by Dr. H. Kuroko are deposited in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Carpinus Tschonoskii* Maximowicz.

Distribution: Japan (Kyusyu).

Mine: Ptychonomous, on the lower surface of leaves.

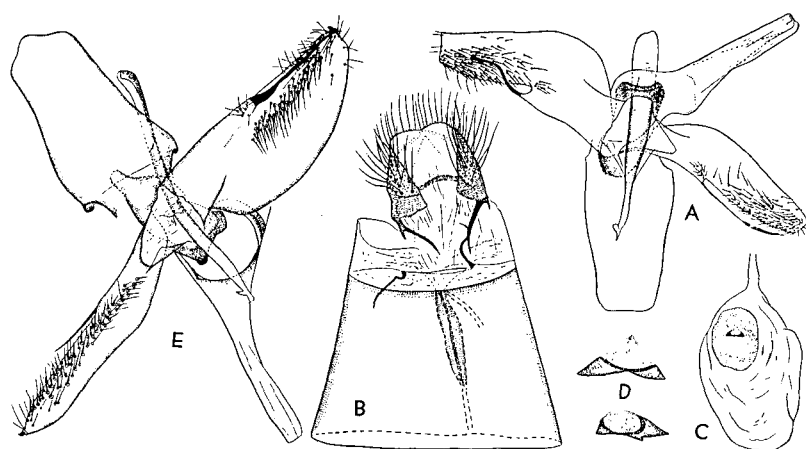


Fig. 14. A-D: *Lithocolletis ermani*, sp. nov.;

E: *Lithocolletis dakekanbae*, sp. nov.

A & E: caudal view of male genitalia. B: ventral view of female genitalia; C: corpus bursae; D: variations of sclerotized projections of signa.

Remarks: The new species differs from *L. carpini* by the valva which has an apically dentate thorn and a basally spiraled, long seta on its inner surface in the male, and by the deeply rifted seventh abdominal segment in the female.

16. *Lithocolletis ermani*, sp. nov. (Fig. 14, A-D)

♂♀. Face pure white, rarely dusted with dark grey; palpus whitish or pale fuscous, terminal segment clouded outside; tuft of head wholly snow-white; antenna whitish, each segment broadly ringed with dark brown. Thorax whitish, rather densely scattered with grey scales on the whole surface, with the posterior half and base of tegula golden-ochreous. Legs pale fuscous; fore and mid tibiae clouded outside; all tarsi with four dark rings.

Fore wing golden-ochreous, rather densely irrorated with pale grey on the whole surface, with large, white markings. Dorso-basal streak reaching basal 1/4, rather broad, expanding to middle across wing near the apex. Medio-basal streak as long as the dorso-basal

which is wider than the former. A costal blotch placed at basal $1/4$, rather perpendicular, rectangular, and margined with black scales internally. A median fascia very broad, acutely angulated outwardly above middle across wing, and slightly margined with black scales internally. A black-irrorated blotch situated on dorsal margin between dorso-basal streak and median fascia. A very large, white blotch on tornus triangular, and margined with black scales internally; a black-irrorated blotch opposite the white tornal one internally and externally bordered by white, ill-defined, wedge-shaped blotches. A pair of opposite costal and dorsal white blotches placed near apex of wing. A blackish apical spot very minute, internally adjacent with a few white scales. Apical margin of wing not darkened; cilia pale grey. Hind wing grey, with cilia pale yellowish-grey.

Expanse of fore wings, 7.0–8.5 mm.

Male genitalia asymmetrical. Left valva slightly longer than the right, and about 1.5 times as wide as the latter, and truncated apically; sacculus conspicuously widened, occupying basal half of ventral margin of valva, with filament-like seta rather long and sinuate. Sacculus of right valva slightly produced, with filament-like seta much shorter. Flap of ninth sternite narrowest at about basal $1/4$, truncate or somewhat sinuate on its apical margin. Aedoeagus with a minute, ovate barb at apex.

Female genitalia very slightly asymmetrical. Ninth segment nearly as long as papillae anales, with a short process projecting from base of each postapophysis. Antapophysis much weaker. Sterigma consisting of a weakly sclerotized antrum, which occupies about basal $1/4$ of ductus bursae.

Holotype: ♂ (host: *Betula Ermani*), Zyôzankei, Hokkaido, 10. X, 1957, T. Kumata leg. Paratypes: 1 ♀ (host: *B. Ermani*), Aizankei, Daisetuzan, Hokkaido, 17. VIII, 1957, T. Kumata leg.; 1 ♀ (host: *B. Ermani*), Sapporo, Hokkaido, 17. VII, 1957, T. Kumata leg.; 1 ♂ (host: *B. Ermani*), Sapporo, Hokkaido, 25. IX, 1957, T. Kumata leg.; 1 ♂ & 5 ♀♀ (host: *B. Ermani*), Zyôzankei, Hokkaido, 25. IX,–15. X, 1957, T. Kumata leg.

Host plants: *Betula Ermani* Chamisso.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, on the space between two veins of the lower surface of leaves.

Remarks: This species is somewhat related to *L. hancola*, from which it is readily distinguished by the colour-pattern of the fore wing and by the structures of the genitalia of both sexes, especially by having only an ovate apical barb on the aedoeagus in the male, and by having very weakly sclerotized antapophysis in the female.

17. *Lithocolletis japonica*, sp. nov. (Fig. 15)

♂♀. Face pure white; palpus whitish, terminal segment clouded inside; tuft of head ochreous, mixed with many white scales in centre; antenna whitish, annulated with black except for apical ten to twelve segments. Thorax golden-ochreous, with two narrow, white stripes running along inner margins of tegulae, and with a minute, white spot at posterior angle. Legs whitish; fore tibia clouded inside; fore tarsus with four broad rings; mid and hind tarsi with two black median rings.

Fore wing golden-ochreous, slightly tinged with red, with white markings, which are

internally margined with dark scales. Medio-basal streak extending to basal $1/4$, running in parallel with costal margin of wing, rather narrow, slightly sinuate, without any dark marginal scales. Dorso-basal streak a little shorter and much narrower than the medio-basal. A median fascia obtusely angulated or sometimes convex outwardly, moderate in width. A pair of opposite costal and dorsal blotches placed at apical $2/5$, triangular, moderately oblique outwardly. Two small, indistinct costal blotches placed near apex of wing, wedge-shaped, vertical or slightly oblique inwardly, and united by a few white scales situated in disc. An indistinct dorsal blotch placed on termen, rather large, scattered with several very small, black spots. A black-irrorated apical streak placed in disc. A very narrow marginal line in cilia dark brown, running around apex of wing from tornus to last costal

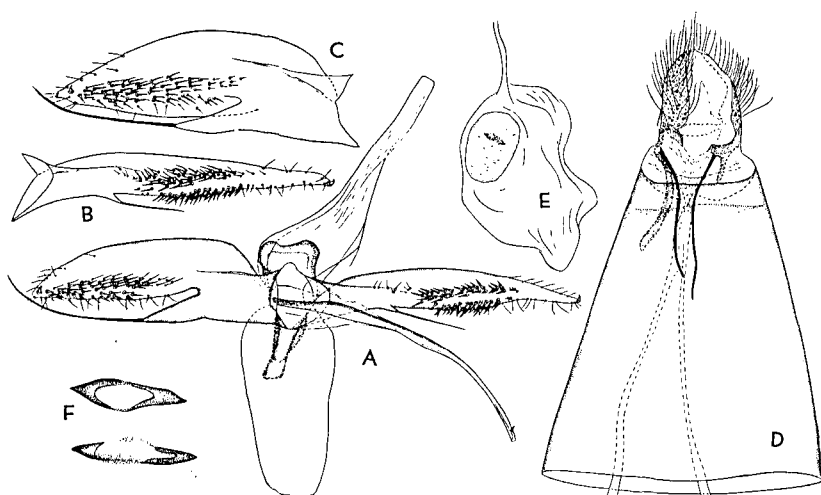


Fig. 15. *Lithocolletis japonica*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: left valva; D: ventral view of female genitalia; E: corpus bursae; F: variations of sclerotized projections of signa.

blotch; cilia pale yellowish-grey. Hind wing pale grey, with cilia pale yellowish-grey.

