

ANNOTATED LIST OF INDIANA SCOLYTIDAE (COLEOPTERA)¹Mark Deyrup²**ABSTRACT**

A list of 80 species of Indiana Scolytidae (bark and ambrosia beetles) is presented. Notes on known Indiana hosts and distribution in the state are included for each species.

Little information has been published on the distribution and hosts of the Scolytidae (bark and ambrosia beetles) in Indiana or other parts of the central Midwest; several factors account for this lack of information. One important factor is that most of the workers conducting faunistic surveys of scolytids during the first half of this century did relatively little collecting in the Midwest. They may have had little reason to investigate midwestern scolytids since at that time all evidence suggested that the midwestern scolytid fauna differed from the eastern fauna only by deletion of some species. A second factor is that the small size and cryptic habits of scolytids protect them from general collectors. This is demonstrated by the incomplete treatment of the family by Blatchley and Leng (1916), even though Blatchley did much of his collecting in Indiana. To take a more recent example, the 4-H collections submitted at the 1979 Indiana State Fair consisted of 443 boxes of insects, including thousands of beetles of all sizes, among which was a single scolytid. There has been little economic incentive for the study of Midwestern scolytids because few species cause economic damage in this region. In Indiana only six or seven species can be considered even minor pests. For these reasons, published records of midwestern scolytids are scarce in the survey literature produced by workers such as Blatchley and Leng (1916), Dodge (1938) and Chamberlin (1939). Some additional records can be found in taxonomic works such as Wood's revision of the Cryphalini (1954) and Bright's revision of the Xyleborini (1968).

A field survey of Indiana scolytids conducted in 1978-1979 has produced many new state records and host records; almost half of the 80 species collected were previously unrecorded from Indiana. This list, therefore, adds to the knowledge of the zoogeography and hosts of Nearctic scolytids. It is hoped that publication of this list will help stimulate further collecting and biological studies.

During the survey collecting trips were taken to all parts of the state, although the most intensive collecting was near the author's residence in the north-central part of the state. It was found that most differences in the scolytid fauna of different parts of the state were most simply explained by the presence or absence of certain host plants. Species that breed in larch, for example, are restricted to a few northern bogs, whereas a species that breeds in bald cypress is necessarily confined to a few localities along the Ohio River. Among the polyphagous species, the genus *Hypothenemus* becomes conspicuously less abundant in both numbers of species and individuals when going from the southern to the northern extremities of the state. It seems likely that climatic factors may directly influence members of this genus, but the possibility remains that distribution may be influenced by a change in the mixture of the many hosts attacked by Indiana *Hypothenemus*.

A number of Indiana scolytids are exotic. Of 44 species of scolytids introduced in North and Central America (Wood 1977), the following species have invaded Indiana: *Crypturgus*

¹Purdue University Experiment Station No. 8190.

²Department of Entomology, Purdue University, West Lafayette, IN 47907.

pusillus, *Hylastinus obscurus*, *Hypothenemus eruditus*, *Scolytus mali*, *S. multistriatus*, *S. rugulosus*, *Xyleborinus saxeseni*, *Xyleborus affinus*, *X. dispar*, *X. ferrugineus*, *X. rubricollis*, and *Xylosandrus germanus*. Several species which are probably native to Indiana have become much more widespread within the state following the planting of conifers. Widespread species which were probably once restricted to conifers around Lake Michigan and Virginia pine in the southeast corner of the state include *Ips grandicollis*, *Orthotomicus caelatus*, *Pityogenes hopkinsi*, *Pityophthorus puberulus*, and *P. opaculus*; the last species, which breeds in spruce, is probably not native to Indiana. A well-documented exposition of the history of invasion of conifer scolytids into an area where conifers are not native is provided by Bejer-Petersen and Jorum (1977).

In the present study almost all collections of scolytids were made from host plants. Parent beetles were removed from their galleries, and larvae, pupae, teneral adults, and associated insects were reared by placing the infested material in plastic bags in the laboratory. A small number of specimens, about 80 individuals, were netted as they made dispersal flights during warm evenings in spring. About 40 specimens, mostly *Hylesinus*, *Corthylus*, *Monarthrum*, and *Xyleborus*, were taken in Malaise traps; no other trapping methods were used. Representative pinned and labelled specimens, numbering about 2000, are in the Purdue University insect collection.

