

Ecological and biogeographical observations on Cerambycidae (Coleoptera) from California, USA

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Abstract. New ecological and biogeographical observations are presented for the following 32 species of Cerambycidae from California: *Atimia confusa dorsalis* LeConte, *Anelaphus albofasciatus* (Linell), *Aneflus prolixus prolixus* LeConte, *Anoplocurius incompletus* Linsley, *Brothylus conspersus* LeConte, *Callidiellum virescens* Chemsak and Linsley, *Calloides lorquini* (Buquet), *Clytus chemsaki* Hovore and Giesbert, *Enaphalodes hispicornis* (Linnaeus), *Methia brevis* Fall, *Neaneflus fuchsi* (Wickham), *Neoclytus balteatus* LeConte, *Plectromerus dentipes* (Olivier), *Phymatodes decussatus decussatus* (LeConte), *Phymatodes decussatus australis* Chemsak, *Purpuricenus dimidiatus* LeConte, *Rosalia funebris* Motschulsky, *Schizax senex* LeConte, *Smodicum pacificum* Linsley, *Stenaspis solitaria* (Say), *Tragidion gracilipes* Linsley, *Brachysomida californica* (LeConte), *Brachysomida vittigera* Linsley and Chemsak, *Centrodera osburni* Knull, *Encyclops californica* Van Dyke, *Judolia sexspilota* (LeConte), *Leptalia macilenta* (Mannerheim), *Leptura hovorei* Linsley and Chemsak, *Leptura pacifica* (Linsley), *Necydalis barbarae* Rivers, *Neobellamira delicata australis* Linsley and Chemsak, *Pachyta armata* LeConte, *Stenocorus alteni* Giesbert and Hovore.

Introduction

Recent field studies on the biogeography, ecology, and life histories of western North American Cerambycidae have resulted in the discovery of new information for several species. Basic ecological data such as host plant associations, behavior, and phenology are essential to our understanding of insect biodiversity, particularly when little or no information has been recorded. Ecological data for species which occur in California are especially critical in light of its recent designation as one of the 25 “Biodiversity Hotspots” on earth (Myers 1999). These data are valuable to land managers, regulatory agencies, and conservation organizations, allowing them to make informed decisions affecting resources under their management.

Most data presented herein represent the first known host associations for a particular species, while some of the accounts either clarify or add to the known data for several species. Since the publication of the Cerambycidae of North America (Linsley 1961, 1962a, 1962b, 1963, 1964 and Linsley and Chemsak 1972, 1976, 1984, 1995, 1997) and subsequent papers documenting host plant associations, much of the botanical taxonomy of North America has changed, and as in the case of California, several new key host species have been described. Thus, updated ecological data are needed for many North American cerambycids.

Methods

Within the taxon accounts presented, new host and state records are indicated in **bold**. Host identifications were made by the author, and in most cases voucher sheets of the host taxa were made and deposited at the Rancho Santa Ana Botanic Garden Herbarium (RSA), Claremont, California, U.S.A. Botanical nomenclature follows that of the Flora of North America (FNA, 1993+). Host plant families are listed for new records, but are not repeated with other species in the same host genus. Collections in which cerambycid specimens were either deposited or reside are indicated within each species account. These include: **CASC** (California Academy of Sciences Collection, San Francisco, CA, U.S.A.); **CSCA** (California State Collection of Arthropods, Department of Food and Agriculture, Sacramento, CA, U.S.A.); **DSVC** (David S. Verity Private Collection, San Bernardino, CA, U.S.A.); **EMEC** (Essig Museum of Entomology Collection, University of California, Berkeley, CA, U.S.A.); **ISPC** (Ian Swift Private Collection,

Santa Clarita, CA, U.S.A.); **LACM** (Los Angeles County Museum of Natural History Collection, Los Angeles, CA, U.S.A.); **UCRC** (Entomological Research Museum, University of California, Riverside, U.S.A.); **SBMN** (Santa Barbara Museum of Natural History, Santa Barbara, California U.S.A.); **SDMC** (San Diego Natural History Museum, San Diego, CA, U.S.A.). Codens follow those of Evenhuis and Samuelson (2004) where applicable. Nomenclature and classification follows that of Monné et al. (2007).