Expanse of fore wings, 6.0–8.0 mm.

Male genitalia extremely asymmetrical. Left valva about twice as wide as the right, slightly shorter than the latter, with a short, spine-like seta on pointed apex, and with many weaker, spine-like setae on ventro-distal area; sacculus of left valva strongly widened, fairly produced outwardly, with filament-like seta slender and long. Right valva slightly swollen on median part, with a short, spine-like seta on acute apex and with two rows of weaker, spine-like setae on medio-ventral region. Saccus rather elongate, widely truncated apically. Flap of ninth sternite rather elongate, rounded apically. Aedoeagus much slender, slightly curved, with a very minute, hook-shaped barb near apex.

Female genitalia asymmetrical. Ninth segment rather elongate, but shorter than papillae anales, with a process produced from base of each long postapophysis, the left process fairly longer than the right and slightly shorter than postapophysis. Antapophysis absent.

Ductus bursae completely membranous, without any sclerotized antrum.

Holotype: ♂ (host: *Carpinus laxiflora*), Sapporo, Hokkaido, 8. IV, 1958, T. Kumata leg. Paratypes: 1 ♂ (host: *Ostrya japonica*), Nopporo, Hokkaido, 16. VII, 1956, T. Kumata leg.; 1 ♂ & 1 ♀ (host: *Carpinus laxiflora*), Sapporo, Hokkaido, 16.-21. VII, 1956, T. Kumata leg.; 1 ♀ (host: *C. laxiflora*), Sapporo, Hokkaido, 8. IV, 1958, T. Kumata leg.; 4 ♂♂ & 2 ♀♀ (host: *Corylus heterophylla*), Sapporo, Hokkaido, 19.-23. VII, 1956, T. Kumata leg.; 1 ♂ & 2 ♀♀ (host: *Carpinus laxiflora*), Teine, Hokkaido, 21. VII, 1956, T. Kumata leg.; 5 ♂♂ & 4 ♀♀ (host: *C. laxiflora*), Okusiri Is., 26. VII, 1958, T. Kumata leg.; 1 ♀ (host: *Corylus* sp.), Inawahara, Nagano-ken, Honsyu, 7. IV, 1958, K. Kamijo leg.; 1 ♂ (host: *Carpinus* sp.), Agematu, Nagano-ken, Honsyu, 8. IV, 1958, K. Kamijo leg.; 1 ♀ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 25. IV, 1954, H. Kuroko leg.; 1 ♂ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 29. VII, 1954, H. Kuroko leg.; 1 ♂ & 1 ♀ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 19.-22. IV, 1955, H. Kuroko leg.; 1 ♂ & 2 ♀♀ (host: *C. Tschonoskii*), Hikosan, Kyusyu, 22.-23. VI, 1957, T. Kumata leg. The paratypes collected by Dr. H. Kuroko are deposited in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Carpinus laxiflora* Blume, *Carpinus Tschonoskii* Maximowicz, *Ostrya japonica* Sargent and *Corylus heterophylla* Fischer.

Distribution: Japan (Hokkaido; Honsyu; Kyusyu).

Mine: Ptychonomous, on the upper surface of leaves.

Remarks: This species is rather similar to *L. hancola*, *L. styracis* and *L. juglandis* in the genitalia of both sexes, especially in the female by lacking antapophysis and the ninth abdominal segment elongate. But it can be distinguished from those related species by lacking a white costal mark at the basal 1/4 of the fore wing. Moreover, in the genital structure, it differs from *L. styracis* and *L. juglandis* by lacking a process of ampulla on the inner surface of the right valva, and from *L. hancola* by having two rows of spine-like setae on the ventro-distal area of the right valva in the male and lacking any sclerotized antrum or genital plate in the female.

18. *Lithocolletis dakekanbae*, sp. nov. (Fig. 14, E)

♂. Face and palpus pure white; tuft of head ochreous, mixed with some white scales in centre; antenna whitish, annulated with black except for apical ten segments. Thorax golden-ochreous, with two narrow, white lines along inner margins of tegulae and with a minute, white spot at posterior angle. Legs whitish; fore tibia clouded inside; mid and hind tibiae blotched with black outside; fore tarsus with four very broad, black rings; mid tarsus with two broad, black rings; hind tarsus with two rather narrow, black rings.

Fore wing golden-ochreous, slightly tinged with red, with white markings, which are margined with dark scales internally. Medio-basal streak very narrow, extending to basal 1/4, slightly bent upwardly near its apex, and connected with a very small costal blotch, which is placed at the basal 1/4, and slightly oblique outwardly, without any dark marginal scales. A dorsal spot placed at basal 1/6, smallest among the white marks, without dark marginal scales. A median fascia rather narrow, gently arched outwardly. A triangular dorsal blotch situated on tornus, nearly touching apex of opposite costal blotch which is

narrower and wedge-shaped. Two costal blotch and a dorsal one placed near apex of wing, small, sometimes indistinct. Black apical spot or streak absent. Apical margin of wing very slightly darker; cilia pale yellowish-grey. Hind wing grey, with cilia pale brownish-grey.

Expanse of fore wings, 7.5 mm.

Male genitalia of this species are very similar to those of the preceding, *L. japonica*, but are evidently distinct from the latter by the following points:—Left valva about 2.5 times as wide as the right, bluntly pointed apically; sacculus not so produced, with a strong filament-like seta which is nearly straight, and extending to the apex of the valva. Right valva rather straight, with its costal and ventral margins nearly parallel, and with many

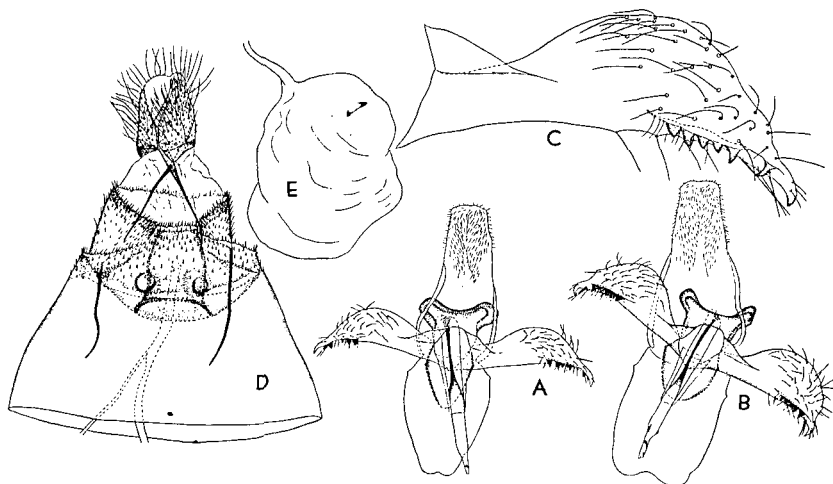


Fig. 16. *Lithocolletis cavella* Zeller.

A & B: caudal view of male genitalia; C: right valva; D: ventral view of female genitalia; E: corpus bursae.

short, spine-like setae on whole surface along ventral margin. Flap of ninth sternite medially convex on its apical margin. Aedoeagus rather thicker, with a larger, triangular barb near apex.

