VOLUME 2

AMERICAN BEETLES

Polyphaga: Scarabaeoidea through Curculionoidea

Edited by
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COVER FIGURES: Center - Coccinellidae, *Harmonia axyridus* (Palles) [Photo by Fred J. Santana]. Outer rim, clockwise from top: Ripiphoridae, *Macrosiagon cruentum* (Germar) [by Fred J. Santana]; Meloidae, *Lytta magister* Horn [by Charles L. Bellamy]; Carabidae, *Rhadine exilis* (Barr and Lawrence) [by James C. Cokendolpher]; Melyridae, *Malachius mirandus* (LeConte) [by Max E. Badgley]; Lampyridae, *Microphotus angustus* LeConte [by Arthur V. Evans].

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131. CURCULIONIDAE Latreille 1802

by Robert S. Anderson

Family common name: The weevils or snout beetles

Weevils are one of the most diverse groups of organisms. Over 60,000 species have been described world wide and their diversity in North America is challenged among beetles perhaps only by Staphylinidae. Weevils are associated with virtually all kinds of plants and plant parts. Most feed on living plants but some are saprophagous. Weevils are immediately recognizable by their elongate rostrum (or snout), with mouthparts situated at the apex, geniculate antennae and compact antennal club. Some weevils in the subfamilies Entiminae, Cossoninae and Scolytinae have the rostrum reduced in form and not markedly produced anteriorly. Traditional considerations of the weevils do not include Scolytinae and Platypodinae but increasing evidence suggests these beetles are derived from within Curculionidae.

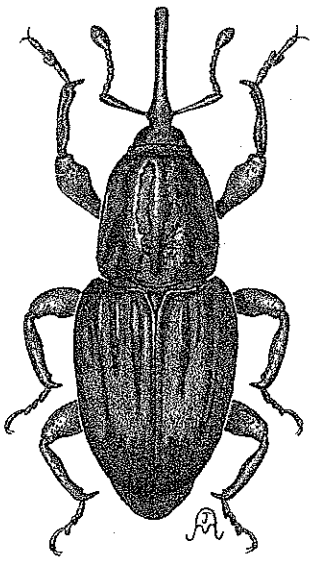


FIGURE 1.131. *Sphenophorus pertinax* (Olivier)

Description (based on Lawrence 1982): Shape very variable, broadly oval to elongate, slightly flattened to markedly convex, most covered with recumbent or appressed vestiture of scales, some with metallic sheen or forming contrasting patterns, some subglabrous or with erect or suberect hairs only; length from 1-40 mm (most 2-20 mm); color variable, typically black or dark brown, more rarely of other colors.

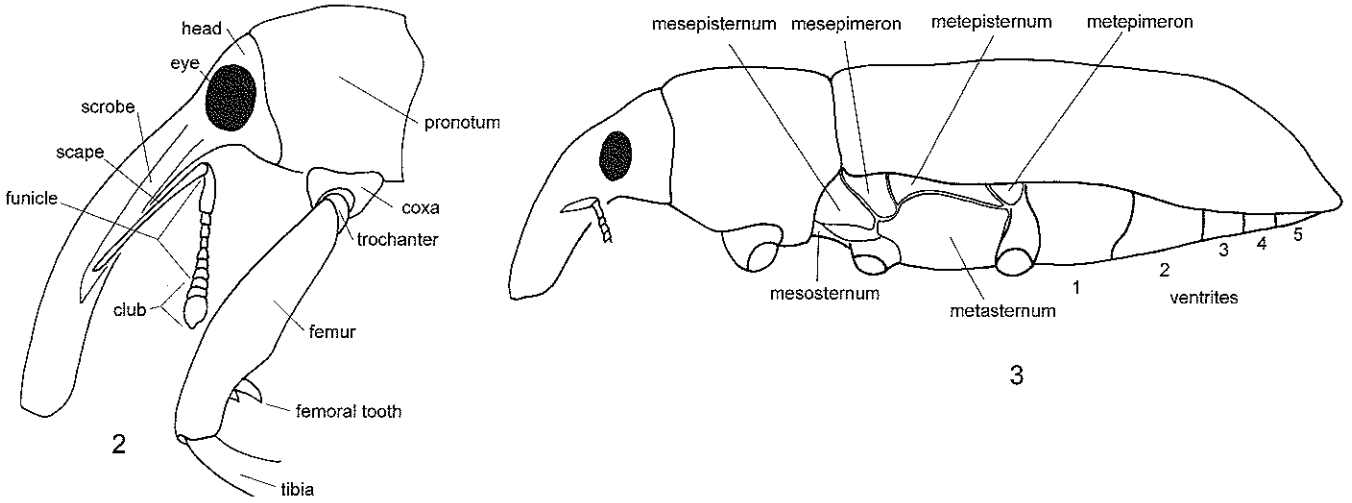
Eyes present, may be reduced or absent. Rostrum varying from very short and indistinct to very long and narrow; most sexually dimorphic with female rostrum longer, finer and with position of antennal insertion more basal. Antennae geniculate (very few exceptions where scape is very short and position of antennal insertion on rostrum is basal); club of three articles (sometimes with one), compact, in some the apical articles recessed in glabrous basal article; funicle of 5-7 articles, slender; point of antennal insertion on rostrum is various, mostly between midlength and apex, mostly lateral but in some, dorsal. Mandibles of some bearing a scar at apex or deciduous process. Maxillae in some concealed by expanded mentum, a few with distinct galea and lacinia. Labial palpi of one or two articles, rarely absent; in some weevils palpi inserted in cavities on the ventral surface of the prementum. Proventriculus of some lacking sclerotized plates. Front coxae contiguous or separated, middle and hind coxae variable. Tarsi of 5 articles but article 4 very small and hidden between lobes of article 3 (exception, Raymondionyminae with only 4 articles); tarsal claws of some connate and simple or with a basal process or tooth. Abdomen with first two ventrites connate, very rarely free. Pygydium formed by tergite VII or VIII, in most concealed beneath apex of elytra, exposed and/or sulcate in some. Cap piece of tegmen may be reduced and may or may not be bilobed, occasionally absent; aedeagus with a trough-like ventral plate and membranous dorsally; in some aedeagus with separate pedon and tectum.

Larvae (based on Lawrence 1982) subcylindrical, slightly curved; lightly sclerotized and grublike; usually with very fine hairs. Head hypognathous and free, rarely retracted into prothorax. Frontal arms "v-shaped" and not reaching mandibular articulations, endocarina usually present. Stemmata absent in most. Antennae of 1 or 2 articles and apical article sometimes a conical sensorium. Frontoclypeal suture present. Labrum free, usually with 4 pairs of setae. Maxillae with galea and lacinia fused to form mala, maxillary palpi usually of 2 articles. Labial palpi of 1 or rarely, and indistinctly, of 2 articles. Abdominal tergites usually with 3 or 4 transverse plicae. Thoracic spiracles found on the prothorax or between prothorax and mesothorax. Legs absent.

Habits and habitats. The habits and habitats of Scolytinae, long treated as a separate family, are summarized under that subfamily heading.

Weevils can be found associated with just about any kind of plant in any terrestrial or freshwater habitat. Most species are strictly phytophagous as adults and larvae and usually have a narrow range of suitable host plants. Most species are associated with angiosperms but a few are associated with gymnosperms, mainly the various conifers in the Pinaceae. Adult and larval feeding habits vary extensively but can loosely be classified into two groups: one in which both adults and larvae are polyphagous

Acknowledgments: This chapter includes major contributions by Robert J. Rabaglia (Scolytinae), Henry A. Hespenheide (Conoderinae), Boris A. Korotyaev (Ceutorhynchinae), and Anne T. Howden (Entiminae), to whom I am deeply grateful. I also thank the many people who contributed to this chapter in other ways, by providing specimens, literature or advice, by checking text or keys, or by answering my many questions. These people are Charles W. O'Brien, Horace R. Burke, Boris A. Korotyaev, Miguel Alonso-Zarazaga, Anne T. Howden, Donald E. Bright, Chris Lyal, Enzo Colonnelli, and Steve Lingafelter. Line illustrations are by Nadine Dupérré of Laval, Quebec. Paul Skelley and Mike Thomas provided the needed push to get it done.



FIGURES 2.131-3.131. 2. Lateral view of a generalized curculionid head; schematic; 3. Lateral habitus of a generalized curculionid; schematic (both after Kissinger 1964)

(Entiminae), and one in which adults and larvae have a more restricted range of host plants (other subfamilies). Among the polyphagous species, the larvae feed externally in the soil on roots whereas the adults feed generally on foliage. Species with more restricted ranges of hosts usually feed little as adults (often visiting flowers) or feed on foliage or reproductive structures, and their larvae feed internally in the stems, roots, leaves or reproductive structures of a few congeric or confamilial plant taxa. Some weevil larvae in the Hyperinae and Ceutorhynchinae feed externally on foliage and reproductive structures. Pupation usually takes place in the host plant or in the soil but species of *Hypera* and *Cionus* construct a loosely woven cocoon that is attached to the host plant.

Adults of some weevil species (Raymondionyminae and Molytinae) have reduced eyes or are eyeless and live in the soil or leaf litter. Some weevil species in the Conoderinae, Cossoninae, Cryptorhynchinae and Molytinae feed in dead plant material, usually wood. Some species appear to live in association with ants, although this appears an obligate relationship only for *Liometophilus* (Cryptorhynchinae). Some species of Entiminae are parthenogenetic. Most Entiminae as well as some Cryptorhynchinae and Molytinae are flightless.

Curculionidae are a very important group economically. Some species are serious pests of ornamental, agricultural and forestry plants and have well-known common names (e.g., boll weevil, white pine weevil, strawberry root weevil, black vine weevil, etc.). Recently, species have become increasingly used in the biological control of introduced pest plants (e.g., *Neochetina*, *Hylobius*, *Cyphocleonus*, *Eustenopus*, etc.) particularly in western North American grasslands and southeastern aquatic habitats (O'Brien 1995). An excellent review of the biology of Anthonomini is by Burke (1976).

Some subfamilies as Erirhininae, Bagoinae, Cyclominae and Ceutorhynchinae have a number of genera and species associated with freshwater macrophytes. Many of these species are very good swimmers (Morris 1995) and adults spend most of their time in or near water. Most of these taxa are best found at night when adults come up onto the plants to feed. A few weevils are found in intertidal situations (e.g., many Cossoninae, *Emphyastes*, and *Thalasselephas*) where they develop in driftwood or seaweed. There are many weevils in arid habitats such as deserts (Entiminae) and grasslands (Baridinae and Ceutorhynchinae), likely because of their associations with the plants that dominate those habitats. A great number of weevils that have immigrated to North America from Europe are likely associated with imported ornamental plants or amongst ballast brought by ships at the turn of the 19th century.