The annotations in the following list indicate the host plant, the condition of the host plant, and the known distribution in Indiana. Hosts listed refer to Indiana records and may not include all known hosts. Collection dates are not presented because, with a few exceptions, adults are present through most of the year. Except in those cases where there is reason to believe that distribution in the state is restricted, distribution is generally described as northern, central, or southern. All records of scolytids and hosts are from the present survey unless otherwise indicated.

Keys to Indiana scolytids are in preparation. For the present it is easiest to identify specimens to species by use of Bright's manual of Canadian species (1976), supplemented by Chamberlin (1939) for the more southern groups, bearing in mind the numerous changes in nomenclature since 1939. Species of the tribe Cryphalini can be identified with the keys provided by Wood (1954). Usage of superspecific names below follows Wood (1978).

The distribution of each species in Indiana is indicated by an abbreviation: NI = northern Indiana, NC = north-central Indiana, CI = central Indiana, SI = southern Indiana. County records are included in parentheses. The counties of Indiana are shown in Figure 1.

Family SCOLYTIDAE
Subfamily HYLESININAE
Genus **HYLURGOPS** LeConte

pinifex (Fitch). Inner bark of underside of boles of *Pinus virginiana* Mill.; SI (Clark). Specimens were taken by Blatchley in 1904 from Mineral Springs, Laporte Co. This locality has been absorbed by the city of Gary.

Genus **HYLASTINUS** Bedel

obscurus Marsham. Indiana host not known, but undoubtedly roots of leguminous herbaceous perennials; widespread, N-CI (Adams, Allen, Kosciusko, Marion, Randolph, Starke, Steuben, Tippecanoe, Vigo, Wayne, Dubois).

Genus **HYLESINUS** Fabricus

acculeatus Say. Inner bark of boles and large branches of recently killed *Fraxinus americana* L.; widespread. (Boone, Crawford, Clinton, Marion, Whitley, Tippecanoe, Vigo, Wayne, Dubois).

criddlei (Swaine). Indiana host not known, but undoubtedly *Fraxinus* spp. (McKnight and Aarhus 1973); a few specimens taken in flight in NCI (Tippecanoe).



Fig. 1. The counties of the State of Indiana.

fasciatus LeConte. Inner bark of recently killed saplings and broken branches of *Fraxinus americana*; C-NI (Jasper, Marion, Tippecanoe).

pruinus (Eichhoff). A single specimen emerged from firewood, *Fraxinus americana*; NCI (Bartholomew, Tippecanoe).

Genus **DENDROCTONUS** Erichson

simplex LeConte. Inner bark of boles of recently killed *Larix laricina* (Du Roi) K. Koch; in large tamarack bog, Pinhook, Laporte Co.; might occur in one or two similar sites in NI.

Genus **CNESINUS** LeConte

strigicollis LeConte. Collected by N. M. Downie from branches of *Gleditzia triacanthos* L.; NCI (Tippecanoe).

Genus **HYLURGOPINUS** Swaine

opaculus LeConte. Inner bark of boles and large branches of recently killed *Ulmus rubra* Muhl., *U. americana* L.; CI (Marion, Parke, Tippecanoe).

Genus **PHLOEOTRIBUS** Latreille

dentifrons (Blackman). Inner bark of recently killed small branches and twigs of *Celtis occidentalis* L.; widespread (Parke, Jefferson, Posey, Pulaski, Tippecanoe, Wabash).

frontalis Olivier. Inner bark of branches and boles of suppressed or apparently healthy *Morus rubra* L.; NCI (Brown, Clay, Parke, Tippecanoe).

liminaris Harris. Inner bark of branches and boles of injured or recently killed *Prunus serotina* Ehrh., *P. pensylvanica* L.; N-CI (Parke, Pulaski, Tippecanoe).

scabricollis Hopkins. Inner bark of branches and boles of injured or apparently healthy *Ptelea trifoliata* L.; Found only at Indiana Dunes near Lake Michigan (Porter).

Genus **CHRAMESUS** LeConte

chapusii LeConte. Inner bark of recently fallen small branches and twigs of *Celtis occidentalis*, older larvae often in wood; NCI (Tippecanoe).

hicoriae LeConte. Inner bark of recently fallen or suppressed branches, twigs, saplings of *Carya ovata* (Mill.) K. Koch, *glabra* (Mill.) Sweet; mature larvae often bore in wood; widespread (Brown, Clark, Dubois, Jefferson, Parke, Posey, Steuben, Tippecanoe).

