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VOLUME 17

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(Coleoptera: Ciidae)

BY

JOHN F. LAWRENCE

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CONTENTS

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INTRODUCTION

THE FAMILY CIIDAE[1] includes about 550 described species of minute Coleoptera, which are distributed throughout the world and are associated with the mycelia and fruiting bodies of wood-rotting fungi. These beetles are usually less than 3 mm long and they vary considerably in body form (elongate and flattened to cylindrical or globose). Many species have become adapted for boring into hard substrates and thus resemble powder-post beetles (Bostrichidae) and bark beetles (Scolytidae). The males are often provided with various kinds of cephalic and thoracic armature (horns, tubercles, plates) which resemble those of the larger Scarabaeidae. According to Crowson (1960, 1966), the family should be included within the Section Heteromera of the Cucujoidea and may be related to such primitive heteromerous groups as the Mycetophagidae, Tetratomidae, and Pterogeniidae. The phylogenetic position of the Ciidae, however, is still open to question.

The present work covers 27 species actually or probably occurring within the confines of the state of California, but it is based on a more extensive study of the North American Ciidae (Lawrence, 1971) and an examination of more than 50,000 specimens from various parts of the world. The terminology used in the keys and discussions is the same as that employed in my revision cited above, but the more important characters are also illustrated in figures 1–19.

The following measurements are used in the keys: PL (pronotal length along midline, but including horns in males); PW (greatest pronotal width); EL (greatest elytral length, just to one side of suture); EW (greatest elytral width); GD (greatest depth, through elytra and metasternum); TL (PL and EL combined). Note that the head is not included in length measurements.

The methods of citing data differ in some respects from those of previous Bulletins. All citations in synonymies are reduced to author, date, and page, but complete references are given in the terminal bibliography. Specimen repositories are given only for types, in which case the following abbreviations are used:

BMNH, British Museum (Natural History)
BYU, Brigham Young University
CAS, California Academy of Sciences
CMNH, Cincinnati Museum of Natural History
MNHN, Muséum National d'Histoire Naturelle
MZUH, Museum Zoologicum Universitatis Helsinki
USNM, United States National Museum
UW, University of Washington.

California records have been reduced to locality only, without any further field data. These localities are listed alphabetically for each county, and the counties are also in alphabetical order. Since adult ciids may be collected

[1] The reasons for using the name Ciidae were given in a previous paper (Lawrence, 1971).

in fungi throughout the year, as can be seen in table 1, the exact collecting dates have been omitted. Host fungi are included in a separate section and other pertinent field data are summarized in the discussion of bionomics.

Species of fungi are arranged according to the total number of records (over the entire geographic range), so that preferred hosts are listed first. An asterisk indicates at least one breeding record (as used by Lawrence, 1971), while a double asterisk indicates a large number of records for one host. The species concepts and generic classification are those of Lowe and Gilbertson (1961*a*, 1961*b*) and Overholts (1953). With the exception of *Ganoderma*, the genera used are essentially form genera and do not reflect phylogenetic relationships. A detailed account of polypore classification and its relationship to host preference in ciids will be included in a future publication (Lawrence, 1973).

BIONOMICS

Except for dispersal flights, about which little is known, the Ciidae spend their entire lives in and around the fruiting bodies of Polyporaceae and other Basidiomycetes which grow on woody substrates. These fruiting structures, which may be referred to as sporophores, brackets, or conks, are usually durable and often corky or woody in texture. Some ciids have been reported from under bark or in dead vines and twigs, but it is likely that they too were associated with fungi. Both larvae and adults bore into and feed upon the sterile hyphae which comprise the bulk of the fruiting structures.

Ciids are normally gregarious, and in the spring they may congregate in large numbers on newly formed sporophores. The females usually bore directly into the conk, while the males tend to remain more active on the surface. Copulation appears to take place on the surface of the fruiting body, but this has been observed in only a few species. The female constructs a main gallery and hollows out egg cavities at irregular intervals along the walls. After an egg is deposited, the cavity is closed with a tightly packed plug of undigested frass. The egg-laying period may be long and there is an overlap in generations.

Ciid larvae are lightly pigmented and cylindrical, and normally bear two conspicuous hooks or urogomphi on the ninth abdominal segment. Upon hatching they bore directly into the fungus tissue and not through the frass plug. There are five larval instars in the several species studied, and eclosion takes place about eight weeks after eggs are laid; the generation time, however, may be somewhat longer, since teneral adults take three weeks or more to become fully pigmented. It is not known if adults in the field disperse immediately to other sporophores, but in the laboratory several generations are easily reared on the same conk.

By midsummer in most areas, large colonies of ciids are usually present within older fruiting bodies or in the older portions of the larger perennial conks. Infested conks may be recognized by the tiny exit holes and the presence of very fine, almost powdery, feces. Although populations are smaller and development is slowed during winter in most areas, larvae and adults may be obtained throughout the year, as may eggs and pupae in milder regions.

Because of their tendency to occur in large localized populations, the Ciidae are a major food source for various entomophagous arthropods working forest habitats. In California, trogositid beetles of the genus *Temnochila* and anthocorid bugs of the genus *Lyctocoris* are known to be predators. A large number of parasitic Hymenoptera are also associated with California ciids. These include Braconidae (*Meteorus* spp. and *Eubadizon* spp.), Pteromalidae (*Janssoniella caudata* Kerrich), Eulophidae (*Astichus pulchrilineata* Gahan), and Bethylidae (*Plastanoxus chittendenii* Ashmead and *Cephalonomia perpusilla* Evans). Larvae of certain cecidomyid flies (*Lestodiplosis* spp.) may also feed on ciid larvae. (Lawrence, unpublished.)

HABITAT AND HOST PREFERENCE

Since the Ciidae live in association with wood-rotting fungi, they are restricted to those habitats in which dead wood is available and humidity is sufficiently high for the development and fruiting of fungi. As would be expected, these beetles are particularly common in the wet forests of the northern California coast and the west side of the Sierra Nevada. They also occur in the drier woodland and chaparral formations throughout the state, and a few inhabit riparian situations in the arid regions of southeastern California. A rough idea of habitat preference is given in table 1, where species are tabulated according to their occurrence in the four major Life Zones of the state (according to Grinnell, 1935). The Life Zone concept, originally proposed by Merriam (1892, 1898) on the basis of temperature criteria, has been criticized by several authors (Kendeigh, 1932; Shelford, 1932), but the zones established in California by Hall and Grinnell (1919) have proven to be quite useful in discussing vertebrate distributions and their relationships to a complex of environmental factors. The majority of Ciidae prefer the Transition Zone, but many of these extend into Upper Sonoran and

Boreal as well. Only a few occur in the Lower Sonoran and all of these are found along streambeds in association with cottonwoods.

The relative abundance of conifers and hardwoods in an area is an important factor in determining the ciid fauna (at least in California) since most species prefer fungi growing on one type of substrate. In table 1, it can be seen that only two species occur regularly on both hardwoods and conifers, while the rest are usually associated with one or the other. Eight ciid species prefer fungi growing on deciduous trees, while thirteen prefer those on conifers. Two of the latter, *Cis creberrimus* and *Dolichocis manitoba*, are apparently restricted to conifers in California, but in eastern North America

TABLE 1.
Seasonal and Ecological Distribution of California Ciidae

CIID SPECIES	Adult Seasonal Activity (known collecting dates)												Tree Preference		California Life Zones			
	January	February	March	April	May	June	July	August	September	October	November	December	Deciduous	Coniferous	Lower Sonoran	Upper Sonoran	Transition	Boreal
C. acritus							X		X					X			X	X
C. americanus	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	XX	X
C. angustus					X	X	X				X			X			X	X
C. biarmatus				X	X				X	X				X			X	
C. creberrimus						X							?	X			X	?
C. duplex						X								X			X	?
C. ephippiatus	X						X	X	X	X	X	X	XX	X			XX	X
C. fuscipes	X	X	X	X	X	X	X	X	X	X	X	X	XX	(X)		X	XX	
C. hystriculus		X	X	X	X	X	X	X	X	X		X	(X)	XX			X	X
C. levettei													?	?			?	?
C. maritimus										X				X			X	
C. megastictus							X							X			?	X
C. striolatus								X						X			?	X
C. tetracentrum													?			?		
C. tridentatus	X	X	X	X	X	X	X	X	X	X		X	X	XX			X	
C. versicolor	X	X	X	X	X	X	X	X	X	X	X		XX	(X)	X	XX	X	
C. vitulus	X	X	X	X	X	X	X	X	X	X	X	X	X			X	XX	
D. indistinctus				X			X		X	X				X			X	X
D. manitoba	X	X			X	X	X	X	X	X	X		?	X			X	XX
Orth. punctatus		X	X	X	X	X		X			X	X	?	?		X	X	?
H. blaisdelli	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X
P. cribrum	X	X		X	X	X	X	X	X	X	X	X		X		X	X	XX
Cer. californicus	X	X	X	X	X	X	X	X	X	X	X	X	XX	(X)		X	X	
Cer. dixiensis	X												X		X			
Cer. similis													?		?			
S. curtulus	X	X	X	X	X	X	X	X	X	X	X	X	XX	(X)		X	X	X
Oct. laevis	X	X	X	X	X	X	X	X	X	X	X	X	X			X	XX	

X — any occurrence
XX — abundant
(X) — rare or doubtful
? — assumed on basis of extralimital distribution

they are commonly associated with hardwoods.

The subject of host preference in ciid beetles is a complicated one which has been dealt with elsewhere (Lawrence, 1967*b*, 1971, 1973; Paviour-Smith, 1960, 1969). Although few Ciidae are monophagous, some have very narrow host ranges, while others prefer groups of related or similar fungi, which have been placed in host preference groups by Paviour-Smith (1960) and Lawrence (1971). Polyphagous species are the exception, and most of these which have been adequately sampled show a preference for one group of fungi.

Among the California Ciidae, that with the broadest host range is *Cis americanus*, which has been collected in the fruiting bodies of 24 different fungi and is known to breed in at least 18 of them. A second polyphagous form is *Ceracis californicus*, which breeds in at least 15 different fungi but appears to have a preference for species of *Ganoderma*. *Hadraule blaisdelli* has been found in a wide variety of hosts and is known to infest herbarium collections. The best example of an oligophagous species is *Plesiocis cribrum*, which normally breeds in the small, whitish, globular fruiting bodies of *Polyporus volvatus* on dead conifers. It may also be found on *Polyporus anceps* in the same habitats.

The most obvious host preference group in this fauna is the *Polyporus versicolor* group, which includes fungi with thin, whitish, coriaceous fruiting bodies, such as *P. versicolor*, *P. hirsutus*, *Lenzites betulina*, *Trametes hispida*, and related forms. The ciids preferring these hosts are *Cis fuscipes*, *C. tetracentrum*, *C. versicolor*, *C. vitulus*, *Ceracis dixiensis*, *Sulcacis curtulus*, and *Octotemnus laevis*. *Ceracis californicus* commonly breeds in these fungi, but it is more often associated with species of *Ganoderma*. *Ceracis dixiensis* is known to breed only in *T. hispida*, while *Cis tetracentrum* has been collected only in *P. versicolor*. All of the fungi in this group occur on deciduous trees and are rarely found on conifers.

A second group of hosts includes *Polyporus pargamenus*, *P. abietinus*, and a few related forms with thin, coriaceous fruiting bodies having a purple or brownish pore surface. In California, all records are from *P. abietinus* which is abundant on dead conifers. Ciids restricted to this fungus are *Cis acritus*, *C. hystriculus*, and *C. striolatus*.

In eastern North America, a number of Ciidae inhabit the darkly pigmented, reddish-brown, woody, or fibrous fruiting bodies of *Polyporus gilvus*, *Fomes robiniae*, and their relatives. This group is represented in California by a single species, *Cis maritimus*, which breeds in *Fomes pini* and *Polyporus schweinitzii* associated with conifers along the extreme northern coast. No other California Ciidae are known to breed in these fruiting bodies, although *Fomes pini* and *Polyporus gilvus* are not uncommon in the state, and the latter is a common host of certain Lepidoptera (Lawrence and Powell, 1969).

Most of the other fungi encountered in California fall into the *Ganoderma applanatum* group, which includes a wide variety of fungi with at least three major types of fruiting bodies: (1) large, woody, perennial, lightly pigmented, growing on conifers (*Fomes pinicola*, *F. annosus*, *F. officinalis*); (2) large, corky, perennial, darkly pigmented, growing mainly on hardwoods (*Ganoderma applanatum*, *G. brownii*); (3) smaller, relatively soft-bodied, annual, lightly pigmented (*Polyporus adustus*, *P. betulinus*). Those ciids preferring the *Fomes pinicola* type include *Cis angustus*, *C. biarmatus*, *C. creberrimus*, *C. duplex*, *C. megastictus*, *C. tridentatus*, *Dolichocis indistinctus*, and *D. manitoba*. These are all characteristic inhabitants of coniferous forests. *Cis americanus* is often associated with *F. pinicola* and *F. annosus*, but it is also common in *Polyporus adustus* and a number of other hosts. *Cis creberrimus* in eastern North America breeds in a variety of fungi growing on hardwoods, including *Polyporus adustus* and *Ganoderma lucidum*, but in the southwest it prefers the lightly pigmented *Fomes* on conifers. Species preferring *Ganoderma applanatum* and its relatives include *Cis ephippiatus*, *C. levettei* (in eastern North America, at least), *Ceracis californicus*, and *C. similis* (in Baja California). *Cis ephippiatus* prefers *G. applanatum* in coastal California, where the closely related *Cis biarmatus* is found on *Fomes pinicola*; in the Sierra Nevada, where *Cis biarmatus* is absent, *C. ephippiatus* occurs on *Fomes pinicola* as well.