Holotype: ♂ (host: *Betula Ermani*), Sapporo, Hokkaido, 15. IV, 1958, T. Kumata leg.

Host plants: *Betula Ermani* Chamisso.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, on the upper surface of leaves.

Remarks: This species is very closely related to *L. japonica*, but is readily separated from the latter by the fore wing with a white dorsal spot at the basal 1/6 as well as by the structure of the male genitalia.

19*. *Lithocolletis cavella* Zeller (Fig. 16)

Lithocolletis cavella Zeller, 1846, Linn. Ent. 1: 213; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 680; Meyrick, 1895, Handb. Brit. Lep.: 740; Spuler, 1913, Schmett. Europas: 414; Petersen, 1927, Stett. Ent. Zeit. 88: 140, f. 20; Pierce et Metcalfe, 1935, Genit. Tin. Brit.: 73, pl. 44; Benander, 1944, Opusc.

Ent.: 109; Povolný et Gregor, 1950, Ent. listy: 13, f. 34.

Lithocolletis schreberella Zeller, 1839, Isis: 218 (preoccupied by Fabricius, 1781).

The Japanese form is more or less smaller than the European (expanse of fore wings, 6.0–7.0 mm.: 8.5–9.0 mm.).

The Ptychonomus mine of this species is found commonly upon the lower surface of the leaves of birch in Japan.

Specimens examined: 1 ♂, Horokanai, 5 ♂♂ & 1 ♀, Sapporo, and 7 ♂♂ & 8 ♀♀, Tomakomai, Hokkaido and 1 ♂, Inawahara, Nagano-Ken, Honsyu, on *Betula platyphylla*; 4 ♂♂, Sapporo, Hokkaido, on *Betula Ermani*; 2 ♂♂ (determined by M. Hering as *L. cavella* Zeller), Europe, on *Betula* sp.

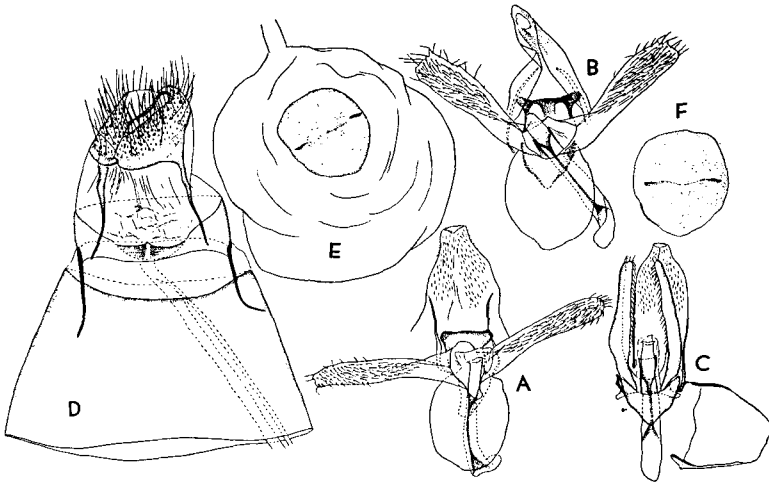


Fig. 17. *Lithocolletis ulmifoliella* (Hübner).

A & B: caudal view of male genitalia; C: ventral view of male genitalia;
D: ventral view of female genitalia; E: corpus bursae; F: signum.

Host plants: *Betula platyphylla* Sukatchev and *Betula Ermani* Chamisso in Japan, and *Betula* spp. in Europe.

Distribution: Japan (Hokkaido; Honsyu) and Europe.

20*. *Lithocolletis ulmifoliella* (Hübner) (Fig. 17)

Tinea ulmifoliella Hübner, 1816, Sammb. Eur. Schmett.: f. 444.

Lithocolletis ulmifoliella: Herrich-Schäffer, 1855, Schmett. Europa 5: 324; Wocke, 1877, in Hein., Schmett. Deutsch. 2: 680; Meyrick, 1895, Handb. Brit. Lep.: 732; Spuler, 1913, Schmett. Europas: 414; Petersen, 1927, Stett. Ent. Zeit. 88: 135, f. 16; Pierce et Metcalfe, 1935, Genit. Tin. Brit.: 73, pl. 44; Benander, 1944, Opusc. Ent.: 109.

The Japanese form agrees well enough with the European, but it differs slightly therefrom in the following points:—tuft of head wholly yellowish-white; ground colour of thorax and fore wing more yellowish or paler, and more heavily tinged with golden reflections.

The mine of this species occurs upon the lower surface of the leaves of the hosts.

Specimens examined: 2♂♂ & 1♀, Horokanai, 1♂, Kenebetu, Nemuro, 1♀, Apoi, Hidaka, and 1♀, Sapporo, Hokkaido, and 3♀♀, Yatugadake (at 1600 m.), and 1♂, Inawahara, Nagano-ken, Honsyu, on *Betula platyphylla*; 2♂♂ & 2♀♀ (determined by M. Hering as *L. ulmifoliella* Hübner), Europe, on *Betula* sp.

Host plants: *Betula platyphylla* Sukatchev in Japan, and *Betula* spp. in Europe.

Distribution: Japan (Hokkaido; Honsyu) and Middle and North Europe.

6. Species attacking Fagaceae.

21. *Lithocolletis fagifolia*, sp. nov. (Fig. 18)

♂♀. Palpus and face silk-white, with palpus lined with dark brown outside; tuft of

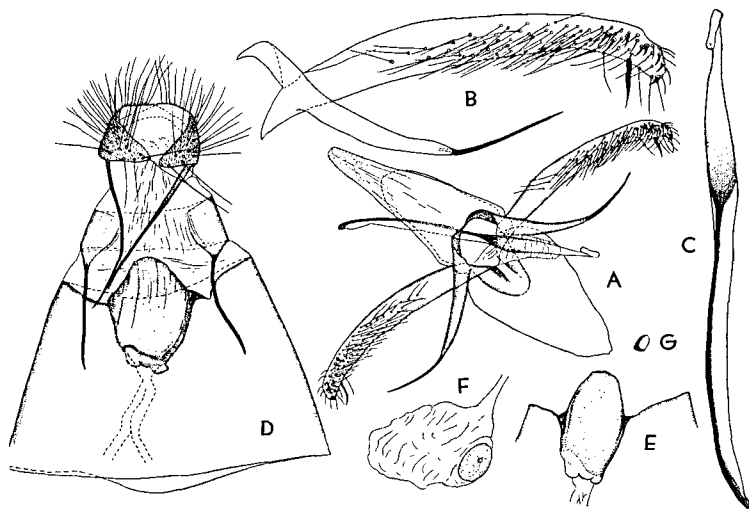


Fig. 18. *Lithocolletis fagifolia*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: aedoeagus;
D: ventral view of female genitalia; E: sterigma of female genitalia; F: corpus bursae; G: sclerotized projection of signum.

head white, mixed with golden-brown scales laterally; antenna fuscous-white, annulated with dark brown. Thorax golden-brown to golden-ochreous, with three white stripes, two of which run along the inner margins of the tegulae. Legs whitish; fore femur black inside; fore tibia and all tarsi with two or three dark rings.

Fore wing golden-brown to golden-ochreous, with white markings margined with black scales internally. Medio-basal streak placed on fold in parallel with costal margin of wing, nearly extending to basal 1/4, straight, rather slender, and weakly margined with dark scales on its upper and lower edges. Dorso-basal streak slightly shorter than the medio-basal, very slender, and weakly margined with dark scales on upper edge. A fascia placed just before middle, rather broad, obtusely angulated near costa outwardly. A pair of opposite costal and dorsal blotches placed at apical 1/3, triangular; dark internal margins of the blotches sometimes nearly touching each other at costal 1/3 across wing. Two costal

blotches separated by a distance from each other and from first costal blotch, wedge-shaped, slightly oblique inwardly. An indistinct spot placed on termen beyond tornus. A black-irrorated streak longitudinally placed on discal area near apex of wing. A black line in cilia running along apex of wing from last costal blotch to tornus; cilia greyish-white. Hind wing pale grey, with cilia greyish-white.