Genus **PHLOEOSINUS** Chapuis

dentatus (Say). Inner bark of recently killed boles and branches of *Juniperus virginiana* L.; NC-NI (Tippecanoe, Pulaski).

taxodii Blackman. Inner bark of recently killed boles and branches of *Taxodium distichum* (L.) Rich.; only from SI (Posey).

Genus **CARPHOBORUS** Eichhoff

bifurcus Eichhoff. Inner bark of recently killed branches of *Pinus virginiana*; seen only from native pine stands in SI (Clark).

Genus **POLYGRAPHUS** Erichson

rufipennis (Kirby). Indiana hosts not reported, but probably found in *Larix laricina*; there are apparently no recent Indiana specimens, but this species may still persist in a few localities in NI (Lake, Steuben).

Subfamily SCOLYTINAE
Genus SCOLYTUS Geoffroy

mali (Bechstein). Inner bark of recently killed boles and large branches of *Malus pumila* Mill. and *Ulmus americana*; NC-NI (Tippecanoe, Steuben, Pulaski).

multistriatus (Marshall). Inner bark of recently killed boles and large branches of *Ulmus americana* and *U. rubra*; widespread (Jackson, Posey, Tippecanoe, Warren).

muticus Say. Inner bark of freshly killed boles, large and small branches of *Celtis occidentalis* and *Gleditzia triacanthos*; older larvae often bore in wood; NC-SI (Madison, Marion, Parke, Putnam, Tippecanoe, Wayne).

piceae (Swaine). Inner bark of freshly killed branches and small boles of *Larix laricina*; in large tamarack bog, Pinhook, Laporte Co. also from Steuben Co.; might occur in one or two similar sites in NI.

quadrispinosus Say. Inner bark of stressed or freshly killed boles and large branches of *Carya* spp.; NC-SI (Posey, Putnam, Warren).

rugulosus (Muller). Inner bark of recently killed branches and twigs of *Prunus serotina*, *P. pensylvanica*; *P. domestica* L.; *Malus pumila*, *Crataegus* sp., *Amelanchier* sp.; widespread (Jay, Lake, Laporte, Madison, Marion, Martin, Putnam, Posey, Starke, Steuben, Sullivan, Tippecanoe, Whitley).

Genus HYLOCURUS Eichoff

rudis (LeConte). Wood, usually sound, of large or small branches of *Carya ovata*, *C. glabra*, *Ostrya virginiana* Scop., *Cladrastis lutea* (Michx.) K. Koch, *Acer saccharum* Marsh., *Quercus rubra* L. *Ulmus* sp.; initial galleries made in sound wood, although wood may be partially rotten by the time adults emerge; widespread (Clay, Marion, Parke, Tippecanoe, Warren).

bicornis Blackman. In wood of branches of *Carya ovata* NCI (Tippecanoe).

Genus MICRACIS LeConte

suturalis LeConte. Sound wood of branches of *Cercis canadensis* L., *Cornus rugosa* Lam., *Ulmus rubra*, *Carya ovata*, *Liquidambar styraciflua* L., *Robinia pseudo-acacia* L.; initial galleries are made in sound wood; this species can be found with great regularity in *Cercis canadensis*; widespread (Clay, Parke, Posey, Steuben, Tippecanoe, Wabash, Warren).

swaini Blackman. Sound wood of branches of *Salix nigra* Marsh., *S. interior* Rowlee, *Cercis canadensis*; may be associated with damage to willow caused by *Cryptorhynchus lapathi* (L.); widespread (Newton, Parke, Posey, Pulaski, Steuben, Tippecanoe).

Genus PSEUDOTHYSANOES Blackman

dislocatus (Blackman). Sound wood of twigs of *Carya ovata* SI (Posey).

lecontei Blackman. Inner bark of freshly killed small branches and twigs of *Quercus alba* L., *Carya glabra* NC-SI (Posey, Tippecanoe).

rigidus (LeConte). Outer bark of freshly killed branches of *Tilia americana* L.; C-NI (Laporte, Pulaski, Tippecanoe).

Genus THYSANOES LeConte

fimbricornis LeConte. In sound wood of dry branches or standing boles of small trees of *Carya ovata*, *C. glabra*, *Ulmus rubra*, *Cercis canadensis*, *Celtis occidentalis*; NC-SI (Brown, Jefferson, Clay, Posey, Tippecanoe).

