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FAMILY - NOCTUIDAE

SUBFAMILY - AGROTIINAE

DESCRIPTIONS

**Agrotis c-nigrum** Linn.

(Fig. 543)

Corpus bursae broad in middle and narrowed anteriorly, strongly corrugated and partially sclerotized; cervix bursae smaller than corpus bursae, more or less rounded, its wall corrugated; ductus bursae moderately long and broad, its anterior half membranous, posterior half with well defined colliculum and adorned with pits and tubercles; genital plates semicircular and strongly sclerotized; anterior apophyses short and stout; posterior apophyses longer than anterior; all the four apophyses tapering apically; ovipositor lobes well developed, covered with setae of variable sizes.

**Agrotis flammatra** Fabr.

(Fig. 544)

Corpus bursae elongated, bag-like, slightly dilated anteriorly, with walls membranous and corrugated; cervix bursae narrow at base; broadened apically, with walls
membranous and wrinkled; ductus bursae short and narrow; genital plates V-shaped, moderately sclerotized; anterior apophyses shorter than posterior; posterior apophyses long and slender; ovipositor lobes broad, each fringed with long and strong setae.

* Aerotis ypsilon* Rott.  
(Figs. 545)

Corpus bursae elongated, narrow in its basal half, its apical region broadened, with walls membranous and weakly wrinkled; signum small, scobinate, lying in the apical portion of corpus bursae; cervix bursae long, irregular in outline, slightly swollen in its distal portion, kept folded like spring in its original position, with walls membranous and poorly corrugated; ductus bursae short, with its walls membranous and wrinkled longitudinally; genital plate more or less circular; anterior apophyses slightly shorter than posterior; posterior apophyses with slightly thickened bases; ovipositor lobes broad and setose.

* Heliothis peltigera* Schiff.  
(Fig. 546)

Corpus bursae long, irregular being broad at base, narrow in middle but balloon shaped apically, with walls
membranous and wrinkled; signa three long, scobinated patches, lying longitudinally in the swollen region of corpus bursae; cervix bursae shorter than corpus bursae, with basal half broadened but narrow and rounded distally; ductus bursae short, narrow, with walls semimembranous; genital plate U-shaped and well sclerotized; anterior apophyses slightly shorter than posterior, each with thickened base and tip; posterior apophyses with tips slightly thickened; ovipositor lobes well marked and covered with setae.

**Heliothis armigera** Hubn.
(Fig. 547)

Corpus bursae more or less balloon shaped, with walls membranous; signa three, elongated and scobinated; cervix bursae elongated, moderately broad, coiled, marked with irregular thickenings; ductus bursae short, with walls poorly sclerotized; genital plates U-shaped and prominent; anterior apophyses slightly shorter than posterior; posterior apophyses with thickened bases; ovipositor lobes fringed with strongly sclerotized setae of different sizes.

**Euxoa spinifera** Roth.
(Fig. 548)

Corpus bursae quite long and narrow, with slightly
swollen apex, its walls membranous; signum very small, more or less circular and denticulate patch, lying near the tip of corpus bursae; cervix bursae quite long, narrow, with its walls membranous; ductus bursae short, with anterior half membranous; its posterior half weakly sclerotized, its surface marked with longitudinal thickenings along with tubercles and pits; anterior apophyses with thickened tips and bases; posterior apophyses longer than anterior; ovipositor lobes margined with macro and micro setae.

Adisura marginalis Wlk.

(Fig. 549)

Corpus bursae almost circular with walls membranous in its anterior half, with sclerotized striations running longitudinally in its posterior half; cervix bursae smaller than corpus bursae and irregular in outline; ductus bursae reduced; genital plates moderately broad and rod-like; anterior apophyses long and slender; posterior apophyses longer than anterior; ovipositor lobes beset with long and short setae.
Timora decorata Moore
(Fig. 550)

Corpus bursae broad in its basal region but narrow in the subapical, with walls completely membranous; signa two, scobinate, lying longitudinally in the basal swollen portion of corpus bursae; cervix bursae long, uniformly broadened, with its distal half curved, its walls membranous; ductus bursae long, narrow its walls marked with striations; genital plates rod-shaped; anterior apophyses shorter than posterior, each with thickened tip; posterior apophyses slightly curved; ovipositor lobes normal, fringed with long and short setae.

DISCUSSION AND CONCLUSIONS

The female genitalia of the Subfamily Agrotiinae, as studied in eight species belonging to five genera, show an excessive development of the cervix bursae and the posterior apophyses are always longer than the anterior apophyses. The congeneric species of the genus Agrotis Ochs. also show some resemblance in the shape of the ovipositor lobes but the other parts of the genitalia show specific differences. Similarly, the two species of genus Heliothis Ochs. show a closer agreement because the number and structure of signa, the shape of the genital plates and that of the ovipositor
lobes are almost similar in the two species. The remaining three genera are represented by a single species each but the structure of the corpus bursae and cervix bursae are strikingly different in the three species.

The female genitalia have also been studied in five species of *Agrotis* Ochs., including one also studied by author (Pierce, 1952), four additional species of *Heliothis* Ochs. along with two species studied here (Pierce, 1952; Bhattacharjee and Gupta, 1972) and five species of *Euxoa* Hubn. (Pierce, 1952). The structure of these organs in all these species generally agrees with the common pattern of structure stated above for this family except that all the four species of *Euxoa* Hubn. not only differ from the single species of *Euxoa* Hubn. included in this study but also lack the characteristic feature of the family i.e., the great development of cervix bursae. Moreover, the compact nature of the genus *Heliothis* Ochs. is further proved by the presence of three signs in the two species studied by Bhattacharjee and Gupta (1972). It can thus be concluded that the female genitalia are broadly similar in the subfamily as a whole and show a very common structure in the genera such as *Heliothis* Ochs. but a variable structure in such genera as *Agrotis* Ochs. and *Euxoa* Hubn.

It will be thus seen that the conclusions derived from the discussion on the female genitalia are more or
less similar to those derived from the study of male genitalia. Both these structures point out the general similarity in the subfamily and the common pattern of structure in some genera and a variable pattern in others. Whereas the compact nature of the genus Heliothis Ochs. is confirmed by the structure of both male and female genitalia, the genus Agrotis Ochs. shows much less similarity in the structure of the female genitalia of the included species.
Corpus bursae elongated, irregular sac, its walls completely membranous and poorly wrinkled; signa two pairs, each elongated and denticulate, lying longitudinally in the posterior half of corpus bursae; cervix bursae small; ductus bursae short and strongly sclerotized; genital plates well sclerotized; anterior apophyses short; posterior apophyses longer than anterior, each with basal half thickened; ovipositor lobes rectangular, each fringed with setae of different sizes.

**Pantella gloriosa** Fabr.  
(Fig. 551)

Corpus bursae long, swollen in middle, with walls membranous and strongly corrugated longitudinally; signa four forming two pairs of similar shape and size, scobinate, lying in swollen region of corpus bursae; cervix bursae small process; ductus bursae short, narrow, its walls membranous and wrinkled longitudinally; genital plates collar-like and poorly sclerotized; anterior apophyses long.
with thickened tips; posterior apophyses short, broad, both tapering apically; ovipositor lobes setose with thin setae.

**Odontestra submarginalis** Wlk.
(Fig. 553)

Corpus bursae small, narrow at base but broadened distally, its walls semimembranous and studded with short dents; cervix bursae shorter than corpus bursae, somewhat oval, with walls membranous; ductus bursae moderately long, broad but narrow at its cephalic end, with walls strongly sclerotized; anterior apophyses short; posterior apophyses much longer than anterior, each with thickened base; ovipositor lobes rectangular, each covered with medium sized setae.

**Borolia byssina** Swinh.
(Fig. 554)

Corpus bursae long, irregular in outline, narrow anteriorly but broadened posteriorly, its walls membranous, with longitudinal sclerotizations in its basal region; cervix bursae more or less Y-shaped and sclerotized; ductus bursae short, with walls irregularly sclerotized; anterior apophyses slightly shorter than posterior, with slightly thickened bases; posterior apophyses with thickened
posterior ends; ovipositor lobes broad, more or less triangular, each covered with scattered setae.

*Cirphis unipuncta* Haw.

(Fig. 555)

Corpus bursae much smaller than cervix bursae, narrow at its base and broadened in its distal half, its walls membranous; cervix bursae elongated, narrow, bent near its anterior and posterior extremities forming c-shaped structure, its walls irregularly sclerotized and ribbed with narrowed ductules; ductus bursae short, marked with poorly sclerotized streaks; anterior apophyses shorter than posterior; posterior apophyses with small basal thickenings; all the four apophyses well sclerotized; ovipositor lobes broad, triangular, each beset with short setae.