Various groups of weevils are also common as Quaternary fossils in northern North America and are important in reconstructing the late Cenozoic history of northern habitats (Matthews 1982).

Obviously a more complete summary of the natural history of Curculionidae is beyond the scope of these few notes.

Status of the classification. The classification of the weevils was regarded by Crowson in 1955 as the last great problem to be clarified within the Coleoptera. While there have been many advances in the classification, much still remains to be resolved. The classification used herein largely is that of Alonso-Zarazaga and Lyal (1999) with a few changes in placement and ranking of certain taxa. A total of 18 subfamilies are recognized. Lawrence and Newton (1995), the classification at the family level adopted for this book, recognize only 6 subfamilies within Curculionidae, demoting many subfamilies to tribes within their Curculioninae. They also refer to the Entiminae as Brachycerinae although the constitution remains basically the same. They recognize Dryophthorinae as a separate family but not Raymondionyminae and Erirhininae, all three of which are recognized as families in the classifications of Thompson (1992) and Alonso-Zarazaga and Lyal (1999). These authors consider these as having family level status because they do not share the same derived male genitalic structure as the Curculionidae *sensu stricto*. Herein all are considered subfamilies within Curculionidae. The classification

of Kuschel (1995) is very similar to that of Lawrence and Newton (1995) but includes Ithyceridae within the subfamily Brachycerinae of Curculionidae.

Catalogs are available for some groups of Curculionidae in North America (*e.g.*, Howden 1993; O'Brien 1986, 1989, 1996, 1997) and an annotated checklist (and supplements) with full synonyms, information about keys, and distributions has been published (O'Brien and Wibmer 1982, 1984; Wibmer and O'Brien 1989). A review of the state of knowledge about immatures is by Burke and Anderson (1976). Excellent (but outdated) regional works to the species level are those of Hatch (1971) for the Pacific Northwest and Downie and Arnett (1996) for northeastern North America. Blatchley and Leng (1916) remains an old standard. Many of the keys used herein are modified from Kissinger (1964).

Distribution. Curculionids are found just about everywhere in North America. Diversity is greatest in the southern United States but no recent regional counts are available. The last tabulation for the Nearctic Region as a whole was in 1978 by O'Brien and Wibmer who counted 239 genera and 2388 species. Bousquet (1991) recorded almost 700 species in Canada and Alaska. Anderson (1993a) counted 249 species in 115 genera in extreme southern Florida alone. Many recent additions to the fauna are the result of deliberate introductions for biological control purposes but also, a number of taxa recently added to the North American fauna are from extreme southern Florida or Texas and are recent discoveries. The species *Isochnus arcticus* (Korotyaev 1976) is found as far north as Ellesmere Island at almost 82 degrees north latitude.

Some weevil species are routinely intercepted at ports of entry of foreign materials (especially agricultural products) into the United States and Canada. Some of these taxa have traditionally or occasionally been considered as part of the North American fauna and included in keys and faunal lists. At present, there is no evidence to suggest they are established in North America and they are not included in the key. These genera are: *Diocalandra* Faust 1894; *Dynatopechus* Marshall 1931; *Sternochetus* Pierce 1917; *Liophloeus* Germar 1817; *Euophryum* Broun 1909.

Terminology. In general, standard terms for beetle anatomy are used in the keys and text (see Figs. 2, 3). Generally known and readily visible characters are used where possible but in some instances specialized characters requiring high magnification or dissections are required. Simply put, some weevil groups are difficult to identify. Measurements of body length are taken from the anterior margin of the eyes to the apex of the elytra; the snout is not included. On the elytra, intervals are numbered with the sutural interval being interval 1. Tarsal articles are numbered from 1 through 5, with 5 being the terminal or apical article bearing the claws; article 4 is very small and recessed between the lobes of article 3. I use the term ventrite to apply to the visible abdominal sternites and they are numbered from 1 through 5, the latter being terminal.

In older literature the terms 'uncus' and 'mucro' are used to describe the structure of the apical tooth on the hind tibia. Following Thompson (1992), I have chosen not to use these terms as comparative study shows them to refer to the same structure, the different names being used for different degrees of development and positioning of the apical tooth. Associated with this is the use of the term 'apical comb of setae' which I use to apply to the row of setae that may be across the apex of the hind tibia or in some weevils is displaced by a change in position of the apical tooth to be oriented longitudinally to the main axis of the tibia. We do use 'corbel' and related terms in the keys to Entiminae, contrary to the recommendations of Thompson (1992). See Thompson (1992) for details.

Classification of the Nearctic Subfamilies and Tribes

Curculionidae Latreille 1802
- I. Dryophthorinae
  - 1. Dryophthorini
  - 2. Orthognathini
  - 3. Rhynchophorini
- II. Erirhininae
  - 4. Erirhinini
- III. Raymondionyminae
  - 5. Raymondionymini
- IV. Curculioninae
  - 6. Curculionini
  - 7. Acalyptini
  - 8. Anthonomini
  - 9. Cionini
  - 10. Derelomini
  - 11. Ellescini
  - 12. Mecinini
  - 13. Otidocephalini
  - 14. Rhamphini
  - 15. Smicronychini
  - 16. Storeini
  - 17. Tychiini
- V. Bagoinae
- VI. Baridinae
  - 18. Baridini
  - 19. Madarini
  - 20. Madopterini
  - 21. Nertinini
- VII. Ceutorhynchinae
  - 22. Ceutorhynchini
  - 23. Cnemogonini
  - 24. Hypurini
  - 25. Mononychini
  - 26. Phytobiini
  - 27. Scleropterini
- VIII. Conoderinae
  - 28. Lechriopini
  - 29. Zygopini
  - 30. Tachygonini
- IX. Cossoninae
  - 31. Cossonini
  - 32. Acamptini
  - 33. Dryotribini

34. Onycholipini
35. Pentarthrini
36. Proecini
37. Rhyncolini

X. Cryptorhynchinae
38. Cryptorhynchini
39. Gasterocercini

XI. Cyclominae
40. Rhythirrinini

XII. Entiminae
41. Agraphini
42. Alophini
43. Anypotactini
44. Brachyderini
45. Cneorhinini
46. Cyphicerini
47. Eudiagogini
48. Eustylini
49. Geonemini
50. Hormorini
51. Naupactini
52. Omiini
53. Ophryastini
54. Otiorhynchini
55. Peritelini
56. Phyllobiini
57. Polydrusini
58. Sciaphilini
59. Sitonini
60. Tanymecini
61. Thecesternini
62. Trachyphloeini
63. Tropiphorini

XIII. Hyperinae
64. Hyperini

XIV. Lixinae
65. Lixini
66. Cleonini
67. Rhinocyllini

XV. Mesoptiliinae
68. Laemosaccini
69. Magdalidini

XVI. Molytinae
70. Molytini
71. Trachodini
72. Anchonini
73. Camarotini
74. Cholini
75. Cleogonini
76. Conotrachelini
77. Cycloterini
78. Erodiscini
79. Hylobiini
80. Lepyrini
81. Lymantini
82. Petalochilini
83. Piazorhinini
84. Pissodini
85. Sternechini
86. Thalassclephantini
87. Trypetidini

XVII. Scolytinae
88. Hylesinini
89. Scolytini

XVIII. Platypodinae
90. Platypodini

KEY TO THE NEARCTIC SUBFAMILIES OF CURCULIONIDAE

1. Pregular sutures present; pregular sclerite distinct, located between median gular suture and labial articulation; head with rostrum virtually absent; at least one pair of tibiae with denticles or stout socketed setae along the dorsal (outer) margin 2

— Pregular sutures absent; pregular sclerite not evident; head with rostrum variable from very long and cylindrical to short and broad, or (rarely) nearly absent; tibiae lacking denticles or stout socketed setae along the dorsal (outer) margin 3

2(1). Tarsus with article 1 as long as articles 2-5 combined; head as wide as pronotum; pronotum usually with lateral constriction near middle; antennal club without sutures; lateral denticles on front tibia not socketed .... XVIII. Platypodinae (p. 805)

— Tarsus with article 1 not longer than articles 2 or 3; head narrower than pronotum, often concealed by pronotum when viewed dorsally; pronotum not constricted laterally; antennal club with sutures; lateral denticles on front tibia socketed or (rarely) not ..... XVII. Scolytinae (p. 792)

Pissodina Gistel 1856

Pissodes Germar 1817, 22 spp., generally distributed throughout the United States and Canada. Adults and larvae are associated with various conifers. Some species are of economic importance. The genus needs revision. See Hopkins (1911) to separate the species.

Piniphilus Dejean 1821

Epipissodes Voss 1956 (valid subgenus)

XVII. Scolytinae Latreille 1807

by Robert J. Rabaglia

Subfamily common name: The bark and ambrosia beetles

Subfamily synonyms: Hylurgidae Zimmerman 1868; Ipidae Latreille 1804

The general body shape of these small beetles ranges from very stout to moderately elongate and cylindrical. Typically the body is brownish with moderate pubescence. The geniculate antennae have a distinct club.

Description: (modified from Wood 1982) Very small to small in size, 1-9 mm, mostly 1-3 mm; shape stout to cylindrical; color brownish or piceous; pubescence sparse to abundant, mostly consisting of very fine, short setae or stout, flat setae.

Head prominent, or withdrawn into pronotum; surface punctate to granulate. Antennal scape well developed, funicle one to seven segmented, club large, either solid, annulated or rarely pseudolamellate; inserted on the sides of head between eyes and mandibles. Labrum absent; mandibles short, curved, the apices blunt, dentate; maxillary palpi three segmented, segments short and stout. Gular region reduced to a small pregula, gular sutures confluent; mentum moderate, variable; labial palpi three segmented, small, stout, apically acute. Eyes lateral, moderate, flat, transverse.

Pronotum slightly broader than head; shape truncate anteroventrally, quadrate to subcircular, borders margined or not; surface punctate, asperate, rugose or striate; pleural region broad; prosternum short in front of coxae, some with a small median process projecting posteriorly; procoxal cavities closed behind. Legs moderate in length; trochantins not exposed; anterior coxae globular, contiguous to widely separated; middle coxae round, flat, separate; hind coxae subtriangular, separate; trochanters small, triangular; femora swollen, short; tibiae compressed, mostly toothed with apical hooks or, with marginal teeth or denticles; tarsal formula 5-5-5, apparently 4-4-4, slender, third segment narrow or dilated, fourth segment minute; claws large, simple divergent. Scutellum small, quadrate, triangular or absent. Elytra entire, apically rounded, mostly declivous and often with tubercles, denticles or spines apically; striae mostly distinct, punctate; epipleural fold obscure. Wing venation and folding pattern not described.

