Tergissima and *Femniterga*, New Sister Genera of *Calycopis* Scudder and *Calystryma* Field from the South Central Andes (Lepidoptera: Lycaenidae)

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Abstract

Tergissima and *Femniterga*, new genera, are described from hitherto seldom sampled localities of 500-1700 m. altitude in Salta, Jujuy and Tucuman provinces, Argentina. The new genera are allied to New World *Calycopis* and Neotropical *Calystryma*, but differ from the generic characters of these in having extreme terminoventrad development of the incised posterior cavity of the eighth abdominal tergite (*Tergissima* males, *Femniterga*, males and females), distinctive genitalic characters and forewing markings on males suggestive of secondary sexual brands. Morphology of the four genera is compared in detail. Four new species are described: *T. mosconiensis*, *T. macphersoni*, *F. notacastanea* and *F. judae*, three of which are also distributed northward into eastern Bolivia.

Introduction

Calycopis Scudder and *Calystryma* Field are genera of "hairstreak" butterflies (Lycaenidae: Theclinae) assigned to the tribe Eumaeini (*sensu* Eliot, 1973). Field (1967a, 1967b) revised *Calycopis* and *Calystryma*, including 21 species of *Calycopis* from the Nearctic and Neotropical realms, and 13 Neotropical *Calystryma* species. Since Field obtained only limited Argentine samples and treated few taxa south of Brazil and Bolivia, Johnson, Eisele and MacPherson (1988, in press) have studied the Argentine *Calycopis* and *Calystryma* faunas in detail.

Taxa of the generally "blue-above" *Calycopis* and "brown-above" *Calystryma* have extremely similar under surface wing patterns (see Field, 1967a, p. 1; 1967b, p. 2) a feature also shared with several little-studied groups of the broadly polyphyletic Theclinae grade "*Thecla*" (*sensu* Bridges, 1986). These latter include the "*vesulus* group" of Draudt (1919) (e.g., *T. vesulus* Cramer and *T. anthora* Hewitson), or Draudt's "*badaca* group" (e.g. *T. autoclea* Hewitson [=*sangala* Hewitson]). *Calycopis* and *Calystryma* are, however, clearly distinguished from these taxa and other Eumaeini by their lack of male forewing "brands" and the presence of a remarkable sclerotized development of the male's eighth tergite. In *Calycopis* and *Calystryma* this development of the eighth tergite forms (quoting Field's [1967a, 1967b] terminology) an "incised posterior cavity" of "subcordate" shape surrounding the genitalic parts. In *Calycopis* (Fig. 3A) this tergal innovation is small, scarcely exceeding the spiracles laterally. However, in *Calystryma* it is much larger (Fig. 3B), usually extending from an anterior protrusion under the seventh abdominal segment ventrad past the seventh abdominal spiracles. To accommodate the spiracles there is usually an incised notch or opening.

In his revisionary work, Field obtained only limited samples from Argentina. He listed no *Calystryma* from Argentina, and in *Calycopis* located only 48 Argentine specimens, 46 of which he identified as *C. chacona*

Jorgensen from northwestern Argentina. The remaining two specimens represented *C. indiqo* (Druce) from extreme northeastern Argentina.

In 1984, the American Museum of Natural History (AMNH) acquired most of the Bruce MacPherson collection of Argentine Theclinae. Subsequently, large samples of Argentine Theclinae were added by Robert C. Eisele. The resulting sample included over five hundred specimens of the *Calycopis/ Calystryma* assemblage from some one hundred Argentine localities distributed from La Rioja Province north to the Bolivian border. Additional material available for study was consulted, including the Steinbach Bolivian material at the Carnegie Museum of Natural History (CMNH), the extensive Argentine material in the British Museum (Natural History) (BMNH) collected near the turn of the century by such workers as Steinbach, Hayward and Giocomelli, the collection of the Instituto Miguel Lillo, Tucuman, Argentina [IML], and material previously deposited at the Allyn Museum of Entomology (AME) by MacPherson and Eisele. From these collections, Johnson, Eisele and MacPherson (1988, in press) identified all the specimens except 58 as various described or undescribed species of *Calycopis* or *Calystryma*. The other specimens, though somewhat similar to *Calycopis* or *Calystryma* in general features, immediately attracted attention because of forewing markings on males suggestive of secondary sexual brands. Such males (and females subsequently associated by wing pattern, collection data, and personal review of the specimens and their data by Eisele) differ remarkably from *Calycopis* and *Calystryma* in genitalic structure and also have unique specializations of the eighth tergite, including tergal modification in some females as well as males. It is apparent from a review of taxa presently placed in the tribe Eumaeini (Johnson, MacPherson and Ingraham, 1986) that these unusual specimens cannot be considered congeneric with *Calycopis*, *Calystryma*, or any known Eumaeini genus. The purpose of this paper is to describe two new genera to include these new taxa and discuss them in relation to *Calycopis*, *Calystryma* and other eumaeine taxa.

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Systematics

Knowledge of character polarity in Eumaeini genera is limited. This results primarily because although 67 genera have been assigned to the tribe (Eliot, 1973) over 750 species are still included in the large, heterogeneous *"Thecla"* grade (Bridges, 1986) and a still larger number of taxa remain undescribed. Consequently, interrelations among groups regarded as monophyletic by various authors are poorly known and the task still remains to define monophyletic terminal assemblages from which future phylogenetic study can proceed.

Calycopis and *Calystryma* are undoubtedly part of a larger infratribal monophyletic assemblage in the Eumaeini. Considering the composition of the tribe, this assemblage probably has at least Holarctic and Neotropical distributions. At present it is doubtful whether the immediate cladistic outgroups of *Calycopis* and *Calystryma* can be determined with certainty to allow their study in a phylogenetic context. A number of groups variously resembling *Calycopis* and *Calystryma*, both new and from within the *Thecla* grade, require description before an adequate range of taxa and character states are available for cladistic evaluation.

Johnson, MacPherson and Ingraham (1986), in describing another new eumaeine genus from western Argentina, have listed taxa examined of the Eumaeini including 359 species of 58 Holarctic and Neotropical genera, 115 apparently undescribed taxa, and taxa of *Calycopis* and *Calystryma*. Their listing includes types and type species examined. These examined taxa serve as the basis here for description of two additional new eumaeine genera. As indicated in Table I and the Appendix, these new genera have characters clearly suggesting affinity to *Calycopis* and *Calystryma* but also characters which are unique. The new genera also appear to have primarily austral Neotropical distributions.

Thus, pending future cladistic study, the genera are treated here as four separate taxa and the new genera tentatively identified amongst Eumaeini as apparent sister taxa of *Calycopis* and *Calystryma*. The Appendix summarizes the taxonomic characters studied in *Calycopis*, *Calystryma*, the new genera and superficially similar but not closely related sympatric eumaeine taxa. The latter are particularly represented by northwestern Argentine *Thecla autoclea*, which we have determined by reference to the type, BMNH. Table I describes the distributions of characters in these taxa and those distinguishing the new ones described below.

Tergissima, new genus
Figures 1; 3C,H; 4E,F; 5C

Diagnosis. As detailed in the Appendix for the characters listed below, *Tergissima* are dark brown colored on both wing surfaces and further distinctive in the presence of markings suggestive of brands, certain male and female genitalic characters and male tergal modification including a sclerotized subcordate incised posterior cavity extending from a protrusion beneath the sixth abdominal segment laterad past the seventh and eighth abdominal spiracles to a recurvate invagination beneath the ninth sternite. Diagnostic characters (Table I and Appendix): shared with *Femniterga* vis-a-vis *Calycopis* and *Calystryma*, 11, 16, 22, 29, 30; unique to *Tergissima*, 1, 17, 31, 33, 35.

Adult. Antennae fuscous, finely striped white, club black with orange-brown terminus, length slightly exceeding one-half that of forewing base to apex; head with frons black-brown, eyes brown with white outlining; thorax black-brown, slightly haired distad; abdomen black-brown, lighter laterally ventrum nearly white.

