THE MALE GENITALIA OF BLATTARIA. VII.

GALIBLatta, DRYADOBLatta, POROBLatta,
COLAPTEROBLatta, NAUCLiDAS, NOTOLAMPRA,
LITOPELTIS, AND CARIACASIA.

(BLABERIDAE: EPILAMPRINAE).

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The male genitalia of cockroaches have proved to be extremely useful in showing generic relationships (Roth, 1970a, 1970b). This study of 8 genera again shows the importance of using internal male genital structures in grouping genera of Blattaria.

The genitalia of species of the following genera are illustrated in this paper: Galiblatta Hebard, Dryadoblatta Rehn, Poroblatta Hebard, Nauclidas Rehn, Notolampra Saussure, Colapteroblatta Hebard, Litopeltis Hebard, and Cariacasia Rehn. Princis (1960) placed Dryadoblatta and Notolampra in the Epilampridae (Epilamprinae and Phoraspinae respectively) and the other 6 genera in the Blaberidae, subfamily Laxtinae. McKittrick (1964) placed Laxta in the Epilamprinae and Princis (in Roth, 1970a) considered his subfamily Laxtinae provisional and predicted it probably would be split up. McKittrick (1964) placed Litopeltis and Poroblatta (with a query), and Galiblatta (in Roth, 1968) in the Epilamprinae. I follow McKittrick in placing all ovoviviparous cockroaches in Blaberidae and consider all the above genera as belonging to the Epilamprinae. Other genera of Epilamprinae will be treated in future publications.

MATERIALS AND METHODS

The source of each of the museum specimens illustrated is given using the following abbreviations: (ANSP) = Academy of Natural Sciences, Philadelphia; (BMNH) = British Museum (Natural History), London; (L) = Zoological Institute, Lund, Sweden; (MCZ) = Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; (USNM) = United States National Museum, Washington, D.C. Geographical collection data and the names of specialists who identified the specimens, if known, follow these abbreviations. The number preceding the abbreviations refers to the number assigned the specimen and its corresponding genitalia (on a slide) which are deposited in their respective museums.

RESULTS AND DISCUSSION

McKittrick (1964, p. 37) stated that "the slight differences evident in the character systems barely justify the designation of
tribes . . .” within the Epilamprinae. However, she tentatively divided the 13 genera of Epilamprinae which she studied into 5 tribes. She included Epilampra, Litopeltis, and Poroblatta (with a query) in the Epilamprini.

I have found that the male genitalia of many genera of Epilamprinae may be used to make tribal designations. In the present study the male genitalia clearly fall into 3 groups based on distinct differences in the L2d and prepuce.

1. Poroblattini (Poroblatta [Fig. 1], Colapteroblatta [Fig. 2], Dryadoblatta [Fig. 3], Galiblatta [Fig. 4], Naucilidas [Fig. 5]). — In this tribe the L2d is elongated, curved, sclerotized, tapers slightly toward the tip, and is separated from L2vm (Figs. 9, 12, 15, 18, 21, 24). Apparently there is no distinctive prepuce. The R2 has a sub-apical incision (Figs. 10, 13, 16, 19, 22, 25) and the shapes of L1 are all basically similar (Figs. 11, 14, 17, 20, 26). Hebard (1919) claimed that Poroblatta (Figs. 9-11) is related to Colapteroblatta (Figs. 12-14) but showed closer affinity to Acroporoblatta, and the nearest relative of Colapteroblatta was Poroblatta. I have not seen any males of Acroporoblatta, but the genitalia support Hebard’s conclusion regarding a close relationship between Poroblatta and Colapteroblatta. According to Hebard (1926, p. 236) Galiblatta is apparently nearest Colapteroblatta. The close relationship between these 2 genera is seen in their genitalia but I would place Galiblatta closer to Dryadoblatta (cf. Figs. 21-23 and Figs. 24-26) than to Colapteroblatta (Figs. 12-14). The male genitalia of Galiblatta cribrosa differs from G. williamsi in the shape and microscopic surface of the tip of L2d (Figs. 18, 21, in Roth, 1968).

Rehn and Hebard (1927, p. 319) not having access to males tentatively assigned the West Indian species Parasphaeria nigra Brunner to the genus Poroblatta. Later Rehn (1930, p. 58) erected the genus Naucilidas using P. nigra as the type genus; he stated that Naucilidas “. . . belongs to the assemblage which also comprises Colapteroblatta, Poroblatta, Acroporoblatta, and Galiblatta.” Rehn placed Naucilidas nearer Galiblatta than to any of the other genera. The male genitalia of Naucilidas (Figs. 15-17) confirm this close relationship to members of the Poroblattini.