Expanse of fore wings, 5.5–6.5 mm.

Male genitalia symmetrical. Valva very slender, arched upwardly, with a rather long, spine-like seta at about apical 1/10 of hind margin, and with a few short, spine-like setae and a number of slender setae on inner surface; costal process rather thin, cone-shaped, very long, with filament-like seta arched downward. Flap of ninth sternite widest at basal 1/6, and then gradually tapering and bluntly pointed apically. Aedoeagus with an ellipsoidal barb at apex.

Female genitalia symmetrical. Sclerotized area of seventh segment broadly separated on ventrum. Sterigma much sclerotized, somewhat irregularly pentagonal or hexagonal. Signum sclerotized in circular plate, with a minute projection in its centre.

Holotype: ♂ (host: *Fagus crenata*), Hikosan, Kyusyu, 3. VIII, 1955, H. Kuroko leg. Paratypes: 12 ♀♀ (host: *F. crenata*), Atusabe, Hiyama, Hokkaido, 23.–29. VIII, 1956, T. Kumata leg.; 1 ♀ (host: *F. crenata*), Hikosan, Kyusyu, 28. VII, 1956, H. Kuroko leg. Paratype collected by Dr. H. Kuroko is deposited in the collection of the Entomological Laboratory, Kyusyu Univeristy.

Host plants: *Fagus crenata* Blume.

Distribution: Japan (Hokkaido; Kyusyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves.

Remarks: The new species is markedly distinguished from *L. maestingella* Zeller (= *faginella* Zeller), a leaf-miner of *Fagus* in Europe, by the fore wing with a white median fascia and by the very slender valva with a long, spine-like seta at the apical 1/10 of the hind margin.

22. *Lithocolletis nipponicella* Issiki (Fig. 19)

Lithocolletis nipponicella Issiki, 1930, Ann. Mag. Nat. Hist. 6: 430; *ibid.*, 1950, Icon. Ins. Jap.: 454, f. 1225; *ibid.*, 1957, Icon. Heteroc. Jap. Color. Natur. 1: 27, pl. 4, f. 97.

♂♀. Palpus and face white; tuft of head snow-white, mixed with a few golden-ochreous scales laterally; antenna fuscous-white, apical segment dark. Thorax golden-ochreous, with a median stripe white and wide; tegula white, with cephalic and inner margins golden-ochreous. Legs silk-white; fore leg somewhat clouded inside.

Fore wing golden-ochreous, with white markings. Medio-basal streak placed on fold, extending to about basal 1/3, nearly straight, rarely bent upwardly at its apical 1/3, and margined with dark scales on upper edge. Costo-basal streak a little longer than the medio-basal, slightly widened towards apex. Dorsal-basal streak extending to basal 1/4, sometimes nearly as long as the medio-basal. A broad fascia situated just before middle, widest on dorsal margin of wing, moderately angulated or convex outwardly at costal 2/5 across wing, margined with dark scales internally, and shading into ground colour exter-

nally; in a few specimens reared in summer the fascia is rather straight and broad in whole. A pair of opposite costal and dorsal blotches placed at apical 1/3, gently curved outwardly, hook-shaped, and margined with dark scales internally. Two costal blotches and a dorsal one placed near apex of wing, somewhat oblique inwardly, wedge-shaped, and margined with dark scales internally. A black spot placed at apex of wing. A black marginal line in cilia running around apex of wing; cilia yellowish-white. Hind wing pale grey, with cilia yellowish-grey to yellowish-white.

Expanse of fore wings, 7.0–8.5 mm.

Male genitalia symmetrical. Valva somewhat semicircularly arched on costal margin, much stoutly sclerotized on dorsal margin near base, with many inwardly curved, short,



Fig. 19. *Lithocolletis nipponicella* Issiki.

A: caudal view of male genitalia; B & C: aedeagus; D: flap of ninth sternite; E & F: ventral view of female genitalia; G: corpus bursae; H: variations of sclerotized projections of signa.

slender setae on inner surface; costal process twice as long as wide, tapering towards top, with filament-like seta rather straight. Saccus rather short, somewhat trapezoid in shape; flap of ninth sternite slightly tapering apically, with apical margin deeply concave. Aedeagus somewhat T-shaped.

Female genitalia symmetrical. Caudal margin of seventh segment almost straight; sterigma crescent in shape, situated on dorsum between both antapophyses, much sclerotized on its cephalic margin.

Specimens examined: 2♂♂ & 3♀♀, Kenebetu, Nemuro, 1♂ & 1♀, Zyôzankei, and 5♂♂ & 4♀♀, Sapporo, Hokkaido, and 4♂♂ & 5♀♀, Misuzuko, Nagano-ken, Honsyu, on *Quercus dentata*; 4♂♂, Morioka, Iwate-ken, 4♂♂ & 3♀♀, Misuzuko, and 1♀, Agematu, Nagano-ken, Honsyu, and 1♂, Ino, Koti-ken, Sikoku, on *Quercus serrata*; 1♂, Horokanai,

1♂ & 1♀, Apoi, 1♀, Nopporo, and 5♂♂ & 2♀♀, Sapporo, Hokkaido, and 4♂♂ & 3♀♀, Okusiri Is., on *Quercus mongolica* var. *grosseserrata*; 1♂, Ryôtu, Sado Is., and 2♂♂ & 2♀♀, Misuzuko, Nagano-ken, Honsyu, on *Quercus acutissima*; 1♂, Nopporo, and 1♀, Zenibako, Hokkaido, and 2♀♀, Mt. Sara, and 1♀, Sugitate, Sikoku.

Host plants: *Quercus dentata* Thunberg, *Quercus serrata* Thunberg, *Quercus mongolica* Fischer var. *grosseserrata* Rehder et Wilson and *Quercus acutissima* Carruthers.

Distribution: Japan (Hokkaido; Honsyu; Sikoku; Kyusyu).

Mine: Ptychonomous, on the lower surface of leaves.

Remarks: This species is very common in Japan, occurring on deciduous species of the genus *Quercus*.

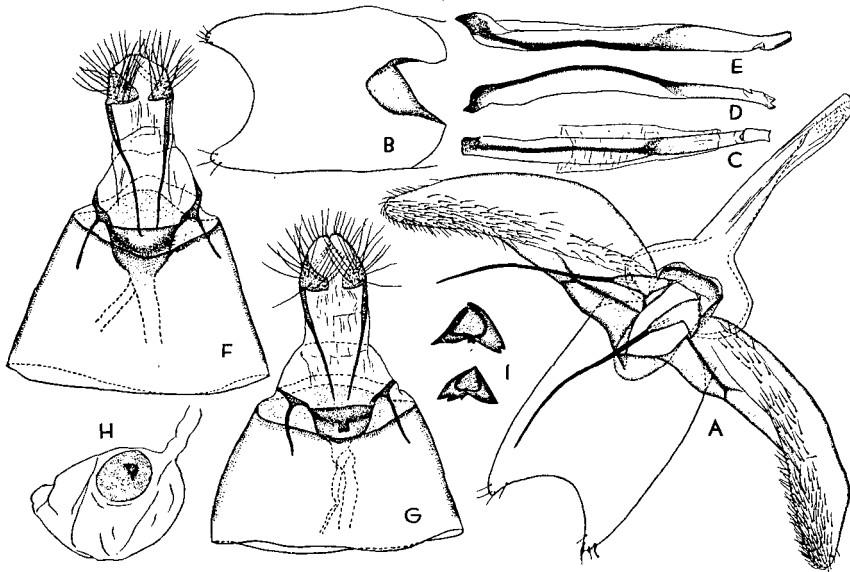


Fig. 20. *Lithocolletis acutissimae*, sp. nov.

