INSECTA MATSUMURANA

NEW SERIES 52 : 105-131 DECEMBER 1995

SOME SPECIES OF THE SUBFAMILY LITHOCOLLETINAE [GRACILLARIIDAE, LEPIDOPTERA] COLLECTED IN THE PHILIPPINES

By TOSIO KUMATA

Systematic and Ecological Surveys on Some Plant-Parasitic Microarthropods in Southeast Asia, Scientific Report No. 23.

Abstract

KUMATA, T. 1995. Some species of the subfamily Lithocolletinae [Gracillariidae, Lepidoptera] collected in the Philippines. *Ins. matsum. n. s.* 52 : 105-131, 13 figs. (8 text-figs., 5 pls.).

Ten species of the subfamily Lithocolletinae are added to the Philippine fauna, in which only two species of the family have hitherto been known. They are classified in four genera : two in *Neolithocolletis*, five in *Cameraria*, one in *Porphyrosela*, and two in *Phyllonorycter*. Three species, *Cameraria philippinensis*, *C. palawanensis* and *Phyllonorycter luzonica*, are new to science ; other three are not decided about their species names. The larval body chaetotaxy of *Porphyrosela dorinda* is described and illustrated, and it suggests that the genus *Porphyrosela* is more related to *Cameraria* than to *Phyllonorycter* contrary to the previous assumption. The fore wing and the genitalia are illustrated for the new species and some others. Photographs of leaf-mines are provided for all the species recorded in this paper.

In Appendix, a new name is given to *Phyllonorycter myricae* Kumata, 1993, which is an objective junior homonym of *Phyllonorycter (Lithocolletis) myricae* Deschka, 1976.

Author's address. Laboratory of Systematic Entomology, Faculty of Agriculture, Hokkaidô University, Sapporo, 060 Japan.

Supported by Grants-in-Aid, Ministry of Education, Science and Culture, Japan, Nos. 02041005 and 05041078 (International Scientific Research Program).

Contents

INTRODUCTION

A comprehensive work on Microlepidoptera of the Philippines was published by A. Diakonoff in 1967. In this work are dealt with two species of the family Gracillariidae, namely, *Epicephala chalybacma* Meyrick and *Lithocolletis triarcha* Meyrick. The latter species surely belongs to the subfamily Lithocolletinae though it is now transferred to the genus *Phyllonorycter*. Since his work no paper on the Philippine Gracillariidae has been published so far.

Recently, I have had the opportunities to make trips for collecting leaf-mining Microlepidoptera in the Philippines under the Japan-Philippines joint surveys held in 1992 to 1994. Based on the material obtained during the trips, ten species of the subfamily Lithocolletinae are now added to the Philippine fauna. Three of them are new to science, and other three are not decided about their species names because of insufficient material.

The eleven Philippines species of the subfamily, including *Phyllonorycter triarcha* recorded by Diakonoff (1967), are classified in four genera as follows: two in *Neolithocolletis*, five in *Cameraria*, one in *Porphyrosela*, and three in *Phyllonorycter*. The species composition mentioned above is similar to that recorded from Malaysia by Kumata (1993). The paucity of the genus *Phyllonorycter* is peculiar to the Philippine fauna of the Lithocolletinae as well as to the Malaysian fauna. Moreover, five of the eleven Philippine species have also been recorded from Malaysia. It is possible that the three species described in this paper are endemic to the Philippines, though our knowledge on the Asian Lithocolletinae is still too poor to discuss their distributions.

In Appendix at the conclusion of this paper I give a new name to *Phyllonorycter myricae* Kumata, 1993, described from Malaysia, because this name is an objective junior homonym of *Phyllonorycter myricae* Deschka, 1976, described from Madeira.

MATERIALS AND TYPE DEPOSITORIES

The specimens used were reared by me from larvae mining in leaves of their food plants collected during trips in the Philippines in connection with the project "Systematic and Ecological Surveys on Some Plant-Parasitic Microarthropods in Southeast Asia". The trips were made in Dec. 1992-Jan. 1993 in central and southern Luzon I., in Aug. 1993 in Palawan I., and in Aug. 1994 in northern Mindoro I. and central Luzon I. About 150 adult specimens of the subfamily Lithocolletinae were obtained during these trips.

All the holotypes and about half of the paratypes of the new species described in this paper are deposited in the collection of the Natural History Museum, University of the Philippines at Los Baños (UPLB), and the other paratypes are in the collection of Systematic Entomology Lab. (formerly Entomological Institute), Hokkaidô University at Sapporo (SEHU). Moreover, about half of the specimens of the identified species are also preserved in UPLB, and the rest in SEHU together with herbarium specimens of larval mines.

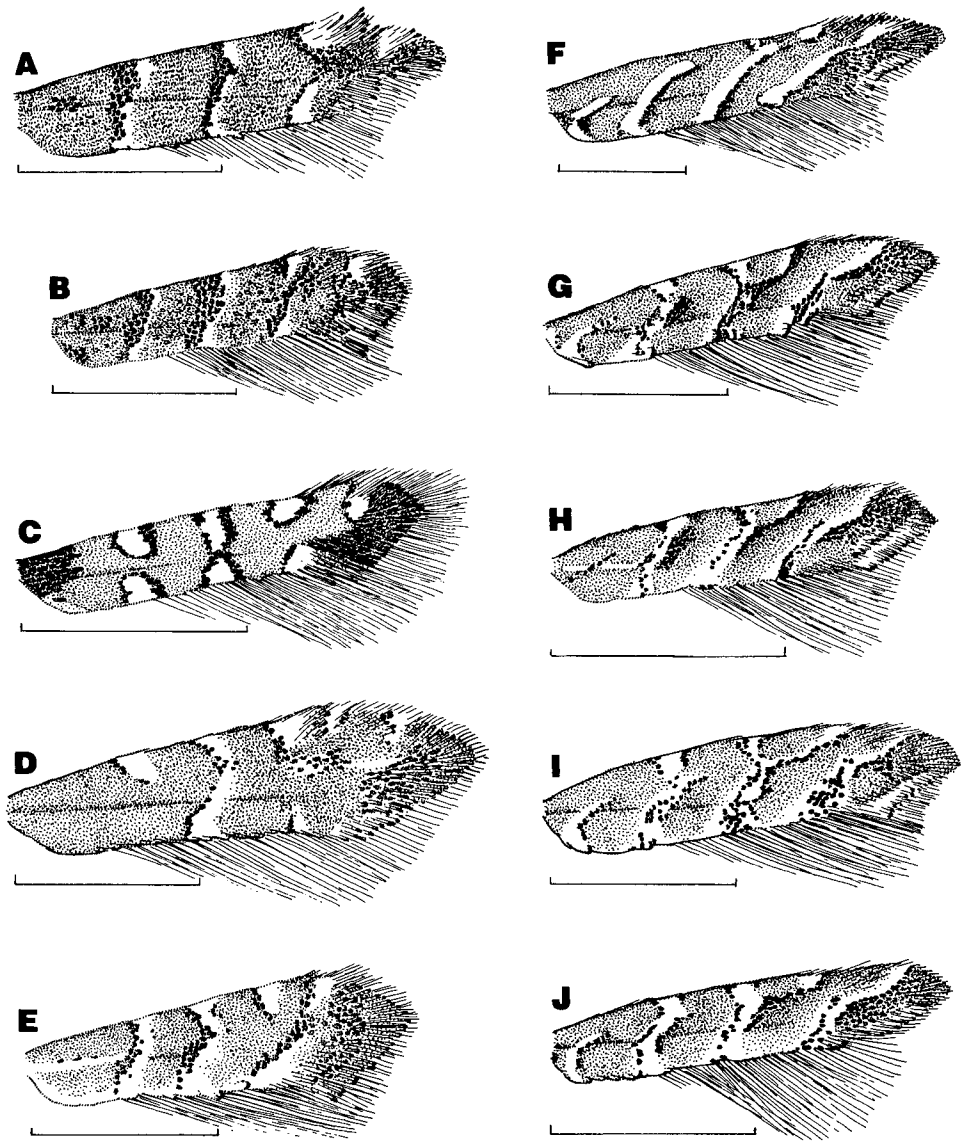


Fig. 1. Fore wing. A : *Neolithocolletis pentadesma* (Meyrick) — B : *Neolithocolletis* sp. — C : *Porphyrosela dorinda* (Meyrick) — D : *Phyllonorycter conista* (Meyrick) — E : *P. luzonica* sp. nov. — F : *Cameraria philippinensis* sp. nov. — G : *C. pongamiae* Kumata — H : *C. palawanensis* sp. nov. — I : *Cameraria* sp. 1 — J : *Cameraria* sp. 2.

GENUS NEOLITHOCOLLETIS KUMATA

The members of this genus are all known to make similar blotch-mines in leaves of the family Leguminosae in East and Southeast Asia (Kumata, 1993). During servey trips in the Philippines, leaf-mines of the following two species were also found on legumes.

Neolithocolletis pentadesma (Meyrick)
[Figs. 1(A), 10 (A-B)]

Lithocolletis pentadesma Meyrick, 1918 : 230.

Neolithocolletis pentadesma : Kumata, 1993 : 8, figs. 3 (male genitalia), 5 (A-B) (female genitalia), 33 (A) (fore wing), 35 (B) (wing venation), 38 (B) (larval body chaetotaxy) and 43 (D) (leaf-mine).

Specimen examined. LUZON I. : 1♀, Mt. Samat, Pilar, Bataan Prov., em. 9/ix/1994, ex *Pterocarpus indicus* (5274), Gen. sl. no. Grc-6312.

Distribution. Philippines (Luzon I.) (new record) ; Borneo (Sarawak) ; Malay Peninsula ; and Indonesia (Java).

Food plant. *Pterocarpus indicus* [Leguminosae] in the Philippines and other countries.

Notes. This species was redescribed and illustrated by Kumata, 1993, in detail. The Philippine material, though represented by a single female, is not different from the redescription.

This leaf-miner is a serious pest on *Pterocarpus indicus* in Malaysia, often causing heavy defoliations. In past years it made outbreaks on trees planted on road-sides of urban areas in Kuala Lumpur and Kuching. In the Philippines it seems to be rather rare, because it was very difficult to find leaf-mines with living larvae at the collection sites. Further, most larvae were parasitized by undetermined chalcidoid wasps.

Neolithocolletis sp.
[Figs. 1 (B), 2 (A-B), 10 (C-D)]

Specimen examined. PALAWAN I. : 1♀, Salogon, near Brooke's Point, em. 20/viii/1993, ex *Dalbergia ferruginea* (5017), Gen. sl. no. Grc-6240.

Food plant. *Dalbergia ferruginea* [Leguminosae].