Species Accounts

Aseminae

***Atimia confusa dorsalis* LeConte.** Linsley (1962) lists the hosts of this species as *Cupressus* spp. Adults were reared from *Cupressus forbesii* Jepson (Cupressaceae) near Otay Mountain in San Diego County, California (ISPC, CASC, LACM). Larvae mine beneath the thin bark of small limbs in long, flattened galleries, entering the heartwood to pupate. Adults emerge from January to March.

Cerambycinae

***Anelaphus albofasciatus* (Linell).** This species is known from various species of cacti; to the known hosts can be added *Opuntia acanthocarpa* Englemann and Bigelow (Cactaceae). Adult females were observed ovipositing on the lower stems and joints of bracts on plants in the western Mojave Desert of southern California (ISPC, CASC). Individuals were collected on the same plants as another cactus-feeding cerambycid, *Moneilema semipunctatum* LeConte, and in the vicinity of *Lycium andersonii* A. Gray (Solanaceae) shrubs, where *Anelaphus inflaticollis* Chemsak were collected.

***Aneflus prolixus prolixus* LeConte.** A specimen from Jacumba, San Diego County, **California** is a new country record for this subspecies as well. It was previously known only from various localities in the central and northern Baja Peninsula, Mexico (SDMC). The subspecies *A. p. fisheri* Knull is common in Arizona and New Mexico.

***Anoplocurius incompletus* Linsley.** This species was first recorded from the U.S.A. by Hovore and Giesbert (1976) from a single specimen taken at light. One adult male was reared from a dead branch of *Prosopis glandulosa* Torrey (Fabaceae) from Imperial County, California (ISPC). This is the first reported host plant for this species. Three additional specimens were taken at light from the Imperial National Wildlife Refuge along the Colorado River (SBMH).

***Brothylus conspersus* LeConte.** Among the various species of oaks listed as host plants can be added *Quercus john-tuckeri* Nixon and C.H. Muller (Fagaceae). Larvae mine the heartwood of dead branches. The larval period is at least two years, as two different sized cohorts of larvae were observed in the host (ISPC).

***Callidiellum virescens* Chemsak and Linsley.** This species was previously known only from *Cupressus glabra* Sudworth in northern Arizona. Specimens reared from *Cupressus forbesii* around the Otay Mountain area in southern San Diego County, **California**, appear to represent this species (ISPC, CASC). This locality is 720 km southwest of the closest known occurrence of *C. virescens* in Arizona, and suggests this species may be more widespread than previous records indicate or is expanding its range. The larval workings are very similar to those described by Chemsak and Powell (1964) for *Callidium cupressi* (Van Dyke).

***Calloides lorquini* (Buquet).** Adults were reared from the living root crowns and lower branches of the scrub oak of *Quercus wislizenii* A. de Condolle var. *frutescens* Englemann in the San Gabriel Mountains, Los Angeles County, California (ISPC, CASC). Larval development is similar to that described by Cope (1984) in living plants. Apparently, burned and charred dead host plants are preferred as well, where adults were reared from the larger dead branches. Adults were also captured in pitfall traps set beneath the host plant.

***Clytus chemsaki* Hovore and Giesbert.** Aside from the type series, this species is virtually unknown and no host has yet been recorded. Two males were reared from intentionally-cut limbs of *Pseudotsuga macrocarpa* (Vasey) Mayr (Pinaceae) near the type locality (ISPC). Larval development is similar to that of *C. planifrons* (LeConte) as noted by Linsley (1964).

***Enaphalodes hispicornis* (Linnaeus).** This large, widespread elaphidiine infests the lower trunks of large, dead *Quercus agrifolia* Nee in the mountains of southern California (ISPC). Larval development can take up to three years, based on laboratory-reared specimens and long-term observations of host trees.

***Methia brevis* Fall.** Adults were reared from *Bernardia myricifolia* (Scheele) S. Watson (Euphorbiaceae) in the San Jacinto Mountains, Riverside County, California (ISPC). Linsley (1962) list no known host plant, however, Linsley and Chemsak (1997) list *Dalea fremontii* Torrey ex. A. Gray (Fabaceae) as a host.