Male. Upper surface of wings: Ground brown to blackish brown. Apical edge of discal cell appearing as flat sheen darker than rest of wing suggestive of brand. Hindwing with shorter and longer tails at termini of veins CuA1 and CuA2, respectively. Chestnut colored dot basad anal lobe. Under surface of wings: Ground light brown. Forewing with postmedian whitish line (sometimes black centrad and red basad) from costa to vein CuA2. Hindwing with postmedian tripartite line from costa to anal margin, white distad, black centrad and with varying amounts of red basad. Cell M3 element of this line distinctly oblique to rest of line, breaking line costad "W"-shaped configuration (this character reduced in one taxon and some females). Sc + R1 element thickly edged and displaced distad from the line. Limbal area with blue coloration in cell CuA2, with remaining cells costad to M3 variously reddish. Apex of discal cell with faint whitish slash, sometimes bordered basad with emphatic red.

Female. Upper surface of the wings: as males but ground color lighter and without apparent brand on forewing. Under surface of the wings: As males but with M3 wing bar reduced.

Male Abdominal Morphology and Genitalia. Figs. 3C,H, 5C. Eighth tergite forming sclerotized posterior cavity (Fig. 3C) extending from protrusion beneath sixth abdominal segment and encircling abdomen laterally (Fig. 3Ca,b,c) until recurving beneath the ninth sternite (Fig. 3Cd), with two ventro- lateral notches or openings proximate the seventh and eighth abdominal spiracles (Fig. 3Ca,b.c). Genitalia (Figs. 3H, 5C) with uncus produced greatly caudo-ventrad (Figs. 3Ha, 5Ca); valvae separate along saccular margin except at base (Figs. 3Hb, 5Cb); saccus very small, hardly extending beyond cephalad base of vincular arc (Figs. 3H, 5C); vincular arc adjoining saccus angled 60-90° to rest of vinculum (Figs. 3H, 5C); aedeagus long, usually approaching twice length of vincular arc from terminus of saccus to terminus of uncus and with aedeagus terminus pointed with two spinelike cornuti (Figs. 3Hd, 5Cd); brush organs tightly packed, originating along ventro-lateral edge of vincular arc, short, barely extending terminad uncus (Figs. 3H, line/carut, 5C, line/carut).

Female Abdominal Morphology and Genitalia. Fig. 4E, F. Eighth tergite unmodified. Genitalia (Fig. 4E, F) with ductus bursae of simple, tubular shape, varying in length, widened at juncture with corpus bursae and lamellal area. Lamellae hardly developed, present only as slightly sclerotized postvaginal flap; corpus bursae of small diameter, variously less then ductal length; signa absent, or present only as two small spines; papillae anales widely elliptical with lateral sclerotized areas dendritic; apophyses of papillae anales short, not much exceeding length of main part of papillae anales.

Type Species. *Tergissima mosconiensis*, new species.

Distribution. Presently known from two sympatric species occurring at 500-1000 m. elevation, in Salta and Jujuy provinces, Argentina, with both species known to occur northward into eastern Bolivia.

Remarks. It is anticipated that further taxa will be discovered assignable to this genus. Dissections by Field in the AMNH, BMNH and National Museum of Natural

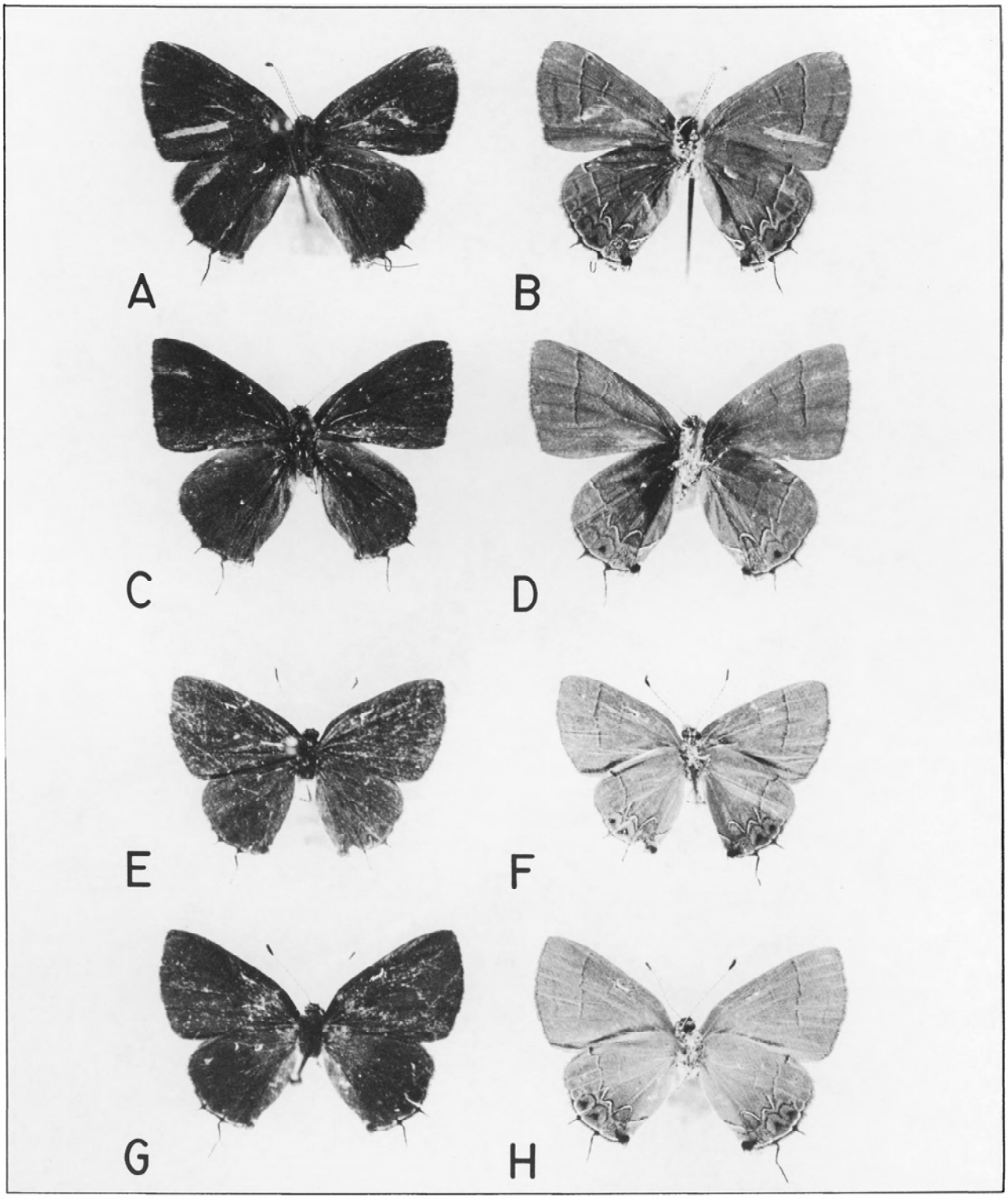

Figure 1. *Tergissima* species. A-D. *T. mosconiensis*. A) Upper surface, male, holotype. B) Under surface, same. C) Upper surface, female, paratype. D) Under surface, same. E-H. *T. macphersoni*. E) Upper surface, male, holotype. F) Under surface, same. G) Upper surface, female, paratype. H) Under surface, same.