**DISCUSSION AND CONCLUSIONS**

The common feature in the female genitalia of the five species of subfamily Hadeninae appear to be the length of the posterior apophyses which are distinctly longer than the anterior apophyses and the occurrence of chitinization in some part of the ductus bursae except *Brithys crini* Fabr. in which the posterior apophyses are relatively much shorter than the anterior ones. It may be mentioned that
the exceptional position of this species has also been noted in the case of male genitalia. The shape and size of the corpus bursae and that of cervix bursae show variations in different genera.
Corpus bursae elongated bag-like, narrow anteriorly, broad in middle, its walls studded with numerous dents in its anterior region, ribbed with strongly sclerotized tubercles in the middle and weakly sclerotized in its caudal portion; ductus bursae short, moderately broad, membranous and corrugated longitudinally; antrum prominent; anterior apophyses longer than posterior, both swollen apically and strongly sclerotized; posterior apophyses with narrowed bases; ovipositor lobes narrow and setose with short setae.

Callyna monoleuca Wlk.
(Fig. 557)

Corpus bursae elongated sac-like, broad in middle, its anterior region marked with numerous dents, its walls ribbed with tubercles in middle and in its caudal region; cervix bursae small; ductus bursae short, moderately broad, with walls membranous and wrinkled longitudinally; genital plate prominent; anterior apophyses slightly shorter than
posterior, both poorly swollen apically and strongly sclerotized; posterior apophyses with narrowed bases; ovipositor lobes normal, each covered with setae.

*Spodoptera abyssinia* Guen.

(Fig. 558)

Corpus bursae more or less globular, membranous, ribbed obliquely and longitudinally with thin tubercles; signum band shaped, its surface adorned with large number of irregularly arranged short spines, lying transversely near the cephalic end of corpus bursae; ductus bursae ribbed longitudinally; genital plate prominent but irregularly sclerotized; anterior apophyses quite short; posterior apophyses much longer than anterior, each with more or less rectangularly thickened base; ovipositor lobes well marked, each adorned with macro and micro setae.

*Spodoptera mauritia acronyxoides* Guen.

(Fig. 559)

Corpus bursae elongated sac-like, longitudinally ribbed throughout its length with sclerotized tubercles, its walls semimembranous; signum scobinate, lying longitudinally in middle of corpus bursae; ductus bursae moderately long, strongly sclerotized, its cephalic half ribbed longitudinally; antrum prominent; anterior
apophyses short; posterior apophyses much longer than anterior, each with thickened base; ovipositor lobes normal and setose.

**Perigæa capensis** Guen.
(Fig. 560)

Corpus bursae more or less globular, its walls membranous; signum comprising weakly sclerotized and different sized thickenings, lying near the basal region of corpus bursae; cervix bursae small protubrance; ductus bursae moderately long, membranous, with walls poorly corrugated longitudinally; anterior apophyses very slightly longer than posterior; posterior apophyses with broad bases; ovipositor lobes broad and setose.

**Prodenia litura** Fabr.
(Fig. 561)

Corpus bursae somewhat oblong, being broad anteriorly and narrowed posteriorly, with its walls membranous anteriorly and longitudinally but irregularly ribbed in its posterior half; signum scobinate, situated in the cephalic half of corpus bursae; cervix bursae small; ductus bursae strongly and uniformly sclerotized; anterior apophyses short, each with broadened tip and base; posterior apophyses much longer than anterior, each with broad base;
ovipositor lobes normal and setose with variable sized setae.

**Acroxycta maxima** Moore
(Fig. 562)

Corpus bursae more or less globular, with walls membranous and poorly wrinkled; signum small, irregularly sclerotized, lying transversely nearly in the middle of corpus bursae; ductus bursae tubular, irregularly sclerotized with well defined colliculum; anterior apophyses shorter than posterior, each with broad base and apex; posterior apophyses long, stout, each with base broad and narrowed apically; all the four strongly sclerotized; ovipositor lobes some what triangular, strongly sclerotized, each adorned with pits and dense array of variable setae.

**Trachea auriplena** Wlk.
(Fig. 563)

Corpus bursae much elongated, more or less triangular in its anterior half, with walls membranous apically but strongly sclerotized and adorned with numerous pits in its posterior region; ductus bursae exceptionally reduced, broad, with its walls strongly sclerotized; genital plates well marked; anterior apophyses slightly longer than posterior; ovipositor lobes setose.
Eriopus riviarius Wlk.

(Fig. 564)

Corpus bursae elongated, irregular in shape, swollen apically, with walls completely membranous; ductus bursae quite reduced, with its walls irregularly sclerotized; anterior apophyses slightly longer than posterior, moderately broad and slender; ovipositor lobes more or less rectangular, each fringed with short setae.

Laphygma exiqua Hubn.

(Fig. 565)

Corpus bursae broad in its anterior half and narrowed posteriorly, with its walls almost membranous and very weakly ribbed in its caudal region; ductus bursae short with well marked colliculum; genital plate uniformly sclerotized; anterior apophyses absent; posterior apophyses long, narrow, each with thickened base; ovipositor lobes short and broad, each covered with thin and weak setae.

Athetis stygia Hampson.

(Fig. 566)

Corpus bursae swollen sac-like, marked with oblique and longitudinally arranged tubercles, with walls membranous; ductus bursae very much reduced, quite broad, with
its walls sclerotized; anterior apophyses shorter than posterior apophyses, each with thickened ends; posterior apophyses long, each thickened near its base; ovipositor lobes moderately broad but short, each setose with thin setae.

*Da dicda lineosa* Moore (Fig. 567)

Corpus bursae irregular in shape, broad in its cephalic region and narrow posteriorly, with walls almost membranous and profusely fringed with spines and dents; ductus bursae much reduced and with colliculum; genital plate well sclerotized; anterior apophyses shorter than posterior, each with broadly thickened epical end; posterior apophyses long, each with both ends thickened; ovipositor lobes moderately broad, setose with fine macro and micro setae.

*Da dicda bipuncta* Snell. (Fig. 568)

Corpus bursae sac-like, its walls almost membranous but studded with strongly sclerotized spines and dents; ductus seminalis swollen forming irregular shaped and small bulla seminalis; ductus bursae much short, broad
and with colliculum; genital plate irregularly sclerotized; anterior apophyses shorter than posterior, each thickened proximally; posterior apophyses long, each with thickened base; ovipositor well marked, each fringed with thin setae of different sizes.

*Polyoryctida dimidialis* Fabr.
(Fig. 569)

Corpus bursae relatively small and ball-like; cervix bursae globular its walls membranous; signum represented by two spinose thickenings; ductus bursae moderately long, broad and uniformly sclerotized; antrum bursae irregularly sclerotized; anterior apophyses shorter than posterior; posterior apophyses long, each slightly bent near its proximal extremity both with thickened tips; ovipositor lobes triangular each fringed with a few variable setae.

**DISCUSSION AND CONCLUSIONS**

The female genitalia in fourteen species under eleven genera of subfamily Acronyctinae present a rather variable structure not only in different species but also in different genera. However, there is met with some similarity in the congeneric species under genera *Callyna* Guen., *Spodoptera* Guen. and *Dadica* Moore. The female
genitalia of two species of *Spodoptera* Guen. studied here have also been worked out by Chatterjee (1970) along with a third species of the same genus. The latter species also falls in the general structure exhibited by the other two species of genus *Spodoptera* Guen. Similarly, the representatives of three other genera studied by the author viz., *Trachea* Ochs., *Laphygma* Guen. and *Athetis* Hubn. have also been studied for their male genitalia by Pierce (1952). Out of these, *Laphygma exigua* Hubn. is the same as studied by the author, *Trachea striolicis* Linn. shows a general resemblance with *Trachea suriplena* Wlk., whereas *Athetis clavi-palpis* Scop. shows little similarity with its congeneric species *Athetis stygia* Hampsn. as studied here. It can thus be concluded that the structure of the female genitalia is useful only for specific discriminations in the subfamily Acronyctinae and shows only limited utility at the generic level. Moreover, the high degree of variation among different genera points to the diverse nature of this group: as has also been mentioned under the discussion of their male genitalia.
Tarache nitidula Syn Catena Sowerby

(Fig. 570)

Corpus bursae elongated and irregular bag-like, its walls membranous; cervix bursae small; ductus bursae short, irregular in shape and irregularly sclerotized; genital plates sclerotized; anterior apophyses slightly shorter than posterior, each with swollen base; posterior apophyses normal; ovipositor lobes short, moderately broad, each setose with macro and micro setae.

Tarache crocata Guen.