***Neaneflus fuchsi* (Wickham).** No host plant has been recorded for this genus or this species. Adults were reared out of dead branches of *Lycium cooperi* A. Gray from the desert slope of the San Gabriel Mountains, Los Angeles County, California (ISPC, CASC). Adults were also taken at light at higher elevations (2200 m), well above any *Lycium* occurrences, and more than one host plant is likely involved.

***Neoclytus balteatus* LeConte.** This species is part of a larger complex of very closely-related species of *Neoclytus* Thompson including *N. magnus* Schaffer, *N. resplendens* Linsley, *N. provoanus* Casey, and *N. interruptus* LeConte, of which the host preferences range widely. Linsley (1964) lists the host simply as "*Ceanothus* spp." *Neoclytus balteatus* was reared and extracted from the living and recently-dead roots of *Ceanothus cordulatus* Kellogg (Rhamnaceae) at the base of Mt. Pinos, Kern County, California, a 500 km range extension into southern California from the nearest northern locality (ISPC, EMEC). One adult male was also taken on the flowers of *Ceanothus integerrimus* Hooker and Arnott.

***Plectromerus dentipes* (Olivier).** An adult male was collected on the campus of California State University, Northridge, Los Angeles County, California in July (ISPC). An additional female specimen was taken in an urban area of Orange County, California (CASC). These collections represent the first known occurrences in California, and are doubtlessly the result of introductions. To what extent this species has been established or what host(s) it is utilizing is unknown.

***Phymatodes decussatus decussatus* (LeConte) and *P. d. australis* Chemsak.** Larval hosts have included various species of oak tree; to which can be added the scrub oak *Q. john-tuckeri*, where adults were reared from the dead branches (ISPC) and collected in fermenting bait traps. Specimens reared from the same branches of this host were assignable to both the nominate and *australis* subspecies, with many specimens representing intermediates between the two phenotypes. This intermediacy was also noted by Hovore and Giesbert (1976), who suggested that the *australis* subspecies was simply a color variety of this polytypic species.

***Purpuricenens dimidiatus* LeConte.** Hovore and Giesbert (1976) reported rearing this species from "scrub oak" in southern California without identifying a particular species. However, there are nine species of scrub oaks that occur in the region. Adults were extracted from the girdled stems of both *Quercus wislizenii* var. *frutescens* and *Q. john-tuckeri* from the San Gabriel Mountains, Los Angeles County, California (ISPC, CASC). Several adults were captured in fermenting bait traps in the same area.

***Rosalia funebris* Motschulsky.** This attractive species is known to have a wide host range, utilizing genera such as *Alnus* Miller (Betulaceae), *Quercus* Linnaeus, *Umbellularia* (Nees) Nuttall (Lauraceae), *Fraxinus* Tournefort ex. Linnaeus (Oleaceae) and *Salix* Linnaeus (Salicaceae). Over the past six years, it has become increasingly more numerous and established in urban areas of southern California, such as Pasadena, San Gabriel, and in the San Fernando Valley, where the larvae have caused considerable damage to ornamental street trees such as the introduced *Ulmus parvifolia* Jacquin (Ulmaceae) and

Platanus X "*hispanica*" Münchhausen (Platanaceae) (ISPC, UCRC). Adults were found aggregating on the walls of buildings during the day, apparently attracted to the volatiles of certain types of paint, as has been noted by Linsley (1995) and others.

Schizax senex LeConte. Specimens of this species were reared from dead branches and collected from the blossoms of *Chilopsis linearis* (Cavanilles) Sweet (Bignoniaceae). This is the first known record of a cerambycid utilizing this genus and species as a larval host (DSVC).

Smodicum pacificum Linsley. This species was originally described from the Tres Marias Islands off the western coast of Mexico. A single specimen from Carrista Creek in San Diego County, **California** in the collection of the SDMC is the first known for the state. It was also previously known from several localities in the Baja Peninsula of Mexico as well as Arizona.