Notes. At a glance the examined specimen is very similar to the preceding *N. pentadesma*, especially in the maculation of the fore wing. The present form is, however, distinguished from *N. pentadesma* by the shorter seventh abdominal segment of the female and by the form of the larval leaf-mine, which is very similar to that of *N. hikomonticola* Kumata of Japan and *N. kangarensis* Kumata of the Malay Peninsula. The distal part of the lower blotch mine is cut out into a semicircular lobe, then this lobe is folded down to cover the circular white coccon, which is located inside the uncut basal half of the mine. In *N. pentadesma* the lower blotch mine is never cut out in any part. For further discussion of his form, male specimens are indispensable.

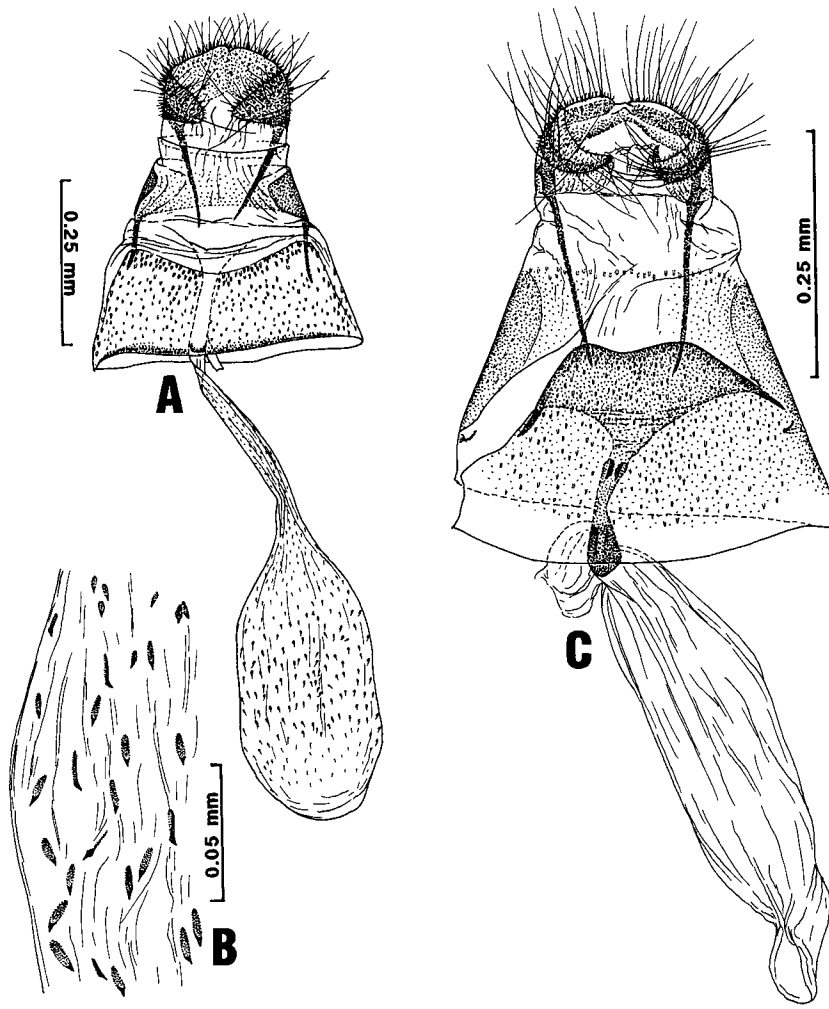


Fig. 2. A-B: *Neolithocolletis* sp. A: Female genitalia in ventral view [Gen. sl. no. Grc-6240] — B: A part of corpus bursae enlarged [ditto].
C: *Cameraria* sp. 2, female genitalia in ventral view [Gen. sl. no. Grc-6230].

Genus Cameraria Chapman

Most members of this genus are recorded from the Nearctic Region and some are from the Palaearctic and Oriental regions. In tropical Asia the known members are all peculiarly associated with a single plant family, the Leguminosae, except for one species, of which the food plant is unknown (Kumata, 1993). In the course of the present survey trips in the Philippines, the following five species also emerged from larvae mining in leaves of legumes. Two of them, however, have not yet been decided about their species names because they are represented by the female alone.

Cameraria philippinensis sp. nov.
[Figs. 1(F), 3, 4(A-C), 11(A-B)]

♂ & ♀. Expanse of wings: 4.0-6.0 mm (5.5 mm in holotype, 5.49 mm on average of eight specimens). Length of fore wing: 2.2-2.8 mm (2.5 mm in holotype, 2.51 mm on average of eight specimens).

Head with tuft ochreous, mixed with fuscous hairs anteriorly and whitish hairs posteriorly; face brilliantly white. Palpi white, with a blackish line on lower side of labial palpus. Antenna ventrally white, dorsally fuscous with paler annulations; scape white, with a fuscous line dorsally. Thorax ochre brownish dorsally, with a reversely U-shaped white mark, which is narrowly margined with fuscous internally. Fore leg blackish, tarsus ringed with white at base, middle and apex. Mid leg white, tibia with three blackish, oblique stripes, and tarsus with three blackish rings. Hind leg whitish, tibia with a browish, oblique preapical stripe, and tarsus with four blackish rings. Abdomen fuscous dorsally, silvery whitish ventrally, with a pair of lateral rows of fuscous marks.

Fore wing brilliantly ochre brownish in ground, with four very oblique, slender, white fasciae, which are nearly parallel to each other and edged with a blackish line on their outer edges; first fascia placed near base of wing, slightly arched inwardly, shortest among the fasciae, and detached far from costa; second fascia lying just before middle of wing, and very slightly detached from costa; third fascia extending from middle of dorsum to apical fifth of costa; fourth fascia from before tornus to apex of costa, sometimes interrupted by an apical mark of blackish irrorations near costa; cilia on costal side brownish, those along termen whitish, with a median fringe-line of blackish irrorations, and those along dorsum whitish grey. Hind wing grey, with cilia whitish grey.

Male genitalia as in Fig. 3. Tegumen elongate, blunt apically, sparsely squamose dorsally, with two pairs of apical setae; tuba analis with a slender subscaphium, not spinulose. Valva shorter than tegumen, somewhat elliptical, round apically, with a small conical apical projection bearing one or two apical long setae, and with a sinuate, stout seta at apex of ventral margin; ventral margin just before this stout seta serrate, the serration having a thick seta; rather dense, slender setae occurring on inner face; transtilla not developed. Vinculum V-shaped in ventral view, slightly widened mesially. Aedeagus about 1.5 times as long as valva, tapering apically and swollen basally, with a conical subapical projection, and without distinct cornuti. Sclerous juxta absent. Flap-like eighth sternite subtrapeziform, about as long as valva, rather deeply emarginate apically, with lateral corners acute and sligtly incurved. (Two slides examined.)

Female genitalia as in Fig. 4 (A-C). Papilla analis moderate, obliquely truncated on caudal margin in lateral view, squamose and spinulose as usual; apophysis posterioris long, about four times as long as apophysis anterioris, widened basally. Eighth abdominal segment moderate in size, rather thickly squamose, with apophyses slender. Seventh abdominal sternite very slightly convex caudally and weakly sclerotized on caudal margin. Ostium bursae opening at caudal end of seventh sternite, membranous; antrum sclerotized in a short ring-shape; ductus bursae membranous, long, with a ring-shaped sclerite at a caudal part shortly

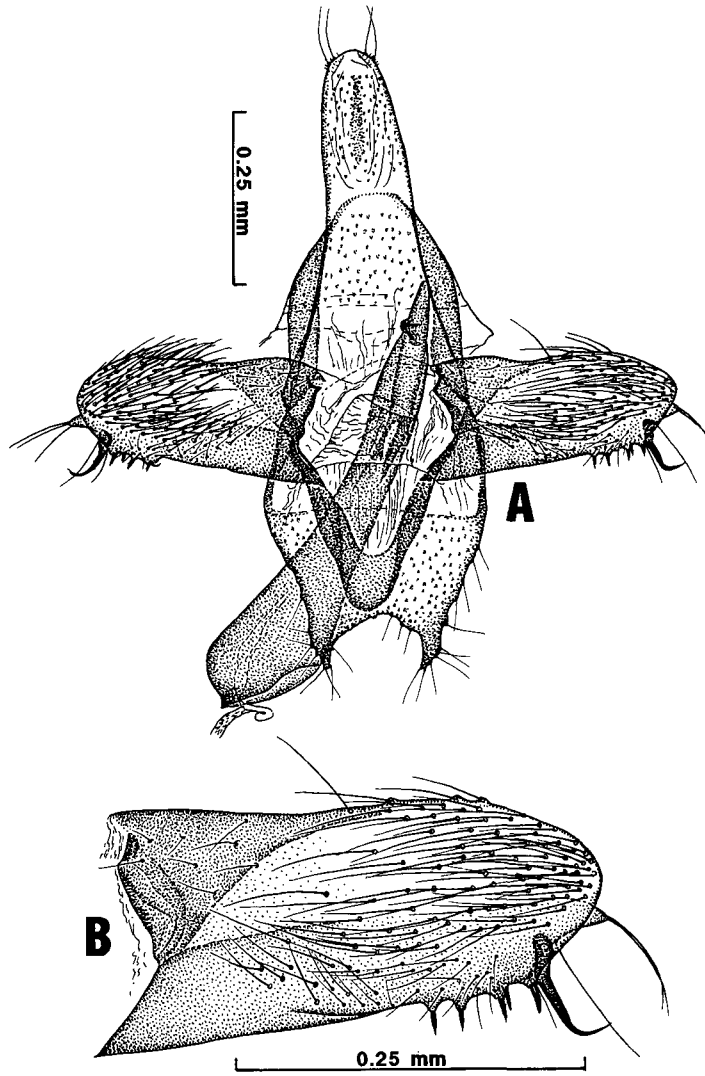


Fig. 3. *Cameraria philippinensis* sp. nov. A : Male genitalia in ventral view [holotype, Gen. sl. no. Grc-6320] — B : Right valva enlarged [ditto].

detached from antrum ; corpus bursae ellipsoidal or globular, covered with spinules on nearly half lateral area, with a smalll, circular signum surrounded by five to seven spines. (Two slides examined.)

Specimens examined. 4♂ & 5♀. Holotype: ♂, Bagac, Bataan Prov., Luzon I., em. 7/ix/1994, ex *Bauhinia malaberica* (5232), Gen. sl. no. Grc-6320. Paratypes: 3♂ & 5♀, with same locality and food plant as holotype, em. 24/viii-8/ix/1994, Gen. sl. nos. Grc-6307 (♂), Grc-6308 (♀) and Grc-6321 (♀).

Distribution. Philippines (Luzon I.).

Food plant. *Bauhinia malaberica* [Leguminosae].

