

A Dichotomous Key for the Identification of the Cockroach fauna (Insecta: Blattaria) of Florida

Insect Classification Exercise

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Abstract: Students used available literature and specimens to produce a dichotomous key to species of cockroaches recorded from Florida. This exercise introduced students to techniques used in studying a group of insects, in this case Blattaria, to produce a regional species key. Producing a guide to a group of insects as a class exercise has proven useful both as a teaching tool and as a method to generate information for the public.

Key Words: Blattaria, Florida, *Blatta*, *Eurycotis*, *Periplaneta*, *Arenivaga*, *Compsodes*, *Holocompsa*, *Myrmecoblatta*, *Blatella*, *Cariblatta*, *Chorisonera*, *Euthlastoblatta*, *Ischnoptera*, *Latiblatta*, *Neoblattella*, *Parcoblatta*, *Plectoptera*, *Supella*, *Symploce*, *Blaberus*, *Epilampra*, *Hemiblabea*, *Nauphoeta*, *Panchlora*, *Phoetalia*, *Pycnoscelis*, *Rhyparobia*, distributions, systematics, education, teaching, techniques.

Identification of cockroaches is limited here to **adults**. A major source of confusion is the recognition of adults from nymphs (**Figs. 1, 2**). There are subjective differences, as well as morphological differences. Immature cockroaches are known as **nymphs**. Nymphs closely resemble adults except nymphs are generally smaller and lack wings and genital openings or copulatory appendages at the tip of their abdomen. Many species, however, have wingless adult females. Nymphs of these may be recognized by their shorter, relatively broad cerci and lack of external genitalia. Male cockroaches possess styli in addition to paired cerci. Styli arise from the subgenital plate and are generally conspicuous, but may also be reduced in some species. Styli are absent in adult females and nymphs.

As keys were modified to include / restrict genera to Florida it became apparent that certain neotropical genera would have to be included; *Epilampra*, *Neoblattella*, and *Rhyparobia*. The latter genus has not been found in Florida but its distribution makes it a likely candidate to be found here (Atkinson et. al, 1991). The other two genera have been recorded from Florida and are known to have established populations in extreme southern Florida.

Published keys were used whenever possible. Photo credits are given with pictures.



Fig. 1. Adult Australian cockroach, *Periplaneta australasiae* (F.); Blattaria, Blattidae). Photo by J. Castner.

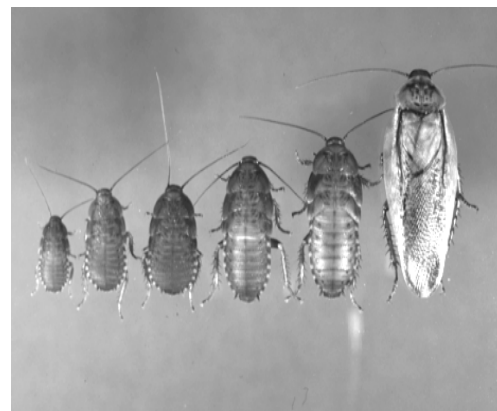


Fig. 2. Nymphs and adult of "Lobster" cockroach *Nauphoeta cinerea* (Olivier). Photo by J. Castner.

Project coordinator: P. M. Choate

Student Contributors: (First class ENY 4161/6166; S. Burns, L. Olsen, D. Richman, O. Pérez, M. Patnaude, C. McFarland, K. McManamy, and R. Pluke. Subsequent classes have tested and modified portions of this document.)

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Key to Genera of Florida Blattaria

(modified from several sources)

1. Ventral margins of femora supplied with numerous spines 2
 - Ventral margins of femora unarmed, with only a few distal spines, or only posterior femora armed with spines 15
- 2(1). Ventro-anterior margin of anterior femora with rows of spines that either decrease gradually in size and length toward apex or are of nearly equal length throughout 3
 - Ventro-anterior margin of anterior femora with row of heavy basal spines followed by row of more slender, shorter apical spines 10
- 3(2). Front wings reduced or not; if latter, then with longitudinal discoidal(cubital) sections extending to apex of front wings 4
 - Front wings not reduced, with discoidal (cubital) sections oblique and extending to hind margin of front wings (**Figs. 3, 4**) ***Supella longipalpa* (Fabricius)**
- 4(3).Ventro-anterior margin of front femora with 2 heavy **apical** spines 5
 - Ventro-anterior margin of front femora with 3 heavy **apical** spines 7
- 5(4). Front wing much reduced; body above blackish with numerous light yellowish markings (**Fig. 2**) ***Nauphoeta cinerea* (Olivier)**
 - Front wings reduced or not, but body above without this color 6
- 6(5). Hind wings with costal veins strongly clubbed apically ***Cariblatta lutea* ssp.**
 - Hind wings with costal veins normal, not clubbed apically ***Symphloe* (2spp; *pallens* & *morsei*)**
- 7(4). Male with subgenital plate symmetrical; styles elongate, straight, slender symmetrical processes; female with subgenital plate valvate 8
 - Male with subgenital plate strongly asymmetrical; styles relatively short and heavy, symmetrical or not; female with subgenital plate simple, not valvate (**Fig. 5**) ***Blatella***
- 8(7). Terminal pads between claw (arolia) present; size medium to large (>24mm) 9
 - Terminal pad between claw absent; size medium (<24mm) (**Fig. 6**) ***Blatta orientalis* L.**
- 9(8). Front wing represented by subquadrate pads, with inner (sutural) margins weakly overlapping (**Fig. 7**) ***Eurycotis* (key to species)**



Fig. 3. *Supella longipalpa* (F.) female (note short wings).Photo by J. Castner.



Fig. 4. *Supella longipalpa* (F.) male (note long wings).Photo by J. Castner.



Fig. 5. *Blatella vaga* Hebard.Photo by J. Castner.



Fig. 6. The Oriental roach - *Blatta orientalis* L.Photo by J. Castner.



Fig. 7. The Florida woods roach *Eurycotis floridana* (Walker). Photo by J. Castner.

- Front and hind wings fully developed, extending beyond apex of abdomen (**Fig. 8**)
..... *Periplaneta* (key to species)
- 10(2). Four basal tarsomeres, each with a ventral pad (see plates 1, 3, 5) 11
- Fourth tarsomere only with a ventral pad 14
- 11(10). Ventro-anterior margin of front femora with 3 apical spines 12
- Ventro-apical margin of front femora with only 1 apical spine *Phoetalia pallida* (Brunner)
- 12(11). Tarsal claws symmetrical 13
- Tarsal claws strongly asymmetrical
..... *Latiblatella rehni* Hebard
- 13(12). Male with 6th dorsal abdominal segment bearing toward the middle, at specialization of 6th and 7th segments, 2 minute, chitinous projections armed dorso-median with elongate delicate teeth; styles of subgenital plate not flexed, of very unequal bulk; female with general color solid, shining blackish brown, legs yellowish orange
..... *Ischnoptera deropeltiformis* (Brunner)
- Male with dorsal surface of abdomen either specialized or not but never showing armed projections or character of specialization just mentioned; styles of subgenital plate slender, deflexed, cylindrical processes, with rounded apices, right slightly longer; female with general color never solid, shining blackish brown with legs yellowish orange
..... *Parcoblatta* (key to species)
- 14(10). Front wings fully developed (male), considerably reduced but not truncate (female); pronotum shining blackish brown, margined laterally and anteriorly with buff *Euthlastoblatta*
- Front wings considerably reduced; truncate, in both sexes; pronotum buffy, disk sub-marginally bordered, rather narrowly, with blackish brown and median anchor-shaped marking (**Fig. 9**)
..... *Euthlastoblatta gemma* Hebard
- 15(1). Front and hind wings not reduced, anal section of hind wings folding fanwise; general surface hairless 16
- Front and hind wings reduced or not; some species with wings completely absent, but if hind wings present, anal field not folded fanwise; general surface hairy 22
- 16(15). Fourth tarsomere only with a ventral pad; hind wings with an an interclaated triangle or appendicular field 17
- Four basal tarsomeres each with a ventral pad; wings without an intercalated triangle or appendicular field 19



Fig. 8. The American cockroach *Periplaneta americana* (L.). Photo by J. Castner.



Fig. 9. *Euthlastoblatta gemma* Hebard

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- 17(16). Front femur with 3 spines on ventral margin and 2 spines at the tip ***Ectobius* (=Symploce)**
 - Front femur with a single elongate apical spine 18
- 18(17). Tarsal claws single but asymmetrical; hind wing with an intercalated trinagle of length equal to not more than one-third total wing length
***Chorisoneura* (2 spp., *parishi* Rehn (Dade Co., & *texensis* Saussure & Zehntner)**
 - Tarsal claws equal but with 2 microscopic teeth on each internal margin; hind wing with a reflexed appendicular filed of length equal to approximately one half total wing length
 ***Plectoptera poeyi* (Saussure)**
- 19(16). Pad between claws present; size medium (under 30mm); pronotum produced posteriorly obtuse-angulate, apex rounded 20
 - Pad between claws absent; size extremely large (over 40mm); pronotum subelliptical (**Fig. 10**)
 ***Blaberus* (key to species)**
- 20(19). General color brown 21
 - General color light Paris green; front wings not pitted (**Fig. 11**) ***Panchlora nivea* (L.)**
- 21(20). Front wing light brown; pronotum dark brown, pale in front; basal fourth of front wing with numerous small round pits, many in double rows; front femur bordered with stiff hairs and single stout spine at base (**Fig. 12**)
 ***Pycnoscelus surinamensis* (L.)**
 - Pronotum and front wing pale brownish; pronotum with dark central blotch, with intricate pale markings, and a dark band at each side; basal third of discoidal vein of hind wing pigmented brown
 ***Nauphoeta cinerea* (Olivier)**
- 22(15). Tarsomeres with pads 23
 - Tarsomeres without pads 24
- 23(22). Front wings not reaching to middle of abdomen; pad between claws absent; size large (over 30mm) ***Hemiblabera tenebricosa* Rehn & Hebard**
 - Front and hind wings extending beyond apex of abdomen; pad present between claws; size smaller (under 7mm) ***Holocompsa nitidula* (F.)**
- 24(22). Size 3mm or less; cerci stout, segmentation poorly indicated but present; arolia absent; labrum spadelike, longer than broad; frequents ant nests (*Camponotus*) (**Fig. 13**)
 ***Myrmecoblatta wheeleri* Hebard**
 - Size variable but always much larger than above;
 25



Fig. 10. *Blaberus craniifer* Burmeister. Photo by J. Castner.