Stenaspis solitaria (Say). This species was collected at the University of California Granite Mountains Reserve, San Bernardino, **California** (SBMN). It is widespread in the deserts of the southwest, utilizing the host *Acacia greggii* A. Gray (Fabaceae).

Tragidion gracilipes Linsley. Linsley lists the host for this species in northern California as *Rhamnus californica* Eschscholtze, and Hovore and Giesbert (1976) recorded it from southern California for the first time, but could not ascertain the host. An adult was chopped from fire-killed *Adenostoma fasciculatum* Hooker and Arnott (Rosaceae), and another collected on the flowers of that plant (DSVC) in the San Gabriel Mountains of southern California.

Lepturinae

Brachysomida californica (LeConte). No larval host plants were previously known for this genus or this species. Most of the known localities are in northern California (Linsley and Chemsak 1972). Adults were reared from *Lomatium lucidum* (Torrey and A. Gray) Jepson (Apiaceae), as well as collected from the tops of grasses amongst fields of the host plant in the Laguna Hills, Orange County, California (DSVC, ISPC). Larval behavior and development are similar to *B. vittigera* Linsley and Chemsak described below.

Brachysomida vittigera Linsley and Chemsak. Adults were reared from the living roots of *Lomatium utriculatum* (Torrey and A. Gray) J. M. Carter and Rose, a geophyte, growing in disturbed grasslands in the southern San Joaquin Valley, Kern County, California in the vicinity of the type locality (CASC). The eggs are laid at the base of live plants and larvae bore into the center of the taproot, working their way down to the narrowest part of the root, then boring back to the middle and exiting to pupate. Larval development appears to require one year. Pupation may take place in the soil, as some of the larvae exited the roots of the plant and pupated at the bottom of the rearing chamber in the lab. Both species of *Brachysomida* discussed herein have a clear larval host preference for the genus *Lomatium* Rafinesque. While other hosts may be involved, this preference could be valuable in determining or confirming host associations of other species in this genus where larval hosts and biology are unknown.

Centrodera osburni Knull. The host plant of this rare species was previously unknown. Two male specimens were reared from the living root crowns of *Ceanothus integerrimus* in the San Gabriel Mountains of Los Angeles County, California (ISPC, LACM). The type locality is the New York Mountains in the Mojave Desert, a very different biogeographic region than that of the more coastal populations, and likely more than one host is involved. The female of this species remains undescribed.

Encyclops californica Van Dyke. This species was previously known from coastal regions of northern California. It was collected in Lindgren funnel traps at Forest Falls, San Bernardino County, California, a 420 km range extension to the south (CSCA). The two regions of known occurrence have very little, if any, floristic elements in common, and this record suggests that different host(s) may be utilized in the southern portions of its range.

***Judolia sexspilota* (LeConte).** No host plant has been previously recorded for this species. Adults and pupae were extracted from the upper portions and exposed roots of *Juniperus californica* Carriere (Cupressaceae), that were dug up as part of a road widening in the San Gabriel Mountains, Los Angeles County, California (ISPC). The larval work appears to be similar to that of *Judolia erratica* (Dalman) from Asia, detailed by Cherepanov (1988).

***Leptalia macilenta* (Mannerheim).** Linsley and Chemsak (1972) list *Alnus*, *Umbellularia californica* (Hooker and Arnott) Nuttall, and *Salix* as hosts for this species. To this list can be included *Quercus agrifolia*, from Marin County, California (ISPC, CASC). Adults were reared from long-dead logs that were covered in thick moss and lichens. The larval development is similar to that reported by Chemsak and Powell (1971).

***Leptura hovorei* Linsley and Chemsak.** No host plant for this species has been previously recorded. Adults and pupae were cut out of the base and root crown of a standing dead *Pinus jefferyi* Gerville and Balfour (Pinaceae) in the San Gabriel Mountains, Los Angeles County, California (ISPC). This record extends the range of the species into southern California. In the series of seven specimens from this locality, the elytral apices are black and confluent with the subapical transverse band. Linsley and Chemsak (1976) distinguished *L. hovorei*, in part, from *L. obliterata* (Haldeman) by the separation of the apical and subapical black markings. Therefore, this character should be used with caution when identifying this species. In all other characters the series agrees with *L. hovorei*. This species is part of a complex of closely-related taxa, including *L. obliterata* and *L. propinqua* Bland, of which the characters are quite subjective and tend to overlap.