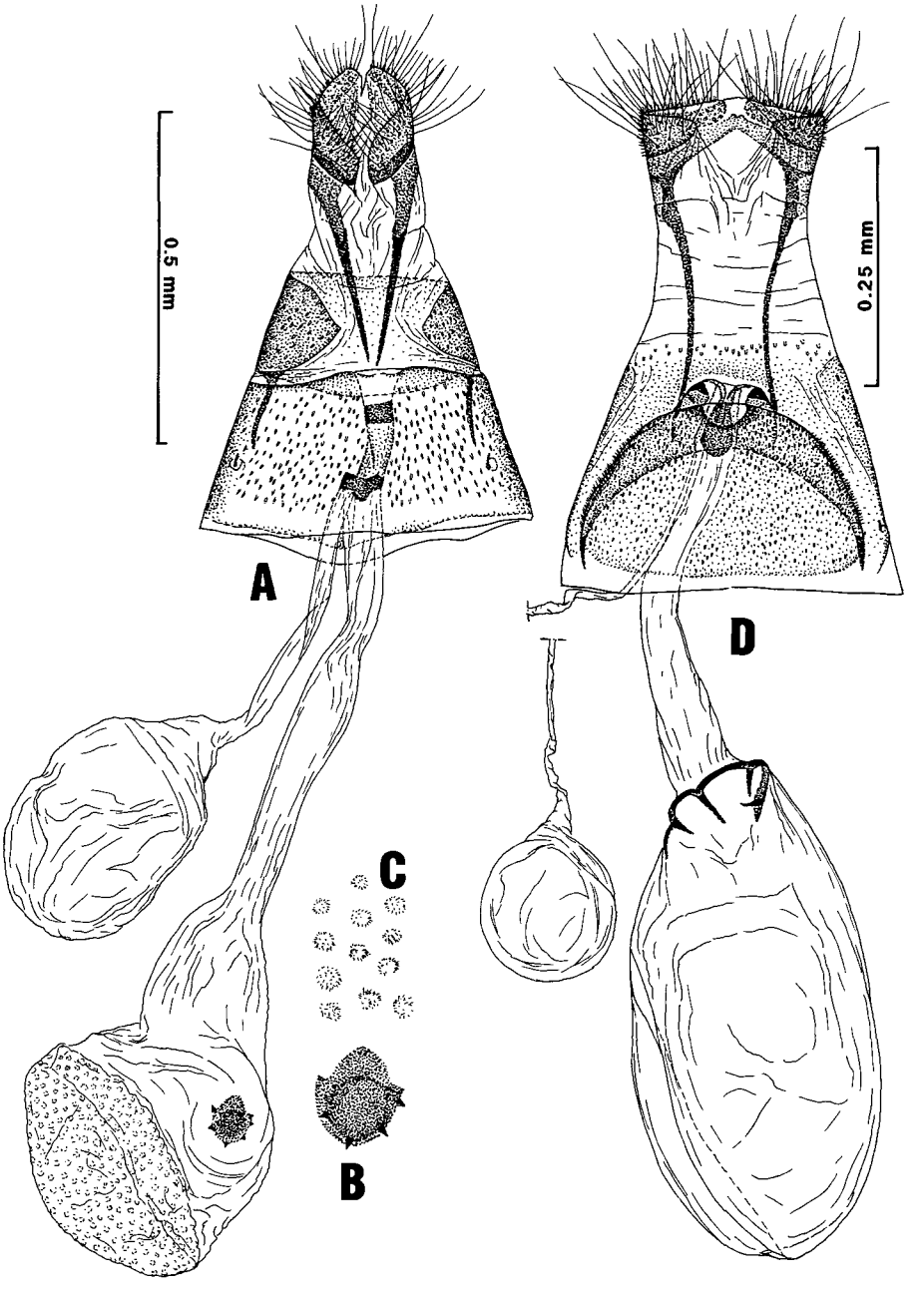


Fig. 4. A-C: *Cameraria philippinensis* sp. nov. A: Female genitalia in ventral view [paratype, Gen. sl. no. Grc-6321] — B: Signum enlarged [ditto] — C: Spinules on corpus bursae enlarged [ditto].

D: *Cameraria palawanensis* sp. nov., female genitalia in ventral view [paratype, Gen. sl. no. Grc-6229].

Mine (Fig. 11(A-B)). A blotch mine occurring on the upper surface of leaves, usually on veins, nearly circular in shape, 8-12 mm in long diameter, and blackish purple in colour. The upper epidermis of the mining part is strongly contorted to form a round dome, thus the lower side of the mine is longitudinally folded upwardly to form a round, dome-like mine-cavity. The pupation takes place inside this mine-cavity within a rough coccon.

Notes. Three species of the genus *Cameraria* have been known to make leaf-mines on plants of the genus *Bauhinia*: *C. bauhiniae* (Stainton) in India, and *C. quadrifasciata* Kumata and *C. trizosterata* Kumata both in Malaysia (Kumata, 1993). The present new species is most similar to *C. quadrifasciata* among them in all respects, especially in colour pattern. But it is distinguished from *C. quadrifasciata* by the much clearer ground colour of the fore wing, by the short and elliptical valva, by the apically emarginated flap-like eighth sternite of the male, and by the ostium bursae opening under the convex caudal margin of the seventh sternite of the female.

Cameraria pongamiae Kumata
[Figs 1(G), 9(B), 12(A)]

Cameraria pongamiae Kumata, 1993: 26, figs. 12 (male genitalia), 13 (female genitalia), 34 (F) (fore wing), 36(A) (wing venation), 41(A) (larval body chaetotaxy), and 45(A) (leaf-mine).

Specimens examined. 8♂ & 5♀. LUZON I.: 1♂, Cabayo, Bagac, Bataan Prov., em. 26/viii/1994, ex *Pongamia pinnata* (5192), Gen. sl. no. Grc-6305; 3♂ & 3♀, Bagac, Bataan Prov., em. 24/viii-2/ix/1994, ex *P. pinnata* (5243), Gen. sl. nos. Grc-6304 (♀) and Grc-6317 (♂). PALAWAN I.: 4♂ & 2♀, White Beach, Puerto Princesa, em. 16-24/viii/1993, ex *P. pinnata* (5006), Gen. sl. nos. Grc-6226 (♂) and Grc-6227 (♀).

Distribution. Philippines (Luzon I.; Palawan I.); Taiwan; Borneo (Sabah); and Malay Peninsula.

Food plant. *Pongamia pinnata* [Leguminosae] in the Philippines and other countries.

Notes. The specimens emerged from leaf-mines on the upper surface of leaves of *Pongamia pinnata* in the Philippines well agree with the type series of *C. pongamiae* collected from Malaysia and Taiwan in all essentials. *C. pongamiae* is new to the Philippine fauna; indeed, it has been expected to occur in this country, too.

Cameraria palawanensis sp. nov.
[Figs. 1(H), 4(D), 5, 11(C-D)]

♂ & ♀. Expanse of wings: 3.9-4.1 mm (4.1 mm in holotype). Length of fore wing: 1.7-1.8 mm (1.8 mm in holotype).

Head with tuft ochre brownish, mixed with whitish hairs posteriorly; face white, tinged with leaden lustre. Palpi whitish. Antenna whitish below, fuscous above, with first, third, seventh and eleventh segments from apex entirely white, and the other segments faintly annulated with white at base of each segment; scape white below, ochre brown above. Thorax ochre brownish on dorsum including

tegulae, whitish on pleural and ventral surfaces. Fore leg blackish, with coxa and two or three rings of tarsus whitish. Mid leg whitish, with two dorsal spots of tibia and three narrow rings of tarsus blackish. Hind leg whitish, coxa with a blackish, semicircular marginal line on outer side, femur spotted with fuscous apically, tibia blackish basally and brownish apically, and tarsus with four blackish, minute rings. Abdomen fuscous dorsally, whitish ventrally, with a pair of fuscous lateral lines.

Fore wing ochre brownish in ground, with markings whitish; a very narrow

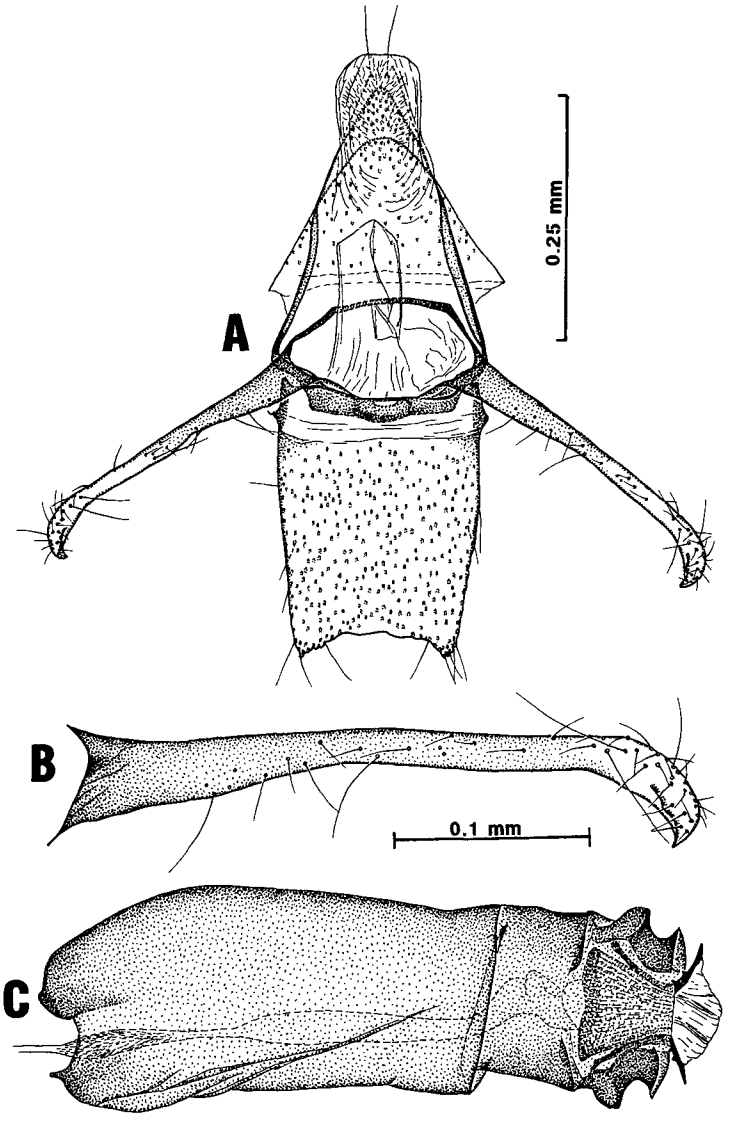


Fig. 5. *Cameraria palawanensis* sp. nov. A: Male genitalia in ventral view, aedeagus omitted [holotype, Gen. sl. no. Grc-6228] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto].

mediobasal streak reaching first fascia at basal fourth, intersected by a short, oblique line of black irrorations at its middle; first fascia oblique inwardly from costa, margined with blackish irrorations on both inner and outer edges, but in dorsal half of the fascia the inner black irrorations running inside the fascia, and in costal half the outer black irrorations becoming thicker and more conspicuous; second fascia lying nearly in mdddle of wing, parallel to the first, with blackish irrorations similar to those of the first; third fascia running from before tornus to apex of costa, the dorsal half nearly parallel to that of the second and intercalated by a narrow line of black irrorations in centre as in preceding two fasciae, and the costal half more oblique than the second and more thickly margined with black irrorations on outer edge alone; an indistinct white spot placed on costa between second and third fasciae, outwardly margined with black irrorations which are united with the outer black irrorations of second fascia; cilia on costal side ochreous brown, those along termen whitish with a median fringe-line of black irrorations, and those on dorsum pale greyish. Hind wing grey, with cilia pale greyish.