DISTRIBUTION

California Distribution–The distribution of Ciidae within the state is summarized in table 2, which shows the occurrence of each species in the various biotic areas originally proposed by Miller (1951) and mapped by Hurd and Michener (1955). The absence of ciids from the Great Basin is partly an artifact of collecting, while the few records for the two desert provinces are all from the Colorado River Basin. As would be expected from the previous discussion of habitat preferences, the great majority of records are from the northern coast and the Sierra Nevada, while a lesser number are from the foothills, inner coastal ranges, and southern mountains. Very few ciids extend into the Great Valley, and most of these occur along the major

river systems. Three species have not been recorded from a specific locality, so that their occurrence within the state must be surmised on the basis of extralimital distribution. *Ceracis similis* occurs on the islands in the Gulf of California, and may be present in low dry areas near the Mexican border. *Cis tetracentrum*, on the other hand, inhabits mountain canyons in Arizona and is more likely to occur in mesic situations at intermediate elevations. Finally, *C. levettei* occurs in eastern British Columbia, eastern Washington, and the Rocky Mountains, and its occurrence in California would probably be within the Sierran Montane region.

TABLE 2
Distribution of Ciidae in California
According to Biotic Areas of Hurd and Michener (1955)

	Boreal					Austral			
Ciid Species	North Coastal	Sierran	So. California Montane	Great Basin Montane	Great Basin	Mojave Desert	Colorado Desert	Californian	Great Valley
C. acritus		X	?						
C. americanus	X	X						(X)	
C. angustus		X							
C. biarmatus	X								
C. creberrimus			X						
C. duplex			X						
C. ephippiatus	XX	X						(X)	
C. fuscipes	XX	X						X	(X)
C. hystriculus	XX	XX	X						
C. levettei		?							
C. maritimus	X								
C. megastictus	X	X							
C. striolatus		X							
C. tetracentrum			?						
C. tridentatus	X								
C. versicolor	X	X	X			X	X	XX	X
C. vitulus	X	X	X					XX	(X)
D. indistinctus	X	X							
D. manitoba	X	XX						(X)	
Orth. punctatus	X							X	
H. blaisdelli	X	X	X				X	X	X
P. cribrum	X	XX	X					X	(X)
Cer. californicus	X	X	X					XX	
Cer. dixiensis							X		
Cer. similis								?	
S. curtulus	XX	X	X					XX	X
Oct. laevis	XX	X						X	

X — any occurrence
XX — abundant
(X) — rare or doubtful
? — assumed on basis of extralimital distribution

North American Patterns and Faunal Affinities.—The majority of California Ciidae have northern distribution patterns usually corresponding to the Nearctic Boreal of Powell (1964) or the CO2 Type of Munroe (1956). These widespread northern species may be further divided into those primarily western and rare in the East (*Cis ephippiatus, C. maritimus, Dolichocis indistinctus*, and *Plesiocis cribrum*), those primarily eastern (*Cis levettei*), and those fairly common on both coasts (*Cis americanus, C. fuscipes, C. striolatus, Orthocis punctatus, Dolichocis manitoba, Sulcacis curtulus*, and *Octotemnus laevis*). There are no species having the Western Boreal (or W3) type of distribution, since those occurring in the Rocky Mountains are also present in the Northeast.

A few species occur only along the Pacific Coast west of the Sierra Nevada. Two of these, *Cis biarmatus* and *C. tridentatus*, are restricted to the immediate coast from just south of San Francisco Bay to southern Alaska. Each species is broadly sympatric with a sibling species, *Cis ephippiatus* and *C. americanus* respectively, which has a much broader distribution. *C. hystriculus* occurs both along the northern coast and in the Sierra Nevada; it is closely related to and possibly conspecific with *C. horridulus* Casey, which occurs in eastern British Columbia, the Rocky Mountains and the Northeast. A fourth Pacific coastal species is *C. angustus*, which occurs in the Sierra Nevada and the Cascade Ranges; further collecting may reveal a wider distribution. A final member of the Boreal group is *C. megastictus*, which is known only from a few montane localities in northern California, but which is probably more widespread in the Pacific Northwest.

All of the 17 species mentioned above probably have Old World affinities, and most of them have closely related counterparts in Eurasia. They would belong to the modern Holarctic element of Linsley (1958). Two of these northern forms, *Plesiocis cribrum* and *Dolichocis manitoba*, appear to be more isolated and may represent older elements.

The remainder of the California ciids have southern distribution patterns and Neotropical affinities. *Cis vitulus* is practically endemic to the state, the only extralimital record being from Oak Creek Canyon, 6,000 feet, in northern Arizona. The species occurs in association with hardwoods in fairly wet situations

along the coast and in the Sierran foothills. Its closest relative, *C. congestus* Casey, is found in the Southeast, while other members of the species group are Neotropical. This is the only species which may be a member of the California faunal element of Linsley (1958), although these "Californian" species are said to be associated with more xeric communities.

Ceracis californicus is the most widely distributed of the southern forms, extending from Washington and Colorado south into central Mexico, and occurring in both lowland and montane situations. *Cis acritus*, *C. creberrimus*, and *C. duplex* are southern montane species, occurring only at higher elevations in association with conifers. *C. creberrimus* is also widespread in eastern North America, but there is some doubt that the southwestern populations are actually conspecific with those of the East. *C. acritus* is closely related to the eastern *C. subtilis* Mellie. *C. versicolor*, *Hadraule blaisdelli*, *Ceracis dixiensis*, and *Ceracis similis* are primarily lowland species, although the first two occur at intermediate elevations in the Sierra Nevada. All four extend into Mexico and may inhabit fairly arid regions. *Cis tetracentrum* is associated with hardwoods in the mountain canyons of southern Arizona and the Mexican highlands. These southern species are representatives of Linsley's Sonoran and Neotropical faunal elements.

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SYSTEMATICS

Although the Ciidae are the most common and abundant inhabitants of Polyporaceae and related wood-rotting fungi, they may occasionally be confused with other small, fungus-inhabiting Coleoptera. The following list includes some of the more obvious external characters which distinguish the Ciidae from other small cucujoid beetles: (1) head usually declined and partly concealed by pronotum; (2) eyes oval, entire, and fairly coarsely facetted; (3) frontoclypeal area in male often raised to form a ridge, tubercles, or horns; (4) antennae 8- to 10-segmented, with a distinct 2- to 3-segmented club bearing large sensory organs (*see* Lawrence, 1971); (5) last segment of maxillary palp subconical; (6) anterior edge of pronotum in male often bearing horns; (7) procoxal cavities narrowly open to closed behind, trochantins hidden; (8) elytra never striate, epipleura narrow, extending almost to apex; (9) mesocoxal cavities not closed outwardly by sterna, trochantins hidden; (10) metacoxae narrow, transverse, subcontiguous; (11) tarsi 4–4–4 in both sexes, segments simple, not lobed; (12) tibiae without apical spurs, the outer edge of protibia often expanded and modified at apex; (13) abdomen with five freely articulated sternites, first sternite without coxal lines, often with median pubescent fovea in male. Some California cucujoids which occur in fungi and might be confused with ciids are *Pentaphyllus californicus* Horn (Tenebrionidae), *Eupisenus elongatus* (LeConte) (Tetratomidae), and *Sphindocis denticollis* Fall (*see* Addendum). All three have 11-segmented antennae, the first two have a 5–5–4 tarsal formula, *Pentaphyllus* has the first three abdominal sternites fused, and *Sphindocis* has the first two fused.

Ciid larvae have been illustrated by Böving and Craighead (1931) and Peterson (1957), and they may be recognized by the following characters (based on more than half of the North American species, including all genera, and a number of exotic forms): (1) body cylindrical, without lateral extensions, lightly and evenly pigmented, except for head, first thoracic tergite, and posterior abdominal tergites; (2) head with Y-shaped epicranial suture, 5 ocelli or less, and short gula; (3) antennae 2-segmented, with a long, ventral, sensory appendage near base of second segment and a long seta at the apex of that segment; (4) mandibles bidentate, with or without "retinaculum" and mola; (5) maxillae with obliquely obtuse mala, and small, dorsal, subapical, lobelike lacinia; (6) spiracles small, annular; (7) tergite 9 variously modified, but usually with two hook-like urogomphi; (8) sternite 9 without asperites, segment 10 pygopod-like. The larvae are not treated further in this paper (*see* Addendum).

KEY TO THE SUBFAMILIES AND GENERA OF CALIFORNIA CIIDAE

1. Procoxae subconical, strongly projecting below intercoxal process, which does not extend to middle of coxae (figs. 1–2); metasternal suture absent; outer edges of all tibiae spinose for more than half their lengths (fig. 15); first visible abdominal sternite (III) in male with posteriorly-projecting, triangular flap, which partly conceals pubescent fovea (fig. 5); antennae 8-segmented.....OROPHIINI, *Octotemnus* (p. 23)
   Procoxae transverse or globular, not projecting below intercoxal process, which extends beyond middle of coxae (figs. 3–4); metasternal suture present; outer edges of tibiae not spinose or bearing spines at apices only (figs. 7–14); first visible abdominal sternite in male simple or foveate, but without triangular flap (fig. 6).....CIINI, 2
2. Prosternum in front of coxae almost twice as long as intercoxal process (fig. 17); sides of pronotum slightly diverging towards apex; body small (TL usually less than 1.4 mm.), elongate and extremely flattened (fig. 33); antennae 9-segmented with a 2-segmented club .....*Hadraule* (p. 19)
   Prosternum in front of coxae not or slightly longer than intercoxal process; sides of pronotum not diverging towards apex; body usually larger and less flattened; antennal club 3-segmented 3
3. Outer apical angle of protibia expanded, rounded, and bearing several spines (figs. 13–14) 4
   Outer apical angle of protibia narrowly rounded (fig. 7), blunt and angulate (fig. 9), or produced and dentate (fig. 11), not spinose..... 5
4. Intercoxal process of prosternum laminate, less than 0.15 X as wide as a procoxal cavity; vestiture consisting of very short, fine hairs; antennae 8- or 9-segmented.....
   Ceracis (p. 20)
   Intercoxal process of prosternum not laminate, at least 0.20 X as wide as a procoxal cavity; vestiture consisting of short, stout bristles; antennae 10-segmented.....
   Sulcacis (p. 22)
5. Antennae 10-segmented 6
   Antennae 9-segmented 7
6. Outer apical angle of protibia narrowly rounded (fig. 7); elytral suture with an inflexed margin near apex (fig. 16); head and pronotum in both sexes simple; elytral punctation single and uniform; vestiture consisting of very short, fine hairs; body elongate and parallel-sided.....*Orthocis* (p. 18)
   Outer apical angle of protibia usually produced and dentate (fig. 11) or blunt and agulate (fig. 9), if somewhat rounded, then vestiture consisting of short, stout bristles and elytral punctation seriate; elytral suture without inflexed margin; head of male usually bearing plates, teeth, or tubercles .....*Cis* (p. 9)
7. Outer apical angle of protibia rounded (fig. 12); body more elongate, TL/EW more than 2.25; apex of pronotum simple in both sexes.....*Dolichocis* (p. 18)
   Outer apical angle of protibia distinctly produced and dentate (fig. 8); body shorter and stouter, TL/EW less than 2.20; apex of pronotum in male bearing two horns or tubercles.....*Plesiocis* (p. 20)

Genus *Cis* Latreille

This is the largest genus in the family with about 350 named species distributed throughout the world. At present, the North American fauna includes 43 species, of which 17 probably extend into California.

KEY TO THE CALIFORNIA SPECIES OF CIS

1. Elytral punctation dual, consisting of larger, shallow, nude megapunctures and smaller, deeper micropunctures, which bear bristles or hairs..... 2
   Elytral punctation single, the punctures fairly uniform in size and all or most of them bearing bristles or hairs 12
2. Vestiture consisting of fine hairs 3
   Vestiture consisting of short, stout bristles..... 7
3. Elytral hairs longer, more than 0.20 times as long as scutellar base and visible under 10 X magnification, decumbent 4
   Elytral hairs very short, less than 0.15 times as long as scutellar base and not visible under 10 X magnification, erect or inclined 5
4. Pronotal punctation finer and sparser, punctures subequal to eye facets and separated by 1.0 to 1.5 diameters; body usually smaller, narrower, and bicolored, brownish with black pronotum and transverse elytral macula.....*C. ephippiatus* (p. 13)
   Pronotal punctation coarser and denser, punctures larger than eye facets and separated by 0.33 to 0.66 diameter; body usually larger, broader, and more uniformly pigmented, brownish....*C. biarmatus* (p. 12)
5. Outer edge of protibia irregularly notched or serrate for part of its length; pronotal punctation finer and sparser, punctures smaller than eye facets and separated by more than 1.0 diameter; lateral edges of pronotum smooth; elytral punctation not distinctly seriate .....*C. levettei* (p. 14)
   Outer edge of protibia simple; pronotal punctation coarser and denser, punctures usually larger than eye facets and separated by less than 1.0 diameter; lateral edges of pronotum coarsely crenulate; elytral punctation distinctly seriate 6
6. Anterior angles of pronotum broadly rounded; pronotal punctures very dense, separated by 0.33 diameter or less; interspaces smooth; elytral megapunctures 4 times as large as micropunctures; abdominal fovea in male circular .....*C. megastictus* (p. 15)
   Anterior angles of pronotum subacute; pronotal punctures not as dense, separated by 0.50 to 0.66 diameter; interspaces granulate; elytral megapunctures less than 4 times as large as micropunctures; abdominal fovea in male longitudinally oval .....
   C. maritimus (p. 14)
7. Anterior angles of pronotum distinctly produced and broadly rounded, the disc impressed above each angle (fig. 19); lateral margins of pronotum broader, easily visible for their entire lengths from above, their edges smooth or barely crenulate; prosternum in front of coxae tumid but not carinate; TL usually

more than 2.00 mm ..... *C. fuscipes* (p. 13)
Anterior angles of pronotum not or barely produced and subacute (fig. 18); lateral pronotal margins distinctly crenulate, usually narrower; prosternum flat or carinate; TL usually less than 2.0 mm..... 8