Abdomen with five visible sterna, sutures entire; surface microrugose to punctate. Male genitalia with penis stout, apically blunt, basally with a pair of slender, articulating struts; parameres absent; pars basalis reduced to a slender complete or incomplete ring and a curved, slender basal strut of variable length. Female genitalia undescribed.

Larvae C-shaped, subcylindrical, fleshy; size 2 mm - 10 mm in length; vestiture ranges from absent to a few, simple setae; color near white. Head partly retracted or distinctly exserted, mouthparts hypognathous or nearly prognathous with a faint epicranial suture surrounding the frons. Antennae very small to absent. Mandible mostly short, stout, gouge-shaped, subtriangular without mola or retinaculum; maxilla with cardo, fused stipes and mola; maxillary palpi one or two segmented. Stemmata absent in most. Thorax frequently broader than abdomen; legs absent, but with fleshy lobes ventrally. Abdomen with three or more plicae on each segment; nine or ten segmented, segments 8 -10 in some with pigmented tubercles dorsally. Spiracles on mesothorax and abdominal segments one to eight, annular, annular-biforous or biforous, or inconspicuous.

Habits and habitats. Most bark and ambrosia beetles live in injured, weakened or dying woody plants. Hosts must contain sufficient moisture for development and most species complete only one generation in a host. A few species breed in roots and stems of non-woody plants, others breed in seed or cones, but the majority of species are considered bark beetles or ambrosia beetles. Bark beetles feed on the phloem of the inner bark of their woody host plant. Fewer than half the species in the family are bark beetles, but they are the majority of species in the temperate regions. Ambrosia beetles cultivate and feed on symbiotic ambrosia fungi in the xylem of the host plant. Most tropical species exhibit this habit.

Typically, adult bark and ambrosia beetles bore through the outer bark and construct an egg gallery either in the phloem-cambial region (bark beetles) or in the xylem (ambrosia beetles). Females lay eggs at regular intervals on either side of the gallery. Among bark beetles, larval feeding mines radiate out from the egg gallery, and engrave the inner bark or wood or both. These characteristic engravings can often be found under the bark of dead or dying trees. Ambrosia beetle larvae feed on the ambrosia fungus in small cradles off of the egg gallery. After pupation, the next generation of bark beetles emerges through individual exit holes in the bark, giving it a characteristic "shot hole" appearance. Ambrosia beetle adults usually emerge through the parental entrance hole.

Most of the life stages of these beetles occur within the host plant, however, upon emergence adults must find suitable host material in which to feed and breed. They are often among the first insects to colonize a dying tree; therefore, rapid location of hosts is an important part of their biology. In many species, host location is mediated by olfactory responses to host odors (e.g., terpene hydrocarbons), tree degradation products (e.g., alcohols) or conspecific semiochemicals (pheromones). Several species utilize pheromones not only for attraction of potential mates, but also for mass aggregation to overcome resistance of the host tree. The pheromone biology of species of *Dendroctonus*, *Ips* and *Scolytus*, among others, has been well studied, and the complex inter- and intraspecific interactions elucidated (Wood, D.L. 1982, Borden 1982, Raffa *et al.* 1993).

Many bark and ambrosia beetle species have distinctive, subsocial behaviors. Social organization associated with reproductive behavior ranges from simple monogamy to heterosanguineous polygyny to consanguineous polygyny. Division of labor in gallery construction and maintenance is marked by sexual dimorphism, especially in structures on the head and elytral declivity.

Ecologically and economically this is a very important group of beetles. Members of *Dendroctonus* and *Ips* kill or degrade vast expanses of forest each year. Species of *Scolytus* are well known as vectors of the Dutch elm disease fungus. In the tropics, ambrosia beetles stain and degrade valuable wood products. In North America, several species of exotic xyleborines cause damage to young, stressed trees in the landscape and nurseries, and species of *Gnathotrichus, Monarthrum* and *Trypodendron* degrade wood products in the Pacific Northwest (Furniss and Carolin 1977).

There have been numerous studies on the biology, chemical ecology and control of many of the economically important genera.

Status of the classification. This book treats bark and ambrosia beetles as a subfamily of Curculionidae following Crowson (1967); however, the following Key and Classification of Tribes and Genera follow Wood (1973) and a family catalog by Wood and Bright (1992), but with the status of the subfamilies and tribes reduced to tribes and subtribes. See Wood (1973 and 1986) for a discussion of this issue.

Bark and ambrosia beetles occur on all continents except Antarctica. In North America, the fauna has been well studied within the past century, and is now well known. Wood (1982) published a monograph on the bark and ambrosia beetles of North and Central America, including a key to all genera and species in the region (at the time about 1430 species were recognized). Wood and Bright (1992) published a catalog of the worldwide Scolytidae, followed by a recent update (Bright and Skidmore 1997). The taxonomic status of tribes and genera in the Key and Classification sections below follows these catalogs. The two exceptions are the new genera *Dryoxylon* Bright and Rabaglia (1999) and *Pseudips* Cognato (2000) which have been added to the key.

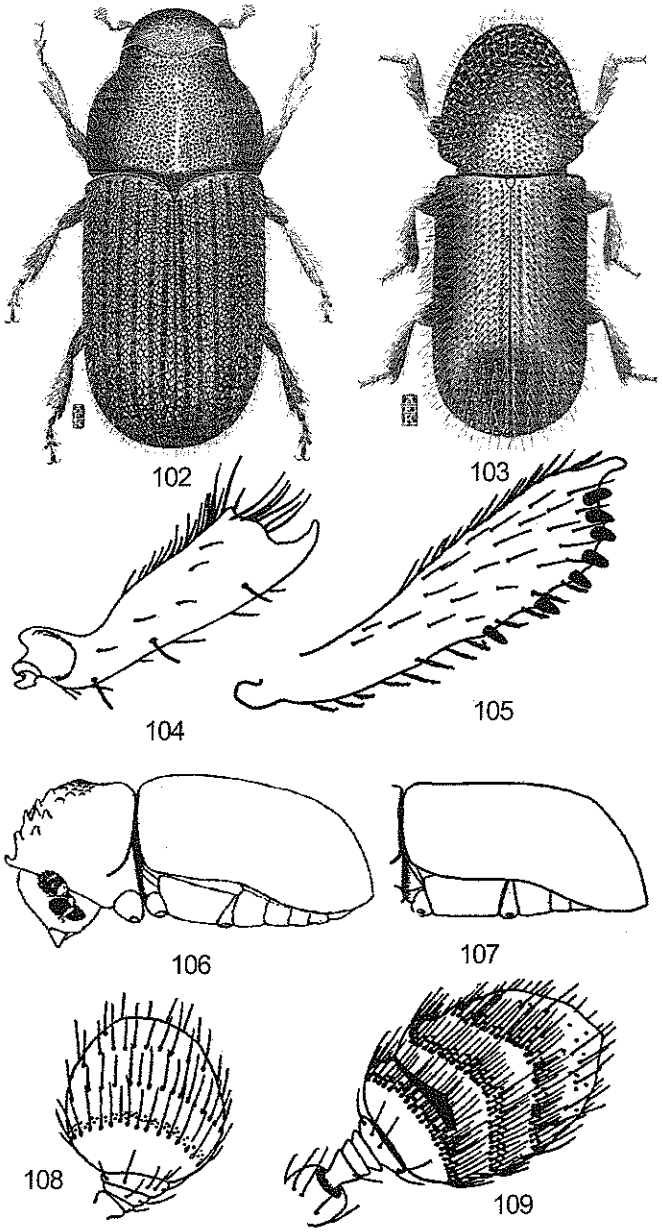
Distribution. There are approximately 5,800 species worldwide, with about 525 species and subspecies described from the United States and Canada. Bark beetles can be found from the subalpine forests of the north to the subtropical forests of Florida. Distinctive faunas exist in the desert plateau of the southwest, the deciduous forests of the southeast, the northern coniferous forests, the Pacific Coast and southern Florida. Bark beetles tend to be more restricted by host than ambrosia beetles. Within a bark beetle genus, most species are restricted to a limited number of host species; for example, *Phloeosinus* are found mostly in Cupressaceae and *Pseudopityophthorus* are found almost exclusively in *Quercus*.

Wood (1977) estimated that there were 37 Old World species established in North and Central America. Since then approximately 10 additional species new to North America have been reported (Atkinson *et al.* 1990, Hoebeke 1991, Haack and Kucera 1993, Rabaglia and Cavey 1994, Bright and Rabaglia 1999, Vandenberg *et al.* 2000, Hoebeke 2001 and Mudge *et al.* 2001).

KEY TO THE NEARCTIC GENERA OF SCOLYTINAE
(Modified from D. E. Bright, unpublished 2000)

1. Anterior margins of elytra procurved and bearing a series of crenulations; pronotum unarmed in most; head visible from above (Fig. 102) (Hylesinini) 2
— Anterior margins of elytra forming a straight line across body, unarmed, smooth and either rounded or with a fine raised line; pronotum, in most, armed by granules or asperities on at least anterior third; head concealed from above (Fig. 103) (Scolytini) 24

2(1). Prothorax longitudinally strigose; prothoracic tibia with a curved bifid process, meso- and metathoracic tibiae with a single curved spine extending beyond spine of inner apical angle; antennal funicle 7-segmented; lateral prosternal area bearing a sharply elevated ridge from coxa to anterior margin; crenulations on elytral bases rather small (Bothrosternina) 3
— Prothorax punctate or asperate, never longitudinally strigose; all tibiae bearing several teeth, none extending beyond tarsal insertion; antennal funicle and prosternal area variable 4



FIGURES 102.131-109.131. Scolytinae. 102-103. Dorsal habitus, 102. *Dendroctonus pseudotsugae* Hopkins; 103. *Dryocoetes affaber* Mannerheim. 104-105. Protibia, 104. *Scolytus* sp.; 105. *Procryphalus* sp. 106-107. Lateral habitus, 106. *Hypothenemus* sp.; 107. *Pityophthorus* sp. 108-109. Antennal club, 108. *Cryptocarenus* sp.; 109. *Hypothenemus* sp. (Figures 102-103 after Swaine 1918; Figure 104 after Chamberlin 1958; Figures 105-109 after Wood 1982.)