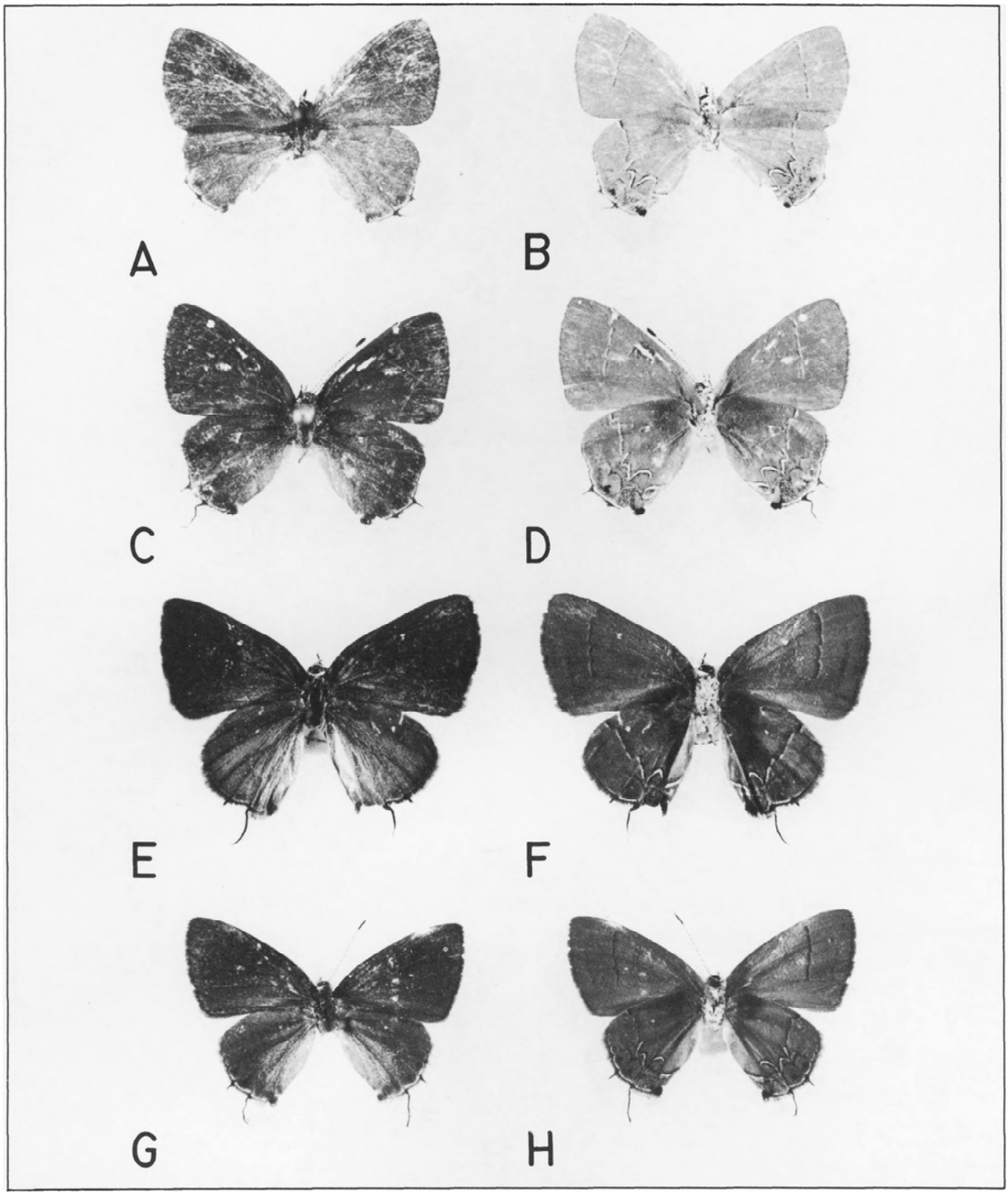

Figure 2. *Femniterga* species. A-D. *F. notacastanea*. A) Upper surface, male, paratype. B) Under surface, same. C) Upper surface, female. holotype. D) Under surface, same. E-H. *F. judae*. E) Upper surface, female, holotype. F) under surface, same. G) Upper surface, male, paratype. H) Under surface, same.

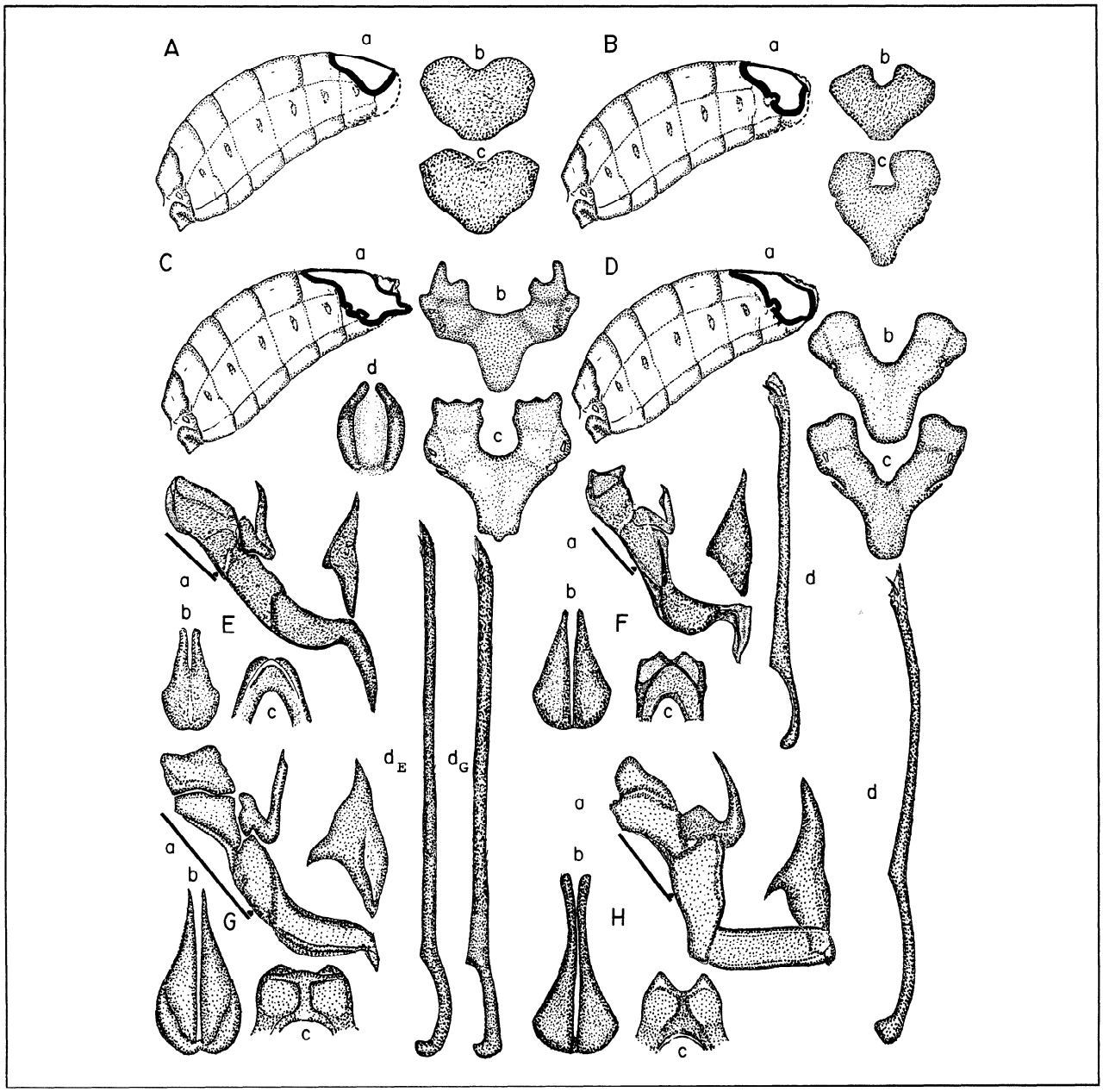

Figure 3. Morphology of the male abdomen and genitalic structures in the genera *Calycopis, Calystryma, Tergissima,* and *Femniterga.* A-D. Comparative male tergal morphology. A) *Calycopis*: a. abdomen, lateral view, diagrammatically outlining in black the expanse of the subcordate incised posterior cavity (hereafter SIPC) in type species *C. poesus* Hübner [=*C. cecrops* Fabricius, Field 1967a]; b. SIPC, dorsal view, *C. cecrops.* c. SIPC, dorsal view, *C. chacona.* B) *Calystryma*: a. Abdomen, lateral view, outlining SIPC in type species *C. blora* Field; b. SIPC, dorsal view, *C. blora*; c. SIPC, dorsal view, maximal extent in genus, *C. trebula* (Hewitson). C) *Tergissima*: a. Abdomen, lateral view, outlining SIPC in type species *T. mosconiensis*; b. SIPC, dorsal view, *T. mosconiensis*; c. SIPC, ventral view, *T. mosconiensis*; d, ventral recurvate invagination. D) *Femniterga.* a. Abdomen, lateral view, outlining SIPC in type species *F. notacastanea*; b. SIPC, dorsal view, *F. notacastanea.* E- H. Comparative male genitalic morphology. Format: a. genitalia with aedeagus removed, lateral view, dark line at left indicating length of brush organ; carut, their point of attachment; b. valvae, ventral view; c. uncus, ventral view; d. aedeagus, lateral view. E) *Calycopis* type species, *cecrops.* F) *Calystryma* type species, *blora.* G) *F. notacastanea,* paratype (for *F. judae,* see Figure 5). H) *T. mosconiensis,* holotype (for *T. macphersoni,* see Figure 5).