8. Prosternum in front of coxae distinctly carinate; body short and broad, oval, EL/EW usually less than 1.40; anterior edge of pronotum in male produced to form a subtriangular process (fig. 20) 9
Prosternum in front of coxae flat or slightly tumid, not carinate; body more elongate and parallel-sided, EL/EW usually more than 1.40; anterior edge of pronotum in male simple 10

9. Elytral punctation obscurely dual, megapunctures barely larger than micropunctures..... *C. tridentatus* (p. 16)
Elytral punctation distinctly dual, megapunctures 1.50 to 3.0 times as large as micropunctures..... *C. americanus* (p. 10)

10. Elytral punctation confused; elytral bristles shorter and stouter, about 0.33 times as long as scutellar base, colorless, and blunt at tip..... *C. acritus* (p. 10)
Elytral punctation distinctly seriate; elytral bristles longer and narrower, usually 0.50 times as long as scutellar base, yellowish, and acute at tip 11

11. Outer apical angle of protibia not produced, rounded or obtusely angulate (fig. 9); lateral margins of pronotum broader, easily visible for their entire lengths from above; pronotum usually lightly granulate and shiny, reddish in color, and paler than elytra; frontoclypeal ridge in male simple.. *C. versicolor* (p. 16)
Outer apical angle of protibia at least slightly produced, usually forming a distinct tooth (fig. 10); lateral margins of pronotum narrower, not or barely visible for their entire lengths from above; pronotum usually distinctly granulate and dull, dark brown or black in color, as are elytra; frontoclypeal ridge in male bituberculate..... *C. striolatus* (p. 15)

12. Body larger and broader, TL at least 2.00 mm. and EL/EW less than 1.50; anterior angles of pronotum strongly produced and rounded; lateral pronotal margins broader, easily visible for their entire lengths from above, with a raised lip (fig. 19)..... 13
Body smaller or narrower, TL less than 2.00 mm. or EL/EW more than 1.50; anterior angles of pronotum not or slightly produced and subacute; lateral pronotal margins narrower, not or barely visible for their entire lengths from above, without a raised lip..... 14

13. Pronotal punctures only slightly smaller than elytral punctures; elytral bristles longer and finer, more than 6 times as long as wide and acute at apex; frontoclypeal ridge in male with 2 triangular plates; male with abdominal fovea; elytra in female more than 2 times as long as pronotum..... *C. tetracentrum* (p. 16)
Pronotal punctures much smaller than elytral punctures; elytral bristles shorter and stouter, less than 6 times as long as wide and blunt at apex; frontoclypeal ridge in male elevated and trisinuate, so that 4 teeth are formed; male without abdominal fovea; elytral in female less than 2 times as long as pronotum..... *C. vitulus* (p. 17)

14. Elytra densely clothed with long, fine, acute bristles, which are subseriate and almost as long as scutellar base; lateral pronotal margins not or barely crenulate; body somewhat flattened ..... *C. creberrimus* (p. 12)
Elytra sparsely clothed with shorter, stouter bristles, which are uniformly distributed and much shorter than scutellar base; lateral pronotal margins distinctly crenulate; body not flattened..... 15

15. Body shorter and broader, EL/EW less than 1.45; prosternum in front of coxae weakly carinate, the lateral portions concave; anterior edge of pronotum in male armed with 2 subtriangular horns..... *C. duplex* (p. 12)
Body longer and narrower, EL/EW more than 1.45; prosternum in front of coxae flat or slightly tumid; anterior edge of pronotum in male simple or with 2 small tubercles 16

16. Elytral bristles shorter, stouter, and colorless or very pale yellow; size larger, TL usually more than 1.85 mm.; pronotal apex in male usually bituberculate; male without abdominal fovea.... *C. hystriculus* (p. 14)
Elytral bristles longer, finer, and bright yellow; size smaller, TL usually less than 1.85 mm.; pronotal apex in male simple; male with abdominal fovea..... *C. angustus* (p. 11)

Cis acritus Lawrence

Cis acritus Lawrence, 1971:443–444, figs. 52, 63, 73, 80, 106. Holotype, ♂, Rustler Park, 8 mi. W Portal, Cochise County, Arizona (CAS).

Geographic range.—Montane regions of southern California, Arizona, and New Mexico.

California records.—Fresno Co.: 3 mi. E. Shaver Lake. Kern Co.: 1 mi. SE Alta Sierra.

*Host fungus.—Polyporus abietinus.**

Discussion.—This is the only California ciid in which the body form is elongate, the elytral punctation is dual and confused, and the vestiture consists of short, stout, colorless bristles. *Cis striolatus* and *C. versicolor* are similar in appearance, but in both species the elytral punctation is seriate. *C. creberrimus* differs in having single elytral punctation and longer, finer vestiture. Although apparently rare, *C. acritus* may occur more widely at higher elevations in southern California. It is to be sought among dead coniferous trees and logs, in the fruiting bodies of *Polyporus abietinus*, which are normally inhabited by *C. hystriculus*.

Cis americanus Mannerheim

(Fig. 20)

Cis americanus Mannerheim, 1852:360. Lectotype, ♂, Sitka Island, Alaska (MZUH).

Map. 1. California distribution of *Cis americanus* Mannerheim. Inset: Distribution in North America.

Map. 2. California distribution of *Cis angustus* Hatch. Inset: Distribution in North America.

Synonyms.—*Xestocis insolens* Casey, 1898:86. *Cis frosti* Dury, 1917:9. *Cis serricollis* Dury, 1917:9. *Xestocis minor* Hatch, 1962:232. *Xestocis oweni* Hatch, 1962:232. *Xestocis strigulosus* Hatch, 1962:231. *Cis hatchi* Lawrence, 1971:445, replacement name for *Xestocis nitidus* Hatch, 1962:232 (not *Anobium nitidum* Fabricius, 1792).

Geographic range.—Northern part of North America, from Alaska to Nova Scotia, south to central California, northern Utah, Colorado, and western North Carolina (map 1).

California records.—Widespread in the Coast Ranges and in the Sierra Nevada through the northern half of the state, ranging up to elevations above 6,000 feet on both sides of the Central Valley.

Host fungi.—*Polyporus adustus**; *Polyporus betulinus**; *Stereum hirsutum**; *Fomes pinicola**; *Polyporus versicolor**; *Fomes annosus**; *Poria versipora**; *Steccherinum ochraceum**; *Pleurotus ostreatus**; *Polyporus sulphureus**; *Ganoderma tsugae**; *Polyporus abietinus*; *Trametes mollis**; *Ganoderma applanatum**; *Polyporus resinosus**; *Polyporus hirsutus**; *Polyporus pargamenus**; *Polyporus squamosus**; *Polyporus tulipiferae*; *Poria nigrescens*; *Fomes fomentarius*; *Polyporus biformis*; *Phlebia merismoides*.

Discussion.—This species is characterized by the short, broad form, by the carinate prosternum, by the dual elytral punctation, and by the vestiture of short, stout bristles. It differs from the closely related *C. tridentatus* in having the elytral megapunctures distinctly larger than the micropunctures. *Cis americanus* is extremely variable throughout its range and may represent a complex of species with *C. tridentatus*. On the West Coast there are two fairly distinct forms which differ in size, relative abundance of megapunctures, density of elytral bristles, and width of pronotal margins; these two forms may be sibling species (*see* Lawrence, 1971).

Cis americanus inhabits a wide variety of fungi and is known to breed in at least 17 species. In coastal California it commonly breeds in *Polyporus adustus* and *Stereum hirsutum*, while montane populations may occur in *Fomes pinicola*.

Cis angustus Hatch

Cis angustus Hatch, 1962:230. Holotype, ♀, Stanley, British Columbia (CAS).

Geographic range.—Mountains of the Pacific Coast, from south-central British Columbia to the southern Sierra Nevada (map 2).

California records.—ELDORADO CO.: Lake Tahoe. FRESNO CO.: Huntington Lake. LASSEN CO.: Black's Mountain; Facht. MADERA CO.: 7 mi. NE The Pines, Bass Lake, 5000'. MARIPOSA CO.: 6 mi. NW Fish Camp. PLUMAS CO.: Canyon Dam. TEHAMA CO.: 7 mi.

N Mineral, 6000'. TULARE Co.: Dorset Camp, Sequoia National Park.

Host fungi. — *Fomes pinicola**; *Fomes annosus*; *Fomes officinalis*.

Discussion. — This species is characterized by the elongate and somewhat cylindrical body form, by the single, coarse, and confused elytral punctation, and by the moderately long and fine, yellowish bristles. It is most easily confused with *C. hystriculus*, which is usually larger, with shorter and stouter colorless bristles, and with no abdominal fovea in the male, but the two species are not likely to be found in the same fruiting bodies. *Dolichocis manitoba* is also similar and may be found in the same kinds of fungi, but that species differs in having 9-segmented antennae, rounded protibial apices, and an anteriorly constricted pronotum. *Cis creberrimus* differs in being somewhat flattened with finer and denser elytral punctation. *C. angustus* appears to be restricted to the mountains of the Pacific Coast, where it occurs at higher elevations only.

Cis biarmatus Mannerheim

(Fig. 21)

Cis biarmatus Mannerheim, 1852:360. Lectotype, ♂, Sitka Island, Alaska (MZUH).

Geographic range. — Pacific Coast of North America, from southern Alaska to Marin County, California (map 3).

California records.—DEL NORTE Co.: Crescent City. HUMBOLDT Co.: 20 mi. E. Arcata; Fieldbrook. MARIN Co.: 2 mi. SW Inverness. MENDOCINO Co.: Caspar.

Host fungi.—*Fomes pinicola**.

Discussion.—This species differs from most California ciids by the short, broad body form, by the distinctly carinate prosternum, by the dual elytral punctation, and by the vestiture of moderately long, decumbent, fine hairs. It may be distinguished from the closely related *C. ephippiatus* by the coarser and denser pronotal punctation, by the larger size, and by the uniform coloration. Throughout its range, *Cis biarmatus* is sympatric with *C. ephippiatus*, but the two species have never been taken on the same conks (*see* p. 13).

Cis creberrimus Mellié

(Fig. 23)

Cis creberrimus Mellié, 1848:357, pl. 12, fig. 5. Lectotype, ♀, New Orleans, Louisiana (MNHN).

Synonyms.—*Cis puberulus* Mellié, 1848:358. *Cis nubillus* Gorham, 1898:331.

Geographic range. — Eastern North America, from Vermont south to Florida and west to eastern Nebraska, Kansas, and Texas; montane regions of the Southwest; throughout the West Indies; and scattered localities in Mexico, Central and South America.

California records.—SAN BERNARDINO Co.: 4 mi. E Running Springs. SAN DIEGO Co.: 1.5 mi. NW Mt. Laguna.

Host fungi. — *Fomes sclerodermeus**; *Polyporus adustus**; *Ganoderma lucidum**; *Ganoderma applanatum*; *Polyporus hydnoides**; *Fomes officinalis**; *Poria latemarginata**; *Fomes pinicola**; *Polyporus pargamenus**; *Trametes corrugata**; *Polyporus gilvus*; *Fomes annosus**; *Ganoderma fulvellum**; *Polyporus sanguineus**; *Poria corticola**; *Daedalea elegans*; *Lenzites striata*; *Pleurotus sp.*; *Polyporus anceps*; *Polyporus hirsutus*; *Polyporus sulphureus*; *Polyporus supinus*; *Schizophyllum commune*; *Trametes hispida*.

Discussion.—*Cis creberrimus* is distinguished by the elongate and flattened form, by the single punctation, and by the dense vestiture of fairly long and fine bristles. The vestiture in this species is actually dual, consisting of erect and inclined bristles differing only slightly in length, but this is not obvious at lower magnifications. There is some doubt as to whether the California populations are conspecific with the eastern *C. creberrimus*, in which the pronotal punctation is finer and the elytral bristles much shorter. The variation in this species or complex is discussed further in Lawrence (1971).

Cis duplex Casey

(Fig. 22)

Cis duplex Casey, 1898:82. Holotype, ♂, California (USNM).

Geographic range. — Mountains of the southwestern United States, from southern California east to north-central New Mexico and south as far as Morelos, Mexico and the southern tip of Baja California.

California records.—SAN DIEGO Co.: 1.5 mi. NW Mt. Laguna.

Host fungi. — *Polyporus anceps**; *Fomes officinalis**; *Fomes pinicola**; *Ganoderma oregonense**.

Discussion.—This species is easily recognized by the fairly short and broad form, single and confused elytral punctation, vestiture of short bristles, narrow, crenulate lateral pronotal margins, and the sexual characters of the male, which consist of two subtriangular plates on both the clypeus and the pronotum.

Map. 3. California distribution of *Cis biarmatus* Mannerheim. Inset: Distribution in North America.

Map 4. California distribution of *Cis ephippiatus* Mannerheim. Inset: Distribution in North America.

Cis ephippiatus Mannerheim

Cis ephippiatus Mannerheim, 1853:234. Types, Sitka Island, Alaska (MZUH?).

Synonym.—Xestocis moznettei Dury, 1917:16.

Geographic range.—Western North America, from southern Alaska south in California to Alameda County and the southern Sierra Nevada, and in the Rocky Mountain Region to northern Nevada and Colorado. Also known from Vermont, New Hampshire, and the Gaspé Peninsula of Quebec (map 4).

