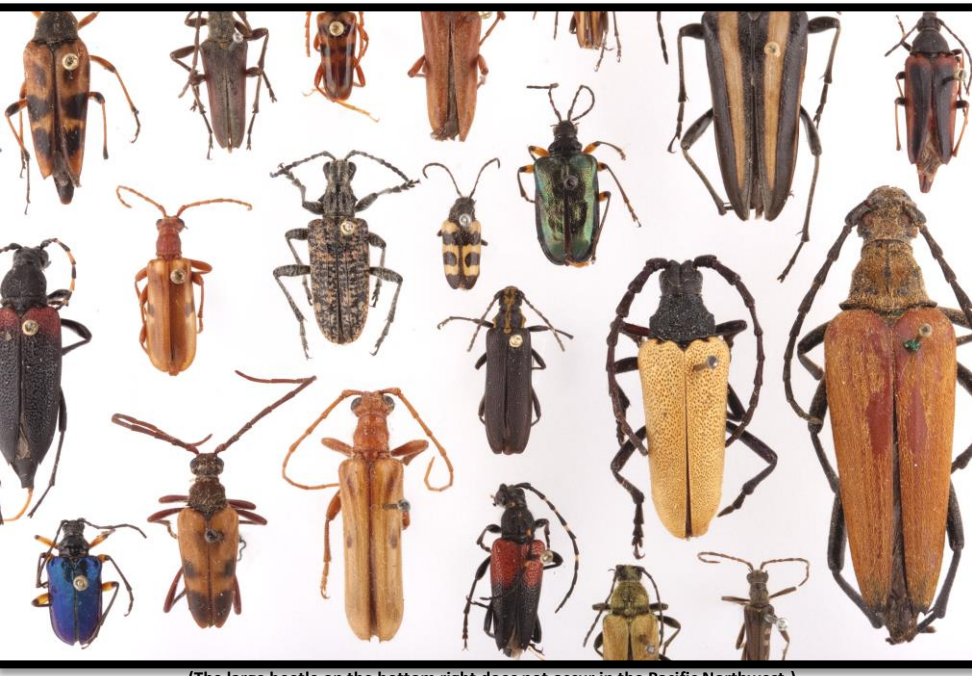
The Lepturine Longhorn Beetles

(Cerambycidae: Lepturinae)



(The large beetle on the bottom right does not occur in the Pacific Northwest.)

of the Pacific Northwest

and Other Stories

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The current work is a continuation of a chapter from my MS thesis at Oregon State University, completed in Sept. of 2014. Much of this version is copied directly from that document with several additions and corrections to the text, and a number of new photographs.

The intitial goal of my thesis was to create a field guide to the PNW lepturines that was useful both to amateur enthusiasts and to scientists in need of a more detailed technical resource. Unfortunately, the work was forshortened due to time constraints for finishing at OSU, and my ultimate pursuit remains a work in progress. After a brief hiatus from active research, I've taken back up the effort.

The key to genera is largely based on Linsley & Chemsak's two-part monograph published in 1972 and 1976. It is currently undergoing testing with the intention to incorporate simpler language, a glossary, and photographic aids. I would greatly appreciate any comments, ideas, corrections, or additions. Feel free to email phil.schapker@gmail.com.

Acknowledgements: Special thanks to Brady Richards for his meticulous help in proofreading the present draft and getting it up on BugGuide. Also to my former adviser, Chris Marshall, for his continued advice and mentorship, and for allowing me to use the resources of the Oregon State Arthropod collection to conduct my research and photograph specimens.

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INTRODUCTION

The lepturines

The Lepturinae is a subfamily of cerambycid longhorn beetles, often referred to as "the flower-visiting longhorn beetles," or simply "the lepturines." It is one of the mid-sized subfamilies, comprising about 1500 species in approximately 350 genera worldwide. Unlike the majority of longhorn beetles that are nocturnal, most lepturine species occur on flowers during daylight, making them easy to observe and collect (Fig. 1). Ecologists recognize lepturine species for their role as forest ecosystem pollinators (Gosling, 1986; Kakutani et al., 1990), and as decomposers, due to the tendency for lepturine larvae to develop in already dead, or decaying wood. For this reason lepturines are not commonly implicated as significant economic pests (Linsley, 1958b; 1959). In a four-year survey of a single, 800 meter forest edge in Ohio, Bond and Philips (1999) found 18 lepturine species in 14 genera on a wide variety of plants, with an average of 9.38 flower species visited, and a maximum of 16. The authors found a positive correlation between the number of different flowers used, and the abundance of individuals, suggesting that the most common lepturines are generalist flower feeders.

Although typically smaller and less colorful than species in the large subfamilies Lamiinae (>30,000 spp), Cerambycinae (~5,000 spp), and Prioninae (~2000 spp.), the lepturines are still a diverse and charismatic group. In the largest tribe, the Lepturini (a group of about 130 genera, and more than 1000 species thought to be closely related to the genus *Leptura* Linnaeus), there are commonalities in the basic body structure (slender, with tapering bodies, and smooth-sided pronota) but a whole range of different colors, shapes and sizes – reflections of an equally diverse array of strategies for adapting to life on a flower. Bee mimickry, with bold black-and-yellow stripes, occurs in several genera like *Xestoleptura, Judolia,* and *Typocerus*. Other species, such as *Neobellamira delicata*, have taken on the slender form of a wasp.

Figure 1.a. Habitat of *Lepturobosca chrysocoma* and *Trachysida aspera aspera* at Colchuck Lake, Washington. Schapker is picking several specimens of both species from a single flower of Cow Parsnip, *Heracleum maximum,* in June of 2012.

In the second largest tribe, Rhagiini (related to *Rhagium* – around 45 genera), the pronota are often sharply spined, the body forms are more variable, and a whole range of unique color patterns exist, but the tendency towards bee-mimicry appears to be largely absent. *Rhagium* itself is covered in thick black, grey and brown hairs, giving it a mottled appearance—a cryptic coloration suggesting something other than life on a flower. A number of smaller, more obscure tribes diverge even further from the appearance of the common lepturine, as exemplified in our fauna by the parallel, elongate forms found in the Enyclopini, Xylosteini, and Rhamnusiini.

Figure 1b. The two major tribes within subfamily Lepturine. *Left*: Tribe Rhaggini, represented by *Rhagium inquisitor.* *Right*: Tribe Lepturine, represented by *Strophiona laeta.*

Several atypical genera are difficult to place within the Lepturinae, and occupy monotypic tribes (tribes with only one genus). *Desmocerus,* for example, the sole genus in the tribe Desmocerini, exhibits a mix of characters shared by genera in several of the tribes, and its uniquely broad mandibles lack the internal pubescent fringe common to the rest of the subfamily.

Global distribution

The bulk of lepturine species are distributed across the Northern Hemisphere, with many North American genera and species having close counterparts in Europe and Asia (Gressitt, 1953; Linsley and Chemsak, 1972, 1976; Bily & Mehl, 1989; Sama, 2002; Danilevsky, 2014a). The highest diversity of species are in the Asian continent (Aldlbauer et al., 2010; Danilevsky, 2014b; Cherepanov, 1990; Hayashi & Kimoto, 1984; Gressit, 1951; Gressitt and Rondon, 1970; Hayashi and Villiers, 1985, 1987, 1989, 1995; Lobanov et al., 1981, 1982; Ohbayashi & Kojima, 1992). Although the mainland African continent appears to be almost entirely devoid of lepturines, Madagascar hosts a highly distinctive endemic lepturine fauna with 141 species in 43 genera – more than all the species that occur in South America (122 ssp.) and the Caribbean (4 spp.) combined (Ribardo & Cope, 2000; Bezark, 2012; Bezark & Monné, 2013; Di Iorio, 1998). At the extreme of its range in the eastern hemisphere, 44 species are currently known from Borneo, several of which are undescribed (Heffern, 2005). A similar, though less speciose fauna is also present in the Philippines. However, to the east of the "Wallace line" lepturines are suddenly absent, with just a single species known from New Guinea and none from Australia (Linsley, 1958b:103; Heffern, 2005). Greenland and the Hawaiian islands also lack lepturines (Böcher, 1988; Heffern, 2006).

The Pacific Northwestern lepturine fauna – history and present state of knowledge

The Pacific Northwest region of North America is roughly defined as the area from British Columbia, south to the Siskiyou Mountain range of southern Oregon, and east to the Rocky Mountains of Idaho and Southwest Alberta. The region as a whole is incredibly varied, with a suite of local biomes, from temperate rainforest along the coast range, to huge deserts east of the Cascades in Washington and Oregon. Neverthless, a wide survey across plant and animal taxa tends to reveal endemic and closely-related sets of fauna in the region, indicative of a long history of shared geographical and a climactic events that have influenced and united the region as a whole (Linsley, 1958a; Galbreath et al., 2010). This makes the Pacific Northwest a sensible boundary within which to conduct a faunistic study. [1]

The earliest important contributions to the study of Pacific Northwest lepturine fauna were made by John L. LeConte, who described 38 of the species, and 6 genera now recognized to occur in our region. LeConte (1850; 1851) and LeConte and Horn (1883) also published the most important early revisions of the Cerambycidae to include Pacific Northwest taxa. Nearly a third of the modern generic concepts were described by Casey (1913, 1924), who, like LeConte, also described a large number of species. Unfortunately, many of Casey's names were based on only a few atypical specimens of previously-described species, and are now regarded as junior synonyms (see Appendix A: Checklist to Pacific Northwestern Lepturine). Swaine and Hopping (1928) and Hopping (1937), conducted the first revision of the Lepturinae of North America, and provided host and flower

[1]Melville Hatch's *Century of Entomology in the Pacific Northwest* (1949:16) discusses Van Dyke's recognition of the unique fauna of PNW insects, which he termed the "Vancouverian fauna. Hatch: "I, on the other hand, am equally impressed by the forms which, although they ran all the way from the Atlantic Coast to the eastern foot of the Cascade Mountains, are unable to make that last climb to the Pacific." A footnote gives a long list of species as examples.

records, and photographs of hindwing venation for many of the species in our fauna. These authors placed many of Casey's generic names into synonymy, and arranged most of the species in the tribe Lepturini into a single large genus, *Anoplodera.* The key and review of Pacific Northwestern species by Hatch (1971) was based on that work.

The most recent modern revisions of North American Lepturinae were conducted by Linsley and Chemsak (1972; 1976), who removed from synonymy many of Casey's generic names, and defined several new ones. They also provided descriptions and keys to the genera and species, and a comprehensive review of flower records, host plants, other biological information, and distribution maps, based on a study of museum specimens. Since that work, subsequent publications have augmented our knowledge of many Pacific Northwestern species' distributions and life history (Penrose and Westcott, 1974a, 1974b; Hovore and Giesbert, 1976; Hovore and Penrose, 1982; Cope, 1984; Robertson, 1988; Westcott et al., 2006; MacRae and Rice, 2007; Swift, 2008; Hart et al., 2013), but these have not been reviewed comprehensively.

Further refinements to the nomenclature or taxonomic composition of the Pacific Northwestern lepturines, particularly for Holarctic genera studied by European and Asian authors, have been tracked in the annual editions of the *Checklist to the Cerambycidae of the Western Hemisphere*, the most recent being Bezark and Monné (2013).

Ninety species in 35 genera, representing seven lepturine tribes, are now thought to occur in the Pacific Northwest. Many of these species also extend into Alaska and California, or have close relatives elsewhere on the west coast. A number of these, such as *Pseudoxylosteus ornatus,* have their primary distribution in California, but extend into southern Oregon by way of the Siskiyou mountain range. Others, like *Typocerus serraticornis,* are probably more properly referred to as Great Basin species, which happen to have found themselves in the very southeastern tip of

Oregon, in the area around the Steens Mountains. Because those areas are also occupied by species that have their primary distribution in the PNW, or that occur throughout the entire west coast, we cannot rule out the possibility that *P. ornatus* and *T. serraticornis* (both of them quite rare) have simply yet to be found more broadly in the PNW. I have included these, and other similar species in the review.

The checklist to Pacific Northwest lepturine species in Appendix A at the end of this chapter is adapted, with additions and corrections from Bezark and Monné (2013). A full review of the literature related to our fauna revealed several important nomenclatural changes that have been recognized for some time by European and Asian workers, but apparently unknown to North American taxonomists. Following Miroshnikov (1998) and Miroshnikov (2000), the genera *Cosmosalia* Casey and *Pyrotrichus* LeConte are now listed as junior synonyms of *Lepturobosca* Linnaeus and *Enoploderes* Faldermann, respectively. The tribal system is arranged to reflect modern usage by the global taxonomic community. Other deviations from Bezark and Monné are also noted in Appendix A.

The organization of genera in the review

A few different strategies could have been employed for arranging the genera in the review, the simplest being to list them alphabetically. Another common method is to arrange the genera within each tribe according to their apparent phylogenetic relatedness (i.e., the arrangement in Linsley & Chemsak, 1972, 1976), and this is to some degree followed here. However, since the review is also intended to function as a field guide, in several instances I have placed genera closer together that might be easily confused, for example, the several genera that have striped elytral patterns that are actually quite distinct morphologically.

A note on tribes

Nine tribal names within Lepturinae were recognized as available and valid by Bosquet et al. (2009) and Bouchard et al. (2011). However, many of these have never had a universally accepted definition, and the proper arrangement of the tribes continues to be a subject of debate, or simply confusion, among cerambycid systematists (see: Gressitt and Rondon, 1970; Linsley and Chemsak, 1972; Sama, 1993). More recently, larval characters (Švácha & Danilevsky, 1989) and DNA sequence data (Sýkorová, 2008) have been used to assess the tribal hypotheses that were historically based on adult external morphology alone and led various authors to adopt widely different classification schemes (reviewed in Sýkorová, 2008). Vives (2000), for example, rejected a large, inclusive Rhagiini, restricting it to only *Rhagium* and *Rhamnusium* (see also Cebeci & Özdikmen, 2010). A phylogenetic study by Sýkorová (2008) supported the Lepturini (including *Desmocerus*), and Oxymirini (see Özdikmen, 2010) as natural, monophyletic lineages.

In attempting to arrange the PNW tribes according to a system that will be broadly acceptable to the global taxonomic community, I have made some subjective judgements where competing hypotheses for our taxa exist, which I note in the review. It was outside the scope of this study to perform a detailed phylogenetic analysis of the tribes, and so my classification should be regarded as more or less preliminary at this time.

The use of specimens in conducting the review

In addition to reviewing the taxonomic literature, I was able to obtain specimens from all but three of the 90 species and subspecies in the Pacific Northwest. The Oregon State Arthropod Collection had 84 species and subspecies in its holdings, a large number of which bore determination labels from previous experts, in particular Melville Hatch, Ralph Hopping, E. G. Linsley and John Chemsak. Figure 2.2 shows a single specimen that was

determined as *Acmaeops proteus* by Ralph Hopping, and then again in 1968 by Melville Hatch, who indicates that he compared it with the collection of the eminent John LeConte.

Comparing the determined material to photographs of type specimens available online, along with their original desciptions, assisted me in my own species determinations. I also sorted and identified more than 1000 lepturine specimens that had arrived at the OSAC over the last few decades. To a more limited extent, I also viewed and accessed specimens from other museums, namely, the Collection of the California Academy of Sciences, in San Francisco, the Essig Museum at the University of California, Berkely, and the Snow Museum at the University of Kansas.

Given limited time and resources, I was not able visit some important Pacific Northwestern collections, like the Canadian National Collection or the Bill Barr collection at the University of Idaho. I am certain that a wealth of valuable information remains to be discovered in those, and other collections.

Figure 2b. *Acmaeops pratensis* (Kirby in Richardson, 1837), with determination labels by Ralph Hopping and Melville H. Hatch

DIAGNOSIS OF THE SUBFAMILY LEPTURINAE

The Lepturinae may be distinguished from other cerambycoids by the characters below (based on Linsley and Chemsak, 1972 and 1976). Following Lawrence and Newton (1995), Necydalinae is here treated as a separate subfamily from Lepturinae, not as a tribe Necydalini.

Tarsi padded beneath and *pseudotetramerous* (the fourth of fifith tarsomeres highly reduced and hidden within an expanded, bi-lobed third tarsomere. (In Parandrinae and Spondylinae the tarsi are lacking ventral pads and distinctly *pentamerous*, or five-segmented.

Head directed forward and rarely sub-vertical. (The head in Lamiinae is often vertical or retracted with the genal margins always directed posteriorly.)

Antennae capable of laying backwards over the body and usually extending past the posterior margin ("base") of the pronotum.

(shorter in Parandrinae and Spondylinae). The second segment as broad, or broader than long (longer than broad in Aseminae).

Mandibles often with a molar tooth, and (except tribe Desmocerini) densely fringed with pubescence on the inner margin. (Subfamily Aseminae lacks molar tooth.)

Pronotum either smooth or with pronounced tubercles laterally, but never with an elevated lateral margin (as in Prioninae).

Stridulatory plate on mesonotum divided longitudinally by a thin vitta, or line (except the tribe Xylosteini). (Mesonotum is also divided in Aseminae but undivided in Cerambycinae and Necydalinae.)

Elytra extending the length of abdomen (abbreviated in Necydalinae).

Wings with or without a closed cell in the anal sector (never present in Cerambycinae); Vein 1A connected with $2A_{1+2}$. ($2A_2$ is absent in Prioninae, and in Cerambycinae either $2A_1$, or $2A_1$ and $2A_2$ is absent.)