History (NMNH) indicate he dissected widely in groups superficially similar to *Calycopis* and *Calystryma*. The abdominal morphology of *Tergissima* is so extreme that Field would certainly have noted such specimens if he had seen them.

All specimens of *Tergissima* have been dissected and compared with 98 dissections of males and females from the approximately 500 specimens of *Calycopis* and *Calystryma* studied, 15 specimens of *T. autoclea*, and selected dissections of *Calycopis* and *Calystryma* prepared by Field and deposited at the AMNH and BMNH, and various Eumaeini listed in Johnson, MacPherson and Ingraham (1986).

Etymology. The Latin generic name is formed from the root "tergum" (n.) and the superlative suffix meaning "very". It refers to the expansive eighth tergite characterizing the genus and is considered feminine.

Tergissima mosconiensis, new species
Figures IA-D, 3Ca-b,H; 4E

Diagnosis. Superficially distinguishable from *T. macphersoni* by *T. mosconiensis*'s deeper brown upper surface on the male and on both sexes the emphatic red markings on the under surface of the wings basad the small slash in the hindwing discal cell, basad along the tripartite line, and in the limbal cells 2A and CuA1 extending to cell M3. *T. mosconiensis* has more extensive terminal development of the incised posterior cavity, including a termino-lateral protrusion on each side of the genitalic apparatus. This protrusion is notable even without dissection. The terminus of the incised posterior cavity in *T. macphersoni* does not exceed the terminus of the genitalic apparatus and is vaguely tri-lobed (dorsad, centrad and ventrad). Genitalicly, *T. mosconiensis* is distinct as listed below [(1) *T. mosconiensis* and (2) *T. macphersoni*]: Male- uncus, caudo-ventrad, (1) produced roundly, (2) thinly tapered; valvae, ventrad (1) thinly tapered terminad, (2) broadly ovate basad, then tapered; aedeagal length, (1) at least twice length from saccus tip to labides terminus, (2) same ratio 1.5 to 2. Female- ductus bursae length, (1) 7.5 times width, (2) 14 times width; lamella postvaginalis, (1) lightly sclerotized trapezoidal flap, (2) lightly sclerotized tapered flap; signa, (1) none (2) two small spines.

Description. Male. Upper surface of wings: as characteristic of the genus with ground dark brown, apical edge of discal cell with more noticeably darkened patch about 1 mm. basad cross-vein of cell. Under surface of wings: characteristic of genus but with extensive red on hindwing-basad small whitish slash distad in discal cell, along median tripartite line, and in limbal areas in cells 2A, CuA1 and M3. Length of forewing: 11.5 mm. (holotype); 11.5-13.0 ($\bar{X}$ = 12.3) (paratypes).

Female. Similar to males but upper surface lighter brown and lacking forewing brand. Under surface less emphatically marked with red and M3 element in "W" of tripartite line less apparent. Length of forewing 11.5 mm. (paratype female).

Male Abdominal Morphology and Genitalia. Fig. 3Ca-b, H. As in generic description, but differing from *T. macphersoni* as detailed in Diagnosis and in Table I and the Appendix.

Female Abdominal Morphology and Genitalia. Fig. 4E. As in generic description but differing from *T. macphersoni* as detailed in the diagnosis and Table I and the Appendix.

Types. Holotype, male, (Fig. 1AB), Mosconi, Salta Province, Argentina, dry wooded habitat, 500 m. altitude, 9 June 1975, B. MacPherson, deposited AMNH. Paratypes: AMNH: female- (Fig. 1,CD) same data as holotype; two males-Represa de Rio Grande, Jujuy Province, Argentina, 20 June 1975; three males- Pichanal, Salta province, Argentina, 1 km. NE, no date; Pichanal, 30 May 1970; 16 May 1972; Robert C. Eisele. CMNH: two males- Rio Bermeijo, Salta Province, Argentina, J. Steinbach, May 1914. IML: one male, one female-Santa Cruz, Bolivia, K. Hayward.

Distribution. Presently known from several localities in Jujuy and Salta provinces, Argentina, and from one locality in Bolivia.

Remarks. Considering the small samples, I have included the Bolivian specimens in the type series since morphological differences are negligible between these and the primary types and since in both Bolivia and Argentina *T. mosconiensis* is sympatric with the sister species described below.

Etymology. The species is named for the type locality, the site of its initial capture by Eisele and MacPherson. Such designation emphasizes the local habitat, which presently serves as the type locality of two genera and three species represented in the MacPherson collection.

Tergissima macphersoni, new species
Figures 1E- H, 3Cc, 4F, 5C

Diagnosis. Distinguished from sister species *T. mosconiensis* by characters noted in Diagnosis of that species and abbreviated here as follows: *T. macphersoni* lighter