3(2). Sutures of antennal club straight; rostrum distinctly wider than distance between eyes; body and frons not as below ..... *Cnesinus*
— Sutures of antennal club procurved; rostrum width at tip equal to distance between eyes; body oval; frons excavated, with median tubercle just above epistoma ..... *Pagiocerus*

4(2). Prothoracic precoxal area rather large, lateral margin strongly elevated from anterior margin to coxa 5
— Prothoracic precoxal area short, lateral prosternal ridge poorly developed or absent 8

5(4). Crenulations on elytral bases forming a single row of teeth; first and second segments of antennal club subequal in length; body rather stout, length less than 2.5 mm; in roots of herbaceous legumes (Hylesinina, part) ..... *Hylastinus*
— Crenulations on elytral bases obsolete, if visible, then irregularly placed, not forming a definite single row; first segment of antennal club distinctly longer than second; body mostly larger than 3 mm, very slender if smaller; not in herbaceous legumes (Hylastina) 6

6(5). Anterior coxae widely separated; surface of elytra and between punctures on pronotum dull; vestiture sparse, recumbent, yellow; body color dull reddish brown ..... *Scierus*
— Anterior coxae narrowly separated, almost contiguous; surface between punctures on pronotum and elytra smooth and glossy; the longer hairlike vestiture erect; mature color glossy, dark brown or black 7

7(6). Pronotum, in most, constricted anteriorly, discal surface with about equal numbers of small and large punctures intermixed; third tarsomere broad, bilobed ..... *Hylurgops*
— Pronotum not noticeably constricted anteriorly, discal surface with punctures uniformly large, with very few small punctures; third tarsomere narrower, emarginate ..... *Hylastes*

8(4). Scutellum visible, elytral bases notched for its reception 9
— Scutellum not visible, elytral bases straight 20

9(8). Antennal club symmetrical, sutures transverse 10
— Antennal club with sutures oblique, pseudolamellate or absent 18

10(9). Pronotum asperate on anterolateral areas (Hylesinina, part) 11
— Anterolateral areas of pronotum unarmed 12

11(10). Eye entire; vestiture scalelike; costal margins of elytra ascending slightly at apex, abdomen ascending to meet them; hosts *Fraxinus* species ..... *Hylesinus*
— Eye shallowly emarginate; vestiture hairlike; costal margins of elytra descending to apex, abdomen horizontal; hosts *Alnus* species ..... *Alniphagus*

12(10). Scutellar notch between elytra very deep, acute; elytra extended anteriorly over pronotum, posterolateral area of pronotum abruptly grooved to accommodate elytral margins; xylophagous species (Phloeosinina, part) ..... *Dendrosinus*
— Scutellar notch between elytra emarginate, but not deeply grooved; elytra not extended anteriorly, pronotum not grooved; phloeophagous species (Tomicina) 13

13(12). Fore coxae widely separated 14
— Fore coxae contiguous, or at most very narrowly separated 16

14(13). Elytral vestiture hair-like; antennal club slightly flattened, segment 1 occupying one-fourth of club length; in *Ulmus* ..... *Hylurgopinus*
— Elytral vestiture scale-like; antennal club conical, segment 1 occupying less than one-fourth of club length; in conifers 15

15(14). Each elytral interspace bearing a row of erect, flattened scales in addition to recumbent ground cover; antennal funicle 5-segmented ..... *Xylechinus*
— Elytral interspaces bearing a row of erect, hairlike setae, ground cover scale-like or stout setae; antennal funicle 7-segmented .... *Pseudohylesinus*

16(13). Antennal funicle 5-segmented; antennal club with sutures slightly procurved; anterior margin of pronotum distinctly emarginate; 2.5-9.0 mm in length ..... *Dendroctonus*
— Antennal funicle 6-segmented 17

17(16). Elytra with erect interstrial setae abundant, randomly placed; a short median carina on frons extending from epistomal margin to level of antennal insertion, ending dorsally in an acute elevation; elytra densely rugose ..... *Hylurgus*
— Elytra with erect interstrial setae in uniseriate rows; a fine median carina on frons extending from epistoma to middle of frons, of equal height throughout; elytra smooth ..... *Tomicus*

18(9). Antennal club pseudolamellate, constricted at sutures and movable at intersegmental lines (Phloeotribina) ..... *Phloeotribus*
— Antennal club fused at sutures, sutures oblique or partly to entirely obsolete (Phloeosinina, part) 19

19(18). Antennal club with three oblique sutures; funicle attached to base of club; pronotum unarmed; eye deeply emarginate; hosts Cupressinine trees, rarely other conifers ..... *Phloeosinus*
— Antennal club solid and unmarked by sutures; funicle attached to side of club; pronotum, in most, armed by a few asperities in anterolateral areas; eye entire; hosts mostly hardwoods ..... *Chramesus*

20(8). Eye emarginate or completely divided; pronotum never armed by asperities; crenulations at bases of elytra widely distributed, extending laterally beyond interstriae 5; antennal funicle 5- or 6-segmented (Polygraphina) 21
— Eye sinuate or entire; pronotum armed by a few scattered or clustered asperities; crenulations at bases of elytra restricted to area between suture and interstriae 5; antennal funicle 4- or 5-segmented (Hypoborina) 23

21(20). Eye completely divided into two parts; antennal club solid, unmarked by sutures ... *Polygraphus*
— Eye less than half divided by an emargination; antennal club marked by sutures 22

22(21). Antennal funicle 5-segmented ..... *Carphoborus*
— Antennal funicle 6-segmented ..... *Carphobius*

23(20). Antennal funicle 4-segmented, sutures of club indicated only by marginal notches; elytra with uniseriate rows of erect, broad interstrial scales and recumbent strial hair of equal length; pronotum armed by 3 or 4 pairs of median tubercles, the anterior pair marginal .. *Liparthrum*
— Antennal funicle 5-segmented, sutures of club transverse, distinct; elytral vestiture without conspicuous recumbent hair; pronotum armed by 2 or 3 widely separated paired clusters of lateral teeth ..... *Chaetophloeus*

24(1). Lateral margin of anterior and posterior tibia unarmed except for a single curved process at outer apical angle that curves toward and extends beyond process of inner apical angle (Fig. 104); lateral line of pronotum sharply elevated; antennal club flattened, the sutures strongly procurved; antennal funicle 7-segmented (Scolytina) 25
— Lateral margin of anterior tibia armed by several toothlike processes, none of which curve toward the inner process (Fig. 105); lateral line of pronotum raised or not; antennal club and funicle variable 26

25(24). Elytra slightly if at all declivous behind, the abdomen ascending abruptly behind to meet them; scutellum depressed; antennal scape distinctly shorter than funicle ..... *Scolytus*
— Elytral declivity rather steep, descending to meet the horizontal abdomen; scutellum small, flush with surface of elytra; antennal scape at least as long as funicle ..... *Cnemonyx*

26(24). Metepisternum visible to posterior extremity (Fig. 106); antennal club varying from flat to obliquely truncate; tibia and antennal funicle variable 27
— Metepisternum largely covered by elytra, visible only in front (Fig. 107); antennal club strongly flattened with sutures on both sides, those on posterior surface not strongly displaced apically; tibia slender, in most, bearing about three teeth on apical portion; antennal funicle 1- to 5-segmented 66

27(26). Lateral margins of prothorax subacutely elevated; procoxae widely separated (Ctenophorina) .. 28
— Lateral margins of prothorax rounded; procoxae subcontiguous 29

28(27). Anterior area of pronotum transversely rugose; pronotum and elytra subglabrous .... *Scolytodes*
— Pronotum uniformly punctured, unarmed; vestiture of pronotum and elytra abundant, consisting of erect, stout, almost scalelike bristles ..... *Pycnarthrum*

29(27). Fore tibia with sides parallel, in most, armed only on apical margin by small teeth never with process on outer apical angle exceeding tarsal insertion; procoxae separated; (Micracina) 30
— Fore tibia much wider apically, armed on lateral margin by several denticles; procoxae contiguous 36

30(29). Antennal club small, greatest width through basal half, apex narrowly rounded, sutures straight, transverse 31
— Antennal club larger, greatest width through apical half, apex broadly rounded, sutures procurved 32

31(30). Elytral declivity subvertical, bisulcate, obtusely angulate behind; sutures of antennal club distinctly marked by rows of setae; antennal pedicle and scape about equal in length ... *Stenocleptus*
— Elytral declivity more gradual, evenly convex, rather narrowly rounded behind; sutures of antennal club indicated only by marginal notches; scape distinctly longer than pedicle ..... *Pseudothysanoes* (part)

32(30). Elytra broadly rounded behind; margins of antennal club, in most, constricted at first suture 33
— Elytra acuminate behind; antennal club without sutural constrictions at sides 34

33(32). Pronotum wider than long, widest near base, summit more prominent; fore tibia more slender, apically obliquely truncate, mucro often bifurcate ..... *Psuedothysanoes* (part)
— Pronotum longer than wide, widest near middle, summit less prominent; fore tibia rather broad, more nearly truncate apically, mucro undivided ..... *Thysanoes*

34(32). Sutures of antennal club broadly procurved, the first appearing bisinuate and extending less than one-third length of club; scape club-shaped, with few setae; eye oval, rather small; fore tibia more slender, slightly wider apically, with supplemental tubercles on posterior face ..... *Hylocurus*
— Sutures of club very strongly, narrowly procurved, the first most often reaching middle of club; scape compressed, subtriangular, with numerous long setae; eye elongate, large; fore tibia broad, sides subparallel, posterior surface devoid of tubercles except for teeth on apical margin 35

35(34). Eyes moderately separated beneath, entire; fore tibia with all five teeth on distal margin, mucro broad ..... *Micracis*
— Eyes subcontiguous beneath, emarginate; fore tibia with at least one of the five teeth on outer margin, mucro more slender ..... *Micracisella*

36(29). Male frons bearing a very large, long, partly double process which may curve upward and backward over prothorax, in some, reaching its posterior margin; pronotum asperate to base in median area, summit on basal third, in most, extending behind its basal margin and over scutellum; body usually covered by an incrustation (Cactopinina) ..... *Cactopinus*
— Male frons not armed by a large median process; pronotal summit at or slightly behind middle of prothorax, basal third devoid of asperities 37

37(36). Antennal club more strongly flattened, with sutures on both faces, those on posterior face strongly procurved and limited to apical half; costal margins of elytra slightly ascending posteriorly; vestiture scale-like (Cryphalina) 38

— Antennal club obliquely truncate or at least with sutures of posterior face restricted to less than apical one-fourth; costal margins of elytra descending posteriorly; vestiture hairlike setae... 46

38(37). Pronotum without a fine, raised lateral line; eye, in some, sinuate, never emarginate; costal margins of elytra ascending only slightly posteriorly 39

— Pronotum acutely margined at sides, and with a fine, raised line at least on basal one-third; eye emarginate or entire; costal margins of elytra distinctly ascending posteriorly 42

39(38). Antennal funicle 5-segmented; antennal club narrow, pointed at tip, sutures straight, not septate; basal half of pronotum without scale-like setae ..... *Trypophloeus*