Male genitalia as in Fig. 5. Tegumen subconical, squamouse dorsally,with a pair of apical setae; tuba analsis densely spinulose apically, without sclerous subscaphium. Valva about as long as tegumen, very slender, slightly dilated basally, somewhat hook-shaped at apex, sparsely setose on inner surface; transtilla complete, slender, somewhat angulate laterally. Vinculum very short, wide-trapeziform, with lateral angulations. Aedeagus thickly cylindrical, with a pair of slender, acute barbs at apex, and with a pair of strongly sclerotized, comma-shaped sclerites located basally of the apical barbs; vesica without cornutus. Sclerous juxta absent. Flap-like eighth sternite nearly quadrangular, almost parallel-sided, with an emarginate apical margin. (One slide examined.)

Female genitalia as in Fig. 4(D). Papilla analis short, setose and spinulose rather densely; apophysis posterioris long, slender, but slightly widened on basal area. Eighth abdominal segment tightly united with the seventh, squamose dorsally, with apophysis anterioris indistinct. Seventh abdominal sternite semicircular, produced caudally to form a round flap, bearing dense spinules along lateral margins. Ostium bursae a little produced beyond flap of seventh sternite, with a pair of weakly sclerotized, round, lateral lobes; weakly sclerotized antrum pyriform, placed near opening of ostium bursae; ductus bursae moderate in length, wholly membranous; corpus bursae ellipsoidal, a little longer than ductus bursae, caudally with a slender, semicircular signum ornamented by four long, acute projections, which are much longer than those of the signum of *C. pongamiae*. (One slide examined.)

Specimens examined. 2♂ & 1♀. Holotype: ♂, Tigwayan, Bataraza, Palawan I., em. 26/viii/1993, ex *Derris elliptica* (5035), Gen. sl. no. Grc-6228. Paratypes: 1♂ & 1♀, with same locality and food plant as holotype, em. 27/viii/1993 and 3/ix/1993, Gen. sl. no. Grc-6229 (♀).

Distribution. Philippines (Palawan I.).

Food plant. *Derris elliptica* [Leguminosae].

Mine (Fig. 11(C-D)). A blotch mine occurring on the lower side of the leaf of the food plant, placed usually along margins or rarely in disc between two lateral veins, whitish in colour and slightly tentiformed in mature condition. Parenchymal tissues attached to the upper surface of the mine are incompletely eaten, giving a

mottled appearance as in mines of most species of the genus *Phyllonorycter*. The pupation takes place inside the mine-cavity within a roughly spun, whitish coccon.

Notes. This new species definitely belongs to the *virgulata*-group of the genus *Cameraria*, and is very similar to *C. virgulata* (Meyrick) and *C. pongamiae* Kumata among the members of the group. It is, however, distinguished from the latter two by the presence of a pair of comma-shaped sclerites near the apex of the aedeagus, by the sclerotized antrum placed near the opening of the ostium bursae, by the longer projections of the signum, by the spinulate lateral margins of the round flap-like seventh sternite of the female, and by the larval mine occurring on the lower surface of the host leaf.

Cameraria sp. 1

[Figs. 1(I), 6(A), 12(B)]

Specimens examined. 2♀, Cabayo, Bagac, Bataan Prov., Luzon I., em. 23/viii-2/ix/1994, ex *Pongamia pinnata* (5193), Gen. sl. nos. Grc-6306 and Grc-6316.

Food plant. *Pongamia pinnata* [Leguminosae].

Notes. The examined specimens emerged from larvae mining in the lower layer of a leaf of *Pongamia pinnata*. They are very similar in colour-pattern and size to *Cameraria pongamiae* Kumata and *C. magnisignata* Kumata, both of which are also associated with the same plant species. Moreover, leaf-mines of *Cameraria* sp. 1 and *C. pongamiae* were found on the same tree, even on the same leaf, at the collection site in the Philippines. However, *Cameraria* sp. 1 occurs on the lower side, while *C. pongamiae* on the upper side.

The present species is distinctly separated from *C. ponamiae* and *C. magnisignata*, and also from the preceding *C. palawanensis*, by the simple corpus bursae without any sclerous signum and by the spinulate and reversely bent ductus bursae in genitalia (Fig. 6(A)). It may be a new species belonging to the *virgulata*-group. At present, however, I wish to avoid giving a new name to it, because it is represented by the female alone.

Cameraria sp. 2

[Figs. 1(J), 2(C), 12(C)]

Specimen examined. 1♀, Mt. Makiling (alt. 500 m), Laguna Prov., Luzon I., em. 27/wii/1992, ex an undetermined legume (4826), Gen. sl. no. Grc-6230.

Food plant. An undetermined species of the Leguminosae.

Notes. The single female specimen at hand may belong to a new member of the *virgulata*-group of the genus *Cameraria*. It is similar in the colour-pattern of the fore wing to the other members of the species group, though it is rather bad in condition. Moreover, it has a caudal lobe covering over the ostium bursae in the seventh abdominal sternite as in other members of the species group. It is, however, distinguishable in the shorter ductus bursae with a bilobated antrum and in the simply membranous corpus bursae without any signum and spinulate area (Fig. 2(C)). Further specimens including males are necessary for a formal description.

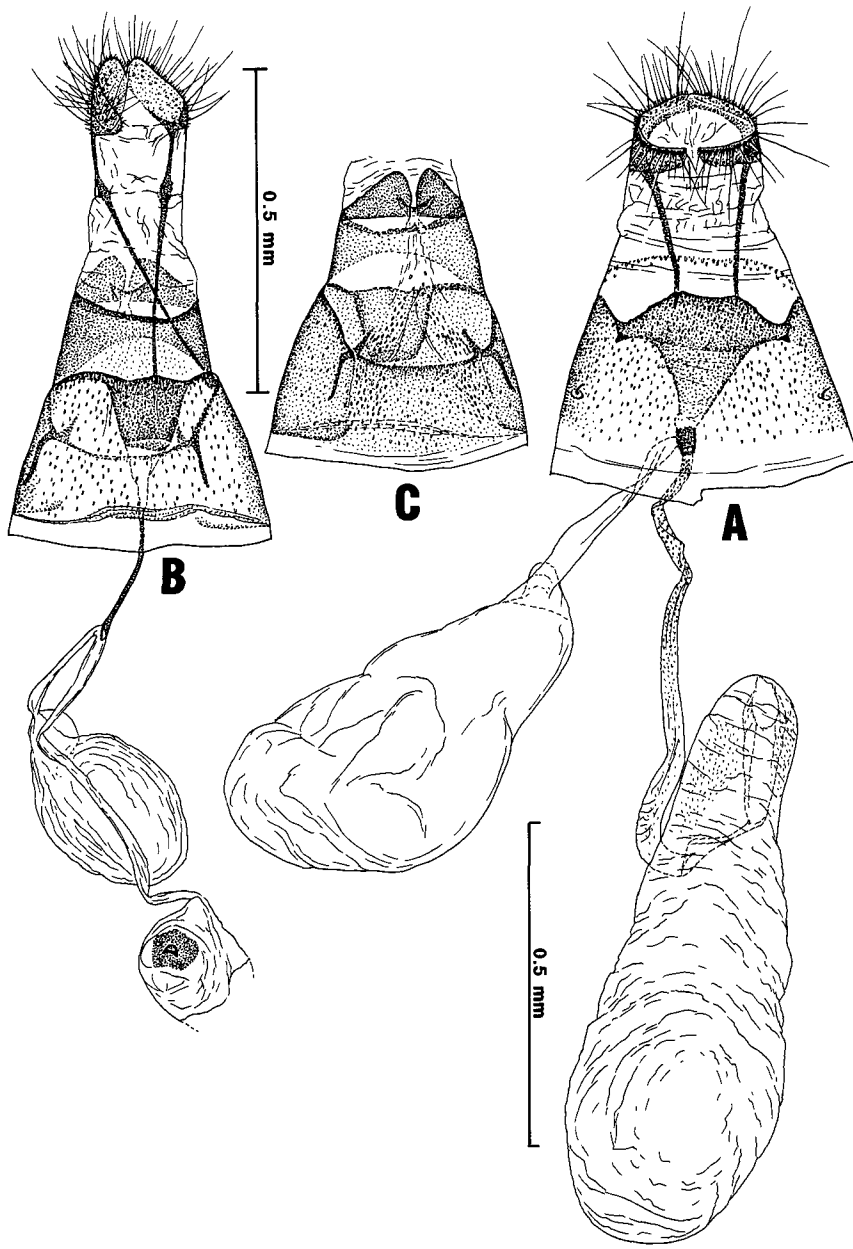


Fig. 6. A: *Cameraria* sp. 1, female genitalia in ventral view [Gen. sl. no. Grc-6316].
B-C: *Phyllonorycter luzonica* sp. nov. B: Female genitalia in ventral view [paratype, Gen. sl. no. Grc-6318]—C: Seventh and eighth abdominal segments of female in dorsal view [ditto].

Genus Porphyrosela Braun

The validity of this genus was discussed by Kumata (1993) on the basis of adult structures. Fortunately, during trips in the Philippines, larvae of *P. dorinda* were collected from several localities. The body chaetotaxy (Fig. 9(C)) of these larvae suggests that *Porphyrosela* is more related to *Cameraria* than to *Phyllonorycter* as follows: — Prothorax with seta SV2 absent as in the *virgulata*-group of *Cameraria* (in other groups including *Phyllonorycter*, prothorax with two subventral setae, SV1 and SV2); second to seventh abdominal segments each with two lateral setae, L1 and L2, as in *Cameraria, Neolithocolletis* and *Hyloconis* (in *Phyllonorycter*, all abdominal segments with only one lateral seta, L1), seta V1 absent on sixth to ninth abdominal segments and proprioceptor MV3 absent on all abdominal segments as in the *virgulata*-group (in other groups including *Phyllonorycter*, seta V1 usually present on abdominal segments, and propriocepter MV3 also present on abdominal segments except on eighth and ninth).