A: caudal view of male genitalia, aedeagus removed; B: flap of ninth sternite; C-E: aedeagus; F & G: ventral view of female genitalia; H: corpus bursae; I: variations of sclerotized projections of signa.

23. *Lithocolletis acutissimae*, sp. nov. (Fig. 20)

This species is closely related to *L. nipponicella*, and I have failed to find any distinct characters in the colour-markings to distinguish it from *nipponicella*. But it may be readily distinguished from *nipponicella* by the following features of the genitalia:—

Male genitalia: Flap of ninth sternite wider, with lateral margins nearly parallel, and apical margin more deeply concave. Aedeagus nearly as long as valva, bar-shaped, with a round subapical incision as shown in the figure, without any barb.

Female genitalia: Caudal margin of seventh segment markedly convex on dorsum. Sterigma broader, somewhat semicircular in shape.

Holotype: ♂ (host: *Quercus acutissima*), Nagano, Honsyu, 10. IV, 1958, K. Kamijo leg. Paratypes: 1♂ & 2♀♀ (host: *Q. serrata*), Sapporo, Hokkaido, 6.-12. VII, 1956, T.

Kumata leg.; 2♂♂ & 1♀ (host: *Q. mongolica* var. *grosseserrata*), Teine, Hokkaido, 19. VII, 1956, T. Kumata leg.: 5♂♂ & 11♀♀ (host: *Q. acutissima*), Nagano, Honsyu, 5.-7. IV, 1958, K. Kamijo leg.; 1♀ (host: *Castanea crenata*), Tokyo, Honsyu, 13. VI, 1958, A. Kawada leg.; 1♀ (host: *Quercus acutissima*), Kawatinagano, Honsyu, 8. VII, 1957, T. Kumata leg.; 1♂, Matuyama, Sikoku, 1957, T. Yano leg.; 1♂, Sugitate, Sikoku, 12. IV, M. Okada leg.; 1♂ (host: *Castanea crenata*), Ino, Koti-ken, Sikoku, 16. VI, 1957, T. Kumata leg.; 1♂ (host: *Quercus serrata*), Hukuoka, Kyusyu, 16. VI, 1957, T. Kumata leg. The specimen collected by Dr. A. Kawada is deposited in the collection of the National Institute of Agricultural Science, Tokyo.

Host plants: *Quercus acutissima* Carruthers, *Quercus mongolica* Fischer var. *gros-*

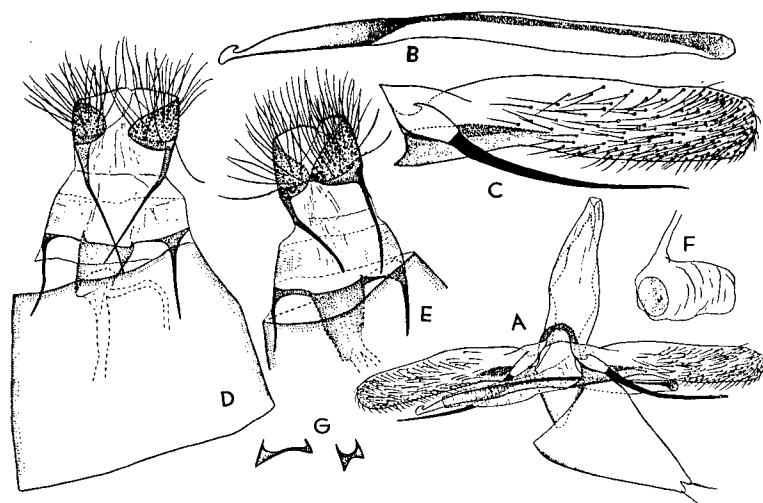


Fig. 21. *Lithocolletis kamijoi*, sp. nov.

A: caudal view of male genitalia; B: aedeagus; C: right valva;
D & E: ventral view of female genitalia; F: corpus bursae; G:
variations of sclerotized projections of signa.

seserrata Rehder et Wilson, *Quercus serrata* Thunberg and *Castanea crenata* Siebold et Zuccarini.

Distribution: Japan (Hokkaido; Honsyu; Sikoku; Kyusyu).

Mine: Ptychonomous, on the lower surface of leaves.

24. *Lithocolletis nigristella* Kumata

Lithocolletis nigristella Kumata, 1957, Ins. Mats. 21: 62.

Specimens examined: Types of *nigristella*; 3♂♂ & 1♀, Morioka, Honsyu, and 1♂, Ino, Koti-ken, Sikoku, on *Quercus serrata*.

Host plants: *Quercus dentata* Thunberg and *Quercus serrata* Thunberg.

Distribution: Japan (Hokkaido; Honsyu; Sikoku).

25. *Lithocolletis kamijoi*, sp. nov. (Fig. 21)

♂♀. Palpus and face white; tuft of head snow-white, mixed with a few golden-ochreous

scales laterally; antenna fuscous-white, apical segment dark. Thorax golden-yellowish, median stripe white and wide; tegula white, with inner margin golden-yellowish. Legs silk-white; fore leg lined with black inside; hind tarsus with a subbasal spot outside.

Fore wing golden-yellowish, with white markings. Medio-basal streak placed on fold, straight, extending to basal $1/3$, and margined with dark scales on upper edge. Dorso-basal streak $3/4$ as long as the medio-basal, slightly widened near its apex, and slightly margined with dark scales on upper edge. Costo-basal streak conspicuously margined with dark scales on upper and lower edges, gradually widened outwardly, fused with a broad median fascia into a single mark, the median fascia being moderately angulated or convex outwardly at middle across wing, widened on dorsal margin of wing, margined with dark scales internally, and dark margin of fascia being also united with lower dark margin of costo-basal streak in a curved line. A pair of opposite costal and dorsal blotches placed at apical $1/3$, gently curved outwardly, triangular or hook-shaped, and margined with dark scales internally. Two costal blotches placed near apex of wing, slightly oblique outwardly, wedge-shaped, and margined with dark scales internally. An ill-defined dorsal spot placed on termen, smallest, and not extending to cilia. A small, black spot placed at apex of wing. A black marginal line in cilia running around apex of wing; cilia whitish. Hind wing pale grey, with cilia whitish.

Expanse of fore wings, 5.5–6.5 mm.

Male genitalia symmetrical. Valva rather elongate, slightly sinuate at basal $1/3$, much stoutly sclerotized on hind area near base, with slender setae on the whole inner surface; costal process fusiform, thickest near base, with filament-like seta long, arched downward. Flap of ninth sternite triangular, with apex bilobed and bearing only one seta on each lobe. Aedoeagus entirely slender, with an apical barb.

Female genitalia symmetrical. Sterigma somewhat cone-shaped, with a narrowed cephalic top obliquely truncated.

Holotype: ♂ (host: *Quercus acutissima*), Nagano, Honsyu, 8. IV, 1958, K. Kamijo leg. Paratypes: 2♂♂ & 1♀ (host: *Q. acutissima*), Nagano, Honsyu, 31. III,–7. IV, 1958, K. Kamijo leg.; 2♂♂ & 3♀♀ (host: *Q. acutissima*), Kawatinagano, Honsyu, 6.–9. VI, 1957, T. Kumata leg.; 1♂ & 2♀♀ (host: *Q. acutissima*), Hikosan, Kyusyu, 27.–30. VI, 1957, H. Kuroko leg.; 1♂ (host: *Q. acutissima*), Hikosan, Kyusyu, 3. VIII, 1958, H. Kuroko leg. The paratypes collected by Dr. H. Kuroko are deposited in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Quercus acutissima* Carruthers.