Rehn (1930, p. 56-58) based the genus Dryadoblatta on Homalopteryx scotti Shelford. He believed that Dryadoblatta was “. . . probably as near to Pinaconota Saussure as to any other genus known at this writing . . . In the present incomplete state of our knowledge of the diagnostic features of the genera placed in the Epilamprinae, and in the absence of any phylogenetic concept of their classification, it seems best to compare Dryadoblatta with Pinaconota. Future
study may show the two genera are not closely related, but it is not possible at this writing to attempt an analytic treatment of the genera of the subfamily. It is certain, however, that Dryadoblatta is not closer in relationship to any of the other genera, and its agreement with Pinaconota in many features is marked.”

I have examined a male specimen which Rehn determined as Pinaconota sp. (Fig. 52), and have also seen the male type of Ischnoptera (?) sicca Walker which Kirby synonymized with Pinaconota bifasciata (Saussure) and which Princis (1958, p. 68) lists as a synonym of this species. The male shown in Fig. 51 is similar to the type of sicca, and I collected all stages of this species in the hanging nest of an oriole in the Amazon. Princis (personal communication) examined my specimens of sicca and concluded that Ischnoptera sicca Walker is not a Pinaconota. The male genitalia indicate clearly that neither Ischnoptera sicca (Figs. 53-55) nor Rehn’s Pinaconota sp. (Figs. 56-58) are closely related to Dryadoblatta (Figs. 24-26), a genus obviously related to Galiblatta (Figs. 21-23). The genitalia of Pinaconota sp. and “I.” sicca are quite different and support Princis’s conclusion that they are not congeneric.

2. Notolamprini (Notolampra [Figs. 6, 8a]). — Rehn and Hebard (1927, p. 202) noted that the 3 species of Notolampra have a markedly convex dorsal surface but are more elongate than Phoraspis, which is a genus whose species are also strongly convex and resemble cassidid Chrysomelidae. According to Rehn and Hebard, Notolampra “... marks a transition from the more normal epilamprine type to that of the specialized phoraspid offshoot of the family.” Princis (1960) placed Notolampra in the Phoraspinae; but the male genitalia of Phoraspis differ considerably from those of Notolampra and I have placed Phoraspis in the Phoraspini of the Epilamprinae (Roth, 1972).

The genitalia of 2 species of Notolampra which I have seen differ markedly from each other. In N. gibba (Type genus) the L2d (Fig. 27) is much more robust than the L2d of members of Poroblattini, and does not taper toward the apex. R1 (Fig. 28) is long and slender and has a subapical incision; L1 (Fig. 29) differs in shape from the L1 of Poroblattini (cf. Figs. 11, 14, 16, 20, 23, 26). In N. antillarum, the shape of L2d (Figs. 30, 33) differs from that of N. gibba (Fig. 27) and is partially covered by minute spines. The phallosomes R1 (Figs. 31, 34) and L1 (Figs. 32, 35) are very similar to those of Poroblattini. Notolampra gibba is found in Brazil, and N. antillarum is West Indian.