On the other hand, the following larval characters indicate that *Porphyrosela* is distinct from *Cameraria*: — Body segments except for prothorax and anal segment lacking dorsal and ventral sclerous shields as in *Phyllonorycter*; first abdominal segment without setae L2 and SV1; and eighth abdominal segment without seta L2. The last two characters seem to be specific to *Porphyrosela*.

These larval characters combined with adult characters clearly show that *Porphyrosela* is a good genus. Further, it is more related to the genus *Cameraria* than to the genus *Phyllonorycter*, and especially closely to one species-group of *Cameraria*, the *virgulata*-group. In this connection it may be noteworthy that both the groups are, so far as known, exclusively associated with Leguminosae.

Porphyrosela dorinda (Meyrick)

[Figs. 1(C), 9(C), 12(D)]

Lithocolletis dorinda Meyrick, 1912: 21.

Porphyrosela dorinda: Kumata, 1993: 52, figs. 24 (male genitalia), 25 (female genitalia), 33(D) (fore wing), 37(C) (wing venation), and 47(A-C) (leaf-mine).

Specimens examined. Adult: 15♂ & 40♀. Luzon I.: 2♂ & 5♀, Mt. Makiling (alt 500 m), Laguna Prov., em. 30/xii/1992-1/I/1993, ex an undetermined legume (4849), Gen. sl. nos. Grc-6225 (♂) and Grc-6239 (♀); 2♂& 1♀, Ditto, em. 10-14/viii/1994, ex *Calopogonium* sp. (5098); 2♂ & 7♀, Ditto, em. 9-16/viii/1994, ex *Desmodium gangeticum* (5108); 10♂ & 33♀, Mariveles, Bataan Prov., em. 25-28/viii/1994, ex *D. gangeticum* (5255), Gen. sl. no. Grc-6337 (♀). Mindoro I.: 1♂ & 1♀, Villaflor, Puerto Galera, em. 22/viii/1994, ex *Calopogonium* sp. (5141).

Larvae: 4 exs. of last instar, Mt. Makiling (alt. 500), Laguna Prov., Luzon I., 24/xii/1992, ex an undertermined legume (4849), mounted on slides.

Distribution. Philippines (Luzon I.; Mindoro I.); Japan; Taiwan; Malay Peninsula; and India.

Food plants. *Calopogonium* sp. and *Desmodium gangeticum* in the Philippines; *Calopogonium* spp., *Desmodium* spp., *Pueraria* spp., and *Uraria* spp. in other countries. All belonging to Leguminosae.

Notes. This tiny moth is new to the Philippine fauna. The fore wing is less than 2 mm in length, brilliantly golden brownish in ground, with specific maculations as follows: a black basal spot; four costal and three dorsal silvery white spots all surrounded by black scales, the first three pairs being nearly opposite to each other, and the median pair sometimes confluent to form a fascia; a blackish mark suffusedly occupying apical area distal to silvery white spots. The silvery head has a blackish hairy tuft on the vertex. The antenna is blackish with white apical nine segments.

In addition to the characteristic colouration of the adult moth, the larvae are exceptionally gregarious, usually three to five larvae living in a lower tentiform leaf-mine.

Genus Phyllonorycter Hübner

The genus *Phyllonorycter* is very rich in species in the temperate Holarctic Region, while rather poor in tropical Asia (Kumata, 1993). In accord with this general pattern of distribution, only two species have been obtained during survey trips in the Philippines: one feeding on *Urena lobata* that is widely distributed in tropical Asia, and the other on *Celtis* sp. Besides the two species, *P. triarcha* (Meyrick, 1908), a cotton leaf-miner, was recorded by Diakonoff, 1967, from Luzon I. and Negros I.

Phyllonorycter is very similar to *Cameraria* especially in wing venation, but distinguished from the latter by the internally black-margined white marks of the fore wing, by the simple tegumen without apical setae in male genitalia, and by the single lateral seta (L1) on the mesothorax, metathorax and all abdominal segments in last instar larvae.

Phyllonorycter conista (Meyrick)
[Figs. 1(D), 13(A-B)]

Lithocolletis conista Meyrick, 1911: 212.

Phyllonorycter conista: Kumata, 1993: 37, figs. 17-18 (male genitalia), 19-20 (female genitalia), 33(F) (fore wing), and 46(A) (leaf-mine).

Lithocolletis clarisona Meyrick, 1916: 622.

Specimens examined. 27♂ & 29♀. Luzon I.: 16♂ & 14♀, Mt. Makiling, Laguna Prov., em. 8-13/viii/1993, ex *Urena lobata* (4925), Gen. sl. nos. Grc-6215 (♂) and Grc-6216 (♀); 8♂ & 12♀, Ditto, em. 7-11/viii/1994, ex *U. lobata* (5097), Gen. sl. nos. Grc-6335 (♂) and Grc-6336 (♀). Palawan I.: 3♂ & 3♀, Luzniminda, Puerto Princesa, em. 13-17/viii/1993, ex *U. lobata* (4962).

Distribution. Philippines (Luzon I.; Palawan I.); Malay Peninsula; Nepal; India; and Sri Lanka.

Food plant. *Urena lobata* [Malvaceae].

Notes. This species is new to the Philippine fauna, though it is known to be widely distributed in South and Southeast Asia in association with its food plant (Kumata, 1993). Its lower leaf-mines have commonly been seen on the food plant at some collection sites in the Philippines.

P. conista is characterized by the absence of a white medio-basal streak and by the presence of a white costal strigula before the white median fascia in the fore wing. Moreover, it is more easily separated from the other members of the genus by the genital structures as follows: — In male, the valva is narrowly bar-shaped, slightly sinuate, with slender setae alone on the inner surface; the long aedeagus is dilate basally, with a minute hook near the curved apex. In female, the eighth abdominal segment is normally separated from the seventh through an intersegmental membrane; the ostium bursae is short cylindrical, with its ventrocaudal margin sinuate into an M-shape.

Phyllonorycter luzonica sp. nov.
[Figs. 1(E), 6(B-C), 7, 8, 13(C-D)]

♂ & ♀. Expanse of wings: 4.2-4.7 mm (4.3 mm in holotype, 4.4 mm on average of eight specimens). Length of fore wing: 1.9-2.1 mm (1.9 mm in holotype, 2.0 mm on average of eight specimens).

Head with tuft, face and palpi white, the tuft mixed with a few brownish hairs laterally. Antenna pale ochreous, annulated with fuscous above; scape brownish above, whitish below including a rather thick pecten. Thorax white, with tegulae brownish. Legs whitish, with fore femur and tibia fuscous dorsally, mid tibia with two oblique fuscous bands, fore and mid tarsi with two rather wide, fuscous rings, hind tibia brownish apically on outside, and hind tarsus with three narrow fuscous rings beyond middle. Abdomen brilliantly whitish, slightly tinged with ochre grey dorsally.

Fore wing ochre brownish, strongly tinged with golden lustre, with narrow, whitish strigulae and fasciae margined with blackish irrorations on their inner edges; a white mediobasal streak extending along wing-fold to first fascia, very narrow, straight, and margined with fuscous irrorations on its upper edge very sparsely; first fascia at basal fourth, obtusely angulated near costa outwardly; second fascia in middle, nearly parallel to the first, with dorsal arm widened towards dorsum; dorsal margin of wing from base to second fascia suffusively whitish, confluent to first and second fasciae; third fascia at about apical fourth, inwardly oblique from costa, nearly straight, with its costal half usually becoming indistinct, but black irrorations along its inner edge always forming a complete line from tornus to costa near apex of wing; a similar, but more irregular, line of blackish irrorations obliquely crossing wing beyond third fascia; a short strigula on costa between second and third fascia, nearly parallel to costal arm of second fascia; cilia on costal side brownish and those along termen whitish, with a narrow, curved median fringe-line of blackish irrorations around apex of wing; cilia on dorsum pale greyish. Hind wing grey, with cilia pale greyish.

Male genitalia as in Figs. 7 & 8, strongly asymmetrical in valvae. Tegumen narrowly cylindrical, slightly dilate basally, very sparsely squamose dorsally, faintly spinulose at apex ventrally. Right valva nearly as long as tegumen, narrowly bar-shaped, slightly tapering apically, with a slightly swollen costal part beyond middle, sparsely covered with truncate setae on swollen part and near apex. Left valva shorter than the right, widely bag-shaped, with round costal margin, with two apical projections, the upper one being beak-shaped, and the lower one shorter and

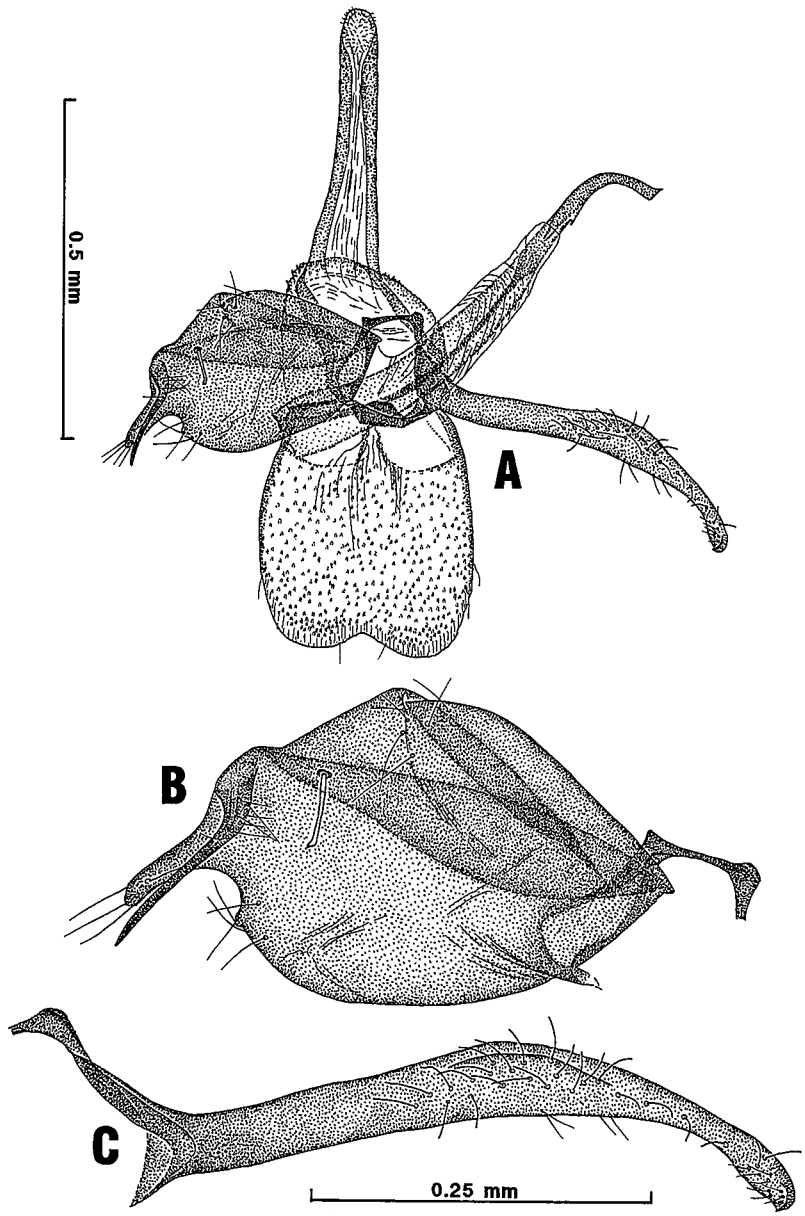


Fig. 7. *Phyllonorycter luzonica* sp. nov. A: Male genitalia in ventral view [holotype, Gen. sl. no. Grc-6319] — B: Left valva enlarged [ditto] — C: Right valva enlarged [ditto].