Distribution: Japan (Honsyu; Kyusyu).

Mine: Ptychonomous, on the lower surface of leaves.

Remarks: This species is closely related to *L. manni* Zeller, a leaf-miner of *Quercus* in Europe, but may be distinguished from the latter by the presence of the white median fascia of the fore wing, the absence of the dark apical hook of the fore wing, and the triangular flap of the ninth sternite of the male being bilobed at the top and bearing only one seta on each lobe. It differs also from *L. nipponicella* and *L. acutissimae* by the triangular flap of the ninth sternite of the male, the cone-shaped sterigma of the female,

and the white costo-basal streak being completely fused with the median fascia into a single mark.

26. *Lithocolletis pseudolautella*, sp. nov. (Fig. 22)

♂♀. Palpus and face silk-white, with palpus spotted with black apically; tuft of head golden-yellow, sometimes mixed with a few whitish scales in centre; antenna black, apical ten segments white. Thorax golden-brown, with three narrow, white stripes, median one extremely narrow and lateral two running along inner margins of tegulae. Legs fuscous-white; fore leg blackish inside; mid and hind tibiae blackish outside; mid and hind tarsi broadly ringed with black near base.

Fore wing golden-brown, with brilliant, white markings. Medio-basal streak placed on

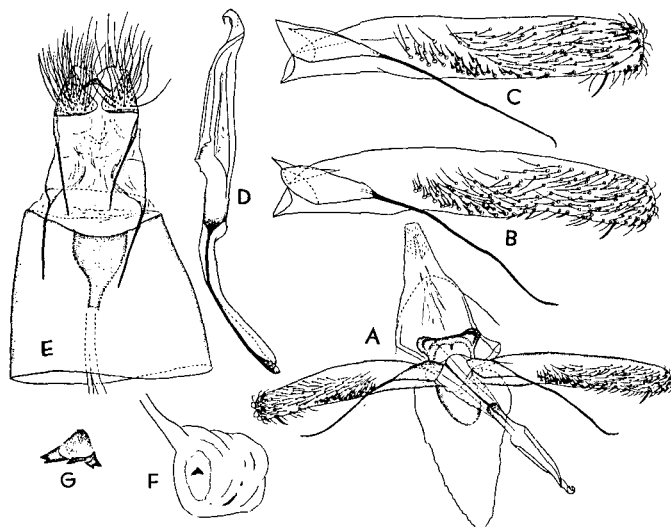


Fig. 22. *Lithocolletis pseudolautella*, sp. nov.

A: caudal view of male genitalia; B & C: right valva; D: aedoeagus; E: ventral view of female genitalia; F: corpus bursae; G: sclerotized projections of signum.

fold, straight, nearly extending to basal $1/4$, slightly widened towards apex, and margined with black scales on whole of edges. A dorsal streak placed at basal $1/8$, very short, sometimes forming a minute spot. A fascia placed a little before middle, straight or slightly convex outwardly, and markedly margined with black scales internally. Two or three costal blotches separated by nearly equal distances from each other and from the fascia, vertical or slightly oblique inwardly, wedge-shaped, and margined with black scales internally. A triangular dorsal blotch placed just before tornus, largest among white blotches, and margined with black scales both internally and externally. A very small, white spot placed on termen, not extending to cilia, and surrounded by black scales. An ill-defined, large, black blotch placed beyond last white dorsal spot in parallel with termen of wing. Basal half of cilia broadly purplish-black, and the apical half pale greyish-yellow. Hind wing dark

grey, with cilia pale grey.

Expanse of fore wings, 6.0-7.5 mm.

Male genitalia symmetrical. Valva very elongate, almost straight, with a rather long, spine-like seta at apical 1/10 to 1/8 of hind margin, and with many shorter, spine-like setae and a number of slender setae on inner surface; costal process cone-shaped, with filament-like seta very slender, somewhat sinuate. Flap of ninth sternite elongate-triangular, bluntly pointed apically. Aedoeagus somewhat spiraled, with two longitudinal membranes on apical 1/3.

Female genitalia symmetrical. Sclerotized area of eighth segment interrupted on ventrum. Sterigma originating from caudal margin of seventh segment, campanulate in shape,

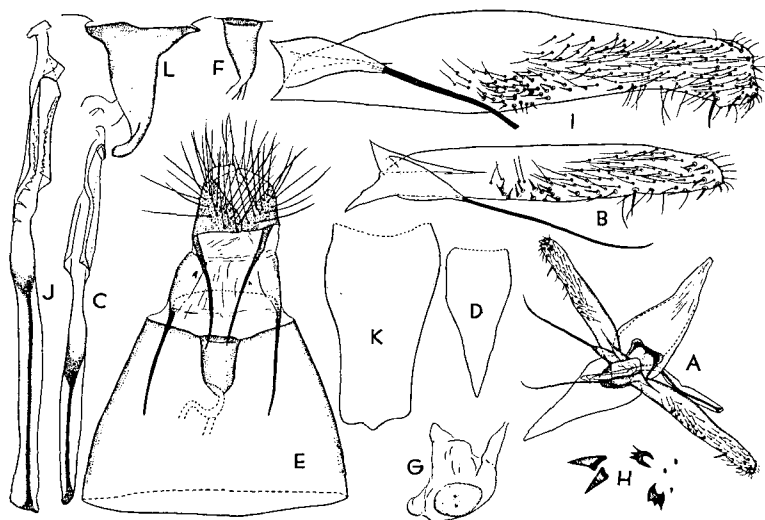


Fig. 23. A-H: *Lithocolletis pygmaea*, sp. nov.;

I-L: *Lithocolletis lautella* Zeller.

A: caudal view of male genitalia; B & I: right valva; C & J: aedoeagus; D & K: flap of ninth sternite; E: ventral view of female genitalia; F & L: ventral view of sterigma; G: corpus bursae; H: variations of sclerotized projections of signa.

with its cephalic top narrowed, truncated, and reaching middle of seventh segment. Signum subelliptical, bearing a few projections in centre.

Holotype: ♂ (host: *Quercus serrata*), Otaki, Nagano-ken, Honsyu, 5. IV, 1958, K. Kamijo leg. Paratypes: 1 ♂ & 1 ♀ (host: *Q. mongolica* var. *grosseserrata*), Nukabira, Hokkaido, 21. VII, 1959, T. Kumata leg.; 5 ♂♂ & 1 ♀ (host: *Q. mongolica* var. *grosseserrata*), Nopporo, Hokkaido, 4-9. VII, 1956, T. Kumata leg.; 4 ♂♂ & 7 ♀♀ (host: *Q. mongolica* var. *grosseserrata*), Sapporo, Hokkaido, 1-8. VII, 1956, T. Kumata leg.; 1 ♂ & 1 ♀ (host: *Q. mongolica* var. *grosseserrata*), Zyôzankei, Hokkaido, 21-27. VII, 1956, T. Kumata leg.; 3 ♂♂ & 3 ♀♀ (host: *Q. serrata*), Gamusi, Hiyama, Hokkaido, 21-23. VII, 1958, T. Kumata leg.; 1 ♀ (host: *Q. serrata*), Yatugadake (at 1600 m.), Nagano-ken, Honsyu, 8. IV, 1958, K.

Kamijo leg.; 2♂♂ & 2♀♀ (host: *Q. serraia*), Otaki, Nagano-ken, Honsyu, 5.-10. IV, 1958. K. Kamijo leg.

Host plants: *Quercus serrata* Thunberg and *Quercus mongolica* Fischer var. *grosseserrata* Rehder et Wilson.