(Fig. 571)

Corpus bursae more or less oblong, large, broad posteriorly but narrowed anteriorly, its walls partially sclerotized; signum represented by sclerotized plates; ductus bursae much reduced and uniformly sclerotized; genital plates prominent and strongly sclerotized thickenings; anterior apophyses shorter than posterior, each with slightly swollen apex and prominently thickened basal region; ovipositor lobes well marked and setose with very short setae.
Tarache marmoralis Fabr.

(Fig. 572)

Corpus bursae elongated and irregular sac, swollen and bent in its anterior region, with its walls partially sclerotized; signum represented by an irregularly sclerotized mass; cervix bursae small oval lobe; ductus bursae much reduced; genital plates represented by somewhat triangular sclerotized plates; anterior apophyses shorter than posterior; posterior apophysis with swollen and moderately sclerotized base; ovipositor lobes exceptionally small, partially sclerotized, each adorned with small setae.

Amyna natalis Wlk.

(Fig. 573)

Corpus bursae small, with walls completely membranous; signum poorly sclerotized, lying longitudinally in the centre of corpus bursae; ductus bursae irregular in outline and membranous; anterior apophyses longer than posterior, each with thickened base; posterior apophyses short, slender, each with somewhat triangular thickening; ovipositor lobes broad, more or less semicircular and setose with variable setae.
Eublemma anachoresis Wlk. divisa Moore
(Fig. 574)

Corpus bursae small and irregular sac, its walls completely membranous; signum poorly defined, sclerotized and spinose thickenings; cervix bursae smaller than corpus bursae; ductus bursae long, irregular, strongly sclerotized in its posterior half and very weakly in the anterior, anterior apophyses much shorter than posterior; ovipositor lobes long, narrow and covered with short setae.

Eublemma amabilis Moore
(Fig. 575)

Corpus bursae small, somewhat irregular, with its walls semimembranous and adorned with scattered dents; signa two sclerotized very small patches; cervix bursae more or less globular, and with walls membranous; ductus bursae short and broad anteriorly; antrum well marked; anterior apophyses short, each with thickened apical end; posterior apophyses longer than anterior, each with thickened and moderately sclerotized apex; ovipositor lobes somewhat triangular, each bearing long and short but fine setae.
Eustrotia quadripartita Wlk.

(Fig. 576)

Corpus bursae more or less oval, rounded anteriorly, and narrowed posteriorly, its walls semimembranous and slightly folded; signum represented by few sclerotized streaks; ductus bursae long and partially sclerotized; anterior apophyses slightly shorter than posterior; all the four with slightly thickened posterior ends; ovipositor lobes narrow, triangular, each setose with small setae.

Eustrotia marginalis Wlk.

(Fig. 577)

Corpus bursae oblong, broad anteriorly and slightly narrowed distally, somewhat irregular, its walls very weakly sclerotized; signum spine shaped thickening, lying in the middle along with numerous spines in the posterior region of corpus bursae; ductus bursae moderately long, with walls sclerotized except its posterior most portion; anterior apophyses slightly shorter than the posterior; all the four long and slender; ovipositor lobes setose, with small setae.
Lithacodia signifera Wlk.
(Fig. 578)

Corpus bursae irregular bag-like, with its walls completely membranous; ductus bursae long, narrow, curved, its walls semimembranous; genital plate collar shaped and irregularly sclerotized; anterior apophyses short, narrow and slender; posterior apophyses longer than anterior, each with narrow and tapered tip and with broadened base; ovipositor lobes normal and setose with variable setae.

Hicocoda excisa Swinh.
(Fig. 579)

Corpus bursae elongated, with its cephalic half ball-like and lower more or less irregularly rectangular, its walls semimembranous and ribbed with irregularly arranged ductules, with its swollen region studded with minute dents; signa represented by four U-shaped sclerotized thickenings, arranged beautifully in two rows; cervix bursae small protuberance; ductus bursae very much reduced and narrow; genital plates cone-shaped and sclerotized; anterior apophyses narrow and tapering anteriorly; posterior apophyses slightly longer than anterior; ovipositor lobes normal and covered with short setae.
Corpus bursae roughly rounded, with walls completely membranous and slightly folded; signa represented by three small, rounded denticulate areas along with longitudinally and centrally placed long scobinate structure; ductus bursae long, narrow, slightly broad at its base, with sclerotized and spinose collar at its posterior end; genital plates flask-shaped and symmetrically sclerotized; anterior apophyses short, thin and wavy; posterior apophyses slightly longer than anterior, each with slightly swollen base; ovipositor lobes moderately broad, short, each fringed with macro and micro setae.

Ozarbe punctigera Wlk.
(Fig. 580)

Corpus bursae elongated, rounded anteriorly and narrowed posteriorly, its walls completely membranous; ductus bursae long, narrow anteriorly and broadened posteriorly, with sclerotized collar at its base, very poorly sclerotized; genital plates rod-shaped and strongly sclerotized; anterior apophyses shorter than posterior each slightly curved; posterior apophyses thin, each with slightly thickened base; ovipositor lobes well marked, each beset with long and short setae.

Ozarbe phlebatis Hampsn.
(Fig. 581)
Earias insulana Boisd.
(Fig. 582)

Corpus bursae more or less spherical, with walls membranous, wrinkled and profusely marked with sclerotizations and numerous dents; ductus bursae long, narrow and completely membranous; anterior apophyses moderately long; posterior apophyses longer than anterior apophyses; all the four with swollen bases; ovipositor lobes normal and adorned with moderately long and short setae.

Earias fabia Stoll.
(Fig. 583)

Corpus bursae small, broad anteriorly and narrowed distally, its walls marked with longitudinal sclerotized ductules and studded with numerous dents; ductus bursae quite long, narrow and membranous; anterior apophyses with slightly swollen ends; posterior apophyses longer than anterior; ovipositor lobes normal, each densely setose with long and short setae.

Earias cupreoviridis Wlk.
(Fig. 584)

Corpus bursae oblong, marked with several sclerotized
streaks and dents; ductus bursae moderately long, narrow and membranous; anterior apophyses moderately long; posterior apophyses curved and longer than anterior; ovipositor lobes well marked and covered with fine and variable setae.

_Earias luteolaria_ Hampson.
(Fig. 585)

Corpus bursae more or less oval, its walls lined with sclerotized ductules and dents; ductus bursae long and membranous; anterior apophyses short and slender; posterior apophyses longer than anterior; ovipositor lobes normal and each fringed with dense array of macro and micro setae.

_Chasmisia judicate_ Wlk.
(Fig. 586)

Corpus bursae more or less oval-shaped, with walls membranous, ribbed longitudinally and obliquely; signa represented by two, long, broad and strongly sclerotized scobinate patches, lying longitudinally in middle of corpus bursae; ductus bursae long, moderately broad, ribbed longitudinally in its anterior region and with strongly sclerotized collar-like structure at its ostial region; genital plates well sclerotized; anterior
DISCUSSION AND CONCLUSIONS

The study of female genitalia in seventeen species under nine genera of subfamily Erastrianae further strengthens the general trend about the dissimilarity in these organs at higher levels. Accordingly, the structure of the female genitalia in different genera studied shows important differences from one another, except that most of the species have the posterior apophyses longer than the anterior ones. There is however, found some similarity in the species falling under the same genus. This resemblance is less apparent in the case of genera like TaracHor Hubn. and Eublemma Hubn. but is prominently displayed in the genus Earias Hubn., all the four species of which have very similar parts i.e., the ductus bursae, the corpus bursae and the ovipositor lobes.

There is no other reference on the female genitalia of this subfamily except that Pierce (1952) has figured the organs of two species of genus Eustrotia Hubn. other than the two studied by the author. There is however hardly any resemblance in the structure of the two sets of the species.
Corpus bursae quite long, almost uniformly broad sac-like, with its walls completely membranous; signa four, elongated, scobinate patches, lying longitudinally in the basal half of corpus bursae, along with scattered spines; ductus bursae short and irregularly sclerotized; antrum bursae present; anterior apophyses short; posterior apophyses much longer than anterior, each with a thickened base; ovipositor lobes short and setose.

DISCUSSION AND CONCLUSIONS

The female genitalia of the above species show agreement with two other species of this family namely Opsiogalea ocellata Wlk. and O. blanchardi Todd, studied by Todd (1966) particularly in the more or less cylindrical shape of the corpus bursae, short and broad ductus bursae and prominently dilated eighth abdominal segment with laterally diverging anterior apophyses. As such, the female genitalia of this subfamily appear to be constructed on a broad similar plan, the validity of which, however, can be tested through the study of more species and genera.
Corpus bursae more or less rounded, its walls poorly sclerotized; signum represented by a few very weakly formed denticulate patches, lying near the cephalic margin of corpus bursae; cervix bursae almost rounded, more or less of the same size of corpus bursae, very weakly sclerotized; ductus bursae long, narrow and poorly sclerotized; anterior apophyses missing; posterior apophyses long, slender, each slightly bent near its basal end; ovipositor lobes semicircular, each studded with pits and setae.