KEY TO THE GENERA OF PACIFIC NORTHWEST LEPTURINAE

(Modified from Linsley and Chemsak, 1972; 1976)

1. Mandibles short, broad, without an internal pubescent fringe ***Desmocerus***

   Mandibles slender, acute, with a pubescent frindge along inner margin 2

2. Pronotum with acute lateral spines or distinct tubercles and/or eyes entire 3

   Pronotum with sides sinuate, rounded or at most angulate, without spines or tubercles; eyes notched or emarginate..... 18

3(2). Eyes coarsely faceted (nocturnal species)..... 4

   Eyes finely faceted (diurnal species) 5

4(3). Body brown or pale-colored; head with tempora absent; eyes deeply notched or marginated ..... ***Centrodera***

   Body black with white or red markings on elytra, elongate and narrow; head with tempora inflated behind eyes; eyes shallowly emarginated ..... ***Pseudoxylosteus***

5(3). Tibial spurs subterminal, inserted into an emargination near tibial apex 6

   Tibial spurs terminal, insterted at tibial apices 7

6(5). Antennal segments short, stout, segments 3-11 subequal in length, not extending beyond middle of elytra; tempora subparallel; eyes entire ..... ***Piodes***

   Antennae with segments slender, elongate, extending well beyond middle of elytra; tempora convergent; eyes notched or emarginated ..... ***Stenocorus***

7(5). Eyes deeply emarginated or notched 8

   Eyes entire, not deeply emarginated or notched, at most very shallowly concave along inside margin 12

8(7). Front of head verticle, front and vertex meeting at an angle of nearly 90 degrees; front short, distance from tips of mandibles to forward edge of eyes shorter than width between outside edges of genae 9

Front of head oblique, meeting vertex at an angle of more than 90 degrees; front long, distance from tips of mandibles to forward edges of eyes greater than width across genae ……10

9(8). First segment of antennae shorter than third; hind tarsi with second segment much longer than third; intercoxal process of prosternum narrow, straight ……***Encyclops***

First segment of antennae longer than third; hind tarsi with second segment subequal to third; intercoxal process of prosternum broad, arcuate ……***Enoploderes***

10(8). Hind tarsi with third segment cleft to base; basal margins of elytra not elevated around scutellum …….. 11

Hind tarsi with third segment cleft about to middle; basal margins of elytra elevated around scutellum …….. ***Pachyta***

11(10). Pronotum transverse, sides strongly tuberculate or spined; eyes deeply emarginated …….. ***Neanthophylax***

Pronotum longer than broad, sides very feebly tuberculate; eyes shallowly notched dorsally …….. ***Evodinus***

12(7). Prosternum with intercoxal process narrow, extending between coxae; antennae extending well beyond humeri; pronotal spines, if present, small, obtuse…… 13

Prosternum with intercoxal process broad, extending over coxae, abruptly declivous behind; antennae very short; pronotal spines large, acute …….. ***Rhagium***

13(12). Pronotum with disk convex, not flattened behind nor elevated on each side into a broad, obtuse tubercle …… 14

Pronotum with disk flattened behind and elevated on each side into a broad, obtuse tubercle …… **Acmaeops** (*part*)

14(13). Head with tempora inflated, parallel, abruptly constricted at neck …….. 15

Head with tempora not inflated, convergent, not abruptly constricted at neck …… 16

15(14). Pronotum with lateral tubercles; prosternum with intercoxal process extending behind coxae …….. ***Leptalia***

Pronotum with sides rounded to angulate, not tuberculate; prosternum with intercoxal process not extending beyond coxae …….. ***Cortodera***

16(14). Elytra with basal margin not elevated around scutellum …….. 17

Elytra with basal margin strongly elevated around scutellum; integument bright metallic green or bluish … ***Pseudogaurotina***

17(16). Head with front longer than broad; antennae with outer segments slender, without poriferous areas …….. ***Acmaeops*** (*part*)

Head with front short; antennae with outer segments thickened, usually with small poriferous areas …… ***Brachysomida***

18(2). Pronotum with hind angles acute and/or expanded over humeri …… 19

Pronotum with hind angles rounded, not acute nor produced over humeri …… 28

19(18). Elytra elongate, narrow, strongly attenuated posteriorly and strongly constricted behind middle ……..……***Neobellamira***

Elytra not as above ……..... 20

20(19). Elytra broadly to narrowly rounded or transversely truncate at apices …….. 21

Elytra obliquely emarginated to acuminate at apices, outer angles usually produced ……..…… 24

21(20). Pronotum with sides sinuate, disk inflated or plane, base usually impressed across middle, hind angles not toothed-appearing …… 22

Pronotum campanuliform (bell-shaped), hind angles tooth-like and produced over elytral humeri, dorsal surface lacking an impressed area. Small species, less than 1 cm in length …… ***Grammoptera***

22(21). Head with front short, quadrate, tempora prominent, parallel; antennae stout, usually thickened ……..…… 23

Head with front moderately long, tempora not prominently produced, usually convergent; antennae slender; body form short and stout …….. ***Judolia***

23(22). Antennae elongate, longer than body in males, extending to a little behind humeri in females; Elytra about twice as long as broad, form robust, short …….... ***Dorcasina***

Antennae short, subserrate, shorter than body in males, extending to a little behind humeri in females; form more elongate, elytra more than twice as long as broad …. ***Pygoleptura***

24(20). Antennae with distinct, elongate poriferous areas on outer segments ……..... 25

Antennae lacking poriferous areas or these reduced to small round pits near apices of outer segments …….. 26

25(24). Pronotum deeply, transversely impressed at apex; antennae prominently expanded apically; form robust, tapering … ***Typocerus***

Pronotum not impressed at apex; antennae slender, segments not expanded apically; form elongate, subparallel …. ***Neoalosterna***

26(24). Tempora not inflated, usually short and convergent; antennae slender, not subserrate, third and forth segments together much longer than fifth segment in males ……. 27

Tempora inflated, parallel; antennae subserrate, third and fourth segments together as long as fifth segment in males … ***Pygoleptura***

27(26). Elytra about 2 ½ times as long as broad, color variable; antennae usually lacking poriferous areas ……..... ***Leptura***

Elytra less than 2 ½ times as long as broad, always with transverse yellow and black bands; antennae with small poriferous areas ……..... ***Stenostrophia***

28(18). Intercoxal process of prosternum very narrow, not expanded at apex, coxal cavities wide open behind ……. 29

Intercoxal process of prosternum expanded at apex, coxal cavities closed or nearly closed behind …… 30

29(28). Pronotum barely impressed at apex and base, disk almost plane; palpi with apical segments dilated …….. ***Trachysida***

Pronotum deeply impressed at base and apex, disk convex; palpi with apical segments dialated …… ***Pidonia***

30(28). Eyes finely faceted; form small to moderate sized, not elongate and subparallel. Diurnal species. ……. 31

Eyes coarsely faceted; Body elongate and subparallel, color testaceous or pale yellow and brown; Body either large (2-3 cm long), with elytra prominently spined at inner angles at apex, or small (1-2 cm) with elytral apices rounded and unarmed. Nocturnal species…….. ***Ortholeptura***

31(30). Elytra rounded, truncate, or shallowly emarginated at apices, angles not strongly produced; antennae never 12-segmented ……. 32

Elytra strongly emarginated at apices, angles strongly produced; antennae 12-segmented or eleventh segment very strongly appendiculate, outer segments subserrate…… ***Stictoleptura***

32(31). Pronotum with disk strongly convex, basal and apical transverse impressions deep …… 33

Pronotum with disk very feebly convex, almost plane, apical and basal impressions very shallow …… ***Anastrangalia***

33(32). Pronotum with basal margin sinuate to straight, disk often deeply impressed longitudinally; elytra not bilobed around scutellum; if bilobed, pronotum deeply impressed longitudinally…… 34

Pronotum with basal margin broadly lobed at middle, disk not or barely impressed longitudinally; elytra bilobed around scutellum; body usually rather slender, subparallel … ***Xestoleptura***

34(33). Pronotum not or very shallowly impressed longitudinally, impression if present not extending length of disk …… 35

Pronotum deeply impressed longitudinally, impression extending length of disk …… ***Lepturopsis***

35(34). Elytra not strongly dehiscent at apex, sides not strongly sinuate behind middle; hind tibiae of males normal …….. 36

Elytra rather strongly dehiscent at apex, sides strongly sinuate behind middle; hind tibiae of males often modified ... ***Brachyleptura***

36(35). Elytra with apices obliquely truncate, outer angles produced, surface always yellow and black banded ……***Strophiona***

Elytra with outer apical angles not produced, surface never yellow and black banded …….. ***Lepturobosca***

REVIEW OF GENERA

Tribe Lepturini Latreille, 1802

Figure 2.a. *Xestoleptura crassicornis* (LeConte, 1873), on leaf of blue elderberry, *Sambucus nigra cerulea.* Specimen: OSAC_0000556476

Xestoleptura Casey, 1913

Type species: *Xestoleptura corusca* Casey (by original designation).

Xestoleptura is one of several genera in the tribe Lepturini recognizable for its species' yellow and black-striped elytra. The genus is represented by 9 species worldwide, 6 of which occur in North America. The four Pacific Northwestern species are also found in California. The species *X. octonotata* is broadly distributed in Eastern North America, and *X. cockerelli* occurs on the Colorado Plateau. The species *X. rufiventris* (Gebler), *X. baechmanni* (Plavilstshikov), and *X. nigroflava* (Fuss), recently transferred from the genus *Anoplodera*, occur in Europe and Asia (Miroshnikov, 1998; Kadlec and Hájek, 2005).

Diagnosis of *Xestoleptura* in the Pacific Northwest.

Xestoleptura can be distinguished from other lepturine genera with similar elytral patterns (*Brachyleptura, Dorcasina, Judolia*, *Leptura, Stenostrophia, Strophiona,* and *Typocerus*) by its distinctive pronotum, which is convex and subequal to the width of the head, deeply constricted dorsally at both the anterior and posterior margins, and with the posterior margin strongly sinuate and rounded at the lateral angles. The elytra in *Xestoleptura* are strongly bilobed at the base (anterior), especially in *crassipes* and *crassicornis.* On the global scale, Miroshnikov (1998, figs. 26-39) has made a convincing case for the generic concept of *Xestoleptura* based on the structure of the male genitalia, which have the parameres distinctively notched on the inner angles.

Key to Pacific Northwest species of *Xestoleptura*

1. Femurs either pale or dark; if dark, then elytra only moderately densely punctate at base and suture entirely black (*behrensii* males) or bordered along its entire length by thick black line (*behrensii* females)…… **2**

1'. Femurs black. Elytra densely, closely punctate at base (anterior), the inner elytral margin never bordered along its entire length by a thick black line; elytra sub-parallel, not strongly tapering posteriorly. Pronotum with disc weakly convex or flattened, sometimes strongly bi-lobed posteriorly due to a longitudinal posterior impression. Antennal segments not strongly expanded at apices. Inner hind tibial spurs of males never modified into a plate-like structure. Length, 10-16mm. British Columbia to California, Rocky Mts. and Labrador……***X. tibialis***

2(1). Antennae stout, segments usually thickened and expanded at apices. Elytra usually with humeral angles pale, and lacking a thick black stripe that runs the entire length of the interior elytral margin ……..**3**

2'. Antennae slender, segments not distinctly thickened nor expanded at apices. Elytra usually with humeral angles darkened or black; elytral suture black, in females bordered along entire length with thick black line; elytra with punctures course, irregular, often confluent or sub-confluent latitudinally, punctures at base irregularly, sparsely punctate, becoming denser near interior margin. Abdomen and tibiae either orange, pale or dark. Pronotum with disc flattened or weakly convex, never strongly bilobed posteriorly. Males strongly tapering posteriorly, never with hind tibial spur modified into a plate. Length, 10-16mm. Western N.A. from British Columbia to California…… ***X. behrensii***

3(2). Elytra distinctly, irregularly, sometimes sub-confluently punctate, densely pubescent; elytra with anterior black band absent or reduced to two lateral spots in males, in females obliquely angled, sometimes meeting at the inner elytral margin, but often often fading medially to a pale brownish spot. Pronotum densely pubescent. Antennae black, yellowish or striped, not strongly expanded apically in males. Hind tibiae of males with the inside spur often modified into a plate. Length, 8-15mm. British Columbia to Colorado and California …… ***X. crassipes***

3'. Elytra very sparsely punctate and pubescent; pronotum moderately pubescent; elytra with anterior black band transverse, meeting horizontally at the inner elytral margin. Antennae always reddish, those of male strongly expanded at apices. Hind tibiae of males with normal spurs. Length, 10-17 mm. Western North America to southern California …… ***X. crassicornis***

Figure 3b. *Xestoleptura crassipes* (LeConte, 1857). 1 male (*left*, Mt. Rainier, Longmire, Washington) and 4 females (*middle three*, Mt. Rainier, Wash.; *right*, Bremerton, Wash.). (OSAC_0000600330, OSAC_0000600336, OSAC_0000600361, OSAC_0000600332).

The Pacific Northwest *Xestoleptura*

Four species of *Xestoleptura* occur in the Pacific Northwest, three of which are very likely to be encountered, even by the casual collector. In the Oregon State Arthropod Collection, a huge number of specimens are present for *X. crassipes,* and to a somewhat lesser degree, *X. tibialis.* As might be expected (see Bond and Philips, 1999), these common species are both found on a wide variety of flowers. The two species *X. behrensii* and *X. crassicornis* are more scarce in the collection, however, and relatively little is known about their basic life history and biology.

Figure 3c. *Xestoleptura tibialis* (Leconte, 1850). 1 male (*left,* 4000 ft. at Kelsay Camp in Umpqua N.F., Oregon) and 3 females (*middle-left*, Woods, Oregon; *middle-right*, 4200 ft., ½ mi. E. Frog Camp, Hwy. 242, Lane Co., Oregon; and *right*, Seaside, Oregon). OSAC_0000583019, _0000583016, _0000582969, _0000583018).

Figure. 3d. *Xestoleptura crassicornis* (LeConte, 1873). 2 females (*far left*, Sequoia N.F., Cal., and *left,* Lassen N.F., Cal) and 2 males (*right,* both taken at Milk Creek Rd., 12 mi. SE Union Co., Oregon). (OSAC_0000324233, _0000324227, _0000617561, _0000617564).

Xestoleptura crassicornis, depicted above, is intriguing. The species occurs throughout the west, from Washington and Idaho to southern California, but most of what we know about it is derived from two host plant, and three flower records. In August of 2013, the author found several populations of *X. crassicornis* scurrying around on the leaves of blue elderberry (*Sambucus nigra cerulea*) at high elevation in the Warner Mountains of Northern California. No individuals were observed on the elderberry flowers, but three specimens were observed clustered and apparently drinking from an open wound on the base of a 1 cm green stem. The only other lepturines known to feed on the leaves of *Sambucus* are those in the genus *Desmocerus,* for which *Sambucus* is an obligate host. *Sambucus* is known to contain cyanogenic glucocides, and it has been speculated that the brightly-colored species of *Desmocerus* sequester these as defensive chemicals. It is possible that *X. crassicornis* are following a similar strategy in the Warner Mountains.

In addition to this observation, Jim Labonte of the Oregon Department of Agriculture informs me that since 1997, the ODA has turned up quite a number of *X. crassicornis* through its invasive species trapping and monitoring efforts across Oregon, indicating (1) that the species is attracted to plant volatiles and (2), that it is probably more common than indicated by the number of museum specimens present.

Figure. 3e. *Xestoleptura behrensii* (LeConte, 1873). Female (*left*, Ketchikan, Alaska) and male (*right*, HJ Andrews Experimental Forest, Oregon). (OSAC_0000598975, _0000143421)

Who knows if we will ever figure out *X. behrensii* — the species is incredibly rare, and may not visit flowers at all (no records exist). The most specific label data for this specimen at OSAC was collected in the Cascades of Oregon, at the H. J. Andrews Experimental Forest. It reads "ex *Tsuga martensiana*," which may indicate a previously unrecorded host plant for the species**.** The locality is "ORE: Lane-Linn Co., HJ Anddrews ExpFor, ½ mi N FisselPt, T15S R6E Sec 29 SE1/2, Elev. 4850'. VIII-20-[19]80." Someone there should go find it again.

Judolia Mulsant, 1863

Type species: *Leptura 6-maculata* Linnaeus (Casey designation, 1913)

Judolia is a diverse genus consisting of 17 species distributed throughout the Northern Hemisphere (see Ödikmen, 2011). Five of these species occur in the Pacific Northwest, including the commonly-encountered *J. instabilis*, one of the most variable lepturines in North America.

Many species in *Judolia* can be collected during the daytime in the spring and summer, often in natural areas where wildflowers are abundant. Based on records from museum specimens, most species in *Judolia* appear to be generalists in their use of flowers. In California and Oregon, *J. instabilis* is most frequently observed on lupines, which has led to some speculation that lupine might be a host plant. *Pinus* is known to be the host for *J. instabilis* in the southern extent of its range in Arizona and Mexico, as well as in British Columbia. A photo (#320303) recently posted to BugGuide.net by Mark Brown appears to be the first record of *J. gaurotoides gaurotoides* visiting a lupine, at Yellowstone National Park.

Like many lepturines that share a similar life history, species in *Judolia* usually bear a striking black-and-yellow patterning on their elytral shell, probably as an adaptation against predation. The pattering of some species, like *J. montivigans montivigans,* is fairly distinctive, and can be used reliably to identify the species on sight. On the other hand, the species *J. instabilis, J. gaurotoides,* and *J. montivigans* each possess three transverse black lines on their elytra which fluctuate in their extent, and each species can achieve almost exactly the same patterns, ranging from all black, to mostly yellow with just a few black spots. It is not surprising, then, that a careful re-examination of the

specimens at OSAC identified by Melville Hatch as *J. instabilis* revealed several misidentified *gaurotoides*. Proper identification of these species requires the use of a microscope to examine subtle features in the shape and punctuation of the elytra and pronotum (see key, below).

Additional notes: The fossil species *Leptura antecurrens* Wickham, 1913: 295, described from the Miocene shales of Florissant, Colorado, is thought to belong to the genus *Judolia* (see Ödikmen, 2011). The chromosome number of *Judolia erraticus* was determined to be 2n = 18. (Okutaner et al., 2012).

Figure 4a. *Judolia gaurotoides gaurotoides* (Casey, 1893).
Yellowstone N. Park, 7-5-[19]27, Hopk[ins], US; H.E. Burke, Collector.
OSAC_0000026660

Figure 4b. *Judolia instabilis* (Haldeman, 1847). OSAC_0000331475

Figure 4c. *Judolia montivigans montivigans* (Couper, 1864). OSAC_0000331626

Diagnosis of *Judolia* in the Pacific Northwest

According to Linsley and Chemsak (1976, p. 47) the genus *Judolia* can be distinguished from other North American lepturines "by the convex disk and acute hind angles of the pronotum, and usually short, stout body form, and by the proportions of the basal antennal segments." In *Judolia*, the scape (1st antennal segment) is "usually longer thdan, or subequal to the third segment, fourth shorter than the third, and the outer segments subopaque."

Several other PNW lepturine genera contain species which closely resemble Judolia in their overall form and coloration. These include the black and yellow species, *Stenostrophia tribalteata, Strophiona laeta, Xestoleptura tibialis,* and *Dorcasina matthewsii*, as well as the all- or mostly-black lepturines *Brachysomida atra* and *B. vexatrix*, *Cortodera nitidipennis,* and *Lepturopsis dolorosa.*

Key to Species of *Judolia* in the Pacific Northwest

1. Pronotum with anterior edge bearing a distinct margin and narrow transverse depression. Elytra either all black, or black and yellow—never brown or red 2

   Pronotum lacking anterior margin and transverse depression. Elytra either black with red stripes, or brown with two lateral spots
   4

2(1). Pronotum densely, confluently punctate. Scutellum deeply recessed below base of elytra. Elytral apices truncate to sub-truncate .....***J. montivigans***

   Pronotum either separately or densely, but rarely confluently punctate. Scutellum more-or-less even with the base of the elytra. Elytral apices either broadly rounded or narrowly, obliquely rounded, or pointed 3

3(2). Pronotum with a depression extending across the entire basal (posterior) edge. Pubescence on pronotum either long and erect or short and depressed. Elytra narrowly rounded or pointed at apex. Elytral pattern varies from all black to mostly yellow with a few transvers black lines or spots. Occasionally anterior, median, and basal spots connected by narrow longitudinal lines …….. ***J. instabilis***

Pronotum with basal depression at sides only, pubescence usually long and erect in both sexes. Elytra broadly rounded at apex. Elytra yellow, with anterior, median and basal black lines or spots which vary in shapeand extent, but are never connected by longitudinal lines … ***J. gaurotoides***

4(1). Elytra frequently all black except for reddish basal band extending back from humeri (shoulders), apices always black. Males with tooth-like projections on metasternum near median suture and before hind coxal cavities. Southern Oregon to north central Arizona … ***J. scapularis***

Elytra pale brown, usually with two large lateral dark spots at the middle.Males lacking tooth-like projections on metasternum. Oregon to central California …….. ***J. impura***

NOTE: The couplet for *J. scapularis* and *J. impura* is taken directly from the key provided by Linsley and Chemsak (1976: 49).
I have not had the opportunity to view specimens of these species.

Typocerus LeConte, 1850

Type species: *Leptura zebra* Fabricius (Thomson designation, 1860).

Figure 5. *Typocerus serraticornis* Linsley & Chemsak, 1976. Female taken from Little Cottonwood Creek, near Fields, Oregon. OSAC_0000613179

The only representive of *Typocerus* in western North America, the charismatic *T. serraticornis* Linsley and Chemsak, is found along the shorlines of dry lakes in the Great Basin region, extending into southern Idaho and southeastern Oregon (Penrose, 1979). Larvae of *T. serraticornis* develop in the living stems of Indian ricegrass (*Oryzopsis hymenoides*), and employ the varnish, or silk-like substance in constructing their pupal chambers. This is apparently the only known case of silk production in the Cerambycidae (see Robertson, 1988). *Typocerus serraticornis* and the eastern North American *T. octonotatus* are among a very small handful of cerambycids known to use grass as a host plant. The host plants for the majority of *Typocerus* species remain unknown at present, while the rest utilize either decaying *Pinus* (for *T. zebra, T. sparsus, T. lunulatus lunulatus*, and *T. lugubris*) or a hardwood (in the case of *T. velutinus velutinus*) for their larval hosts (Linsley and Chemsak, 1976).

Aside from *T. serraticornis,* there are 14 additional *Typocerus* species, all of which are restricted to eastern North America. There is a related genus *Pseudotypocerus* Linsley and Chemsak, 1971 with 8 species in South America.

Diagnosis of *Typocerus* in the Pacific Northwest

Typocerus is set apart from other lepturine genera primarily by the characters of the pronotum and antennae. In *Typocerus* the base of the pronotum is broad and unconstricted, and the outer antennal segments bear sizeable depressions, called “poriferous areas.” The antennal segments are usually expanded apically, which is most pronounced in the Pacific Northwestern *T. serraticornis.* The antennal poriferous areas may be used to distinguish *Typocerus* from *Leptura*, which has a similarly broad-based pronotum. Other genera that superficially resemble *Typocerus*, such as *Xestoleptura*, *Strophiona* and *Stenostrophia*, have a constriction at the base of the pronotum near the elytra, making the pronotum appear almost spherical from above.