Genus **CRYPTURGUS** Erichson

pusillus (Gyllenhal). In bark of recently killed branches of *Pinus strobus* L., probably an inquiline in galleries of *Orthotomicus caelatus* (Eichhoff); collected at Indiana Dunes near Lake Michigan. (Laporte).

Genus **DRYOCOETES** Eichhoff

autographus Ratzeburg. Inner bark of root collars of small recently killed *Larix laricina*; in tamarack bog, Pinhook, Laporte Co.

granicolis (LeConte). Collected by N. F. Downie and R. M. Brattain in C-NCI (Madison, Tippecanoe).

Genus **LYMATOR** Lovendal

decipiens LeConte. Wood of fungus-infested branches of *Acer saccharum* and *Salix interior*; widespread (Parke, Pulaski, Tippecanoe).

Genus **IPS** DeGeer

calligraphus (Germar). Inner bark of recently killed boles and large branches of *Pinus sylvestris* L.; NI (Lake, Laporte, Porter, Pulaski).

grandicollis (Eichhoff). Inner bark of recently killed boles and large branches of *Pinus strobus*, *P. sylvestris*, *P. banksiana* Lamb. *P. virginiana*; widespread (Clark, Lake, Laporte, Pike, Porter, Pulaski, Tippecanoe, Wabash, Warren).

pini Say. Indiana hosts not known, but probably *Pinus* spp.; NI (Lake).

Genus **ORTHOTOMICUS** Ferrari

caelatus (Eichhoff). Inner bark of recently killed branches and boles of *Pinus strobus*, *P. sylvestris*, *P. virginiana*, *P. banksiana*, *Picea abies* (L.) Karst., *Larix laricina*; widespread (Clark, Lake, Laporte, Owen, Pike, Porter, Tippecanoe, Wabash).

Genus **PITYOGENES** Bedel

hopkinsi Swaine. Inner bark of recently killed branches of *Pinus strobus*, *P. sylvestris*; widespread (Brown, Lake, Porter, Pulaski, Tippecanoe, Wabash).

Genus **XYLOTERINUS** Swaine

politus Say. Wood of recently killed boles of *Acer saccharum*, *Tilia americana* L., *Fagus grandifolia* Ehrh. *Quercus velutina* Lam.; widespread (Dubois, Marion, Parke, Pulaski, Tippecanoe).

Genus **XYLEBORINUS** Reitter

saxeseni (Ratzeburg). Wood of recently killed *Acer saccharum*, *Tilia americana*, *Quercus alba* L., *Prunus persica* Batsch, *Cornus florida* L., *Rhus typhina* L.; frequently found flying about picnics, possibly attracted by condiments; widespread (Brown, Dubois, Knox, Posey, Pulaski, Tippecanoe).

Genus **XYLEBORUS** Eichhoff

affinus Eichhoff. Boles and large stumps of *Taxodium distichum*, *Quercus rubra*, and *Pinus sylvestris*; NC-SI (Clark, Pike, Posey, Tippecanoe).

celsus Eichhoff. Indiana specimens caught in traps and at lights, not in hosts; NC-SI (Brown, Clark, Posey, Tippecanoe).

- dispar** (Fabricius). Specimens in the Purdue collection were taken in pitfall traps; NCI (Tippecanoe).
- ferrugineus** (Fabricius). Specimens in the Purdue collection were collected from *Acer rubrum*, *Quercus rubra*; SI (Bartholomew, Clark, Dubois, Tippecanoe, Vigo).
- obesus** LeConte. Boles and large branches of *Fagus grandifolia*; CI (Tippecanoe, Parke).
- rubricollis** Eichhoff. Section of bole of *Ulmus americana*, branch of *Carya glabra*; SI (Jefferson).
- sayi** (Hopkins). Dying twigs of *Carya ovata*, *Sassafras albidum* (Nutt.) Nees and *Acer saccharinum* L.; NC-CI (Clark, Parke, Putnam, Tippecanoe).
- tachygraphus** Zimmermann. A specimen in the Purdue collection was collected in CI (Marion).
- xylographus** (Say). Specimens were taken in flight in NCI (Tippecanoe).