Fig. 11. Cuban cockroach *Panchlora nivea* (L.). Photo by J. Castner.



Fig. 12. Surinam cockroach *Pycnoscelus surinamensis* (L.). Photo by J. Castner.

- 25(24). Ocelli absent; male with styles of subgenital plate small; female without transverse clypeal swelling; subgenital plate valvular **Compsodes** (2 spp., *cucullatus* & *schwarzii*)
- Ocelli large (male) or ocellar spots present, usually weakly defined (female); male with styles absent from subgenital plate; female with transverse clypeal swelling; subgenital plate simple (Fig. 13a., 13b) **Arenivaga floridensis** Caudell

Species of **Plectoptera** in Florida
(modified from Nickle and Gurney, 1985)

1. Glossy, uniformly translucent yellowish species **Plectoptera poeyi** Saussure
- Silvery-gray, with overlying reddish mottled pattern on tegmina; pronotum dark reddish brown or black with irregular white or buff border; head and body dark brown; distinctive buff colored band extending across face from eyes to midpoint of antennal sockets **Plectoptera picta** Saussure and Zehntner

Species of **Periplaneta** found in Florida

1. Color above shining blackish brown; length 24-33mm **P. fuliginosa** (Serville)
 - Color not as above; pronotum with distinct to vague pronotal markings 2
- 2(1). Tegmina with conspicuous lateral pale basal stripe; pronotum with sharply contrasting, pale or yellow margin; length 23-29mm **P. australasiae** (F.)
 - Tegmina entirely reddish brown; pronotum with less defined markings 3
- 3(2). Distal segment of cercus elongated, length more than twice width; male with caudal tergite deeply notched; distal portion of plate thin, projecting as hood over corresponding terminal sternite; median segment unspecialized **P. americana** (L.)
 - Distal segment of cercus triangular; less than twice width; male with caudal tergite only slightly notched; distal portion opaque; median segment specialized, consisting of a shallow channel having a tuft of hairs; 25-33mm **P. brunnea** Burmeister

Species of **Blaberus** found in Florida

1. Overall color brownish; pronotum dull yellow with a central black-brown marking having lighter central area suggesting a smiling human face; 40-60mm **B. craniifer** Burmeister
- Overall color yellowish; tegmina with central brown blotch; pronotum dull yellow with clearly defined,

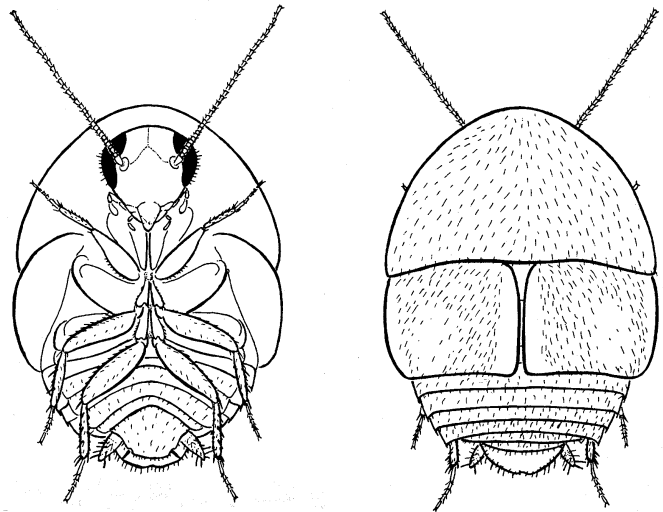


Fig. 13. *Myrmecoblatta wheeleri* (modified from Deyrup and Fisk, 1984.)



Fig. 13a. *Arenivaga floridensis* male (Photo P. M. Choate)



Fig. 13b. *Arenivaga floridensis* female (Photo P. M. Choate)

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shield-shaped black-brown central area; 50-80mm
 *B. discoidalis* Serville

Species of *Eurycotis* found in Florida
 (modified from Gurney, 1959)

1. Tegmina very broad, subquadrate; overall color brownish; pulvillus of hind tarsus one-third to ½ ventral length of basal segment; basal segment of hind tarsus less elongate *E. floridana* (Walker)
- Tegmina lateral, subtriangular; overall color black; basal segment of hind tarsus more elongate; pulvillus of basal segment of hind tarsus about ¼ ventral length of segment *E. lixa* Rehn

Species of *Parcoblatta* found in Florida
 (modified from Blatchley, 1920)

1. Female with inner wings absent and tegmina represented by very small oblong pads, separated by more than twice their width; male with dorsal segments of abdomen unmodified; head and pronotal disk shining blackish-brown
 *P. bolliana* (Saussure & Zehntner)
- Female with inner wings present, often very short, and tegmina not as above; male with one or more dorsal segments modified 2
- 2(1). Tegmina of female strongly abbreviated, covering not more than ½ the abdomen; males with disc of pronotum not distinctly darker than sides and nearly uniform in color with tegmina 3
- Tegmina of female much less abbreviated, reaching beyond middle of abdomen, their tips never truncate; those of male delicate in structure and fully developed 6
- 3(2). Females shining blackish brown, their tegmina subtriangular, separated by a space equal to ¼ their width, their hind margins oblique; males pale brownish-yellow, their tegmina much wider than pronotum, their supra-anal plate only twice as broad as long, its apex broadly rounded; median dorsal abdominal segment of male with 2 raised ridges at middle, each bearing on basal portion a heavy tuft of hairs *P. uhleriana* (Saussure)
- Females reddish brown or brownish-yellow, the abdomen often darker, their tegmina subquadrate, slightly overlapping; males almost uniform brownish yellow in hue 4
- 4(3). Length of male body 17.5-21.5mm, of tegmina 17.8-22mm; females with hind margins of tegmina broadly rounded; middle of median and first dorsal abdominal segments of male each with 2 feeble elevations convergent in front and supplied with a heavy tuft of hairs *P. lata* (Brunner)

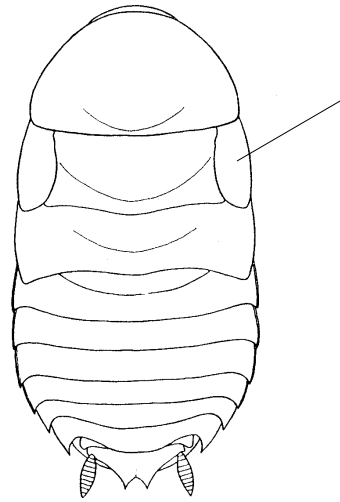


Fig.14. *Eurycotis lixa* Rehn (note shape of tegmina).

- Length of male body not over 16.5mm, of tegmina not over 17mm; females with tegmina covering only basal third of abdomen, their hind margins almost squarely truncate; tegmina of male but slightly wider than pronotum 5
- 5(4). Smaller and more slender, average size of pronotum of female 3.5X4.4mm; male with a large area at middle of median dorsal abdominal segment supplied with minute scattered hairs and with supra-anal plate 4 times as broad as long, squarely truncate; pronotum of male elliptical, widest at middle, not distinctly narrowed in front; average length of male body 13mm, of tegmina 15mm
 *P. virginica* (Brunner)
- Larger and broader, average of pronotum of female, 4X5.6mm; modified abdominal segment of male much as in uhleriana; pronotum of male longer, more narrowed in front, widest slightly behind the middle; average length of body of male 14.6mm; of tegmina 15.7mm
 *P. fulvescens* (Saussure & Zehntner)
- 6(2). Larger, average size of pronotum of female 5X6.1mm; median and first dorsal abdominal segments of male each concave at base, the concavity overhung with 2 elevations which are heavily supplied with hairs on the under surface; average length male body 20.7mm, tegmina 21.2mm
 *P. pennsylvanica* (DeGeer)
- Smaller, average of pronotum of female 4.3X5.6mm, its sides less strikingly pale; median dorsal abdominal segment of male alone modified as in pennsylvanica; average length of male body 16.6mm, of

tegmina 18.6mm.....
 *P. divisa* (Saussure & Zehntner)

Florida *Blattella* species
 (modified from Mizukubo 1981)

B. vaga Hebard - differs from both German and Asian by its black face (light colored in other two). Otherwise superficially similar.

B. germanica - pronotal stripes simple, slightly more broadly separated by their widths. Male interocular distance scarcely 3/4 times as long as distance between antennal sockets; lateral submarginal area of tergite VII immaculate; apical margin of tergite VIII shallowly notched in the middle; left stylus armed with 5-6 thorns; genitalia with R21 less than 4/5 times as long as R3; recurved portion of L3 elongate; female with interocular distance more than 4/5 times as wide as distance between antennal sockets; apical margin of subgenital plate subsinuous distally.

B. asahinai - pronotal stripes paler, irregularly shaped and rather irregularly separated from each other; male with interocular distance decidedly narrower, 1/2 to 3/5 the distance between antennal sockets; lateral submarginal area of tergite VII weakly marked basally with brownish blotches; apical margin of tergite VIII more deeply notched in the middle; left stylus armed with 2-3 thorns; genitalia with R21 nearly as large as R3; recurved portion of L3 shortened. Female with interocular distance less than 4/5 times as wide as distance between antennal sockets; apical margin of subgenital plate without sinuation distally. Note: this species is quick to take flight, frequenting vegetation outdoors.

Comments: In general *B. asahinai* individuals are lighter colored than *B. germanica*. Both sexes of *B. asahinai* have longer wings than *B. germanica*. Wings of female *B. asahinai* are long enough to cover their oothecae.

Selected References

- Blatchley, W. S.** 1920. Orthoptera of Northeastern America with special reference to the faunas of Indiana and Florida. The Nature Publ. Co., Indianapolis.
- Deyrup, M., and Fisk, F.** 1984. A myrmecophilous cockroach new to the USA (Blattaria: Polyphagidae). Entomological News. 95(5):183-185.
- Fisk, F. W.** 1971. An annotated checklist of Costa Rican cockroaches. Proceedings of the Entomological Society of Washington 73: 431-444.