Leptura (Leptura) Linnaeus, 1758

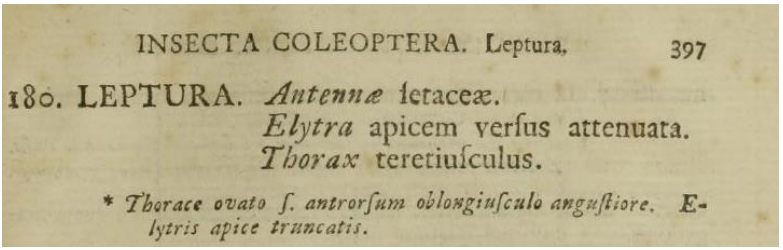
(*Stenura* Haldeman, 1847:62 (part); *Strangalia*; LeConte, 1850:327 (part); *Nakane &* Ohbayashi, 1963:9)

Type species: *Leptura 4-fasciata* Linnaeus (Westwood designation, 1840).

Leptura Linnaeus is the type genus for the tribe Lepturini, and the subfamily Lepturinae. Five species occur in the Pacific Northwest, all of them diurnal flower-feeders. They are usually medium- to large in size, and recognizeable for the unique shape of their pronota, with the hind angles acute and extended over the humeral angles of the elytra, as well as other features appearing in the key to genera. The genus was historically comprised of a huge number of diverse species, but over time, systematists carved out little sections from that group to name new genera. (See Linsley and Chemsak (1976:91-92) for a detailed review of the complicated nomenclatural history of *Leptura.*)

Leptura propinqua and *Leptura obliterata obliterata* are both very common throughout the Pacific Northwest. Each species has been recorded from a wide variety of flowers, and their larvae reared from the decaying wood of numerous species of Pinaceae, and other coniferous hosts (see Linsley & Chemsak, 1976 for a complete review of habits).

Other, less-typical species in *Leptura* are known to utilize living plants as hosts. Cope (1984) observed larvae of the Pacific Northwestern species *L. anthracina* in healthy, living white fir (*Abies* concolor), occurring in the decaying tissue of scars high off the ground. The Californian species *L. pacifica* is apparently obligated to use living scrub oak *Quercus john-tuckeri,* as a host (see Swift, 2008).



INSECTA COLEOPTERA. Leptura. 397

180. LEPTURA. *Antennæ* ſetaceæ.
Elytra apicem verſus attenuata.
Thorax teretiuſculus.

* *Thorace ovato ſ. antrorſum oblongiuſculo anguſtiore. Elytris apice truncatis.*

Figure 6a. Original description of the genus *Leptura* Linnaeus, 1758.

Key to *Leptura* in the Pacific Northwest

1. Hairs on pronotum subdepressed and pointed backwards 2

1'. Hairs on pronotum sparse and erect 3

2. Elytra black, or black with anterior (basal) portion reddish ..... ***L. anthracina***

2'.Elytra yellowish with black stripes and blotches, sometimes reduced to two medio-lateral dots and an apical band (*common species*) ..... ***L. obliterata***

3. Abdomen with golden hairs not obscuring surface. Elytra yellow-reddish or red with a large discal black spot 4

3'. Abdomen densely clothed with golden pubescence. Elytra yellow always with two medio-lateral spots and an apical band ..... ***L. propinqua***

4. Elytra red with large discal black spot extending over most of area. Pronotum with short, erect bristles ..... ***L. plagifera***

4'. Elytra with only very faint splotches on a mostly reddish-yellow or yellow-brown base. Pronotum with hairs long and wavy (*rare species*) ..... ***L. kerniana***

Figure 6.b Left: *Leptura propinqua* Bland, 1865. OSAC_0000583337.
Right: *Leptura anthracina* LeConte, 1875. OSAC_0000261812

Figure 6c. Left: *Leptura kerniana* Fall, 1907. OSAC_0000300419
Right: *Leptura plagifera* LeConte, 1873. OSAC_0000583264

Figure 6f. *Leptura obliterata obliterata* (Haldeman, 1847) - two common eltyral patterns. *Left*, OSAC_0000497351. *Right,* OSAC_0000338641.

Leptura obliterata may be divided into three subspecies. *Leptura o. obliterata* (Fig. 2.6d) occurs from British Columbia and Washington, to Montana and Idaho, and south to the coastal ranges of California. The subspecies *L. o. soror* is restricted to the Sierra Nevada mountain range of California. The eastern subspecies, *L. obliterata deleta* (LeConte, 1850) is apparently extremely rare in collections and its host plant is unknown.

Leptura o.obliterata is quite variable in size, and obtains two extreme forms in its elytral coloration which often occur within the same locality. The form with the black markings reduced to just the apical and medial band closely resembles *L. propinqua* (Fig. 2.6d) as well as the Sierra Nevadan subspecies *L. obliterata soror.* However, the subdepressed pubescence of the pronotum should separate *L. obliterata* from *L. propinqua,* which has the pronotal hairs sparse and erect. The subspecies *L. o. soror* is indistinguishable from *L. o. obliterata* except for the elytral medial band, which is continuous across the central elytral margins.

Dorcasina Casey, 1913

Type species: *Leptura matthewsii* LeConte (by original designation)

Dorcasina is represented by only two species worldwide, both of which are endemic to North America. One species, *Dorcasina mathewsii* (LeConte) inhabits the Pacific Northwest, ranging from British Columbia to California. Its congener, *D. grossa* (LeConte) is restricted to the Sierra Nevada mountain range of California. *Dorcasina* specimens are relatively sparse in the Arthropod collection at Oregon State.

Diagnosis of *Dorcasina* in the Pacific Northwest

Males of *Dorcasina mathewsi* are easily identified among our northwestern lepturines by their antennae, which are longer than the length of the body. According to Linsley and Chemsak (1976, p. 63), *Dorcasina* is recognized among the North American Lepturinae “by the elongate, opaque male antennae with segments three to five thickened. Also characteristic are the parallel tempora, the short front of the head, and the acute hind angles of the pronotum. Females have much shorter opaque antennae and the body form is very robust and parallel."

Note on Pacific Northwest species

Dorcasina matthewsii ranges from British Columbia to coastal central California, and reportedly uses a number of host plants, including *Sequoia sempervirens, Thujua plicata,* and *Libocedrus.* Garnett (1918, p. 250) reported rearing *D. matthewsii* from the sapwood of the redwood tree, and noted that *D. matthewsii* is "never found on flowers, but resting on leaves," including *Vaccinium ovatum* (Linsley and Chemsak, 1976). See also: Hardy (1926:30) and Hardy and Preece (1927:198).

Figure 7. *Dorcasina matthewsii* OSAC_0000496365

Lepturobosca Reitter, 1913

(*Cosmosalia*, Casey, 1913:267)

Type species: *Leptura virens* Linnaeus, 1758 (monobasic)

Figure 8. *Lepturobosca chrysocoma*
OSAC_0000556501

One of the most commonly-encountered lepturines in the Pacific Northwest is *Lepturobosca chrysocoma,* which is immediately recognizeable for the dense golden hairs that cover its entire body. The species is a generalist flower-feeder, and most active when flowers are blooming in June and July. Many of the ample museum specimens are caked in pollen.

L. chrysocoma uses a wide variety of larval host plants across its broad range in North America, including decaying *Achillea, Epilobium, Picea mariana,* and *Populus* (see Gardiner, 1970, and range map in Linsley & Chemsak, 1972, fig. 49). Gardiner also observed the species being parasitized by the Ichneumonid *Coleocentrus quebecensis* Provancher.

The other North American species of *Lepturobosca*, *L. nigrolineata,* occurs primarily in the southwestern United States in New Mexico and Colorado. Hatch (1971:135) included *L. nigrolineata* in his review of Pacific Northwest Coleoptera, indicating that the species also occurs in southwest Idaho and southeastern Oregon, but I have not been able to verify this based on the Hatch specimens in OSAC.

A new genus for the Old *"Cosmosalia" chrysocoma*:

Entomologists already familiar with the Pacific Northwest beetle fauna may have a hard time adapting to a new genus name for *L. chrysocoma,* which until recently had been the type species of the genus *Cosmosalia*. North Americans since Casey (1913) had thought that no species directly related to *Cosmosalia* existed outside the continent. However, the uncanny resemblance of the North American species to the Palearctic *Lepturobosca virens* Linnaeus was pointed out by the Russian taxonomist A. Miroshinikov. Miroshnikov (1998) provided illustrations of the male genitalia of all three species as additional evidence for the group's relatedness, and grouped them into one genus, *Lepturobosca,* with *Cosmosalia* as a subgenus. (The original description of *Lepturobosca* Reitter, 1913, was published slightly earlier in the year, and has priority over *Cosmosalia* Casey, 1913; see Miroshnikov, 1998.)

Strophiona Casey, 1913

Type species: *Leptura laeta* LeConte (by original designation)

Diagnosis: *Strophiona* is distinguished from *Stenostrophia* by the obtuse posterior-lateral angles of the pronotum.

Figure 8b. *Strophiona laeta.* Female. Specimen in Schapker collection. Corvallis, OR. 11th and Van Buren. evening near campire. vi.23.16.

Figure 8c. *Strophiona laeta.* Male. OSAC_0000598859. Corvallis, Oregon, June 24, 1898

Strophiona is known only in North America. One species, *S. nitens* inhabits central and eastern N.A., and at least one, *S. laeta* LeConte, 1857, occupies western North America. *Strophiona* bears a resemblance to species in the genus *Strophiona* and *Typocerus.* In those species, the lateral angles of the pronotal apices are produced outward and pointed.

Linsley and Chemsak recognized an additional species on the west coast, *S. tigrina* Casey, 1913, which they argued could be separated based on its size, pronotal punctuation, and the oblique angle of the subbasal (second from head) black strip on the elytra. In a number of series present at OSAC, I have found considerable variation among these characters, and have thus decided to follow Hatch (1971) in treating the populations as one species, *S. laeta,* until a more detailed study can be performed.

Stenostrophia Casey, 1913

Type species: *Leptura tribalteata* LeConte (by original designation)

Diagnosis: *Stenostrophia* is distinguished from S*trophiona* by the pointed posterior-lateral angles of the pronotum.

Stenostrophia is represented by three species worldwide, all in western North America. Two species occur in the Pacific Northwest, *S. amabilis* and *S. tribalteata*. The two subspecies of *S. tribalteata* can usually be separated by the color of their antennae, and the median transverse black band on the elytra. In *S. t. serpentina,* the median band is narrow and oblique at the center, while in *S. t. sierrae,* the band is broader, with the posterior edge meeting at the center of the elytra at a roughly 180° angle (below).

Figure 9a. Subspecies of *Stenostrophia tribalteata.*
Left: S*. t. serpentina* (OSAC_0000598388).
Right: *S .t. sierrae* (OSAC_0000583780).

Key to *Stenostrophia* species in the Pacific Northwest

1. Pronotum with dense bands of golden pubescence at least on apical and basal margins; pubescence of elytra golden on yellow areas. Length, 7-12 mm. British Columbia to southern California to Wyoming…… ***S. tribalteata***

   Pronotum lacking golden pubescent bands; pubescence of elytra all dark Length, 7-11 mm. British Columbia to southern Sierra Nevada…… ***S. amabilis***

Figure 9b. *Stenostrophia amabilis* (LeConte, 1857). Merion Forks, N. Santiam Hwy, Oregon. OSAC_0000271206

Grammoptera Audinet-Serville, 1835

(*Parallelina* Casey, 1913:247)

Type species: *Leptura praeusta* Fabricius (Westwood designation, 1840).

Introduction

Grammoptera is a fairly large genus, with 34 species and subspecies presently recognized worldwide (see Adlbauer et al., 2010). Six species occur in North America. Two of the Pacific Northwestern species are generalist flower feeders, while *G. rhodopus* apparently lives in close association with a living host plant Coffeeberry, *Rhamnus californica* (see Cope, 1984; Gardiner, 1970). *Grammoptera* is one of several lepturines known from the Oligocene-era fossil beds in Florissant, Colorado. (see Linsley, 1958a, p. 302, table III.)

Only a handful of specimens of *G. rhodopus* are present at OSAC, from the following localites: Corvallis, Oregon (June 3, 1950, V. Roth), Dayton, Oregon (June 3, 1942, K.M. Fender), Cornucopia, Oregon (Aug. 7, 1937, Bolinger/Jewett) and Carkeek Park in Seattle, Washington (May 3, 1959, T.J. Growes).

Diagnosis

Grammoptera has no close look-alike genera in the Pacifc Northwest. The following characters of the pronotum make it easily identifiable: Pronotum campanuliform, hind angles tooth-like and produced over elytral humeri; sides sinuate, lacking tubercles; dorsal surface convex, lacking an impressed area. Smaller species, less than 1 cm in length.

Key to *Grammoptera* species in the Pacific Northwest

1. Head with tempora not inflated, convergent to neck..... 2
   Head with tempora inflated, usually subparallel, distinctly constricted at neck. Length, 5-8 mm. Boreal North America..... ***G. subargentata***

2(1). Elytra and integument metallic bluish or greenish; pronotum with disk not inflated, rather finely, shallowly, subconfluently punctate; elytral humeral area densely puncate. Length, 4-7 mm. British Columbia to Idaho and southern California ..... ***G. molybdica***

   Elytra and integument black; pronotum with disk inflated, moderately coarsely, separately punctate; elytra coarsely punctate. Length, 6-10 mm. Oregon to southern California. ..... ***G. rhodopus***

Figure 10. *Grammoptera subargentata*. OSAC_0000555785

Neobellamira Swaine & Hopping, 1928

Type species: *Strangalia delicate* LeConte (By original designation)

The genus consists of one species, *Neobellamira delicata* (LeConte, 1874), that is easily recognizeable among Pacific Northwestern lepturine fauna for its modified elytra, which are strongly constricted at the middle, giving the species a wasp-like appearance. The nominative subspecies, *N. d. delicata* is found from western Oregon to the Sierra Nevada mountains of California. The species occurs on a variety of flowers, and its larvae have been taken from walnut wood (*Juglans*) (see Linsley and Chemsak, 1976:5). The latter authors note that "adults are readily attracted to codling moth baits and a long series was taken in a light trap during April at Linden, San Joaquin County, California." The subspecies *N. delicata australis* Linsley and Chemsak, 1972, is restricted to southern California.

Diagnosis among Pacific Northwestern Genera

The strongy constricted elytra and bell-shaped pronotum, shallowly impressed at the base, will distinguish *Neobellamira* from other Pacific Northwestern genera. Three related genera found elsewhere in North America, *Bellamira* LeConte, *Strangalia* Audinet-Serville, and *Analeptura* Linsley and Chemsak, 1972, have antennae with distinct sesnsory poriferous areas on the outer segments (not present in *Neobellamira*) and characteristic pronota which differ from that of *Neobellamira*.

Figure 11. *Neobellamira delicata delicata* OSAC_0000588970

Trachysida Casey, 1913

Type species: *Leptura mutabilis* Newman (by original designation)

Trachysida is represented by one species in the Pacific Northwest. *Trachysida aspera aspera* ranges from Alaska to Oregon and New Mexico, which is fairly common but so far known only to visit flowers of *Heracleum* and *Achillea* (see Gardiner, 1970; Linsley and Chemsak, 1976). Aside from the nominative subspecies, *Trachysida aspera* has two additional subspecies, *T. aspera rufescens* Linsley and Chemsak, 1976, known from Santa Cruz County, California and *T. aspera brevifrons* (Howden), which ranges from New Brunswick to Michigan and New York. The only other species in *Trachysida* is *T. mutabilis*, in Eastern North America. *Trachysida* possesses a pubsescent sole on the first segment of its hind tarsi, a trait that is shared by species in *Ortholeptura* and *Dorcasina,* but is more common in the tribe Rhagiini.

Lepturopsis Linsley & Chemsak, 1976

Type species: *Leptura dolorosa* LeConte (by original designation)

Linsley and Chemsak (1976) separated this genus, which consists of the two North American species *L. biforus* (Newman) and *L. dolorosa* (LeConte), on the basis of the longitudinally impressed pronotum and biolobed base of the elytra. *Lepturopsis dolorosa* is fairly common in the Cascades and Coast range of Washington and Oregon, and may be easily recognized among other Pacific Northwestern lepturines by the shape of its pronotum.

The original specimen of *L. dolorsa* was collected on the Northwest Boundary Survey (1857-1861), "East of Fort Colville" on the Columbia River, Washington and was described by the famous entomologist John LeConte. LeConte's (1961) article is available on the Biodiversity Heritage Library, and a photograph of the holotype specimen is viewable at Harvard's MCZ Museum of Comparative Zoology website. Hardy and Preece (1926) note that on Vancouver Island "the adults are most frequently taken in flight, but are also found frequenting the flowers of *Spiraea* [=*Holodiscus*] *discolor* Pursh and sunning themselves on large leaves such as those of *Acer macrophyllum* Pursh.

Figure 12. *Lepturopsis dolorosa* (LeConte, 1861). OSAC_0000597099

Pygoleptura Linsley & Chemsak, 1976

Type species: *Leptura nigrella* Say (by original designation).

Three species of this genus are known. All are restricted to the North American continent and all can be found in the Pacific Northwest, though they appear to be rarely collected. Relatively little is known about the life histories of *Pygoleptura* species, and flower records are only available for *P. nigrella nigrella.*

Pygoleptura nigrella oregonensis and *P. brevicornis* are found along the same range in the central Oregon cascades. Females of the two species are easily separated on sight—the outer antennal segments of *P. brevicornis* females are as broad as they are long, and the antennae barely extend past the pronotum, while the antennae of *P. n. oregonensis* females extend well past the pronotum, and the outer segments are longer. The males of the two species, however, may be difficult to distinguish definitely on their own without a series of both species for comparison. In the small amount of material available at OSAC, the posterior apices of the elytra are the most reliable character for separating the two species, and are given first in the key. The relative size and density of the elytral punctuation, the antennal length, and the degree to which the male antennal segments are serrate, or sub-serrate will be more difficult to judge when only a single specimen is available.

Diagnosis of *Pygoleptura* in the Pacific Northwest

The species of *Pygoleptura* are similar in appearance to other common species in the genera *Stictoleptura*, *Brachyleptura,* and *Lepturopsis,* but may be readily separated by the hind angles of the pronotum, which are flattened and produced outwards along the humeral angles of the elytra. In both *Pygoleptura* and in the genera just mentioned, the area behind the eyes (the temporal region) is prominently produced with a sharp constriction, forming a distinct "neck." This character separates *Pygoleptura* from the all-black species *L. anthracina,* in which the head narrows gradually behind the eyes.

The following key is modified from Linsley and Chemsak (1976). The key provided by Linsley and Chemsak (1976) indicates that the basal elytral punctures in *P. brevicornis* are always larger than those of the pronotum. This may be true for the females, however the male specimens present at OSAC have a tendency for *very* large pronotal punctures, some of which are even larger than the large elytral punctures. The strongly produced and dentate elytral apices nevertheless confirm those specimens' identity as *P. brevicornis.*

Key to Species of *Pygoleputra* in the Pacific Northwest

1. Pronotum densely, closely punctate at middle; elytra with apices obliquely truncate…… 2

   Pronotum sparsely punctate at middle; elytra with apices transversely truncate. Length 14-20 mm. Brit. Columbia to Idaho and Calif. … ***P. carbonata***

2. Elytra with apices obliquely emarginate, outer angles dentate. Elytra coarsely punctate at base, punctures large. Female antennae with segments 8-10 as broad as long; male antennae with segments 5-10 strongly produced apically, often backwards-pointing. Color always black; Length, 11-21 mm. Sierra Nevada to southern California and central Oregon ……..***P. brevicornis***

Elytra with apices narrow, shallowly, obliquely truncate. Elytra finely, densely punctate at base, color often reddish testaceous with apical dark margins; female antennae with outer segments elongate; male antennae with segments 5-10 sub-serrate ……..……3

3.Elytra usually brownish to reddish with dark lateral bands at apices. Pronotum moderately coarsely, densely, confluently punctate, basal glabrous area small. Elytra finely separately punctate at base, punctures smaller than those of pronotum. Length, 11-23 mm. Alaska to Newfoundland, south to Oregon and northern United States …… ***P. nigrella* subsp. *nigrella***

Elytra black in both sexes. Pronotum rather coarsely, separately punctate on disk,punctures fairly sparse at middle. Elytra moderately coarsely, contiguouslypunctate at base, punctures about as large as those on pronotum. Length, 13-23 mm. Crater Lake and Cascades of Oregon ……. ***P. nigrella* subsp. *oregonensis***

Figure 13a. *Pygoleptura brevicornis*– male. (OSAC_0000268671)

Figure 13b. *Pygoleptura brevicornis*– female. (OSAC_0000268673)

Figure 13c. *Pygoleptura carbonata*– male. (OSAC_0000597220)

Figure 13d. *Pygoleptura carbonata*– female. (OSAC_0000597219)

Stictoleptura Casey, 1924:280

(*Corymbia* Des Gozis, 1886:33; nec Walker, 1865; *Aredolpona* Nakane & N. Ohbayashi, 1957:50; *Melanoleptura* Miroshnikov, 1998:594; *Paracorymbia* subgen. *Batesiata* Miroshnikov, 1998:594)

Type species: *Leptura cribripennis* LeConte (by original designation)

Figure 14. *Stictoleptura canadensis cribripennis*. (OSAC_0000558294)

Twenty-eight *Stictoleptura* species are currently recognized worldwide, which are Holarctic in distribution. Only one species, *S. canadensis* (Olivier, 1795), occurs in North America. One of its three subspecies, *S. canadensis cribripennis* (LeConte, 1859), is found in the Pacific Northwest, ranging from British Columbia, south to California and the Rocky Mountains to New Mexico. The nominative subspecies, *S. c. canadensis* occurs in northeastern United States and Canada, and the subspecies *S. canadensis arizonensis* Linsley and Chemsak, 1976 is restricted to central and southeastern Arizona. Özdikmen and Turgut (2008) recently described a new species *Stictoleptura gevneensis* from Gevne Valley, Turkey, and commented on the taxonomic status of the genus. Cope (1984) reported that throughout Colorado and New Mexico, larvae of *S. canadensis cribripennis* utilize dead standing *Populus tremuloides* Michx.