**Bombotelia rugatrix** Guen.
(Fig. 588)

Corpus bursae small, shorter than cervix bursae and weakly sclerotized; cervix bursae long, broad in middle and irregular; ductus bursae short, narrow, bent and poorly sclerotized; genital plates sclerotized; anterior apophyses absent; posterior apophyses long; ovipositor lobes covered with pits and setae of variable sizes.

**Bombotelia jocosatrix** Guen.
(Fig. 589)
The female genitalia of the two species of genus *Bombotelia* Hampsn. have been studied for the first time. The structure of these organs clearly brings out the agreement between the different parts of the female genitalia in the two species. This shows the genus *Bombotelia* Hampsn. to form a rather uniform natural group. However, as only a single genus has been studied, the condition of these organs in other genera of the subfamily can decide the general condition in Euteliinae.

The compact nature of the genus *Bombotelia* Hampsn. has also been witnessed in the male genitalia of this genus.
SUBFAMILY - SARROTHRIPINAE

DESCRIPTIONS

Risoba obstructa Moore
(Fig. 590)

Corpus bursae elongated, more or less spindle shaped, ribbed longitudinally, its walls irregularly sclerotized; signum represented by longitudinally placed, strongly sclerotized spinose thickening; appendix bursae small, irregular, with its wall very weakly sclerotized; ductus bursae short, tubular, strongly but irregularly sclerotized; antrum bursae well marked; anterior apophyses shorter than posterior; posterior apophyses long and slender; ovipositor lobes normal and setose.

Risoba prominens Moore
(Fig. 591)

Corpus bursae moderately long, spindle shaped, its walls poorly sclerotized; ductus bursae quite long and weakly sclerotized; antrum bursae collar-shaped and well sclerotized; anterior apophyses short, each with thickened base; posterior apophyses longer than anterior; ovipositor lobes normal, more or less triangular, each fringed with setae of different sizes.
Elenina quinaria Moore
(Fig. 592)

Corpus bursae short, sac like, slightly broad anteriorly, narrow posteriorly, its walls with longitudinal and scatteredly arranged ridges; ductus seminalis swells to form bulla seminalis; ductus bursae short, with well marked colliculum; antrum present; anterior apophyses longer than posterior, each with slightly thickened base; posterior apophysis with slightly thickened base; ovipositor lobes moderately broad, each densely setose with variable and strong setae.

Selepa celtis Moore
(Fig. 593)

Corpus bursae more or less ball like and weakly sclerotized; signum represented by rounded spinose patch, lying in the posterior half of corpus bursae; ductus bursae long, narrow, with walls poorly sclerotized, except with strongly sclerotized transverse thick streak in its posterior region; anterior apophyses greatly reduced, each swollen apically; posterior apophyses uniquely reduced and shorter than anterior; ovipositor lobes with array of different sized setae.
DISCUSSION AND CONCLUSIONS

The female genitalia of the four species under three genera of the subfamily Sarrothripinae again present notable differences which cannot be correlated at the generic or the species level. Even the two species of genus *Risoba* Moore show entirely different structure of corpus bursae and ductus bursae, although the male genitalia of the same two species do show some similarity.
Subfamily - Phytometrinae

Descriptions

Phytometa sp. I
(Fig. 594)

Corpus bursae oblong, with slightly irregular margin, irregularly ribbed, its walls poorly sclerotized and wrinkled; ductus bursae moderately long, weakly sclerotized except near its ostial end; anterior apophyses very slightly longer than posterior; ovipositor lobes short and broad, each setose with fine setae.

Phytometa sp. II
(Fig. 595)

Corpus bursae more or less rectangular with its margins wavy, with walls membranous except in its caudal region and wrinkled irregularly; ductus bursae long, narrow but swollen in its cephalic region, irregularly sclerotized and somewhat corrugated; anterior apophyses longer than posterior; all the four tapering apically; ovipositor lobes rectangular, each beset with long and short setae.
Phytometra sp. III  
(Fig. 596)

Corpus bursae bag like, with irregular boundary, ribbed irregularly, with a few wrinkled sclerotizations; ductus bursae moderately long, with walls corrugated and irregularly sclerotized; anterior apophyses slightly longer than posterior; all the four slender; ovipositor lobes well marked and setose.

Phytometra chalytis Koll.  
(Fig. 597)

Corpus bursae irregular in shape forming small rounded lobe anteriorly, with walls membranous but wrinkled and marked with tubercles; cervix bursae small, triangular projection; ductus bursae moderately long, exceptionally flattened and ribbed longitudinally in its ostial region; anterior apophyses slightly longer than posterior; posterior apophyses slender; ovipositor lobes moderately broad, each fringed with setae.

Phytometra albostriata Frem and Greg  
(Fig. 598)

Corpus bursae more or less triangular, with walls poorly sclerotized, wrinkled and marked with large number
of minute tubercles; ductus bursae quite long, narrow, ribbed longitudinally and strongly sclerotized; anterior apophyses slightly longer than posterior; ovipositor lobes broad, each beset with long and short setae and two rows of pits.

**Phytometra orichalcea** Fabr.

(Fig. 599)

Corpus bursae irregular sac, with walls wrinkled and ribbed irregularly but poorly sclerotized; cervix bursae small but long protuberance; ductus bursae long, narrow with broadened anterior and ostial ends, with walls irregularly sclerotized and wrinkled, with its anteriormost region studded with short dents; anterior apophyses slightly shorter than posterior; all the four tapering and slightly wavy; ovipositor lobes beset with setae and pits.

**Phytometra tetragona** Wlk.

(Fig. 600)

Corpus bursae broad, cephalic wall incurved forming more or less rounded structure on one side and somewhat tubular on the other, with its tubular region ribbed irregularly with fine and sclerotized tubercles; signa comprising four scrobinate patches along with branched
sclerotization, lying in the rounded portion of corpus bursae; ductus bursae moderately long, irregularly broad and sclerotized; anterior apophyses long and slender; posterior apophyses slightly longer than anterior; ovipositor lobes normal, each fringed with variable setae.

**Phytometra nigrisigna** Wlk.

(Fig. 60)

Corpus bursae irregular, with walls wrinkled and ribbed but poorly sclerotized; secondary cervix bursae pear-shaped; ductus bursae long and irregularly sclerotized; anterior apophyses long and slender; posterior apophyses slightly longer than anterior; ovipositor lobes normal, each setose with different sized setae.

**DISCUSSION AND CONCLUSIONS**

Under the subfamily Phytometrinae, only genus *Phytometra* Haw. represented by eight species has been studied. The female genitalia of all the species show a general resemblance in as far as the irregular shape of their corpus bursae, the weakly developed cervix bursae and long and convoluted ductus bursae are concerned. These broad features are also shared by the genitalia of nine species of the same genus studied by Pierce (1952),
although there is only one common species studied by him and by the author. Obviously the common structure of the female genitalia in the species of genus *Phytometra* Haw. and for that matter of the subfamily Phytometrinae shows the compactness of these taxa. The details of several parts of the genitalia, however, show variations in different species which can be easily noticed in the width of the ductus bursae and the absence or presence and the structure of the signum of the corpus bursae. *Phytometra nigrisigna* Wlk. is exclusive in showing the occurrence of a secondary rounded and prominent cervix bursae at the base of the normal one.
SUBFAMILY - STICTOPTERINAE

DESCRIPTIONS

**Odontodes aleuca** Guen.  
(Fig. 602)

Corpus bursae moderately long and broad, with its walls membranous and corrugated; signum short, irregular and with serrated margins, lying transversely near the cephalic margin of corpus bursae; ductus bursae long, very narrow and ribbed; anterior apophyses missing; posterior apophyses long and slender; ovipositor lobes broad, semi-circular, each bearing dense array of thin setae.

**Lophoptera costata** Moore  
(Fig. 603)

Corpus bursae very small, its walls poorly sclerotized; signum very small, sclerotized and denticulate, lying nearly in the middle of corpus bursae; appendix bursae somewhat triangular; cervix bursae small protuberance; ductus bursae long, narrow except at its ostial end, almost membranous but ribbed; anterior apophyses absent; posterior apophyses moderately long and slender; ovipositor lobes setose.
DISCUSSION AND CONCLUSIONS

One representative each of the two genera, *Odontodes aleuca* Guen. and *Lophoptera costata* Moore has been studied under the subfamily Stictopterinae. There is noticed a common plan of structure in the female genitalia of these species in respect of the ductus bursae which is long and narrow, eighth abdominal segment which is membranous and devoid of anterior apophyses and the ovipositor lobes which are short and flattened. The details of these and some other parts are however different in the two species. It is thus evident that the female genitalia, unlike their male genitalia, show a constant structure in the subfamily. As such, the subfamily provides a rather unusual example where the female genitalia assume more taxonomic significance than the male genitalia.
Westermannia superba Hubn.