Genus XYLOSANDRUS Reitter

germanus (Blandford). Boles and branches of dying or recently killed trees and shrubs. This exotic species was the ambrosia beetle most frequently encountered during the present study. Indiana hosts include *Pinus sylvestris*, *Tsuga canadensis* (L.) Carr., *Juniperus virginiana*, *Salix interior*, *Juglans nigra* L., *J. cinerea* L., *Fagus grandifolia*, *Quercus rubra*, *Q. imbricaria* Michx., *Liriodendron tulipifera* L., *Fraxinus americana*, *Ulmus rubra*, *Aesculus glabra* Willd., *Tilia americana*, *Acer saccharum*, *Rhus typhina*, *Carpinus caroliniana* Walt., *Platanus occidentalis* L., *Sassafras albidum*, *Lonicera* sp., *Rhododendron* sp. Widespread (Brown, Dubois, Greene, Fountain, Parke, Clark, Pike, Putnam, Starke, Vanderburg, Wayne, Wabash, Tippecanoe).

Genus HYPOTHENEMUS Westwood

- californicus** Hopkins. Collected by Blatchley in SI (Clark).
- crudiae** Panzer. Dr. Stephen wood has seen Indiana specimens (in litt.).
- dissimilis** (Zimmermann). Living or recently killed twigs of *Cercis canadensis*, *Carya ovata*, *C. glabra*, *Acer saccharinum*, *A. saccharum*, *Quercus alba*, *Q. imbricaria*, *Celtis occidentalis*, *Robinia pseudoacacia* L., *Plantanus occidentalis*; widespread (Clay, Clark, Fountain, Jefferson, Madison, Marion, Posey, Pulaski, Tippecanoe, Vanderburg, Steuben, Warren).
- eruditus** Westwood. Usually under thin bark of dead standing trees and branches, galleries are in the bark and surface of the sapwood; there are no conspicuous fungi present. Indiana hosts include *Carya ovata*, *C. glabra*, *Tilia americana*, *Cornus florida*, *Ulmus rubra*, *Asimina triloba* (L.) Dun., *Salix interior*, *Carpinus caroliniana*, *Liriodendron tulipifera*, *Cercis canadensis*, *Quercus alba*, *Acer rubrum* L., *Juglans nigra*; widespread (Clay, Jefferson, Parke, Porter, Posey, Tippecanoe).
- interstitialis** Hopkins. Living or recently killed twigs of *Ulmus rubra*, *Carya ovata*, *C. glabra*, *Acer saccharinum*, *Sassafras albidum*, *Cercis canadensis*; NC-SI (Clay, Clark, Marion, Posey, Tippecanoe).
- rotundicollis** (Eichhoff). Living and recently killed twigs of *Quercus alba*, *Q. imbricaria*, *Carya ovata*, *C. glabra*; NC-SI (Posey, Tippecanoe, Vermillion).
- seriatus** (Eichhoff). Recently killed twigs of *Pinus virginiana*, *Populus deltoides* Bartr., *Rhus glabra* L.; NC-SI (Clark, Tippecanoe, Jefferson).

Genus TRISCHIDIAS Hopkins

- atoma** (Hopkins). Under thin bark of dead standing shoots of *Liriodendron tulipifera*, *Ulmus rubra*; NC-SI (Jackson, Tippecanoe).

Genus **CONOPHTHORUS** Hopkins

coniperda (Schwarz). Living cones of *Pinus strobus*; NI (Pulaski).

resinosae Hopkins. Living cones of *Pinus virginiana*; SI (Clark).

Genus **GNATHOTRICHUS** Eichhoff

materiarius (Fitch). In boles of recently killed *Pinus sylvestris* and *P. virginiana*; SI (Clark, Pike).

Genus **PITYOPHTHORUS** Eichhoff

consimilis LeConte. Inner bark of small dying branches of *Pinus strobus*, *P. virginiana*, *Larix laricina*; NI, SI, not in central part of state. (Clark, Porter, Laporte).

crinalis Blackman. Inner bark of dying and recently killed stems of *Toxicodendron radicans* (L.) Kuntze; widespread (Marion, Parke, Posey, Pulaski, Tippecanoe, Starke, Steuben, Wabash).

lautus Eichhoff. Inner bark of dying and recently killed *Ulmus rubra* (twigs and small branches only), *Acer saccharinum* (large to small branches only), *Cercis canadensis* (boles and large branches only), *Acer saccharinum* (large to small branches), *Pinus strobus* (small branches), *Rhus glabra*, *R. typhina*, *R. copallina* L. (twigs, branches, boles). Indiana specimens found in different host genera show small, consistent morphological differences which suggest that Indiana *P. lautus* is acting as a species complex. Widespread (Clay, Jefferson, Newton, Posey, Parke, Pulaski, Porter, Steuben, Tippecanoe, Wabash, Warren).

