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New larval host plants and ecological observations on North American Cerambycidae (Coleoptera)

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Abstract. New larval hosts are presented for 152 North American Cerambycidae (Coleoptera). Larval host plants of *Aneflus calvatus* Horn in Leng, *Aneflomorpha arizonica* Linsley, *Aneflomorpha fisheri* Linsley, *Aneflomorpha opacicornis* Linsley, *Anelaphus magnipunctatus* (Knull), *Atylostagma glabra* Schaeffer, *Cacophrissus pauper* Bates, *Elytroleptus limpianus* Skiles and Chemsak, *Obrium rubidum* LeConte, and *Stenelytrana splendens* (Knull) are reported for the first time. The types of wood utilized by larvae of *Leptorhabdium pictum* (Haldeman), *Sphenostethus taslei* (Buquet), *Typocerus lugubris* (Say), and *Xestoleptura octonotata* (Say) are discussed. Notes on larval morphology and larval habits of *Aneflus* spp. and *Stenaspis solitaria* (Say), including a correction of a published host plant record for *S. solitaria*, are provided. *Urgleptes sandersoni* Gilmour is reported from the United States (Florida) for the first time.

Key words. Long-horned beetles, rearing.

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Introduction

The family Cerambycidae is a diverse group of wood boring beetles with over 1000 species in North America alone and tens of thousands worldwide. Host plant associations for North American Cerambycidae have been summarized by Linsley and Chemsak (1997) and many subsequent papers have provided additional information (Swift 2008; Vlasak 2014; Heffern et al. 2018; Maier 2018; Maier 2020 and references therein). Several recent publications attempted to correct erroneous records in the literature and highlighted some questionable ones (Bousquet et al. 2018; Heffern et al. 2018; Maier 2018; Maier 2020). Nevertheless, the biology of about 180 North American species remains unknown and the understanding of host plant associations overall is incomplete. This work is a continuation of efforts to further the knowledge of the natural history of Cerambycidae. Only host plants not previously reported in the literature (summarized in Table 1) are presented unless stated otherwise. Plant taxonomy follows that of Kartesz (2015).

Materials and Methods

Rearing occurred under in-house conditions as previously described (Vlasak 2014). More details are provided below:

In the development cycle of Cerambycidae, the pupal stage and the adulthood are brief periods, both only about one month long, while the larva may live for many years and it often spends many months fully developed in the pupal cell waiting for the right time to start transformation. In the temperate climate, the larvae typically build pupal cells in the fall and wait there until spring. As collection occurred throughout the entire year, mostly larvae were encountered. When the larvae are in pupal cells they can be transferred into rearing vials and they eventually transform there. The timing can depend significantly on the temperature, especially for more northern species that hibernate through cold winters, where the emergence can be accelerated at home by two months or more. Southern species, in our experience, seem to more follow the time rather than the conditions, which may

Table 1. New host plant records for Cerambycidae. Bold cerambycid species names in the left column indicate that the first ever host record for that species is newly reported here. Bold host plant genera in the right column indicate that the new host plant species record is also a new host genus record for the corresponding cerambycid species.

Cerambycid taxa	Host plant
Prioninae	
Archodontes m. melanopus	*Quercus geminata*
Mallodon dasystomus	***Fraxinus*** *velutina*
Nothopleurus lobigenis	*Baccharis sarothroides*
Orthosoma brunneum	***Chamaecyparis*** *thyoides*, *Pinus rigida*, *Pinus virginiana*
Prionus laticollis	***Kalmia*** *latifolia*
Tragosoma soror	*Pinus contorta*
Lepturinae	
Analeptura lionela	***Acer*** *rubrum*, ***Castanea***, ***Corylus*** *americana*, ***Kalmia*** *latifolia*, ***Prunus*** *virginiana*, ***Tilia*** *americana*, ***Viburnum*** *acerifolium*
Anoplodera pubera	***Nyssa*** *sylvatica*
Bellamira scalaris	*Acer rubrum*, *Betula lenta*, ***Nyssa*** *sylvatica*, ***Tilia*** *americana*
Brachyleptura rubrica	*Acer rubrum*, *Betula populifolia*, ***Nyssa*** *sylvatica*, *Quercus montana*
Centrodera decolorata	*Acer saccharum*, ***Magnolia*** *acuminata*, ***Prunus*** *serotina*, *Quercus alba*, *Quercus rubra*
Centrodera spurca	***Ceanothus***
Encyclops caeruleus	*Quercus bicolor*
Etorofus plebejus	*Pinus rigida*
Etorofus subhamatus	***Picea*** *rubens*
Leptorhabdium pictum	***Prunus*** *serotina*
Lepturobosca chrysocoma	*Pinus contorta*
Ortholeptura valida	***Picea*** *sitchensis*
Pidonia ruficollis	*Acer saccharum*, *Prunus serotina*
Stenelytrana emarginata	*Quercus falcata*
Stenelytrana splendens	***Quercus*** *emoryi*, *Quercus hypoleucoides*
Strangalepta abbreviata	*Acer rubrum*, ***Chamaecyparis*** *thyoides*, ***Fagus*** *grandifolia*, ***Picea*** *rubens*, *Quercus rubra*
Strangalia acuminata	***Hamamelis*** *virginiana*, ***Nyssa*** *sylvatica*
Strangalia bicolor	*Quercus alba*
Strangalia f. famelica	*Quercus stellata*
Strangalia luteicornis	***Corylus*** *americana*, ***Lindera*** *benzoin*, ***Prunus*** *virginiana*, ***Vaccinium*** *corymbosum*
Strophiona laeta	***Notholithocarpus*** *densiflorus*
Strophiona nitens	*Quercus alba*, *Quercus rubra*
Trachysida aspera brevifrons	*Picea rubens*
Trachysida mutabilis	*Alnus incana*, *Alnus serrulata*, *Betula nigra*, *Betula populifolia*, ***Crataegus***, ***Hamamelis*** *virginiana*, ***Kalmia*** *latifolia*, *Prunus serotina*, *Quercus alba*, ***Viburnum***
Trigonarthris proxima	*Acer rubrum*, ***Liriodendron*** *tulipifera*
Trigonarthris subpubescens	*Acer rubrum*, ***Tsuga*** *canadensis*
Typocerus deceptus	***Acer*** *rubrum*, *Quercus alba*, *Quercus rubra*
Typocerus lugubris	***Quercus*** *alba*, *Quercus rubra*
Typocerus v. velutinus	***Alnus*** *serrulata*, *Betula lenta*, *Betula populifolia*, ***Fagus*** *grandifolia*, ***Juniperus*** *virginiana*, ***Kalmia*** *latifolia*, ***Nyssa*** *sylvatica*, *Quercus ilicifolia*, *Quercus stellata*, ***Sassafras*** *albidum*
Typocerus zebra	*Pinus virginiana*
Xestoleptura behrensii	*Picea sitchensis*, ***Pinus*** *contorta*, ***Sequioa*** *sempervirens*, ***Tsuga***
Xestoleptura octonotata	*Quercus alba*
Spondylidinae	
Asemum caseyi	*Pinus jeffreyi*
Necydalinae	
Necydalis cavipennis	*Quercus gambelii*, *Quercus hypoleucoides*
Necydalis diversicollis californica	***Heteromeles*** *arbutifolia*
Necydalis d. diversicollis	*Quercus gambelii*
Necydalis laevicollis	***Morella*** *californica*
Ulochaetes leoninus	*Picea sitchensis*, *Pinus jeffreyi*
Cerambycinae	
Aethecerinus hornii	*Quercus myrtifolia*

Cerambycid taxa	Host plant
Aneflomorpha arizonica	***Ceanothus*** *fendleri*
Aneflomorpha delongi	*Quercus chapmanii*, *Quercus geminata*, *Quercus inopina*, *Quercus myrtifolia*
Aneflomorpha fisheri	***Cercocarpus*** *montanus*, ***Quercus***
Aneflomorpha opacicornis	***Guaiacum*** *angustifolium*
Aneflus calvatus	***Senegalia*** *greggii*
Aneflus levettei	*Mimosa grahamii*
Anelaphus brevidens	***Baccharis*** *sarothroides*
Anelaphus debilis	***Ulmus***
Anelaphus dentatus	***Cercocarpus*** *montanus*
Anelaphus magnipunctatus	***Senegalia*** *greggii*, ***Vachellia*** *constricta*
Anelaphus moestus	***Acer*** *negundo*, ***Cercocarpus*** *montanus*, *Quercus geminata*
Anelaphus pumilus	*Quercus montana*
Anelaphus subinermis	***Ambrosia*** *monogyra*, ***Cercocarpus*** *montanus*, ***Mimosa*** *dysocarpa*, ***Quercus*** *grisea*
Atylostagma glabra	***Quercus*** *emoryi*
Brothylus gemmulatus	***Alnus*** *oblongifolia*, *Quercus hypoleucoides*
Cacophrissus pauper	***Ziziphus*** *obtusifolia*
Callimoxys sanguinicollis	*Quercus velutina*
Callimus cyanipennis	*Quercus kelloggii*
Clytus ruricola	*Betula lenta*, *Betula populifolia*, ***Corylus*** *americana*, ***Prunus*** *pennsylvanica*
Cyrtophorus verrucosus	*Quercus montana*
Eburia haldemani	***Populus*** *deltoides*, ***Quercus***
Eburia quadrigeminata	***Betula*** *lenta*, *Quercus alba*, *Quercus rubra*
Elaphidion i. irroratum	***Rhizophora*** *mangle*
Elaphidion linsleyi	***Ulmus***
Elaphidion mucronatum	***Ailanthus*** *altissima*, ***Baccharis*** *halimifolia*
Elytroleptus limpianus	***Quercus*** *grisea*
Enaphalodes niveitectus	*Quercus gambelii*
Eucrossus villicornis	*Pinus edulis*
Euderces picipes	*Quercus bicolor*
Euderces pini	***Betula*** *nigra*
Haplidus laticeps	***Leucaena*** *retusa*
Heterachthes ebenus	*Quercus marilandica*
Knulliana c. cincta	*Quercus marilandica*
Knulliana c. soronensis	*Quercus grisea*
Metaleptus batesi	*Quercus hypoleucoides*
Methia mormona	***Quercus*** *muehlenbergii*, ***Robinia*** *neomexicana*
Methia necydalea	*Quercus myrtifolia*
Methia tenuipes	***Viburnum*** *acerifolium*
Molorchus b. bimaculatus	*Acer negundo*, ***Corylus*** *americana*, *Quercus stellata*
Molorchus longicollis	***Eriodictyon*** *crassifolium*
Neoclytus a. acuminatus	*Acer saccharinum*, *Celtis occidentalis*, *Quercus marilandica*, *Quercus montana*
Neoclytus caprea	*Juglans major*, *Quercus gambelii*, *Quercus grisea*
Neoclytus conjuctus	***Juglans***
Neoclytus horridus	*Quercus alba*, *Quercus montana*
Neoclytus m. modestus	*Quercus agrifolia*, *Quercus vaccinifolia*
Neoclytus m. zebratus	*Quercus garryana*
Neoclytus m. mucronatus	*Carya cordiformis*, *Ulmus americana*
Obrium constricticolle	*Quercus emoryi*, *Quercus hypoleucoides*
Obrium glabrum	*Quercus emoryi*
Obrium rubidum	***Robinia*** *pseudoacacia*
Oeme c. costata	*Pinus cembroides*, ***Pseudotsuga*** *menziesii*
Oeme rigida deserta	*Juniperus deppeana*
Orwellion gibbulum arizonense	***Juglans*** *major*
Paranoplium gracile laticolle	***Amorpha*** *californica*
Parelaphidion aspersum	***Populus*** *deltoides*, *Quercus alba*
Parelaphidion incertum	***Acer*** *negundo*, *Carya ovata*, ***Juglans*** *nigra*, *Quercus rubra*
Phymatodes aeneus	***Alnus*** *rubra*
Phymatodes ater	*Quercus stellata*
Phymatodes grandis	*Quercus kelloggii*