- Fisk, F. W., and C. Schal.** 1981. Notes on new species of Epilamprinae cockroaches from Costa Rica and Panama. Proceedings of the Entomological Society of Washington 83: 694-706.
- Fisk, F. W., M. V. Vargas, and F. B. Fallas.** 1976. Notes on *Myrmecoblatta* from Costa Rica (Blattaria: Polyphagidae). Proceedings of the Entomological Society of Washington 78: 317-322.
- Gresham, W. B.** 1952. Items of interest. Florida Entomologist 35:77. (*Nauphoeta cinerea* (Oliv.) reported established in Tampa.)
- Gurney, A. B.** 1959. New records of Orthoptera and Dermaptera from the United States. Florida Entomologist 42:75-80.
- Hebard, M.** 1917. A new species of myrmecophilous blattid (Orthoptera: Blattidae; Corydiinae). Entomological News 28: 360-363.
- Helfer, J. R.** 1963. How to know the grasshoppers, cockroaches, and their allies. 2nd. ed. Pictured Key Nature Series. Wm. C. Brown Co., publ. vii + 359p.
- Hoebke, E. R., and D. A. Nickle.** 1981. The forest cockroach, *Ectobius sylvestris* (Poda), a European species newly discovered in North America (Dictyoptera: Blattodea: Ectobiidae). Proceedings of the Entomological Society of Washington 83: 592-595.
- Lawson, F. A.** 1967. Ecological and collecting notes on eight species of *Parcoblatta* (Orthoptera: Blattidae) and certain other cockroaches. Journal of the Kansas Entomological Society 40: 267-269.
- Nickle, D. A., and A. B. Gurney.** 1985. Confirmation of the Neotropical cockroach *Plectoptera picta* Saussure and Zehntner in the United States (Blattodea: Blattellidae). Proceedings of the Entomological Society of Washington 87: 187-190.
- Peck, S. B., and Beninger, C.** 1989. A survey of insects of the Florida Keys: Cockroaches (Blattodea), mantids (Mantodea), and walkingsticks (Phasmatoidea). Florida Entomologist 72(4): 612-617.
- Pratt, Harry D.** 1988. Annotated checklist of the cockroaches (Dictyoptera) of North America. Annals of the Entomological Society of America 81: 882-885.
- Rehn, J. A. G., and M. Hebard.** 1914. Records of Dermapters and Orthoptera from west central and southwestern Florida, collected by William T. Davis. Journal New York Entomological Society 22:96-116.
- Rehn, J. A. G., and M. Hebard.** 1927. The Orthoptera of the West Indies. No. 1, Blattidae. Bulletin of the American Museum of Natural History 54: 1-320.
- Roth, L. M., and A. B. Gurney.** 1969. Neotropical cockroaches of the *Epilampra abdomennigrum* complex; a clarification of their systematics (Dictyoptera, Blattaria). Annals of the Entomological Society of America 62: 617-627.

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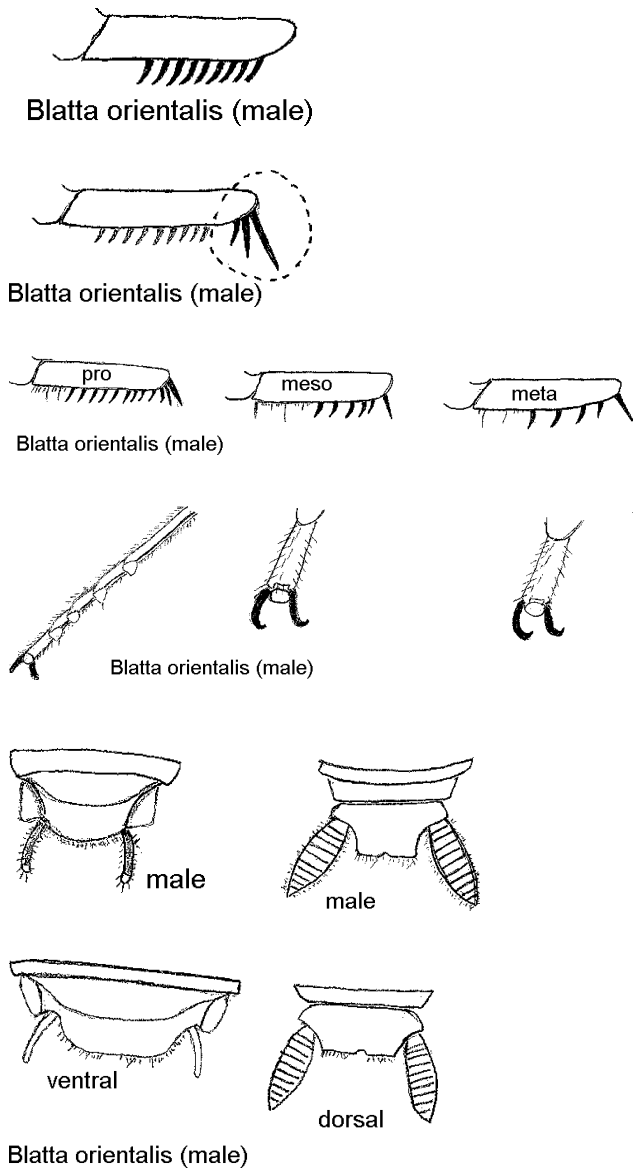


Plate 1. *Blatta orientalis* male. Illustrations by Clint McFarland.