Diagnosis of *Stictoleptura* in the Pacific Northwest

The color of the elytra, combined with the usually black-and-red striped antennae will readily distinguish *S. canadensis cribripennis* from the rest of the PNW lepturine fauna. The black forms are superficially similar to the species of *Pygoleptura* and *Leptura anthacina*, all of which have the posterior pronotal angles expanded apically. According to Linsley and Chemsak (1976), *Stictoleptura* is distinguished among other North American genera by the rounded posterior pronotal angles, the apically and basally impressed disk of the pronotum, the subserrate antennae, and the dentate elytral apices.

Neoalosterna Podany, 1961

Type species: *Leptura capitata* Newman (monobasic).

Linsley and Chemsak (1976:86) remarked: "Although Podany (1961) considered *Neoalosterna* as a subgenus of *Alosterna,* we consider the species of the former as being sufficiently distinct from the type species of *Alosterna, Leptura tabacicolor* (Degeer), to warrant generic status. In our opinion *rubida* LeConte is more closely related to *capitata* Newman than to *tabacicolor* and we include that species in *Neoalosterna* along with *capitata."*

Figure 15. *Neoalosterna rubida. (*OSAC_0000597160)

Anastrangalia Casey, 1924

Type species: *Leptura sanguinea* LeConte (by original designation).

There are 17 species and subspecies of *Anastranglia* worldwide, with two in the PNW, *A. sanguinea* and *A. laetifica.* Both Pacific northwestern species are fairly common on flowers in the spring and summer, and both use decaying Pinaceae spp. as larval hosts. Linsley and Chemsak provide a range map for *A. sanguinea* (p.147, fig. 38) but not for *A. laetifica*.

Diagnosis

Anastranglia is characterized by its pronotum. Note the contrast between the shape of the *Anastranglia* pronotum and that of *Neoalosterna,* which is bell-shaped and has the posterior angles produced over the humeral angles of the elytra

Figure 16a. *Anastrangalia laetifica* – *Left:* male, *Right*: female. (Specimens: OSAC_0000332288 and OSAC_0000273261)

Key to *Anastranglia* species in the Pacific Northwest

1. Males with basal punctures of the elytra larger than those of the pronotum. Female elytra usually brownish red. …….. ***A. sanguinea***

   Males with basal punctures of the elytra equal in size to those of the pronotum. Female elytra usually red with black spots. ……..***A. laetifica***

Figure 16b. *Anastrangalia sanguinea*. *Left:* male, *Right*: female. (OSAC_0000593939 and OSAC_0000593965).

Notes on Anastrangalia laetifica

Female *A. laetifica* are easily recognized in the field by their distinctive red elytra marked with black spots. The males are sometimes marked with a brown pattern on their black elytra, and Linsley and Chemsak found that the proportion of males with these markings in local populations varied along a geographical gradient.

Tyson (1966) reared adults from *Pinus sabiniana* from Jamestown, Tuolumne Co., Cal., and from *Pinus attenuata* from Santa Cruz Co., Cal. "In both hosts the larvae mined in the rotten heartwood of stumps and limbs that had been dead for about 3 years. The adults emerged in early June" (p. 202).

Shoening and Tilden (1959) cut an abundance of adults, pupae and larvae from stumps of *Pinus attanuata* that had been killed in a fire 3 years prior. The specimens were found within 2 feet of the ground, and the authors noted "the larval tunnels are concentrated in the deeper parts of the wood, at a depth of more than one or two inches, and seem to run generally in a longitudinal pattern to the tree." For other references to habits, see Gardiner (1970) and Gosling (1954). New distribution records are reported in MacRae and Rice (2007).

Notes on *Anastrangalia sanguinea*

Found on a wide variety of flowers from May to August throughout the west coast and in a few scattered localities in the southwestern and northwestern United States. The basal punctures of the elytra are larger than those of the pronotum.

Brachyleptura Casey, 1913

Type species: *Leptura vagans* Olivier (By original designation)

Seven species of *Brachyleptura* may be recognized, all of which exist in North America. Two species occur in the Pacific Northwest. Gosling (1954) records a peculiar instance of two eastern species*, B. rubrica and B. champlaini,* having an apparent toxic reaction to the pollen of the introduced ornamental plant species *Euonymus fortunei* var. *radicans.* These two species were the only lepturines in the study to visit the plant, and were stunned and unable to fly for a day after feeding on the pollen.

Diagnosis

Brachyleptura can be distinguished by the strongly convex, seemingly "inflated" pronotum, the narrow intercoxal process of the prosternum, and elytra which are truncate and dehiscent (diverging) at the tips.

Remarks on Classification

Miroshnikov (1998) proposed that the species *B. vexatrix* and *B. pernigra* are easily separated as a new genus, *Toxoleptura* Miroshnikov 1998:411*,* based on the shared, unique structure of the male genitalia of both species, as well as by the placement of the antennal insertions (see Figures 137-145 in Miroshnikov (1998). Bezark and Monné (2013) list *Toxoleptura* as a junior synonym of *Brachyleptura.*

Key to *Brachyleptura* species in the Pacific Northwest

1. Elytral apices with inner angle rounded. Antennae with 5 outer segments expanded apically, nearly sub-serrate ..... ***B. dehiscens***

   Elytral apices with inner angle acute. Antennae slender, outer segments not expanded. ..... ***B. vexatrix***

Figure 17a. *Brachyleptura dehiscens* (LeConte, 1859). Female, OSAC_0000593111. *Brachyleptura dehiscens* is brown- to reddish brown with the males being smaller and more lightly colored than the females. The species can be readily distinguished from *B. vexatrix* by the characters listed in the key.

Figure 17b. *Brachyleptura vexatrix* (Mannerheim, 1853). Male, OSAC_0000143835. *B. vexatrix* may be distinguished from *B. dehiscens* by its narrower antennae that are not serrate or sub-serrate. The inner angles of the elytral apices are acute in *B. vexatrix*. North of the Siskiyous, the elytra of this species are generally almost entirely black, and occassionaly with yellow spots. From Northern California southward into the Sierra Nevadas the elytra become more prominently yellow with black spots.

Ortholeptura Casey, 1913

Type species: *Ortholeptura oculea* Casey (by original designation)

Three species in *Ortholeptura* are known, two of which occur in the Pacific Northwest. All three species are nocturnal and apparently do not visit flowers. *Ortholeptura valida* is common and widespread, while *O. obscura* is very rare, known from only a handful of specimens taken from the Wallowa Mountains of Northeastern Oregon and Southeastern Washington (see Penrose, 1979). The third species, *O. insignis,* occurs along the coast of California.

Ray et al. (2011) discovered and synthesized a unique long-range sex pheromone produced by females of *Ortholeptura valida.* The pheromone is likely also used by other members of the genus (see Ray et al., 2006).

Diagnosis of *Ortholeptura* among Pacific Northwestern genera

The distinctive pale color and elongate body shape will serve to separate *Ortholeptura* from most Pacific Northwestern genera. The pronotum lacks the lateral tubercles or protrusions found in other similar-looking genera, such as *Centrodera,* and the abrupt constriction of the head behind the eyes will easily distinguish *O. obscura* from *Stenocorus obtusus*.

Key to *Ortholeptura* species in the Pacific Northwest

1. Elytra with apices spinose at suture, each with two or three sets of dark spots on disk, color testaceous. Larger species. Length, 12-28 mm. Common. Oregon to southern California along the Sierra Nevada..... ***O. valida***

   Elytra with apices without spines, yellow at base and sides, oblique dark spots sometimes reduced to a single median pair. Rare. Smaller species. Length, 12-17 mm. Rocky Mts. of Oregon, Washington and Idaho..... ***O. obscura***

Figure 18. Left: *Ortholeptura obscura* (Swaine & Hopping, 1928). OSAC_0000556500. **Right**: *Ortholeptura valida* (LeConte, 1857). OSAC_0000583774. Adults are common at higher elevations. Tyson (1966) found larvae of *O. valida* in a rotten stump of *Abies concolor* (white fir) collected in April at Pinecrest, Tuolumne County, California. Larvae "pupated in chambers near the surface, and emerged as adults in late July."

Tribe Rhagiini Kirby, 1837:178

Fig. 2.19. *Rhagium inquisitor* (Linnaeus, 1758). OSAC_0000621569.

Rhagium Fabricius, 1775

(*Stenocorus* Geoffroy, 1762:221; *Stencorus*; Lamarck, 1817:312; *Hargium* Samouelle, 1819:210; *Harpium*; Reitter, 1912:6; *Allorhagium* Kolbe, 1884:270)

Type species: *Cerambyx inquisitor* Linnaeus (Curtis designation, 1839)

Rhagium, with its dense short hairs, mottled coloration, and distinctly pronounced elytral costae, is one of the most impressive and recognizable lepturine genera. While at least 23 species are currently recognized in three subgenera worldwide, North America is home to just one of these, the Holarctic *Rhagium inquisitor inquisitor* Linnaeus*.* Adults of that species are found from late spring through mid summer, but are not known to visit flowers. The larvae bore into a variety of hosts, including *Abies, Pinus* and *Picea,* and construct a recognizeable broad oval pupal chamber on the wood surface that is stuffed with fiber. Gardiner (1957) notes that adults are readily attracted to turpentine bait. The basic life history of *R. inquisitor* has been described by Gardiner (1970) and Hardy and Preece (1926) (under the junior synonym *Rhagium lineatum* Oliv.).

Recently there has been a fair amount of physiological research using various species of *Rhagium*. In Siberia and Norway, *R. inquisitor,* and several congeners are able to overwinter under bark in areas that reach well below 0 ^{o}C, raising the question of how they able to keep from freezing. In a laboratory setting, Zachariassen et al. (2008) found that *R. inquisitor* is able to supercool to -25^{o}C. This remarkable feat is attributable to a protein in the *Rhagium* hemolymph, aptly named *Ri*ATP, or *Rhagium inquisitor* Antifreeze Protein, which is now thought to be the most potent antifreeze protein known (Kristiansen et al., 1999, 2011, 2012; Hakim et al., 2012, 2013). Hakim et al. (2012) determined the crystal structre of *Ri*ATP and used it to elucidate the molecular basis for ice binding in

antifreeze proteins, which had been poorly understood. *Rhagium* larvae have also been of interest to research into digestive enzymes (see Zverlov et al., 2003, and Chipoulet and Chararas, 1984).

Rhagium inquisitor (Linneaus, 1758) is one of the earliest cerambycids to be described by European naturalists. Although Carolus Linnaeus is credited with naming *R. inquisitor* (it appeared in his 1758 Systemae Naturae as *Cerambyx inquisitor*), the species had actually already been discussed and illustrated by the German entomologist Johann Leonhard Frisch, in his 1730 *Beschreibung von allerley Insecten in Teutsch-Land* (Tom. 13, tab.14). The plate can be viewed on page 646 of the digital version available from openlibrary.org.

Rhagium was reviewed by Casey (1913) and Cenek Podany (1964), both of whom recognized several distinct species within our current concept of *R. inquisitor*. Linsley and Chemsak (1972, p. 88) placed Casey's and Podany's names into synonymy and considered our species the same as the European form.

Pseudogaurotina Plaviltstshikov, 1958

Type species: *Gaurotes splendens* Jakowleff (by original designation)

Our region's only representative of the genus *Pseudogaurotina* is also one of the most eye-catching of the Pacific Northwest lepturine fauna—the bright metallic blue/green *Pseudogaurotina cressoni* (Bland, 1864). Its two subspecies are disguished from one another by their elytral setae and punctuation, and their geographic ranges. The nominative subspecies, *P. c. cressoni* ranges along the Rocky Mountains from British Columbia to Colorada where it may be encountered at higher elevations (4,500 – 9000 ft) during the daytime on flowers of *Heracleum, Xerophyllum, Rosa,* and *Ranunculus*. The subspecies *P. c. lecontei* (Casey, 1913) has only been reported on honeysuckle, which is the host plant of its European and Asian congeners. *P. c. lecontei* occurs as far North as Mount Olympus and the North Cascades, and from the Wallowa Mountains of Northeastern Oregon, southward along the coast ranges to southern California, and in the Sierra Nevada mountains. Some populations contain individuals that are intermediate in their characteristics and may be difficult or impossible to identify without a series of specimens.

Five additional *Pseudogaurotina* species are recognized worldwide, all in the Holarctic. The other North American species, *P. abdominalis* (Bland, 1962), is found in the Northeastern United States and southeastern Canada. The type species, *P. splendens* (Jakovlev, 1893) occurs in southern Europe and Mongolia. *P. excellens* (Brancsik, 1874) occurs throughout Europe, *P. magnifica* Plavilstshikov, 1958 in the far eastern part of Russia, and *P. robertae* Pesarini & Sabbadini, 1997 in Sichuan Province, China. (see Adlbauer et al., 2010:131)

Pseudogaurotina is one of several Rhagiini genera that are superficially similar in form and recognizeable for their metallic elytra. These genera include *Gaurotes* LeConte, 1850*, Carilia*

Mulsant, 1863, *Paragaurotes* Plavilstshikov, 1921, and *Tomentgaurotes* Podany, 1962. All of the north American forms of *Pseudogaurotina* were originally described within the genus *Gaurotes,* and subsequently referred to the subgenus *Gaurotes* (*Pseudogaurotina*) by Podany (1962). Chemsak and Linsley (1963) raised *Pseudogaurotina* to the status of genus, distinguished from *Gaurotes* by the lack of protuberant mesosternum.

Švácha and Danilevsky (1989), both specialists in the Palearctic Cerambycidae, have since cast doubt on the placement of *P. cressoni* and *P. abdominalis* within *Pseudogaurotina.*

"True affinities of the two North American species assigned to that genus by Linsley and Chemsak (1972) remain to be investigated. I have seen adults of *P. abdominalis* (Bland), and they almost surely do not belong to *Pseudogaurotina,* and may be related to *Carilia*[2]. Also, the adults of *Pseudogaurotina* are most frequently found on their host plants, while the two North American species seem to routinely visit various flowers (however, single flower record for *P. cressoni lecontei* (Casey) is *Lonicera* – Linsley et Chemsak, l.c., and this is the host genus for the European *P. excellens*). If the host plant records for *P. cressoni* (Bland) (*Pseudotsuga* and *Abies*) are correct, then it could be taken as another evidence against classifying them in *Pseudogaurotina*." (p. 17)

To the best knowledge of the author, no detailed account of the biology of *P. cressoni* exists. The host plant records, *Pseudotsuga* and *Abies*, given for both subspecies of *P. cressoni* appear to have been introduced by Linsley and Chemsak (1972), presumably from specimen label data, but no indication is given as to their source of evidence.

Diagnosis of *Pseudogaurotina* in the Pacific Northwest

[2] The type species of *Carilia* Mulsant is *Leptura virginea* Linneaus (monobasic). Starzyk (1977) provided illustrations of the adult, pupae and larvae, and the male genitalia of that species, along with a description of its life history and biology in Europe. A series of 8 specimens in OSAC are determined *Gaurotes virginea* L. by Staudinger & Bang-Haas Co. (Det. 1922).

Pseudogaurotina is easily separated from other Pacific Northwest lepturine genera by its robust size and shining blue and green metallic elytra, which have the basal margin strongly elevated around the scutellum. *Brachysomida californica* and some species of *Desmocerus* can be somewhat metallic blue or greenish, but always have the scutellum more or less level with the base (anterior) of the elytra.

Key to *Pseudogaurotina cressoni* subspecies in the PNW

1. Elytra with basal punctures moderately coarse, dense, subcontiguous; pronotum with disk distinctly punctate; pubescence usually evident on head and elytra. Length, 9-16mm. Rocky Mountains from Colorado to British Columbia …….. ***P. cressoni cressoni***

Elytra with basal punctures usually very fine, sparse, greatly separated; pronotum with disk often impunctata; pubescence obsolete on elytra, very sparse on head. Length, 9-15 mm. North Wash. Cascades and Northeastern Oregon to Southern California …… ***P. cressoni lecontei***

Figure 20a. *Pseudogaurotina cressoni cressoni* (Bland, 1864). Female, with relatively coarse, subcontiguous punctures at the base (anterior third) of the elytra. OSAC_0000259953

Figure 20b. *Pseudogaurotina cressoni lecontei* (Casey, 1913). Female, wih very finely punctured pronotum and base (anterior third) of the elytra. OSAC_0000259953.

Individuals of both subspecies can be either blue, green, or purple.

Brachysomida Casey, 1913

Type species: *Acmaeops tumida* LeConte (by original designation)

There are five species in North America and two in the Pacific Northwest. One of these, *Brachysomida californica* is extremely variable throughout its range, and presents a challenging taxonomic puzzle that is presently open for further study (see extensive remarks by Linsley and Chemsak, 1972). Swift (2008) recently reported that *Brachysomida californica* utilizes the living roots of *Lomatium lucidum* (Torrey and A. Gray) and made further notes on the habits of that species, and its Californian congener *B. vittigera.*

Diagnosis

In treating this genus, Linsley and Chemsak (1972:127) remarked "the species presently assigned to this genus appear to represent a heterogenous group. They are placed together for convenience and because they are similar in form and do not fit into the definitions of other genera. The resultant genus may be recognized by the short, stout form, convergent tempora, short, thickened antennae, and transverse pronotum."

Key to *Brachysomida* species in the Pacific Northwest

1. Body subglabrous, usually all-black; pronotum nonpubescent, obtusely tuberculate at sides. Length, 7-13 mm. Northwestern United States to Colorado and Alberta. …….. ***B. atra***

   Body distinctly pubescent, coloration variable; pronotum distinctly pubescent, sides sub-angulate; integument often with a metallic lustre, shining; Length, 7-16 mm. Washington to California …….. ***B. californica***

Figure 21a. *Brachysomida atra* (LeConte), female. Sanders Co., Montana. 5 mi. S. hotsprings. 2900 ft., el. June 23, 1967. L. Russell. OSAC_00000602611.