— Antennal funicle 4-segmented; antennal club broadly rounded at tip, sutures curved, partly septate or not septate; basal half of pronotum with scalelike setae 40

40(39). Antennal club not septate, sutures indicated by 3 strongly procurved rows of setae (Fig. 108) .... *Ernoporicus*

— Antennal club with at least part of first suture septate, none of sutures indicated by strongly procurved rows of setae (Fig. 109) 41

41(40). Sutures of antennal club straight, the first septate; anterior margin of pronotum slightly produced; pronotum with no indication of a fine raised lateral margin ..... *Procryphalus*

— Antennal club with a strongly oblique septum on one side, no other sutures indicated; anterior margin of pronotum broadly rounded; pronotum with an indistinct, fine, raised lateral line .... *Scolytogenes*

42(38). Antennal club with sutures indicated by rather strongly recurved rows of setae; third tarsomere broad and emarginate ..... *Cryphalus*

— Sutures of antennal club straight or procurved; third tarsomere cylindrical 43

43(42). Eye entire; antennal club large, aseptate, funicle normally 3-segmented, rarely 4-segmented; body stout, less than 2.3 times longer than wide; body shorter than 1.1 mm ..... *Trischidias*

— Eye emarginate; antennal funicle 5-segmented, rarely 4- or 3-segmented; in most, body longer than 1.1 mm 44

44(43). Strial punctures obscure, not impressed; posterior half of pronotum finely granulate; antennal club large, not septate; male and female similar in size and appearance ..... *Hypocryphalus*

— Strial punctures distinct; posterior half of pronotum not closely granulate, in most, punctate; male much smaller than female 45

45(44). Antennal club not septate; raised lateral margin of pronotum extending two-thirds of distance from basal margin; elytra glabrous except for a few subcapitate interstrial bristles ... *Cryptocarenus*

— Antennal club with suture 1 partly septate; raised lateral margin extending only one-third of distance from basal to anterior lateral margin; elytra clothed by rows of strial and interstrial setae ... . *Hypothenemus*

46(37). Antennal funicle 2- or 3-segmented; pronotum unarmed, punctured over entire surface, lateral line not sharply raised; length 2.0 mm or less (Crypturgina) 47

— Antennal funicle 4- or 5-segmented; pronotum mostly armed anteriorly by granules or asperities, if unarmed, lateral line sharply raised; length mostly over 2.0 mm 48

47(46). Antennal funicle 2-segmented, club with 1 obscure suture indicated at tip ..... *Crypturgus*

— Antennal funicle 3-segmented, club with 3 sutures ..... *Dolurgus*

48(46). Eye completely divided by an emargination; antennal funicle 4-segmented, club without distinct sutures (Xyloterina) 49

— Anterior margin of eye sinuate or emarginate, never completely divided; antennal funicle 4- or 5-segmented, club, in most, with evident sutures 50

49(48). Antennal club with subcorneous basal area strongly, rather narrowly procurved; protibia of female thickened and tuberculate on posterior face, flattened and finely tuberculate in male; male head deeply, broadly excavated, the prothorax sub-quadrate; female frons convex, anterior margin of female pronotum rounded .... *Trypodendron*

— Antennal club with subcorneous basal area broadly procurved; protibia flattened and devoid of tubercles on posterior face; frons not excavated in either sex; anterior margin of prothorax rounded in both sexes ..... *Xyloterinus*

50(48). Pronotum either punctate or else finely granulate over almost entire surface, dorsal profile evenly convex, not strongly declivous anteriorly, anterior margin never armed; tibia rather slender and armed by few, coarse teeth; declivity unarmed (Dryocoetina) 51

— Pronotum coarsely asperate and strongly declivous anteriorly, in most, punctate at least on posterior third, in some, anterior margin armed; tibia variable; declivity frequently armed by spinous processes 55

51(50). Antennal club compressed or with membranous apical portion extended beyond corneous portion, sutures procurved; scutellum very small 52

— Antennal club subtruncate, sutures transverse or recurved; scutellum moderate to large 53

52(51). Antennal funicle 4-segmented; club compressed, sutures strongly arcuate; pronotum granulate on anterior half, punctate behind; host *Acer* .... *Lymantor*

— Antennal funicle 5-segmented; club less strongly compressed, sutures rather broadly procurved; pronotum granulate to base; host *Cucurbita* ..... *Dendrocranulus*

53(51). Frons convergently aciculate; elytral declivity evenly convex, extending over at least posterior one-third of elytra, granules absent; protibia armed on lateral margin by 2-4 socketed teeth; posterior face of antennal club with 2 sutures . ..... *Coccotrypes*

— Frons never convergently aciculate; elytral declivity flattened or impressed, confined to posterior one-fourth of elytra, granules mostly present; protibia armed on lateral margin by 5 or more socketed teeth; posterior face of antennal club without sutures or with 1 suture 54

54(53). Pronotum 1.4 times longer than wide, anterior margin slightly notched or emarginate; elytral declivity moderately deeply, evenly sulcate ..... *Dryoxylon*

— Pronotum 1.0-1.2 times longer than wide, anterior margin evenly rounded; elytral declivity evenly convex to slightly flattened, may have second interspace impressed ..... *Dryocoetes*

55(50). Meso- and metathoracic tibia rather slender, abruptly narrowed apically, armed by a few rather widely spaced coarse teeth; males and females similar in size and general shape (Ipina) 56

— Meso- and metathoracic tibia rather broadly dilated to a point slightly beyond middle then gradually narrowed to apex, and armed by a series of small closely set teeth of more or less uniform size and shape; males rare, in most, smaller and radically different in shape (Xyleborina) 61

56(55). Elytral declivity rather narrowly bisulcate, margins moderately elevated, rounded and armed by not more than 3 teeth; lower margin of declivity rounded; in most, body shorter than 3.0 mm 57

— Elytral declivity broadly, rather deeply excavated, margins acutely elevated and armed by 3 or more tubercles or teeth; lower margin of declivity with an acutely elevated transverse ridge separating declivital excavation from apical margin; body mostly longer than 3.0 mm 58

57(56). Female frons deeply, rather narrowly excavated; male declivity with 2 or 3 pairs of enlarged teeth; antennal club compressed, 2 sutures visible on distal third of posterior face ..... *Pityogenes*

— Female frons convex; male declivity more narrowly impressed with 2 or 3 pairs of very small teeth or granules; antennal club obliquely truncate, without sutures on posterior face ..... *Pityokteines*

58(56). Antennal club obliquely truncate, with sutures recurved; elytral declivity less strongly excavated, the third tooth displaced mesally, not on summit of declivital margin ..... *Orthotomicus*

— Antennal club flattened, with sutures procurved or strongly bisinuate; elytral declivity broadly excavated, armed by 3 to 6 major denticles, all denticles on summit of lateral margin 59

59(58). Lateral margins of elytral declivity armed by 4 to 6 pairs of spinelike denticles; ventrolateral margin of elytral declivity very strongly produced, circumscribing an arc much less than one-third of a circle, its lateral extremities ending a long distance from largest denticle; sutures 1 and 2 of antennal club weakly bisinuate to strongly angulate ..... *Ips* (part)

— Lateral margins of elytral declivity armed by 3 pairs of spinelike denticles; ventrolateral margin of elytral declivity only slightly to moderately produced, circumscribing an arc at least one-third of a circle, its lateral extremities ending near third (last and largest) denticle; sutures 1 and 2 of antennal club weakly to very strongly, broadly procurved 60

60(59). Sutures on antennal club weakly procurved, almost straight; strial punctures at least twice as large as those of interstriae, in clearly defined rows; spine 3 on elytral declivity cylindrical or conical, not constricted before apex; body length 2.3-3.6 mm ..... *Ips* (part, *latidens* group)

— Sutures on antennal club very strongly procurved; strial and interstrial punctures subequal in size, not always in clearly definable rows; spine 3 on declivity subcapitate, distinctly constricted before apex; body length 3.5-5.0 mm ..... *Pseudips*

61(55). Antennal club more strongly compressed, corneous area small, near base, its distal margin strongly procurved, distal pubescent portion reaching basal one-fifth at sides; pregula not impressed; elytra obliquely truncate behind, declivity broadly, concavely excavated and acutely margined on a complete circle at periphery ..... *Premnobius*

— Antennal club thickened basally, corneous area larger with its distal margin recurved, pubescent area not reaching basal third; pregula depressed; elytral declivity convex, not acutely margined on upper half 62

62(61). Procoxae widely separated; body stout, elytra less than 1.3 times as long as pronotum ..... *Xylosandrus*

— Procoxae contiguous; body elongate, often slender, elytra at least 1.5 times as long as pronotum 63

63(62). Pronotum wider than long, subquadrate, anterior margin unarmed 64

— Pronotum longer than wide, subcircular, anterior margin armed by a series of median serrations 65

64(63). Pronotum asperate to base; declivity steep, bearing several granules or rather large denticles, strial and interstrial punctures small ..... *Ambrosiodmus*

— Pronotum asperate only on anterior half, punctate on basal half; declivity more sloping, bearing small tubercles, strial and interstrial punctures larger ..... *Euwallacea*

65(63). Scutellum conical; lower margin of declivity, beginning about interspace 7, bearing a series of pointed tubercles, the one nearest suture (at end of interspace 2) largest ..... *Xyleborinus*

— Scutellum flat; lower margin of declivity acute or rounded, unarmed ..... *Xyleborus*

66(26). Antennal funicle 5-segmented (3-segmented in *Dendroterus*) club mostly small, symmetrical; pubescence more abundant; bark or twig beetles (Pityophthorina) 67
— Antennal funicle 1-, 2-, or 5-segmented, club much larger, asymmetrical in most; pubescence less abundant; ambrosia beetles (Corthylina) 73

67(66). Basal and lateral margins of prothorax rounded, without a fine raised line; antennal club somewhat large in size; vestiture shorter and more uniform in length 68
— Basal and posterior portion of lateral margins of prothorax with an obvious, fine, raised line; antennal club proportionately smaller; most with vestiture longer on declivity than on disc 69

68(67). Antennal funicle 3-segmented; club less than twice as long as funicle; female pronotum without patches of pilose pubescence; elytral pubescence abundant ..... *Dendroterus*
— Antennal funicle 5-segmented, club at least twice as long as funicle; female prothorax with a pair of pilose pubescent areas on middle third of lateral areas; elytral pubescence sparse ... *Pityoborus*

69(67). Antennal club devoid of sutures except for one strongly oblique septum on anterior half of club only; prothorax evenly rounded in dorsal profile, summit inconspicuous, asperities fine, transition from asperate to punctate area gradual ..... *Araptus*
— Antennal club with at least two complete sutures indicated at least by setae; prothorax more strongly declivous anteriorly, summit and arrangement of asperities variable 70