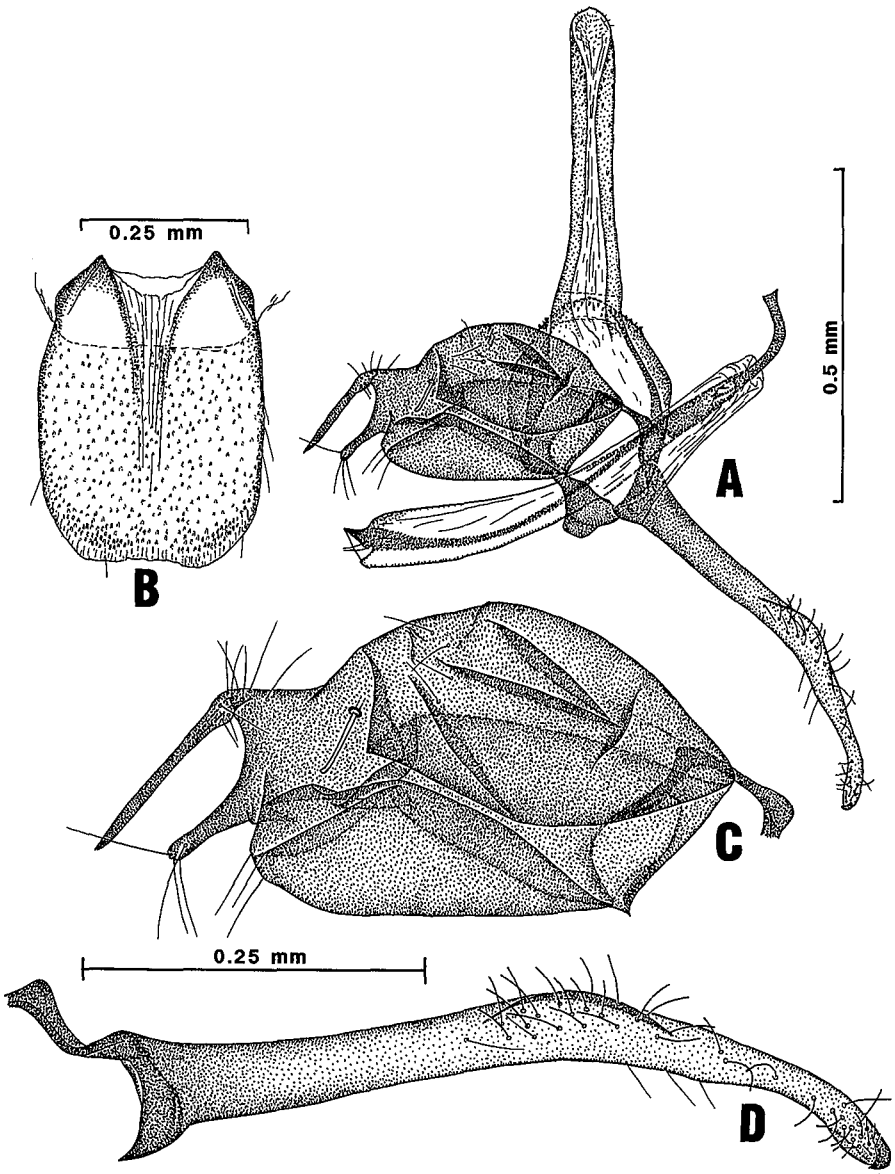


Fig. 8. *Phyllonorycter luzonica* sp. nov. A: Male genitalia in ventral view [paratype, Gen. sl. no. Grc-6309] — B: Flap-like eighth sternite in ventral view [ditto] — C: Left valva enlarged [ditto] — D: Right valva enlarged [ditto].

finger-shaped; a thick and truncate seta occurring on inner surface basal to beak-shaped apical projection; usual slender setae scattered on top of finger-shaped apical projection, at base of beak-shaped apical projection, and near apices of ventral and costal margins. Transtilla complete, angulate laterally. Vinculum small, trapeziform. Aedeagus a little longer than right valva, gradually dilate basally, with its tubular apical fifth bent, and bearing a minute subapical barb. Flap-like eighth sternite somewhat spatulate, nearly as long as left valva, slightly emarginate apically. (Two slides examined.)

Female genitalia as in Fig. 6 (B-C), symmetrical. Papilla analis moderate is length, setose and spinulose as usual; apophysis posterioris very long, slender, a little widened at basal fourth. Eighth abdominal segment elongate, well sclerotized, tightly combined with seventh segment; tergite with a pair of subtriangular caudal lobes between which there is a small hole, perhaps an opening of glandular invagination; apophysis anterioris about one-fifth as long as apophysis posterioris. Seventh abdominal segment with tergite shortened, and about half as long as sternite, oblique in laterocaudal margins. Ostium bursae opening under caudal margin of seventh sternite, rather large, funnelform; ductus bursae slender, long; a slenderer sclerous tube occupying ductus bursae from basal one-sixth to two-sixths; corpus bursae globular, with a sclerous, elliptical plate bearing a pair of minute spines in its centre; ductus seminalis branched off from apex of sclerous tube of ductus bursae. (Two slides examined.)

Specimens examined. 2♂ & 6♀. Holotype: ♂, Cabayo, Bagac, Bataan Prov., Luzon I., em. 29/viii/1994, ex *Celtis* sp. (5199), Gen. sl. no. Grc-6319. Paratypes: 1♂ & 5♀, with same locality and food plant as holotype, em. 22/viii-1/ix/1994, Gen. sl. nos. Grc-6309 (♂) and Grc-6310 (♀); 1♀, Mt. Makiling (alt. 500 m), Laguna Prov., Luzon I., em. 7/ix/1994, ex *Celtis* sp. (5282), Gen. sl. no. Grc-6318.

Distribution. Philippines (Luzon I.).

Food plant. *Celtis* sp. [Ulmaceae].

Mine (Fig. 13(C-D)). A tentiform blotch-mine occurs on the lower side of leaves, usually on the space between lateral veins or sometimes along the leaf margin, being oblong and 1.5-2.0 mm in long diameter. The contracted lower epidermis of mining parts has two or three longitudinal wrinkles; lateral margins of the mine are sometimes united with each other to form a cylindrical chamber in the mine-cavity. The pupation takes place inside the mine without a particular cocoon.

Notes. This is a very remarkable species among the members of the genus in having the completely asymmetrical valvae in male genitalia, the paired subtriangular lobes accompanied with a glandular invagination on the eighth abdominal tergite in female genitalia, and a white strigula at apical third of the costa between the second and third white fasciae on the fore wing. Nevertheless, it is similar to *P. bifurcata* (Kumata, 1967), another *Celtis* leaf-miner distributed in Japan, in some respects. In *P. bifurcata*, however, the right valva is only slightly wider than the left; the aedeagus is peculiarly bifurcate at the middle; the ostium bursae is narrow and produced far beyond caudal margin of seventh sternite; and the fore wing has three rather broad, vertical, white fasciae alone, without a costal strigula between the second and third fasciae.

A LIST OF FOOD PLANTS OF THE PHILIPPINE LITHOCOLLETINAE
(* Not treated in this paper)

Food plant	Leaf-miner
Bauhinia malaberica [Leguminosae]	*Cameraria philippinensis* sp. nov.
Calopogonium sp. [Leguminosae]	*Porphyrosela dorinda* (Meyrick)
Celtis sp. [Ulmaceae]	*Phyllonorycter luzonica* sp. nov.
Dalbergia ferruginea [Leguminosae]	*Neolithocolletis* sp.
Derris elliptica [Leguminosae]	*Cameraria palawanensis* sp. nov.
Desmodium gangeticum [Leguminosae]	*Porphyrosela dorinda* (Meyrick)
Gossypium herbaceum [Malvaceae]	**Phyllonorycter triarcha* (Meyrick)
Pongamia pinnata [Leguminosae]	*Cameraria pongamiae* Kumata
	Cameraria sp. 1
Pterocarpus indicus [Leguminosae]	*Neolithocolletis pentadesma* (Meyrick)
Urena lobata [Malvaceae]	*Phyllonorycter conista* (Meyrick)
Undetermined [Leguminosae]	*Cameraria* sp. 2

APPENDIX
A NEW NAME FOR PHYLLONORYCTER MYRICAE KUMATA, 1993

Phyllonorycter myricae Kumata, 1993, was described from Malaysia. Just after it was published, Dr. P. Triberti, Italy, kindly informed me that the name of this species is preoccupied by *Phyllonorycter myricae* Deschka, 1976. On this occasion, I wish to give the following new name to it.

Phyllonorycter myricella nom. nov.

Phyllonorycter myricae Kumata, 1993, Ins. matsum. n. s. 48: 44 [nec *Phyllonorycter myricae* Deschka, 1976, Entomologische Ber., Amst. 36: 90].

ACKNOWLEDGEMENTS

I wish to make grateful acknowledgements to Prof. Dr. Venus J. Calilung, former Director, and Prof. Dr. William S.M. Gruezo, Director, of the Natural History Museum, University of the Philippines at Los Baños (UPLB), for their kindness in giving us the permission to make survey trips in the Philippines in 1992, 1993 and 1994. I also express my cordial thanks to the following members of survey trips for their kindly helping me in various ways during trips in the Philippines: Mr. Ireneo L.Lit of the Department of Entomology, UPLB; Mr. Orlando L. Eusebio and Mr. Edison A. Cosico, both of the Natural History Museum, UPLB; Prof. Dr. S. Takagi of Hokkaidô University, Sapporo; Dr. F. Komai of Ôsaka University of Art, Kanan-tyô, Ôsaka; and Dr. I. Kudô of Aiti Women's College, Nagoya. I am indebted to Dr. Edwin S. Fernando of the Forestry Department, UPLB, for the identification of the food plants of leaf-miners I collected in the Philippines.