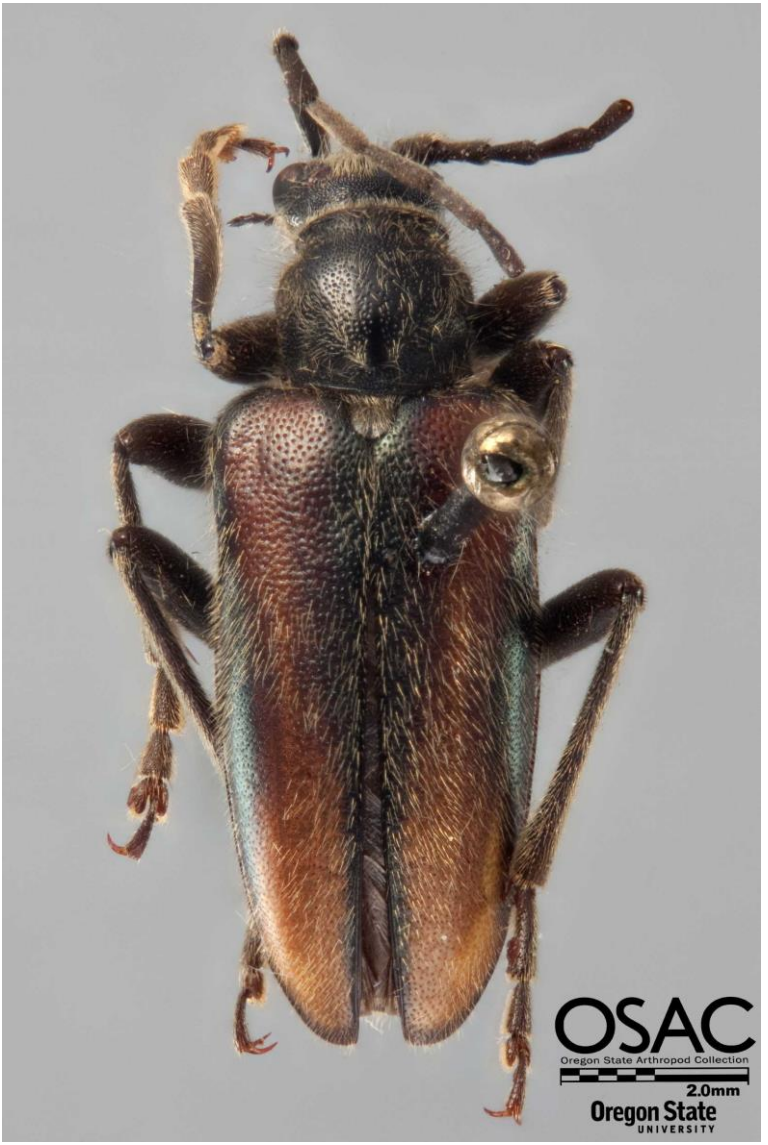


Figure 21b. *Brachysomida californica* (LeConte). Collected at Monroe, Oregon. June 18, 1930. M. H. Hatch. OSAC_0000602638

Cortodera Mulsant, 1863

(*Acmaeops* LeConte, 1850:321 (part); *Leptacmaeops* Casey, 1913:219;
Leptacmaeops (Acmaeopsilla) Casey, 1913:240)
Type species: *Grammoptera spinulosa* Mulsant
(=*Leptura humeralis* Schaller) (Gressitt designation, 1951)

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Cortodera is a large and taxonomically difficult genus distributed throughout the Northern Hemisphere, the species of which are diurnal, generalist flower feeders. The larvae of several species in both Europe and North America appear to be associated with the roots of *Ranunculus*, although detailed biological information for most of the genus is lacking.

Among the eight species of *Cortodera* in the Pacific Northwest, several display a substantial amount of variation in form and coloration, both within and between geographically disjunct populations. This led previous authors working with more limited specimen material to name a number of species which now appear to be merely varieties of the two common and widespread species *C. longicornis* and *C. subpilosa* (which have 10 and 5 junior synonyms, respectively). Hatch (1971) recognized 12 species of *Cortodera* in the Pacific Northwest, based on an early revision by Hopping (1947). Linsley and Chemsak (1972) synonymized several of Hopping's species, and added one new species and a subspecies, bringing the total to 9. Although still recognized here as a valid species, newly examined specimens from OSAC render the specific status of *C. nitidipennis* somewhat dubious, and these populations may eventually be recognized as varieties of *C. subpilosa*. Re-evaluation of the type specimens, along with a population-level study using DNA would be useful in solving the remaining problems in this genus, and may also restore some of the synonymized names to specific status.

Figure 22a. *Cortodera impunctata*, showing characteristic shape of pronotum in the genus *Cortodera.* Specimen: OSAC_0000605700.

Diagnosis of the Genus

Unlike some of the charistmatic Pacific Northwest lepturines that are readily identified on sight, *Cortodera* falls into a set of bean-sized, black and brownish genera that can be difficult to distinguish without a microscope. *Cortodera* can be distinguished by the following characters:

Eyes entire, finely faceted (diurnal species); **antennae** filiform, slender; **pronotum** laterally with slight, obtuse tubercles, the dorsal pronotal surface (disk) convex (not flattened behind nor elevated on each side dorsally into a broad obtuse tubercle, as in *Acmaeops proteus*); **head** with front short (elongate in *Gnathacmaeops pratensis*), tempora inflated, parallel, abruptly constricted at neck; **tibial spurs** terminal, insterted at apices of tibiae (subterminal in *Stenocorus* and *Piodes*); **prosternum** with intercoxal process narrow, not extending beyond coxae (as in *Leptalia*); **mesosternum** with intercoxal process laying well below margins of coxae.

Figure 22b. *Cortodera longicornis* – showing diverity of elytral coloration within a single species**.**

The Pacific Northwestern *Cortodera*

Most likely, a specimen caught in the Pacific Northwest and identified to *Cortodera* will turn out to be one of the three common and widespread species in our region, *C. subpilosa, C. militaris militaris,* or *C. longicornis.* For the most part, these three species are easily separated using the characters given in the key below. *Cortodera subpilosa* is usually covered in long, thick, golden pubescence, giving the elytra a velvety appearance. Many of our museum specimens of this species are caked in pollen. The relative amount of pubescence varies substantially throughout its range however, sometimes making the species difficult to separate from the more densely pubescent forms of *C. militaris.*

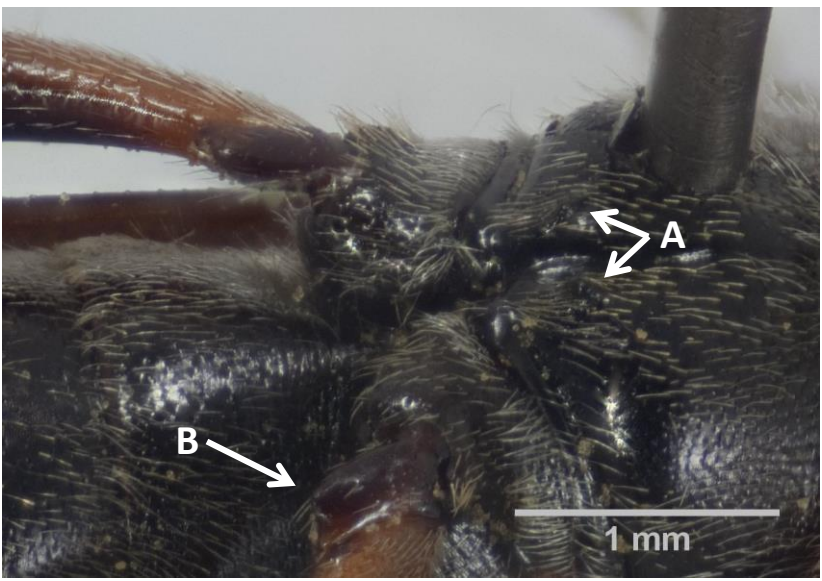

Figure 22c. *Cortodera longicornis,* male. (A) metasternal tubercles, (B) distinctly angulate trochanters.

The most reliable character to separate *C. militaris* from *C. subpilosa* is the presence of metasternal tubercles in males, which are lacking in *C. subpilosa*. In addition, both *C. militaris* and *C. longicornis* "usually" possess distinctly angulate trochanters on their

hind legs, which often form a 90-120 degree angle as they extend out from the coxae to join the femur. In *C. subpilosa* the trochanters are typically more elongate and smoothly rounded on the distal margin. However, in some of the series examined in both *C. militaris* and *C. longicornis* the trochanter angle varied between 90 and 150 degrees, making the distinction between "angled" and "rounded" difficult to judge. In such cases only male specimens provide a definitive identification with reference to the metasternal tubercles.

Cortodera longicornis is the most variable in form and coloration throughout its range. The species is most easily identified by the unique characteristics of its pronotum, which is strongly convex and only moderately punctate, usually with a median longitudinal glabrous area on the pronotal disk. Several discrete elytral patterns occur in *C. longicornis*, from tan with a median black stripe, to vittate, or all-black, or (more infrequently) black with humeral angles red.

Of the rest of the 8 Pacific Northwester species, several appear to be quite rare or otherwise restricted in their range. *C. robusta* is apparently known from only 3 female specimens of the type series, from Vantage, Washington, and *C. spuria* is also known from just a small handful of specimens (see Linsley and Chemsak, 1972). The subspecies *C. militaris* ssp. *constans* is restricted to southeasern Oregon and Modoc Co., California. The species *C. impunctata* and *C. coniferae* are only represented in OSAC by a few specimens each, though the latter apparently has a wide geographic range, from British Columbia to Northeastern Oregon and Colorado. Only 30 specimens of *C. impunctata* were available to Hopping (1947), and 29 to Linsley and Chemsak (1972). Three specimens in the OSAC collection from Kittitas Co., Washington, taken on "sunflowers" represent the first known flower record for that species, although it unclear what genus. The species *C. subpilosa, C. longicornis* and *C. nitidipennis* are found on *Balsamorhiza* in the sunflower family.

Key to Species of *Cortodera* in the Pacific Northwest

1. Pronotum moderately, to densely pubescent, punctuation either regularly distributed over pronotum, or bisected by a longitudinal glabrous[3] area …….. 2

1'. Pronotum glabrous, shining, punctuation, if present, very sparse and irregularly distributed. Color black, shining, elytra often with two broad, testaceous, longitudinal vittae ……
C. impunctata

2(1). Pronotum moderately- to densely covered with long, erect pubescence. Elytra never vittate …….. 3

2'. Pronotum covered with short, appressed pubescence …… 4

3(2). Hind trochanters distinctly angulate on distal margin (often forming a 90° angle with respect to the femur, but as much as 150° in some specimens); males with metasternal tubercles; Elytra moderately densely pubescent and punctate throughout; punctures fine, dense, contiguous; elytra black or with reddish humeri or tan with suture narrowly black
C. militaris (2 subspp.)

3'. Hind trochanters typically evenly rounded on distal margin (angle with respect to the femur usually more than 150°) males without metasternal tubercles; elytra densely, irregularly punctate, usually densely covered with long, flowing pubescence, in males sometimes completely reduced on the disk with only the sides and suture pubescent and elytra glabrous, shining. Elytra either black or tan/testaceous
subpilosa or ***nitidipennis***[4]

[3] *glabrous* – "smooth, hairless and without punctures or structures" (Torre-Bueno, 1937: *A glossary of entomology*)

[4] *subpilosa* is older and preferred name when ID is ambiguous. See discussion in Species Notes section.

4’. Hind trochanters usually distinctly angulate on distal margin, sometimes rounded. Body elongate. Pronotum shining, punctures only moderately dense, disk strongly convex. Elytra with punctures at base separate, irregularly spaced. Males with metasternal tubercles. Elytra color usually one several atterns: all-black or dark brown, tan with black and brown vittae, or tan with black suture, or occasionally black with humeral angles red …….. ***C. longicornis***

4(2’). Hind trochanters always evenly rounded to apex; otherwise not as in above 5

5(4). Elytra with punctures behind base rather fine, separate, often contiguous but not transversely confluent …….. 6

5’. Elytra with punctures behind base coarse, transversely confluent; elytra all-black or vittate …….. 7

6(5). Elytra testaceous with suture narrowly black, basal punctures as large as those on pronotum, separated, becoming obsolete towards apex; pubescence short, subdepressed, and suberect; apices subtruncate …… ***C. barri***

6’. Elytra testaceous, punctures at base slightly larger and denser near basal 1/3 then much finer and sparser toward apex; pubescence rather sparse, fairly long, subdepressed, erect hairs absent; apices rounded. …….. ***C. spuria***

8(6). Elytra with hairs short, half the length of the second antennal segment (extremely rare species)…….. ***C. robusta***

8’. Elytra with hairs long, at least the length of the second antennal segment. Punctures at base of elytra larger than those of the pronotum, separated, becoming denser behind scutellum and transversely rugose, punctures becoming finer and shallower toward apex …….. ***C. coniferae***

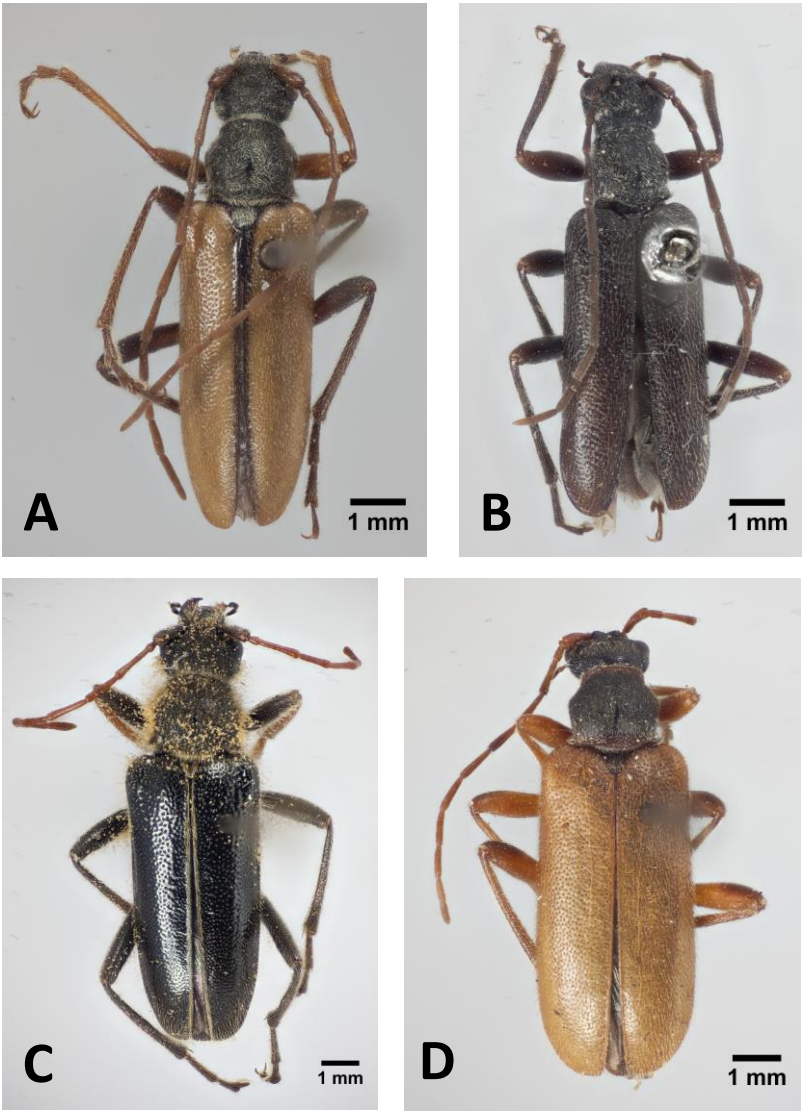

Figure 22d. (A) *Cortodera barri* (OSAC_0000335219); **(B)** *C. coniferae* (OSAC_0000556499); **(C)** *Cortodera nitidipennis* (OSAC_ 0000615387); **(D)** *Cortodera spuria* (CAS specimen).

Notes on species of *Cortodera*

Cortodera barri - (Fig. 22d.A) - In their original description, Linsley and Chemsak mentioned specimens from Harper, OR and Keerin's Ranch, Izee, OR. A third Oregon locality may be added from 1 female specimen, Sucker Creek Canyon, Malheur Co., Oregon, June 15-18, 1951 (Borys Malkin).

Cortodera coniferae - (Fig. 22d.B) - Linsley and Chemsak (p. 120) note "this species differs from *C. spuria* primarily by the color of the elytra." The two specimens at OSAC assignable to this species were taken at Mt. Rainier, Washington, VII-30-41, on frying-pan glacier (R.L. Furniss) and Flathead L., MSU Biol. Station, Montana, VII-31-1965 (Mary Richardson).

Cortodera impunctata - (Fig. 22a) - New flower record: "Sunflowers," from three OSAC specimens with label data: W[ashingto]n, Kittitas Co., Taneum Cr. Cutoff, 16 May, 1970. (Norma Berona).

Cortodera longicornis - (Figs. 22b, 22c) - Considerable taxonomic confusion has resulted from the wide variation in size and coloration of this species, which led to the description of ten species now recognized as variants of *C. longicornis.* An additional point of confusion arises from the shape of the hind trochanter, which was described as distinctly angled by Linsley and Chemsak (1972). However, several series are present at OSAC in which individuals have trochanters ranging from very distinctly angled to more or less rounded (particularly demonstrated in series of 4 specimens from Bozeman, MT).

Individual populations of *C. longicornis* may be dominated by just one or two of the several possible phenotypes for elytral coloration. There is a marked tendency for vittate individuals near The Dalles, Oregon, and a series of 30 specimens from Creston, BC has only tan individuals. Of the 450 specimens available for study, only one series, from Durkee, Oregon (Wallowa Mtns.) has several individuals with elyral red humeral

angles. The rest from that locality are either black or tan with a sutural black stripe.

A unique phenotype from Pipestone Pass, Montana, was identified by Loren Russell (1968) as *C. robusta*, which has contributed to that species being incorrectly reported from Montana by Hart et al. (2013).

OSAC is in possession of 1 paratype specimen of *C. oregonensis* Hopping & Hopping, 1947, and 1 paratype specimen of C. *harneyensis* Hopping & Hopping, 1947.

Cortodera militaris militaris - Individuals have elytra either all-black, light brown with a narrow black sutural vittae, or black with red humeri. According to Penrose (1979), "an interesting phenomenon is found in the distribution of local populations with red and black individuals within the range of the nominate subspecies. All bicolored specimens seen are from Washington (Tacoma, Olympia and Chehalis), and Linsley and Chemsak's statement that black *C. militaris* tend to have reddish humeri would seem to be valid only as regards specimens from the northern portions of the subspecies range."

Cortodera militaris constans - When Linsley and Chemsak described this subspecies from northeast California, the authors noted that the population was "remarkably constant" in its coloration ("color black, moderately shining, humeri always reddish…" Shortly after this description, Rick Penrose discovered several new populations from Lake Co. in SE Oregon which were anatomically similar to *constans,* but included specimens which deviated from the typical coloration.

According to Penrose (1979):

"In the Lake County material … 60 specimens (86%) are typical *constans*, 9 (13%) have elytra brown/vittate and 1 (1%) is wholly black. Inclusion of Oregon populations would therefore require a redefinition of *constans* to encompass predominantly black populations in which the red humeral condition is *usually* expressed. It should also be noted that four of the six specimens

from Quartz Mt., in marked contrast to other Lake County specimens, have the reddish mark vaguely defined and restricted to the humeral angle. This reduction in maculation size, combined with the occurrence of a wholly black individual could indicate that transitional populations between *constans* and typical *militaris* remain to be discovered in the Klamath Basin."

Cortodera nitidipennis - (Fig. 22d.C) - Both Hopping and Hopping (1947) and Hatch (1971) expressed reservations regarding the specific delimitation of *nitidipennis.* Linsley and Chemsak (1972), whose characterization was based on just 42 specimens stated "the irregularly punctate basal half of the elytra and very short discal pubescence will readily separate *C. nitidipennis* and *C. subpilosa."* OSAC is in possession of 15 specimens studied by those latter authors, taken at three localities in the vicinity of The Dalles, Oregon. The specimens, which are all male, generally agree with the above description, as well as the original description by Casey.

However, in sorting through the unidentified *Cortodera* in OSAC, some difficulty arose in trying to segregate certain populations into the species *nitidipennis* and *subpilosa*. Several series with glabrous, *C. nitidipennis*-like males were accompanied by densely pubescent females, indistinguishable from the typical *subpilosa* (as described in Linsley and Chemsak, 1972). This may suggest that the females of *C. nitidipennis* have been historically mischaracterized[5]. Furthermore, the hind trochanters of *C. nitidipennis* specimens identified by Hopping, Hatch, and Chemsak are indistinguishable from those of *C. subpilosa*, and not distinctly angled as stated in Linsley and Chemsak's description and key. Although I have not had the opportunity to inspect the type specimens of either species, the material in OSAC determined as *C. nitidipennis* by J. Chemsak is

[5] Casey described the female elytra as "nearly as in the [male], but with the rather coarse punctures very widely spaced, being separated by nearly three to five times their own diameters, becoming but slightly smaller apically but notably smaller and closer on the basal swelling near the scutellum."

clearly unique in elytral punctuation and pubescence compared to those he determined as *C. subpilosa*, so I have retained both species as valid.