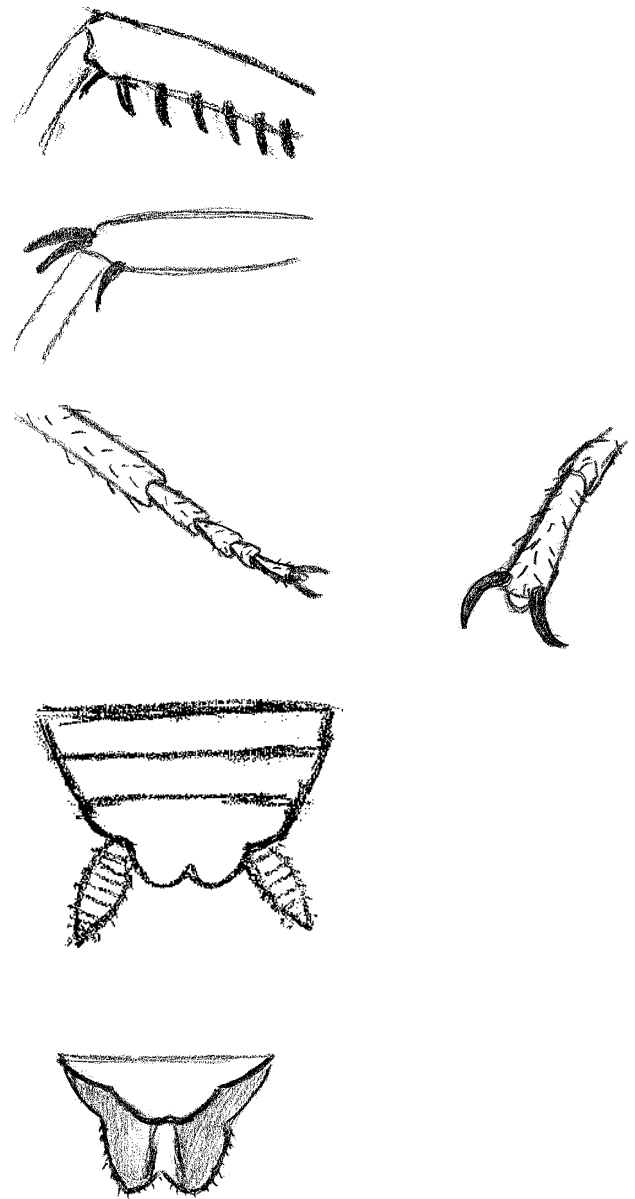


Plate 2. *Blatta orientalis* female. Illustrations by Kim McManamy

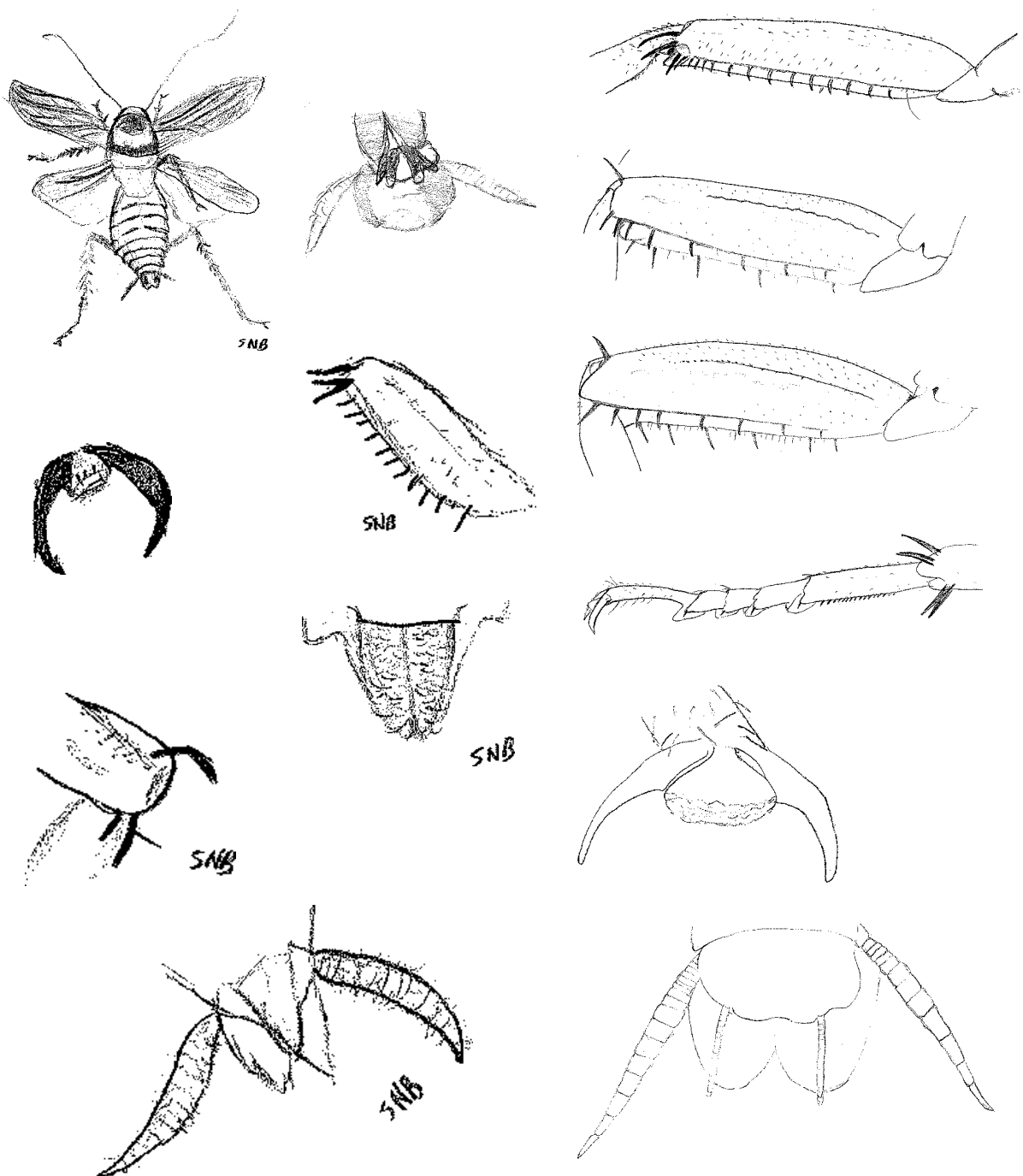


Plate 3. *Periplaneta americana* female. Illustrations by Shunt-ele Burns.

Plate 4. *Periplaneta americana* male. Illustrations by Richard Pluke.

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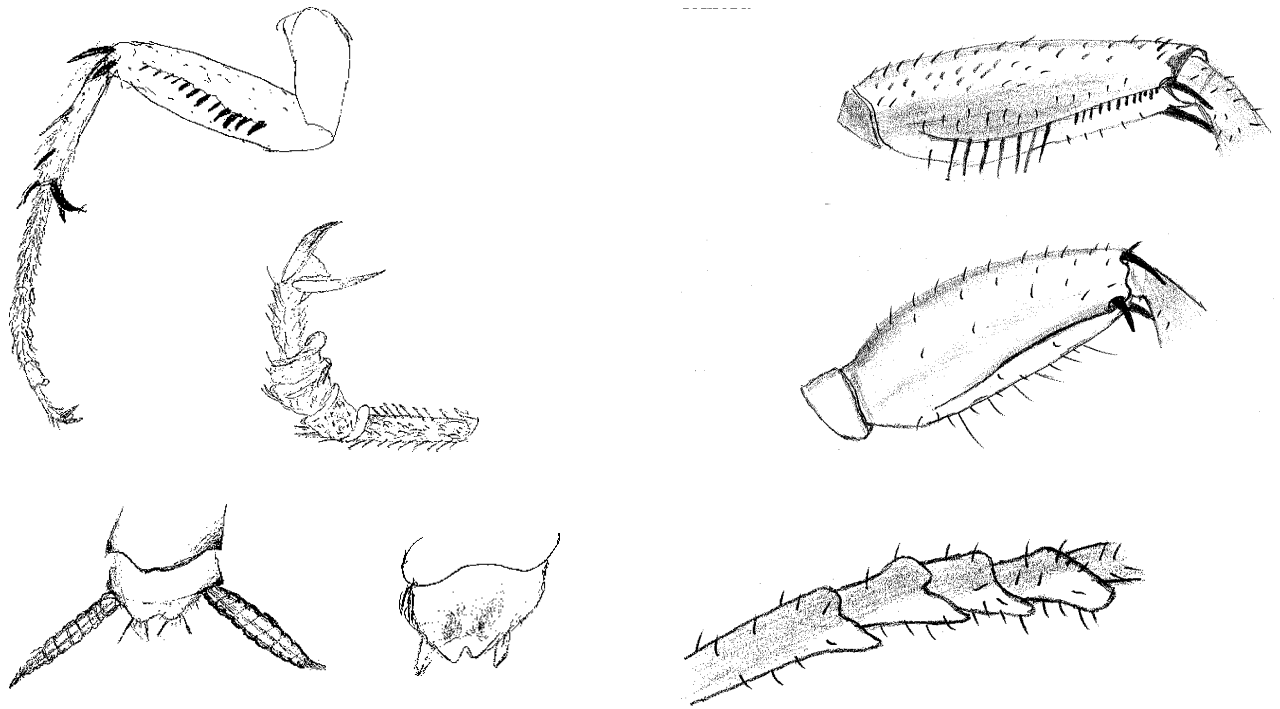


Plate 5. *Supella longipalpa* male. Illustrations by Mike Patnaude.

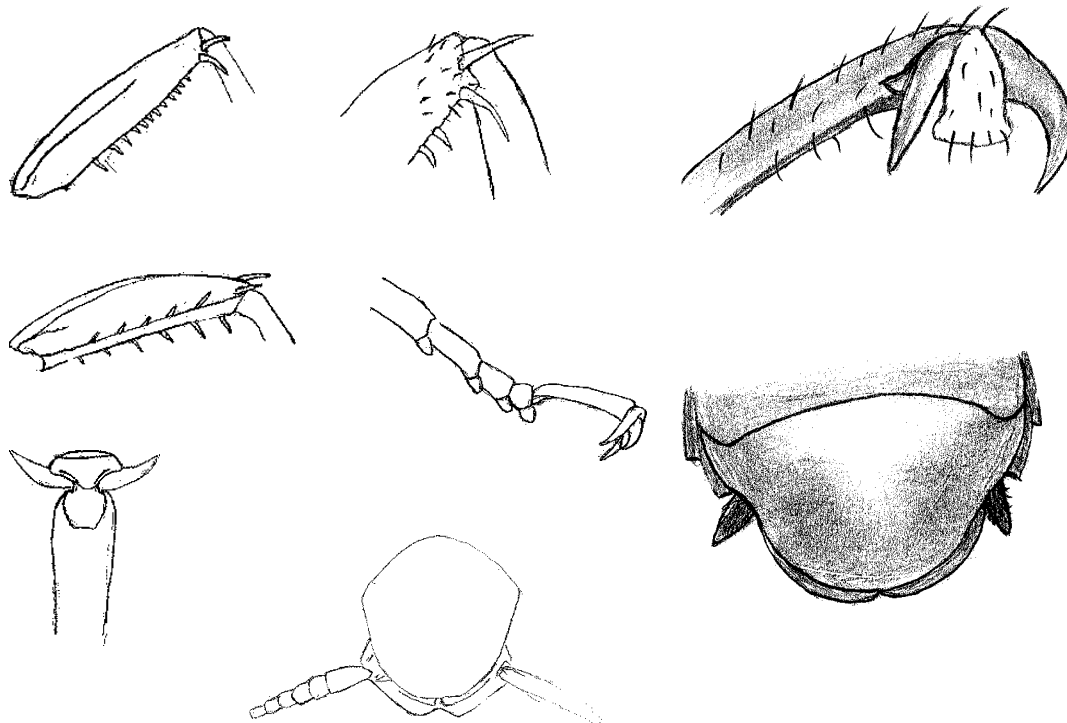


Plate 6. *Supella longipalpa* female. Illustrations by Lisa Olsen.

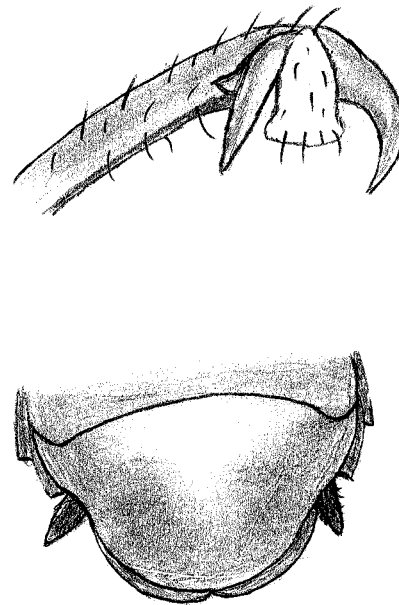
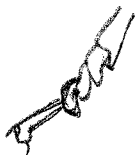
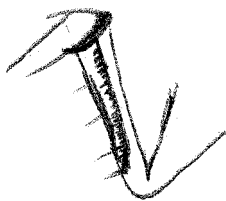


Plate 7. *Pycnoscelis surinamensis* (L.). Illustrations by Oscar Pérez.



male



female

Plate 8. Adult Cuban cockroach *Panchlora nivea* L. Illustrations by Dina Richman.

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Additional Blattaria references