Cerambycid taxa	Host plant
Phymatodes varius	***Betula*** *lenta*, *Quercus marilandica*
Phymatodes vulneratus	***Cercocarpus*** *ledifolius*
Physocnemum violaceipenne	*Quercus coccinea*, *Quercus falcata*, *Quercus ilicifolia*
Pilostenaspis lateralis	*Quercus grisea*
Plionoma suturalis	***Simmondsia*** *chinensis*
Psyrassa unicolor	*Quercus ilicifolia*
Purpuricenus dimidiatus	*Quercus garryana*, *Quercus vaccinifolia*
Purpuricenus humeralis	*Quercus ilicifolia*
Smodicum cucujiforme	*Quercus geminata*
Stenaspis solitaria	***Canotia*** *holocantha*, ***Condalia***, ***Mimosa*** *aculeaticarpa*, *Mimosa dysocarpa*, ***Vachellia*** *constricta*
Stenelaphus alienus	***Senegalia*** *greggii*
Stenosphenus sobrius	***Robinia*** *neomexicana*
Styloxus bicolor	*Juniperus osteosperma*
Styloxus fulleri californicus	*Quercus kelloggii*
Tragidion coquus	*Quercus grisea*
Xylotrechus colonus	***Amelanchier***, ***Celtis*** *occidentalis*, ***Prunus*** *serotina*
Xylotrechus nauticus	*Quercus kelloggii*
Xylotrechus quadrimaculatus	*Betula populifolia*
Xylotrechus quercus	*Quercus hypoleucoides*
Lamiinae	
Acanthocinus leechi	*Pinus edulis*
Acanthocinus obliquus	*Pinus jeffreyi*, *Pinus longaeva*
Acanthocinus princeps	*Pinus coulteri*
Aegomorphus modestus	***Amelanchier***, *Betula populifolia*, *Celtis occidentalis*, ***Vitis***
Aegomorphus quadrigibbus	*Acer negundo*
Astylopsis macula	*Quercus montana*
Ataxia crypta	***Baccharis***
Ataxia falli	***Bursera*** *simaruba*
Dorcaschema cinereum	*Carya cordiformis*
Dorcaschema nigrum	*Carya ovata*
Ecyrus d. dasycerus	*Acer negundo*, *Acer rubrum*, *Quercus ilicifolia*, *Quercus marilandica*, *Quercus stellata*
Eupogonius pauper	***Ostrya*** *virginiana*
Eutrichillus biguttatus	*Pinus strobus*, *Pinus virginiana*
Goes pulverulentus	*Quercus ilicifolia*, *Quercus marilandica*, *Quercus rubra*
Graphisurus triangulifer	*Acer negundo*
Hippopsis l. lemniscata	*Bidens alba*
Hyperplatys aspersa	***Euonymus*** *alatus*, ***Frangula*** *alnus*
Leptostylus transversus	*Prunus virginiana*
Lepturges angulatus	***Fagus*** *grandifolia*, ***Toxicodendron*** *radicans*
Monochamus c. clamator	*Pinus edulis*
Oncideres quercus	*Quercus arizonica*
Pogonocherus penicillatus	*Pinus jeffreyi*
Saperda l. lateralis	***Salix***
Saperda obliqua	*Alnus incana*, *Betula lenta*, *Betula populifolia*
Sternidius alpha	*Quercus marilandica*
Sternidius punctatus	*Celastrus orbiculatus*, *Cornus florida*, ***Ostrya*** *virginiana*, ***Ulmus***
Styloleptus b. biustus	***Pinus*** *clausa*, ***Vitis***
Urgleptes sandersoni	***Bursera*** *simaruba*
Urgleptes signatus	*Betula lenta*, *Carya ovata*, ***Staphylea*** *trifolia*

simply reflect the fact that our in-house temperature could be similar to the temperature in the natural habitat. Nevertheless, since the emergence at home may not reflect the situation in nature, information regarding when the transformation occurred is not provided. We also typically do not discuss what developmental stage was collected but most of the time it was the larva. However, this kind of information is emphasized for unusual situations and for species where the adult beetles hibernate through winter. This is far less common, and it is also a useful practical knowledge because, for such species, the best time to look for the beetles is the long hibernation period.

When immature, still feeding larvae were encountered, the entire branch was collected since such larvae require feeding to complete development. This is not possible when immature larvae are found in larger branches or trunks. In such situations, the collected larvae were transferred at home into a new material. In these cases, only the original host is listed. Such transfers can be quite successful especially for larger species, and particularly for Prioninae, and it was done simply by drilling a hole into a new wood, trying to approximate the stage of decay but not the plant genus. For beetles developing in living hosts the presence of larvae is usually the most apparent when the larva is still feeding (it often expels frass). This is, however, not a good time to cut the plant since the larvae typically require living host throughout the entire development. In these cases, the infested plant was sometimes marked and examined again in the following year(s).

Collecting beetles via rearing is a powerful tool and it can sometimes yield species that are infrequently captured as adult beetles. However, it is important to recognize larval workings of common species as those are the most frequently encountered. Many clues can help to recognize the species the larva belongs to. Those include the host plant, the state of the host plant (dead or living, large limb or a small twig, etc.), the shape of the galleries and frass (fine vs. fibrous), the way the pupal cell is constructed, the shape of the emergence hole and whether the larva cuts the hole all the way through or not, the size of the larva and its general morphology (without magnification), and the locality itself. When considering all these clues one can usually make a good guess as to what species it is and based on that decide whether to collect or not. Therefore, these clues are sometimes commented on throughout this work.

Reared specimens are deposited in author's collection. Images of the habitat and larval workings were taken either with an iPhone 7 or a Canon EOS Rebel T5i DSLR.

Abbreviations. AZ – Arizona, CA – California, FL – Florida, IN – Indiana, MD – Maryland, MI – Michigan, NJ – New Jersey, NV – Nevada, NY – New York, OH – Ohio, OR – Oregon, PA – Pennsylvania, TX – Texas, UT – Utah, VA – Virginia.

Results and Discussion

Prioninae

***Archodontes melanopus melanopus* (Linnaeus).** Larvae were found mining in living roots of *Quercus geminata* Small, Polk Co., FL, where they also constructed their pupal cells.

***Mallodon dasystomus* (Say).** This common beetle develops in a variety of different plants, often in dead wood on living trees but also in entirely dead trees. In Arizona, its workings are most noticeable on dead parts of sycamore trees. We have also found it in lower parts of a partially dead trunk of *Fraxinus velutina* Torr., Santa Cruz Co., AZ.

***Nothopleurus lobigenis* Bates.** Linsley and Chemsak (1997) reported several different plants, including *Baccharis sergiloides* A. Grey. and *Parkinsonia florida* (Benth. ex A. Gray) S. Watson. We have found it in living root crowns of *Baccharis sarothroides* A. Grey in Pima and Santa Cruz Co., AZ. In contrast, in the washes of southern California, we have found it in dead, decaying trunks and roots of *Parkinsonia florida* and so it can clearly utilize both dead and living wood.

***Orthosoma brunneum* (Forster).** This species develops in a wide variety of plants, both in conifers and deciduous trees, typically in moist wood in the base of dead standing trunks and stumps or in fallen trunks that are in contact with the ground. New host plants include a moist, fallen trunk of *Pinus rigida* Mill. and *Chamaecyparis thyoides* (L.) Britton, Sterns and Poggenb., Burlington Co., NJ; a moist, fallen trunk of *Pinus virginiana* Mill., Anne Arundel Co., MD.

***Prionus laticollis* (Drury).** The larvae were found feeding in the roots of a dead, decaying, fire-killed shrub *Kalmia latifolia* L., Lehigh Co., PA. Pupation occurred in the soil around the roots in oval pupal cells constructed from soil and fibrous frass from the roots.

***Sphenostethus taslei* (Buquet).** Craighead (1923) states that *S. taslei* attacks dry, dead, seasoned tops of various hardwoods and contrasts this behavior with other North American Prioninae larvae that generally feed in wood that is in contact with the ground and require considerable moisture for development. Our field experience

somewhat differs from that of Craighead. In Maryland, we have found larvae most frequently in dead, decaying beech and oak branches on the ground (Fig. 1, 2). Branches of intermediate thickness (5–10 cm in diameter) were preferred; no larvae or emergence holes could be found in thick branches or trunks. Occasionally, we have found larvae in dead tops of felled oaks (i.e. material reported by Craighead), but it appeared to be less common than in the branches on the ground. Based on our experience, we would contrast larval habits of *S. taslei* to other North American Prioninae as preferring material of smaller diameter but not necessarily drier. *Elateropsis scabrosa* Gahan in Florida and other Solenopterini in the Caribbean show similar preference for branches of a smaller diameter.

***Tragosoma soror* Laplante.** This recently recognized species was reported from *Pinus* (Laplante 2017). We have reared specimens from dead logs of *Pinus contorta* Douglas ex Loudon, Mono Co., CA. *Tragosoma* Audinet-Serville species are typically found in dead pine logs without bark. They can be quite abundant in some areas of western USA. Looking for fresh oval exit holes of the appropriate size is the best way to identify logs containing larvae, as many generations typically occur in one log.

Lepturinae

***Analeptura lineola* (Say).** Larvae were found in the following: decaying base of dead *Acer rubrum* L., Ulster Co., NY; decaying base of *Castanea* Mill., Berks Co., PA; dead stem stub (cut by beavers) of *Corylus americana* Walter and *Prunus virginiana* L., Luzerne Co., PA; decaying base of *Kalmia latifolia* and *Viburnum acerifolium* L., Montgomery Co., PA; large, dead, standing, somewhat dry trunk of *Tilia americana* L., Sullivan Co., PA.

***Anoplodera pubera* (Say).** Larvae were found in scars with dead, exposed wood on living *Nyssa sylvatica* Marshall, Carbon and Leigh Co., PA. While the scars were frequently utilized by *A. pubera*, hollows on nearby living trees sometimes harbored *Charisalia americana* (Haldeman) but never vice versa. *Ch. americana* is considered rare (Bousquet et al. 2018), but in Pennsylvania larvae are not difficult to find in hollows of living *N. sylvatica*.