In my MS thesis (Schapker, 2014) I have provided further detailed notes on the populations that appear to represent transitions between *C. nitidipennis* and *C. subpilosa* that may be of interest to taxonomists interested in performing a more detailed analysis of the genus.

Cortodera robusta - At the time of Linsley and Chemsak's (1972) revision, *C. robusta* was known only from the type series consisting of three females from Vantage, Washington. Recently Hart, Cope and Ivie (2013) reported the species occurring in three localities in western Montana. One record is based on a male specimen at MTEC identified as *C. robusta* by those authors, and two records are from an M.S. thesis by Russell (1968), who surveyed the Coleoptera of Montana. Russell's specimen from "Pipestone Pass: Silver Bow Co.: eWn: 6000' el.", now at OSAC, is a relatively rare morph of *C. longicornis* with reddish humeral angles. The MTEC specimen, an all-black male with prominent metasternal tubercles and glabrous pronotal vitta, also appears to be a misidentified *C. longicornis* based on photos sent to me by Charles Hart. The second Russell specimen, from "Sanders Co: Hot Springs – National Bizon Refuge", may have been lost, since a large portion of that collection was destroyed by dermestids before being transferred to OSAC (Loren Russell, personal communication).

Cortodera spuria - (Fig. 22d.D) - No specimens are present at OSAC. The author has only viewed one specimen from California Academy of Sci.

Cortodera subpilosa - Linsley and Chemsak (1972) note a population at Yellowstone National Park in which the elytral pubescence is reduced. This also occurs in a large series from the Moiese National Bison Range in Montana. See additional comments on *C. nitidipennis.*

Acmaeops LeConte, 1850

(*Gnathacmaeops*, Linsley and Chemsak, 1972:137)

Type species: *Leptura proteus* Kirby (Casey designation, 1913)

Acmaeops consists of 10 species worldwide. Linsley and Chemsak (1972) considered one of the two northwestern species, *A. pratensis,* to be distinct enough to erect a new monotypic genus, which they called *Gnathacmaeops*.

"it differs markedly from *Leptura proteus* Kirby (the type of *Acmaeops*) and relatives in the short body form, elongate head, wide genal area below the eyes, and absence of pronotal tubercles." (Linsley and Chemsak, 1972:135)

Following Sama (2002), *Gnathacmaeops* is normally treated as either a subgenus or junior synonym of *Acmaeops*. At the time of writing, *Gnathacmaeops* is still occasionally used as a valid genus by North American authors, as well as on BugGuide.net. (Accessed October 10, 2014).

Key to the species of *Acmaeops* in the Pacific Northwest

1. Pronotum with disk convex, not flattened behind nor elevated on each side into a broad, obtuse tubercle; Head with front longer than broad ……. ***A. pratensis***

   Pronotum with disk flattened behind and elevated on each side into a broad, obtuse tubercle; head with front short, not longer than broad ……. ***A. proteus***

Figure 23a. *Acmaeops proteus proteus* (Kirby in Richardson, 1837). Note each side of the posterior dorsal surface of the pronotum is expanded into a large tubercle. OSAC_0000266588

Figure 23b. *Acmaeops pratensis* (Laicharting, 1784). OSAC_0000609018

Evodinus LeConte, 1850

(*Brachyta* Fairmaire in Jacquelin du Val, 1864:185)

Type species: *Leptura monticola* Randall (monobasic)

Six species in *Evodinus* are recognized worldwide, with two species in North America, *E. lanhami* Lewis and *E. monticola* (Randall). *Evodinus monticola* is further divided into two subspecies. The nominative subspecies, *E. monticola monticola* is distributed throughout the eastern half of the continent, while *E. monticola vancouveri* occurs west of the Rocky Mountains. Authors prior to Linsley and Chemsak (1972) had *E. m. vancouveri* as a distinct species, *E. vancouveri.*

Gardiner (1970) summarized the habits of the eastern subspecies as follows:

"Adults fly in late May and throughout June in Ontario and Quebec, visiting flowers of *Trilium, Cornus, Viburnum, Ledum,* etc. Eggs are laid under bark scales of dead *Pinus, Picea,* and *Tsuga.* The larvae feed in the phloem for 12 to 14 months, then drop to the soil in which they pupate at the onset of cold weather. It is not known if they pass the second winter as adults or pupae. Occassionally this species is infected with *Isaria farinose* in the soil. It is also parasitized by the ichneumonid *Rhyssa persuasoria* (L.)." According to Craighead (1923), the earthen pupal chamber is constructed about 6 inches below the surface of the ground.

Fig. 23c. *Evodinus monticola vancouveri.* Male. This is one of several specimens collected by Danielle Mendez and the author from Steven's Pass Summit, Wash., on June 19, 2016. Around 15 individuals were running about and mating on leaves of red elderberry, *Sambucus racemosa*, growing next to some cabins near the highway. An energetic, aggressive species… they put up a good fight.

Pidonia Mulsant, 1863

(*Grammoptera*; Thomson, 1864:141 (not Audinet-Serville, 1835); *Pseudopidonia* Pic, 1900:81; *Hapalosalia* Casey, 1913:200; *Pidnota*; Bayer & Shenefelt, 1969:5)

Type species: Of *Pidonia, Leptura lurida* Fabricius (Swaine and Hopping designation, 1928) (Pic designation?); of subgenus *Ceratopidonia* Linsley & Chemsak, 1976:119*, Pidonia quadrata* Swaine and Hopping (by orig. des.); of subgenus *Thesalia* Casey, 1891:36, *Acmaeops lisa* Leng (by orig. des.).

Fig. 24. *Pidonia scripta* pair copulating on blossom of Nootka Rose, *Rosa nootkana,* in Corvallis Oregon. May 30, 2014. Photo by Schapker.

According to Mikio Kuboki (1981), who revised the genus on a global basis, "the genus *Pidonia* Mulsant is one of the most interesting genera of cerambycid beetles in the world." Linsley and Chemsak (1976) recognized three subgenera in *Pidonia* and remarked that "most of the species which we have assigned to *Pidonia* s. str. are related to Asiatic forms and would fall in *Pseudopidonia* Pic as defined by Plavilstshikov (1936)."

Key to the PNW subgenera and species of *Pidonia*

*The following key is only slightly modified from Linsley and Chemsak (1976), and contains their original desciption (in quotations) of the subgenus *Ceratopidionia.*

1. Antennae with third antennal segment shorter than the scape……. 2
   Antennae long and filiform in both sexes, outer segments at most feebly enlarged toward their apices, third segments distinctly longer than scape (***Pidonia* s. str**.).
   1 PNW species: Elytra pale, irregularly or obsoletely maculate, not vittate. Length, 6-9 mm. Pacific Coast from southern Alaska to Central California …….. ***P. scripta***

2(1). Pronotum feebly constricted at base and apex, distinctly longer than broad in the male, less so in the female, surface coarsely, deeply punctate, including constricted areas; antennae thickened, with third and fourth segments subequal, those of male attaining apical one-fifth or one-sixth of elytra, outer segments not flattened and without poriferous areas, those of female heavier, attaining middle of elytra (**subgenus *Thesalia***).
   1 PNW species: Elytra rufotestaceous with a small spot on each side of the elytra fuscous or blackish. Length, 7-9 mm. Western Washington and Oregon to Central Coastal California and the southern Sierra Nevada …… ***P. gnathoides***

   *"*Pronotum strongly constricted at base and apex, wider than long in both sexes, finely, shallowly punctate; antennae short in both sexes, barely surpassing middle of elytra in male, scarcely attaining middle in female, those of male with segmentssix to ten flattened, expanded, bearing shallow elongate poriferous areas, those offemale with outer segments thickened but not flattened nor bearing poriferous areas," (**subgenus *Ceratopidonia***).
   1 PNW species: Form moderately slender; integumentpale testaceous, elytra with a faint brownish spot on each side near middle. Length, 6-7 mm. Coastal Pacific Northwest from Southern British Columbia to northwestern California…… ***P. quadrata***

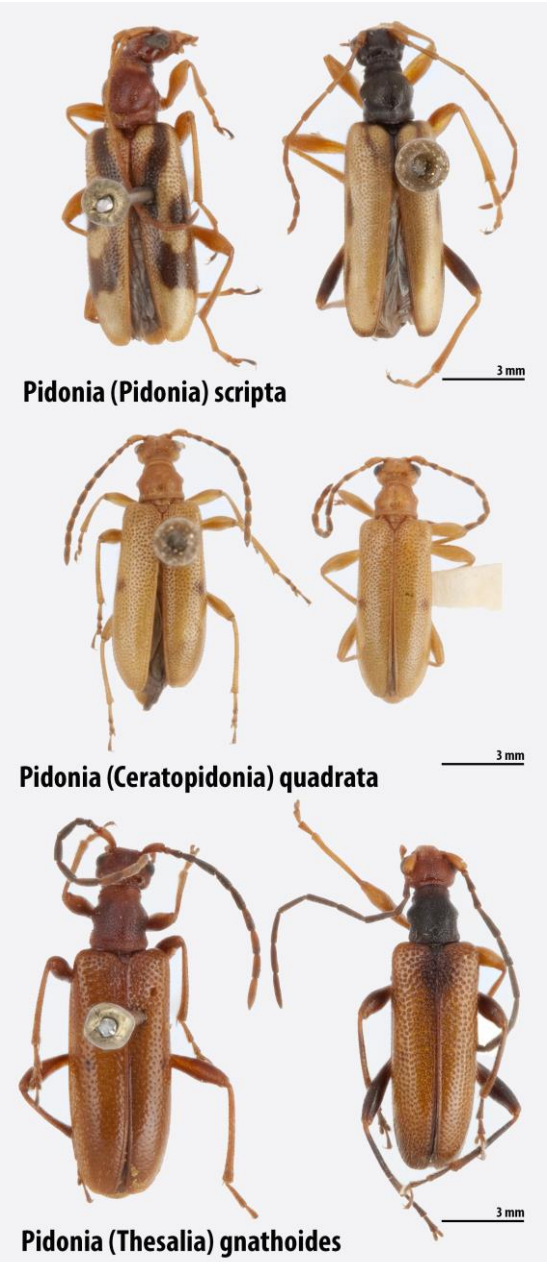

Figure 24.b.
Pidonia species of the PNW. Females on left. Males on right.

Pachyta Dejean, 1821

(*Argaleus* LeConte, 1850:319; *Acmaeops*; Thomson, 1866:55 (not LeConte, 1850) ; *Anthophylax*; Blessig, 1873:232 (not LeConte, 1850); *Neopachyta* Bedel, 1906:93; *Pachyta (Linsleyana)* Podany, 1964:43)
Type species: *Leptura 8-maculata* Fabricius (=*4-maculata* Linnaeus) (Westwood designation, 1840)

Ten species are presently assigned to *Pachyta* worldwide, most of them in Europe and Asia. Both of the North American species, *P. armata* and *P. lamed liturata,* occur in the Pacific Northwest and are easily recognized among our regional lepturine fauna. *Pachyta lamed lamed* Linnaeus is found in Europe and Asia.

Diagnosis of *Pachyta* in the Pacific Northwest

Pachyta is recognized by its robust form, broad, strongly tuberculate pronotum, elytra prominently raised around the scutellum, and eyes notched behind the antennae.

Key to *Pachyta* species in the Pacific Northwest

1. Elytra brownish to infuscated, about twice as long as broad, tapering apically. Length, 10-17 mm. Alaska to Labrador and mountains of western North America …… ***P. lamed liturata***

   Elytra yellow except for narrow or broad black lateral stripes at apical half; Elytra less than 1 ½ times as long as broad, strongly tapering posteriorly. Length, 13-17 mm. Pacific Coast to California. ……. ***P. armata***

Figure 24c. *Pachyta armata.* OSAC_000262965

Stenocorus Geoffroy, 1762

Type species: *Leptura meridiana* Linnaeus (Plavilstshikov designation, 1936).

Figure 25a. Hind leg of *Stenocorus nubifer,* showing sub-terminal tibial spurs characteristic of the genus. OSAC_0000621677

Figure 25b. *Stenocorus obtusus* (LeConte, 1873), female. OSAC_000602700

Four *Stenocorus* species occur in the Pacific Northwest. All the species can be quite variable in size, form, and coloration, but are reliably separated by the characters given in the key below. There are presently thought to be 30 species in the genus wordwide, 12 of which occur in North America.

Key to Species of *Stenocorus* in the Pacific Northwest

1. Pronotum with basal margin slightly sinuate, not broadly lobed at middle, disk densely punctate and pubescent ……. 2

   Pronotum with basal margin strongly sinuate, broadly lobed at middle, disk sparsely punctate, shining; elytra with longitudinal yellow vittae or concolorous black. 17-27 mm. British Columbia to California …… ***S. flavolineatus***

2(1). Elytra with apices rounded, occasionally feebly transversely truncate …… 3

   Elytra with apices obliquely truncate, very finely, densely punctate, often with larger punctures superimposed over minute ones; color variable. 9-21 mm. British Columbia to Montana, Southeast Oregon, Utah, and southern California ***S. nubifer***

3(2). Elytra densely clothed with appressed pubescence, concolorous or margined with black, not longitudinally vittate; abdomen with last tergite notched at apex in females. 9-12 mm. British Columbia to southern California and Utah ……..***S. vestitus***

   Elytra sparsely pubescent, pubescence short and suberect or very short and depressed;males black or with pale longitudinal vittae, females usually pale reddish testaceous. 10-17 mm. Rocky Mountains from Colorado to British Columbia, and Nevada..... ***S. obtusus***

Figure 25c. *Stenocorus flavolineatus* (LeConte, 1854). OSAC_143933

Figure 25d. *Stenocorus nubifer* (LeConte, 1859): one of many phenotypic variants. OSAC_0000621677. (See also Fig. 25.e.)

This large and handsome *Stenocorus* is usually quite easy to recognize on sight due to its size and striped elytral pattern. Some specimens however may lack the typical elytral stripes, or "vittae," and occasionally small and narrow specimens appear similar to *S. vittiger.* According to Linsley and Chemsak (1972), *S. flavolineatus* can be distinguished from *S. vittiger* "by the minutely punctate, shining pronotal disk, strongly lobed basal margin of the pronotum, and narrower head."

Figure 25e. Two more phenotypic variants of *Stenocorus nubifer.* OSAC_0000621647, OSAC_0000621675)

Taxonomic History of *Stenocorus*

"*Antennae a vasi ad apecim decrescentes, ante oculos positae. Elytra apice angustiora*,"

- (Geoffroy, 1972)

Geoffroy's original (1762) concept of *Stenocorus* was fairly different from our modern use of the term. His twelve species, which had antennae *'smaller from the base towards the tip, and positioned before the eyes*' included not only the familiar *Rhagium inquisitor* (Linnaeus,1758) but also Linnaeus' *Leptura aquatica,* which today we recognize as *Donacia aquatica* in the family Chrysomelidae. Geoffroy's 3rd species, described as new (p. 223), appears to be the same as Linnaeus' *Leptura meridiana* (see reference in Latreille, 1758 p. 310). Fabricius (1775), who was the first to characterize *Stenocorus* in the standard Latin binomial format, included *L. meridiana* as his first species, but made no reference to Geoffroy.

Geoffroy used polynomial, rather than binomial taxonomic terms, and for this reason was placed on the Official Index of Rejected and Invalid Works in Zoological Nomenclature. The type for *Stenocorus* was later designated by Plavilstchikov (1936) as *Leptura meridiana* Linneaus, 1758. The International Commission on Zoological Nomenclature (ICZN, 1994: Opinion 1754) later upheld this type designation, when it decided that 24 of Geoffroy's genus names, and *only* his genus names, could be considered available to taxonomy.

Etymology

Stenos (narrowed) + *coros* (particularly), after the particularly narrowed elytra in some species.

Piodes LeConte, 1850

Type species: *Piodes coriacea* LeConte (monobasic)

Piodes consists of a single species worldwide, *Piodes coriacea,* that is associated with sagebrush (*Artemisia*) in the Pacific Northwest, but the species is not commonly collected and little is known about its biology and life history. No specimens of this species are present in OSAC. Several photographs (#381604 - #381606) of a pinned specimen were posted to BugGuide.net by Andrew McKorney with the following data: Dalles, Oregon, USA. At Deschutes river around the sage bushes. March 27, 2010. Size: 17 mm.

Westcott et al. (2006) recently recorded a specimen of *P. coriacea* from Malheur Co., Adrian, 23-V-72; Wasco Co., Warm Springs Indian Res., 29-VI-76, both KJG. They remark that "apparently the few published references to this species occurring in Oregon originated from the type locality, "Or". However, when LeConte (1850) described this beetle Oregon was not a state. His reference can refer only to the Oregon Territory."

Diagnosis

The following features distinguish *Piodes* from other PNW genera: Tibial spurs subterminal, inserted into an emargination near apex of tibiae. Antennae with segments very short, stout, almost subequal in length from third segment, not extending beyond middle of elytra; tempora subparallel; eyes entire.

Figure 25f. *Piodes coriacea.* California Academy of Sciences specimen. Pascoe, Wash., IV-10-1925, on Artemesia, Walter Carter, Col.

Tribe Oxymirini Danilevsky (in Althoff & Danilevsky, 1997)

The taxonomic status of the tribe Oxymirini was recently discussed by Özdikmen (2010).

Neanthophylax Linsley & Chemsak, 1972
(*Anthophilax* Horn in Leng, 1890:98 (part))

Type species: *Anthophylax tenebrosus* (LeConte) (By original designation).

Figure 25g. *Neanthophylax tenebrosus tenebrosus.* OSAC_0000399158.

Key to *Neanthophylax* species in the Pacific Northwest

1. Disk of pronotum convex, not longitudinally impressed, never densely pubescent. (*tenebrosus* ssp.) 2
   Disk of pronotum deeply, longitudinally impressed with a longitudinal callus on each side or pubescence dense 4

2(1). Elyta coarsely punctate and rugose 3
   Elytra rather finely punctate, rugae not coarse. Length, 13-18 mm. Wallowa Mtns., Oregon ..... ***N. tenebrosus orientalis***

3(2). Pronotum with punctures on disk fine, separated, not rugose; lateral tubercle of pronotum obtuse. Elytra moderately coarsely punctate and rugose; pubescence very obscure. Length, 11-18 mm. Sierra Nevada Mts. to southern Oregon. ***N. t. tenebrosus***
   Pronotum with disk densely, confluently, rugosely punctate; lateral tubercles of pronotum acute. Elytra coarsely punctate and rugose, pubescence pale, visible. Length, 11-17 mm. Cascade Range of Oregon and Washington to British Columbia ..... ***N. t.nigrolineatus***

4(1). Pronotum not densely clothed with depressed pubescence; elytra black and rugose or black and red, opaque and finely punctate at base only. Length, 12-19 mm. Rocky Mts. ..... ***N. mirificus***
   Pronotum densely clothed with short, depressed pubescence, surface subopaque; elytra vittate, finely, separately punctate over entire length. Length, 10-12 mm. Idaho. ..... ***N. pubicollis***

Tribe Rhamnusiini Sama, 2009

Enoploderes Falderman, 1837
(*Pyrotrichus* LeConte, 1862)

Type species: *Enoploderes sanguineus* Faldermann, 1837

One species of this unusual, and probably very ancient genus occurs in the Pacific Northwest. *Enoploderes vitticollis* ranges from British Columbia to southern California and western Nevada, and is easily recognizeable for its parallel form and the bright yellow stripes of thick pubescence adorning its head and pronota. Adults are active as early as February to June, but their activity is apparently confined to their host plants, as no flower records exist. The other two species are *E. bicolor* Ohbayashi, endemic to Japan, and *E. sanguineum* Faldermann, found in the Caucasus, Balkan Penninsula (Albania), Northern Iran, and Turkey (see Miroshnikov, 2000).

Figure 26. Four specimens of *E. vitticollis* in the OSAC. The species is easily recognized among the PNW genera by the distinct yellow stripes on its head and pronotum, as well as its parallel form.

Notes on species of *Enoploderes*

The unusual life history of *E. vitticollis* may account for its scarcity in collections. The most detailed account of the behavior of *E. vitticollis* was made by Hardy (1944:16), who reared a number of specimens from the decaying heartwood of a dead maple, *Acer macrophyllum*, in January, 1935. Hardy found the larvae and pupae "in some numbers in a spot twelve feet from the ground." Upon rearing his specimens in the lab, Hardy observed that "the adults, all females, evinced a decided aversion to daylight; as soon as exposed to its influence they burrowed into the friable rotten wood."