- Abul Hab, J. 1980. A list of arthropoda of medical and veterinary importance recorded from Iraq. Bulletin of the Biological Research Centre. 12(1):9-40.
- Andersen, T., Kjaerandsen, J. 1995. Three new species of *Nocticola* Bolivar from Ghana, West Africa (Blattaria: Nocticolidae). Journal of African Zoology. 109(4):377-385.
- Antonova, O. A., Brodskii, A. K., Ivanov, V. D. 1981. Wing-motion kinematics of 5 insect species. Zoologicheskii Zhurnal. 60(4):506-519.
- Areval, K. 1987. Some trends in the change of the indoor insect fauna since 1950. Entomologiske Meddelelser. 55(2-3):129-136.
- Asahina, S. 1979a. Taxonomic notes on Japanese Blattaria: 11. The species of the tribe, Ischnopterites. Japanese Journal of Sanitary Zoology. 30(3):217-235.
- Asahina, S. 1979b. Taxonomic notes on Japanese Blattaria: 12. The species of the tribe Ischnopterites (Taiwanese species). Japanese Journal of Sanitary Zoology. 30(4):335-354.
- Asahina, S. 1979c. Taxonomic notes on Japanese Blattaria: X. *Margattea* and *Theganosilpha*. Japanese Journal of Sanitary Zoology. 30(2):107-119.
- Asahina, S. 1984. Taxonomic notes on Japanese blattaria: 13. A collection made on the Ryukyu Islands in May 1983. Japanese Journal of Sanitary Zoology. 35(2):117-120.
- Asahina, S. 1988a. Taxonomic notes on Japanese Blattaria: XVI. Notes on two *Trichoblatta* species. Japanese Journal of Sanitary Zoology. 39(1):35-42.
- Asahina, S. 1988b. Taxonomic notes on Japanese Blattaria: XVII. The species of the genus *Panesthia*. Japanese Journal of Sanitary Zoology. 39(1):53-62.
- Asahina, S. 1988c. Taxonomic notes on Japanese Blattaria: XVIII. The species of the genus *Salganea*. Japanese Journal of Sanitary Zoology. 39(3):257-265.
- Barni, S., Lambiase, S., Grigolo, A., Sacchi, L., Corona, S., Scovassi, A. I., Laudani, U. 1997. Occurrence of apoptosis in serosa of *Periplaneta americana* L. (Blattaria: Blattellidae): Ultrastructural and biochemical features. Journal of Insect Physiology. 43(11):999-1008.
- Barwig, B. 1985. Isolation and characterization of plasma coagulogen of the cockroach *Leucophaea maderae* (Blattaria). Journal of Comparative Physiology B Biochemical Systemic and Environmental Physiology. 155(2):135-144.
- Becker, C. J. 1984. Preliminary survey of the Blattaria of the state of Rio Grande do Sul, Brazil. Revista Brasileira De Entomologia. 28(1):87-98.
- Bohn, H. 1987. Reversal of the right-left asymmetry in male genitalia of some Ectobiinae (Blattaria: Blattellidae) and its implications on sclerite homologization and classification. Entomologica Scandinavica. 18(3):293-304.
- Bohn, H. 1989. Revision of the sylvestris group of *Ectobius* Stephens in Europe (Blattaria: Blattellidae). Entomologica Scandinavica. 20(3):317-342.
- Bohn, H. 1990. Revision of the *Loboptera* spp. of Spain (Blattaria: Blattellidae). Entomologica Scandinavica. 21(4):369-404.
- Bohn, H. 1991. Revision of the *Loboptera* spp. of Morocco (Blattaria: Blattellidae: Blattellinae). Entomologica Scandinavica. 22(3):251-296.
- Bohn, H. 1992. Revision of the *baetica*-group of *Phyllo-dromica* in Spain (Blattaria: Blattellidae: Ectobiinae). Entomologica Scandinavica. 23(3):319-345.
- Bohn, H. 1993. Revision of the *panteli*-group of *Phyllo-dromica* in Spain and Morocco (Blattaria: Blattellidae: Ectobiinae). Entomologica Scandinavica. 24(1):49-72.
- Bohn, H., Barwig, B., Bohn, B. 1981. Immunochemical analysis of hemolymph clotting in the insect, *Leucophaea maderae* (Blattaria). Journal of Comparative Physiology B Biochemical Systemic and Environmental Physiology. 143(2):169-184.
- Bohn, H., Saks, T. M. 1986. Inhibition of crosslinking in clotting of cockroach hemolymph (*Leucophaea maderae*) (Blaberidae, Blattaria). Journal of Comparative Physiology B Biochemical Systemic and Environmental Physiology. 156(5):625-634.
- Boudreaux, H. B. 1980. Proventricular acanthae and their phylogenetic implications. Annals of the Entomological Society of America. 73(2):189-196.
- Brenner, R. J. 1988. Focalilty and mobility of some peridomestic cockroaches in Florida (USA) (Dictyoptera: Blattaria). Annals of the Entomological Society of America. 81(4):581-592.
- Brenner, R. J., Carlson, D. A., Roth, L. M., Patterson, R. S. 1993. Morphological and chemotaxonomic identification of *Blattella* cockroaches (Blattaria: Blattellidae) from Taiwan and selected pacific basin locations. Invertebrate Taxonomy. 7(5):1205-1219.
- Brenner, R. J., Patterson, R. S. 1988. Efficiency of a new trapping and marking technique for peridomestic cockroaches (Dictyoptera: Blattaria). Journal of Medical Entomology. 25(6):489-492.
- Brenner, R. J., Patterson, R. S. 1989. Laboratory feeding activity and bait preferences of four species of cockroaches (Orthoptera: Blattaria). Journal of Economic Entomology. 82(1):159-162.
- Brossut, R., Sreng, L. 1980. Comparative ultrastructure of the abdominal exocrine glands of Blattaria (Dictyoptera). International Journal of Insect Morphology and Embryology. 9(3):199-214.
- Casanueva, M. E. 1993. Phylogenetic studies of the free-living and arthropod associated Laelapidae (Acari: Mesostigmata). Gayana Zoologia. 57(1):21-46.
- Deleporte, P., Grillou, H. 1982. A new labeling method for cockroaches (Dictyoptera, Blattaria). Annales de la Societe Entomologique de France. 18(2):199-204.
- Della Cioppa, G., Engelmann, F. 1980. Juvenile hormone-stimulated proliferation of endoplasmic retic-

- ulum in fat body cells of a vitellogenic insect, *Leucophaea maderae* (Blattaria). Biochemical and Biophysical Research Communications. 93(3):825-832.
- Denic, N., Huyer, D. W., Sinal, S. H., Lantz, P. E., Smith, C. R., Silver, M. M. 1997. Cockroach: The omnivorous scavenger. Potential misinterpretation of post-mortem injuries. American Journal of Forensic Medicine and Pathology. 18(2):177-180.
- Dial, R., Roughgarden, J. 1995. Experimental removal of insectivores from rain forest canopy: Direct and indirect effects. Ecology. 76(6):1821-1834.
- Elzinga, R. J., Hopkins, T. L. 1994. Foregut microspines in four families of cockroaches (Blattaria). International Journal of Insect Morphology and Embryology. 23(3):253-260.
- Elzinga, R. J., Hopkins, T. L. 1995. Microspine variation in hindgut regions for four families of cockroaches (Blattaria). International Journal of Insect Morphology and Embryology. 24(2):203-211.
- Feng, P., Woo, F. 1988. Three species and two new records of Blattaria from Yunnan and Guizhou, China. Entomotaxonomia. 10(3-4):305-312.
- Feng, P. Z., Guo, Y. Y. 1990. Two new species of the genus *Symplocodes* from Yunnan, China (Blattaria: Phyllodromiidae). Acta Zootaxonomica Sinica. 15(3):339-342.
- Fent, P. Z., Woo, F. C. 1990. A study on the genus *Panesthia* from China (Blattaria: Panesthiidae). Acta Entomologica Sinica. 33(2):213-218.
- Ferstl, S., Weber, J., Bohn, H. 1988. Conditions for the association of the two clotting proteins of the cockroach *Rhyparobia maderae* (Blattaria). Journal of Comparative Physiology B Biochemical Systemic and Environmental Physiology. 158(5):527-536.
- Fisk, F. W., Schal, C. 1981. Notes on new species of epilamprine cockroaches from Costa Rica and Panama (Blattaria: Blaberidae). Proceedings of the Entomological Society of Washington. 83(4):694-706.
- Fisk, F. W., Wolda, H. 1983. New species of *Ceratioptera* cockroaches from Panama and Costa Rica (Blattaria: Blattellidae: Plectopterinae). Proceedings of the Entomological Society of Washington. 85(2):286-296.
- Gaede, G. 1989. The hypertrehalosemic peptides of cockroaches: A phylogenetic study. General and Comparative Endocrinology. 75(2):287-300.
- Garcera, M. D., Ibanez, P., Martinez, R., Cunat, P. 1991. Changes induced on the metabolic rate of three insect species by juvenile hormone and precocene II treatments. Revista Espanola De Fisiologia. 47(1):31-36.
- Gautier, J. Y. 1979. Contribution to the study of dominance order phenomenon of Blattaria: II. Qualitative analysis of male/male *Blaberus craniifer* relationships. Biology of Behaviour. 4(1):61-74.
- Grandcolas, P. 1990. Description of new Zetobrinae from French Guiana with some remarks on this subfamily (Dictyoptera Blattaria Blaberidae). Bulletin De La Societe Entomologique De France. 95(7-8):241-246.
- Grandcolas, P. 1992. *Paradicta*, new genus and *Neorhincnoda*, new genus, two new genera of Blaberinae (Dict., Blattaria, Blaberidae). Bulletin De La Societe Entomologique De France. 97(1):7-15.
- Grandcolas, P. 1993a. The ecological distribution of *Thanatophyllum akinetum* in French Guyana (Insecta, Blattaria). Compte Rendu Des Seances De La Societe De Biogeographie. 69(2):73-86.
- Grandcolas, P. 1993b. The genus *Paramuzoa* Roth, 1973: Its distribution and a case of xylophagy in the subfamily Nyctiborinae (Dictyoptera: Blattaria). Bulletin De La Societe Entomologique De France. 98(2):131-138.
- Grandcolas, P. 1993c. The genus *Therea* Billberg, 1820: Phylogenetic position, new species, distribution ecological valence (Dictyoptera, Blattaria, Polyphaginae). Canadian Journal of Zoology. 71(9):1816-1822.
- Grandcolas, P. 1993d. Habitats of solitary and gregarious species in the neotropical Zetoborinae (Insecta, Blattaria). Studies On Neotropical Fauna and Environment. 28(3):179-190.
- Grandcolas, P. 1993e. The phylogenetic position of *Miroblatta* Shelford, 1906 and its bearing for the evolution of hind wings folding in cockroaches (Dictyoptera: Blattaria). Annales de la Societe Entomologique de France. 29(4):345-349.
- Grandcolas, P. 1994a. Evidence for hypopharynx protrusion and presumptive water vapour absorption in *Heterogamisca chopardi* Uvarov, 1936 (Dictyoptera: Blattaria: Polyphaginae). Annales de la Societe Entomologique de France. 30(3):361-362.
- Grandcolas, P. 1994b. The genus *Gyna*: Definition and composition of the *oblonga* group (Dictyoptera, Blattaria). Bulletin de la Societe Entomologique de France. 99(3):287-293.
- Grandcolas, P. 1994c. Phylogenetic systematics of the subfamily polyphaginae, with the assignment of *Cryptocercus* Scudder, 1862 to this taxon (Blattaria, Blaberoidea, Polyphagidae). Systematic Entomology. 19(2):145-158.
- Grandcolas, P. 1995a. Bionomics of a desert cockroach, *Heterogamisca chopardi* Uvarov, 1936 after the spring rainfalls in Saudi Arabia (Insecta, Blattaria, Polyphaginae). Journal of Arid Environments. 31(3):325-334.
- Grandcolas, P. 1995b. New data on the genus *Alloblatta* Grandcolas, 1993 (Dictyoptera, Blattaria). Bulletin de la Societe Entomologique de France. 100(4):341-346.
- Grandcolas, P. 1996a. Habitat and population structure of *Polyphaga aegyptiaca* (Blattaria: Polyphagidae) in Asir, Saudi Arabia. Annales de la Societe Entomologique de France. 32(2):201-206.
- Grandcolas, P. 1996b. Short-lived brooding behaviour in *Rhabdoblatta erubescens* (Gerstaecker, 1883) and its relationship with social behaviour (Blattaria, Epil-