California records.—ALAMEDA Co.: Berkeley. DEL NORTE Co.: 18 mi. S. Klamath. FRESNO Co.: Huntington Lake. HUMBOLDT Co.: 20 mi. E Arcata; 8 mi. S Korbel. MARIN Co.: Alpine Lake; S. P. Taylor State Park. MENDOCINO Co.: 1 mi. N Albion; Little River; Mendocino. PLUMAS Co.: Buck's Lake; 7 mi. NE Buck's Lake.

Host fungi. — ***Ganoderma applanatum**; **Fomes pinicola**; **Ganoderma brownii**; **Fomes annosus**; **Polyporus betulinus**; **Polyporus resinosus**; **Polyporus sulphureus**; **Poria versipora**.*

Discussion.—This species closely resembles *Cis biarmatus*, but may be distinguished by the finer and sparser pronotal punctation, smaller size, and normally bicolored elytra. In California, it occurs both along the northern coast and in the Sierra Nevada. The coastal populations of *C. ephippiatus* are usually collected in the fruiting bodies of *Ganoderma* spp., while the sympatric *C. biarmatus* is restricted to *Fomes pinicola*. Montane populations of *C. ephippiatus*, however, occur on *Fomes pinicola* as well.

Cis fuscipes Mellié

(Figs. 24 and 25)

Cis fuscipes Mellié, 1848:271, pl. 2, fig. 23. Lectotype, ♀, Boston (MNHN).

Synonyms.—Cis atripennis Mellié, 1848:258, pl. 2, fig. 15. *Cis chevrolatti* Mellié, 1848:249. *Cis dubius* Mellié, 1848:273. *Cis carolinae* Casey, 1898:78. *Cis impressa* Casey, 1898:79. *Cis pallens* Casey, 1898:78.

Geographic range. — Widespread and abundant throughout most of northern and eastern North America, from northern British Columbia, south to Los Angeles County, California, east across Canada to Nova Scotia, and south through eastern and midwestern United States (east of the 100th meridian) to southern Texas and Florida (map 5). Also known from Cuba, Madeira, and Hawaii.

California records. — ALAMEDA Co.: Berkeley; Oakland. CONTRA COSTA Co.: Tilden Park, Berkeley Hills. HUMBOLDT Co.: Garberville; 8 mi. S Korbel. LOS ANGELES Co.: (no specific

locality). MARIN Co.: Alpine Lake; Carson Ridge; Inverness; 1 mi. SE Inverness; 2 mi. N Inverness; Lagunitas; Mill Valley; Muir Woods; S. P. Taylor State Park; Tomales; Taylorville. MENDOCINO Co.: 2 mi. N Piercy. MONTEREY Co.: Big Sur; Carmel; Monterey. NAPA Co.: Calistoga; Napa. PLUMAS Co.: 7 mi. NE Buck's Lake. SACRAMENTO Co.: Sacramento. SAN FRANCISCO Co.: San Francisco. SAN MATEO Co.: Hillsboro; Salada Beach. SANTA CLARA Co.: 2 mi. SW Los Gatos. SANTA CRUZ Co.: Ben Lomond. SHASTA Co.: 1.5 mi. S Castella; Viola, 4000'. SISKIYOU Co.: Dunsmuir; Hamburg; Weed.

Host fungi. – *Polyporus versicolor***; *Polyporus hirsutus**; *Lenzites betulina**; *Polyporus pubescens**; *Polyporus conchifer**; *Ganoderma brownii**; *Polyporus adustus**; *Polyporus squamosus**; *Daedalea ambigua*; *Fomes fraxinophilus*; *Fomes pinicola*; *Ganoderma applanatum*; *Polyporus subectypus*.

Discussion.—This species may be distinguished by the fairly large size, dual and subseriate elytral punctation, moderately long elytral bristles, produced and rounded anterior pronotal angles, broad lateral pronotal margins, and impressed pronotal disc in the male (fig. 24). *Cis versicolor* and *C. striolatus* are usually smaller and more elongate, with narrower pronotal margins and differently constructed anterior angles, while *C. americanus* and *C. tridentatus* have a carinate prosternum and different sexual modifications in the male.

Cis fuscipes is most common in northern coastal California and is practically absent from the Sierra Nevada and the southern part of the state. It prefers humid areas where it occurs in *Polyporus versicolor* and its relatives. It is parthenogenetic throughout most of its range, but in California many populations are bisexual; the biology of this species is further discussed in Lawrence (1967*a*).

Cis hystriculus Casey

(Fig. 26)

Cis hystriculus Casey, 1898:82. Holotype, ♂, Lake Tahoe, California (USNM).

Geographic range.—Western British Columbia, Washington, and Oregon, south along the California coast and through the Sierra Nevada to the Transverse Ranges in the southern part of the state (map 6).

California records.—ALAMEDA Co.: Berkeley; Oakland. ALPINE Co.: Ebbett's Pass, 8730'. EL DORADO Co.: Lake Tahoe. FRESNO Co.: Huckleberry Meadow; Huntington Lake; Lakeshore; 3 mi. E Shaver Lake. KERN Co.: 1 mi. SE Alta Sierra; 11 mi. W Frazier Park. MARIN Co.: Alpine Lake; 1 mi. SE Inverness; 2 mi. SW Inverness; Lagunitas; Muir Woods. MARIPOSA Co.: 6 mi. NW Fish Camp. MENDOCINO Co.: Caspar; 2 mi. N Piercy; Van Damme State Park. MONTEREY Co.: Carmel. RIVERSIDE Co.: 2 mi. NE Idyllwild. SAN MATEO Co.: Montara. SANTA CRUZ Co.: Ben Lomond. SHASTA Co.: Castella. TULARE Co.: Portuguese Pass, 7 mi. SE Pine Flat; Round Meadow, 6400', Giant Forest. TUOLUMNE Co.: Dardanelle; Leland Meadow; 7 mi. NE Strawberry.

Host fungi.—*Polyporus abietinus***; *Poria cinerascens*; *Poria versipora*.

Discussion.—This species may be distinguished by the elongate, subcylindrical body form, single, coarse, and confused elytral punctation, vestiture of short, colorless bristles, distinctly dentate protibial apex, and lack of an abdominal fovea in the male. *Cis angustus* is usually smaller, with yellowish bristles and an abdominal fovea in the male, while *C. creberrimus* is flatter, with finer and denser punctation and much longer and finer vestiture.

Cis hystriculus is known only from the Pacific states, but it is closely related to and possibly conspecific with *C. horridulus* Casey, which occurs throughout the Rocky Mountains and the northeastern part of the continent (*see* discussion in Lawrence, 1971).

Cis levettei (Casey)

Xestocis levettei Casey, 1898:83. Holotype, ♂, Indiana? (USNM).

Geographic range.—Widespread in North America east of the 100th meridian, from Newfoundland south to Alabama and west to Manitoba, Kansas, and Texas; in the western part of the continent, recorded from Alberta, northwestern Colorado, eastern British Columbia and Washington, and California.

California record.—No specific locality ("Cal.").

Host fungi.—*Ganoderma applanatum***; *Fomes fomentarius**; *Fomes pinicola**; *Ganoderma tsugae**; *Polyporus versicolor*; *Ganoderma lucidum**; *Polyporus betulinus**; *Polyporus pargamenus*; *Polyporus pubescens*; *Stereum ostrea*; *Daedalea confragosa**; *Polyporus resinosus**; *Poria nigrescens**; *Fomes robiniae*; *Lenzites betulina*; *Polyporus adustus*; *Polyporus squamosus*; *Poria vitrea*.

Discussion.—The inclusion of *Cis levettei* in the California fauna is based on a single specimen from "Cal." which might be mislabelled. The species does occur in eastern Washington, however, and may extend into northern California. It resembles *C. maritimus* but differs in having much finer and sparser pronotal punctation.

Cis maritimus (Hatch)

(Fig. 27)

Xestocis maritimus Hatch, 1962:233. Holotype, ♂, Ocean Park, Oregon (UW).

Map. 5. California distribution of *Cis fuscipes* Mellié. Inset: Distribution in North America.

Geographic range.—Pacific Coast from extreme northwestern California to southwestern British Columbia. Also known from south-central Manitoba.

California record.—DEL NORTE CO.: Crescent City.

Host fungi.—Polyporus schweinitzii; Fomes pini*.*

Discussion. — This species resembles *Cis levettei*, *C. biarmatus*, and related forms with a carinate prosternum, but it may be distinguished by its vestiture of very short and fine hairs, the finely granulate and shiny pronotum with large dense punctures, the produced and acute anterior pronotal angles, and the longitudinally oval abdominal fovea in the male. Except for the Manitoba record, *Cis maritimus* is known only from the narrow, humid, coastal strip extending from northwestern California to British Columbia. This appears to be the only California ciid which breeds in the reddish-brown fruiting bodies of *Fomes pini* and *Polyporus schweinitzii.*

Cis megastictus Lawrence

Cis megastictus Lawrence, 1971:465–7, figs. 39, 55, 64, 74, 78. Holotype, ♂, Bucks Lake, Plumas County, California (CAS).

Map. 6. California distribution of *Cis hystriculus* Casey. Inset: Distribution in North America.

Geographic range. — Known only from montane regions in northern California.

California records.—CALAVERAS CO.: Calaveras. GLENN CO.: Plaskett Meadows, 6200′. PLUMAS CO.: Bucks Lake.

Host fungi. — Fomes annosus; Fomes pinicola; Polyporus sulphureus.*

Discussion.—This species resembles *Cis maritimus* in general form, vestiture of short, fine hairs, and coarse, dense pronotal punctation; it may be distinguished, however, by the rounded anterior pronotal angles, larger elytral megapunctures, and round abdominal fovea in the male. *Cis biarmatus* is also similar, but differs by the finer punctation and longer, decumbent hairs.

Cis megastictus occurs at higher elevations in the conifer forests of northern California, but it does not appear to be common.

Cis striolatus Casey

Cis striolata Casey, 1898:79. Holotype, ♀, Salida, Colorado (USNM).

Synonyms.—Cis fraterna Casey, 1898:80. *Cis macilenta* Casey, 1898:80.

Geographic range.—Widespread across the northern part of North America from the Mackenzie District, Northwest Territory, to Nova Scotia, south into the Sierra Nevada and Rocky Mountains, in the Midwest as far as Kansas, and on the Atlantic Coast as far as northern Florida.

California records.—EL DORADO CO.: Lake Tahoe. TUOLUMNE CO.: 21 mi. NE Strawberry.

Host fungi.—***Polyporus abietinus*****; *Polyporus pargamenus*****; *Daedalea unicolor**; *Polyporus hirsutus**.

Discussion.*—*Cis striolatus resembles *C. versicolor* in its elongate, somewhat flattened form, dual and distinctly seriate elytral punctation, and vestiture of short bristles; it differs from that species, however, in having the protibial apex at least slightly produced and angulate, the lateral pronotal margins narrower, the pronotal surface more granulate and the color uniform. In *C. acritus* the elytral punctation is confused and the elytral bristles are usually shorter and colorless.

Cis tetracentrum Gorham

(Fig. 28)

Cis tetracentrum Gorham, 1886:357. Lectotype, ♂, Northern Sonora, Mexico (BMNH).

Synonym.—*Cis arizonae* Dury, 1917:5.

Geographic range.—Mountains of southern Arizona and California south through the Mexican highlands as far as central Veracruz.

California record.—No specific locality ("Cal.").

Host fungus.—*Polyporus versicolor**.

Discussion.*—*Cis tetracentrum is doubtfully included on the basis of an old Morrison specimen labelled "Cal." It should be sought in the fruiting bodies of ***Polyporus versicolor*** or related fungi growing on hardwoods at intermediate elevations in the southern California mountains.

Cis tridentatus Mannerheim

Cis tridentatus Mannerheim, 1852:360. Syntypes, Sitka Island, Alaska (MZUH).

Synonyms.—*Xestocis ednae* Hatch, 1962:232. *Xestocis reflexus* Hatch, 1962:232.

Geographic range.—Pacific Coast from southern Alaska to Monterey County, California (map 7).

Map 7. California distribution of *Cis tridentatus* Mannerheim. Inset: Distribution in North America.

California records.—DEL NORTE CO.: Crescent City. HUMBOLDT CO.: 20 mi. E Arcata; Fieldbrook. MARIN CO.: Alpine Lake; Inverness; 1 mi. SE Inverness; 1 mi. NW Inverness; Lagunitas; Muir Woods; Tocaloma; Woodacre. MENDOCINO CO.: 1 mi. N Albion; Caspar; Fort Bragg; Pigmy Forest. MONTEREY CO.: Big Sur; Carmel. SANTA CLARA CO.: Los Gatos. SANTA CRUZ CO.: Ben Lomond.

Host fungi.—***Fomes pinicola*****; *Poria cinerascens**; *Ganoderma oregonense**; *Polyporus sulphureus**; *Poria carbonica**; *Trametes sepium**; *Ganoderma applanatum*; *Pleurotus ostreatus*; *Polyporus gilvus*.