***Bellamira scalaris* (Say).** New larval records include: decayed, standing trunk of *Acer rubrum*, Burlington Co., NJ; decaying log of *Betula lenta* L., Monroe Co., PA; decaying log of *Nyssa sylvatica*, Carbon and Montgomery Co., PA; decaying top of *Tilia americana*, Chester Co., PA.

***Brachyleptura rubrica* (Say).** New larval records include: decaying scar on living *Acer rubrum*, Vinton Co., OH; decaying *Acer rubrum* and *Betula populifolia* Marshall; decaying base of *Nyssa sylvatica*, Camden Co., NJ; dead branch stub adjacent to living tissue of *Quercus montana* Willd., Carbon Co., PA.

***Centrodera decolorata* (Harris).** This species was found in the heartwood of various trees. In all cases, pupal cells were constructed within the wood, emergence holes were large and rather elongated, making them characteristic for the species in the area. The galleries contained quantities of large fibrous frass, like galleries of the common *Neandra brunnea* (Fabricius), except larger and less dense. New host plants include the following: very old stumps of *Prunus serotina* Ehrh. together with *Leptorhabdium pictum* (Haldeman) (Sullivan Co., PA); in the heartwood of dead, standing trunks without bark of *P. serotina* (Sullivan Co., PA), or in the heartwood of fallen trunks of *P. serotina* (Clinton Co., PA); in the heartwood of an old *Quercus alba* L. log without bark, Luzerne Co., PA (the same trunk also harbored *Necydalis mellita* (Say)); in the heartwood of an old log of *Quercus rubra* L. without bark (Clinton Co., PA). We have also found this species in trees with softer decayed wood: fallen trunk of *Acer saccharum* Marshall and in dead wood after beaver damage on a large living trunk of *Magnolia acuminata* (L.) L., Clinton Co., PA.

***Centrodera spurca* (LeConte).** Larvae were found in roots of dead *Ceanothus* L., adults were in pupal cells constructed in the soil around the root, San Diego Co., CA.

***Encyclops caeruleus* (Say).** This species was found in the outer bark of living, mature *Quercus bicolor* Willd., Chester Co., PA.

***Etorofus plebejus* (Randall).** This species has only been found in dead, dry, standing trunks and not in the moister, fallen trunks that are often preferred by other Lepturinae. *Pinus rigida*, Pike Co., PA represents a new host plant record.

Figures 1–7. Larval host plants of Cerambycidae. **1–2)** Decayed branches of *Fagus grandifolia* utilized by *Sphenostethus taslei*, emergence hole is in Fig. 1, exposed larva in a gallery in Fig. 2. **3–4)** Stump of *Prunus serotina* with emergence holes from *Lepthorhabdium pictum*. **5)** *Quercus falcata* with a basidiocarp of *Phellinus everhartii* and an emergence hole from *Stenelytrana emarginata* (enlarged in the inset). **6)** *Quercus emoryi* with resupinate basidiocarp of *Inonotus andersonii*. **7)** Old emergence holes of *Stenelytrana splendens* in an oak with an old resupinate basidiocarp of *Inonotus andersonii*.

***Etorofus subhamatus* (Randall).** Larvae were found in moist, decaying lower parts of *Picea rubens* Sarg., Monroe Co., PA.

***Leptorhabdium pictum* (Haldeman).** This species has been reported to develop in *Betula alleghaniensis*, *Carya*, *Castanea*, *Cornus florida*, and *Quercus* (Linsley and Chemsak 1997). We found *L. pictum* in stumps of *Prunus serotina* Ehrh. (Sullivan Co., PA) that were likely more than a decade old, consisting only of remnants of dry, hard, heart wood (Fig. 3, 4). The larvae bored and pupated within the wood. Emergence holes were oval, not cut all the way through by the larva and therefore a removal of a layer of wood was necessary to expose future emergence holes and pupal cells. Fully transformed adult beetles were found in pupal cells in September and then in April and early May the following year, indicating that the adult beetles hibernate in their pupal cells.

***Lepturobosca chrysocoma* (Kirby in Richardson).** This species was found in the base of a mildly decaying log of *Pinus contorta*, Mono Co., CA.

***Ortholeptura valida* (LeConte).** Larvae were found in decaying stumps of *Picea sitchensis* (Bong.) Carrière, Curry Co., OR. Also, *Ulochaetes leoninus* LeConte was frequently found in the same wood.

***Pidonia ruficollis* (Say).** This common species has been reported from several genera, including *Prunus* and *Acer* (Linsley and Chemsak 1997). Larvae were found feeding and pupating within moist bark close to the ground on dead *Prunus serotina* (Monroe and Sullivan Co., PA) and in dead bark on a damaged part of a still living *Acer saccharum* Sullivan Co., PA. The taxonomic status of the genus was recently revised (Bousquet et al. 2018) and several species previously synonymized with *P. ruficollis* have been resurrected. We have carefully examined our specimens using the key in Bousquet et al. 2018 to ascertain species identity.

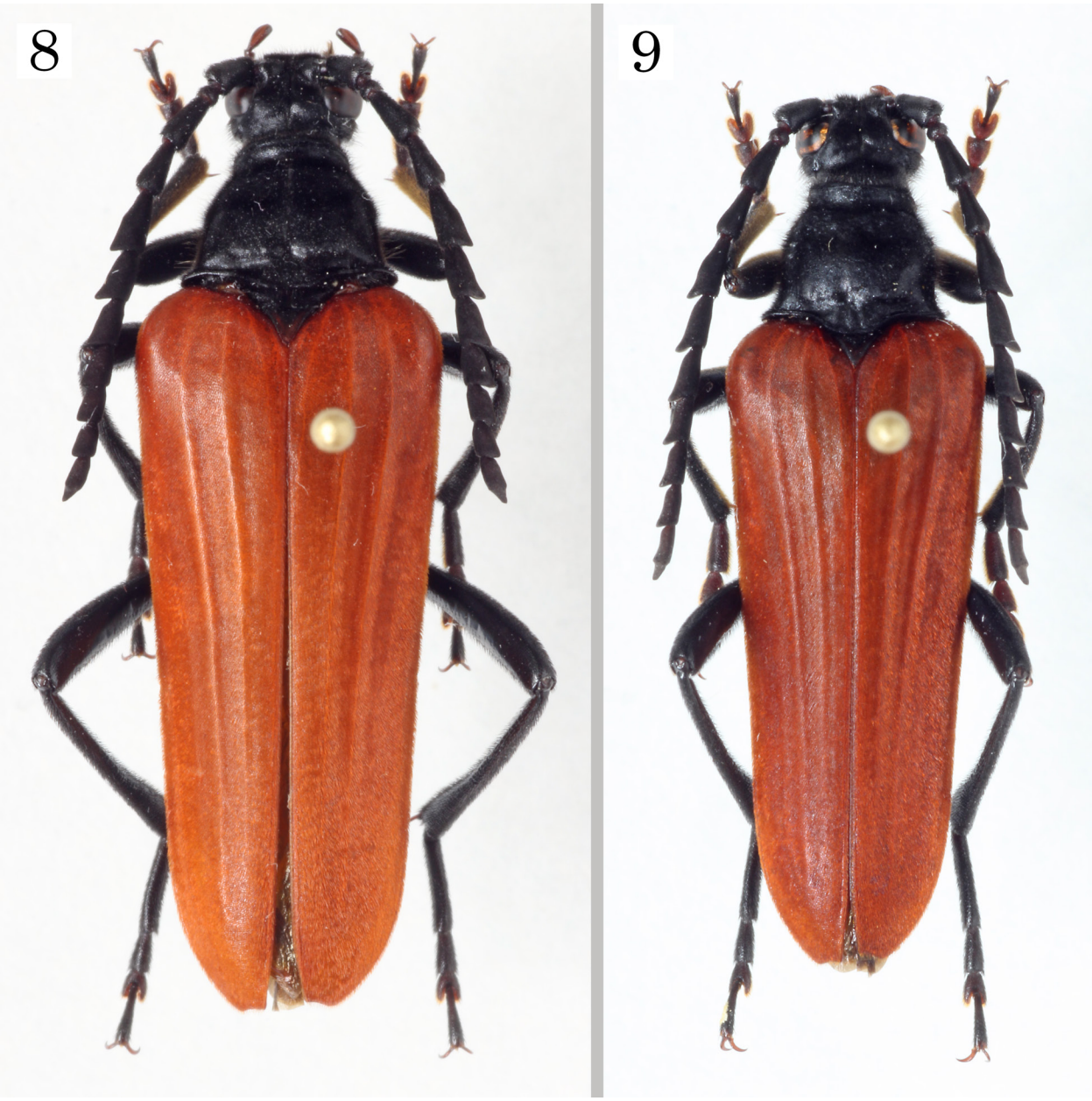
***Stenelytrana emarginata* (Fabricius).** In the Pine Barrens region of New Jersey, it is frequent in lesions from a fungus, *Phellinus everhartii* (Ell. and Gall.) A. Ames, on living *Quercus falcata* Michx., Burlington Co., NJ. The area of the trunk where the mycelium of *P. everhartii* grows is typically enlarged with dead wood in the middle and the still-living wood growing around it (Fig. 5). These lesions with dead wood containing soft, moist, decayed wood seem to strongly attract *S. emarginata*. Large, round emergence holes, comparable to those of *Monochamus* spp., are a good sign that the beetle is present at the locality. More than one generation usually occurs in the same tree.

***Stenelytrana splendens* (Knull)** (Fig. 8, 9). **First host plant record.** This rare, enigmatic species described by Knull in 1935 from a single female specimen from Globe, Arizona is only known from Arizona. It is related to the more abundant *S. gigas* (LeConte) that occurs in Texas. Nothing has been reported regarding the natural history of *S. splendens*. Larvae were found in oaks with a fungus, *Inonotus andersonii* (Ellis and Everh.) **Černy** (Fig. 6, 7). Similar to the aforementioned association of *S. emarginata* with a related fungus, *Phellinus everhartii*, the decayed wood in trees infested with *I. andersonii* seems to attract *S. splendens* and likely also *S. gigas*, as we have seen similar oaks with the characteristic large and round *Stenelytrana* Gistl exit holes in west Texas. The larvae bore within the wood and may pupate deep in the center of the trunk or closer to the periphery, perhaps depending on the remaining moisture in the tree. In fact, most trees with dead basidiocarps of *I. andersonii* that were observed in Arizona were dry and hardened and did not contain *Stenelytrana* emergence holes. Likely, there is only a narrow timeframe in the demise of such trees that can support *Stenelytrana* development. New host plants include: dead *Quercus emoryi* Torr. with dead basidiocarps of *I. andersonii*, Cochise Co., AZ (1 female); dead *Quercus hypoleucoides* A. Camus with dead basidiocarps of *I. andersonii*, Santa Cruz Co., AZ (3 males and 3 females).

***Strangalepta abbreviata* (Germar).** Larvae of this common species can be found in both conifers and deciduous trees. New host plants include: a decaying log of *Acer rubrum*, Monroe and Wayne Co., PA; base of a standing, partially dead *Chamaecyparis thyoides* (larvae bored in the dead part of the tree together with *Leptura abdominalis* (Haldeman)), Burlington Co., NJ; decaying branches on the ground of *Fagus grandifolia* Ehrh., Anne Arundel Co., MD; in the heartwood of an old log of *Quercus rubra* without bark (together with *Centrodera decolorata*), Clinton Co., PA; a moist trunk on the ground of *Picea rubens*, Carbon Co., PA.