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- amprinae). Bulletin de la Societe Entomologique de France. 101(3):231-234.
- Grandcolas, P. 1997a. Habitat use and population structure of a polyphagine cockroach, *Ergaula capensis* (Saussure 1893) (Blattaria Polyphaginae) in Gabonese rainforest. Tropical Zoology. 10(2):215-222.
- Grandcolas, P. 1997b. The monophyly of the subfamily Periphaeriinae (Dictyoptera: Blattaria: Blaberidae). Systematic Entomology. 22(2):123-130.
- Grandcolas, P. 1997c. Phylogenetic systematics of the subfamily Tryonicinae (Dictyoptera, Blattaria, Blattidae). Memoires du Museum National d'Histoire Naturelle. 171:91-124.
- Grandcolas, P. 1997d. What did the ancestors of the woodroach *Cryptocercus* look like? A phylogenetic study of the origin of subsociality in the subfamily Polyphaginae (Dictyoptera, Blattaria). Memoires du Museum National d'Histoire Naturelle. 173:231-252.
- Greve, L. 1982. The harlequin cockroach, *Neostylophaga rhombifolia*, new record, and other cockroach species in the Zoological Museum, University of Bergen (Norway). Fauna. 35(3):130-132.
- Grigolo, A., Lambiase, S., Sacchi, L., Biscaldi, G., Laudani, U. 1997. Topographic relationships between the fat body and bacteriocytes in the early embryonic stages of two Blattaria species. Animal Biology. 6(1):37-39.
- Gundel, M., Penzlin, H. 1995. Anatomy of neurons crossing the tritocerebral commissures of the cockroach *Periplaneta americana* (Blattaria). Journal of Morphology. 223(2):223-242.
- Hackstein, J. H. P., Stumm, C. K. 1994. Methane production in terrestrial arthropods. Proceedings of the National Academy of Sciences of the United States of America. 91(12):5441-5445.
- Huang, F., Zhu, S., Li, G. 1988. The morphology of the termite (Isoptera) and its taxonomic system. Zoological Research. 9(3):301-307.
- Humphreys, W. F. 1993. Cave fauna in semi-arid tropical Western Australia: A diverse relict wet-forest litter fauna. Memoires de Biospeologie. 20:105-110.
- In Den Bosch, H. A. J. 1986. Limited field analyses of the food of *Algyroides fitzingeri* on Sardinia (Italy). Salamandra. 22(1):47-54.
- Izquierdo, I., Martin, J. L. 1990. A new blind species of *Loboptera* Brunner W. from Tenerife island (Canary Islands) (Blattaria, Blattellidae). Fragmenta Entomologica. 22(1):19-26.
- Izquierdo, I., Oromi, P., Belles, X. 1990. Number of ovarioles and degree of dependence with respect to the underground environment in the Canarian (North Atlantic Ocean) species of the genus *Loboptera* Brunner (Blattaria, Blattellidae). Memoires De Biospeologie. 17:107-112.
- Kim, K., Jeon, J. H., Lee, D. K. 1995. Various pathogenic bacteria on German cockroaches (Blattellidae, Blattaria) collected from general hospitals. Korean Journal of Entomology. 25(1):85-88.
- Kim, K. C., Kim, S. G., Choi, H. S. 1988. An investigation of insect pest and maximum occurrence period of key pest insect on stored rice grains. Korean Journal of Applied Entomology. 27(2):117-124.
- Klass, K. D. 1997. The external male genitalia and the phylogeny of Blattaria and Mantodea. Bonner Zoologische Monographien(42):1-341.
- Krueger, H. 1980. Cockroach (Blattaria): Pest detrimental to health. Monatshefte fuer Veterinaermedizin. 35(7):270-276.
- Lambiase, S., Grigolo, A., Laudani, U., Sacchi, L., Baccetti, B. 1997. Pattern of bacteriocyte formation in *Periplaneta americana* (L.) (Blattaria: Blattidae). International Journal of Insect Morphology and Embryology. 26(1):9-19.
- Lange, C. E. 1985. *Coelosporidium periplanetae* Lutz and Splendore (Ascetospora, Haplosporidiidae) in *Blatta orientalis* Linn. (Blattaria: Blattidae). Neotropicalia. 31(86):177-180.
- Lee, D. K. 1995. Distribution and seasonal abundance of cockroaches (Blattellidae and Blattidae, Blattaria) in urban general hospitals. Korean Journal of Entomology. 25(1):57-67.
- Lee, Y. B., Park, H. S. 1991. Three species of the Laboulbeniales (Ascomycotina) collected in Korea. Korean Journal of Mycology. 19(1):18-21.
- Leslie, G. W., Boreham, P. F. L. 1981. Identification of arthropod predators of *Eldana saccharina* (Lepidoptera: Pyralidae) by crossover electrophoresis. Journal of the Entomological Society of Southern Africa. 44(2):381-388.
- Li, B., Fan, V., Chang, F. 1984. Cockroaches: The chromosomal karyotype of *Blattella germanica* in Changsha area (China). Bulletin of Hunan Medical College. 9(4):358-360.
- Liu, H., Beckenbach, A. T. 1992. Evolution of the mitochondrial cytochrome oxidase II gene among 10 orders of insects. Molecular Phylogenetics and Evolution. 1(1):41-52.
- Luykx, P. 1983. XO:XX sex chromosomes and Robertsonian variation in the autosomes of the wood-roach *Cryptocercus punctulatus* (Dictyoptera: Blattaria: Cryptocercidae). Annals of the Entomological Society of America. 76(3):518-522.
- Machado, V. L. L., Palma, M. S., Da Costa, O. M. 1995. Repellent action of essential oil fractions from leaves of *Laurus nobilis* L. on nymphs and adults of *Periplaneta americana* (L.) (Blattaria: Blattidae). Anais da Sociedade Entomologica do Brasil. 24(1):13-20.
- Martin, J. L., Izquierdo, I. 1987. Two new subterranean *Loboptera* Brum and W. from El Hierro Island (Canary Islands (Spain)) (Blattaria, Blattellidae). Fragmenta Entomologica. 19(2):301-310.
- Martin, J. L., Oromi, P. 1987. Three new species of subterranean *Loboptera* Brum. and W. (Blattaria: Blattellidae) and considerations on the subterranean environment of Tenerife (Canary Islands)