opaculus LeConte. Inner bark of dying twigs and small branches of *Picea abies*; N-NCI (Steuben, Tippecanoe).

puberulus LeConte. Inner bark and pith of living and recently killed twigs of *Pinus strobus*, *P. sylvestris*, *P. banksiana*, *P. nigra* Arnold; widespread (Brown, Clark, Clay, Jefferson, Porter, Pulaski, Steuben, Tippecanoe).

pulicarius (Zimmermann). Pith and wood of *Pinus banksiana*; NI (Porter).

scriptor Blackman. Inner bark of branches and boles of dying *Rhus copallina*; SI (Jackson).

virilis Blackman. Inner bark of branches of dead *Rhus aromatica* Ait.; NCI (Tippecanoe).

Genus **PSEUDOPITYOPHTHORUS** Swaine

asperulus LeConte. Inner bark of recently killed small branches and twigs of *Quercus rubra* and *Q. velutina*; widespread (Allen, Parke, Pike, Posey, Porter, Tippecanoe, Wabash).

minutissimus (Zimmermann). Inner bark of recently killed branches and twigs of *Quercus rubra*, *Q. velutina*, *Q. prinus* L., *Fagus grandifolia*; widespread (Allen, Jefferson, Newton, Parke, Pulaski, Starke, Steuben, Porter, Tippecanoe).

pruinosis (Eichhoff). Inner bark of recently killed branches of *Quercus* sp.; NI (Steuben).

Genus **CORTHYLUS** Erichson

columbianus Hopkins. Specimens in the Purdue collection were collected from wood of living *Acer saccharum*, *A. rubrum*; S-CI (Dubois). The biology of this species in Indiana has been reported by Kabir and Giese (1966).

punctatissimus Zimmermann. Indiana hosts not known; NC-SI (Tippecanoe, Posey).

Genus **MONARTHURUM** Kirsch

fasciatum (Say). In wood of large branches and boles of recently killed *Quercus alba*, *Fagus grandifolia*; widespread (Clark, Dubois, Knox, Kosciusko, Marshal, Parke, Pulaski, Tippecanoe, Wayne).

mali (Fitch). In wood of large branches and boles of recently killed *Fagus grandifolia*, *Quercus alba*, *Juglans cinerea*; widespread (Clarke, Crawford, Marion, Parke, Posey, St. Joseph, Tippecanoe, Wayne, Wabash).

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LITERATURE CITED

- Bejer-Petersen, B., and P. Jorum. 1977. Dansk barkbillers hyppighed og udbredelse (Coleoptera, Scolytidae). Entomol. Meddr. 25:1-36.
- Blatchley, W. S., and C. W. Leng. 1916. Rhynchophora or weevils of Northeastern North America. Indianapolis, Ind.: Nature Publ. Co.
- Bright, D. E. 1968. Review of the tribe Xyleborini in America north of Mexico (Coleoptera; Scolytidae). Canadian Entomol. 100:1288-1323.
- . 1976. The insects and arachnids of Canada. Part II. The bark beetles of Canada and Alaska. Coleoptera: Scolytidae. Canada Dept. Agric. Publ. 1576.
- Chamberlin, W. J. 1939. The bark and timber beetles of North America north of Mexico. OSC Coop. Assoc., Corvallis, Ore.
- Dodge, H. R. 1938. The bark beetles of Minnesota. Univ. Minnesota Agric. Exp. Sta. Tech. Bull., 132.
- Kabir, A. K. M. F., and R. L. Giese. 1966. The Columbian timber beetle, *Corthylus columbianus* (Coleoptera: Scolytidae). I. Biology of the beetle. Ann. Entomol. Soc. Amer. 59:883-894.
- McKnight, M. E., and D. G. Aarhus. 1973. Bark beetles, *Leperisinus californicus* and *L. criddlei* (Coleoptera: Scolytidae), attacking green ash in North Dakota. Ann. Entomol. Soc. Amer. 66:955-957.
- Wood, S. L. 1954. A revision of the North American Cryphalini (Scolytidae, Coleoptera). Univ. Kansas Sci. Bull. 36:959-1089.
- . 1977. Introduced and exported American Scolytidae (Coleoptera). Gt. Basin Nat. 37:67-74.
- . 1978. A reclassification of the subfamilies and tribes of Scolytidae (Coleoptera). Ann. Soc. Entomol. France (N.S.) 14:95-122.