***Strangalia acuminata* (Olivier).** This species was found in the decaying base of *Hamamelis virginiana* L., Chester Co., PA; and a decaying stem of *Nyssa sylvatica*, Burlington Co., NJ.

***Strangalia bicolor* (Swederus).** Larvae were found in dry, decayed sapwood of felled *Quercus alba*, Pike Co., PA.



Figures 8–9. *Stenelytrana splendens*. **8)** Female. **9)** Male.

***Strangalia famelica famelica* Newman.** Larvae were found in the dead scar tissue on living *Quercus stellata* Wangenh., Burlington Co., NJ.

***Strangalia luteicornis* (Fabricius).** New larval records include: dead stems of *Corylus americana*, Carbon Co., PA; a decaying root crown of *Lindera benzoin* (L.) Blume, Montgomery Co, PA; a dead stem stub of *Prunus virginiana* cut by beavers, Luzerne Co., PA; a decaying base of *Vaccinium corymbosum* L., Burlington Co., NJ.

***Strophiona laeta* (LeConte).** This species was found in the base of recently dead *Notholithocarpus densiflorus* (Hook. and Arn.) P.S. Manos, C.H. Cannon, and S.H. Oh. Galleries and pupal cells were constructed entirely within the thick, moist bark, Curry Co., OR.

***Strophiona nitens* (Forster).** This species was found in the moist base of large, recently dead and still standing *Quercus alba*, New Castle Co., DE and Carbon Co., PA; and in the moist base of recently dead and still standing *Quercus rubra*, Madison Co., VA and Luzerne Co., PA.

Both *S. laeta* and *S. nitens* show strong preferences for moist bark on recently dead or dying trees, which is typically found at the tree base. Reports in the literature (Craighead 1923) suggest that *S. nitens* attacks living trees, but that does not agree with our experience, as we have always found it in recently dead trees or in dead parts on living trees.

***Trachysida aspera brevifrons* (Howden).** This species was found in decayed trunks (both standing and felled) of *Picea rubens*, Carbon Co., PA.

***Trachysida mutabilis* (Newman).** This is probably the most common cerambycid in small-diameter, moist, decaying wood in eastern PA. The following host plants can be added to the already large list: a decaying stem of *Alnus incana* (L.) Moench, Schuylkill Co., PA; decaying lower portions of *Alnus serrulata* (Aiton) Willd. and a decaying trunk of *Betula nigra* L., Montgomery Co., PA; a decaying trunk of *Betula populifolia*, Carbon Co., PA; base of decaying *Crataegus* L., and a decaying base of *Viburnum* L., all in Chester Co., PA; a decaying base of *Hamamelis virginiana*, Lackawanna Co., PA; a decaying base and roots of fire-killed *Kalmia latifolia*, Camden Co., NJ; decaying branches of *Prunus serotina*, Montgomery Co., PA; decaying branches of *Quercus alba*, Delaware Co., PA.

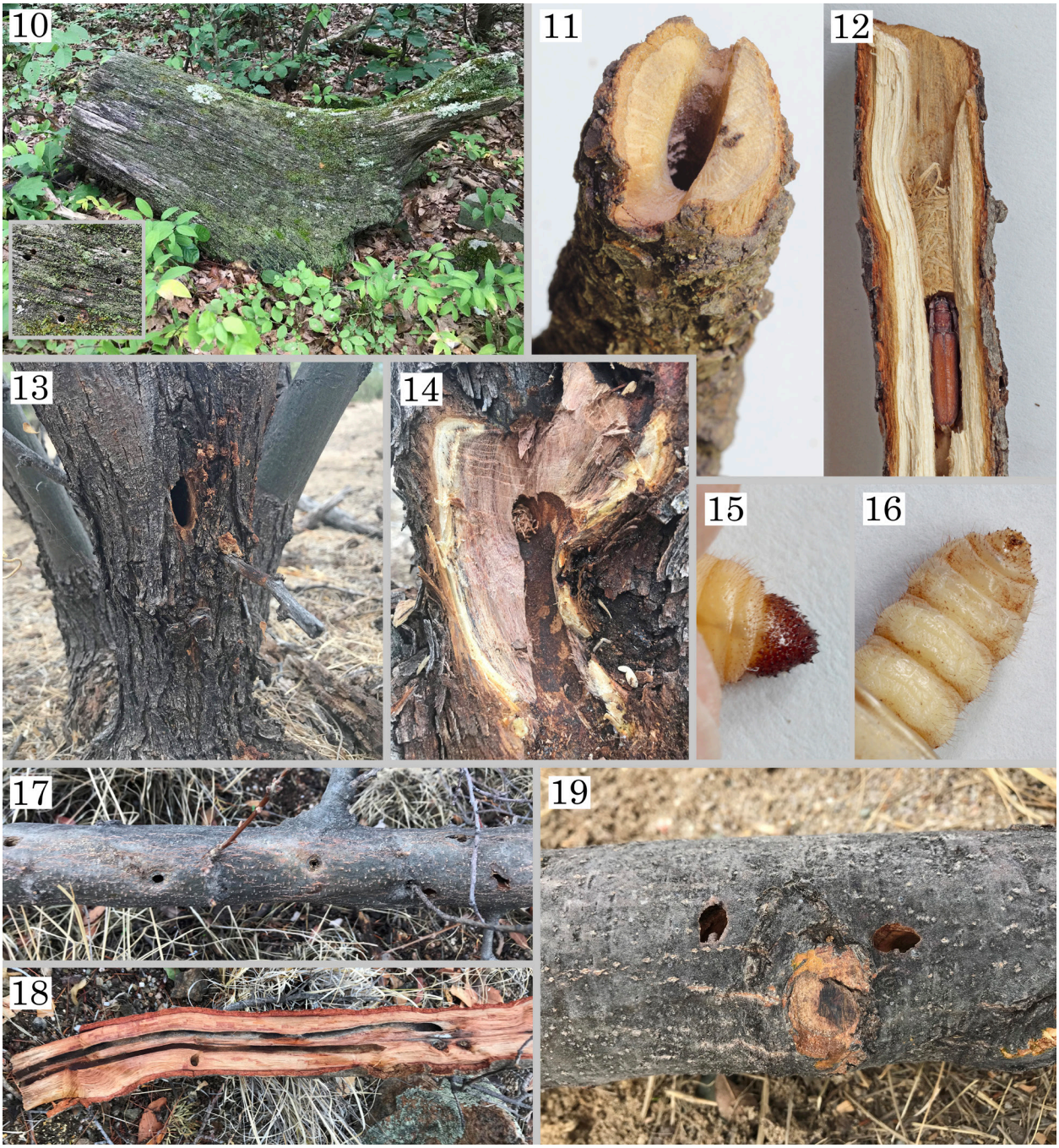
***Trigonarthris proxima* (Say).** Larvae were found in dead wood in a hollow of living *Acer rubrum*, Lehigh and Monroe Co., PA; dead wood in a hollow of mature, living *Liriodendron tulipifera* L., Berks and Montgomery Co., PA. *T. proxima* appears to develop in hollows of living trees. In addition to the aforementioned new host plants, we have also frequently found it in hollows of living *Nyssa sylvatica*. In contrast, *Trigonarthris subpubescens* Kirby in Richardson seems to develop in decaying logs or standing, decaying trunks of dead trees.

***Trigonarthris subpubescens*.** Larvae were found in a decaying standing trunk of *Acer rubrum*, Monroe Co., PA; and a decaying trunk of *Tsuga canadensis* (L.) Carrière, Montgomery Co., PA.

***Typocerus deceptus* Knull.** This species was reported from a dead scar on a living oak (Vlasak 2014). Since then, we have found it in decayed *Quercus* logs and in the sapwood of felled trunks of *Quercus alba* without bark, such trunks likely died standing and fell later (Frederick Co., MD), and in a dead thick branch without bark on a living *Quercus rubra* (Vinton Co., OH). Additionally, we have found this species in a hollow of living *Acer rubrum*, together with *Trigonarthris proxima*, Berks Co., PA. So overall, it seems that *T. deceptus* does seek out dead wood on living trees, but it may utilize dead, decaying trees as well.

***Typocerus lugubris* (Say).** *T. lugubris* has been reported to develop in *Pinus* but Bousquet et al. (2018) argued that this record is doubtful. We have found larvae in decayed heartwood of old, felled trunks of *Quercus* (Lehigh Co., PA), *Quercus alba* (Pike Co., PA), and *Quercus rubra* (Clinton Co., PA). The age of these trunks and the overall appearance of the exit holes and galleries were similar to *Necydalis mellita* but the exit holes appeared slightly larger and the wood appeared somewhat more decayed (always white rot) and moist, although in one case the same log harbored both *T. lugubris* and *N. mellita*. As is discussed below, similar logs are also utilized by *Xestoleptura octonotata* (Say). Because oak heartwood decays very slowly, these logs (Fig. 10), often covered with lichens and mosses, may have been decaying more than a decade, and one could imagine that they might be overlooked by entomologists.

***Typocerus velutinus velutinus* (Olivier).** This species was found in the decaying base of *Alnus serrulata*, Montgomery Co., PA; decaying log of *Betula lenta*, Sussex Co., NJ; decaying base of *Betula populifolia*, Ulster Co., NY; decaying branches of *Fagus grandifolia*, Anne Arundel Co., MD; moist decaying bases of several different *Juniperus virginiana* L. trees, Montgomery Co, PA; decaying base and roots of fire-killed *Kalmia latifolia*, Camden Co., NJ; decaying base of *Nyssa sylvatica* and fire-killed *Quercus ilicifolia* Wangenh., Carbon Co., PA; decaying base of *Quercus stellata*, Burlington Co., NJ; decaying base of *Sassafras albidum* (Nutt.) Nees, Northampton Co., PA. This common species develops in decayed wood of various plants but only recently (Maier 2018) it has been reported from a coniferous tree (*Pinus rigida*). *Juniperus virginiana* represents a second conifer record.



Figures 10–19. Larval host plants of Cerambycidae. **10)** An old log of *Quercus alba* covered with lichens and mosses that harbored *Typocerus lugubris*, exit holes in the inset. **11–12)** *Quercus* sp. stem girdled by *Aneflomorpha fisheri*. **13)** Elongated future emergence hole of *Aneflus paracalvatus* in *Prosopis velutina* (holes of *A. calvatus* in *Senegalia greggii* are similar). **14)** Fig. 13 after removal of a layer of wood – plug in the turn is visible, remnants of the tunnel leading to the plug can be seen due to their darker color. **15)** Sclerotized terminal segment of *Aneflus levettei* larva (dorsal view). **16)** Larva of *Aneflus calvatus* (ventral view) with the terminal segment bearing spikes but not having the area between them sclerotized. **17)** Holes along a branch of *Quercus emoryi* through which *Atylostagma glabra* expelled frass. **18)** Empty central tunnels of *A. glabra* (split branch from Fig. 17). **19)**. Future emergence holes of *A. glabra* on a branch of *Quercus emoryi*.