- (Spain). *Annales De La Societe Entomologique De France*. 23(3):315-326.
- Matsumoto, T. 1988. Colony composition of the wood-feeding cockroach, *Panesthia australis* Brunner (Blattaria, Blaberidae, Panesthiinae), in Australia. *Zoological Science*. 5(5):1145-1148.
- Matsumoto, T. 1992. Familial association, nymphal development and population density in the Australian giant burrowing cockroach, *Macropanesthia rhinoceros* (Blattaria: Blaberidae). *Zoological Science*. 9(4):835-842.
- Menon, M. 1986. Morphological evidence for a probable secretory site of the male sex pheromones of *Nauphoeta cinerea* (Blattaria, Blaberidae): 2. Electron microscope studies. *Journal of Morphology*. 187(1):69-80.
- Mizukubo, T. 1981. A revision of the genus *Blattella* (Blattaria: Blattellidae) of Japan: 1. Terminology of the male genitalia and description of *Blattella asahinai*, new species from Okinawa Island, Japan. *Esakia*(17):149-160.
- Mizukubo, T., Hirashima, Y. 1987. Homology of male genital sclerites in cockroaches (Blattaria) by means of analysis of their association patterns. *Journal of the Faculty of Agriculture Kyushu University*. 31(3):247-278.
- Morimoto, N., Kiritani, K. 1995. Fauna of exotic insects in Japan. *Bulletin of the National Institute of Agro Environmental Sciences*(12):87-120.
- Nagashima, T., Meyer Rochow, V. B. 1993. Ultrastructure of the compound eye of the footspinner *Oligotoma japonica* Okajima (Insecta: Embioptera): Winged males. *Biocell*. 17(1):39-59.
- Nakayama, Y., Suto, C., Kumada, N. 1984. Further studies on the dispersion-inducing substances of the German cockroach, *Blattella germanica* (Blattaria: Blattellidae). *Applied Entomology and Zoology*. 19(2):227-236.
- Nakayama, Y., Suto, C., Kumada, N. 1987. Degradation of the dispersion-inducing substances in the alimentary canal of the German cockroach, *Blattella germanica* (Linne) (Blattaria: Blattellidae). *Applied Entomology and Zoology*. 22(2):153-158.
- Penzlin, H. 1994. Antagonistic control of the hyperneural muscle in *Periplaneta americana* (L.) (Insecta, Blattaria). *Journal of Insect Physiology*. 40(1):39-51.
- Penzlin, H., Agricola, H., Blechschmidt, K., Eckert, M., Hertel, W., Kusch, T., Sobek, L., Stoya, G., Ude, J. 1988. Neuropeptide proctolin: Presence and effectiveness in *Periplaneta americana* (Insecta, Blattaria). *Wissenschaftliche Zeitschrift Der Friedrich Schiller Universitaet Jena Naturwissenschaftliche Reihe*. 37(5):711-740.
- Petryszak, A. 1984a. Sense organs of the hypopharynx of some representatives of the suborder Blattaria. *Acta Biologica Cracoviensia Series Zoologia*(26):75-82.
- Petryszak, A. 1984b. Sense organs of the labrum of *Periplaneta americana* and some other Blattaria. *Acta Biologica Cracoviensia Series Zoologia*(26):65-74.
- Platenkamp, G. A. J. 1984. Seasonal fluctuations in the flight activity of aquatic Heteroptera (*Nepomorpha*) on Barro Colorado Island, Panama. *Studies On Neotropical Fauna and Environment*. 19(4):201-208.
- Purrini, K., Weiser, J., Kohring, G. W. 1988. *Coelospiridium tangae*, new species (Protista), a new protist parasitizing a natural population of a field cockroach, *Blatta* sp. (Blattaria). *Archiv Fuer Protistenkunde*. 136(3):273-281.
- Qgrandcolas, P., Deleporte, P. 1994. Escape from predation by army ants in *Lanxoblatta* cockroach larvae (Insecta, Blattaria, Zetoborinae). *Biotropica*. 26(4):469-472.
- Rocha, E. S. I. 1984. Blattaria of Amazonia: Some Blattellidae of Sinop, state of Mato Grosso, Brazil (Dictyoptera, Blattodea). *Revista Brasileira De Entomologia*. 28(3):207-212.
- Rocha, E. S. I. 1987a. Blattaria of Amazonia: Two new species of *Hormetica* Burmeister, 1838 (Blaberidae: Blattodea: Dictyoptera). *Boletim Museu Nacional Rio De Janeiro Zoologia*(313):1-8.
- Rocha, E. S. I., Vasconcelos, S. M. 1987. New contribution to the knowledge of the Blattaria (Dictyoptera) fauna from Alto da Mosela, Petropolis, Rio de Janeiro State, Brazil, with a description of 3 new species. *Boletim Museu Nacional Rio De Janeiro Zoologia*(312):1-19.
- Rocha, I. R. D. 1987b. The relationship between time of molting and the formation of the adult male dominance hierarchy in *Nauphoeta cinerea* and *Henchoustonedia flexivitta* (Dictyoptera, Blattaria). *Revista Brasileira De Entomologia*. 31(3):369-378.
- Rocha, I. R. D. 1990. Development of spacing patterns in *Nauphoeta cinerea* and *Henchoustonedia flexivitta* (Dictyoptera, Blattaria, Blaberidae). *Revista Brasileira De Entomologia*. 34(2):341-348.
- Rollo, C. D., Borden, J. H., Casey, I. B. 1995. Endogenously produced repellent from American cockroach (Blattaria: Blattidae): Function in death recognition. *Environmental Entomology*. 24(1):116-124.
- Roth, L. 1997a. A new combination, and new records of species of *Blattella* Caudell (Blattaria: Blattellidae: Blattellinae). *Oriental Insects*. 31:229-239.
- Roth, L. M. 1979a. A taxonomic revision of the Panesthiinae of the world: 2. The genera *Salganea*, *Microdina* and *Caeparia* (Dictyoptera, Blattaria, Blaberidae). *Australian Journal of Zoology Supplementary Series*(69):1-201.
- Roth, L. M. 1979b. A taxonomic revision of the Panesthiinae of the world: 3. The genera *Panesthia* and *Miopanesthia* (Dictyoptera: Blattaria: Blaberidae). *Australian Journal of Zoology Supplementary Series*(74):1-276.

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- Roth, L. M. 1981. The non-Australian species of *Calolampira* (Dictyoptera, Blattaria: Blaberidae). *Entomologica Scandinavica*. 12(4):405-425.
- Roth, L. M. 1982a. Ovoviviparity in the blattellid cockroach, *Symploce bimaculata* (Dictyoptera: Blattaria: Blattellidae). *Proceedings of the Entomological Society of Washington*. 84(2):277-280.
- Roth, L. M. 1982b. A taxonomic revision of the Panesthinae of the world: 4. The genus *Ancaudellia*, with additions to parts I-III, and a general discussion of distribution and relationships of the components of the subfamily (Dictyoptera: Blattaria: Blaberidae). *Australian Journal of Zoology Supplementary Series*(82):1-142.
- Roth, L. M. 1983. The genus *Chorisia* (Dictyoptera, Blattaria: Blattellinae). *Entomologica Scandinavica*. 14(3):297-302.
- Roth, L. M. 1984a. The genus *Symploce*: 2. Species from New Guinea (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 15(3):299-331.
- Roth, L. M. 1984b. The genus *Symploce*: 3. Species from Borneo, Flores, India and the Philippines (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 15(4):455-472.
- Roth, L. M. 1985a. The genus *Episymploce*: I. Species chiefly from Java, Sumatra and Borneo (Kalimantan, Sabah, Sarawak) (Indonesia): (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 16(4):355-374.
- Roth, L. M. 1985b. The genus *Symploce*: IV. Species from Borneo (Kalimantan, Sabah, Sarawak), Sumatra and West Malaysia, (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 16(2):139-160.
- Roth, L. M. 1985c. The genus *Symploce*: V. Species from mainland Asia (China, India, Iran, Laos, Thailand, South Vietnam, West Malaysia): (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 16(4):375-398.
- Roth, L. M. 1985d. A revision of the cockroach genus *Parasymploce* (Dictyoptera: Blattaria: Blattellidae). *Journal of Natural History*. 19(3):431-532.
- Roth, L. M. 1985e. A taxonomic revision of the genus *Blattella* (Dictyoptera, Blattaria: Blattellidae). *Entomologica Scandinavica Supplement*(22):1-221.
- Roth, L. M. 1986a. The genus *Episymploce* Bey-Bienko: III. Species from Laos, North and South Vietnam and Thailand (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 17(4):455-474.
- Roth, L. M. 1986b. The genus *Episymploce*: II. Species from Sulawesi (Celebes) (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 17(2):173-188.
- Roth, L. M. 1986c. The genus *Symploce* Hebard: VII. African species (continued) (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 17(4):433-454.
- Roth, L. M. 1986d. The genus *Symploce*: VI. African species (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 17(2):189-214.
- Roth, L. M. 1987a. The genus *Episymploce* Bey-Bienko: IV. Species from India (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 18(2):111-124.
- Roth, L. M. 1987b. The genus *Episymploce* Bey-Bienko: V. Species from China (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 18(2):125-142.
- Roth, L. M. 1987c. The genus *Episymploce* Bey-Bienko: VI. Species from Taiwan and the Japanese Islands (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 18(2):143-154.
- Roth, L. M. 1987d. The genus *Neolaxta* Mackerras (Dictyoptera: Blattaria: Blaberidae). *Memoirs of the Queensland Museum*. 25(1):141-150.
- Roth, L. M. 1987e. The genus *Symploce* Hebard: VIII. Species from Taiwan and the Japanese Islands (Dictyoptera: Blattaria, Blattellidae). *Entomologica Scandinavica*. 18(2):155-164.
- Roth, L. M. 1987f. The genus *Tryonicus* new record Shaw from Australia and New Caledonia (Dictyoptera: Blattaria: Blattidae: Tryonicinae). *Memoirs of the Queensland Museum*. 25(1):151-168.
- Roth, L. M. 1988. Some cavernicolous and epigeal cockroaches with six new species, and a discussion of the Nocticolidae (Dictyoptera: Blattaria). *Revue Suisse De Zoologie*. 95(1):297-322.
- Roth, L. M. 1989a. Cockroach genera whose adult males lack styles: Part I. (Dictyoptera: Blattaria: Blattellidae). *Revue Suisse De Zoologie*. 96(4):747-770.
- Roth, L. M. 1989b. The cockroach genus *Margattea* Shelford, with a new species from the Krakatau Islands, and redescriptions of several species from the Indo-Pacific region (Dictyoptera: Blattaria: Blattellidae). *Proceedings of the Entomological Society of Washington*. 91(2):206-229.
- Roth, L. M. 1989c. *Miriamrothschildia*, new genus of cockroach from the Seychelle Islands (Indian Ocean) (Dictyoptera, Blattaria: Blattellidae). *Entomologica Scandinavica*. 20(1):65-74.
- Roth, L. M. 1989d. *Paranauphoeta rufipes* Brunner in Queensland (Australia) and a description of the female *Calolampira elegans* Roth and Princis (Dictyoptera: Blattaria: Blaberidae). *Memoirs of the Queensland Museum*. 27(2):589-598.
- Roth, L. M. 1989e. *Sliferia*, new genus, a new ovoviviparous cockroach genus (Blattellidae) and the evolution of ovoviviparity in Blattaria (Dictyoptera). *Proceedings of the Entomological Society of Washington*. 91(3):441-451.
- Roth, L. M. 1990a. Cockroaches from the Krakatau Islands (Indonesia) (Dictyoptera: Blattaria). *Memoirs of the Museum of Victoria*. 50(2):357-378.
- Roth, L. M. 1990b. A revision of the Australian Parcoblattini (Blattaria: Blattellidae: Blattellinae). *Memoirs of the Queensland Museum*. 28(2):531-596.
- Roth, L. M. 1990c. Revisionary studies on Blattellidae (Blattaria) from the Indo-Australian region. *Memoirs of the Queensland Museum*. 28(2):597-663.
- Roth, L. M. 1991a. The cockroach genera *Beybienkoa*, new genus, *Escala* Shelford, *Eowilsonia*, new ge-