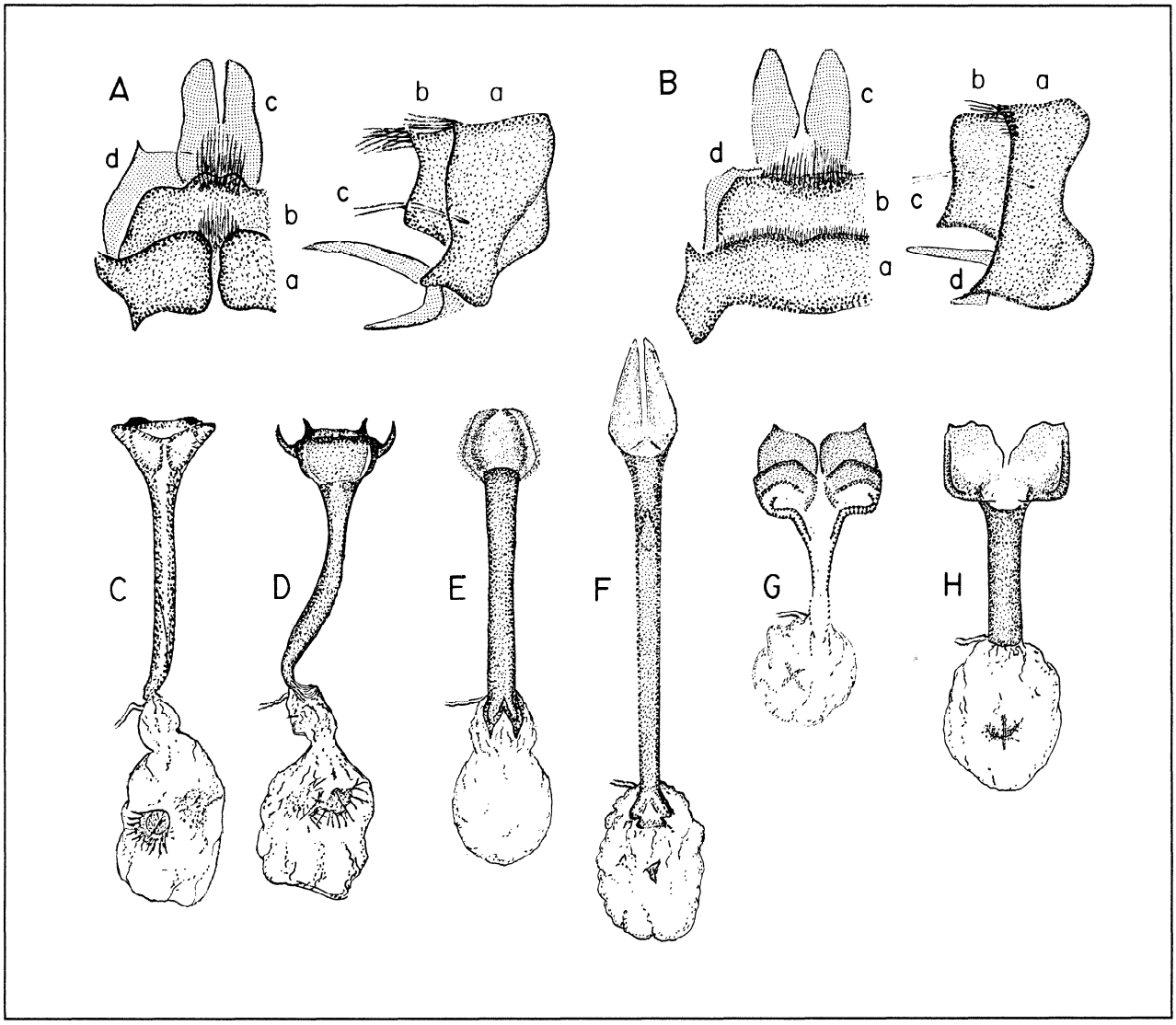

Figure 4. Comparative female morphology, *Calycopis, Calystryma, Tergissima,* and *Femniterga.* A-B. Incised posterior cavity (abdominal tegumen removed) in *Femniterga* species. Format: Left, dorsal view of: a. specialization of eighth abdominal tergite; b. sclerotized area caudad eighth tergite and dorsad genitalic apparatus; c. papillae anales; d. lamella postvaginalis.Right lateral view, same as above, with c. representing apophyses papillae anales. A) *F. notacastanea.* B) *F. judae.* C-H. Genitalia. Format: genital plate and corpus bursae, ventral view. C) *Calycopis* type species, *cecrops.* D) *Calystryma keta* Field (type species C. *blora* not available but stated to be like C. *keta,* Field, 1976b). E) *Tergissima mosconiensis,* paratype. F) *T. macphersoni,* paratype. G) *Femniterga notacastanea,* holotype. H) *F. judae,* holotype.

brown above, with longer "brand" (see below); under surface with less red than *T. mosconiensis,* particularly on hindwing at slash in discal cell, along tripartite line and in cell M3 of the limbal area. Sc + R1 bar smaller in *T. macphersoni* male. Male genitalia of *T. macphersoni* with uncus produced dorsad to two long horns, not roundly produced as in *T. mosconiensis;* valvae of *T. macphersoni* bulbously ovate basad, terminally tapered, not basally elliptical with thinly tapered terminus as in *T. mosconiensis.* Female of *T. macphersoni* with extremely long ductal configuration, length being 14 times width (*T. mosconiensis* 7.5x); lamella postvaginalis two long tapered flaps (*T. mosconiensis,* flaps trapezoidal shaped).

Description. Male. Upper surface of wings: ground light brown, apical area of discal cell notably darker from about 2 mm. basad cross vein of discal cell along cell's cross vein. Under surface of wings: as described for genus but with very thin red coloration along the tripartite median line and from basal the anal lobe to cell CuA1 only. M3 element of tripartite line reduced. Length of forewing: 10.0 mm. (holotype), 10.5-11.5 mm. ($\bar{X}$=11.2) (paratypes).

Female. Upper surface of wings: as on males but without brand on forewings. Under surface of wings: as on males. Length of forewing 11.0, 12.0 mm. (paratypes).

Male Abdominal Morphology and Genitalia. Fig. 3Cc, 5C. As characteristic of genus but distinctive from *T. mosconiensis* as detailed above and in Table I and the Appendix.

Female Abdominal Morphology and Genitalia. Fig. 4E. As typical of the genus but differing from *T. mosconiensis* as detailed in Diagnosis and Table I and the Appendix.

Types. Holotype, male, (Fig. 1EF), Tartagal, Salta Province, Argentina, 31 May 1982, B. MacPherson, deposited AMNH. Paratypes. AMNH: one female- same data as holotype; CMNH: two males- Rio Surutu, E. Bolivia, April 1915, J. Steinbach. BMNH: three males- Buenavista, Bolivia, May 1915, J. Steinbach. IML: one male, one female- Santa Cruz, Bolivia, no other data.

Distribution. Presently known from Salta Province, Argentina and northward into eastern Bolivia.

Remarks. I have included the CMNH, IML and BMNH specimens as paratypes because of the small number of specimens in the Argentine sample and because morphological features of the Bolivian specimens differ negligibly from those of the primary types.

Etymology. This species is named for the Rev. Bruce MacPherson.

Femniterga, new genus
Figures 2; 3DG; 4ABGH; 5D

Diagnosis. As detailed in the Appendix for the characters listed below, contrasted to *Tergissima*, *Femniterga* taxa are variously blue-colored on the wing upper surfaces, not brown, and otherwise distinct in male and female genitalic characters and modification of the eighth tergite to a sclerotized subcordate incised posterior cavity in females and males. Also, in *Femniterga* males the presence of distinct forewing patches suggesting brands includes not only darker coloration but apparent modification of the scales. Diagnostic characters (Table I, Appendix)- shared with *Tergissima* vis-a-vis *Calycopis* and *Calystryma*, 11, 16, 22, 29, 30; unique to *Femniterga*, 3, 12, 19, 36, 37, 38.

Description. Adult. Antennae fuscous, finely striped, white, club black-brown with orange terminus, length about one- half that of forewing base to apex; head with frons black-brown, eyes outlined white; thorax fuscous, with gray to black-brown hairs distad, sometime dusted iridescent blue; abdomen fuscous dorsad, whitish ventrad midline with scattered iridescent blue powdering adjacent hindwings.

Male. Upper surface of wings: ground color variously blue and brown- either washed with blue or silvery blue over one or both wings or with entire or section of either or both wings bright silvery blue. Apical area of discal cell with usually circular darkened area of apparently modified hairy scales resembling sexual brand. Submarginal black dot(s) in cell CuA1 or here and basad the anal lobe; shorter and longer tails at termini of veins CuA1 and CuA2, respectively. Under surface of the wings: ground color, both wings, brown, sometimes with buff or yellow cast; forewing with dark postmedian line from costa to vein CuA2 or across entire wing, edged whitish basad. Hindwing with tripartite median line, white distad, black centrad, red-orange basad from costa to anal margin, continuous but with M3 element broken obliquely from rest of line costad with "W"-shaped configuration; Sc + R1 element thickly edged and displaced distad median line. Limbal area vaguely orange-red in cells 2A, and M3, bluish in CuA2; orange Thecla-spot in cell CuA1 with or without black dot centrad depending on the species.

Female. Upper surface of the wings: forewing lacking evidence of brand; wing ground color with more extensive blue than males- either more washed with blue, or with more extensive fully blue areas depending on the species.

Male Abdominal Morphology and Genitalia. Fig. 3D,G. Characterized by the structures detailed in the above Diagnosis and as noted under each subsequent species description.