Distribution: Japan (Hokkaido; Honsyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves.

Remarks: This species is very closely related to *L. lautella* Zeller (Fig. 23, I-L), a leaf-miner of oaks in Europe, from which it may be distinguished by the brownish tuft of the head (which is black in *lautella*), by the shape of the flap of the ninth sternite in the male, and by the form of the sterigma in the female.

27. *Lithocolletis pygmaea*, sp. nov. (Fig. 23, A-H)

♂♀. Palpus fuscous-white, with a dark apical spot on caudal surface; face silvery-white; tuft of head brownish-yellow; antenna black, with apical nine to ten segments white. Thorax golden-brown, with apical half of tegula leaden-metallic. Legs silvery-white; fore leg blackish inside; mid and hind tibiae blackish outside; hind tarsus with two, subapical and subbasal, rings black and broad.

Fore wing reddish-brown, tinged with golden reflections, with silvery-white markings. Medio-basal streak placed on fold, extending to basal 1/5, rather straight, and broadly margined with black scales on whole edge. A dorsal streak placed at basal 1/8, very short, margined with black scales on upper edge. A fascia placed a little before middle, usually straight, becoming narrower towards costa, and broadly margined with black scales both internally and externally; black external margin somewhat invisible on the dorsal half. Two costal blotches separated by a distance from each other and from the fascia, slightly oblique inwardly, wedge-shaped, and surrounded by black scales. A dorsal blotch placed just before tornus, triangular, surrounded by black scales. An ill-defined, purplish-black, large blotch placed on discal area near apex of wing, with a very small, indistinct, silvery-white spot in its centre. Cilia greyish-white, with basal half broadly greyish-black. Hind wing dark grey, with cilia greyish-white.

Expanse of fore wings, 5.0-5.5 mm.

Male genitalia symmetrical. Valva rather slender, straight, with a rather long, spine-like seta at apical 1/5 to 1/4 of hind margin, and with a few short, spine-like setae and a number of slender setae on inner surface; costal process cone-shaped, with filament-like seta very slender, extending to about apical 1/6 of valva. Flap of ninth sternite widest at basal 1/5, then suddenly becoming narrower and acutely pointed apically. Aedoeagus very similar to that of the preceding species in structure, but shorter.

Female genitalia symmetrical. Sterigma originating from caudal margin of seventh segment, cylindrical, slightly narrowed cephalad, and obliquely truncated at cephalic end.

Holotype: ♂ (host: *Quercus mongolica* var. *grosseserrata*), Sapporo, Hokkaido 21. VII, 1959, T. Kumata leg. Paratypes: 1♀ (host: *C. mongolica* var. *grosseserrata*), Sapporo, Hokkaido, 21. VII, 1959, T. Kumata leg.; 1♂ & 1♀ (host: *Castanea crenata*), Ino, Kōti-ken, Sikoku, 13.-25. VI, 1957, T. Kumata leg.; 1♀ (host: *Quercus acutissima*), Hikosan, Kyusyu,

28. IV, 1954, H. Kuroko leg.; 1 ♂ (host: *Q. acutissima*), Hikosan, Kyusyu, 18. VII, 1954, H. Kuroko leg.; 2 ♀♀ (host: *Q. acutissima*), Hikosan, Kyusyu, 9.-10. VIII, 1957, H. Kuroko leg. The paratypes collected by Dr. H. Kuroko are deposited in the collection of the Entomological Laboratory, Kyusyu University.

Host plants: *Quercus mongolica* Fischer var. *grosseserrata* Rehder et Wilson, *Quercus acutissima* Carruthers and *Castanea crenata* Siebold et Zuccarini.

Distribution: Japan (Hokkaido; Sikoku; Kyusyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves.

Remarks: This is the smallest species of *Lithocolletis* known to occur in Japan. In the colour-pattern and the genital structure it is very similar to *L. pseudolautella* and *L. lautella*, but differs from the latter two by the fact that the white median fascia of the fore wing is margined with black scales not only on the anterior edge but also on the posterior edge, and that the rather long spine-like seta of the valva is situated at the apical 1/5 to 1/4, etc.

28. *Lithocolletis rostrispinosa*, sp. nov. (Fig. 9, A & B)

♂. Palpus and face white; tuft of head snow-white, mixed with golden-brown scales laterally; antenna fuscous-white, apical segment dark. Thorax golden-ochreous, with three white stripes, lateral two of which run along inner margins of tegulae. Legs whitish; fore leg dark brown inside; mid tibia lined with black outside; mid tarsus broadly ringed with black basally; hind leg damaged.

Fore wing golden-ochreous, with white markings margined with black scales internally. Medio-basal streak placed on fold, extending to basal 2/5, slender, upwardly bent at its apical 1/3, and scarcely margined with dark scales on upper edge. Dorso-basal streak extremely narrow, half as long as the medio-basal. First pair of opposite costal and dorsal streaks placed on middle, strongly oblique outwardly, a little produced and pointed towards apex of wing, the dorsal being about twice as long as the costal. Second pair of streaks placed at apical 1/3 or just before tornus, the dorsal being triangular, very wide on dorsal margin of wing, with its anterior margin very oblique or much curved outwardly, and the costal being rather slender, vertical, and wedge-shaped. Two costal streaks separated by a distance from each other and from the second costal, slightly oblique inwardly, and wedge-shaped. An indistinct dorsal spot placed on termen beyond tornus, not extending to cilia. A streak of dark irrorations placed on apex of wing in parallel with termen. A black marginal line in cilia running along apex of wing; cilia yellowish-white. Hind wing grey, with cilia pale yellowish-grey.

Expanse of fore wings, 6.2 mm.

Male genitalia symmetrical. Valva very slender, slightly arched upwardly, with an inwardly curved, strong, spine-like seta near apex of hind margin, with a row of some short, spine-like setae on apical half of inner surface, and with a few slender setae on inner surface; costal process semiellipsoidal, with a long, sinuate, filament-like seta extending near apex of valva. Saccus very elongate; flap of ninth sternite suddenly narrowed towards apex, and rather acutely pointed apically. Aedoeagus thickened on apical 1/7, with a

minute, slender barb at apex.

Holotype: ♂ (host: *Quercus serrata*), Hikosan, Kyusyu, 5. VI, 1957, T. Kumata leg.

Host plants: *Quercus serrata* Thunberg.

Distribution: Japan (Kyusyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves.

Remarks: This species somewhat resembles *L. ilicifoliella* Zeller, a leaf-miner of *Quercus* in Europe, in the structure of the genitalia and in the form of the median marks of the fore wing, but differs conspicuously from *ilicifoliella* by the fore wing without a dark apical hook, the saccus without a long apical projection, the apically pointed flap of the ninth sternite, and the very sinuate filament-like seta extending near the apex of the valva.

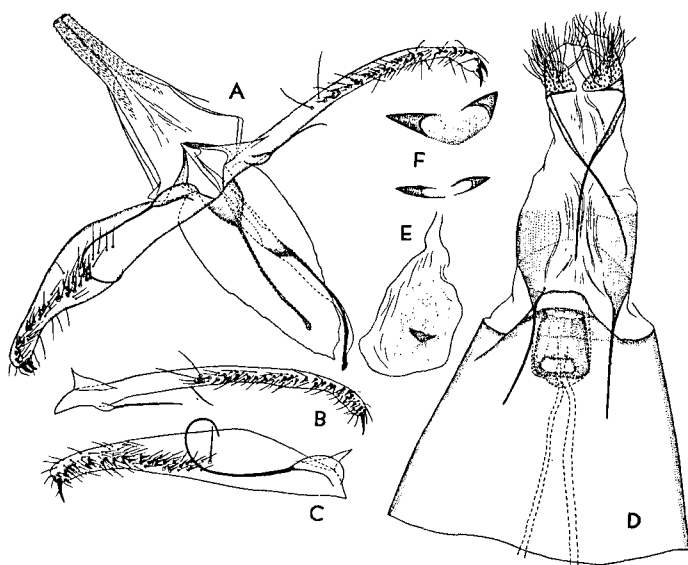


Fig. 24. *Lithocolletis mongolicae*, sp. nov.