- nus, *Hensaussurea* Princis, *Parasigmoidella* Hanitsch and *Robshelfordia* Princis (Dictyoptera: Blattaria: Blattellidae). *Invertebrate Taxonomy*. 5(3):553-716.
- Roth, L. M. 1991b. The cockroach genera *Sigmella* Hebard and *Scalida* Hebard (Dictyoptera: Blattaria: Blattellidae). *Entomologica Scandinavica*. 22(1):1-30.
- Roth, L. M. 1991c. A new cave-dwelling cockroach from Western Australia (Australia) (Blattaria: Nocticolidae). *Records of the Western Australian Museum*. 15(1):17-22.
- Roth, L. M. 1992a. The Australian cockroach genus *Choristima* Tepper (Blattaria, Blattellidae: Ectobiinae). *Entomologica Scandinavica*. 23(2):121-151.
- Roth, L. M. 1992b. The cockroach genus *Allacta* Saussure and Zehntner (Blattaria, Blattellidae: Pseudophyllodromiinae). *Entomologica Scandinavica*. 23(4):361-389.
- Roth, L. M. 1993a. The genus *Macrocerca* Hanitsch with descriptions of new species (Blattaria, Blattidae: Macrocercinae, subfam. n.). *Entomologica Scandinavica*. 24(3):343-360.
- Roth, L. M. 1993b. Revision of the cockroach genus *Ctenoneura* Hanitsch (Blattaria, Polyphagidae). *Tijdschrift voor Entomologie*. 136(1):83-109.
- Roth, L. M. 1995a. Description of a new species of *Ctenoneura* Hanitsch from Sabah (Blattaria, Polyphagidae). *Tijdschrift voor Entomologie*. 138(1):117-119.
- Roth, L. M. 1995b. New species and records of cockroaches from Western Australia (Blattaria). *Records of the Western Australian Museum*. 17(2):153-161.
- Roth, L. M. 1995c. New species of *Blattella* and *Neoloboptera* from India and Burma (Dictyoptera: Blattaria: Blattellidae). *Oriental Insects*. 29:23-31.
- Roth, L. M. 1995d. Revision of the Cockroach genus *Homopteroidea* Shelford (Blattaria, Polyphagidae). *Tijdschrift voor Entomologie*. 138(1):103-116.
- Roth, L. M. 1996a. The cockroach genera *Anaplecta*, *Anaplectella*, *Anaplectoidea*, and *Malaccina* (Blattaria, Blattellidae: Anaplectinae and Blattellinae). *Oriental Insects*. 30:301-372.
- Roth, L. M. 1996b. The cockroach genera *Sundablatta* Hebard, *Pseudophyllodromia* Brunner, and *Allacta* Saussure and Zehntner (Blattaria: Blattellidae, Pseudophyllodromiinae). *Tijdschrift voor Entomologie*. 139(2):215-242.
- Roth, L. M. 1996c. Cockroaches from the Seychelles Islands (Dictyoptera: Blattaria). *Journal of African Zoology*. 110(2):97-128.
- Roth, L. M. 1996d. New species of *Sigmella* Hebard (Blattaria: Blattellidae, Blattellinae). *Tijdschrift voor Entomologie*. 139(2):201-213.
- Roth, L. M. 1996e. New species of *Tomeisneria* Roth, *Squamoptera* Bruijning, and *Dethieridris*, gen. nov. (Blattaria: Blattellinae and Pseudophyllodromiinae). *Oriental Insects*. 30:181-192.
- Roth, L. M. 1997b. The cockroach genera *Pseudothyrsocera* Shelford, *Haplosymploce* Hanitsch, and *Epi-symploce* Bey-Bienko (Blattaria: Blattellidae, Blattellinae). *Tijdschrift voor Entomologie*. 140(1):67-110.
- Roth, L. M. 1997c. The cockroach genera *Shelfordina* Hebard, *Delosia* Bolivar, and *Duryodana* Kirby (Blattaria: Blattellidae: Pseudophyllodromiinae). *Oriental Insects*. 31:209-227.
- Roth, L. M. 1997d. New species of *Parasigmoidella* Hanitsch (Blattaria: Blattellidae: Blattellinae). *Oriental Insects*. 31:149-208.
- Roth, L. M. 1997e. *Pseudobalta*, a new Australian ovoviparous cockroach genus (Dictyoptera: Blattaria: Blattellidae: Pseudophyllodromiinae). *Australian Journal of Entomology*. 36(2):101-108.
- Roth, L. M., McGavin, G. C. 1994. Two new species of Nocticolidae (Dictyoptera: Blattaria) and a rediagnosis of the cavernicolous genus *Spelaoblatta* Bolivar. *Journal of Natural History*. 28(6):1319-1326.
- Schal, C., Bell, W. J. 1985. Calling behavior in female cockroaches (Dictyoptera: Blattaria). *Journal of the Kansas Entomological Society*. 58(2):261-268.
- Schaller Selzer, L., Weiser, B. 1985. Fine structure and function of the sex-specific "long wavy hairs" in the giant cockroach, *Gromphadorhina portentosa* (Blattaria, Blaberidae): Reduction of receptor cell dendrites due to a specific pattern of mating behavior? *Zoologischer Anzeiger*. 215(1-2):23-32.
- Shim, J. C., Lee, D. K., Lee, K. W. 1997. Insecticide susceptibility of German cockroaches (Blattaria: Blattellidae) in Seoul. *Korean Journal of Entomology*. 27(1):73-77.
- Shinohara, A. 1994. *Opisthoplatia orientalis* (Blattaria, Epilampidae) found in Mie Prefecture, Honshu, Japan. *Japanese Journal of Entomology*. 62(2):356.
- Silva, I. R. E. 1979. Notes on the genus *Hormetica* with description of 2 new Brazilian species (Blattaria, Dictyoptera). *Revista Brasileira de Biologia*. 39(2):383-392.
- Smettan, H. W. 1986. The grasshoppers, earwigs and cockroaches of the Kaiser Mountains, Tirol (Austria) (Insecta, Saltatoria, Dermaptera, Blattaria), with special reference to their distribution and sociology within plant communities. *Courier Forschungsinstitut Senckenberg*(79):1-93.
- Smith, B. J. B., Valentine, B. D. 1985. Phylogenetic implications of grooming behavior in cockroaches (Insecta: Blattaria). *Psyche*. 92(4):369-386.
- Smith, V. R. P., Das, S. S. M. 1992. Circadian rhythm pattern of alpha amylase activity in the salivary glands and hepatic caeca of *Periplaneta americana* (Blattaria: Blattidae) exposed to constant LL under normal and eye-blocked conditions. *Uttar Pradesh Journal of Zoology*. 12(2):95-100.
- Smith, V. R. P., Kumar, R. R., Das, S. S. M. 1992. Impact of blocking some major sensory inputs on the feeding behaviour of *Periplaneta americana* (Blattaria:

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- Blattidae). Uttar Pradesh Journal of Zoology. 12(1):57-61.
- Stefano, G. B., Scharrer, B., Assanah, P. 1982. Demonstration, characterization and localization of opioid binding sites in the midgut of the insect *Leucophaea maderae* (Blattaria). Brain Research. 253(1-2):205-212.
- Stoltzman, C. A., Stay, B. 1997. Gonadotrophic and morphogenetic effects of a juvenile hormone analog treatment and ovary presence on last instar male and female *Diploptera punctata* (Blattaria: Blaberidae). European Journal of Entomology. 94(3):335-348.
- Tanaka, A., Hasegawa, A. 1979. Nymphal development of the German cockroach *Blattella germanica* (Blattaria: Blattellidae), with special reference to instar determination and intra-instar staging. Kontyu. 47(3):225-238.
- Thorne, B. L., and J. M. Carpenter. 1992. Phylogeny of the Dictyoptera. Systematic Entomology 17: 253-268.
- Turgay, F., Atatur, M. K. 1994. Feeding biology in *Hemidactylus turcicus* (Lacertilia: Gekkonidae): Populations of the Izmir Region. Turkish Journal of Zoology. 18(2):123-129.
- Vidlicka, L. 1993. Seasonal dynamics of vertical migration and distribution of cockroach *Ectobius sylvestris* (Blattaria: Blattellidae: Ectobiinae) in oak forest. Biologia. 48(2):163-166.
- Vidlicka, L. 1994. *Phyllodromica transylvanica* sp. nov., a new cockroach species from Romania and key of the *maculata*-group of *Phyllodromica* in central Europe (Blattaria: Blattellidae: Ectobiinae). Entomological Problems. 25(2):55-62.
- Vidlicka, L., Majzlan, O. 1997. Revision of the *megerlei*-group of the cockroach genus *Phyllodromica* Fieber (Blattaria: Blattellidae, Ectobiinae). Entomologica Scandinavica. 28(2):163-173.
- Vidlicka, L., Okali, I. 1996. Orthopteroid insects studied by Karol Brancik: Part 1. Cockroaches (Blattaria). Zbornik Slovenskeho Narodneho Muzea Prirodne Vedy. 42:9-15.
- Weaver, R. J., Strambi, A., Strambi, C. 1984. The significance of free ecdysteroids in the hemolymph of adult cockroaches (*Periplaneta americana*). Journal of Insect Physiology. 30(9):705-712.
- Wendelken, P. W., Barth, R. H. J. 1985. On the significance of pseudofemale behavior in the neotropical cockroach genera *Blaberus*, *Archimandrita* and *Byrsotria*. Psyche. 92(4):493-504.
- Wolda, H. 1983. Diversity, diversity indices and tropical cockroaches (Blattaria). Oecologia. 58(3):290-298.
- Wolda, H., Fisk, F. W. 1981. Seasonality of tropical insects: 2. Blattaria in Panama. Journal of Animal Ecology. 50(3):827-838.
- Wolda, H., Fisk, F. W., Estribi, M. 1983. Faunistics of Panamanian cockroaches (Blattaria). Uttar Pradesh Journal of Zoology. 3(1):1-9.
- Woo, F. C. 1982. Species of the genus *Periplaneta* from China, with reference to their bionomics and economic importance (Blattaria: Blattidae). Acta Entomologica Sinica. 25(4):416-422.
- Woo, F. C., Guo, Y. Y. 1984. The specific identification, distribution, bionomics and economic importance of the genus *Blattella* (Blattaria: Blattidae) from China. Acta Entomologica Sinica. 27(4):439-443.
- Woo, F. C., Guo, Y. Y., Li, Y. C. 1985. Description of a new genus and a new species of *Pseudomopidae* (Blattaria). Acta Entomologica Sinica. 28(2):215-218.
- Wu, W. J., Shiao, S. F. 1994. Notes on the rediscovery of *Blattella bisignata* (Brunner) in Taiwan and its morphological discrimination from *B. germanica* (L.) (Blattaria: Blattellidae). Zhonghua Kunchong. 14(4):539-542.
- Wueest, J. 1979. Histological and cytological studies on the ovary of *Nauphoeta cinerea* (Blattaria, Oxyhaloidea) during the 1st reproductive cycle. International Journal of Invertebrate Reproduction. 1(3):153-166.
- Zhu, S., Huang, F. 1989. Effect of geological vicissitude on origination of a termite from Yunnan, China. Zoological Research. 10(1):1-8.