***Typocerus zebra* (Olivier).** Larvae were found in decaying fallen logs of *Pinus virginiana*, Prince William and Fairfax Co., VA.

***Xestoleptura behrensii* (LeConte).** Larvae were found in decaying logs of *Picea sitchensis* and in decaying branches of *Pinus contorta*, Curry Co., OR; in decaying logs of *Picea sitchensis* and *Sequoia sempervirens* (Lamb. ex D. Don) Endl., Humboldt Co., CA; in a decaying log of *Tsuga* Carrière, Del Norte Co., CA. Although *X. behrensii* is apparently rare in collections (Schapker 2017) it was the main lepturine species that we found in various decaying conifers in the coastal region of northern CA and southern OR and it appeared to be common there.

***Xestoleptura octonotata* (Say).** *X. octonotata* has been reported to develop in *Quercus* (Linsley and Chemsak 1997). We found larvae in decayed heartwood of many old trunks of *Quercus alba* on the ground (Pike Co., PA). The age of the wood and the appearance of the exit holes were similar to those of the aforementioned *Typocerus lugubris*.

Spondylidinae

***Asemum caseyi* Linsley.** This species was found in the thick bark of large fallen *Pinus jeffreyi* Grev. and Balf., El Dorado Co., CA. *Asemum* species typically bore and construct their pupal cells deep in the sapwood but in this case the galleries and pupal cells were constructed solely within the bark. Such behavior usually occurs when the bark is unusually thick, and it can be observed for other cerambycid species as well.

Necydalinae

***Necydalis cavipennis* LeConte.** This species was found in the base of dead *Quercus gambelii* Nutt., Coconino Co., AZ; and in the base of dead *Quercus hypoleucoides*, Graham and Santa Cruz Co., AZ.

***Necydalis diversicollis californica* Linsley.** Pupae were found in the base of dead *Heteromeles arbutifolia* (Lindl.) M. Roem., Santa Cruz Co., CA.

***Necydalis diversicollis diversicollis* Schaeffer.** Pupae were found in the base of dead *Quercus gambelii*, San Juan Co., UT.

***Necydalis laevicollis* LeConte.** Pupae were found in the base of decaying *Morella californica* (Cham. and Schltdl.) Wilbur, Curry Co., OR. For all the aforementioned *Necydalis* Linnaeus species, the pupae were always positioned so that the head was not directed towards the future exit and therefore, the beetle must turn around in the relatively narrow pupal cell. The same behavior was reported for the eastern *Necydalis mellita* (Say) (Heffern et al. 2018).

***Ulochaetes leoninus* LeConte.** This species was found in decaying stumps of *Picea sitchensis*, Curry Co., OR; and in the bark and sapwood of large, dead *Pinus jeffreyi*, Riverside Co., CA.

Cerambycinae

***Aethecerinus hornii* (Lacordaire).** Larvae were found in broken, thin branches of *Quercus myrtifolia* Willd., Marion Co., FL. All three species of *Aethecerinus* Fall and Cockerell tend to develop in very thin terminal twigs or stems, which they completely hollow out, leaving all but the thin bark.

***Aneflomorpha arizonica* Linsley. First host plant record.** This species was found abundantly in girdled, living stems of *Ceanothus fendleri* A. Gray, Santa Cruz Co., AZ. Larvae feed in living stems, working from the apical part down, occasionally fully girdling the stem. The galleries usually reach into the root crown. Prior to pupation the larva creates the last, V-shaped girdle, typically just above the soil level and plugs it with fibrous frass. The larger size of the beetle is apparent in the size of the galleries and in the size of the fibrous-frass plug.

***Aneflomorpha delongi* (Champlain and Knull).** This Florida and Georgia endemic is apparently rare in collections (Morris 2002). Nevertheless, girdled stems of oaks, usually no more than 1 cm in diameter, can be frequently seen in central Florida. The stems can be collected in the spring and even though the larvae are very young at that time they seem to readily finish development in the cut stem. Of the approximately two dozen adult beetles reared

from these stems all belonged to *A. delongi*. New hosts plants include *Quercus chapmanii* Sarg., *Q. geminata*, *Q. inopina* Ashe, and *Q. myrtifolia*, Polk Co., FL.

***Aneflomorpha fisheri* Linsley. First host plant record.** Larvae were found in girdled living stems of scrub oaks, *Quercus*, and in a living stem of *Cercocarpus montanus*, Culberson Co., TX. The girdled stems were about 1–2 cm in diameter, which is larger than stems girdled by smaller *Aneflomorpha* species. The fibrous frass plug was typically deep inside (Fig. 11–12).

***Aneflomorpha opacicornis* Linsley. First host plant record.** Larvae were found in living stems (1–3 cm in diameter) of *Guaiacum angustifolium* Engelm., Brewster Co., TX. These stems are generally larger than those used by other *Aneflomorpha* Casey species. The larva works down, sometimes straight but more often spiraling around the living stem, occasionally girdling the stem where it may break when stressed. Old downward galleries can be seen on many stems, generally still living, suggesting that the larva does not fully kill the stem. The V-shaped girdle that is typical for many *Aneflomorpha* species is not constructed. Instead, the larva chews the future emergence hole on a side of the stem and plugs the pupal cell deeper inside with a fibrous-frass plug. *Aneflomorpha luteicornis* Linsley also does not construct the V-shaped girdle prior to pupation and emerges on a side of the branch (Heffern et al. 2018).

***Aneflus calvatus* Horn in Leng. First host plant record.** Larvae were found in living, larger trunks of *Senegalia greggii* (A.Gray) Britton and Rose, Pima Co., AZ. The larvae appeared to bore subcortically but the galleries were not very apparent. What was noticeable was a tunnel where pupation took place – from the subcortical area a tunnel turns approximately 2 cm inward and then about 20 cm down. The tunnel is sealed with a wad of fibrous frass at the beginning of the downward turn. At the level of the turn, the larvae cut elongated (parallel with the grain) future emergence holes through the bark. Fresh holes as well as holes from previous years could be seen on many trees at various heights, although mostly less than one meter above ground. Using a small twig, one could probe to determine whether the plug at the beginning of the downward turn was still present or whether the beetle had already emerged. Larval workings of *Aneflus paracalvatus* Knull are essentially the same but occur on *Prosopis* (Fig. 13–14). We have collected a small series of both species at the same locality and both species seemed selective for their respective host.

Larvae of *Aneflus* LeConte species that we have seen, including a larva of *A. protensus* (LeConte) reported by Craighead (1923) have the last segment covered with small, sclerotized spikes. The sclerotization is developed to a different degree depending on the species and possibly also depending on larval habits. In the case of *A. calvatus* and *A. paracalvatus*, the spikes are not immediately noticeable to a naked eye because the area between the spikes is not sclerotized (Fig. 16). For *A. levettei* (Casey), however, the last segment is sclerotized even between the spikes, resulting in a brown appearance (Fig. 15). The larvae of *A. levettei* construct long, narrow tunnels along the stem, which they keep completely empty and the sclerotized tail may help to protect the larva from attacks by ants. This was hypothesized by Vogt (1949), who erroneously considered these larvae as larvae of *Stenaspis solitaria* (Say). On the other hand, the larvae of *A. calvatus* and *A. paracalvatus* do not construct these long, narrow, empty tunnels and therefore they would apparently not benefit from having their posterior end protected.

***Aneflus levettei* (Casey).** This species was found in living stems of *Mimosa grahamii* A. Gray, Cochise Co., AZ. The larva starts feeding in the apical part of a living stem, gradually working its way down, occasionally girdling the stem, and keeping the central tunnel empty through openings along the stem. At the ground level, the stem is girdled again, and the larva continues deep into the taproot, while expelling frass from the root tunnel through an opening right below the last girdle. The frass accumulates and is noticeable. When the stem breaks at this ground girdle the tunnel is plugged with a fibrous frass.

***Anelaphus brevidens* (Schaeffer).** This species was found in the girdled stem of *Baccharis sarothroides*, Pima Co., AZ.

***Anelaphus debilis* (LeConte).** This species was reared from dead branches of *Ulmus*, Denton Co., TX.

***Anelaphus dentatus* Chemsak.** *A. dentatus* has been reported only from *Quercus hypoleucoides* (Linsley and Chemsak 1997). We have found it in dead branches of *Cercocarpus montanus* Raf., Santa Cruz Co., AZ.

***Anelaphus magnipunctatus* (Knull). First host plant record.** This species was reared from dead branches of *Senegalia greggii* and *Vachelia constricta* (Benth.), Jeff Davis Co., TX. In one case, larvae were found in dead roots of an unidentified shrub exposed in a wash. In this case, the galleries were examined more carefully and were found to be mostly inside the wood, tightly packed with fine frass and, at first, appeared to belong to a species of Clytini.

***Anelaphus moestus* (LeConte).** Additional records for this species are: under bark of a dead branch of *Acer negundo* L., Grand Co., UT; under bark of a dead branch of *Cercocarpus montanus*, Doña Ana Co., NM; and under bark of a dead trunk of *Quercus geminata*, Polk Co., FL.

***Anelaphus pumilus* (Newman).** This species was found in dead branches of *Quercus montana*, Frederick Co., MD. This species overwinters as adults. In one instance, we have found both adults and larvae in pupal cells in early spring. The larvae did not transform until late summer and would likely not emerge until the following year, which is interesting because they essentially spent the whole year in their pupal cell. We have made similar observations in the case of *Semanotus litigiosus* (Casey). *A. pumilus* larvae bore under bark of dead branches. The entrance into the pupal cell is transversal, reminiscent of *Physocnemum* spp. or *Semanotus* spp, which, together with their small size, makes them unique for oak branches in north-eastern USA.

***Anelaphus subinermis* Linsley.** Larval workings of this beetle are very common in west Texas. Habits are similar to those of *Anelaphus brevidens* and this species seems to fill the same niche that is occupied by *A. brevidens* in Arizona. It develops both in living and dead stems of about 1 cm (occasionally thicker) in diameter. Prior to pupation the larva girdles the stem with the characteristic V-shaped girdle that is also typical for many species of *Aneflomorpha* and *Oberea* Mulsant. These girdles are seen frequently along trails. New host plant records include: girdled stems of living or dead *Cercocarpus montanus*, Culberson Co., TX; girdled living stems of *Ambrosia monogyra* (Torr. and A. Gray) Strother and B. G. Baldwin, girdled living or dead stems of *Mimosa dysocarpa* Benth., cut thin branches (girdling in these branches was not apparent) of *Quercus grisea* Liebm., all in Jeff Davis Co., TX.