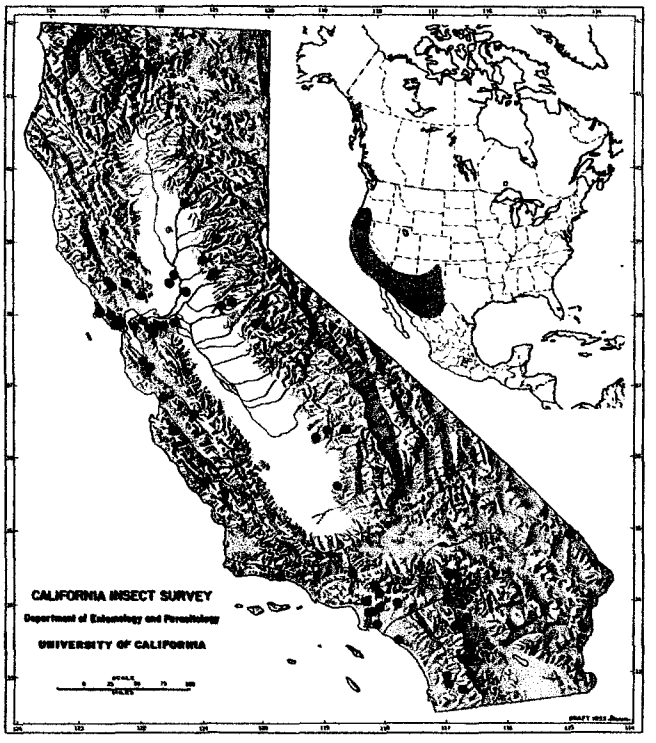
Discussion.*—This species** differs from the closely related ***Cis americanus in having obscurely dual elytral punctation, with the megapunctures barely larger than the micropunctures.

Cis versicolor Casey

(Fig. 29)

Cis versicolor Casey, 1898:80. Holotype, ♀, Calaveras County, California (USNM).

Geographic range.—Extreme southern Oregon, south throughout most of California, west of the Sierran crest, into Baja California and east through Arizona into New Mexico and western Texas (map 8).



Map 8. California distribution of *Cis versicolor* Casey. Inset: Distribution in North America.

California records.—Common and widespread through much of the state in both arid and mesic environments, from low to intermediate elevations, ranging up to above 5,000 feet in southern California. Apparently lacking from the Mojave Desert except along the Colorado River and from the east side of the Sierra Nevada, but lack of records from the northern counties probably represents sampling error.

*Host fungi.—Polyporus versicolor***; *Trametes hispida**; *Polyporus hirsutus**; *Lenzites betulina**; *Ganoderma brownii*; *Polyporus cinnabarinus*; *Schizophyllum commune.*

Discussion.—This species may be distinguished by the elongate and somewhat flattened form, dual and seriate elytral punctation, vestiture of short bristles, rounded or angulate protibial apex, shiny pronotum with fairly broad lateral margins, and lack of frontoclypeal tubercles in the male. It is normally bicolored, with a reddish pronotum and black or brown elytra. In collections, it may be confused with bicolored specimens of *Sulcacis curtulus*, but that species differs in having single and confused elytral punctation, narrow pronotal margins, and spinose protibial apices (*see* also generic key).

Cis versicolor is a common inhabitant of *Polyporus versicolor* and its relatives which usually occur on dead hardwoods.

Map. 9. California distribution of *Cis vitulus* Mannerheim. Inset: Distribution in North America.

Cis vitulus Mannerheim

(Fig. 30)

Cis vitulus Mannerheim, 1843:299. Types, California (MZUH?).

Synonyms.—Cis caseyi Dalla Torre, 1911:8, replacement name for *Cis illustris* Casey, 1898:81 (not Broun, 1880).

Geographic range.—California, from Del Norte County to San Diego County and north-central Arizona (map 9).

California records.—Widespread at low to moderate elevations throughout much of cismontane California. This species is most common in mesic situations along the northern coast and in the foothills of the Sierra Nevada, ranging up to about 3,000 feet elevation in the north and to above 5,000 feet in the mountains of the southern counties.

*Host fungi.—Polyporus versicolor***; *Lenzites betulina**; *Polyporus adustus**; *Schizophyllum commune.*

Discussion.—Cis vitulus may be distinguished by the fairly large and robust form, single and confused elytral punctation, vestiture of moderately long bristles, broad lateral pronotal margins with a raised lip, produced and rounded anterior pronotal angles, and strongly tumid prosternum. The male is characterized by having two

stout pronotal horns, an elevated, trisinuate frontoclypeal ridge, and no abdominal fovea. *Cis fuscipes* approaches it in size and shares the same habitat but differs in having dual and subseriate elytral punctation. *Cis tetracentrum* differs by the characters given in the key and is unlikely to be collected in the same areas.

Genus *Dolichocis* Dury

This is a small group of species placed in the genus *Ennearthron* by European workers (Lohse, 1967) but differing from the type, *E. cornutum* (Gyllenhal), by the narrower body form and simple protibial apices. At least two Old World species are included, as well as the two North American forms, both of which occur in California (Lawrence, 1965; 1971).

KEY TO THE CALIFORNIA SPECIES OF DOLICHOCIS

1. Pronotal punctation coarser and denser, the punctures more than 0.25 times as large as scutellar base and usually separated by less than 0.33 diameter; elytral punctures distinctly larger than pronotal punctures; elytral bristles 3 to 4 times as long as wide and about 0.33 times as long as scutellar base; vertex of male with median, raised, pubescent fovea; abdominal fovea of male margined and located in center of sternite III.... *D. manitoba*

   Pronotal punctation finer and sparser, the punctures less than 0.25 times as large as scutellar base and usually separated by more than 0.33 diameter; elytral and pronotal punctures subequal in size; elytral bristles 2 to 3 times as long as wide and about 0.17 times as long as scutellar base; vertex of male simple; abdominal fovea of male not margined and located anterad of center..... *D. indistinctus*

Dolichocis indistinctus Hatch

Dolichocis indistinctus Hatch, 1962:234. Holotype, ♂, Stanley, British Columbia (CAS).

Geographic range.—Known from scattered localities throughout the northern and montane parts of North America, from British Columbia to the Gaspé Peninsula of Quebec and south into the Sierra Nevada, Chiricahua Mountains of southeastern Arizona, and the Green Mountains of Vermont.

California records.—Del Norte Co.: Crescent City. Mendocino Co.: Caspar. Mariposa Co.: 6 mi. NW Fish Camp.

Host fungi.—*Fomes pinicola**; *Trametes serialis**; *Fomes officinalis.*

Discussion.—This species differs from *D. manitoba* in having finer and sparser punctation, shorter, stouter elytral bristles, and no fovea on the vertex in the male. It appears to be distributed throughout the range of *D. manitoba*, but it is much less common.

Dolichocis manitoba Dury

(Fig. 32)

Dolichocis manitoba Dury, 1919: 158. Holotype, ♀, Aweme, Manitoba (CMNH).

Geographic range.—Northern and montane regions of North America, from the northern coast of British Columbia to New Brunswick and south to the central California coast, the southern Sierra Nevada, southeastern Utah, and northern Pennsylvania (map 10).

California records.—Coastal Transition Zone situations and in the Coast Ranges and Sierra Nevada from the foothills to above 6,000 feet elevation.

Host fungi.—*Fomes pinicola***; *Polyporus betulinus**; *Polyporus pargamenus*; *Fomes annosus**; *Daedalea unicolor**; *Fomes officinalis**; *Ganoderma applanatum**; *Polyporus sulphureus**; *Fomes fomentarius*; *Polyporus adustus*; *Polyporus tulipiferae*; *Polyporus volvatus.*

Discussion. — *Dolichocis manitoba* may be distinguished by its elongate, cylindrical form, 9-segmented antennae, rounded protibial apex, anteriorly constricted pronotum, coarse and dense punctation, which is single and confused, and vestiture of moderately long bristles. In the male, the frontoclypeal ridge bears two sharp tubercles and the vertex has a median, raised, pubescent fovea. *D. indistinctus* differs in having finer and sparser punctation, much shorter and stouter bristles, and no fovea on the head of the male. *Sulcacis curtulus* resembles this species in having a cylindrical form and coarse, dense punctation, but the antennae are 10-segmented and the protibial apices spinose.

Dolichocis manitoba is common and widespread throughout the coniferous forests of western North America and is less common in the northeastern part of the continent. In California, its preferred host fungus is *Fomes pinicola.*

Genus *Orthocis* Casey

This genus, considered a subgenus of *Cis* by Lohse (1967), includes 38 described species and many more undescribed forms from various parts of the world (Lawrence, 1965; 1971). Unlike most *Cis*, members of the genus *Orthocis* always lack the teeth, tubercles, horns, or other armature on the head and pronotum of the male. The single California species is easily recog-

Map 10. California distribution of *Dolichocis manitoba* Dury. Inset: Distribution in North America.

Map 11. California distribution of *Hadraule blaisdelli* (Casey). Inset: Distribution in North America (isolated dots are probably all herbarium records).

nized by its large size (TL usually more than 1.75 mm) and characteristic form and vestiture (*see* below).

Orthocis punctatus (Mellié)

(Fig. 31)

Cis punctatus Mellié, 1848: 337. Holotype, ♂, North America (MNHN).

Synonym.—Orthocis aterrima Casey, 1898: 84.

Geographic range.—Widespread across North America from the edge of the Beaufort Sea (Mackenzie District, Northwest Territory) to the Island of Newfoundland, south on the Pacific Coast to Santa Barbara, California, through the Rocky Mountains to northeastern New Mexico, into the Black Hills of South Dakota, and through the eastern and midwestern states from New England to Florida and west to Kansas and Texas.

California records.—ALAMEDA Co.: Berkeley; Oakland Hills. MARIN Co.: Cypress Ridge; Fairfax; Muir Woods. MONTEREY Co.: Carmel; Monterey. SAN MATEO Co.: Crystal Lake. SANTA BARBARA Co.: Santa Barbara. SANTA CLARA Co.: Stanford University. SONOMA Co.: Sobre Vista.

*Host fungi.—Auricularia auricula**.

Discussion.—This is the only California ciid in which the body form is elongate, the lateral pronotal margins broad and subparallel, the prosternum slightly tumid, the protibial apex narrowly rounded, the elytral punctation single and confused, and the vestiture consists of very short, fine hairs. In addition, the elytral suture has an inflexed margin near the apex and the male bears no tubercles or horns on the head or pronotum. It is easily distinguished from other members of the family and is more likely to be confused with *Eupisenus elongatus* (LeConte) or *Sphindocis denticollis* Fall, which are presently included in the family Tetratomidae (*see* Addendum).

Orthocis punctatus occurs throughout the northern and montane regions of North America, where it probably feeds on the mycelium and fruiting bodies of *Auricularia auricula* and its relatives. In California, it has been collected only along the northern coast, and it does not appear to be common.

Genus *Hadraule* Thomson

This genus includes a few very small, flattened species in which the prosternum is much longer than its intercoxal process (fig. 17). In addition to *H. blaisdelli*, there are two species in the northeastern part of North

America, one of which also occurs in the Palearctic region (*see* Lawrence, 1971). Casey included *blaisdelli* in a separate genus, *Maphoca*, on the basis of the apparently 2-segmented antennal club, but the reduction of the first club segment appears to be the only significant difference between Casey's species and the type of *Hadraule, H. elongatula* (Gyllenhal).

Hadraule blaisdelli (Casey)

(Fig. 33)

Maphoca blaisdelli Casey, 1900: 165. Holotype, ♀, Mokelumne Hill, Calaveras County, California (USNM).

Geographic range.—Western North America, from southern British Columbia to southern California, east through Utah, Arizona, and New Mexico into Texas, and south into Mexico. Also recorded from Michigan, Iowa, Ohio, Massachusetts, Connecticut, and Florida (map 11).

California records.—CALAVERAS Co.: Mokelumne Hill. EL DORADO Co.: 2 mi. N Placerville. KERN Co.: 8 mi. W Bakersfield; Kernville. LOS ANGELES Co.: 1 mi. NE Crystal Lake; Pasadena. MARIN Co.: Alpine Dam; Alpine Lake. MENDOCINO Co.: Leggett; 4 mi. W Leggett; 2 mi. N Piercy. RIVERSIDE Co.: 4 mi. E Blythe; Palm Springs. SAN DIEGO Co.: 1.5 mi. NW Mt. Laguna. SAN LUIS OBISPO Co.: 5 mi. SE Nacimiento Dam. SANTA CLARA Co.: 2 mi. SW Los Gatos. SHASTA Co.: (no specific locality). SISKIYOU Co.: (no specific locality). YOLO Co.: Davis.

Host fungi.—Lenzites saepiaria; Polyporus adustus*; Trametes sepium; Polyporus munzii; Polyporus versicolor; Daedalea confragosa*; Fomes annosus*; Polyporus anceps*; Polyporus biformis*; Trametes hispida*; Fomes robiniae.*

Discussion.—This species is easily distinguished from other California Ciidae by the very small size, elongate and flattened form, 9-segmented antennae with a 2-segmented club, seriate elytral punctation, and by the structure of the prothorax (*see* generic key). The color is similar to that of *Cis versicolor*, with a reddish pronotum and brownish or black elytra.

Hadraule blaisdelli occurs naturally throughout the Pacific Coast and southwestern states, but it has also been recorded as a herbarium pest in various parts of the country. In California, it is known from scattered localities along the coast, in the Sierra foothills, and in both desert and montane portions of southern California.

Genus *Plesiocis* Casey

This genus contains the single species *P. cribrum*, Hatch's *P. spenceri* having been transferred to *Ennearthron* (Lawrence, 1971). The prosternal structure is similar to that in *Ceracis*, while the protibial apex resembles that found in *Cis* and *Ennearthron*. *Plesiocis cribrum* is not obviously related to any New World or European species, and its closest relatives may occur in the Oriental Region.

Plesiocis cribrum Casey

(Fig. 34)

Plesiocis cribrum Casey, 1898: 87. Holotype, ♂, Mokelumne Hill, Calaveras County, California (USNM).

Geographic range.—Northern and montane regions of North America from British Columbia to the Gaspé Peninsula of Quebec, south to the Laguna Mountains in California, the edge of the Colorado Plateau in Arizona and New Mexico, the Great Lakes Region, and the Shenandoah Mountains of Virginia (map 12).