(Fig. 604)

Corpus bursae moderately long and broad, its walls membranous and ribbed; signum disc shaped and denticulate; appendix bursae oval, slightly larger than corpus bursae, wrinkled and attached by means of short irregularly shaped duct to the corpus bursae; cervix bursae small and triangular; ductus bursae very much reduced, with walls strongly but irregularly sclerotized; anterior apophyses slender; posterior apophyses slightly longer than anterior; ovipositor lobes broad, semicircular, each fringed with dense array of variable sized setae.

Correa subtilis Wlk.

(Fig. 605)

Corpus bursae nearly oval, its walls almost membranous; signum strongly sclerotized spine with exceptionally broad base, lying near the cephalic margin of corpus bursae; cervix bursae irregular; ductus bursae short, with margins irregular, broad near its ostial end; genital plate very weakly sclerotized; anterior apophysis short; posterior
apophyses much longer than anterior; ovipositor lobes long, moderately broad and setose with variable setae.

_Arcyophora icterica_ Swinh.
(Fig. 606)

Corpus bursae long bag, with its walls poorly sclerotized; ductus bursae long, irregular in outline and irregularly thickened; anterior apophyses short and thick; posterior apophyses longer than anterior; ovipositor lobes marked with strong, variable sized setae.

_Acontia transversa_ Guen.
(Fig. 607)

Corpus bursae more or less triangular, its walls membranous and ribbed longitudinally; signa comprising two, short thickenings, lying near the caudal end of corpus bursae; bulla seminalis more or less triangular and spinose structure; ductus bursae long, broad, sclerotized and bent in middle; anterior apophyses short, each with thickened anterior end; posterior apophyses longer than anterior, each with thickened ends; ovipositor lobes well marked, each fringed with setae of different sizes.
Acontia intersepta Guen.
(Fig. 608)

Corpus bursae irregular bag, with rounded anterior end and narrowed posteriorly, its walls wrinkled and poorly sclerotized; cervix bursae smaller than corpus bursae, irregular and more or less rounded; ductus bursae moderately long, bent in middle and sclerotized; anterior apophyses short; posterior apophyses longer than anterior, each with thickened base and tip; ovipositor lobes fringed with different sized setae.

Moma champa Moore
(Fig. 609)

Corpus bursae almost globular, with walls weakly sclerotized; ductus bursae short, broad at its ostial end; anterior apophyses longer than posterior; ovipositor lobes fringed with variable sized setae.

Swinhoea vegeta Swinh.
(Fig. 610)

Corpus bursae elongated and irregular bag, its walls marked with spines in its anterior region; signum represented by strongly sclerotized and irregularly shaped plate,
lying in the posterior half of corpus bursae; ductus bursae indistinctly marked from corpus bursae, short, broad, strongly but irregularly sclerotized; anterior apophyses long; posterior apophyses nearly same to the length of anterior, ovipositor lobes very small, each setose with variable sized setae.

DISCUSSION AND CONCLUSIONS

The female genitalia of the seven species under six genera of subfamily Acontiinae show wide variations, without forming a basic plan of structure. There is found a close similarity in the two species of the genus Acontia Ochs. but a third species of the same genus worked out by Todd (1960) shows a totally different structure and hence the uniformity of the genitalia in the congeneric species of Acontia Ochs. also breaks down. Likewise, the structure of the genitalia in Moma champa Moore and M. albium (Pierce, 1952) also does not tally, thereby failing to correlate the two species of genus Moma Hbn.. Accordingly, the female genitalia of this subfamily like their male genitalia present a very diverse structure, which is rather more variable in the case of the former.
SUBFAMILY - HYPENINAE

DESCRIPTIONS

Hypena conscitalis Wlk.
(Fig. 611)

Corpus bursae small, its walls almost membranous and marked with small dents; ductus bursae long, irregular, its walls marked with small dents near its posterior end; antrum bursae very poorly sclerotized; anterior apophyses long, slender, each with a slight basal thickening; posterior apophyses slightly longer than anterior; ovipositor lobes broad, each fringed with long and short setae.

Hypena rectivittalis Moore
(Fig. 612)

Corpus bursae moderately long, broad at its anterior end and narrowed posteriorly, with its walls almost membranous; ductus bursae short and irregular; antrum bursae very weakly sclerotized; anterior apophyses long and slender; posterior apophyses slightly shorter than anterior; ovipositor lobes broad, each marked with thin and short setae.
Corpus bursae small, narrow apically and swollen in its middle, with walls poorly sclerotized and ribbed longitudinally; signum may be represented by small, a few rayed thickenings, lying in the swollen region of corpus bursae; ductus bursae long, irregular and ribbed longitudinally; antrum bursae almost membranous but distinctly marked; anterior apophyses slightly longer than posterior; all the four with thickened bases; ovipositor lobes quite broad, more or less rectangular, each fringed with thin setae.

Rhynchine abducalis Wlk.
(Fig. 614)

Corpus bursae short, narrow anteriorly and slightly broadened distally, with its walls membranous and ribbed longitudinally in its basal half; ductus bursae short, irregular, and ribbed longitudinally; antrum bursae well marked and sclerotized; anterior apophyses slightly longer than posterior; ovipositor lobes normal, each setose with different sized setae.

Nederia similis Moore
(Fig. 615)

Corpus bursae irregular, its walls poorly sclerotized
but marked with small dents; cervix bursae irregular and elongated projection; ductus bursae slightly shorter than corpus bursae, tubular, strongly but irregularly sclerotized; antrum bursae with walls membranous; anterior apophyses shorter than posterior, each with thickened and bifurcated base; ovipositor lobes fringed with thin but variable sized setae.

**Dichromia trigonalis** Guen.

(Fig. 616)

Corpus bursae irregular, its walls membranous; ductus bursae long, indistinctly marked from corpus bursae, studded with longitudinal row of short spines in its anterior region; antrum bursae distinct; anterior apophyses slightly shorter than posterior; posterior apophysis with rectangularly thickened base; ovipositor lobes clearly marked and fringed with scattered and different sized thin setae.

**Dichromia erosia** Gram.

(Fig. 617)

Corpus bursae more or less oval, with walls membranous, ribbed, its posterior half marked with longitudinal rows of dents; ductus bursae short, marked indistinctly from corpus bursae, its anterior region marked with numerous
dents; antrum bursae distinct; anterior apophyses shorter than posterior; posterior apophysis with prominently thickened base; ovipositor lobes quite broad, each fringed with setae.

DISCUSSION AND CONCLUSIONS

The seven species of four genera of the subfamily Hypeninae present a more or less similar plan of structure on account of the moderately elongated corpus bursae without any signa, moderately developed ductus bursae and flattened and short ovipositor lobes. However the similarity in these organs is less apparent as compared to their male genitalia, which is also true of the congeneric species under the genera Hypena Sch. and Dichromia Guen.
SUBFAMILY - CATOCALINAE

DESCRIPTIONS

Speiredonia retorta Cram.
(Fig. 618)

Corpus bursae balloon shaped, its wall membranous; ductus bursae indistinctly marked from corpus bursae, long, coiled in its ostial region; genital plates circular and strongly sclerotized; anterior apophyses shorter than posterior; posterior apophyses long, each with a swollen base; ovipositor lobes normal, each fringed with strong setae of different sizes.

Achaea janata Linn.
(Fig. 619)

Corpus bursae irregular mass, its walls marked with irregular sclerotization; signum long, irregular and spinose strap forming more or less U-shaped structure, lying in the swollen region of corpus bursae; ductus bursae short and irregularly sclerotized; anterior apophyses shorter than posterior; posterior apophyses long, each slightly swollen near its posterior and subapical regions; ovipositor lobes broad, each marked with strong, long and short setae.
Achaea merzentia Stoll.
(Fig. 620)

Corpus bursae somewhat elongated, irregular, with walls partially sclerotized in its basal half; cervix bursae short projection; ductus bursae moderately long, irregular and strongly sclerotized; anterior apophyses shorter than posterior, each with broadened and truncate anterior end; posterior apophyses long, each slightly swollen in its sub-apical region; ovipositor lobes more or less rectangular, each fringed with macro and micro setae.