***Atylostagma glabra* Schaeffer. First host plant record.** This species was reared from living *Quercus emoryi*, Cochise Co. AZ and the distinctive galleries were seen on several other *Q. emoryi* and on one *Quercus arizonica* Sarg. at the same locality. Oviposition likely occurs on terminal twigs (< 1 cm in diameter) as the galleries originate in thin terminal twigs and then go into thicker branches (~ 5 cm in diameter) and often all the way into the main trunk (~ 10 cm in diameter). From the oviposition site, the larva mines a long, central tunnel (Fig. 18), which gradually widens as the larva grows. The larva keeps the tunnel completely empty by expelling frass through many conspicuous, large holes along the branch (Fig. 17). The larva may travel 2–3 m before it finally pupates. Several parallel tunnels often exist in the branch, each possibly belonging to a different larva, but this was not confirmed. Prior to pupation, the larva prepares the future oval emergence hole all the way through the bark (Fig. 19). The tunnel that leads to this future emergence hole is empty but when following the tunnel 10–15 cm inside one finds a fibrous-frass plug behind which the larva pupates. We have observed one oak for two consecutive years and from the time we first noticed the galleries, which were already in thicker branches at that time, it took one additional year for the emergence holes to appear, suggesting that the larvae require several years for development.

In Costa Rica, similar larval habits were observed for the related *Atylostagma polita* White. We found adult beetles in large (3–5 cm in diameter) branches that had been girdled on living trees and subsequently broke off and fell on the ground. These branches contained long straight and completely empty tunnels with conspicuously large holes alongside that were used to expel frass. Aside from girdling, the habits of *A. polita* larvae were very much the same as those of *A. glabra*.

***Brothylus gemmulatus* LeConte.** This species was found in the base of dead *Quercus hypoleucoides* without bark, Santa Cruz Co., AZ and in a dead, fallen trunk of *Alnus oblongifolia* Torr., Graham Co., AZ. *Alnus* represents the first non-*Quercus* larval host for this species. *B. gemmulatus* as well as *B. conspersus* LeConte develop in dead trunks or in large limbs without bark or in scars on living trees.

***Cacophrissus pauper* Bates. First host plant record.** Specimens were reared from dead stems (often close to living tissue) of *Ziziphus obtusifolia* (Hook. ex Torr. and A. Gray) A. Gray, Pima Co., AZ. The larvae bore within

the wood, tightly packing galleries with fine granular frass. The overall appearance of the galleries is reminiscent of galleries of various Clytini. The emerging beetle gnaws a slightly oval emergence hole parallel with the grain.

***Callimoxys sanguinicollis* (Olivier).** This species was found in a dead branch of *Quercus velutina* Lam., Philadelphia, PA. Larvae mine inside dead branches and infested branches can be recognized by the rather elongated, oval exit holes oriented parallel with the grain. The adults overwinter in pupal cells.

***Callimus cyanipennis* (LeConte).** This species was reared from a fire-killed, young *Quercus kelloggii* Newb., San Diego Co., CA.

***Clytus ruricola* (Olivier).** Additional host records for this species are as follows: a mildly decayed branch of *Betula lenta*, Berks Co., PA; decayed branches of *Betula populifolia*, Carbon Co., PA; a dead stem stub of *Corylus americana* cut by beavers, Luzerne Co., PA; a mildly decayed branch of *Prunus pennsylvanica* L. f., Montgomery Co., PA. *C. ruricola* seems to prefer somewhat decayed wood, which is unusual among Clytini.

***Cyrtophorus verrucosus* (Olivier).** This species was found in a scar tissue on living *Quercus montana*, Clinton Co., PA.

***Eburia haldemani* LeConte.** Larvae were collected in a beaver-damaged base of a large and already dead *Populus deltoides* W. Bartram ex Marshall, Denton Co., TX; partially dead trunk of *Quercus*, Orange Co., FL; base of a fire-killed *Quercus*, Burnet Co., TX.

***Eburia quadrigeminata* (Say).** Larvae were found in scar tissue on a living, large branch of *Betula lenta* and in dead branch stubs on living *Q. alba* and *Quercus rubra*, Montgomery Co., PA. Exit holes resemble those of larger Buprestidae but are generally less elongated along the transversal axis and the lower side is more arched out than the upper side. This shape is distinctive for many other species of the genus and can be used to recognize *Eburia* Lacordaire workings in the field.

***Elaphidion irroratum irroratum* (Linnaeus).** *E. irroratum* develops in recently dead branches and trunks of various hardwoods. Interestingly, we have once found it in a living seedling of *Rhizophora mangle*, Monroe Co., FL. This is likely an unusual behavior.

***Elaphidion linsleyi* Knull.** This species was reared from a dead branch of *Ulmus*, Wise Co., TX.

***Elaphidion mucronatum* (Say).** Specimens were reared from a dead stem of *Ailanthus altissima* (Mill.) Swingle, Montgomery Co., PA; and a dead stem of *Baccharis halimifolia* L., Ocean Co., NJ.

***Elytroleptus limpianus* Skiles and Chemsak. First host plant record.** One specimen was reared from a dead, thin branch of *Quercus grisea*, Jeff Davis Co., TX. Of the eight *Elytroleptus* species found in the USA, five have been now reported to develop in thin oak branches. *Elytroleptus divisus* (LeConte) has been reared from "dry branches (probably Senegalia/Vachellia (formerly Acacia) or Celtis) from TX: Val Verde Co" (Heffern et al. 2018). Larval host plants of *Elytroleptus luteus* Dugès and *Elytroleptus rufipennis* (LeConte) are still unknown.

***Enaphalodes niveitectus* (Schaeffer).** Larvae were collected under bark of a large, recently dead *Quercus gambelii*, Santa Cruz Co., AZ.

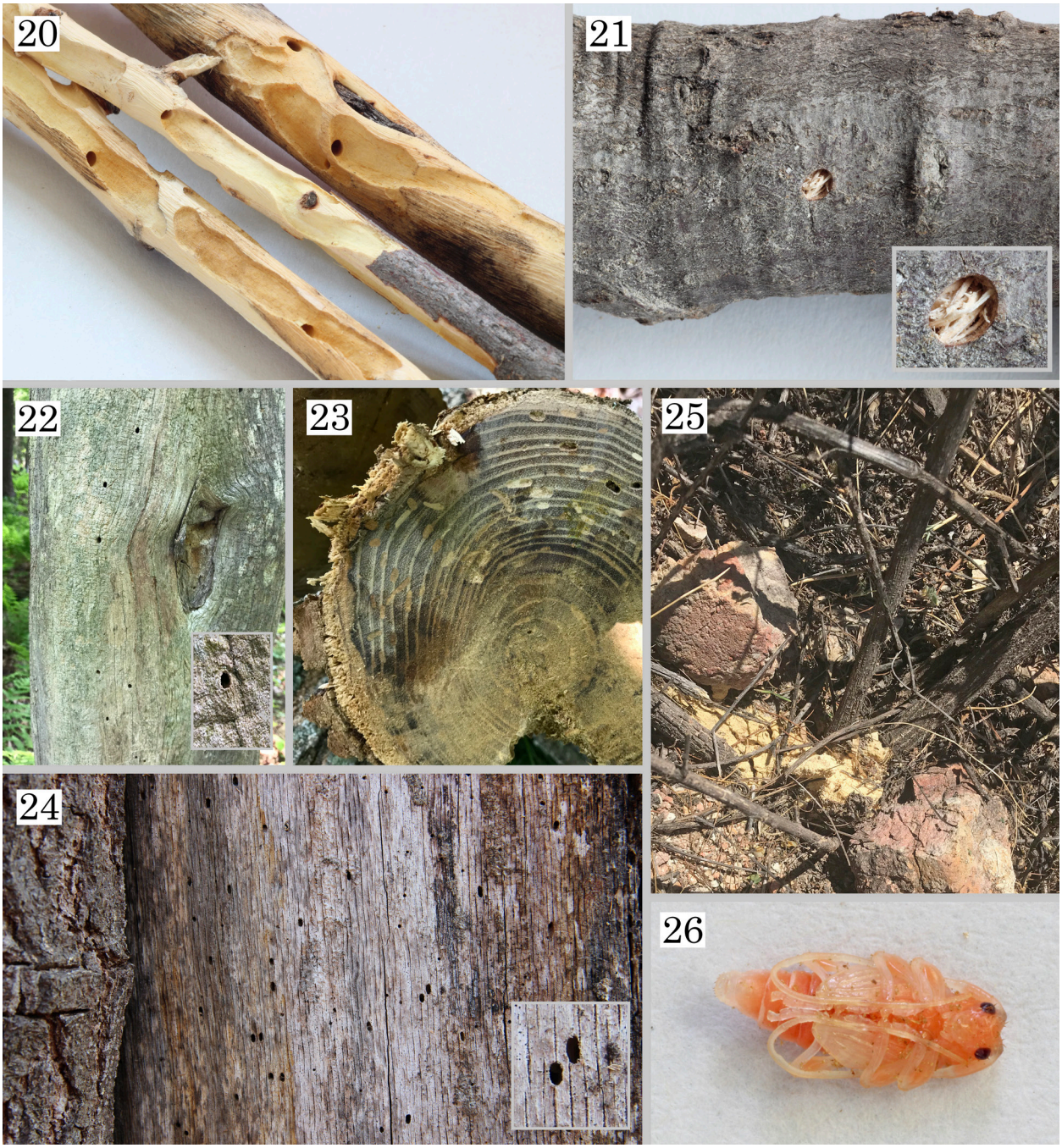
***Eucrossus villicornis* LeConte.** This species was found in the dead trunk of *Pinus edulis* Engelm., Grand Co., UT.

***Euderces picipes* (Fabricius).** This species was reared from dead branches of *Quercus bicolor*, Montgomery Co., PA.

***Euderces pini* Olivier.** This species was reared from a dead branch of *Betula nigra*, Montgomery Co., PA.

***Haplidus laticeps* Knull.** Rice et al. (1985) reported this species from *Vachelia constricta*. We have seen it frequently in dead stems of the same plant but also in *Leucaena retusa* Benth., Jeff Davis Co., TX. Deep and relatively wide subcortical galleries were characteristic for this species in the area (Fig. 20). Larvae and pupae were found in pupal cells in early October and adult beetles in December, suggesting that adult beetles overwinter in their pupal cells.

***Heterachthes ebenus* Newman.** This species was reared from branches of fire-killed *Quercus marilandica* Münchh., Burlington Co., NJ.



Figures 20–26. Larval host plants of Cerambycidae. **20)** Galleries of *Haplidus laticeps* in *Vachelia constricta*. **21)** One sealed opening in a branch of *Quercus* used by larvae of *Metaleptus batesi* to expel frass (enlarged in inset). **22)** Exit holes of *Obrium rubidium* on a dead limb of *Robinia pseudoacacia* (enlarged in inset). **23)** Galleries of *O. rubidium* on a cross-section. **24)** Elongated exit holes of *Smodicum cucujiforme* in a scar on living *Quercus* (enlarged in the inset). **25)** A pile of yellow granular frass around a base of living *Mimosa* expelled by larvae of *Stenaspis solitaria*. **26)** Pink pupa of *Sternidius alpha*.

***Knulliana cincta cincta* (Drury).** A specimen was reared from the stem of a fire-killed *Quercus marilandica*, Burlington Co., NJ.

***Knulliana cincta sonorensis* (Schaeffer, 1908).** This subspecies was reared from a dead, uprooted *Quercus grisea*, Jeff Davis Co., TX. In Arizona and west Texas, this subspecies is common in recently dead trunks and larger limbs of oaks. Larvae keep galleries relatively empty by expelling large quantities of fine granular frass, which forms large piles under the infested wood. Adult beetles gnaw the last layer of the bark so the presence of holes in the bark is a sign that the beetles have already emerged.