California records.—Throughout most of the Boreal Zone areas of the state, from coastal and foothill Transition Zone situations to above 7,000 feet in the central Sierra Nevada and above 8,000 feet in southern California.

*Host fungi.—Polyporus volvatus**; Polyporus anceps*; Polyporus alboluteus.*

Discussion.—This species is characterized by the robust form, 9-segmented antennae, dentate protibial apex, coarse, dense, and confused punctation, and vestiture of short bristles. The male has 4 sharp teeth on the frontoclypeal ridge and 2 weak protuberances on the apex of the pronotum. *Cis vitulus* may be confused with *P. cribrum* on the basis of size, general form, and the sexual modifications, but individuals of the former are distinguished by the 10-segmented antennae, finer punctation, especially on the pronotum, broader lateral pronotal margins, and lack of an abdominal fovea in the male. In *Dolichocis manitoba* the antennae are 9-segmented and the punctation is similar, but that species differs in the more elongate form, rounded protibial apices, and modifications of the head in the male.

Plesiocis cribrum is very common throughout western North America wherever conifers occur and is also known from the northeastern states. Although the preferred host is *Polyporus volvatus*, the species also breeds in *Polyporus anceps*—the two fungi often grow together on dead conifer logs.

Genus *Ceracis* Mellié

This genus includes 42 described species, mostly

Map 12. California distribution of *Plesiocis cribrum* Casey. Inset: Distribution in North America.

Map 13. California distribution of *Ceracis californicus* (Casey). Inset: Distribution in North America.

from the New World. Of these, 20 occur in America north of Mexico (Lawrence, 1967*b*; 1971). Two species occur in California, one generally distributed and the other known only from the vicinity of the Colorado River. A third species, *C. similis* Horn, is known from islands in the Gulf of California and may occur in the state.

KEY TO THE CALIFORNIA SPECIES OF CERACIS

1. Antennae 9-segmented; pronotal punctation coarser and denser, punctures usually more than 0.20 times as large as scutellar base and separated by less than 1.5 diameters; occurring throughout state..... *C. californicus* (p. 21)
   Antennae 8-segmented; pronotal punctures usually less than 1.5 times as large as scutellar base and separated by more than 1.5 diameters; extreme southern part of state 2
2. Body smaller and narrower, TL usually less than 1.30 mm. and EL/EW usually more than 1.40; elytra uniformly black; apex of pronotum in male simple or weakly emarginate; abdominal fovea in male transversely oval .....*C. dixiensis* (p. 22)
   Body larger and broader, TL usually more than 1.30 mm. and EL/EW usually less than 1.40; elytra usually reddish in part; apex of pronotum in male bearing an emarginate lamina; abdominal fovea in male circular.... *C. similis* (p. 22)

Ceracis californicus (Casey)

(Fig. 35)

Ennearthron californicum Casey, 1884:36. Holotype, ♂, California (USNM).

Synonyms.—Ennearthron convergens Casey, 1898: 89. *Ennearthron discolor* Casey, 1898: 89. *Ennearthron grossulum* Casey, 1898: 89. *Ennearthron coloradense* Dury, 1917: 22. *Ennearthron oregonus* Dury, 1917: 22.

Geographic range. — Western North America, from Seattle, Washington, east to western Nebraska, south along the Pacific Coast to southern California and through the Great Basin and Rocky Mountain Regions to southern Arizona and New Mexico; extending into Mexico as far as Baja California Sur and southern Sinaloa (map 13).

California records. — Widespread in cismontane areas of the state at low and intermediate elevations, ranging up to 5,000 feet in southern California.

Host fungi. — ***Polyporus versicolor**; **Polyporus adustus**; **Ganoderma brownii**; **Ganoderma* sp.*; **Lenzites betulina**; **Ganoderma applanatum**; **Trametes hispida**; **Pleurotus ostreatus**; **Poria versipora**; **Steccherinum ochraceum**; **Polyporus gilvus*; *Ganoderma lucidum**; *Ganoderma lobatum**; *Polyporus pargamenus**; *Daedalea unicolor**; *Fomes annosus**; *Fomes fraxinophilus**; *Ganoderma oregonense*; *Fomes cajanderi*; *Trametes mollis*.

Discussion. – *Ceracis californicus* may be distinguished by the elongate, cylindrical form, 9-segmented antennae, concave prosternum with a laminate intercoxal process, spinose protibial apices, coarse, dense punctation, and vestiture of short, fine hairs. The other two *Ceracis* which might coexist with this species in the extreme southern part of the state both have 8-segmented antennae and finer punctation. The only other elongate and subglabrous ciid in the California fauna is *Orthocis punctatus*, which differs in having 10-segmented antennae, rounded protibial apices, a slightly tumid prosternum with a broader intercoxal process, and a flatter form (*see* also generic key). In California *Ceracis californicus* breeds in a variety of fungi associated with hardwoods.

Ceracis dixiensis (Tanner)

Octotemnus dixiensis Tanner, 1934: 57. Holotype, ♂, Zion National Park, Utah (BYU).

Geographic range.—Southwestern North America, from southern Utah to Guadalajara, Mexico, and from Colorado River in California to the Big Bend Region in Texas.

California record.—Riverside Co.: 4 mi. E Blythe.

Host fungi.—*Trametes hispida***; *Ganoderma* sp.

Discussion. – This species is characterized by the small size, 8-segmented antennae, and fine pronotal punctation. It is usually found breeding in the fruiting bodies of ***Trametes hispida*** growing on cottonwoods along dry river beds.

Ceracis similis Horn

Ceracis similis Horn, 1894: 391. Syntypes, Coral de Piedra, Sierra el Taste, Baja California Sur (CAS).

Geographic range. – Baja California and Nayarit, Mexico, south to El Salvador.

California records.—None. To be expected in extreme southern California.

Host fungi.—*Ganoderma zonatum**; *Ganoderma* sp.*; *Ganoderma applanatum**.

Discussion.—This species is fairly common in Baja California and on various islands in the Gulf of California; its occurrence in the state is doubtful. It differs from *C. californicus* in having 8-segmented antennae and a somewhat shorter body form, and from *C. dixiensis* in the larger size, reddish coloration, and different sexual modifications.

Genus *Sulcacis* Dury

Sulcacis contains four Palearctic species and two North American forms, one of which extends into California. The spinose protibial apices are similar to those of *Ceracis* species, while the structure of the prosternum and the type of vestiture are more like that in the genus *Malacocis*.

Sulcacis curtulus (Casey)

(Fig. 36)

Cis curtula Casey, 1898: 83. Holotype, ♂, New York (USNM).

Synonyms.—*Cis montana* Casey, 1898: 82. *Cis sorror* Casey, 1898: 83. *Cis cylindricus* Dury, 1917: 8. *Sulcacis niger* Dury, 1917: 21. *Cis criddlei* Dury, 1919: 158.

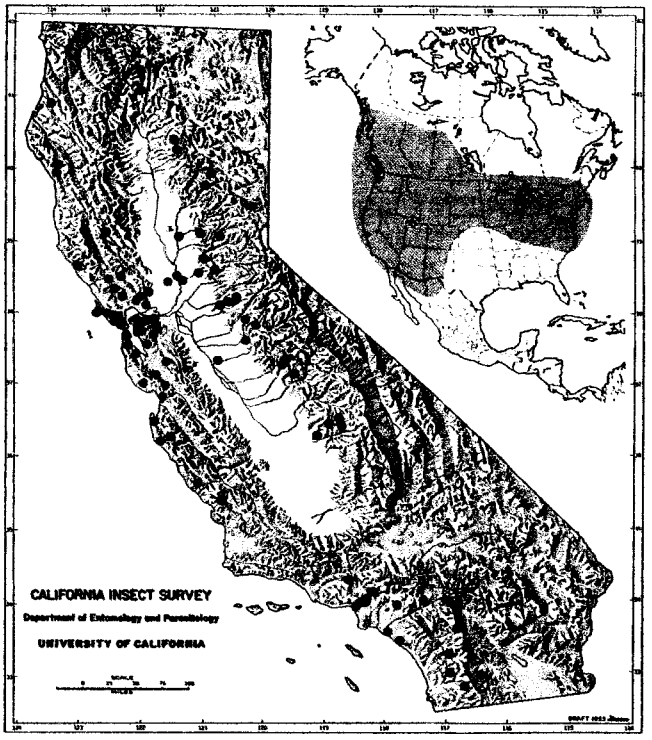
Geographic range. – Widespread through the northern and montane regions of North America, from the northern coast of British Columbia to southern Quebec and New England, south to San Diego County, California, the mountains of southern Arizona and northern Mexico, and the states of Nebraska, Illinois, and North Carolina (map 14).

California records. – Common and widespread throughout much of the state except in the more arid regions east of the Sierra Nevada and in the deserts. This species occurs in Upper Sonoran and Transition Zone situations at low elevations, ranging up to moderate elevations (5,000–6,000 feet) in the mountains of both central and southern California.

Host fungi. – ***Polyporus versicolor*****; ***Polyporus hirsutus****; ***Polyporus adustus****; ***Lenzites betulina****; ***Trametes hispida****; ***Pleurotus ostreatus***; ***Polyporus cinnabarinus****; ***Fomes igniarius***; ***Schizophyllum commune****; ***Ganoderma applanatum***; ***Polyporus gilvus***; ***Polyporus vulpinus***; ***Steccherinum ochraceum***; ***Stereum hirsutum***.

Discussion.—This species may be distinguished by the subcylindrical form, 10-segmented antennae, spinose protibial apex, biconcave prosternum with a fairly broad, tapering intercoxal process, coarse, dense, confused punctation, and vestiture of yellowish bristles which vary somewhat in size. Species of *Ceracis* have much finer vestiture, 8- or 9-segmented antennae, and laminate intercoxal process, while in *Dolichocis* the protibial apex is rounded, the prosternum is slightly tumid, and the antennae are 9-segmented. *Cis hystriculus* differs in having the protibial apex distinctly dentate and the prosternum tumid.

Although *Sulcacis curtulus* occurs at fairly high altitudes in the Sierra Nevada, it is not usually associated with conifers but rather is an inhabitant of *Polyporus versicolor* and various other fungi growing on hardwoods.



Map 14. California distribution of *Sulcacis curtulus* (Casey). Inset: Distribution in North America.

Map 15. California distribution of *Octotemnus laevis* Casey. Inset: Distribution in North America.

Genus *Octotemnus* Mellié

Octotemnus is primarily an Old World genus, with only one North American species, occurring throughout the northern part of the continent. It is easily distinguished from most American ciids by the tribal characters given in the key on page 9. The only other North American orophiine is *Rhopalodontus americanus* Lawrence from Wisconsin (Lawrence, 1971).

Octotemnus laevis Casey

(Fig. 37)

Octotemnus laevis Casey, 1898: 91. Holotype, ♂, Rhode Island (USNM).

Synonym.—Octotemnus denudatus Casey, 1898: 91.

Geographic range.—Widespread throughout the northern part of North America, from southern Alaska to Quebec and Nova Scotia, south along the Pacific Coast to Monterey County, California, in the Sierra Nevada to Tulare County, in the Midwest to southern Iowa and Kansas, and on the East Coast to Alabama (map 15).

California records.—ALAMEDA Co.: Berkeley; Oakland; Strawberry Canyon. CONTRA COSTA Co.: Tilden Park, Berkeley Hills. DEL NORTE Co.: Patrick Creek. EL DORADO Co.: 2 mi. N Placerville; 3 mi. N Placerville. HUMBOLDT Co.: Eureka; Garberville; 8 mi. S Korbel. MARIN Co.: Alpine Lake; Inverness; 1 mi. SE Inverness; Lagunitas; Mill Valley; Muir Woods; Redwood Canyon; S. P. Taylor State Park; Taylorville. MENDOCINO Co.: Van Damme State Park. MONTEREY Co.: Big Sur; Carmel. PLUMAS Co.: 7 mi. NE Buck's Lake. SAN MATEO Co.: Marilama Point. SANTA CLARA Co.: Los Gatos; 2 mi. SW Los Gatos; San Jose; 2 mi. E Sveadal. SANTA CRUZ Co.: Big Basin; Ben Lomond; Redwood Glen; Santa Cruz Mountains. SISKIYOU Co.: Dunsmuir; Weed. SONOMA Co.: Duncan Mills; Glen Ellen. TULARE Co.: Dorset Camp, Sequoia National Park.

Host fungi. — ***Polyporus versicolor*****; ***Polyporus hirsutus****; ***Polyporus pubescens****; ***Lenzites betulina****; ***Polyporus conchifer****; ***Ganoderma applanatum****; ***Polyporus abietinus***; ***Polyporus adustus***; ***Polyporus albellus***; ***Polyporus galactinus***; ***Polyporus pargamenus***; ***Polyporus squamosus***; ***Polyporus sulphureus***; *Stereum* sp.

Discussion.—This species is characterized by its oval body form, 8-segmented antennae, spinose tibiae, finely punctate, almost glabrous surface, and by other features mentioned in the generic key. It appears to prefer humid areas where it is a common inhabitant of ***Polyporus versicolor*** and its relatives.

ADDENDUM

The monotypic genus *Sphindocis* Fall was removed from the Ciidae (Lawrence, 1971) and tentatively

placed in the Tetratomidae. Further studies of this and related heteromerous Coleptera since the completion of this manuscript have convinced me that *Sphindocis* must be returned to the family Ciidae and should be included in this paper, since it represents a subfamily endemic to California. Although most of the resemblances between *Sphindocis* and the Ciidae are probably primitive with the Heteromera, at least one, the distinct laciniar lobe of the larval maxilla, appears to be derived and argues for a common ancester of the two groups, which is not at the same time the ancestor of any other heteromeran. Since the genus differs from all other ciids with respect to several fundamental characters (listed in Lawrence, 1971: 427, table 1), a new subfamily is being proposed (Lawrence, *in press*) for its inclusion; the remaining ciids (Ciini and Orophiini) comprise the subfamily Ciinae.