Female Abdominal Morphology and Genitalia. Fig. 4A,B. Eighth tergite with specialized subcordate incised posterior cavity (Fig. 4 A,B) appearing as heavily sclerotized covering encompassing entire lateral areas from dorsum (Fig. 4Aa,b, Ba,b) laterad to lamellae of genital plate (Fig. 4 Ad, Bd). Depend-

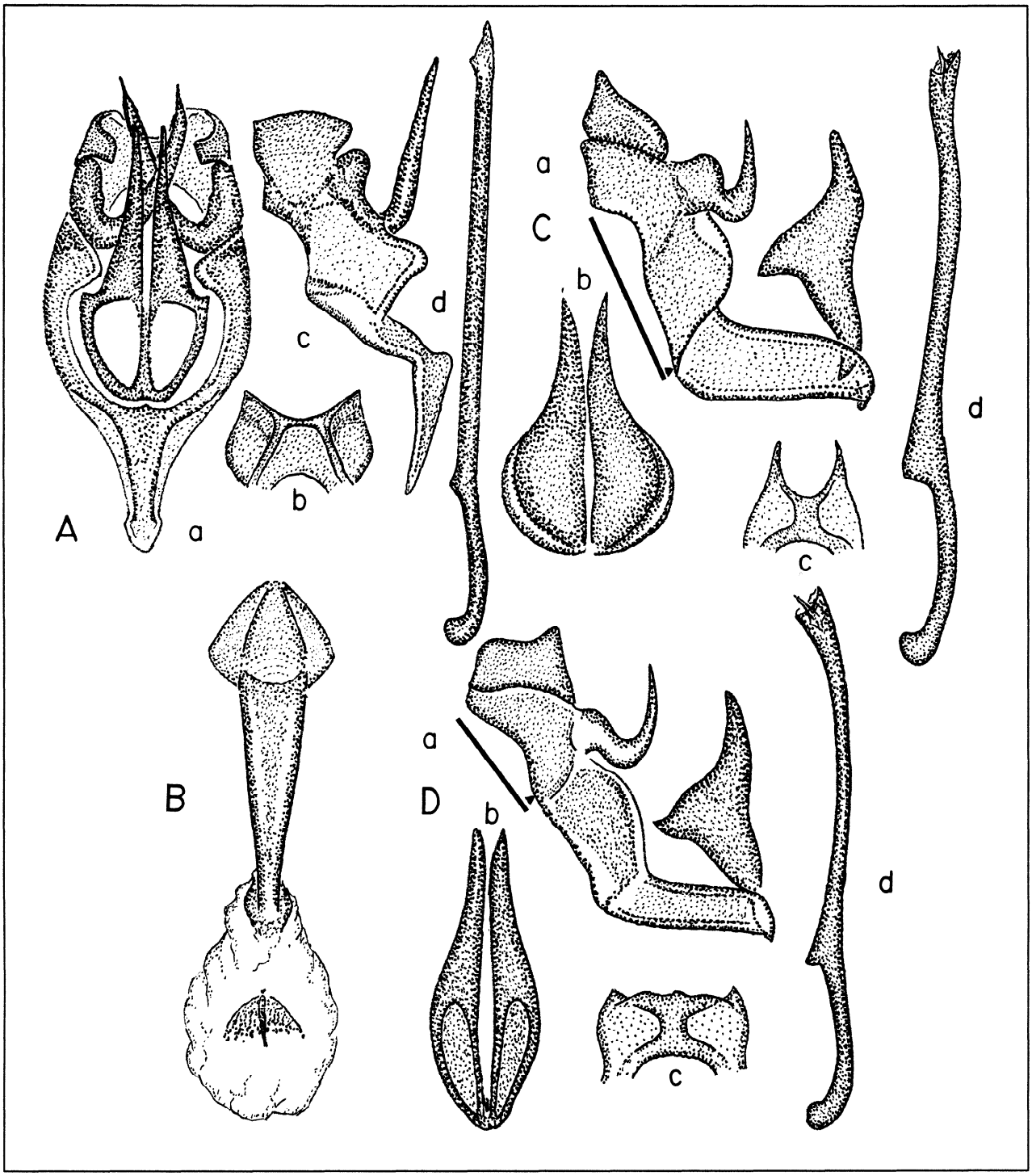

Figure 5. Male genitalia of other *Tergissima* and *Femniterga* species and male and female genitalia of sympatric *Thecla autoclea*. A-B. *T. autoclea* (Pinchanal, Salta Province, Argentina, AMNH). A) Male genitalia: a. genitalia, ventral view, aedeagus removed; b. uncus, dorsal view; c. genitalia, lateral view, aedeagus removed; d. aedeagus, lateral view. B) Female genitalia: genital plate and corpus bursae, ventral view. C-D. Male genitalia, *Tergissima macphersoni*, holotype, and *Femniterga judae*, paratype, respectively. Format: same as Figure 3.

ing on the species, lateral areas of the incised cavity are either completely fused along the dorsum (Fig. 4B) or fused dorso-caudad by spiny hair- tufts (Fig. 4A). Lateral wall of cavity variously sculptured with ventro-caudad arm-like articulation conjoining juncture of superior and inferior genital plates (Fig. 4Ad, Bd). A dorso- caudad plate occurs caudad the eighth tergite (Fig. 4Ab, Bb) and variously covers the papillae anales (Fig. 4Ac, B.c.) depending on the species. Female genitalia (Fig. 4G,H) have short ductus bursae, angled sharply toward dorsum of incised posterior cavity and diminutively sclerotized in one species. Lamella postvaginalis large, equalling or exceeding half the ductal length in their length and width. Lamella antevaginalis diminutive to lacking. Corpus bursae round with its diameter hardly exceeding expanse of lamellae; two variously cross-shaped signa occur laterad on the bursae.

Type Species. *Femniterga notacastanea,* new species.

Distribution. Presently comprised of two species sympatric in northwestern Argentina (Salta, Jujuy and Tucuman provinces), 500-1700m. altitude with one species distributed further north to the Rio Surutu region of eastern Bolivia.

Remarks. Hitherto in the literature, specialized sclerotizations of the eighth tergite in female Eumaeini have not been noted. Specialization of the eighth tergite in *Femniterga* should not be confused with the occasional slightly sclerotized junctions sometimes occurring between the lamella postvaginalis and eighth tergite in various Eumaeini taxa. I reported this condition in *Mitoura siva* Edwards (Eumaeini; Callophryina) (Johnson, 1978) and one species of *Calycopis* being described by me, Eisele and MacPherson (1988, in press) shows this development. This modification is not a subcordate incised cavity but only a localized strengthening of the tergite as it conjoins the postvaginal lamella. Because of the uniqueness of the eighth abdominal morphology in *Femniterga* it seems doubtful that Field saw any specimens representing it. As a result, if more species of *Femniterga* are to be discovered these may be of more southern Neotropical distribution. I have a male and female from two southern Argentine localities which represent *Femniterga*. They are not described herein since consultation with Robert C. Eisele and staff of the Institute Miguel Lillo (Tucuman) indicates that efforts will be made in the future to gather extensive samples of southern Argentine butterflies. The assignment of the above mentioned male and female should wait for this additional information.

My qualified usage of the term "brand" in regard to darkened patches on the forewings of *Femniterga* and *Tergissima* (above and Appendix) follows from discussions with John Eliot. The variety of sexual brands in male Eumaeini is vast and it is difficult to link all such "visual brands" with demonstrated pheromonal functions (Eliot, 1973). Further, conventional compound microscopy, though adequate to distinguish possibly modified scales, cannot alone confirm pheromonal activity. Only scanning electron microscopy can clearly distinguish modified scale types and these may or may not involve pheromone production (Eliot, 1973). The appearance of "brands" in *Tergissima* and *Femniterga*, while a noticeable trait, is not as emphatic as in many other Eumaeini. Thus, though the darkened patches deserve mention, it cannot be assumed at this time that the patches are androconial in nature. Apparent modification of scales appears, however, in *Femniterga.*

In the present study, all type material of *Femniterga* was studied and dissected, along with material listed in the generic description of *Tergissima,* and in Johnson, MacPherson and Ingraham (1986). In addition, a long series of one species of *Femniterga* was studied at the CMNH but only a representative sample dissected.

Etymology. The Latin name combines the roots "tergum" (n.) and "femni" as modified from "femini" (referring to female) and refers to the unique development of the female's eighth tergite characteristic of the genus. It is considered feminine.

Femniterga notacastanea, new species Figures 2A-D; 3DG; 4A,G.