Diphthera champa Moore
(Fig. 621)

Corpus bursae somewhat bladder shaped, its walls membranous, ribbed and adorned with small dents and a few sclerotizations; signum sclerotized plate, lying in the posterior region of corpus bursae; ductus bursae short, narrow at base broadened and irregularly sclerotized apically; genital plates V-shaped and irregularly sclerotized; anterior apophyses longer than posterior; posterior apophyses short, each with triangularly thickened base; ovipositor lobes broad, each marked with long and short but strong setae.
Euclidisema mydron Cram.
(Fig. 622)

Corpus bursae irregular bag, with walls constricted nearly in its middle; signum irregular sclerotized mass, being impregnated with small dents; ductus bursae short and narrow; genital plates well sclerotized; anterior apophyses short; posterior apophyses longer than anterior; all the four with thickened anterior extremities; ovipositor lobes well marked, each covered with numerous setae of different sizes.

Enmonodia vespertilio Fabr.
(Fig. 623)

Corpus bursae short, wrinkled, with walls partially sclerotized; ductus bursae quite long, narrow in its anterior half and broadened posteriorly; ostium bursae surrounded by strongly sclerotized genital plates; anterior apophyses short, each slightly bent in its subapical region; posterior apophyses longer than anterior, each with thickened base and apex; ovipositor lobe small and setose.

Anua tirrhaca Cram.
(Fig. 624)

Corpus bursae somewhat oval shaped, its walls marked
with sclerotizations and partially ribbed; cervix bursae small and irregular lobe; ductus bursae short, broad, strongly sclerotized; genital plates more or less circular, very strongly but irregularly sclerotized; anterior apophyses moderately long, each slightly swollen apically; posterior apophyses longer and narrower than anterior; ovipositor lobes more or less triangular, each covered with numerous setae of different sizes.

**Entomogramma tortum** Guen.  
(Fig. 625)

Corpus bursae balloon shaped, being broad anteriorly and narrowed distally, its walls marked with a few sclerotized patches; ductus bursae short, irregular and irregularly sclerotized; genital plates well marked; anterior apophyses moderately long, each with slightly thickened base and tip; posterior apophyses much longer than anterior; ovipositor lobes well marked and setose.

**Mecisia undata** Fabr.  
(Fig. 626)

Corpus bursae somewhat oval, its walls semi-membranous and impregnated with numerous small spines; ductus bursae moderately long, broad, tubular, its walls
strongly sclerotized and studded with numerous pits; genital plates circular and prominent; anterior apophyses moderately long and stout; posterior apophyses longer than anterior; all the four with swollen posterior ends; ovipositor lobes well developed, each densely setose with an array of different sized setae.

**Catocala prolifica** Wlk.
(Fig. 627)

Corpus bursae irregular, rounded anteriorly and irregularly narrowed posteriorly, its walls semimembranous, and marked with pits and ribbed longitudinally in its posterior region; cervix bursae small and irregular swelling; secondary cervix bursae broad, irregular and strongly sclerotized; ductus bursae short, broad, tubular, with walls strongly but irregularly sclerotized; antrum bursae quite distinct and sclerotized; anterior apophyses much shorter than posterior, each with its tip flattened and weakly sclerotized; posterior apophyses long, each with its apical region uniformly flattened and less sclerotized; ovipositor lobes somewhat rectangular, each marked with pits and setae of variable sizes.
Corpus bursae more or less spherical, its walls semi-membranous and impregnated with numerous minute pits; cervix bursae somewhat oval, semimembranous and with sclerotized protuberance; ductus bursae moderately long, broad, tubular, with walls irregularly sclerotized; antrum bursae distinct; genital plates circular; anterior apophyses short, each flattened apically; posterior apophyses much longer than anterior, each with flattened tip; ovipositor lobes well marked and fringed with long and short setae.

Pericyma glaucinans Guen.
(Fig. 629)

Corpus bursae more or less oblong, its walls marked with denticulate and wrinkled sclerotizations along with numerous small dents; ductus bursae much reduced; genital plates beautifully designed and well sclerotized; anterior apophyses short; posterior apophyses longer than anterior; all the four flattened and truncate apically; ovipositor lobes broad, more or less triangular and setose.

Pericyma mendex Wlk.
(Fig. 630)

Corpus bursae exceptionally large, more or less
oblong, its walls semimembranous and with numerous pits; ductus bursae very much reduced; ostium bursae surrounded by prominent and well sclerotized genital plates; anterior apophyses quite short and weak; posterior apophyses longer than anterior, each swollen in its middle; ovipositor lobes small, each fringed with macro and micro setae.

_Pericyma umbrina_ Guen.
(Fig. 631)

Corpus bursae large, oblong, irregular, its walls semimembranous and marked with numerous scattered dents; ductus bursae reduced; genital plates prominent, strongly sclerotized, comprising broad and irregular lobe being surrounded by two irregular and sclerotized plates; anterior apophyses short and thin; posterior apophyses longer than anterior; all the four slightly thickened posteriorly; ovipo­

_Poselilia crameri_ Moore
(Fig. 632)

Corpus bursae moderately long sac, with its walls semimembranous and ribbed longitudinally; ductus bursae very much reduced; genital plate exceptionally developed; anterior apophyses moderately long and stout; posterior
apophyses longer than anterior; all the four flattened apically; ovipositor lobes small and setose.

**Parallelia algira** Linn.

(Fig. 633)

Corpus bursae somewhat globular, its walls membranous and impregnated with very minute pits and wrinkled streaks; ductus bursae short and strongly sclerotized; antrum bursae well marked; anterior apophyses moderately long, each with its apical end flattened and less sclerotized; posterior apophyses longer than anterior, each very slightly swollen and less sclerotized near its anterior most margin; ovipositor lobes broad, more or less triangular, each fringed with strong setae of variable sizes.

**Parallelia latifascia** Warr.

(Fig. 634)

Corpus bursae somewhat oval, irregular, its walls membranous, wrinkled, impregnated with numerous small spines and pits; ductus bursae short, irregular and strongly sclerotized; antrum distinctly marked; anterior apophyses short, each with flattened tip; posterior apophyses much longer than anterior, each slightly swollen, less sclerotized apically; ovipositor lobes setose with setae of different sizes.
Corpus bursae large, irregular, its walls poorly sclerotized and carrying scatteredly arranged minute pits; ductus bursae short; antrum bursae sclerotized; anterior apophyses shorter than posterior, each flattened and truncate shaped apically; posterior apophyses long, strong, each with slightly swollen subapical region; ovipositor lobes setosed.

**Parallelia stuposa** Fabr.  
(Fig. 635)

Corpus bursae irregular bag like, its walls membranous and adorned with scattered dents; ductus bursae short; antrum bursae narrow anteriorly and broadened in its ostial region, strongly sclerotized and impregnated with pits except its lateral projections; anterior apophyses shorter than posterior, each with thickened base and apex; posterior apophyses long, slender and narrowed than anterior; ovipositor lobes well marked and setosed.

**Trigonodes hypopsea** Cram.  
(Fig. 636)

Corpus bursae quite long, broad, irregular, its walls membranous and impregnated with minute spines; ductus bursae short; antrum bursae narrow anteriorly and broadened in its ostial region, strongly sclerotized and impregnated with pits except its lateral projections; anterior apophyses shorter than posterior, each with thickened base and apex; posterior apophyses long, slender and narrowed than anterior; ovipositor lobes well marked and setosed.

**Attacca regalis** Moore  
(Fig. 637)

Corpus bursae quite long, broad, irregular, its walls membranous and impregnated with minute spines; ductus
bursae indistinctly marked; antrum bursae sclerotized; ostium bursae surrounded by semicircular genital plates; anterior apophyses very short; posterior apophyses much longer than anterior, each with swollen base and flattened tip; ovipositor lobes broad, more or less rectangular, each fringed with micro and macro setae.

Grammodes stolida Fabr.
(Fig. 638)

Corpus bursae irregular, with its walls poorly sclerotized; ductus bursae short, broad, irregular and strongly sclerotized; anterior apophyses quite short, each flattened apically; posterior apophyses much longer than anterior, each flattened and less sclerotized anteriorly; ovipositor lobes somewhat rectangular, each setose with macro and micro setae.

Grammodes geometrica Fabr.
(Fig. 639)

Corpus bursae irregular, its walls semimembranous and studded with irregularly arranged dents along with group of setae; ductus bursae irregular and irregularly sclerotized; anterior apophyses moderately long, each with thickened and truncate tip; posterior apophyses much longer than anterior; ovipositor lobes normal, each carrying setae of different sizes.
Corpus bursae much elongated, somewhat bean-shaped, irregular, its walls semimembranous, ribbed irregularly and lined with minute pits; ductus bursae long, narrow anteriorly and broadened posteriorly, its walls very strongly but irregularly sclerotized and impregnated with minute pits; genital plates prominent, irregularly sclerotized, with strongly sclerotized bracket shaped limes; anterior apophyses long, strong, each swollen apically; posterior apophyses longer than anterior, each with swollen base; ovipositor lobes covered with strong, long and short setae.