70(69). Sutures of antennal club not septate; in most, pronotal asperities extending behind middle at sides, the transition from asperate to punctate area gradual; body moderately to very stout .... *Conophthorus*
— First and second sutures of antennal club septate; pronotal asperities mostly not reaching middle, the transition from asperate to punctate area usually abrupt, summit usually well developed; body slender to moderately stout 71

71(70). Pronotum and elytra minutely densely punctured; vestiture very short, mostly dense, almost always scalelike; antennal club with first segment shorter than others; greater development of frontal vestiture a male character; hosts *Quercus*, rarely other broadleaf trees ..... *Pseudopityophthorus*
— Pronotum and elytra more coarsely, less densely punctured; vestiture usually longer, less abundant, always hairlike; greater development of frontal vestiture a female character; hosts usually conifers, but also broadleaf trees and shrubs ... 72

72(71). Pregular area greatly enlarged and ornamented by a beard-like brush of exceedingly long hair..... *Pityotrichus*
— Pregular area small, without conspicuous vestiture ..... *Pityophthorus*

73(66). Antennal funicle 5-segmented, club smaller, less than twice as long as funicle ..... *Gnathotrichus*
— Antennal funicle 1- or 2-segmented; club very large, more than three times as long as funicle..... 74

74(73). Antennal funicle 2-segmented; posterior surface of fore tibia tuberculate; elytra emarginate or divaricate at sutural apex ..... *Monarthrum*
— Antennal funicle 1-segmented; posterior surface of fore tibia smooth; elytra evenly rounded behind, without a sutural notch at apex ..... *Corthylus*

Classification of the Nearctic Scolytinae

88. Hylesinini Erichson 1836

Hylastina Leconte 1876

Scierus LeConte 1876, 2 spp., northern and western North America in *Picea*; usually found in the phloem of roots and stumps of standing dead trees or next to the ground in boles of downed trees.

Hylurgops LeConte 1876, 6 spp., 2 with subspecies, throughout coniferous forests of North America; all species breed in the phloem of stumps, roots and souring logs. The genus is closely related to *Hylastes* from which some species are distinguished with difficulty.

Hylesinites Germar 1813
Hylastities Hagedorn 1906
Myelophites Hagedorn 1906
Hylescierites Schedl 1947

Hylastes Erichson 1836, 14 spp. in Pinaceae throughout America north of Mexico, *H. opacus* Erichson 1836 is an adventive from Europe. All species breed in the phloem of stumps and roots.

Hylesinina Erichson 1836

Hylastinus Bedel 1888, 1 sp., *H. obscurus* (Marsham 1802), native to Palearctic, now found throughout North America. Breeds in roots of legumes, especially *Trifolium* species.

Alniphagus Swaine 1918, 2 spp. in western North America (an additional species occurs in east Asia). All species breed in phloem of *Alnus* species.

Hylastinoides Spessivtev 1919

Hylesinus Fabricius 1801, 7 spp. throughout America north of Mexico in mostly *Fraxinus* hosts. Adults and larvae deeply mine the wood in the phloem-cambial area. Adults construct biramous galleries and larvae mine parallel to the grain of the wood.

Leperisinus Reitter 1913
Apidocephalus Wickham 1916

Tomicina Thomson 1859

Hylurgopinus Swaine 1918, 1 sp., *H. rufipes* (Eichhoff 1868) occurs east of the Rocky Mountains. This phloeophagous species breeds in large branches and boles of *Ulmus,* and is a vector of the Dutch elm disease fungus.

Pseudohylesinus Swaine 1917, 9 spp., 2 with subspecies, occur in western North America (2 additional species occur in Mexico). They breed in the phloem of limbs, boles and roots of weakened conifers.

Xylechinus Chapuis 1869, 2 spp. occur in northern and western North America coincident with their *Picea* hosts. They are phloeophagous in small, weakened trees.

Pruniphagus Murayama 1958
Squamosinus Nunberg 1964
Xylechinops Browne 1973

Hylurgus Latreille 1807, 1 sp., *H. ligniperda* (Fabricius 1787), native to Europe, was recently found in cut pine stumps in New York State (Hoebeke 2001). All species are native to Palearctic.

Tomicus Latreillle 1802, 1 sp., *T. piniperda* (L. 1758), native to Palearctic, was first found in North America in 1992. It is now recorded from the Lake States, Maine, Maryland, New Hampshire, New York, Pennsylvania, Vermont, West Virginia, Ontario and Quebec. Adults feed in shoots of *Pinus* and breed in boles of weakened or downed trees.

Blastophagus Eichhoff 1864
Myelophilus Eichhoff 1878

Dendroctonus Erichson 1836, 13 spp. found throughout America north of Mexico. Most species breed in the boles of conifers and some are capable of killing healthy hosts. Species in this genus are among the most economically important bark beetles.

Bothrosternina Blandford 1896

Cnesinus LeConte 1868, 1 sp., *C. strigicollis* LeConte 1868, in southeast United States and Mexico (an additional 100 species occur from Mexico to Argentina). Twigs and small woody stems are selected for attack. Adults bore through the bark and into the wood, normally reaching the pith. Larvae feed in the center of twigs extending the parental gallery.

Nemophilus Chapuis 1869

Pagiocerus Eichhoff 1868, 1 sp., *P. frontalis* (Fabricius 1801) occurs north of South America from North Carolina to Mexico (additional species occur in South America.). This species infests large seeds of trees and other plants, especially corn.

Phloeotribina Chapuis 1869

Phloeotribus Latreille 1796, 9 spp. occur north of Mexico; 2 in the west and 7 in the east, especially in the southeast. Adults breed in the phloem-cambial region of hosts. *P. liminarus* (Harris 1852) occasionally is a pest of *Prunus.*

Phloeophthorus Wollaston 1854
Dryotomus Chapuis 1869
Phthorophloeus Rey 1885
Elzearius Guillebeau 1893
Eulytocerus Blandford 1897
Comesiella DelGuercio 1925
Neophleotribus Eggers 1943
Dryotomicus Wood 1962

Phloeosinina Nusslin 1912

Dendrosinus Chapuis 1869, 1 sp., *D. bourreriae* Schwarz 1920, in the Florida Keys (nine additional species occur in Central and South America). Adults and larvae feed in the wood of small woody plants.

Phloeosinus Chapuis 1869, 25 spp., 3 of which occur in the east and the remainder in the west. All species, except *P. pini* Swaine 1915, attack Cupressaceae and Taxodiaceae. Adults construct longitudinal galleries under the bark that usually deeply engrave the wood.

Phloeosinites Hagedorn 1906

Chramesus LeConte 1868, 9 spp. are found north of Mexico. These small beetles are phloeophagous in twigs and small branches of hardwood trees and shrubs.

Rhopalopleurus Chapuis 1869
Thaumasinulus Reitter 1913
Prochramesus Wood 1956

Hypoborina Nusslin 1911

Chaetophloeus LeConte 1876, 9 spp., eight in western North America and one in the Florida Keys and adjacent islands. All species attack branches and twigs. Long larval mines radiate from the parental gallery, deeply engraving the xylem and phloem.

Renocis Casey 1886
Pseudocryphalus Swaine 1917

Liparthrum Wollaston 1854, 2 spp., one in Arizona and one in Mississippi and Indiana. These phloeophagous species are very small and attack small twigs of woody plants.

Erineosinus Blackman 1920
Phloeochilus Schedl 1953
Phloeotrypetus Wood 1960
Dacryophthous Schedl 1971
Trypanophellos Bright 1982

Polygraphina Chapuis 1869

Polygraphus Erichson 1836, 3 spp. of the 60 worldwide species occur in North America. They are phloeophagous in recently broken, cut or fallen *Picea.*

Lepisomus Kirby 1837

Spongotarsus Hagedorn 1908
Pseudopolygraphus Seitner 1911
Ozophagus Eggers 1919
Nipponopolygraphus Nobuchi 1981

Carphoborus Eichhoff 1864, 9 spp. in the 48 states and one additional species in northern Canada and Alaska. All are phloeophagous in small or broken branches of Pinaceae.
Estenoborus Reitter 1913

Carphobius Blackman 1943; 1 sp., *C. arizonicus* Blackman 1943, in Arizona, extends north from Central America. Two additional species occur in Central America. They are phloeophagous in small broken branches of conifers.

89. Scolytini Latreille 1807

Scolytina Latreille 1807

Cnemonyx Eichhoff 1868, 2 spp. of this Neotropical genus are found in the Florida Keys. They are phloeophagous in woody hosts.
Ceratolepis Chapuis 1869
Loganius Chapuis 1869
Minulus Eggers 1912
Coptodryas Schedl 1948
Coptosomus Schedl 1952

Scolytus Geoffroy 1762, 20 spp. found throughout America north of Mexico. Native western species are found in conifers, while most eastern species are in hardwoods. Three Palearctic species are established in North America, most notably, *S. multistriatus* (Marsham 1802), which transmits the Dutch elm disease fungus. All are phloeophagous and construct characteristic galleries under the bark.
Ekkoptogaster Herbst 1793
Coptogaster Illiger 1807
Eccoptogaster Gyllenhal 1813
Scolytochelus Reitter 1913
Ruguloscolytus Butovitsch 1929
Archaeoscolytus Butovitsch 1929
Spinuloscolytus Butovitsch 1929
Tubuloscolytus Butovitsch 1929
Pygmaeoscolytus Butovitsch 1929
Pinetoscolytus Butovitsch 1929
Confusoscolytus Tsai and Huang 1962

Ctenophorina Chapuis 1869

Pycnarthrum Eichhoff 1878, 1 sp., *P. hispidum* (Ferrari 1867), infests *Ficus* limbs and boles in south Florida and Texas.
Nemobius Chapuis 1869
Monebius Hopkins 1914
Nomebius Navas 1915

Scolytodes Ferrari 1867, 1 sp., *S. schwarzi* (Hopkins 1902) infests *Ficus* in south Florida. Approximately 100 spp. occur in Central and South America.
Hexacolus Eichhoff 1868
Ctenophrus Chapuis 1869
Prionosceles Blandford 1897
Epomadius Blandford 1897
Erinophlius Hopkins 1902
Hylocurosoma Eggers 1940
Hexacolinus Schedl 1963

Micracina LeConte 1876

Pseudothysanoes Blackman 1920, 19 spp. throughout the United States, one of which extends into Canada; most inhabit arid areas in the western states, three species are found in the east and southeast (approximately 60 additional species occur in Central America). Within this genus a wide variety of hosts are attacked. Several western species breed in the phloem of dying mistletoe (*Phoradendron*), other species occur in the twigs of hardwood trees. This is a very diverse genus, and several species groups were previously treated as distinct genera. Species keying out to couplet 31 in this section's key were previously recognized as the genus *Cryptocleptus*. Species with the antennal scape short and broadly expanded are placed in the subgenus *Aphanocleptus*, and those with an elongate and slender antennal scape are placed in the subgenus *Psuedothysanoes*.
Cryptocleptes Blackman 1920
Chalcohyus Blackman 1943
Bostrichips Schedla 1951
Gretschkinia Sokanovskii 1959
Aphanocleptus Wood 1960
Cryptulocleptus Wood 1967
Neoglostatus Schedl 1978

Stenoclyptus Blackman 1943, 1 sp. in U.S., *S. sulcatus* (Bruck 1936). Two species in the genus, one in California and one in Mexico. The genus is closely related to *Pseudothysanoes*. They are phloeophagous in small branches of woody plants.