A: caudal view of male genitalia; B: right valva; C: left valva;
D: ventral view of female genitalia; E: corpus bursae; F:
variations of sclerotized projections of signa.

29. *Lithocolletis cretata* Kumata

Lithocolletis cretata Kumata, 1957, Ins. Mats. 21: 67.

Specimens examined: Types of *cretata*.

Host plants: *Quercus serrata* Thunberg and *Quercus mongolica* Fischer var. *grosseserrata* Rehder et Wilson.

Distribution: Japan (Hokkaido).

Mine: Ptychonomous, rather small, situated between two veins of the lower surface of leaves; cocoon wholly surrounded by black frasses.

30. *Lithocolletis mongolicae*, sp. nov. (Fig. 24)

♂♀. Palpus and face silk-white; palpus with black apical blotch outside; tuft of head

yellowish-white, mixed with a few golden-ochreous scales laterally; antenna black, with apical eight to ten segments pure white. Thorax golden-brown, with three stripes, of which lateral two run along the inner margins of the tegulae. Legs white; fore leg blackish inside; basal segment of hind tarsus black in whole.

Fore wing golden-brown, with white markings margined with dark scales internally. Medio-basal streak placed on fold, straight, extending to about basal $2/7$, and conspicuously surrounded by dark scales. Costo-basal streak equal to the medio-basal in size, surrounded by dark scales. Dorso-basal streak a little shorter than the other, and margined with dark scales on upper edge. A fascia placed just before middle, rather vertical, and slightly convex outwardly. A pair of opposite costal and dorsal blotches placed at apical $1/3$ or just before tornus, wedge-shaped or rectangular, vertical or slightly oblique outwardly, the dorsal being slightly longer than the costal. An ill-defined, black blotch running along termen near apex of wing, with a very small, white spot in its centre. A white costal blotch placed between the first costal and apex of wing, slightly oblique inwardly, and wedge-shaped. A black spot placed on apex of wing. Basal half of cilia broadly purplish-black, the apical half being yellowish-white. Hind wing grey, with cilia greyish-white.

Expanse of fore wings, 5.5–7.0 mm.

Male genitalia asymmetrical, especially in valvae and costal processes. Right valva very slender, slightly dilated apically, weakly arched upwardly, with one or two short, spine-like setae on apex, and with many minute, spine-like setae and some slender setae on inner surface; costal process very small, fusiform, with filament-like seta rather short, and almost straight. Left valva as long as the right, and much dilated at middle, where it is 4 times as wide as that of the right, with many various setae like the right; costal process thrice as long as the right, curved, and fusiform, with filament-like seta more than twice as long as the right, and circularly curved on its apical half. Saccus semicircular, bearing a very long, slender projection on cephalic top; flap of ninth sternite spatular, rounded or bluntly pointed apically. Aedoeagus with round apical barb.

Female genitalia symmetrical. Caudal margin of seventh segment partially convex on ventrum, with sclerotized sterigma placed under the convexity, thick, and cylindrical.

Holotype: ♂ (host: *Quercus mongolica* var. *grosseserrata*), Wakkanai, Hokkaido, 7. VIII, 1958, T. Kumata leg. Paratypes: 2 ♂♂ & 4 ♀♀ (host: *Q. mongolica* var. *grosseserrata*), Wakkanai, Hokkaido, VIII, 1958, T. Kumata leg.; 1 ♀ (host: *Q. mongolica* var. *grosseserrata*), Gamusi, Hiyama, Hokkaido, 26. VII, 1958, T. Kumata leg.; 1 ♂ (host: *Q. mongolica* var. *grosseserrata*), Yatugadake (at 1600 m.), Nagano-ken, Honsyu, 10. IV, 1958, K. Kamijo leg.; 1 ♂ & 1 ♀ (host: *Q. serrata*), Otaki, Nagano-ken, Honsyu, 5. IV, 1958, K. Kamijo leg.; 3 ♂♂ & 3 ♀♀, Mt. Turugi, Sikoku, 2. VI, 1957, M. Okada leg.; 1 ♂, Mt. Sara, Sikoku, 1. VI, 1958, M. Okada leg.; 1 ♂ (host: *Q. mongolica* var. *grosseserrata*), Mt. Kuzyu, Kyusyu, 8. VIII, 1955, H. Kuroko leg., in the Entomological Laboratory, Kyusyu University.

Host plants: *Quercus mongolica* Fischer var. *grosseserrata* Rehder et Wilson and *Quercus serrata* Thunberg.

Distribution: Japan (Hokkaido; Honsyu; Sikoku; Kyusyu).

Mine: Ptychonomous, on the lower surface of leaves; cocoon surrounded by black

frasses.

Remarks: In general feature this species is similar to *L. cretata*, but is readily distinguished from the latter by the broadly black termen of the fore wing, the black antenna except the apical eight to ten segments being wholly white, the conspicuously asymmetrical valvae, and the sclerotized sterigma.

31. *Lithocolletis leucocorona* Kumata

Lithocolletis leucocorona Kumata, 1957, Ins. Mats. 21: 66.

Specimens examined: Types of *leucocorona*; 1 ♀ (host: *Quercus serrata*), Nisinomiya, Honsyu, 10. VI, 1949, S. Issiki leg.; 1 ♂ (host: *Q. serrata*), Hukuoka, Kyusyu, 16. VI, 1957, T. Kumata leg.

Host plants: *Quercus dentata* Thunberg and *Quercus serrata* Thunberg.

Distribution: Japan (Hokkaido; Honsyu; Kyusyu).

Mine: Ptychonomous, situated between two veins of the lower surface of leaves; cocoon surrounded or enveloped by black frasses.

—To be continued—

HOST RECORDS OF BRACONIDAE

By CHIHISA WATANABE

Subfamily **Microgasterinae**

***Apanteles parnarae* Watanabe**

Apanteles parnarae Watanabe, Ins. Mats. 10: 50, 1935.

Specimens examined: Many examples, Kusatsu, Shiga-ken, Honshu, Japan, 5-ix-57, T. Shimbo leg., bred from the larva of *Parnara guttata*.

Host: *Parnara guttata* Bremer.

This species was originally described in 1935 from North China as a parasite of *Parnara guttata*. Having compared the specimens examined with the types of *A. parnarae*, I have been convinced that these specimens should be identified with this species which is new to Japan. It is a gregarious parasite. The cocoons examined are white, clustered indiscriminately together in a mass, surrounded by some loose silk, and attached to the leaf of the rice-plant.

Subfamily **Euphorinae**

***Meteorus versicolor* (Wesmael)**

Perilitus versicolor Wesmael, Nouv. Mém. Acad. Sci. Bruxel. 9: 43, ♀♂, 1835.

Meteorus versicolor: Watanabe, Jour. Facul. Agr. Hokkaido Imp. Univ. 42: 132, 1937; Ogata, Jap. J. Sanit. Zool. 9: 223, 1958.

Specimens examined: 1 ♀, 1 ♂, Fukushima, Hokkaido, vi-61, M. Hasegawa leg., bred from the larva of *Euproctis flava*.

Host: *Euproctis flava* Bremer.

This species is also recorded by Ogata (1958) from Asakawa, Tokyo, as a parasite of *Euproctis flava*.