Distribution and life history data for this species are limited. Jim Labonte (personal communication) reports finding adults in rotting portions of willow trees (*Salix* sp.) at Willamette Park, in Corvallis, Oregon, and similar observations have been made by Hovore and Giesbert (1976:350) and Cope (1984). The larvae are also reported from the following host plants: *Anus, Populus, Umbellularia, Ulmus procera* Salsib (see Cope, 1984).

Taxonomic status of *Enoploderes*

North American taxonomists (e.g., Linsley and Chemsak, 1972; Bezark and Monné, 2013) have historically placed *E. vitticollis* in the monotypic genus *Pyrotrichus* LeConte, 1862, although Kasuma & Hayashi (1971) demonstrated convincingly some time ago that *Pytrotrichus* was a synonym of *Enoploderes*. The placement of *Pyrotrichus* in the tribe Encyclopini LeConte, 1873, also followed by North American authors, is a relict of LeConte's original characterization of that tribe. Švácha and Danilevsky (1989, p. 14) separated *Enoploderes* and the Palearctic genus *Rhamnusium* Latreille as an informal tribe ("Tribe II") in the Lepturinae based on a series of unique larval characters. Recently Sama, in Sama & Sudre (2009, p. 383) validly established the tribe Rhamnusiini based on the observation that the adult anatomy of the two genera was also distinct, "chiefly the mandible without or with strongly reduced membranous setose area in front of the prostheca." See also Cebeci & Özdikmen (2010).

Tribe Encyclopini LeConte, 1873

Encyclops Newman, 1838

Type species: *Encyclops pallipes* Newman (=*Leptura caerulea* Say) (monobasic).

The genus consists of 10 species worldwide. Two of these are endemic to North America, including the type, *E. caeruleus* (Say, 1826), and *E. californicus* (Van Dyke, 1920). The eight Palaearctic species are *E. concinna* Holzschuh, 1991, *E. hubeiensis* Ohbayashi & Wang, 2004, *E. luteoscelis* Chou & Ohbayashi, 2010, *E. macilenta* (Kraatz, 1879), *E. olivacea* Bates, 1884, *E. ussuricus* Cherepanov & Cherepanova, 1975, *E. viridipennis* Makihara, 1978, and *E. x-signata* Chiang, 1981.

A single species, *Encyclops californicus* (Van Dyke, 1920) is thought to occur in the Pacific Northwest, but the majority of its range is in Coastal northern California. The PNW record is based on the existence of a single museum specimen (**Fig. 2.27**) taken in central Oregon in 1972 (see Penrose and Westcott, 1974b). The larvae of *E. californicus* are known to develop in *Rhamnus* and *Neolithocarpus.* No flower records have been reported.

Diagnosis.

The deeply emarginated eyes and narrow, elongate body, which is at least 4 times as long as broad will separate *Encyclops* from most Pacific Northwestern lepturine genera. In addition to the eyes, in *Encyclops californicus* the area between the front of the eyes and the mandibles is shorter than the width of the first antennal segment, serving to distinguish the species from the paler forms of *Leptalia macilenta.*

Figure 27. *Encyclops californicus* Van Dyke, 1920. A single specimen at OSAC (shown above) has the following label data: "Lane Co., Blue River, H. J. Andrews Experimental Forest, mid-age Douglas-fir stand, 10-VII-1972, IBP Biome Survey, beating *Tsuga*." OSAC_0000579556

Figure 28. *Leptalia macilenta* (Mannerheim, 1853). OSAC_0000 584281

Leptalia LeConte, 1873

Type species: *Anoplodera macilenta* Mannerheim
(by original designation)

Leptalia LeConte, 1873 is a monotypic genus consisting of the type species, *L. macilenta* Mannerheim, which is found in Montana, and in the Pacific Northwest from Alaska southward along the Cascade and Coastal ranges to Central California. According to Linsley and Chemsak (1972:99), *Leptalia* "is closely related to *Encyclops* and may be separated by the very feebly emarginate eyes, more strongly tuerculate sides of the pronotum, and arcuately constricted head behind the eyes." *Leptalia* was one of the three genera, including *Encyclops* and *Pyrotrichus* (now *Enoploderes*) to comprise LeConte's original concept of the tribe Encyclopini (see LeConte, 1873b).

Specimens of *L. macilenta* are abundant in OSAC. The life history and mating behavior of *L. macilenta* was described in detail by Chemsak and Powell (1971). Since the species was last reviewed by Linsley and Chemsak (1972), Penrose and Westcott (1974b) found teneral adults and pupae of *L. macilenta* in mid April "boring under the bark of decaying logs of bitter cherry, *Prunus emarginata* (Dougl.) Walp.," at Salem, Oregon, and also reared adults "from portions of a dead trunk section of big leaf maple, *Acer macrophyllum* Pursh., in McDonald Forest, near Corvallis, Benton Co." Recently Swift (2008) reared specimens from dead logs of *Quercus agrifolia* from Marin County, California.

Tribe Xylosteini Reitter, 1913

The tribe Xylosteini presently includes around 8 genera, which are parallel in form and usually have prominently spined pronota. These include (from Wikispecies): *Caraphia*, *Centrodera*, *Formosotoxotus*, *Leptorhabdium*, *Noctileptura*, *Palaeoxylosteus, Pseudoxylosteus*, and the type genus, *Xylosteus*. *Centrodera* is placed in Xylosteini based on larval characters discussed in Svacha and Danilevsky (1989:15), but the genus grouped closely with *Rhagium* in a molecular phylogenetic study by Sýkorová (2008, thesis in Czech). (See also: Sama, 1993)

Pseudoxylosteus Sama, 1993

Type species: *Xylosteus ornatus* (LeConte) (Monotypie)

Pseudoxylosteus is a monotypic genus established by Sama (1993) for *Xylosteus ornatus* LeConte. *Pseudoxylosteus ornatus* is a nocturnal species found only in North America, where it ranges from the Siskiyou Mountains of southern Oregon to California. The species is instantly recognizeable for its sharply-spined pronotum, and parallel black eltyra with four inward-pointing white or reddish lines, that form an 'X' with the middle erased. An apparent mimic of *P. ornatus* in the subfamily Cerambycinae is also found in the Pacific Northwest. *Phymatodes obliquus* has the same elytral markings but does not have lateral spines on the pronotum.

Pseudoxylosteus ornatus is rare in collections, and very little is known about its habits. Linsley and Chemsak (1972) report *Abies* as a host, presumably based on specimen label data. Two specimens are currently posted to BugGuide.net which indicate an association with deer brush. Brady Richards' photo (#632217) was found on deer brush (*Ceanothus integerrimus*) at West Branch Feather River along Humbug Summit Road, Butte County, CA, July 10, 2010. Richard Waldrep's photo (#857948) was taken at Nevada City, 20 km E, Nevada County, CA, June 2, 2013; with note: "3 specimens

found on the same Buckbrush at 1524 m. No others seen in the next week." Hovore & Giesbert (1976: 350) report a specimen "beaten by E. F. Giesbert from dead portions of a living Elderberry bush (*Sambucus sp.*) in company with *Desmocerus auripennis auripennis* Chevrolat in July, near Buck's Summit, Plumas County, California."

Figure 29. *Pseudoxylosteus ornatus* (LeConte, 1873). A single specimen in OSAC, pictured here, has the following label data: OR: Josephine Co., Flat Top. T.36S-R.9W-sec.19. 4300'. Aug. 5, 1999. Dana Ross, leg. (42.425°N, -123.795°W). Dr. Paul Hammond, a Lepidopterist at OSAC, recalls having noticed the unusual lepturine specimen and deciding to preserve it while he was assisting Mr. Ross with moth specimens taken from a blacklight trap.

Centrodera LeConte, 1850

(*Rhamnusium*; Haldeman, 1847; *Centrodera* (*Apatophysis*);
Gressitt, 1947; *Parapachyta* Casey, 1913)
Type species: *Rhagium decoloratum* Harris (Thompson designation, 1864).

Figure 30. *Centrodera dayi* Leech, 1963 – paratype female.
Hood River, OR, "Mid. Col. Expt. Sta." OSAC_000061835
(1 of 18 paratype specimens at OSAC).

Centrodera has 13 species and subspecies worldwide, all species are nocturnal and restricted to the North American continent. Three species occur in the Pacific Northwest. The most common species, *C. spurca* is found from British Columbia to southern California and Utah, and is known from a variety of host plants, including *Quercus, Amelanchier, Shepherdia,* and *Arbutus* (see Linsley & Chemsak, 1972). *Centrodera dayi* Leech ranges from the Cascade Mountains of Washington to central California. Leech's (1963) original description of *C. dayi* includes figures and discussion on its biology. The host plant for that species is unknown. *Centrodera nevadica nevadica* ranges along the east side of the Sierra Nevada mountains, and was previously thought to extend as far north as southeastern Oregon and Idaho.

Four specimens present at the OSAC now extend the range of *C. n. nevadica* to the eastern flank of the central Oregon Cascades. Label data are as follows: 2 males—Redmond, Oreg., August 13, 1930; 1 male and 1 female—Oregon, Deschutes Co., 13 mi. S. E. Sisters, July 24, 1965 bl. lt. (C. W. Baker, J. Cornell, and N. Virkii).

Diagnosis

Brown or pale-colored insect with eyes deeply notched and coarsely faceted. The lateral spines of the pronotum and proportions of the antennal segments separate *Centrodera* from the nocturnal genus *Ortholeptura* and other pale-colored species, such as *Stenocorus obtusus.* In *Centrodera* the 1st antennal segment is always longer than the 4th, and the 3rd longer than 4th.

Taxonomic Status

Centrodera is atypical and difficult to classify among other lepturine genera. Based on larval characters, Švácha and Danilevsky (1987: 15) state, "the North American genus *Centrodera*… is a true Lepturine, belonging into the tribe Xylosteini." Others, however, treat *Centrodera* in Rhagiini (see Özdikmen, 2010). Gressit (1947, p. 191) thought *Centrodera* was subgenerically related to the Palearctic genus *Apatophysis* Chevrolat, 1860, however, Adlbauer et al. (2010) follow Danilevsky (1979) in treating *Apatophysis* within a separate subfamily, the Apathophysinae Lacordaire, 1869 (see also Rapuzzi & Sama, 2013).

Key to *Centrodera* species in the Pacific Northwest

1. Elytra coarsely, closely punctate near base, surface never partially obscured by pubescence ……. 2
   Elytra finely, shallowly punctate near base ……. ***C. nevadica nevadica***
2. Elytra with vestiture not conspicuous, hairs on basal half suberect, apices not dentate at suture; antennae of males with pubescence of outer segments bristling. Length 13.5-20.5 mm. Washington to central California. …….. ***C. dayi***
   Elytra with hairs at basal portion depressed, recurved, apices dentate at suture; males with pubescence of outer antennal segments smooth, satiny. Length 19-30 mm. British Columbia to southern California and Utah…… ***C. spurca***

Tribe Desmocerini Blanchard, 1845

The tribe Desmocerini comprises just one genus, *Desmocerus,* with 6 species entirely restricted to the North American continent.

Figure 31a. *Desmocerus aureipennis* Chevrolat, 1855. Taken on blue elder in late July at approx. 7000 feet at the summit of Mt. Ashland, Oregon.

Desmocerus Dejean, 1821

Type species: *Stenocorus cyaneus* Fabricius (monobasic)

Desmocerus has an obligate relationship with a living host plant, elderberry (*Sambucus*). The use of a living host and leaf eating are notably uncommon in lepturines, the majority of which bore into decaying wood and feed on flowers. The atypical diet of *Desmocerus* probably accounts for its characteristically broadened mandibles, and may also be involved in an apparent predisposition in the genus for aposematism.

There are 6 species in the genus, all in North America. The large yellow-and-purple species *D. palliatus* is popular among collectors on the east coast and has appeared on a United States postal stamp. In California there is *D. californicus,* with two subspecies. *Desmocerus californicus dimorphus* from the central valley of California is one of a very short list of federally endanged beetles in America, and has been the subject of much controversy.

The Pacific Northwest is the hotbed of *Desmocerus* diversity, with at least 4 (but potentially more) closely-related species that bore into either blue or red elderberry. The largest, and most visually striking PNW *Desmocerus* is the blue elderberry-boring *D. aureipennis* (Fig. 31a), known from from California to the Rocky Mountains of Alberta, Canada. This species emerges in late July through early September when the elderberry *S. nigra cerulea* is flowering, and may be found on the leaves, sometimes in large aggregations.

The red elderberry-boring species, formerly considered subspecies of *D. aureipennis*, are nearly identical to each other in their external anatomy and may be difficult to identify without further consideration of internal genitalia and/or DNA. Schapker (2014) rejected Linsley and Chemsak's (1972) subspecies hypothesis on the grounds of morphology and separate ecological niches, and elevated the former subspecies of *D. aureipennis* to full species as follows in this section. Schapker and Marshall (in prep) are currently working on a publication clarifying the species boundaries in the Pacific Northwestern *Desmocerus,* expected to be published in 2017.

A new key to the species based on that work is coming soon.

A map based on specimen data should be available here.

D. cribripennis – Washington, and Oregon and Northern Cal. Type locality: Washington. Uses red elderberry exlusively as host plant. Male elytra always dark green. Includes populations which are the smallest among all *Desmocerus.*

Fig. 31b. *Desmocerus cribripennis* Horn, 1881. *Left*: male lectotype, MCZ Type 34546. *Right*: female, "Allotype 3739." Both labeled "W.T" [Washington Territory].

D. lacustris – Oregon Cascades, Coast range of Oregon and Haida Gwaii. Type locality: Crater Lake. Uses red elderberry exclusively as a host plant. Male elytra variable within populations from entirely dark green to reddish green or completely red. Populations in the Oregon Coast range identified as *D. lacustris* by Mitochondrial DNA appear similar to *D. cribripennis* and may be impossible to distinguish on morphology alone, and further study is needed to tease apart species delimitations.

Fig. 31c. *Desmocerus lacustris* Linsley and Chemsak, 1972. *Left*: male from Haida Gwaii, British Columbia. *Middle and Right*: males from Monument Peak, in the Cascade Range of central Oregon, showing within-population variation in elytral pattern.

D. piperi – Blue mountains of NE Oregon to western Montana and Rocky Mountains of Alberta. Type locality: Blue Mountains. Bores into black elderberry, *Sambucus racemosa* var. *melanocarpa.* Male elytra entirely red. In pinned specimens, male elytra almost always bright yellow, only occasionally with faint dark streaks, as in the specimen below.

Figure 31d. *Desmocerus piperi* Webb. *Left*: adult male. *Right*: adult female from same series as type specimen (OSAC_000824761).

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REFERENCES

Althoff, J. & Danilevsky, M. L. 1997. A Check-List of Longicorn Beetles (Coleoptera, Cerambycoidea) of Europe. Slovensko Entomološko Društvo Štefana Michielija. Ljubljana, 64 pp.

Adlbauer, K., Danilevsky, M.L., Drumont, A., Hubweber, L., Komiya, Z., Löbl, I., Morati, J., Rapuzzi, P., Sama, G., Smetana A., and A. Weigel. 2010. In: I Lobl & A. Smetana (ed.): *Catalogue of Palearctic Coleoptera. Vol. 6.* Stenstrup: Apollo Books, 924 pp.

Bezark, L. G. 2012. Especies presentes en Brasil de la familia Cerambycidae: Lepturinae (Cerambycidae: Lepturinae species from Brasil). Website accessed August 27, 2014. http://www.coleoptera-neotropical.org/paginas/2_PAISES/Brasil/Cerambycidae/lepturinae-brasil.html

Bezark, L. G. and M. A. Monné. 2013. Checklist of the Oxypeltidae, Vesperidae, Disteniidae and Cerambycidae, (Coleoptera) of the Western Hemisphere. Available from: plant.cdfa.ca.gov/byciddb/documents.html

Bily, S. and O. Mehl. 1989. Longhorn beetles (Coleoptera, Cerambyciae) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica. Vol. 22: 1-203.

Böcher, J. 1988. *The Coleoptera of Greenland*. Nyt Nordisk Forlag Arnold Busck.Gressitt, J. L. 1951. Longicorn beetles of China. Longicornia, Paris. 2: 1-667. 22 pl.

Bond, W.B. and T.K. Philips. 1999. Diversity, phenology, and flower hosts of anthophilous long-horned beetles (Coleoptera: Cerambycidae) in a southeastern Ohio forest. Entomological News. 110: 267-278.

Bousquet Y, Heffern DJ, Bouchard P, Nearns EH. 2009. Catalogue of family-group names in Cerambycidae (Coleoptera). Zootaxa 2321: 1–80. (22 Dec 2009)

Bouchard, P., Bousquet, Y., Davies, A.E., Alonso-Zarazaga, M.A., Lawrence, J.F., Lyal, C.H.C., Newton, A.F., Reid, C.A.M., Schmitt, M., Ślipiński, S.A., and Smith, A.B.T. (2011). "Family-Group Names in Coleoptera (Insecta).", ZooKeys, 88, pp. 1-972. doi : 10.3897/zookeys.88.807

Casey, T. L. 1913. Further studies amongst the American Longicornia. Memoirs on the Coleoptera, 4:193-388.

Cebeci, H. & Özdikmen, H. 2010. A synopsis on the genus Rhamnusium Latreille, 1829 with a new record (Coleoptera: Cerambycidae) for Anatolian fauna from a new host plant, Liquidambar orientalis Miller (Hamamelidaceae). Munis Entomology & Zoology 5 (1): 131-139

Chemsak, J.A. and J.A. Powell. 1971. Behavior of Leptalia macilenta (Mannerhiem), with a description of the pupa (Coleoptera: Cerambycidae). The Pan-Pacific Entomologist 47(2):101-104.
Cherepanov, A. I. 1990. Cerambycidae of northen Asia. Volume 1 Prioninae, Disteniinae, Lepturinae, Aseminae, Brill, Leiden, 105-109.
Craighead, F. C. 1923. North American cerambycid larvae. A classification and the biology of North American cerambycid larvae. Canada Department of Agricultue, Bulletin (new series) 27:1–239.
Cope, J. 1984. Notes on the ecology of western Cerambycidae. Coleopterists Bulletin 38:27-36.
Danilevsky, M. L. 2014a. A check-list of Longicorn Beetles (Coleoptera, Cerambycoidea) of Europe. Available from: http://www.cerambycidae.net/ (Updated 17.01.2014)
Danilevsky, M. L. 2014b. A check list of the longicorn beetles (Cerambycoidae) of Russia, Ukraine, Moldova, Transcaucasia, Central Asia, Kazakhstan and Mongolia. Available from: http://www.cerambycidae.net/ (Updated 17.01.2014)
Di Iorio, Osvaldo. 1998. Redescriptions, new combinations, synonymies,and new records of South American Lepturini (Coleoptera: Cerambycidae: Lepturinae). *Insecta Mundi*. Paper 365. http://digitalcommons.unl.edu/insectamundi/365/
Galbreath, K. E., D. J. Hafner, K. R. Zamudio, and K. Agnew. 2010. Isolation and introgression in the Intermountain West: contrasting gene genealogies reveal the complex biogeographic history of the American pika (*Ochotona princeps*). Journal of Biogeography, 37:344-362.
Gardiner L. M. 1970. Biological Notes on some Nearctic Lepturinae (Coleoptera: Cerambycidae), The Pan-Pacific Entomologist, San Francisco 46 (4): 284-288.
Garnett, R. T. 1918. An annotated list of the Cerambycidae of California. Canadian Entomologist, 50:172-178, 205-213, 248-252, 281-284. <archive.org>
Geoffroy, E. L. 1762. Histoire abrégée des insectes qui se trouvent aux environs de dans laquelle ces animaux sont rangés suivant un ordre méthodique. Durand. 1: xxviii + 523 pp., pls I-X.
Gosling, D. C. L. 1986. Ecology of the Cerambycida (Coleoptera) of the Huron Mountains in northern Michigan. GT Lakes Entomol. 19:153-162.
Gressitt, J. L. 1953. Notes on nomenclature and relationships of some Palearctic and Nearctic Lepturinae Pan-Pacific Entomologist, 29(4): 207

[6]Gressitt, J. L. & J. A. Rondon. 1970. Cerambycidae of Laos (Disteniidae, Prioninae, Philinae, Aseminae, Lepturinae, Cerambycinae). Pacific Insects Monograph. Bishop Museum, Honolulu. 24:1-314

Hardy, G. A. 1926. Cerambycidae of Vancouver Island (Preliminary annotated list). B. C. Prov. Mus. Rep., 1925: 24-33, pls. 4-5.