Thysanoes LeConte 1876, 7 spp. across the southern United States, 1 species extends north to Illinois and Pennsylvania. Apparently they are xylophagous in small branches of trees.

Hylocurus Eichhoff 1872, 15 spp. north of Mexico, most of which occur in the southeast (more than 40 additional species occur in Central and South America). The *rudis* group needs further study; Atkinson (1989) suggests the synonymy of some species. All species are xylophagous in small branches.
Micracisoides Blackman 1920

Micracisella Blackman 1928, 5 spp. in eastern and southern United States. These small (1.0-2.5 mm) beetles breed in the pith of damaged, small twigs.
Pseudomicracis Blackman 1920

Micracis LeConte 1868, 4 spp. in the United States, 1 extends to Canada, 2 are known only from Arizona. They are xylophagous in twigs.

Cactopinina Chamberlin 1939

Cactopinus Schwarz 1899, 5 spp. in southwestern United States, additional species occur in Mexico. The unique, paired epistomal male horns distinguish this genus. They are phloeophagous in woody plants, but more commonly feed subepidermally in *Cereus* and related cacti.

Cactopinorus Bright 1967

Ipina Bedel 1888

Pityogenes Bedel 1888, 7 spp. across the United States and Canada. One species, *P. bidentatus* (Herbst 1784), is native to the Palearctic. The North American species of this primarily Eurasian genus are phloeophagous in branches, limbs and boles of *Pinus*.

Eggersia Lebedev 1926

Pityoceragenes Balachowsky 1947

Pityokteines Fuchs 1911, 6 spp. in North America, one of which, *P. sparsus* (LeConte 1868) occurs in the east. They often construct star-shaped galleries in the phloem of limbs and boles of dying trees. This genus is closely related to *Orthotomicus*. Various Pinaceae serve as hosts.

Othotomides Wood 1951

Orthotomicus Ferrari 1867, 1 sp. found across North America, *Orthotomicus caelatus* (Eichhoff 1868), is phloeophagous in *Pinus, Picea and Larix* (about 10 species are known from the Palearctic).

Neotomicus Fuchs 1911

Ips DeGeer 1775, 23 spp. plus subspecies are currently recognized from across North America. Some species placed in synonomy by Wood (1982) are recognized as valid species (Lanier 1987, Lanier *et al.*1991). Species in this relatively large genus have been put into various species groups by several workers (Hopping 1963, Lanier 1970a, 1970b, 1972, Wood 1982, Cognato and Sperling 2000). Cognato and Vogler (2001) recently revised *Ips* as monophyletic with the removal of the *latidens* group and their tentative placement in *Orthotomicus*. In addition, they also named four subgenera for monophyletic groups of *Ips* species. This well known and important genus is phloeophagous in *Pinus* and *Picea*. Most breed in dying trees and slash, but some may attack the boles and tops of healthy trees. Characteristic egg galleries engrave the phloem-cambial area.

Cumatomicus Ferrari 1867

Cyrtotomicus Ferrari 1868

Pseudips Cognato 2000, 2 spp. in North America and 1 species in Asia. Cognato (2000) used molecular, morphological and behavioral characters to separate these species from *Ips*. The two North American species occur in the west where they are phloeophagous on *Picea* (*Pseudips concinnus* (Mannerheim 1852)) and *Pinus* (*Pseudips mexicanus* (Hopkins 1905)).

Dryocoetina Lindemann 1876

Dendrocranulus Schedl 1937, 3 spp. in southern and western United States. All species infest stems of Cucurbitaceae. The genus is closely related to the Old World *Xylocleptes* Ferrari.

Lymantor Lovendal 1889, 1 sp. in eastern United States and Canada and 1 species in Alaska. These beetles are phloeophagous in small, dry, often dead, branches of *Acer* and, rarely, other hosts.

Dryocoetes Eichhoff 1864, 7 spp. in United States and Canada. They are phloeophagous in the boles of mostly conifers, except *D. betulae* Hopkins 1915, which infests the bole of *Betula*.

Anodius Motschulsky 1860

Dryocoetinus Balachowsky 1949

Dryoxylon Bright and Rabaglia 1999, 1 sp., *D. onoharaensum* (Murayama 1934), native to Japan, originally described as a *Xyleborus*, is established in southeastern United States. Little is known about the biology, but it appears to feed in the xylem (Bright and Rabaglia 1999). Normark *et al.* (1999) discussed the genetic affinities of this genus and other Dryocoetini to Xyleborini.

Coccotrypes Eichhoff 1878, 9 spp. are known from United States, mostly Florida and California. This genus contains many species, mostly from southeast Asia and Africa, and species found in most other areas, including the United States, have arrived through commerce (Wood 1986). Females mate with dwarfed siblings before they emerge to seek a new host. They most often infest large seeds; however, a few species are phloeophagous. Wood (1986) stated that this genus is "in a state of taxonomic chaos". Jordal *et al.* (2000) showed the genetic relatedness of the genus to Xyleborini.

Poecilips Schaufuss 1897

Cryphaloides Formanek 1908

Thamnurgides Hopkins 1915

Spermatoplex Hopkins 1915

Dendrurgus Eggers 1923

Crypturgina LeConte 1876

Dolurgus Eichhoff 1868, 1 sp. is known from western North America. *Dolurgus pumilus* (Mannerheim 1843) occurs from Alaska to California where it breeds in dying *Picea*. It utilizes the entrance holes of larger bark beetles, and its galleries are often wholly in the bark.

Crypturgus Erichson 1836, 3 spp. occur in America north of Mexico, one of which, *C. pusillus* (Gyllenhal 1813), is native to Europe and Asia. They utilize the entrance holes of other beetles to gain access to the phloem in the boles of conifers.

Xyloterina Lindemann 1876

Trypodendron Stephens 1830, 5 spp. in North America, additional species occur in Europe and Asia. These are monogamous ambrosia beetles that breed in either conifers or hardwoods. *Trypodendron lineatum* (Olivier 1795), which occurs across North America and into northern Europe and Asia, is often a pest of conifer logs in processing yards.

Xyloterus Erichson 1836

Xyloterinus Swaine 1918, 1 sp., *Xyloterinus politus* (Say 1826), is recognized in the genus, which is found throughout eastern North America. This monogamous ambrosia beetle is commonly found attacking weakened hardwood trees.

Xyleborina LeConte, 1876

Premnobius Eichhoff 1878, 1 sp., *P. cavipennis* Eichhoff 1878, from Africa is found in Florida. This genus is unique within the Xyleborini. Browne (1961) treated it as a distinct tribe, and Normark *et al.* (1999), using DNA, showed a separate origin from Xyleborini and a closer relationship to Ipini. Males of these ambrosia beetles are flightless and mate with siblings (consanguineous polygyny) before the females leave the brood gallery.

Premnophilus Browne 1962

Ambrosiodmus Hopkins 1915, 7 spp. occur in the eastern United States, mostly in the southeast. They are consanguineously polygynous in a wide variety of hosts. Most attacks occur in the lower bole and stumps of trees.

Phloeotrogus Motschulsky 1863
Brownia Nunberg 1963

Euwallacea Hopkins 1915, 1 sp., *E. validus* (Eichhoff 1875), native to Asia, is now established in the eastern United States. It is a consanguineously polygynous ambrosia beetle that breeds in the stumps and boles of hardwoods and conifers.

Xyleborus Eichhoff 1864, (Vandenberg *et al.* 2000, key to eastern United States species); 17 spp. are identified from America north of Mexico, 5 of which are native to Europe and Asia. Most United States species are found in the east. More than 500 species are described from the neotropics, Africa and Asia. Representatives of this large and important genus attack almost all parts of woody plants. Most of these ambrosia beetles attack declining trees, but some may attack apparently healthy plants. Flightless, haploid males mate with sibling or parental females within the brood galleries before emergence. Extreme inbreeding and partial parthenogenesis may be the cause of the many morphological races and species. In addition, this mating system has allowed for new founder populations to be easily distributed through commerce (Atkinson *et al.* 1990). The generic and tribal limits of these rapidly radiating species need taxonomic revision. Jordal *et al.* (2000) and Normark *et al.* (1999) showed genetic relatedness to Dryocoetini and Wood (1986) suggests a relationship with Xyloterini.

Anisandrus Ferrari 1867
Anaertus Duges 1887
Progenius Blandford 1896
Heteroborips Reitter 1913
Xyleborips Reitter 1913
Boroxylon Hopkins 1915
Notoxyleborus Schedl 1934

Xylosandrus Reitter 1913, 4 spp. in eastern North America, 3 of which are native to Asia. The three exotic species are becoming very common, and occasionally aggressively attack apparently healthy, small trees. *Xylosandrus compactus* (Eichhoff 1875) often attacks healthy, vigorous twigs of living trees. All species cultivate ambrosia fungi and are consanguineously polygynous.

Apoxyleborus Wood 1980

Xyleborinus Reitter 1913, 3 spp. occur in America north of Mexico, 2 are exotic. *Xyleborinus saxeseni* (Ratzburg 1837), native to Europe, is found across the United States; *X. alni* (Niisima), from Europe and Asia, has recently been found on the west coast of North America (Mudge *et al.* 2001). The genus was often treated as a subgenus or synonym of *Xyleborus,* but it is morphologically distinct. Their biology is similar to *Xyleborus*, attacking limbs and boles of weakened trees.

Cryphalina Lindemann 1876

Trypophloeus Fairmaire 1868, 4 spp. in northern and western North America. These small, less than 2 mm, beetles are monogamous and phloeophagous in the bark of thin-barked limbs and boles of *Alnus, Salix* and *Populus.*

Glyptoderes Eichhoff 1878

Procryphalus Hopkins 1915, 2 spp. in western North America, one additional species in Asia. Biology is similar to *Trypophloeus.*

Ernoporicus Berger 1917, 1 sp., *E. kanawhae* Hopkins 1915, known only from the type series taken in flight in West Virginia.