Last but not least, I wish to give my hearty thanks to Dr. P. Triberti, Museo Civico di Storia naturalle di Verona, Italy, for his kind information.

References

[For further literature of Southeast Asian Lithocolletinae, see Kumata, 1993]

Deschka, G. 1976. Lithocolletidae von Madeira (Lepidoptera). Entomologische Ber., Amst. 36: 90-96.

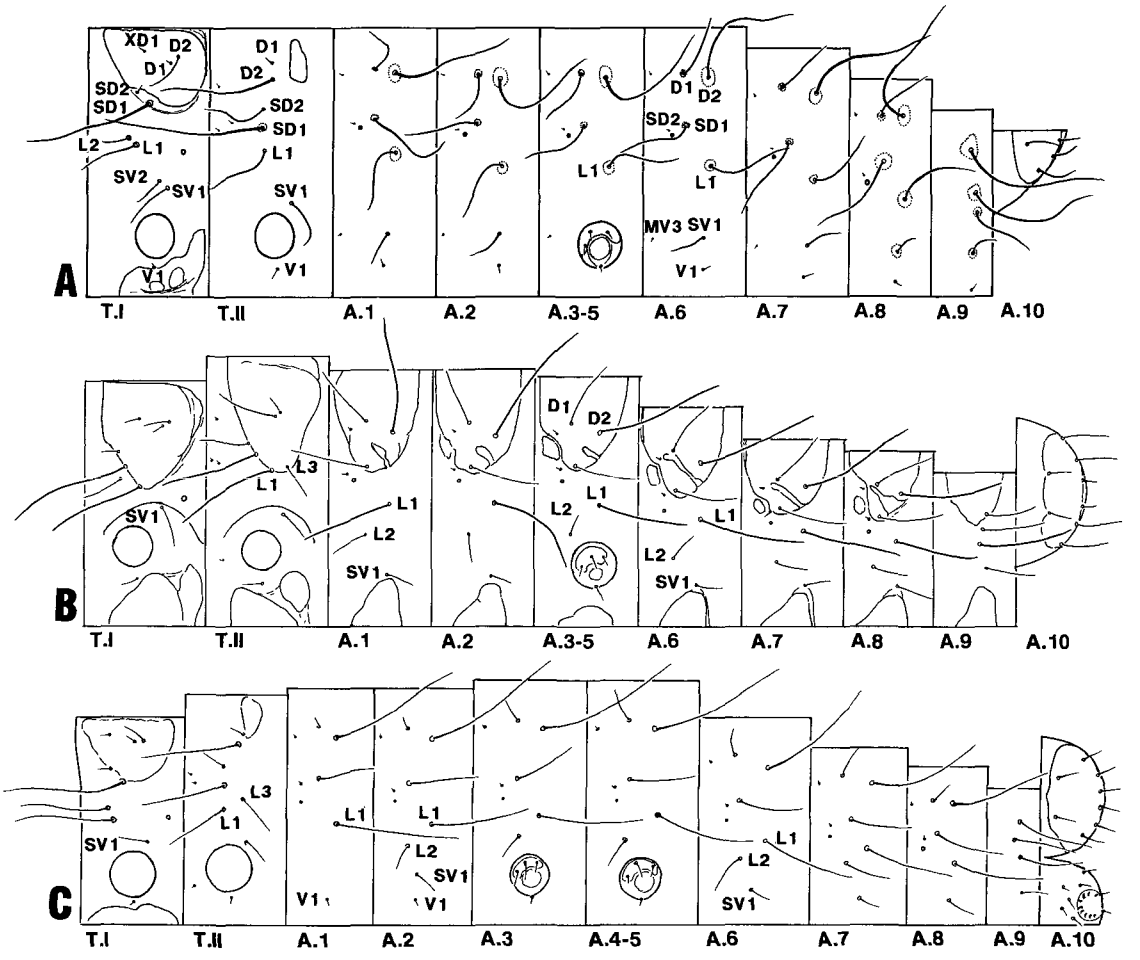
Diakonoff, A. 1967. Microlepidoptera of the Philippine Islands. U. S. Nation. Mus., Bul. 257: 1-484.

Kumata, T. 1993. A contribution to the knowledge of the Malaysian Lithocolletinae (Gracillariidae, Lepidoptera), with a revision of Indian *Cameraria* associated with Leguminosae. Ins. matsum. n. s. 48: 1-85.

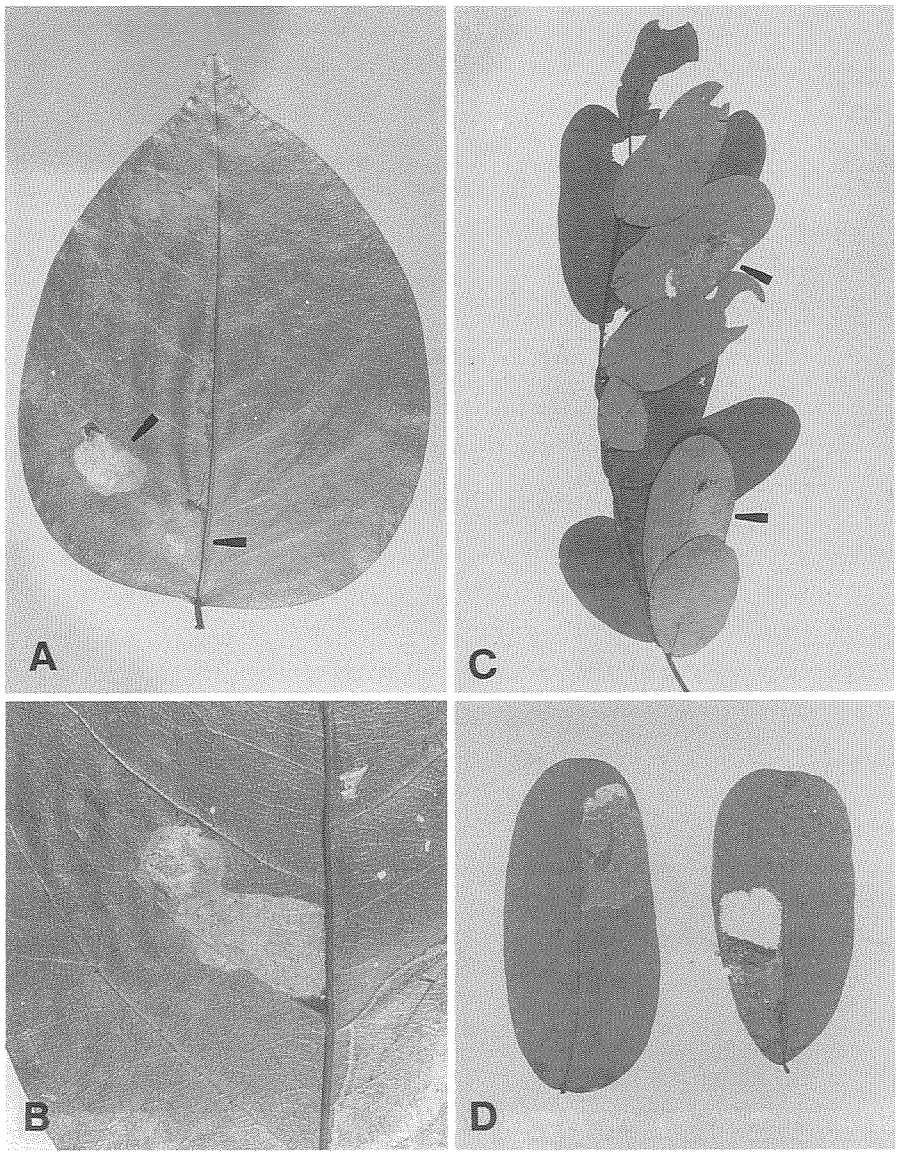
Meyrick, E. 1911. Some Indian Gracilariads. Ent. Mon. Mag. 47: 212-213.

——— 1912 & 1916 (1912-1916). Exotic Microlepidoptera, vol. 1. 640 pp. Second edition, reprinted in 1969. E.W. Classey Ltd., Hampton.

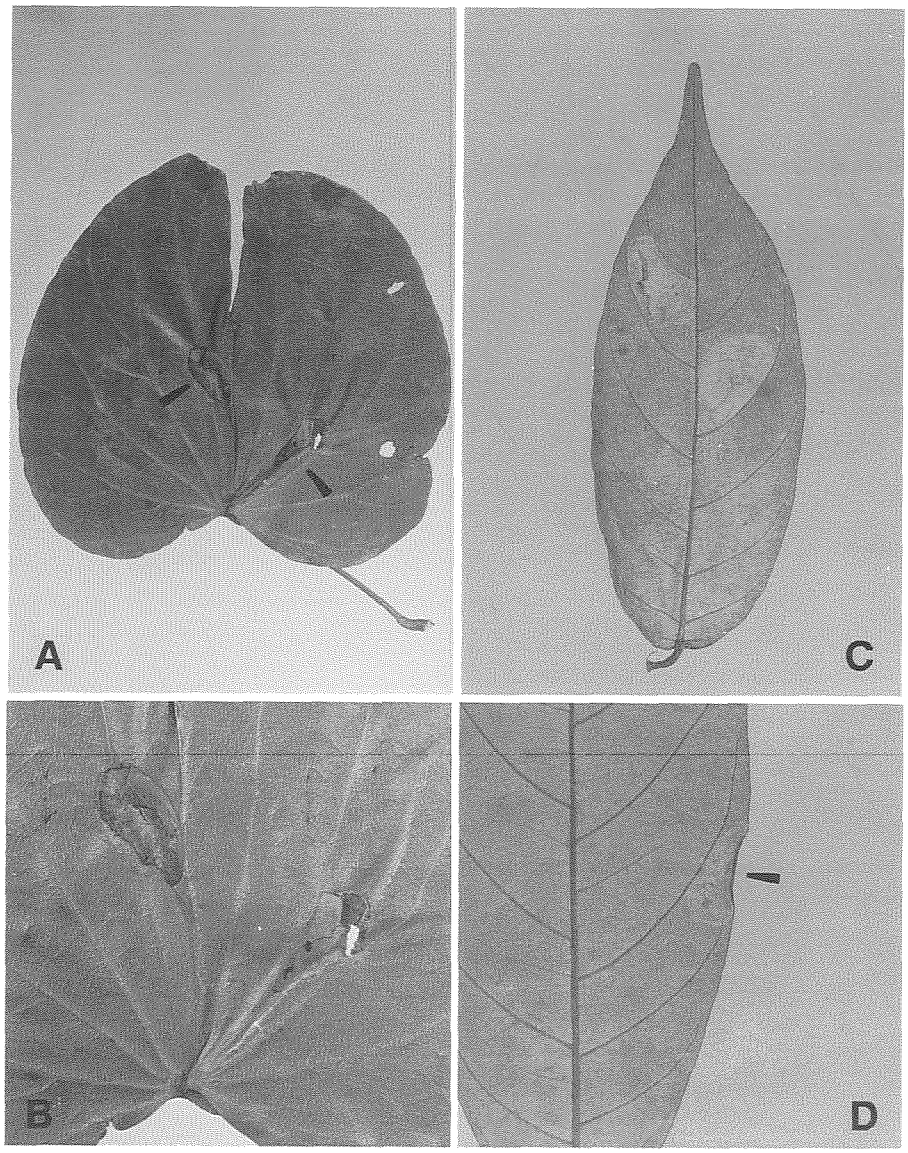
——— 1918 (1916-1923). Exotic Microlepidoptera, vol. 2. 640 pp. Second edition, reprinted in 1969. E.W, Classey Ltd., Hampton.