DISCUSSION AND CONCLUSIONS

Generally speaking, the structure of the female genitalia in twenty three species under sixteen genera of subfamily Catocalinae are characterised by the short ductus bursae which are variably broadened and chitinized in different parts and by the posterior apophyses which are always longer than the anterior ones. Moreover, the ovipositor lobes are also usually conical and densely setose. However, the individual genera do show marked differences in the detailed structure of these organs. As far as the species under different genera are concerned, there is witnessed a general agreement in the genitalia of three
species out of four species of Parallelia Hubn. and all the three species of Pericyma Herr-Schaff. In fact, the similarity in the congeneric species is more evident in the female genitalia than in their male genitalia. In so far as genus Catocala Sch. is concerned, the structure of the genital organs in C. prolific a Wlk. studied here is more or less similar to those of C. promissa Dup. (Pierce, 1952) but two other species studied by the same author i.e., C. nupta Linn. and C. spona Linn. show different genitalia from those of the other two species of this genus. It can thus be concluded that although one or two common features can be observed in both the female and the male genitalia, the wholesome structure is quite variable in the individual genera and only restrictedly similar in their congeneric species.
SUBFAMILY - NOCTUINAE

DESCRIPTIONS

Polydesma umbrosa Boisd.
(Fig. 641)

Corpus bursae more or less oval, short, its walls membranous, wrinkled and studded with numerous minute pits; ductus bursae exceptionally long, variably broad, and strongly sclerotized; anterior apophyses long; posterior apophyses nearly as long as anterior; all the four flattened and less sclerotized apically; ovipositor lobes triangular, each fringed with short setae.

Othreis materna Linn.
(Fig. 642)

Corpus bursae exceptionally large, irregular being quite narrow apically and broadened at base, its walls semi-membranous and with strongly but irregularly sclerotized plate, lying at its basal region may be representing signum; ductus bursae very short; posterior apophyses moderately long; ovipositor lobes small, more or less rectangular and setose.
Othreis fullonica Linn.
(Fig. 643)

Corpus bursae very much elongated, irregular in shape, with variable diameter at different points, being narrow anteriorly and broadened distally, its wall semimembranous, and ribbed longitudinally; ductus bursae short; genital plates strongly sclerotized; anterior apophyses very short; posterior apophyses moderately long, much longer than anterior; ovipositor lobes setosed.

Pandesa quesavadi Guen.
(Fig. 644)

Corpus bursae large, more or less globular, its walls semimembranous and impregnated with dents and sclerotized plate may be representing signum; ductus bursae short and strongly sclerotized; antrum bursae distinct; anterior apophyses moderately long; posterior apophyses longer than anterior; all the four uniquely flattened and less sclerotized apically; ovipositor lobes short and setose.

Hypocale moresi Butl.
(Fig. 645)

Corpus bursae more or less spherical with walls membranous; signum more or less comma-shaped, constituted
by small denticles and minute spines, lying at the basal region of corpus bursae; ductus bursae quite long, narrow, wavy, almost membranous except its middle region sclerotized, its sclerotized portion studded with nearly six spines; anterior apophyses longer than posterior, each with swollen base and flattened tip; posterior apophyses short, each with its tip and base flattened; ovipositor lobes relatively small, each covered with setae and pits.

**Hypocala rostrata** Fabr.

(Fig. 64)

Corpus bursae broad and rounded anteriorly, irregular, with its walls membranous; signa comprising two different sized denticulate patches, smaller one lying in the swollen half, other triangular one in the basal region of corpus bursae; ductus bursae long, narrow and irregular in outline, with walls almost membranous except its middle and basal region, middle sclerotized region adorned with seven small spines in a row; antrum bursae distinctly marked; anterior apophyses longer than posterior, each with butt-shaped base; posterior apophysis with heel-shaped thickened base; ovipositor lobes normal, each beset with thin setae.

**Hypocala subsatura** Guen.

(Fig. 647)

Corpus bursae more or less triangular, irregular,
with walls membranous and ribbed irregularly; signa two sclerotized plates, one bigger lying in the middle and other near the basal margin of corpus bursae, both being ornamented with small dents; ductus bursae quite long, narrow, irregular, membranous in its anterior half and sclerotized basally, its walls marked with two small but prominent spines near its posterior end; antrum distinct; anterior apophyses longer than posterior, each with butt-shaped thickening at its posterior end; posterior apophysis with heel-shaped thickened base; ovipositor lobes broad, each marked with macro and micro setae.

*Acantholipes circumdatus* Wlk.

(Fig. 648)

Corpus bursae small; ductus bursae exceptionally long, more or less uniformly broad and sclerotized; anterior apophyses moderately long, each with bifurcated and thickened base; posterior apophyses thin, slender, much longer than anterior; ovipositor lobes more or less conical, narrow, each sparsely fringed with macro and micro but thin setae.

*Acantholipes trajectus* Wlk.

(Fig. 649)

Corpus bursae small, irregular, with its walls membranous; signum small denticulate patch, lying near the basal
end of corpus bursae: ductus bursae long, broad, irregular, and sclerotized; antrum bursae well marked, genital plates irregularly sclerotized; anterior apophyses much longer than posterior; ovipositor lobes conical and setose.

Gesonla obeditalis Wlk. (Fig. 650)

Corpus bursae small, somewhat oval, irregular, with walls poorly sclerotized; genital plates arc-like and well sclerotized; ductus bursae short; genital plates arc-like and well sclerotized; posterior apophyses longer than anterior, each with thickened and bifurcated base; posterior apophyses longer than anterior; ovipositor lobes quite small, each beset with thin setae.

Fodina stoia Guen. (Fig. 651)

Corpus bursae elongated, narrow anteriorly and posteriorly, irregularly broadened in its middle, with walls poorly sclerotized; signum triangular, denticulate, lying almost in the medio-lateral part of corpus bursae; ductus bursae short; genital plates arc-like and well sclerotized; anterior apophyses moderately long; posterior apophyses longer and thinner than anterior; ovipositor lobes conical and setose.
lobes broad, somewhat rectangular, each fringed with short and thin setae.

_Fodina pallula_ Guen.
(Fig. 652)

Corpus bursae irregular sac like, narrowed at its ends, slightly irregularly dilated in its middle, with walls semi-membranous; ductus bursae short, membranous; genital plates Y-shaped, strongly sclerotized; anterior apophyses shorter than posterior; posterior apophyses moderately long; ovipositor lobes somewhat rectangular and setose with thin setae.

_Dierne strigata_ Moore
(Fig. 653)

Corpus bursae small, more or less ovoid, with its walls membranous; signum small, denticulate, lying in the basal half of corpus bursae; ductus bursae long, narrow and poorly sclerotized; ostium bursae surrounded by prominent, circular, strongly sclerotized genital plates; anterior apophyses moderately long; posterior apophyses much longer than anterior; ovipositor lobes well marked, each fringed with setae of different sizes.

_Plecoptera reflexa_ Guen.
(Fig. 654)

Corpus bursae moderately broad, somewhat spherical but
irregular in outline, with walls semimembranous; signum comprising a few denticulate plates, being overlapping and lying at the base of the corpus bursae; cervix bursae small, irregular, and weakly sclerotized; ductus bursae indistinctly marked from corpus bursae, long, broad, its walls lined with longitudinal and sclerotized thin plates; anterior apophyses slightly longer than posterior; posterior apophyses moderately long and slender; ovipositor lobes broad, each beset with short setae.

*Anticarsia irrorata* Fabr.  
(Fig. 655)

Corpus bursae somewhat oval, its walls membranous and marked with a few sclerotizations; ductus bursae long, irregularly broadened, its walls membranous and with variable thickenings along with a rod-like sclerotization, lying in the anterior broadened half of ductus bursae; anterior apophyses slightly longer than posterior; posterior apophyses moderately long, each with thickened basal region; ovipositor lobes somewhat triangular, each fringed with macro and micro setae.

*Anophia leucomeles* Linn.  
(Fig. 656)

Corpus bursae irregular, its walls semimembranous and
marked with strongly sclerotized, irregularly arranged streaks; ductus bursae irregular, semimembranous, with strongly sclerotized streaks running longitudinally and irregularly throughout its length; ostium bursae surrounded by somewhat V-shaped strongly sclerotized genital plates; anterior apophyses moderately long and slender; posterior apophyses slightly longer than anterior; ovipositor lobes normal and setose.