Eocryphalus Kurenzov 1941
Ernopocerus Balachowsky 1949

Scolytogenes Eichhoff 1878, 1 sp., *S. knabi* (Hopkins 1915), occurs in vines in south Florida. Many other species are found in subtropical and tropical areas of the world.

Lepicerus Eichhoff 1878
Cryphalomorhpus Schaufuss 1891
Letznerella Reitter 1913
Hypothenoides Hopkins 1915
Neocryphalus Eggers 1922
Negritus Eggers 1923
Cylindrotomicus Eggers 1936
Lepicerinus Hinton 1936
Cryphalophilus Schedl 1970
Xylocryptus Schedl 1975

Hypocryphalus Hopkins 1915, 1 sp., *H. mangiferae* (Stebbing 1914), native to Asia, occurs in mango, *Mangifera*, in south Florida. They are phloeophagous in branches of their host.

Dacryphalus Hopkins 1915

Cryphalus Erichson 1836, 3 spp. occur in conifers in northern and western North America. They are generally less than 2 mm and infest declining branches and small trees. Adults construct cave-type galleries in the phloem. Several hundred nominate species occur in Asia to Australia, and a worldwide taxonomic revision is needed (Wood 1986).

Pseudocryphalus Ferrari 1868
Taenioglyptes Bedel 1888
Cryptarthrum Blandford 1896
Allarthrum Hagedorn 1912
Ericryphalus Hopkins 1915
Piperius Hopkins 1915
Ernocryphalus Murayama 1958
Acryphalus Tsai and Li 1963
Jugocryphalus Tsai and Li 1963

Cryptocarenus Eggers 1937, 2 spp. are found in south Texas and Florida and extend through Central and South America. Males are flightless in these consanguineous polygynous pith borers of small twigs.

Tachyderes Blackman 1943

Hypothenemus Westwood 1836, 21 spp. have been recorded from the United States, many of which are native to Asia or Africa. Most United States species occur in the southern half of the country. These small, less than 2 mm, beetles infest twigs, vines, pith, seeds and other plant material. They are consanguineously polygynous and have been widely distributed through commerce. Over 200 species have been assigned to this genus, and species identification is often difficult.

Stephanoderes Eichhoff 1872
Homoeocryphalus Lindemann 1876
Triarmocerus Eichhoff 1878
Adiaeretus Hagedorn 1909
Stylotentus Schedl 1939
Chondronoderes Schedl 1940
Archeophalus Schedl 1941
Pachynoderus Schedl 1941
Lepiceroides Schedl 1957
Ernophloeus Nunberg 1958
Epsips Beeson 1941
Macrocryphalus Nobuchi 1981

Trischidias Hopkins 1915, 5 spp. occur in the southeastern United States. These very small, less than 1 mm, beetles are relatively rare. One species feeds on fungus pustules under the bark of mangrove, and others are phloeophagous in injured, often fungus-infested twigs.

Pityophthorina Eichhoff 1878

(This group has been treated as a subytribe of Corthylina by Wood and Bright (1992).)

Dendroterus Blandford 1904, 2 spp. in United States, one in Texas in *Jatropha* and one in California in *Bursera*. They are phloeophagous in the bark of declining branches.

Plesiophthorus Schedl 1940
Xylochilus Schedl 1956

Araptus Eichhoff 1872, 1 sp., *A. dentifrons* Wood 1974, occurs in south Florida (Atkinson and Peck 1994) and possibly Texas. This Neotropical species breeds in the pith of vines. *Araptus politus* (Blandford 1904) has been intercepted in large seeds in the port of Miami, but it is not known to be established.

Neodryocoetes Eggers 1933
Thamnophthorus Schedl 1938
Neopityophthorus Schedl 1938
Sphenoceros Schedl 1939
Hypertensus Hagedorn 1950
Brachydendrulus Schedl 1951
Gnathocranus Schedl 1951
Gnathoborus Schedl 1970

Conophthorus Hopkins 1915, 8 spp. are currently recognized from America north of Mexico, 2 spp. occur in the east and 6 in the west. All species breed in the cones of *Pinus*.

Pityoborus Blackman 1922, 2 spp. in United States, one in southeast and one in southwest. They are phloeophagous in dying branches of *Pinus*. Their galleries in the cambium deeply score the xylem.

Pityotrichus Wood 1962, 2 spp. in southwest United States (Arizona and New Mexico). These species are distinguished from closely related *Pityophthorus* by the unique pregula referenced in the key. They are monogamous and feed in the phloem of small branches.

Pityophilus Blackman 1928

Pseudopityophthorus Swaine 1918, 11 spp. across America north of Mexico. All species breed in branches or boles of *Quercus*, except *P. fagi* Blackman 1931 which is found in *Fagus*.

Xenophthorus Wood and Yin 1986

Pityophthorus Eichhoff 1864, 104 spp. are recognized north of Mexico, more than 200 additional species occur in Central and South America and more than 50 in Europe, Asia and Africa. This large and diverse genus is found throughout the United States in many different hosts. Representatives may be found breeding in twigs, seedlings, boles or pith. Most are heterosanguinously polygynous and some are monogamous.

Trigonogenius Hagedorn 1912
Hagedornus Lucus 1920

Myeloborus Blackman 1928
Gnathophorus Schedl 1935
Conophthocranulus Schedl 1935
Breviophthorus Schedl 1938
Pityophthoroides Blackman 1942
Cladoborus Sawamoto 1942
Neomips Schedl 1954
Ctenyophthorus Schedl 1955
Gnathophthorus Wood 1962
Hypopityophthorus Bright 1981

Corthylina LeConte 1876

Gnathotrichus Eichhoff 1869, 7 spp. north of Mexico. *G. materiarius* (Fitch 1858) occurs in *Pinus* throughout eastern North America, the remaining species are in the west in oaks and conifers. They are monogamous ambrosia beetles breeding in dying or fallen trees or logs. Some species are pests in wood processing yards, especially in the Pacific Northwest.

Gnathotrichoides Blackman 1931
Ancyloderes Blackman 1938
Paraxyleborus Hoffman 1942
Prognathotrichus Bright 1972

Monarthrum Kirsch 1866, 5 spp. north of Mexico, 2 spp. throughout the east and 3 spp. in the west. More than 100 additional species are found in Central and South America. These ambrosia beetles attack logs and boles of dying hardwoods, especially oaks.

Corthylomimus Ferrari 1867
Cosmocorynus Ferrari 1867
Pterocyclon Eichhoff 1869
Anchonocerus Eichhoff 1878
Phthorius Eichhoff 1878
Trypocranus Eichhoff 1878
Eupteroxylon Eggers 1936

Corthylus Erichson 1836, 3 spp. in United States, one of which occurs in Canada; all are found east of the Rocky Mountains. Approximately 100 additional species occur in Central and South America. These ambrosia beetles breed in a variety of locations on a tree. *Corthylus papulans* Eichhoff 1869, in Florida, breeds in small branches; *C. punctatissimus* (Zimmermann 1868) breeds in sapling trees, especially *Acer*, near ground level and *C. columbianus* Hopkins 1895 breeds in the xylem of living trees, usually *Acer*, which survive after the brood emerges.

Morizus Ferrari 1867
Pseudocorthylus Ferrari 1867
Corthylomimus Schedl 1972

XVIII. Platypodinae Shuckard 1840

by Robert S. Anderson

Platypodinae are an enigmatic group that have been recognized either as a distinct family or a subfamily within Curculionidae. There are 4 genera in North America based on the recent division of the genus *Platypus* into a variety of smaller genera (Wood 1993). Traditionally they have been closely allied with Scolytinae, but Lyal (1995) could not find support for a monophyletic group comprised only of scolytines and platypodines nor could he find support for them having a separate ancestry from Curculionidae. Similarly, Thompson (1992) chose to give Platypodidae family level status while at the same time considering Scolytinae as a subfamily within Curculionidae. A review of their phylogenetic position is given by Kuschel *et al.* (2000).

Platypodinae are easily recognized by the lack of a rostrum, presence of pregular sutures, pregular sclerite distinct, located between median gular suture and labial articulation, at least one pair of tibiae with denticles or stout socketed setae along the dorsal (outer) margin, tarsus with article 1 as long as articles 2-5 combined, pronotum usually with a lateral constriction near the middle and the antennal club without sutures (Fig. 131).

Where known, adults and larvae infest the wood of dead or recently cut or dying trees. Larvae mine galleries deep into the wood which become stained black by ambrosia fungi which grow on the walls of the tunnels and serve as the larval food (Bright 1993).

Key to the Nearctic genera of Platypodinae

1. Metasternum and metepisternum near hind coxa weakly or not impressed for reception of femur, anterior margin of impressed area not continuously carinate or with a row of small spines, surface of impressed area with at least some setae ..... *Treptoplatypus*
— Metasternum and metepisternum near hind coxa impressed for reception of femur, anterior margin of impressed area either continuously carinate or with a series of small spines, surface of impressed area glabrous 2

2(1). Male with ventrite 3, 4 or 5 simple, not armed with spines ..... *Euplatypus*
— Male with ventrite 3, 4 or 5 with a pair of widely separated coarse spines 3

3(2). Male with ventrite 3 with a pair of spines; female with mycetangia pores moderate in size ..... *Myoplatypus*
— Male with ventrite 4 with a pair of spines; female with mycetangia pores unusually large in size ..... *Oxoplatypus*

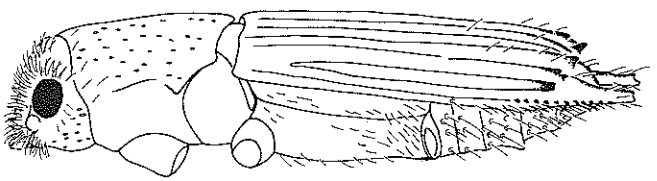


FIGURE 110.131. Platypodinae. 110. *Myoplatypus flavicornis* (Fabricius), lateral habitus.

CLASSIFICATION OF THE NEARCTIC PLATYPODINAE

90. Platypodini Shuckard 1840

Treptoplatypus Schedl 1972, 2 spp., *T. abietis* (Wood 1958) and *T. wilsoni* (Swaine 1916), northwestern United States and British Columbia. Species are associated with timber of conifers (Bright 1993).

Myoplatypus Wood 1993, 1 sp., *M. flavicornis* (Fabricius 1776), southern Florida.

Oxoplatypus Wood 1993, 1 sp., *O. quadridentatus* (Olivier 1795), southeastern United States. This species is associated with various species of *Quercus* (oak; Fagaceae) (Wood 1993).

Euplatypus Wood 1993, 3 spp., *E. parallelus* (Fabricius 1801), *E. compositus* (Say 1824) and *E. pini* (Hopkins 1905), southern United States; one species adventive.

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