***Leptura pacifica* (Linsley).** The excellent account by Skiles et al. (1978) of the biology of this species indicates larval host preferences with *Quercus dumosa* Nuttall. However, in the intervening years since that publication, the taxonomy of the genus *Quercus* in southern California has undergone considerable revision. *Quercus dumosa* is now restricted to the immediate coast of southern California from Santa Barbara to northern Baja California, Mexico, and does not coincide with the range of *L. pacifica*. Based on photographs in Skiles et al. (1978), it appears that the host plant of *L. pacifica* is in fact *Q. john-tuckeri*, a common scrub oak at the type locality (San Jacinto Mountains, California) of this species. Further, this species was reared from *Q. john-tuckeri* as well as taken in fermenting bait traps at several sites in Los Angeles County, slightly extending the range of this species, which was previously known only from the San Jacinto Mountains of California. Based on these observations and those of Skiles (1978), it appears that *L. pacifica* is likely host-specific to *Q. john-tuckeri*, an ecological strategy somewhat common to cerambycid species utilizing living larval hosts (Linsley 1959).

***Necydalis barbarae* Rivers.** This rarely collected and distinctive species is represented by only a few specimens in collections. It was previously known from coastal California from Santa Barbara County to San Mateo County. It was recently collected in Lindgren funnel traps near Forest Falls, San Bernardino County, California (CSCA), and in Placerita Canyon, Los Angeles County, California in fermenting bait traps (ISPC). A search of the latter locality revealed an approximately one-year dead *Quercus chrysolepis* Liebmann from which a desiccated specimen of this species was chopped out. Based on its gallery, it appears that the larvae immediately bore into the heartwood of the host near the base of the tree, extending their galleries down the main trunk for up to 60 cm, then bore back up and pupate in a chamber that is plugged with fine frass on either end, approximately 3 cm from the emergence hole. In this case it appears that the larval development is one year.

***Neobellamira delicata australis* Linsley and Chemsak.** This species' hosts include members of the genus *Juglans* Linnaeus. It is also present in urban areas where adults were reared from *Alnus rhombifolia* Nuttall and the introduced *Fraxinus excelsior* Linnaeus (Oleaceae), both street trees in the San Fernando Valley, Los Angeles County, California (ISPC, CASC, LACM). In all known cases, the host trees were killed. However, it is unknown if the beetles killed the trees or simply contributed to it.

***Pachyta armata* (LeConte).** A series of this species was collected near Devil's Postpile, Mono County, California (ISPC), on flowers of *Sphenosciadium capitellatum* A. Gray (Apiaceae) and a female was collected ovipositing on the dead basal portion of a living *Pinus monticola* Douglas ex. D. Don. As noted by Linsley and Chemsak (1976), all the California specimens have considerably more black on the elytra, in addition to being much smaller than those from Oregon and Washington. In the series of eight specimens from Mono County, the size ranged from 7-9 mm, vs. 13-17 mm in more northern specimens.

***Stenocorus alteni* Giesbert and Hovore.** This recently-described species has no previously confirmed host plants. However, Giesbert and Hovore (1998) speculated the host may be *Quercus berberidifolia* Liebmann. The type locality is composed of xeric desert chaparral, with dominant stands of *Quercus john-tuckeri*, while *Q. berberidifolia* occurs only along the coast of southern California. This species was subsequently reared from the upper roots and root crowns of *Q. john-tuckeri* that were destroyed as part of road grading, in Bouquet Canyon, Los Angeles County, California (ISPC). It was previously known only from the type locality. In addition to this new locality, a series was collected in Lindgren funnel traps near the San Luis Reservoir State Recreation Area, Merced County, California, extending the range of this species into central California (CSCA). All three localities are on the xeric, desert slopes of the coastal ranges in chaparral dominated by *Q. john-tuckeri*. This cryptic species may be the second cerambycid that is host-specific to this plant.

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