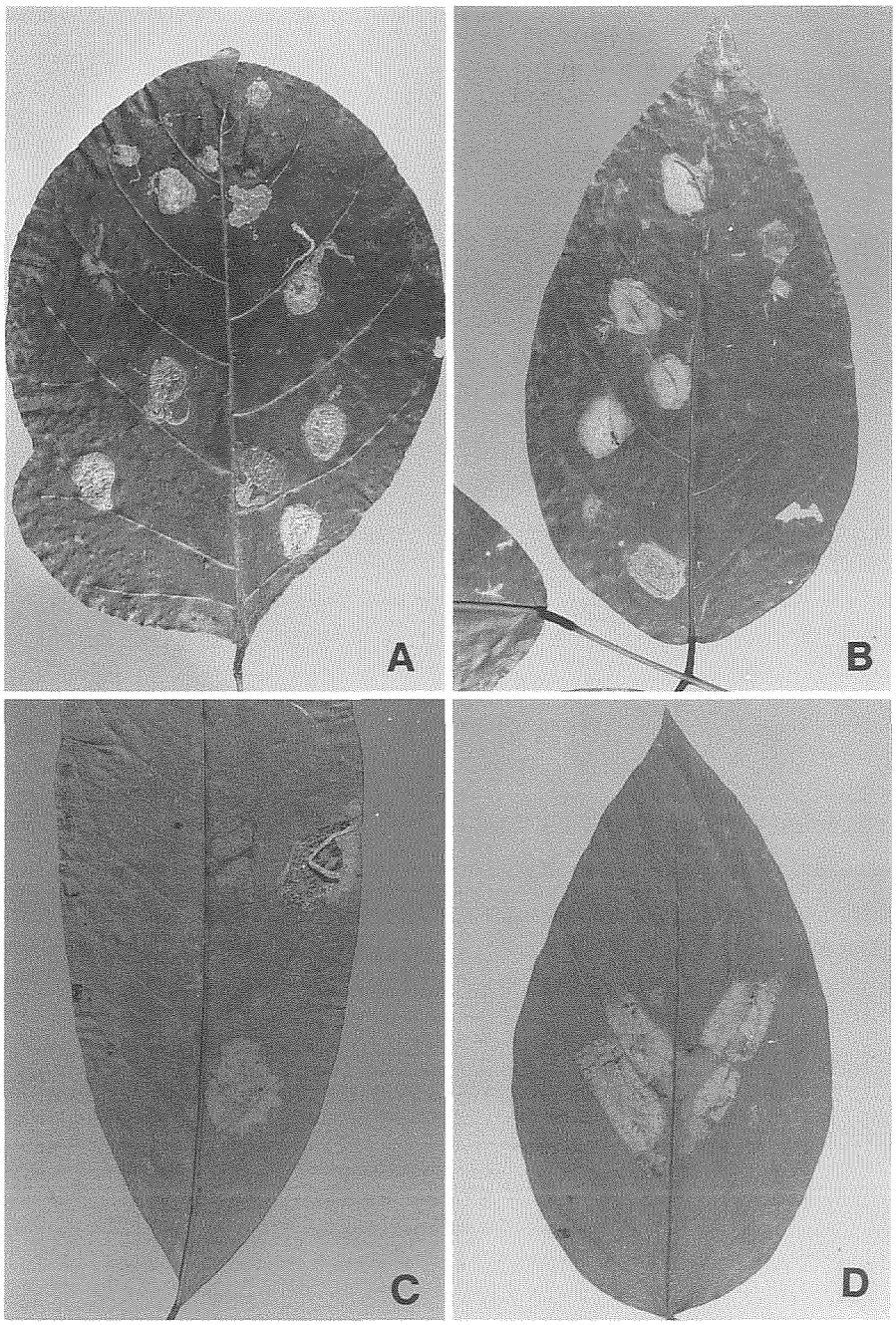
Pl. I : Fig. 9. Body chaetotaxy of last instar larva. A : *Phyllonorycter issikii* (Kumata) [Sapporo, Hokkaidô, Japan, 7/vii/1958, ex *Tilia japonica*] — B : *Cameraria pongamiae* Kumata [Pulau Silingan, nr. Sandakan, Sabah, Borneo, 20/ix/1988, ex *Pongamia pinnata* (3275)] — C : *Porphyrosela dorinda* (Meyrick) [Mt. Makiling (alt. 500 m), Laguna Prov., Luzon I., Philippines, 24/xii/1992, ex an undetermined legume (4849)].



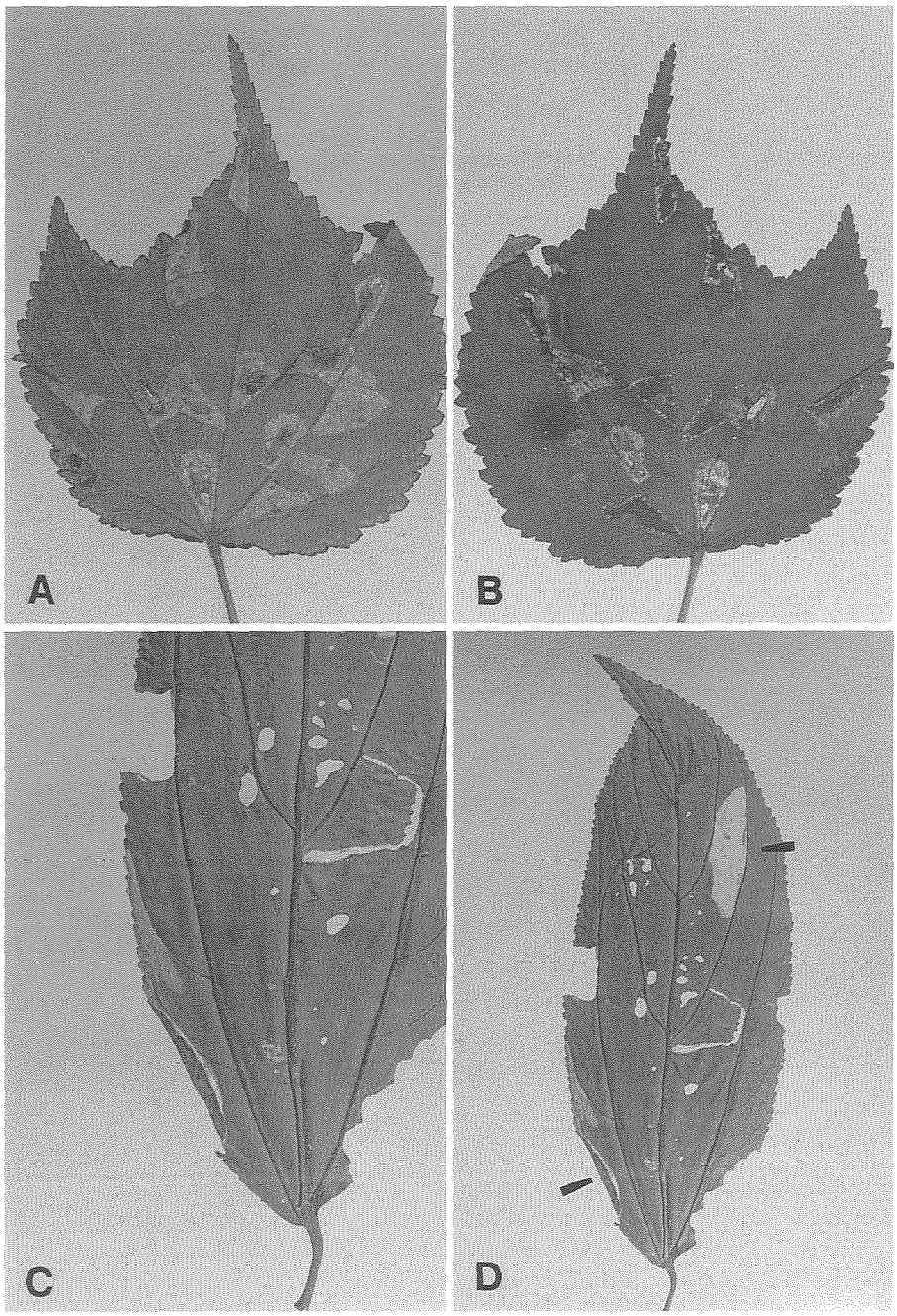
Pl. II : Fig. 10. Leaf-mine. A : *Neolithocolletis pentadesma* (Meyrick) on *Pterocarpus indicus* (lower side) [breeding no. 5274] — B : Ditto, mining part enlarged [ditto] — C : *Neolithocolletis* sp. on *Dalbergia ferruginea* (lower side) [breeding no. 5017] — D : Ditto, mines enlarged [ditto].



Pl. III : Fig. 11. Leaf-mine. A : *Cameraria philippinensis* sp. nov. on *Bauhinia malaberica* (upper side) [breeding no. 5232] — B : Ditto, mining part enlarged [ditto] — C : *C. palawanensis* sp. nov. on *Derris elliptica* (lower side) [breeding no. 5035] — D : Ditto [ditto].



Pl. IV : Fig. 12. Leaf-mine. A : *Cameraria pongamiae* Kumata on *Pongamia pinnata* (upper side) [breeding no. 5006] — B : *Cameraria* sp. 1 on *Pongamia pinnata* (lower side) [breeding no. 5193] — C : *Cameraria* sp. 2 on an undetermined legume (lower side) [breeding no. 4826] — D : *Porphyrosela dorinda* (Meyrick) on *Desmodium gangeticum* (lower side) [breeding no. 5255].



Pl. V : Fig. 13. Leaf-mine. A : *Phyllonorycter conista* (Meyrick) on *Urena lobata* (lower side) [breeding no. 4962] — B : Ditto (upper side) [ditto] — C : *Phyllonorycter luzonica* sp. nov. on *Celtis* sp. (lower side) [breeding no. 5183, Mt. Samat, Bataan Prov., Luzon I., 18/viii/1994] — D : Ditto [ditto].