***Metaleptus batesi* Horn.** Adults were found in dead branches of *Quercus hypoleucoides*, Cochise and Pima Co., AZ. Larvae make conspicuous oval openings in the bark through which they expel excess frass, although the galleries are still packed with frass (Fig. 21). Multiple such openings are made as larvae move along the branch. Unused openings are sealed with a plug of fibrous frass. Adult beetles hibernate in their pupal cells and emerge early in the spring.

***Methia mormona* Linell.** This species was found in dead branches of *Quercus muehlenbergii* and in a thin twig of *Robinia neomexicana* (the terminal portion of the twig was girdled off, pupal cell was constructed in the bottom part that was still living but it is unclear if the top part in which the larva developed was dead or living), Culberson Co., TX.

***Methia necydalea* (Fabricius).** This species was reared from thin, broken branches of *Quercus myrtifolia*, Marion Co., FL.

***Methia tenuipes* (Haldeman).** Specimens were reared from dead stems of *Viburnum acerifolium*, Montgomery Co., PA.

***Molorchus bimaculatus bimaculatus* Say.** Additional host records for this subspecies include: dead branches of *Acer negundo* and *Corylus americana*, Montgomery Co., PA; a dead branch of *Quercus stellata*, Burlington Co., NJ. Adult beetles hibernate in their pupal cells. Galleries of *Molorchus* Fabricius species are quite distinctive and can be recognized by a combination of a transverse entrance into the pupal cell and the overall small size.

***Molorchus longicollis* LeConte.** Larvae were found in dead stems of *Eriodictyon crassifolium* Benth., Riverside Co., CA.

***Neoclytus a. acuminatus* (Fabricius).** *N. acuminatus* has been reported from 47 native genera of plants, the largest number for any North American Cerambycidae. Additional host plants include: a fallen trunk of *Acer saccharinum* (Chapm.) Pax and a dead branch of *Celtis occidentalis* L., Montgomery Co., PA; dead branches of *Quercus marilandica*, Burlington Co., NJ; and fire-killed *Quercus montana*, Northampton Co., PA.

***Neoclytus caprea* (Say).** This wide-spread species has been reported from a variety of plants (Linsley and Chemsak 1997). New host plants include: a dead branch of *Juglans major* (Torr.) A. Heller, Coconino Co., AZ (the branch also harbored *Stenosphenus beyeri* Schaeffer); dead trunks and branches of *Quercus gambelii*, San Juan Co., UT; dead trunks and branches *Quercus grisea*, Jeff Davis Co., TX. In the southwest, *N. caprea* is probably the most common clytine beetle (with round emergence holes) in dead wood and it can be found in a variety of different plants. In contrast, in the northeast, it is less common, and it is restricted to *Fraxinus* spp.

***Neoclytus conjunctus* (LeConte).** This species was reared from a dead, large branch of *Juglans*, Santa Clara Co., CA.

***Neoclytus horridus* (LeConte).** *N. horridus* has been reported to develop in *Quercus* but only *Q. rubra* was given as a specific host plant (Linsley and Chemsak 1997). We have found it in dead branches of *Quercus alba*, Montgomery Co., PA and *Q. montana*, Frederick Co., MD. Adult beetles were found in pupal cells in February and March, indicating that this species overwinters as adults.

***Neoclytus modestus modestus* Fall.** This subspecies has been reported to develop in *Quercus* (Linsley and Chemsak 1997) but no particular species was given. We have found it in dead branches of *Quercus agrifolia*, San Diego and Santa Clara Co., CA and in branches of *Quercus vaccinifolia* Kellogg, typically in the transition zone between dead and living tissue, sometimes in the same branch with *Purpuricenus dimidiatus* LeConte, El Dorado Co., CA.

***Neoclytus modestus zebratus* Van Dyke.** This subspecies was found in dead, thin stems (typically in the transition zone between dead and living tissue) of *Quercus garryana* Douglas ex Hook., Jackson Co., OR.

***Neoclytus mucronatus mucronatus* (Fabricius).** This is a typical heartwood borer. In the northeast, it is most frequently associated with *Carya* spp. The larva prepares a circular exit hole, leaving the last layer of the wood and the entire bark intact (therefore removing only bark does not usually reveal future exit holes), which is then gnawed by the adult. The exit gallery is sealed with fine frass. New host plants include a fallen trunk of *Ulmus americana* L., Berks Co., PA, and a trunk and thick branches of *Carya cordiformis* (Wangenh.) K. Koch, Montgomery Co., PA.

***Obrium constricticolle* Schaeffer.** This Arizona species has been recorded from *Quercus* (Linsley and Chemsak 1997) but no species was given. We have found it in thin (1 cm), dead stems of *Quercus hypoleucoides*, Cochise Co., AZ and in thin, dead branches of *Quercus emoryi*, Santa Cruz Co., AZ.

***Obrium glabrum* Knull.** This minute species has been reported by Linsley and Chemsak (1997) to develop in *Quercus*, but they likely referenced the work of Rice et al. (1985) who reported to have beaten it from dead oak twigs. Nevertheless, we can confirm oak as the host plant. We have reared a specimen from a thin, dead twig of *Quercus emoryi* in Jeff Davis Co., TX.

***Obrium rubidum* LeConte. First host plant record.** Larvae were found in scars on living *Robinia pseudoacacia* L. but also in entirely dead, standing trees of the same species in Clinton and Cumberland Co., PA and Frederick Co., MD, which is the basis for the following detailed observations.

In late May, we noticed oval exit holes on exposed dead wood on living *R. pseudoacacia* (Fig. 22). When removing the wood, we would occasionally find pre-made exit tunnels, but the larvae were not deep inside but rather close to the exit, suggesting that they were just preparing the tunnel. Larvae were often cut in half in this process. Eventually, we started finding adult beetles running on the scars and later also on the bark. We have seen adult beetles on about 10 different trees within a 10 km^2 area, altogether approximately 40 beetles. The trees with beetles always had some dead exposed wood. We never found adult beetles on trees with only intact bark. Sometimes dozens of old exit holes could be seen on larger areas of exposed wood or on dead limbs without bark. The galleries inside were tightly packed with granular frass and on a cross section the galleries resembled those of *Neoclytus* spp. (Fig. 23) that burrow primarily inside wood. The beetles and exit holes could be found on trees dispersed in the vegetation, including those in rather shaded areas where black locusts have been overgrown by other trees such as oaks and sugar maples.

Two apparently immature larvae were placed into rearing vials. One transformed into a pupa in the summer but later died. In the middle of October, a dead branch cut in the spring was examined and fully transformed adults were found inside their pupal cells. The next year, adult beetles were found in pupal cells in March (Frederick Co., MD) and early May 2020 (Cumberland Co., PA). Therefore, the beetle transforms during summer, overwinters as an adult and emerges in early spring. Judging by the abundance of emergence holes, the beetle seemed common in areas of central PA and western MD that contain older black locust trees.

***Oeme costata costata* LeConte.** Larvae were found in recently dead branches of *Pseudotsuga menziesii* (Mirb.) Franco, Graham Co., AZ and in recently dead branches of *Pinus cembroides* Zucc., Jeff Davis Co., TX.

***Oeme rigida deserta* Casey.** A specimen was reared from a broken branch of *Juniperus deppeana* Steud., Jeff Davis Co., TX. Both *Oeme* Newman species have galleries very similar to *Callidium* spp. (pers. obs.).

***Orwellion gibbulum arizonense* (Casey).** This species was reared from a broken large limb of *Juglans major*, Yavapai Co., AZ.

***Paranoplium gracile laticolle* (Linsley).** Larvae were collected from dead parts on living stems of *Amorpha californica* Nutt., Riverside Co., CA.

***Parelaphidion aspersum* (Haldeman).** This species was reared from dead, standing *Populus deltoides*, Denton Co., TX and dead, mature *Quercus alba*, Burlington Co., NJ.

***Parelaphidion incertum* (Newman).** *P. incertum* develops within scaly bark of living trees, while the closely related *P. aspersum* develops under the bark of dead trees. New host plants include: outer bark of mature living

Carya ovata (Mill.) K. Koch, *Juglans nigra* L., and *Quercus rubra*, Montgomery Co., PA. In Maryland, along the Potomac River, it is frequently found in the outer bark of large *Acer negundo* trees.

***Phymatodes aeneus* LeConte.** This species was reared from a dead branch of *Alnus rubra* Bong., Santa Cruz Co., CA.

***Phymatodes ater* LeConte.** Linsley and Chemsak (1997) list *Quercus* as host plant. We have reared it from a broken branch of *Quercus stellata*, Burlington Co., NJ.

***Phymatodes grandis* Casey.** Larvae were collected in the bark of dying *Quercus kelloggii*, San Diego Co., CA.

***Phymatodes varius* (Fabricius).** This species was reared from a dead trunk of *Betula lenta*, Northampton Co., PA and a fire-killed stem of *Quercus marilandica*, Burlington Co., NJ.

***Phymatodes vulneratus* (LeConte).** The larvae of this species were found in the trunks of mostly living *Cercocarpus ledifolius* Nutt., Clark Co., NV. Infested trees were generally still alive but clearly in decline. The larvae typically scored living tissue adjacent to a dead patch. This is an unusual behavior for a *Phymatodes* Mulsant as they typically develop in recently dead wood.

***Physocnemum violaceipenne* Hamilton.** This species was reared from the following: a broken, dead branch of *Quercus ilicifolia*, Carbon Co., PA; and broken branches of *Quercus coccinea* Münchh. and *Q. falcata*, Burlington Co., NJ. Workings of this species can be fairly reliably recognized as they consist of relatively deep and large subcortical galleries with a transverse entrance into the pupal cells in recently dead oak branches, approximately 2–4 cm in diameter.

***Pilostenaspis lateralis* (LeConte).** Pupae were found in dead, thin branches of *Quercus grisea*, Jeff Davis Co., TX in the first week of October. The pupae transformed in rearing vials into adult beetles during late October. This is consistent with an earlier report that adult beetles overwinter in their pupal cells (Heffern et al. 2018).

***Plionoma suturalis* (LeConte).** Larvae were found in living stems of *Simmondsia chinensis* (Link) C.K. Schneid., Riverside Co., CA. The exit hole was chewed by the larva through the bark and then plugged with a noticeable fibrous frass.

***Psyrassa unicolor* (Randall).** This species was reared from a girdled, living branch of *Quercus ilicifolia*, Carbon Co., PA.

***Purpuricenus dimidiatus* LeConte.** Larvae were collected in the transition zone between dead and living tissue in prostrate branches of *Quercus vaccinifolia*, El Dorado Co., CA and in a girdled, living terminal twig of *Quercus garryana*, Jackson Co., OR.

***Purpuricenus humeralis* (Fabricius).** A specimen was reared from a dead branch of *Quercus ilicifolia*, Carbon Co., PA.

***Smodicum cucujiforme* (Say).** Larvae were found within exposed wood on living *Quercus geminata*, Polk Co., FL. *S. cucujiforme* develops in wood without bark, typically in scars on living trees but also in fully dead trees. The exit holes are extremely elongated (to fit the flat body of the beetle), parallel with the grain, and are a fairly reliable indication of *S. cucujiforme*'s presence (Fig. 24).