*Episapis variolis* Wlk.
(Fig. 657)

Corpus bursae somewhat elongated, irregular, and sclerotized; signum may be represented by 7-8 different sized densely sclerotized circular plates; ductus bursae short, irregularly broadened, indistinctly marked from corpus bursae, sclerotized, its posterior half supported by strongly sclerotized plate; genital plates more or less U-shaped and strongly sclerotized; anterior apophyses short; posterior apophyses longer than anterior, each with circularly thickened base and tapering apically; ovipositor lobes relatively broad, each studded with pits and thin macro and micro setae.
Corpus bursae narrow at base, broad in its distal half, and tapered abruptly into more or less pointed structures, its walls weakly sclerotized but impregnated with sclerotized and irregularly arranged lines and pits, along with strongly sclerotized transverse band at the junction of ductus bursae and corpus bursae; ductus bursae long, narrow except its ends, strongly bent in its middle, strongly sclerotized, ribbed longitudinally and marked with pits; antrum quite prominent; anterior apophyses short; posterior apophyses slightly longer than anterior; ovipositor lobes very broad and sparsely setose with short setae.

Anomis fulvida Guen.
(Fig. 659)

Corpus bursae more or less oval, its walls semimembranous and impregnated with sclerotized streaks; ductus bursae moderately long, irregularly broadened, its walls semimembranous and ribbed longitudinally in its posterior half; antrum distinct; genital plates strongly sclerotized; anterior apophyses quite small, broad, each flattened apically; posterior apophyses very slightly longer than anterior, each tapering apically; ovipositor lobes well developed, each beset with pits and short setae.
Hamodesp aurantiaca Guen.  
(Fig. 660)

Corpus bursae irregular bag, with its walls poorly scleritized and adorned with minute dents in its anterior region and with strongly scleritized small spines in its posterior; ductus bursae short, with variable thickness, strongly scleritized in its anterior region; antrum distinctly marked; anterior apophyses long and strong; posterior apophyses longer than anterior; ovipositor lobes very small, each sparsely covered with setae.

Cosmobhila fulvida Guen.  
(Fig. 661)

Corpus bursae irregular, with its walls scleritized; signum comprising strongly scleritized spine, lying in the basal half of corpus bursae; ductus bursae long, irregular, curved nearly in its middle, with its basal half strongly scleritized; genital plates strongly scleritized; anterior apophyses short, each slightly thickened at base and tip; posterior apophyses slightly longer than anterior; ovipositor lobes broad, rectangular, each fringed with short setae.

Pasipedesp haemorrhoea Guen.  
(Fig. 662)

Corpus bursae small, broad and rounded in its anterior
half and wrinkled in posterior, with walls partially scleroticized; signum comprising sclerotized plate being imbedded with scattered dents; ductus bursae short, quite broad and irregularly sclerotized; genital plates more or less U-shaped and sclerotized; anterior apophyses short, each thickened at base; posterior apophyses longer than anterior; ovipositor lobes relatively small, each marked with long and short but strong setae.

**Attonda adspersa** Feld.
(Fig. 663)

Corpus bursae broad, more or less oval anteriorly and narrow posteriorly, with its walls partially sclerotized; ductus bursae short and sclerotized, with prominent colliculum; antrum bursae well developed; genital plates poorly sclerotized; anterior apophyses short; posterior apophyses much longer than anterior; ovipositor lobes moderately developed, each covered with short and long setae.

**Ericeia inanulata** Guen.
(Fig. 664)

Corpus bursae more or less bean-shaped, its walls poorly sclerotized and impregnated with minute spines except its middle, lying scatteredly in its anterior region and
thickly arranged in the posterior, may be representing signa; ductus bursae short, uniformly thickened and strongly sclerotized; anterior apophyses long, each with flattened tip and prominently formed base; posterior apophyses longer than anterior, each flattened apically; ovipositor lobes setose with thin and short setae.

_Sypna punctosa_ Wlk.
(Fig. 665)

Corpus bursae quite small, somewhat oval shaped and membranous; ductus bursae moderately long, uniformly broad and sclerotized; genital plates sclerotized; anterior apophyses short, each with bifurcated base; posterior apophyses longer than anterior; ovipositor lobes setosed with different sized setae.

_Belciana_ Sp.
(Fig. 666)

Corpus bursae moderately long, more or less irregular, its walls semimembranous, marked with strongly sclerotized area in its anterior half, impregnated with minute dents in the middle and with a few small spines lying in its basal portion, latter may be representing signum; ductus bursae short and uniformly sclerotized; anterior apophyses quite
long and slender; posterior apophyses longer than anterior; ovipositor lobes comparatively small, rounded posteriorly, each fringed with a few short and thin setae.

**Arytrurides inornata** Wik.
(Fig. 667)

Corpus bursae more or less oblong but irregular sac, its walls semimembranous and ribbed irregularly; ductus bursae short, broad, irregular and irregularly sclerotized; anterior apophyses moderately long; posterior apophyses longer than anterior; ovipositor lobes fringed with macro and micro setae.

**Bambra sp.**
(Fig. 668)

Corpus bursae somewhat oblong, its walls semimembranous but with a few sclerotizations; signum comprising a few spinose plates lying longitudinally in the middle of corpus bursae; ductus bursae short, narrow and weakly sclerotized; genital plates strongly but irregularly sclerotized; anterior apophyses short, each thickened and truncate tip; posterior apophyses shorter than anterior; ovipositor lobes prominent, each covered with different sized setae.
Corpus bursae much reduced, more or less oval, its walls adorned with short spines; ductus bursae short, narrow, irregularly broad, with its walls completely membranous but wrinkled; anterior apophyses short; posterior apophyses much longer than anterior; ovipositor lobes more or less triangular, each margined with thin setae.

Cocytodes caerulea Guen.

Corpus bursae long, broad anteriorly and narrowed posteriorly, its walls partially sclerotized but impregnated with a few sclerotizations; ductus bursae short, irregular, its walls studded with minute pits; anterior apophyses long, each constricted in its sub-apical region; posterior apophyses slightly shorter than anterior; ovipositor lobes broad, somewhat triangular, each covered with strong setae of variable sizes.

Coarica fasciata Moore

Corpus bursae long, broad and irregular, its walls membranous and marked with a few sclerotizations along with
prominent plate in its basal region; signum small, denticulate and irregular, lying at the anterior half of corpus bursae; ductus bursae short broad, irregularly thickened and irregularly sclerotized; anterior apophyses missing; posterior apophyses long; ovipositor lobes somewhat triangular and moderately developed, each beset with different sized setae.

*Oraesia orthrographa* Butl.

(Fig. 672)

Corpus bursae somewhat oblong and irregular, with its walls partially sclerotized; cervix bursae small and irregular process; secondary cervix bursae very strongly sclerotized; ductus bursae quite long, narrow, tubular, coiled, curved and uniformly sclerotized; anterior apophyses moderately long; posterior apophyses slightly shorter than anterior; ovipositor lobes setosed.

*Oraesia emarginata* Fabr.

(Fig. 673)

Corpus bursae more or less oval, with walls very strongly but irregularly sclerotized, its walls impregnated with numerous small spines and a few sclerotizations; ductus bursae moderately long and broad, tubular, its walls uniformly sclerotized; anterior apophyses moderately long, each with swollen and bifid base; posterior apophyses longer than
anterior, each with broad and heel-shaped base; ovipositor lobes well marked and setosed with short and long setae.

DISCUSSION AND CONCLUSIONS

All the thirty three species of the subfamily Noctuinae show a very variable condition of the different parts of the female genitalia and there cannot be marked any one feature which shows a common structure in the studied species. As such the structure of the female genitalia shows a situation very similar to that of the male genitalia of this group. At the generic level, there are seven such genera which include more than one species and in which the structure of these organs can be discussed at this level. Out of these genera, three genera i.e. Othreis Hubn., Acantholipes Led. and Hypocala Guen. show a more or less uniform condition of female genitalia while the remaining four viz., Polydesma Boisd., Fodina Guen., Anomis Hubn. and Oraesia Guen. show very little similarity in the genitalia of the included species. It may be mentioned that the structure of the male genitalia also expresses a similar condition in the various genera. Therefore, the genera found to be heterogenous on the basis of the variable male and female genitalia warrant a taxonomic examination for their further division and delimitation.
GENERAL STRUCTURE OF THE FEMALE GENITALIA IN THE FAMILY NOCTUIDAE

It is clear from the study of the female genitalia of one hundred and thirty one species under the family Noctuidae that these organs have little to offer for the characterisation of the family on the whole. However there are some subfamilies such as Agrotiinae, Hadeninae, Euteliinae, Phytophaginae, Stictopterinae, Cuculliinae and Hypeninae which appear to have a broadly common plan of structure in the structure of the genitalia of the contained genera and the species. But other subfamilies like Acronyctinae, Erastriana, Sarrothripinae, Acontinae, Catocalinae and Noctuinae exhibit the same type of discordant structures of the genitalia. Under this group of subfamilies are again met with certain genera notably Spodoptera Guen., Farisa Hubn., Acontia Ochs. and Hypocala Guen. whose compact nature is supported from the structure of the female genitalia. But many genera do not show any similarity in the structure of the female genitalia of the included species.