Diagnosis. The present diagnosis serves as a basis for abbreviating that of the subsequently described species. *F. notacastanea* superficially differs from *F. judae* by its washed-blue wing upper surfaces. *F. notacastanea* has blue coloration typified by a thick overcast of blue over the hindwings and at least basad on the forewing while *F. judae* has distinct patches of brilliant blue covering the entire hindwing on females and the anal wing sector in males. On the upper surface *F. notacastanea* has a single emphatic black marginal dot at cell CuA1 on the hindwing, faintly but very noticeable bordered basad with an orangish cast (apparently resulting from the bright orange of the Thecla-spot just beneath in cell CuA1 of the undersurface). Amongst all *Femniterga, Tergissima, Calycopis* and *Calystryma,* this later coloration allows *F. notacastanea* to be readily identified among series of otherwise quite similar specimens.

F. notacastanea and *F. judae* differ significantly in genitalia and in structure of the eighth tergite's incised

posterior cavity. In *F. notacastanea* the walls of the cavity are separated dorsad and the lateral wall is uniformly wide. In *F. judae*, the dorsum in fused and there is a ventro-cephalic protrusion on the lateral wall. In female genitalia, *F. notacastanea* has a diminutive tapered ductus and very large posterior lamellae. The lamellae appear as two very large, terminally-spined "spade-shaped" shields. *F. judae* has very square lamellae, fused centrad with a heavily sclerotized and rectangular ductus pointing perpendicularly cephalad.

Description. Male. Upper surface of wing: ground color brown, washed with iridescent blue; forewing sometimes completely brown but vaguely bluish basad. Large squarish dark patch distad in discal cell about 1 mm. square. Hindwing washed with iridescent blue, sometimes heavily except in basal area. Short and long tails at termini of veins CuA1 and CuA2, respectively. Black marginal spot in cell CuA1, usually with noticeable orangish-chestnut coloration basad. Under surface of wings: as typical of genus; ground more brown than yellowish-brown. Limbal area with black-centered orange Thecla-spot in cell CuA1 and with orange in cell interspace costad to cell M3. Length of forewing: 11.0-12.5 mm., ($\bar{X}$ of 5 paratypes, AMNH, IML, 11.5 mm.).

Female. Upper surface of wings: ground color brown washed with iridescent blue; forewing usually washed blue basad, hindwing usually not as blue as in males. No visual brand on forewing. Otherwise as males. Under surface of wings: as on males. Length of forewing: 11.5 mm. (holotype), 11.0-11.5 mm. ($\bar{X}$ of six females, AMNH, CMNH, 11.8 mm.).

Male Abdominal Morphology and Genitalia. Fig. 3D,G. As typical of the genus (see Diagnosis above), summarized as follows; uncus produced ventrad (Fig. 3Ga,c); saccus slightly protruding and parabolic; vinculum laterad not greatly angled, brush organs tightly packed, attached along dorsal rim (Fig. 3G, line/carut); valvae separated except at base, with pronounced cephalad ovate rim and tapered termini (Fig. 3Gb); aedeagus long, length equaling or exceeding edge of labides (Fig. 3GdG).

Female Abdominal Morphology and Genitalia. Fig. 4A,G. As characterized in detail in generic description and Diagnosis above.

Types. Holotype, female (Fig. 2CD), Laguna Las Casas, Salta Province, Argentina, dense wet woods, 3 September 1979, B. MacPherson deposited AMNH. Paratypes. AMNH: same data as holotype (one male [Fig. 2AB]); Cucho, Salta Province, Argentina, 15 December 1977, B. MacPherson (one male, one female); Pichanal, Salta Province, Robert Eisele, 24 April 1984 (one female), (2 km. W), 10 May 1979 (one male), (3 km. NW), 550 m., 24 April 1979 (one male), 26 April 1973 (one male), 15 May 1972 (one female); Cornejo, Salta Province, 2 June 1986, Robert Eisele (one male); Tartagal, Salta Province, 20 May 1986, Robert Eisele (one female); Tartagal (2 km. NW) 550 m., 30 April 1979, Robert Eisele (one female); Saladillo (5 km. W), Salta Province, 600 m., Robert Eisele, 25 May 1979 (two females), 23 April 1979 (one female); Mosconi, Salta Province, Robert Eisele, 26 July 1977 (one female), 12 June 1976 (one male); Mision Chaquena, Salta Province, 4 July 1974, Robert Eisele (one female); AME: Tartagal, Salta Province, 500 m., 16 June 1980, Bruce MacPherson (one male). IML: El Fuerte, Jujuy Province, 1700 m., 2 January 1968, B. Garcia (one male); Famailla, Tucuman Province, May 1947, B. Garcia (one male); Tucuman, Tucuman Province, K. Hayward, no other data (one female). Additional specimens (see below).

Distribution. Known from Salta, Jujuy and Tucuman provinces, Argentina, 500-1700m., and northward into eastern Bolivia. Flight period indicated as early January through the first week of September.

Remarks. There is a series of 13 females of *F. notacastanea* at the CMNH as follows: three females, Province del Sara, Bolivia, 450 m., J. Steinbach; ten females, Rio Surutu, E. Bolivia, 350 m. J. Steinbach. No males are associated with these, though it is possible these might have been placed elsewhere in the collection through curation of undetermined material by H. K. Clench. In addition there are Bolivian specimens at IML: Santa Cruz, Bolivia, no other data (one male), El Cidual, Santa Cruz, Bolivia, 28 January 1962, R. Golbach (one female). All type material was dissected along with a representative sample of the above-mentioned 13 females from Bolivia. No specimens were located at the BMNH.

Etymology. The name is formed from "castanea", Latin for "chestnut: and "nota", prefix meaning mark or slash. It refers to the chestnut-orange coloration basad the black spot in cell CuA1 of the hindwing which readily distinguishes the species.

Femniterga judae, new species
Figures 2E-H; 4B,H; 5D

Diagnosis. From *F. notacastanea*, *F. judae* is distinctive as follows. *F. judae* has brilliant silver blue patches on the hindwing upper surface, encompassing the entire hindwing in females and the area from vein CuA1 to the anal margin in males. In both sexes, *F. judae* has two marginal black dots, one at cell CuA1 and one basad the

anal lobe. Evidence of a male forewing brand is less emphatic in *F. judae*. In *F. judae* females there is a fused dorsum on the subcordate incised posterior cavity and a cephalad directed process on its lateral walls. Female genitalia of *F. judae* have far smaller lamellae and a strongly sclerotized ductus prominently located perpendicular to the genital plates.

Description. Male. Upper surface of wings: Forewing dark brown, with dark compact spot of less than 1 mm. just basad cross-vein of discal cell suggesting brand. Hindwing dark brown from costa to vein CuA1, then brilliant silvery blue to anal margin. Black spots marginad at cell CuA1 and basad the anal lobe. Short and long tails at termini of veins CuA1 and CuA2, respectively. Under surface of wings: Ground color brown, white- bordered dark postmedian line on forewing, costa to vein CuA2. Hindwing with tripartite median line, broken obliquely at cell M1, "W"-shaped at cells CuA1 and CuA2 with black centered orange Thecla-spot in cell CuA1 and submarginal orange extending costad to cell M3. Length of forewing: 11.5 mm., paratype.

Female. Upper Surface of wings: Without visual brand on forewing; forewing dusted brightly silvery blue along basad vein of discal cell. Hindwing completely brilliant silvery blue with black marginal spots at cell CuA1 and at base of anal lobe. Under surface of wings: as on male but with Thecla-spot completely orange and marginal orange extending costad to cell M1 as a distinct marginal line. Length of forewing: 12.0 mm. (holotype).

Male Abdominal Morphology and Genitalia: Fig. 3Dc, 5D. Posterior incised cavity as typical of genus except a second notchlike opening laterad. Genitalia with uncus extremely produced ventrad; brush organs short and compact, located caudad along the vinculum opposite the base of the falces. Ventrad area of vinculum wide, saccus not protruding. Valvae ventrad elongate and elliptical in shape. Aedeagus short, barely exceeding 1.5 times length from saccus tip to uncus terminus; single pointed cornutus terminad.