***Stenaspis solitaria* (Say).** This species was found in the following: base and roots of living *Canotia holacantha* Torr., Yavapai Co., AZ (only *Anoplocurius canotiae* Fisher has been reported to develop in this desert plant); root crowns of living *Condalia* and *Mimosa dysocarpa*, Pima Co., AZ; root crowns of living *Mimosa aculeaticarpa* Ortega and *Vachellia constricta*, Jeff Davis Co., TX. In all cases, the larvae expelled large quantities of fine granular frass around the base of the infested plant (Fig. 25). The larvae bore mostly underground where they also pupate. Emergence holes are chewed out by the adult beetle near ground level and are difficult to detect.

Although it is likely that *S. solitaria* also develops in *Prosopis*, as suggested by Vogt (1949), *Prosopis* needs to be confirmed. Vogt observed larvae with sclerotized terminal segment that likely belonged to a species of *Aneflus* but not to *S. solitaria*. Larvae of *S. solitaria* do not have the terminal segment sclerotized and do not construct a long central tunnel with openings, at least not above ground. At Madera Canyon in Pima Co., AZ, where *S. solitaria* is very common, a significant fraction of *Mimosa* plants has piles of fine frass around their bases. We have

not seen such piles around *Prosopis* plants, which are also widespread at Madera Canyon, so *Prosopis* is definitely not a favored host there. As discussed above, large emergence holes on *Prosopis* trees and large tunnels on cut *Prosopis* trunks frequently seen at Madera Canyon belong to species of *Aneflus*.

***Stenelaphus alienus* (LeConte).** This species was reared from a dead branch of *Senegalia greggii*, Pima Co., AZ. Galleries of *S. alienus* are relatively frequent on dead branches of *Prosopis*. A deep subcortical tunnel ending with a transverse entrance into a pupal cell seems quite characteristic for the species in Arizona.

***Stenosphenus sobrius* (Newman).** This species was reared from a dead branch of *Robinia neomexicana* A. Gray, Santa Cruz Co., AZ.

***Styloxus bicolor* (Champlain and Knull).** This species was reared from girdled terminal twigs of *Juniperus osteosperma*, Grand Co., UT. The yellowish needles of the girdled twigs were conspicuous and present on nearly every tree. *Juniperus* twigs were also girdled by a species of Buprestidae but in this case the narrow gallery of the girdle makes several, rather than just one, spiral turns around the twig.

***Styloxus fulleri californicus* (Fall).** This species was reared from a girdled branch of *Quercus kelloggii*, San Diego Co., CA.

***Tragidion coquus* (Linnaeus).** Larvae were found in central galleries in dead branches of *Quercus grisea*, Jeff Davis Co., TX.

***Xylotrechus colonus* (Fabricius).** *X. colonus* is perhaps the most common beetle under bark of large dead trees in the northeast. Larvae can be found essentially in every dead hickory trunk. New larval records include: a dead trunk of *Amelanchier*, Luzerne Co., PA; dead branches of *Celtis occidentalis*, Montgomery Co., PA; and under bark of felled *Prunus serotina*, Luzerne and Montgomery Co., PA.

***Xylotrechus nauticus* (Mannerheim).** This species was reared from a dead branch of *Quercus kelloggii*, San Diego Co., CA.

***Xylotrechus quadrimaculatus* (Haldeman).** This species was found in a girdled living branch of *Betula populifolia*, Carbon and Monroe Co., PA.

***Xylotrechus quercus* Schaeffer.** Larvae were found under bark of recently dead *Quercus hypoleucoides*, Santa Cruz Co., AZ. The habits are similar to those of *Xylotrechus colonus* in which the larvae mine under bark, entering wood only to pupate or they may construct pupal cells in thick bark. In contrast, *Neoclytus caprea*, which is very common in oaks in Arizona, starts feeding subcortically but then enters wood and bores there extensively.

Lamiinae

***Acanthocinus leechi* (Dillon).** This species appears to be associated with pinyon pines. Only *Pinus monophylla* Torr. and Frém. has been listed as a host (Linsley and Chemsak (1997). We have found it frequently in dead trunks and thick branches of *Pinus edulis* in Grand and San Juan Co., UT.

***Acanthocinus obliquus* (LeConte).** Larvae were found in a dead branch of *Pinus jeffreyi*, El Dorado Co., CA and in a dead trunk of *Pinus longaeva*, Clark Co., NV.

***Acanthocinus princeps* (Walker *in* Lord).** Larvae were found in the thick bark of recently dead *Pinus coulteri* D. Don, Riverside Co., CA.

***Aegomorphus modestus* (Gyllenhal in Schoenherr).** New larval records include: a decaying base of *Amelanchier*, Northampton Co., PA; a decaying trunk of *Betula populifolia*, Carbon Co., PA; and a decaying branch of *Celtis occidentalis* and decaying stems of *Vitis*, Montgomery Co., PA. This beetle is frequently found in decaying branches. The exit tunnel from the pupal cell is sealed with a distinctly organized fibrous frass—in the outermost layer (adjacent to bark), the fibers are neatly laid down parallel to each other.

***Aegomorphus quadrigibbus* (Say).** This species was reared from a dead trunk of *Acer negundo*, Montgomery Co., PA.

***Astylopsis macula* (Say).** This species was reared from a dead branch of *Quercus montana*, Berks Co., PA.

***Ataxia crypta* (Say).** This species was reared from a dead stem of *Baccharis*, Blanco Co., TX.

***Ataxia falli* Breuning.** This Florida species has been reported to develop in *Metopium*, *Piscidia*, and *Rhizophora* (Linsley and Chemsak 1997). Larvae were found in about 1 cm thick, somewhat decayed branches of *Bursera simaruba* (L.) Sarg. on the ground, in the Florida Keys, FL. The hardwood hammock of southernmost Florida harbors a great diversity of trees, but their identification is difficult for a non-botanist. We believe that this is the reason why host plant records from southern Florida are mostly restricted to familiar plants like *Bursera*, *Metopium* or *Rhizophora* and that the true plant utilization by Cerambycidae is much more diverse.

***Dorcaschema cinereum* (Olivier).** This species was reared from a dead branch of *Carya cordiformis*, Montgomery Co., PA.

***Dorcaschema nigrum* (Say).** This species was reared from a broken branch of *Carya ovata*, Montgomery Co., PA.

***Ecyrus dasycerus dasycerus* (Say).** The following host records can be added for this wide-ranging species: a trunk of dead *Acer negundo*, Denton Co., TX; dead branches of *Acer rubrum*, Montgomery Co., PA; dead branches of *Quercus ilicifolia*, Carbon Co., PA; and dead twigs of *Quercus marilandica* and *Quercus stellata*, Burlington Co., NJ.

***Eupogonius pauper* LeConte.** This species was reared from dead twigs of *Ostrya virginiana* (Mill.) K. Koch, Montgomery Co., PA.

***Eutrichillus biguttatus* (LeConte).** This species was reared from a dead branch of *Pinus virginiana*, Calvert Co., MD and a dead branch of *Pinus strobus* L., St. Mary's Co., MD.

***Goes pulverulentus* (Haldeman).** This appears to be the most polyphagous *Goes* species, having been reported to develop in many different genera including *Pinus virginiana* (Perry 1975), although the record of *P. virginiana* is rather unusual and should be confirmed (Bousquet et al. 2018). Additional hosts include *Quercus ilicifolia* and *Quercus marilandica*, Burlington Co., NJ and *Quercus rubra*, Luzerne Co., PA.

***Graphisurus triangulifer* (Haldeman).** This species was reared from a dead branch of *Acer negundo*, Denton Co., TX.

***Hippopsis lemniscata lemniscata* (Fabricius).** Larvae were found in stems of *Bidens alba* (L.) DC., Miami-Dade and Monroe Co., FL.

***Hyperplatys aspersa* (Say).** New larval records include dead stems of *Euonymus alatus* (Thunb.) Siebold, New Castle Co., DE and Montgomery Co., PA and dead stems of *Frangula alnus* Mill., Carbon Co., PA.

***Leptostylus transversus* (Gyllenhal in Schoenherr).** Larvae were found in the lower parts of dead *Prunus virginiana*, Leelanau Co., MI.

***Lepturges angulatus* (LeConte).** This species was reared from a thin dead branch of *Fagus grandifolia* and a dead stem of *Toxicodendron radicans* (L.) Kuntze, Montgomery Co., PA.

***Monochamus clamator clamator* (LeConte).** Larvae were collected in dead trunks of *Pinus edulis*, San Juan Co., UT.

***Oncideres quercus* Skinner.** This species was reared from a girdled living twig of *Quercus arizonica*, Cochise Co., AZ.

***Pogonocherus penicillatus* LeConte in Agassiz.** This species was reared from a dead branch of *Pinus jeffreyi*, El Dorado Co., CA.

***Saperda lateralis lateralis* Fabricius.** Adult beetles were found in a dead, thick stem of *Salix*, Jasper Co., IN.

***Saperda obliqua* Say.** This beetle develops in living stems and branches of *Alnus* and *Betula* but also apparently in *Corylus* (Felt and Joutel 1904). Larvae bore in a small area, close to the ground (as reported in the literature) but also high up in the branches. Finding larval workings is aided by the expelled fibrous frass and by frequent attacks by woodpeckers, which sometimes do not pick all the larvae in the stem. In Pennsylvania, it was found in *Betula lenta* and *B. populifolia*, Carbon Co., PA and in *Alnus incana*, Luzerne, Schuylkill, and Sullivan, Co., PA.

***Sternidius alpha* (Say).** This species was found in dead twigs of *Quercus marilandica*, Burlington Co., NJ. As noted by Craighead (1923), pupae (not larvae) of *S. alpha* are noticeably pink (Fig. 26). We have seen pupae of hundreds of species and the color was always white to off-white to yellowish, so this is rather unique for Cerambycidae.

***Sternidius punctatus* (Haldeman).** This species was reared from the following: a dead trunk of *Cornus florida*, a dead stem of *Celastrus orbiculatus* Thunb., a thin dead twig of *Ostrya virginiana*, and a dead branch of *Ulmus*, Montgomery Co., PA.

***Styloleptus biustus biustus* (LeConte).** This species was reared from dead branches of *Pinus clausa* and dead stems of *Vitis*, Polk Co., FL.

***Urgleptes sandersoni* Gilmour.** *Urgleptes sandersoni* has been reported from Dominican Republic, Haiti, Puerto Rico, and Virgin Islands (Bezark 2021) but not from the US mainland or Florida Keys. We initially reared it from unidentified wood from Key Largo, FL in 2009. In 2021, we reared it from dead branches of *Bursera simaruba* collected on Key Largo, Monroe Co., FL. These two collections more than ten years apart suggest that the beetle is established in Florida Keys.

***Urgleptes signatus* (LeConte).** This species was reared from the following: a dead branch of *Betula lenta*, Berks Co., PA; a dead stem of *Staphylea trifolia* L., and a dead branch of *Carya ovata*, Montgomery Co., PA.

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