Subfaimily Sphindociinae Lawrence
Genus *Sphindocis* Fall
Sphindocis denticollis Fall

Sphindocis denticollis Fall, 1917: 171. Holotype, ♂, Alameda Co., California (MCZ).

Geographic range.—Coastal California from northern Mendocino County to Alameda and San Mateo Counties.

California records.—ALAMEDA Co.: no specific locality. MARIN Co.: Alpine Lake; Mill Valley; Mt. Tamalpais. MENDOCINO Co.: Fort Bragg; 4 mi. E Fort Bragg; 3 mi. S Leggett; 4 mi. W Leggett; 1 mi. N Piercy; 2 mi. N Percy; 4 mi. W Willits. SAN MATEO Co.: Corte Madera Creek; Kings Mtn. Road, Woodside.

Host fungi.—*Trametes sepium**; *Poria cinerascens**.

Discussion.—This species resembles a large *Orthocis punctatus* (3–4 mm. long, subglabrous, and parallel-sided), but differs from that and all other ciid species by the following characters: (1) antennae 11-segmented, without large sensory organs on the club; (2) tibial spur present; (3) abdominal sternites III and IV connate; (4) lateral margins of pronotum undulate, forming several weak teeth; (5) trochanters strongly heteromeroid (obliquely attached to femur so that part of femoral base is attached directly to coxa); (6) basal piece of aedeagus almost as long as tegmen, with two apical condyles; median lobe membranous with two lateral struts; and (7) metendosternite with distinct median stalk. *Sphindocis* larvae differ from those of other ciids by having 3-segmented antennae, biforous spiracles, and a row of asperites on ventrite IX. Other characters are discussed by Lawrence (1971 and in press). *Sphindocis denticollis* also resembles the pisenine tetratomid *Eupisenus elongatus* (LeConte), but it differs from that species in having only four tarsal segments on all legs, the first two visible abdomnal sternites connate, a completely hidden prothoracic trochantin, and a fovea on the first visible abdominal sternite of the male.

This species is most commonly found in the fruiting bodies of *Trametes sepium* growing on dead madrone (*Arbutus Menziesii*) branches lying on the ground. One series of larvae was collected on *Poria cinerascens* growing on a Douglas fir log (*Pseudotsuga Menziesii*), but none could be reared throdugh to the adult stage. A single pupa was cut out of madrone wood beneath a *T. sepium* fruiting body, and it may be that pupation takes place only within the wood.

Sphindocis denticollis is a very distinct and probably relict form which appears to be endemic to the mixed Transistion Zone forests of the northern California coast.

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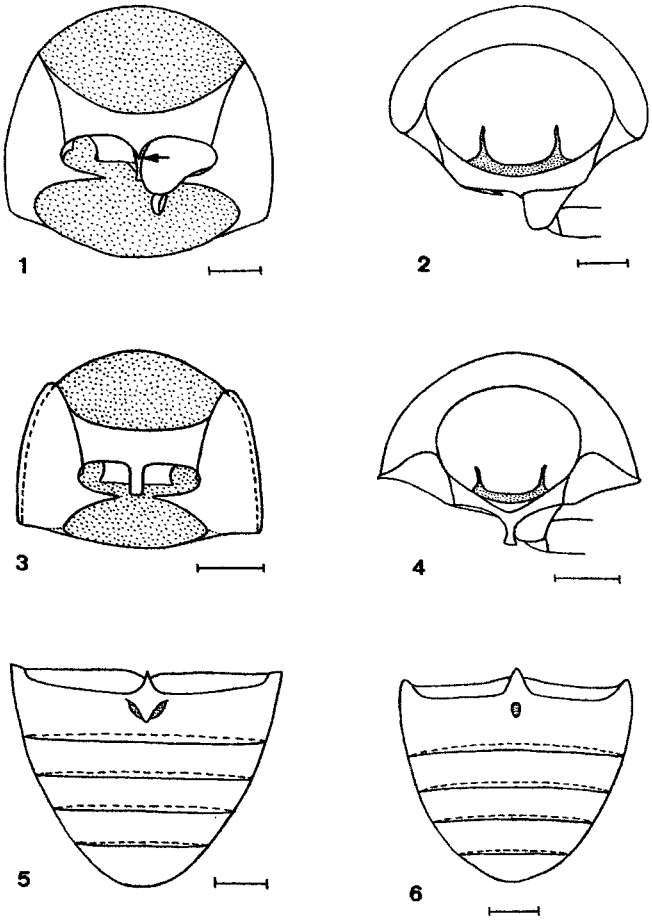
FIGURES

Figs. 1–2. *Octotemnus laevis* Casey, ♂, prothorax with right coxa removed (scale = 0.125 mm). Fig. 1. Ventral view (arrow pointing to tip of intercoxal process). Fig. 2. Anterior view.

Fig.s 3–4. *Cis fuscipes* Mellié, ♀, prothorax (scale = 0.250 mm). Fig. 3. Ventral view with both coxae removed. Fig. 4. Anterior view with right coxa removed.

Fig. 5. *Octotemnus laevis* Casey, ♂, abdomen, ventral view (showing covered abdominal fovea) (scale = 0.125 mm).

Fig. 6. *Cis tetracentrum* Gorham, ♂, abdomen, ventral view (showing exposed abdominal fovea) (scale = 0.250 mm).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Figs. 7–15. Right tibia of male, posterior view (all drawn to same scale). Fig. 7. *Orthocis punctatus* (Mellié). Fig. 8. *Plesiocis cribrum* Casey. Fig. 9. *Cis versicolor* Casey. Fig. 10. *Cis striolatus* Casey. Fig. 11. *Cis vitulus* Mannerheim. Fig. 12. *Dolichocis manitoba* Dury. Fig. 13. *Ceracis californicus* (Casey). Fig. 14. *Sulcacis curtulus* (Casey). Fig. 15. *Octotemnus laevis* Casey.

Fig. 16. *Orthocis punctatus* (Mellié), male, elytral apices, postero-dorsal view.

Fig. 17. *Hadraule blaisdelli* (Casey), male prothorax, ventral view with both coxae removed (scale = 0.125 mm).

Figs. 18–19. Anterior angle and lateral margin of pronotum, dorsal view (scale = 0.063 mm). Fig. 18. *Cis americanus* Mannerheim. Fig. 19. *Cis fuscipes* Mellié.

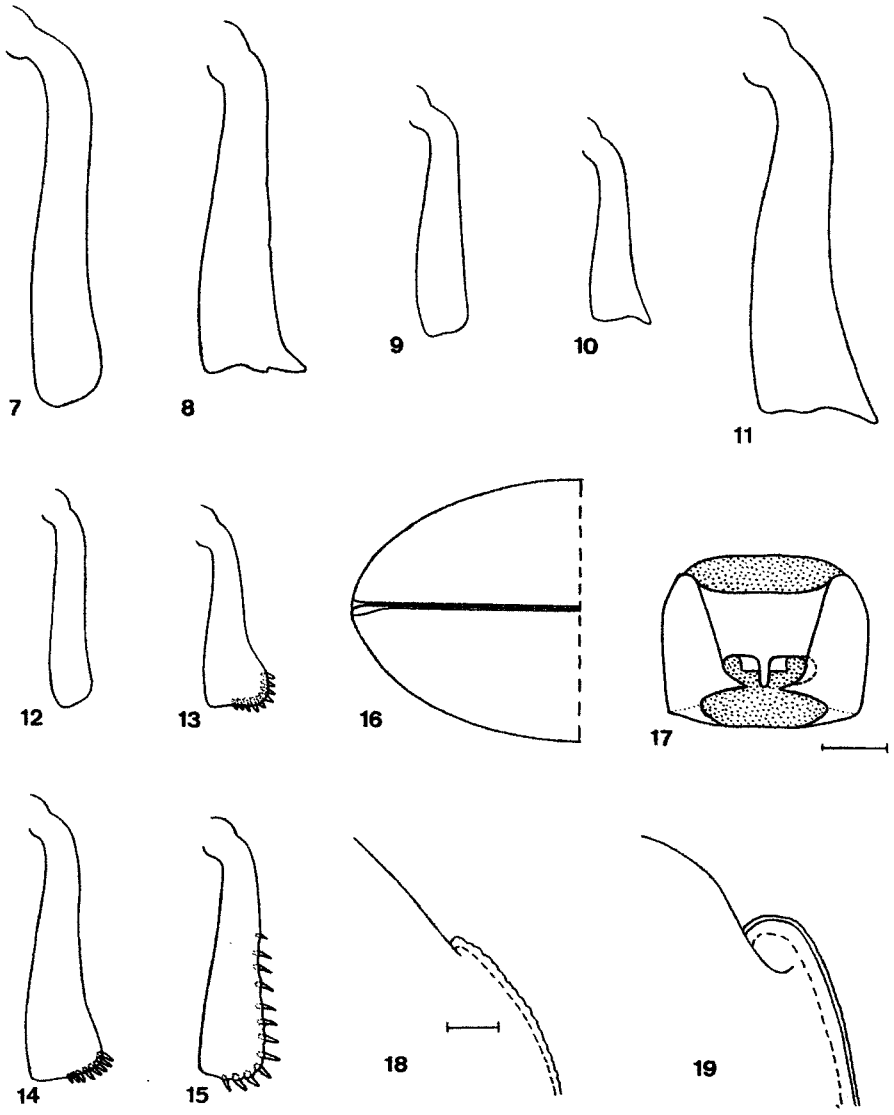
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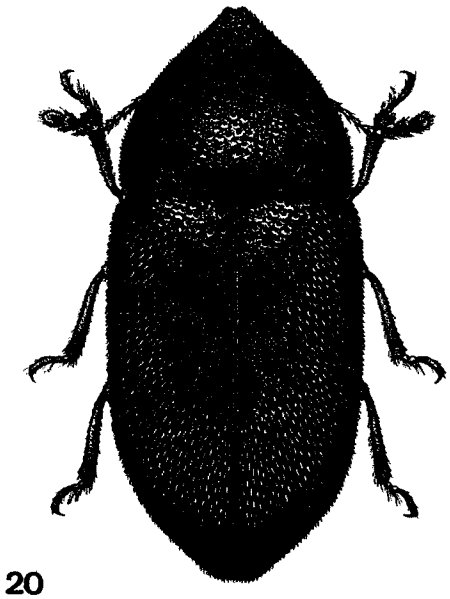
Fig. 20. *Cis americanus* Mannerheim, ♂.

Fig. 21. *Cis biarmatus* Mannerheim, ♂.

Fig. 22. *Cis duplex* Casey, ♂.

Fig. 23. *Cis creberrimus* Mellié, ♂.



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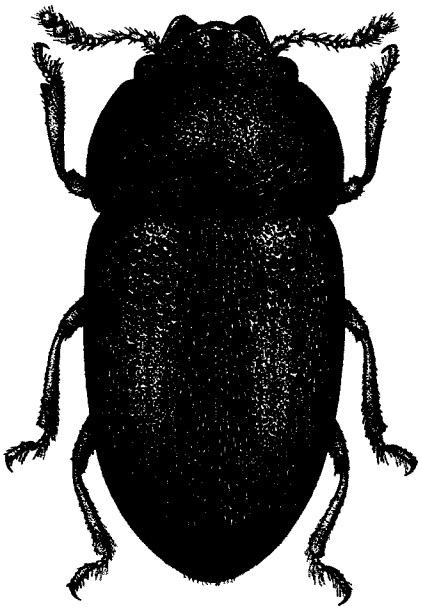

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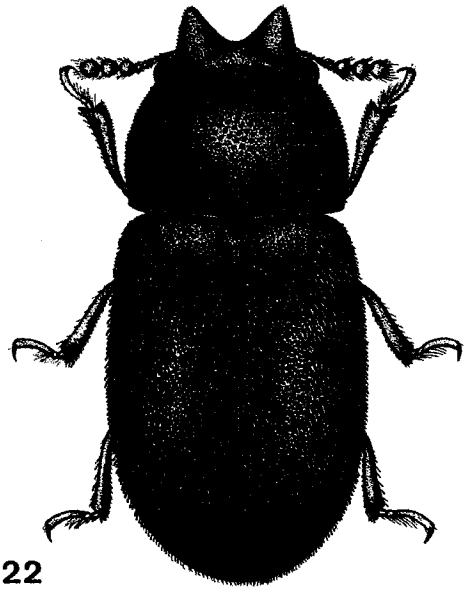

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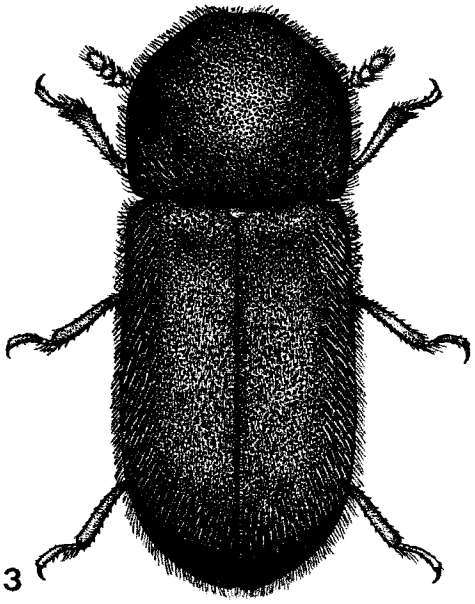

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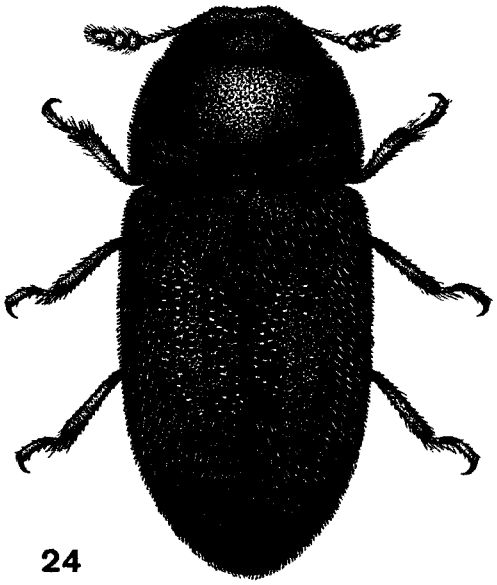
Fig. 24. *Cis fuscipes* Mellié, ♂.