3. Epilamprini (Litopeltis [Figs. 7, 7a], Cariacasia [Fig. 8]. — The genitalia of Litopeltis and Cariacasia are sufficiently close to
Figs. 9-17. Cockroach male genitalia of Epilamprinae (Poroblattini). 9-11. (118 ANSP). *Poroblatta* sp. (from specimen shown in Fig. 1). 12-14. (116 ANSP). *Colapterobblatta compsa* (from specimen shown in Fig. 2). 15-17. *Naucidas nigra*. (from adventive on bananas probably originating in the West Indies; specimen from a small culture established at the British Museum). (L1 = first sclerite of left phallomere; L2vm = median sclerite; L2d = dorsal sclerite of L2; R2 = hooked sclerite of right phallomere; SI = subapical incision). (scale = 0.3 mm).
Figs. 18-26. Cockroach male genitalia of Epilamprinae (Poroblattini).
Maroni, French Guiana. 21-23. (USNM). *Galiblatta williamsi*. Taruma-
Acu, about 15 Km. northeast of Manaus, Amazonas, Brazil (det. Roth).
24-26. (17 MCZ). *Dryadoblatta scotti*. (from specimen shown in Fig. 3).
(Figs. 18-23 from Roth, 1968). (scale $= 0.3$ mm).
Figs. 27-35. Cockroach male genitalia of Epilamprinae (Notolamprini). 27-29. (175 ANSP). Notolampra gibba (from specimen shown in Fig. 8a). 30-35. Notolampra antillarum. 30-32. (24 BMNH). Trinidad. 33-35. (1469 L). (from specimen shown in Fig. 6). (det. Princis). (scale = 0.3 mm).
Figs. 36-44. Cockroach male genitalia of Epilamprinae (Epilamprini). 36-38. Litopeltis bispinosa (Saussure). Puntarenas Province, Costa Rica (det. Fisk). 39-41. (168 ANSP). L. bispinosa. Porto Bello, Panama (det. Rehn). 42-44. (172 ANSP). Litopeltis bialleyi. (from specimen shown in Fig. 7a). (L2d = dorsal sclerite of L2; P = prepuce). (scale = 0.3 mm).
Figs. 45-50. Cockroach male genitalia of Epilamprinae (Epilamprini). 45-47. (119 ANSP). *Litopeltis oreas*. Paratype. (from specimen shown in Fig. 7). 48-50. (114 ANSP). *Cariacasia capucina*. Type. (from specimen shown in Fig. 8). (scale = 0.3 mm).
Figs. 51-58. Adult males and male genitalia of Blaberidae. 51. "Ischnoptera" sicca Walker. Near Serra Tamendaui, Rio Negro, Amazonas (det. Roth). 52. (189 USNM). Pinaconota sp. Ilha das Alcatrazes, São Paulo, Brazil. (det. Rehn). 53-55. "Ischnoptera" sicca (same data as specimen shown in Fig. 51). 56-58. (189 USNM). Pinaconota sp. (from specimen shown in Fig. 52). (scale for adults = 5 mm, for genitalia = 0.2 mm).
most *Epilampra* (Roth, 1971) to place them in Epilamprini; L2d is a variably shaped dark sclerite separated from L2vm and the prepuce is usually a distinctively shaped lobe covered by microtrichia (Fig. 39). The R1's of *Litopeltis* (Figs. 37, 40, 43, 46), and *Cariacasia* (Fig. 49) have a subapical incision and the shapes of L1 (Figs. 38, 41, 44, 47, 50) are similar. The differences in the genitalia of the 3 species of *Litopeltis* are so minor (Figs. 36-47) that it would be impossible to use them to distinguish species.

When Hebard (1920, p. 140) described the genus *Litopeltis* he stated that it “... belongs to the second section of the Perisphaerinae, containing *Stenopilma* Sauss. [= *Cyrtotria*] and its allies. To this section also belong the American genera *Colapteroblatta*, *Poroblatta* and *Acroporoblatta* Hebard and *Mioblatta* . . . . nearest relationship with *Colapteroblatta* exists, this indicated by the general similarity of tegminal and wing form and venation and limb armament.” The genitalia of *Litopeltis* (Figs. 36-47) are sufficiently different from those of *Colapteroblatta* (Figs. 12-14) to place them in different tribes.

Rehn (1928, p. 190) in discussing the genus *Cariacasia* placed it in the Perisphaerinae and claimed it was related to *Litopeltis* and *Mioblatta* Saussure. However, he also stated that “... the male of *Litopeltis* superficially looks more like the epilamproid genus *Leurolestes* [= *Phoetalia*]. The relationship of the two genera here treated is, however, more intimate than a casual glance, even at individuals of the same sex, would indicate.” *Phoetalia* has male genitalia characteristic of Blaberinae and I recently assigned it to this subfamily (Roth, 1970b). Because of differences in tarsal armament, Rehn (1930, p. 59) removed *Litopeltis* and *Cariacasia* “... from the vicinity of the *Poroblatta* complex, although their general appearance much suggests the latter assemblage.” The genitalia of *Litopeltis* (Figs. 36-47) and *Cariacasia* (Figs. 48-50) are very similar showing a close relationship, and differ from those of Poroblattini, thus supporting Rehn’s conclusions.

**Summary**

Based on male genitalia, 8 genera of Epilamprinae are placed into 3 tribes as follows:

1. Poroblattini. — *Poroblatta*, *Nauclidas*, *Galiblatta*, *Dryado-blatta*, and *Colapteroblatta*.
2. Notolampriini. — *Notolampra*.
3. Epilamprini. — *Litopeltis*, *Cariacasia*. 

**SUMMARY**

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