Female Abdominal Morphology and Genitalia: Fig. 4B,H. As typical of genus but with dorsum of incised posterior cavity (Fig. 4B) fused and lateral wall with ventro-cephalad directed protrusion. Genitalia (Fig. 4H) with heavily sclerotized ductus, angled quite obliquely toward the dorsum of the posterior incised cavity and capped terminad with very square-shaped lamella postvaginalis slightly spined along the terminal edge. Lamella antevaginalis present only as slight lip; corpus bursae small and round, diameter hardly exceeding half the ductus length and with two spine-like cornuti, each crossed by arc-shaped dendritic-edged sclerotizations.

Types. Holotype, female; paratype, male Mosconi, Salta Province, Argentina, dry wooded habitat, 500-1000 m., 9 June 1975, B. MacPherson, deposited AMNH.

Etymology. This species is named for Judith L. Kunreuther.

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The Appendix

Characters differentiating *Calycopis*, *Calystryma*, *Tergissima* and *Femniterga*. Asterisked (*) characters represent those whose distributions were used by Field (1967a, 1967b) to differentiate *Calycopis* and *Calystryma* from each other and from other Eumaeini.

Characters of the Wings:

1. Upper surface of wings generally brown.*
2. Upper surface of wings generally blue or bluish.*
3. Upper surface of hindwing with marginal black spots limited to either at cell CuA1 only or at CuA1 and basad the anal lobe.
4. Upper surface of hindwing with marginal black spots usually along most of margin.
5. Under surface of hindwing with emphatic cell M3 cross-bar in tripartite median line.*
6. Under surface of hindwing with cell M3 element in line with rest of median line.
7. Under surface of hindwing with cell M3 element of tripartite median line obsolescent.
8. Under surface of hindwing with cell SC + R1 element heavily edged with coloration and displaced distad.*
9. Under surface of hindwing with limbal/costal area dominated less by Thecla-spot configuration and more by various submarginal lines.

Secondary Sexual Characters

(see Remarks under *Femniterga* generic treatment):

10. Male without forewing "brand" (*sensu* Clench, 1955, 1961; Eliot, 1973).*
11. Male with darkened apex of forewing discal cell suggesting sexual "brand" (*sensu*, Clench, 1955, 1961; Eliot, 1973).
12. Male with apex of forewing discal cell darkened and with compound microscopy suggesting scale modification.

	Thecla autoclea	CALYCOPIS	CALYSTRYMA	TERGISSIMA	FEMNITERGA		Thecla autoclea	CALYCOPIS	CALYSTRYMA	TERGISSIMA	FEMNITERGA
1	●		●	●		21		●	●		
2		●			●	22				●	●
3					●	23			●		
4		●				24	●	●			
5		●	●	●	●	25	●	●			
6	●					26			●	●	●
7	●					27	●	●		●	
8		●	●	●	●	28			●		●
9	●					29				●	●
10	●	●	●			30				●	●
11				●	●	31				●	
12					●	32		●	●		●
13	●					33				●	
14		●				34	●	●	●		
15			●			35				●	
16				●	●	36					●
17				●		37					●
18	●	●	●	●		38					●
19					●						
20	●										

Table I. Distribution of characters listed in the Appendix in *Thecla autoclea, Calycopis, Calystryma, Tergissima,* and *Femniterga.*

Characters of Abdominal Morphology:

Male

13. Eighth tergite unspecialized.*
14. Eighth tergite with sclerotized subcordate posterior cavity (*sensu* Field, 1976a, Figs. 20-21; 1967b, Figs. 1-12) extending from beneath dorsum of seventh segment to a generally incised terminus and extending laterally to dorsad spiracles (Fig. 3A).*
15. Eighth tergite with sclerotized subcordate posterior cavity extending from beneath dorsum of seventh segment to moderately incised terminus

and extending laterally dorsad to spiracles; a few taxa with "innervative opening" (used here and hereafter to refer to holes or notches in incised cavity near spiracles which allow their opening but may also have other functions for anatomical attachment within and without sclerotized wall of cavity) at juncture of specialized tergite with spiracle of eighth segment (Fig. 3B).*

16. Eighth tergite with sclerotized subcordate posterior cavity extending from beneath dorsum of sixth segment to extremely incised terminus and extending laterally ventrad beyond spiracles with one innervative opening at juncture of specialized tergite with spiracles of eighth segment. No caudal process protruding from abdomen (Fig. 3D).
17. (a) Eighth tergite with sclerotized subcordate posterior cavity extending from beneath dorsum of sixth segment to extremely incised terminus and extending laterally ventrad beyond spiracles with two innervative openings at juncture of specialized tergite with spiracles of seventh and eighth segments.

    (b) [*T. mosconiensis* only] caudal process protruding terminad from abdomen; cavity recurving within ninth sternite (Fig. 3C).

Female

18. Eighth tergite unspecialized (Field, 1967a, Fig.26; 1967b, Figs. 13, 17, 22).*
19. Eighth tergite with sclerotized subcordate incised posterior cavity extending from beneath dorsum of eighth tergite variously laterad and ventrad (Fig. 4A,B).

Characters of the Genitalia:

Male

20. Genitalia of Type 1 ("bulldog" type *sensu* Eliot (1973) [characteristic of *Thecla autoclea* and various other Eumaeini] (Fig. 5A): with ventral ellipsoidal expanse of vinculum wide (a much more circular and less elliptical configuration than below [21]) with consequent lateral configuration showing labides angled far less than 180° (circa 135°), saccus far less than 180° (circa 135°), to line of vinculum.
21. Genitalia of Type 2 ("greyhound" type *sensu* Eliot (1973) [characteristic of *Calystryma*, *Calycopis* and various other Eumaeini (Fig. 3E,F)]: with ventral ellipsoidal expanse of vinculum narrow (a much more elliptical and less circular configuration than above [20]) with consequent lateral configuration showing labides angled nearly or only slightly less than 180°, saccus usually between 135° and (often approaching) 180°, to line of vinculum.
22. Uncus produced dorsad (Fig. 3H, 5C).
23. Uncus produced centrad (Field, 1967b, Figs. 4,7,8,9).*
24. Uncus not produced (Field, 1967a, Figs. 4-9).*
25. Valvae fused basad for more than one-half of their lengths from base to terminus (Field, 1967a, Figs. 1-9).*
26. Valvae joined only basad above the juncture with vincular- saccal projection (Field, 1967b, Figs. 1-12).*
27. Aedeagus long (usually exceeding 2x terminal expanse of vincular arc) and with pointed terminus (Field, 1967a, Figs. 1- 19) (Fig. 3E,G).*
28. Aedeagus short (usually much less than 2x terminal expanse of vincular arc) and without pointed terminus (Field, 1967b, Figs. 1-12) (Fig. 3F).*
29. Cephalad areas of vincular arc acutely angled laterad (Fig. 4H; 5C,D).
30. Saccus diminutive to almost completely absent (Fig. 3G,H; 5C,D).

Female

31. Lacking developed genital plate; instead with only slightly sclerotized flaps caudad ductus bursae (Fig. 4E,F).
32. Genital plates developed as two parallel and variously spiny plates (Field, 1967a, Figs. 22-34; 1967b, Figs. 13-23) (Fig. 4C,D,G).*
33. Ductus bursae occurring as simple tube of moderate to extensive length (Fig. 4E,F).
34. Corpus bursae with large, platelike, signa (Field, 1967a, Figs. 22-34; 1967b, Figs. 13-23) (Fig. 4C,D).
35. Corpus bursae without signa or with signa as only vaguely developed spines (Fig. 4E,F).
36. Corpus bursae with cross-like signa (Fig. 4G,H).
37. Female genitalia with ductus bursae diminutive, length hardly equaling that of the terminal expanse of the lamellae of the genital plate and sometimes with reduced sclerotization (Fig. 4G,H).
38. Female genitalia with lamellae greatly enlarged as two highly sclerotized and parallel shields; postvaginal lamella spined terminad (Fig. 4G).