Fig. 25. *Cis fuscipes* Mellié, ♀.

Fig. 26. *Cis hystriculus* Casey, ♂.

Fig. 27. *Cis maritimus* (Hatch), ♂.



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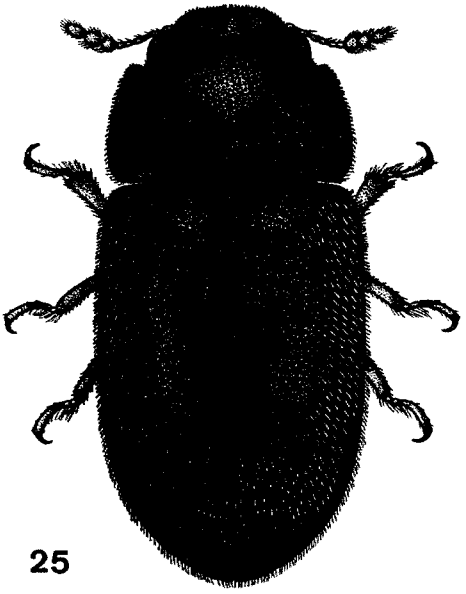

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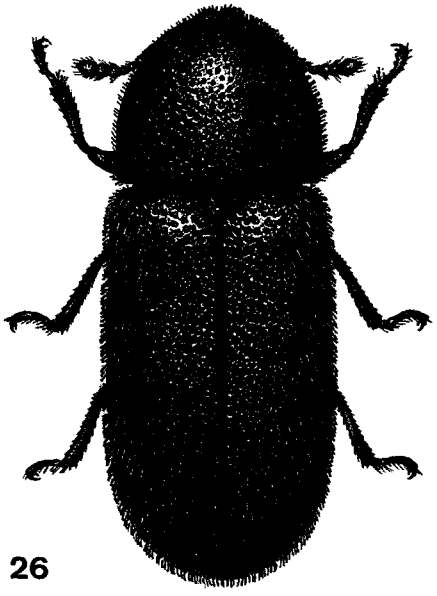

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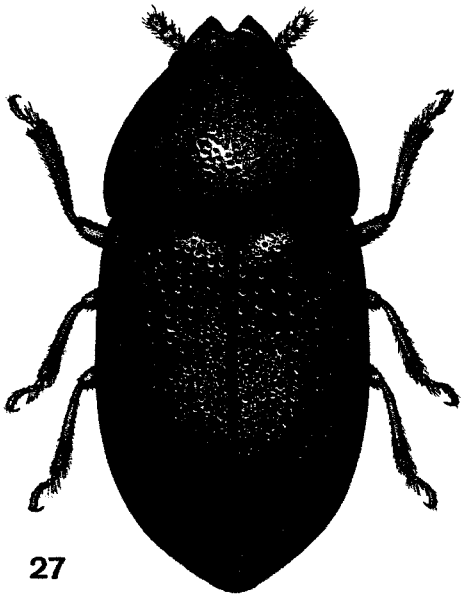

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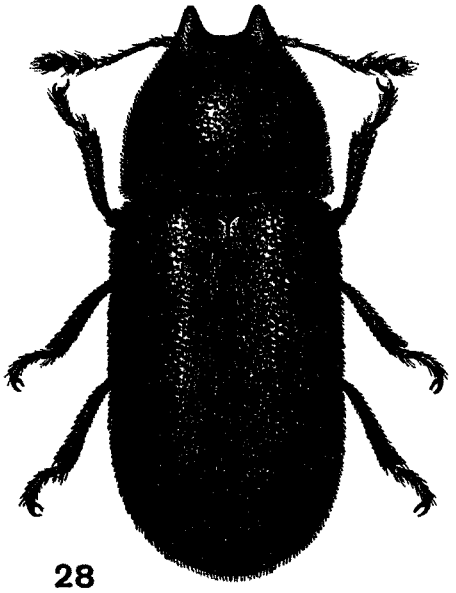
Fig. 28. *Cis tetracentrum* Gorham, ♂.

Fig. 29. *Cis versicolor* Casey, ♂.

Fig. 30. *Cis vitulus* Mannerheim, ♀.

Fig. 31. *Orthocis punctatus* (Mellié), ♂.



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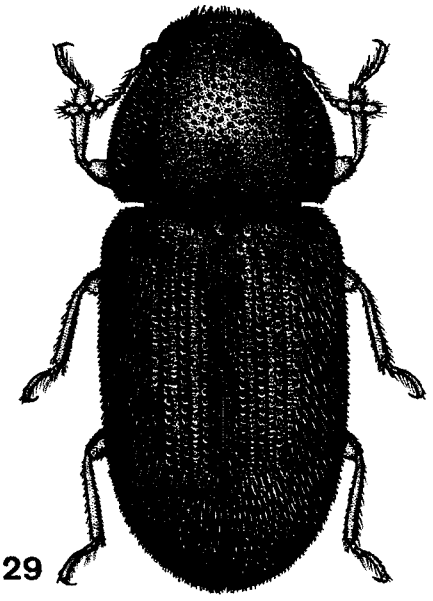

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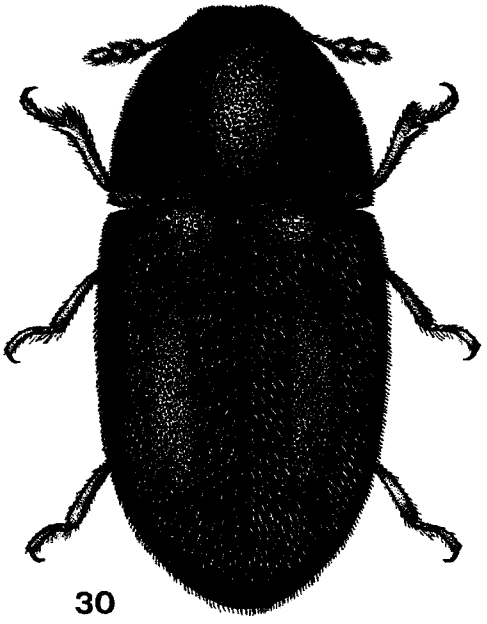

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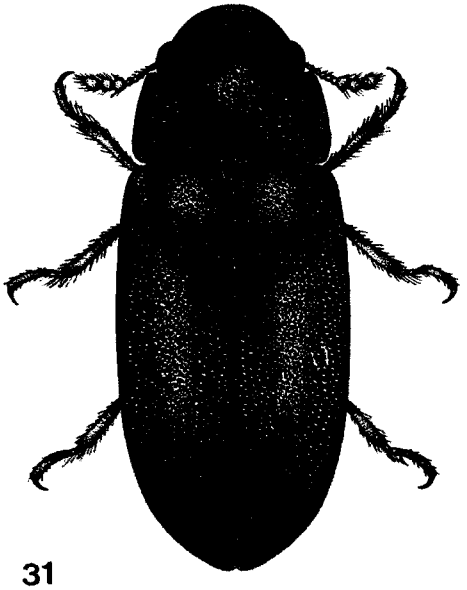

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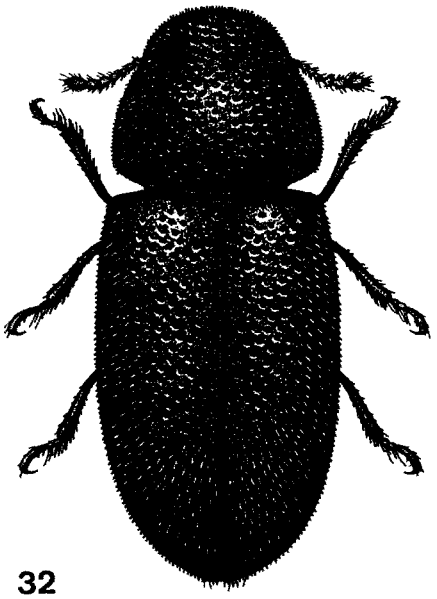
Fig. 32. *Dolichocis manitoba* Dury, ♂.

Fig. 33. *Hadraule blaisdelli* (Casey), ♂.

Fig. 34. *Plesiocis cribrum* Casey, ♂.

Fig. 35. *Ceracis californicus* (Casey), ♂.



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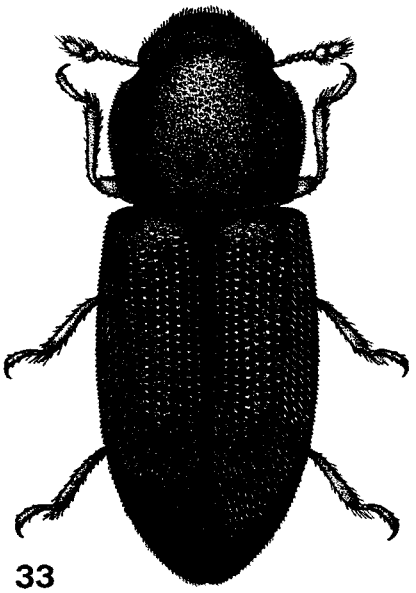

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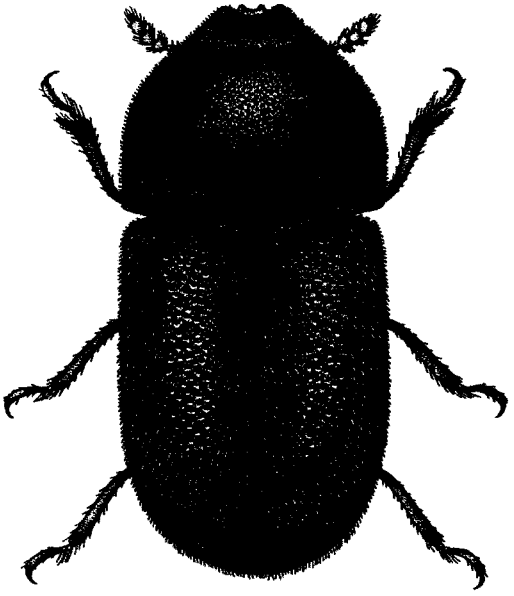

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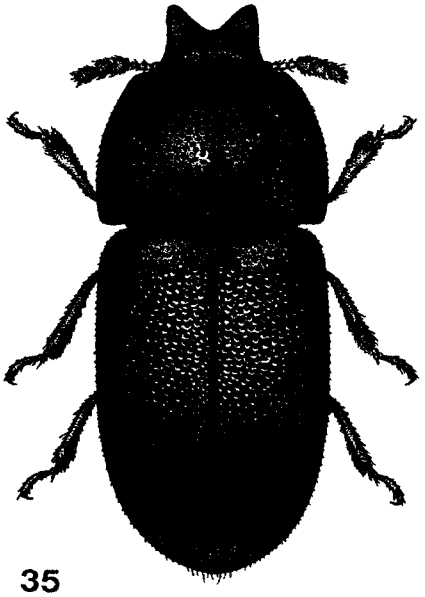

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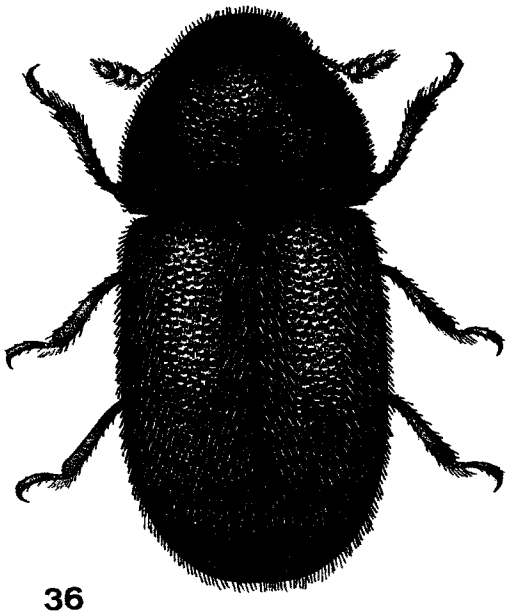
Fig. 36. *Sulcacis curtulus* (Casey), ♂.

Fig. 37. *Octotemnus laevis* Casey, ♂.



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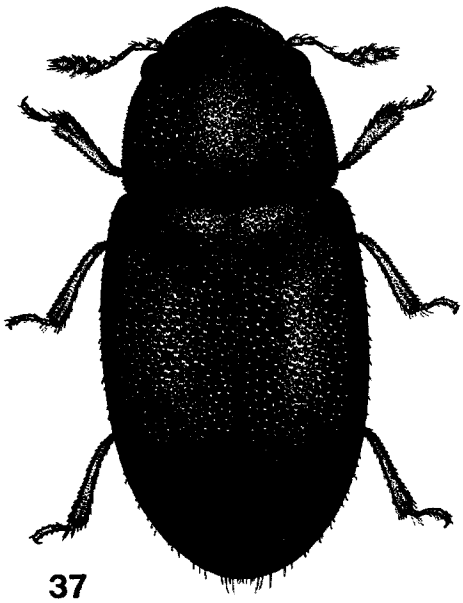

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