Hardy, G. A. and W. H. A. Preece. 1927. Further notes on some species of Cerambycidae from the southern portion of Vancouver Island, B. C., with descriptions of some new varieties. The Pan-Pacific Entomologist, 3:34-40.

Hardy, G. A. 1944. Further notes on the Cerambycidae of Vancouver Island (Coleoptera). Proceedings of the Entomological Society of British Columbia, 41: 15-18 (Dec. 8, 1944) <PDF>

Hart, C. J., J. S. Cope and M. A. Ivie. 2013. A checklist of the Cerambycidae (Coleoptera) of Montana with distribution maps. Coleopterists Bulletin 67: 133-148. doi: http://dx.doi.org/10.1649/0010-065X-67.2.133

Hatch, M. H. 1949. A century of entomology in the Pacific Northwest. University of Washington Press. Seattle. 43 pp.

Hatch, M. 1971. The beetles of the Pacific Northwest. Part V. Rhipiceroidea, Sternoxi, Phytophaga, Rhynchophora, and Lamellicornia. University of Washington Publications in Biology, 16.

Hayashi, M., K. Morimoto and S. Kimoto. 1984. The Coleoptera of Japan in Color, vol. IV, Hoikusha (Osaka). ISBN 4-586-30071-X.

Hayashi M. & A. Villiers. 1985. Revision of the Asian Lepturinae (Coleoptera: Cerambycidae) with special reference to the type specimens inspection. Part I. *Osaka Jonan Women's Junior College*, 19-20: 1-75

Hayashi M. & A. Villiers. 1987. Revision of the Asian Lepturinae (Coleoptera: Cerambycidae) with special reference to the type specimens inspection. Part II. *Osaka Jonan Women's Junior College*, 22: 1-20

Hayashi M. & A. Villiers. 1989. Revision of the Asian Lepturinae (Coleoptera: Cerambycidae) with special reference to the type specimens inspection. Part III. *Osaka Jonan Women's Junior College*, 24: 1-43

Hayashi M. & A. Villiers. 1995. Revision of the Asian Lepturinae (Coleoptera: Cerambycidae) with special reference to the type specimens inspection. Part IV. *Osaka Jonan Women's Junior College*, 30: 1-22

[6] Includes key to the tribes of Lepturinae.

[7]Heffern, Daniel J. 2005. Catalog and Bibliography of Longhorned Beetles from Borneo (Coleoptera: Cerambycidae). Electronic Version. 2005.1.
Heffern, Daniel J. 2006. Catalog and Bibliography of Longhorned Beetles from the Hawaiian Islands (Coleoptera: Cerambycidae). Electronic Version. 2006.1.
Hopping, R. 1937. The Lepturini of America North of Mexico. Part II. National Museum of Canada. (Biological Series) (22)85:1-27, 6 pls.
Hopping, R. and G. R. Hopping. 1947. The Lepturini of America North of Mexico. Part III. Cortodera. Entomol. Agric., 27:220-236, 6 figs.
Hovore, F.T. & E.F. Giesbert. 1976. Notes on the ecology and distribution of western Cerambycidae. Coleop. Bull., 30(4): 349 - 360.
ICZN, 1994. Opinion 1754, (Case 2292). Histoire abrégée des insects qui se trouvent aux environs de Paris (Geoffroy, 1762): some generic names conserved (Crustracea, Insecta). Bulletin of Zoological Nomenclature, 51(1):58. [Biodiversity Heritage Library]
Kadlec, S. and J. Hájek. 2005. Xestoleptura nigroflava, a new genus of longhorn beetles for Europe (Coleoptera: Cerambycidae: Lepturinae). 1 colour plate, 6 pp. [FHC207] Folia Heyrovskyana 12(A)(4): 161-166.
Kakutani, T., Inoue, T., Kato, M., and H. Ichahashi. 1990. Insect-flower relationship in the campus of Kyoto Japan: An overview of the flowering phenology and the seasonal pattern of insect visits. Contrib. Biol. Lab. Kyoto Univ. 27:465-522.
Kasuma, K. and M. Hayashi. 1971. Generic names and type species applied to Japanese Cerambycidae (Coleoptera). Reports Facul. Sci.Shizuoka Univ. 6: 95-126.
LeConte, J. L. 1850. An attempt to classify the longicorn Coleoptera of the part of America, north of Mexico. Journal of the Academy of Natural Sciences of Philadelphia, (2)1: 311-340; 2:5-38. <Biodiversity History Library> <PDF-1> <PDF-2>
[8]LeConte, J. L. 1851. An attempt to classify the longicorn Coleoptera of the part of America, north of Mexico. Journal of the Academy of Natural Sciences of Philadelphia, (2)2:99-112. <Biodiversity History Library>

[7] Accoring to Heffern (2005): "The cerambycid fauna of Borneo is closely related to the fauna of the Malaysian Peninsula, Sumatra and Java, with a distinct overlap of species and a strong commonality of tribes and genera. … nearly all tribes and many genera which occur in Southeast Asia are found in Borneo. … The cerambycid fauna of Borneo is also closely related to the Philippine island of Palawan, since it was part of the Sunda Shelf around 160,000 years ago when sea levels were at their lowest, permitting dispersion of ancestral fauna to that island via a land bridge."

LeConte, J. L. & G. H. Horn. 1883. Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. Smithson. Misc. Coll'ns., 26(507): xxxvii + 1-567

Leech, H. B. 1963. Centrodera spurca (LeConte) and two new species resembling it, with biological and other notes. Proceedings of the California Academy of Sciences, 32:149-218, 28 figs.

Linsley, E. G. 1958a. Geographical origins and phylogenetic affinities of the cerambycid beetle fauna of western North America. In Hubbs, C. L. ed. Zoogeography, Amer. Assoc. Adv. Sci., Washington, pp. 299-320. Openlibrary.org.

Linsley, E. G. 1958b. The role of Cerambycidae in forest, urban and agricultural environments. Pan-Pacif. Ent., 34(3): 105-124.

Linsley, E. G. 1959. Ecology of Cerambycidae. Annual Review of Entomology 4: 99-138. <PDF>

Linsley, E. G., and J. A. Chemsak. 1972. Cerambycidae of North America. Part VI. No. 1. Taxonomy and Classification of the Subfamily Lepturinae. University of California Publications in Entomology 69, xiii+138 pp, 2 pl.

Linsley, E.G. and J.A. Chemsak. 1976. Cerambycidae of North America. Part VI, No.2. Taxonomy and Classification of the Subfamily Lepturinae. University of California Publications in Entomology 80, 186 pp.

Lobanov, A.L., M.L.Danilevsky, S.V.Murzin. 1981. Systematic list of longicorn beetles (Coleoptera, Cerambycidae) of the USSR I. Revue d'Entomol., LX, 4, 1981: 784-803.

Lobanov, A.L., M.L.Danilevsky, S.V.Murzin. 1982. Systematic list of longicorn beetles (Coleoptera, Cerambycidae) of the USSR II. Revue d'Entomol., LXI, 2, 1982: 252-278.

MacRae, T. C. and Rice M. E. 2007. Biological and Distributional observations on North American Cerambycidae (Coleoptera). The Coleopterists Bulletin, 61(2):227–263.

Miroshnikov, A. I., 1998: A new classification of longicorn beetles of the *Anoplodera* complex, tribe Lepturini Coleoptera, Cerambycidae of Holarctic fauna. I. Entomologicheskoe

[8] *G. molybdica* (LeConte, 1851("1850") and *B. californica* (LeConte, 1851 ("1850"). The ("1850") is due to an appendix (on page 101) that amends pages from LeConte (1850) and inserts original descriptions. Although the article was published 1852, the reference is cited as 1851 because, in a footnote in the table of contents, it is indicated that LeConte had pre-prints in December of 1851.

Miroshnikov A.I., 2000. On taxonomy of the genus *Enoploderes* Faldermann and distribution of its congener *Enoploderes sanguineum* Faldermann (Coleoptera Cerambycidae). Entomologia Kubanica, 1: 55-59.
Özdikmen, H. 2010. Turkish Oxymirini Danilevsky in Althoff & Danilevsky, 1997 with zoogeographical remarks (Coleoptera: Cerambycidae: Lepturinae). Munis Entomology & Zoology 5 (1): 52-59
Ödikmen, H. 2011. A propose for acception of a single genus as Judolia Mulsant, 1863 instead of the genera Judolia Mulsant, 1863 and Pachytodes Pic, 1891 (Coleoptera: Cerambycidae: Lepturinae: Lepturini) Munis Entomol. Zool. 6(2): 900-904.
Ohbayashi, N., M. Satô and K. Kojima, 1992. An Illustrated Guide to Identification of Longicorn Beetle of Japan, Tokai University Press (Tokyo). ISBN 4-486-01181-3.
Okutaner, A. Y., Özdikmen, H., Yüksel, E., Koçak, Y., 2012. "Cytogenetic observations of Pachytodes erraticus (Coleoptera: Cerambycidae: Lepturinae: Lepturini). Florida Entomologist, 95 (3): 731-736 (2012) (SCI). http://dx.doi.org/10.1653/024.095.0323
Penrose, R. L. and Richard L. Westcott. 1974a. Lepturine longhorns collected on chinquapin bloom (Coleoptera: Cerambycidae). The Pan-Pacific Entomologist 50(1):72.
Penrose, R. L. and Richard L. Westcott. 1974b. Notes on the Distribution, Hosts and Bionomics of Some Pacific Northwest Cerambycidae (Coleoptera). The Coleopterists Bulletin, Vol. 28, No. 4 (Dec.), pp. 233-236
Penrose, Richard. L. 1979. Notes on three Oregon Lepturine Cerambycidae. Pan-Pacific Entomologist. 55(2): 159-160.
Plavilstshikov, N. N. 1936. Fauna SSSR. Nasekomye zhestokrylye. T. XXI. Zhukidrovoseki (ch. 1). Moskva – Leningrad: Izdatel'stvo Akademii Nauk SSSR, 612 + [1] pp.
Rapuzzi, P. & Sama, G. 2013. A new species of Apatophysis Chevrolat, 1860 from Jordan (Coleoptera: Cerambycidae). Munis Entomology & Zoology, 8 (2): 682-684
Ray, A. M., Lacey, E. S., and Hanks, L. M. 2006. Predicted taxonomic patterns in pheromone production by longhorned beetles. Naturwissenschaften 93:543–550.
Ray, A. M., Zunic, A., Alten, R. L., McElfresh, J. S., Hanks, L. M., and Millar, J. G. 2011. cis-Vaccenyl acetate, a sex attractant pheromone of Ortholeptura valida, a longhorned beetle in the subfamily Lepturinae. J. Chem. Ecol. 37:172–178.

Ribardo, K., & J. Cope, 2000. “Checklist of the Cerambycidae of Madagascar and Adjacent Islands. Website Accessed August 27, 2014. <Link>
Robertson, J. A. 1988. Descriptions of the immatures of Typocerus serraticornis (Coleoptera: Cerambycidae), and new observations on biology, including “Varnish” production and usage by larva. The Pan-Pacific Entomologist. 64(3), 228-242.
Russell, L. K. 1968. The faunal relationships of the Coleoptera of Montana, west of the Continental Divide, with a list of the species known to occur there. MSc thesis, University of Washington, Seattle, WA.
Sama, G. 1993. Notes sur les Xylosteini Reitter. Biocosme Mésogéen, Nice, 10(1): 7-15, 6 figs.
Sama, G. 2002. Atlas of the Cerambycidae of Europe and the Mediterranean Area. Volume 1: Nothern, Western, Central and Eastern Europe. British Isles and Continental Europe from France (excl. Corsica) to Scandinavia and Urals. Nakladatelstvi Kabourek, Zlin, 173 pp.
Shoening, E. H. and J. W. Tilden. 1959. Anoplodera laetifica (LeConte) and Ergates spiculatus LeConte from knob-cone pine [Pinus attenuata] (Coleoptera: Cerambycidae). The Pan-Pacific Entomologist, 35: 167-168.
Švácha P., Danilevsky M. L., 1989. Cerambycoid larvae of Europe and Soviet Union. (Coleoptera, Cerambycoidea). Part III. Acta Univ. Carol. (Biol.) 32[1988]: 1–205. <PDF>
Swaine, J. M. & R. Hopping. 1928. The Lepturini of America North of Mexico. Part I. Bull. Nat. Mus. Canada, (Biol. Serv.) (14)52:1-97, 13 pls.
Swift, Ian. 2008. Ecological and biogeographical observations on Cerambycidae (Coleoptera) from California, USA. Insecta Mundi, 0026: 1-7.
Sýkorová, M. 2008. Molecular phylogeny of the subfamilies Spondylidinae and Lepturinae (Coleoptera: Cerambycidae) based on mitochondrial 16S rDNA. Bachelor’s thesis, Faculty of Natural Sciences, South Bohemian University, Ceske Budejovice. http://www.entu.cas.cz/popevol/lide/sykorova.pdf
Tyson, W. H. 1966. Notes on reared Cerambycidae (Coleoptera). The Pan-Pacific Entomologist, 42(3): 201-207.
Westcott, R. L., J. R. LaBonte, G. L. Parsons & P. J. Johnson. 2006. New records and other notes for Oregon Coleoptera. Zootaxa 1142:1-3

APPENDIX A – CHECKLIST AND BIBLIOGRAPHY FOR PACIFIC NORTHWEST LEPTURINAE

The present checklist was originally adapted from Bezark and Monné (2013), with some corrections made in Schapker (2014). The species of *Desmocerus* reflect Schapker's (2014) MS thesis. In this version I have treated *Strophiona tigrina* as a junior synonym of *S. laeta* in agreement with Hatch (1971).

Tribe Desmocerini
Blanchard, 1845: 163

Desmocerus Dejean, 1821:111
- **aureipennis** Chevrolat, 1855: 187
  - *auripennis*; LeConte, 1857:23
- **cribripennis** Horn, 1881:vii
- **lacustris** Linsley and Chemsak, 1972:11
- **piperi** Webb, 1905: 104

Tribe Lepturini
Latreille, 1802: 218.

Anastrangalia Casey, 1924:280
- **laetifica** (LeConte, 1859:89)
  - *lugens* LeConte, 1859:89
- **sanguinea** (LeConte, 1859:89)
  - *boulderensis* Casey, 1913:252
  - *apicata* Casey, 1924:280

Brachyleptura Casey, 1913:247
- *Toxoleptura* Miroshnikov, 1998:411
- **dehiscens** (LeConte, 1859:89)
- **vexatrix** (Mannerheim, 1853:250)
  - *quadrillum* LeConte, 1859:88
  - *convolvens* Casey, 1913:250

Dorcasina Casey, 1913:269
- **matthewsii** (LeConte, 1869:384)
  - *macrocera* Casey, 1913:270

Grammoptera Audinet-Serville, 1835:215
- *Parallelina* Casey, 1913:247
- **molybdica** (LeConte, 1851 ["1850"]:101)
- **rhodopus** (LeConte, 1874:68)
  - *campanifera* Casey, 1913:256
- **subargentata** (Kirby in Richardson, 1837:184)
  - *similis* Kirby in Richardson, 1837:185
  - *rufibasis* LeConte, 1862:40

quebecensis Couper, 1864:88
filicornis Casey, 1913:255

Judolia Mulsant, 1863:496
gaurotoides gaurotoides (Casey, 1893:592)
vivarium Casey, 1924:282
knulli Swaine & Hopping, 1928:46
gaurotoides auripilis Linsley & Chemsak, 1976:50
impura (LeConte, 1857:64)
instabilis (Haldeman, 1847:64)
convexa LeConte, 1850:332
quadrata; Horn, 1886:xiii (not LeConte, 1873)
flaviventris Schaeffer, 1908:342
pacifica Casey, 1913:249
trajecta Casey, 1913:250
montivigans montivigans (Couper, 1864:87)
sexmaculata; Kirby in Richardson, 1837:182 (not Linnaeus, 1758)
seminigra Casey, 1924:283
montivigans barberi (Fall, 1907:250)
scapularis (Van Dyke, 1920:43)
isabellae Hopping, 1922:162

Leptura (Leptura)
Linnaeus, 1758:397
Stenura Haldeman, 1847:62 (part)
Strangalia; LeConte, 1850:327 (part)
Nakanea Ohbayashi, 1963:9
anthracina LeConte, 1875: 174
subcostata Fall, 1907: 249
kerniana Fall, 1907: 249
obliterata obliterata (Haldeman, 1847:62)
vitiosa LeConte, 1854:18
perductor Walker in Lord, 1866:333
idahoensis Casey, 1913:259
plagifera LeConte, 1873:224
propinqua Bland, 1865:384
regularis Casey, 1913:259
miniscula Casey, 1913:260

Lepturobosca Reitter, 1913:17
Cosmosalia Casey, 1913:267
chrysocoma (Kirby in Richardson, 1837:179)
auripilis LeConte, 1850:339
aureola Casey, 1913:268
auripilis densepilosa Casey, 1924:281

Lepturopsis Linsley & Chemsak, 1976:158
dolorosa (LeConte, 1861:355)

Neoalosterna Podany, 1961:27
rubida (LeConte, 1873:224)
keeni Casey, 1913:257

Neobellamira Swaine & Hopping, 1928:15
delicata delicata (LeConte, 1874:68)

Ortholeptura Casey, 1913:204
obscura (Swaine & Hopping, 1928:56)
valida (LeConte, 1857:64)
oculea Casey, 1913:204

Pygoleptura Linsley & Ch., 1976:59

brevicornis (LeConte, 1873:226)

carbonata (LeConte, 1861:355)

nigrella nigrella (Say, 1826:279)

lacustris Casey, 1891:43

praestans Casey, 1913:267

serricornis Casey, 1924:279

nigrella oregonensis Linsley & Chemsak, 1976:62

Stenostrophia Casey, 1913:248

amabilis (LeConte, 1857:64)

tribalteata serpentina (Casey, 1891:41)

tribalteata sierrae Linsley & Chemsak, 1976:113

Stictoleptura Casey, 1924:280

Corymbia Des Gozis, 1886:33; nec Walker, 1865

Aredolpona Nakane & N. Ohbayashi, 1957:50

Melanoleptura Miroshnikov, 1998:594

Paracorymbia subgen. *Batesiata* Miroshnikov, 1998:594

canadensis cribripennis (LeConte, 1859:21)

coccinea LeConte, 1873: 226

Strophiona Casey, 1913:248

laeta (LeConte, 1857:64)

ostenta Casey, 1913:265

[9]*tigrina* Casey, 1913:266

reducta Casey, 1913:266

Trachysida Casey, 1913:271

aspera aspera (LeConte, 1873:228)

var. *parkeri* Hippisley, 1922:66

Typocerus LeConte, 1850:333

[10]**serraticornis** Linsley & Chemsak, 1976:69

Xestoleptura Casey, 1913:248

[11]**behrensii** (LeConte, 1873:227)

crassicornis (LeConte, 1873:227)

corusca Casey, 1913:261

crassipes (LeConte, 1857:65)

[12]*xanthogaster* LeConte, 1859:88

fasciventris LeConte, 1861:355

crassipes shastana Casey, 1913:263

muliebris Casey, 1913:263

vancouveri Casey, 1913:263

tibialis (LeConte, 1850:236)

hirtella LeConte, 1873:226

columbica Casey, 1913:261

miquelonensis Pic, 1922:11

pictipennis Casey, 1924:285

[99] Bezark and Monne (2016) list *S. tigrina* as valid species. See my comments in text.

[10] Paratype male and female are in Westcott private collection, currently housed at Oregon Dept. Agric. in Salem, Oregon.

[11] Original spelling with two 'i's. Appears in many publications, including L&C'76 as *behrensi* with one 'i.'

[12] L&C give *xanthogaster* LeConte, 1860.

Tribe Rhagiini Kirby, 1837

Acmaeops LeConte, 1850: 235
- **proteus proteus** (Kirby in Richardson, 1837: 186)
  - *sublineata* Haldeman, 1847:60
  - *gibbula* LeConte, 1861:356
  - *pinicola* Schaeffer, 1908:341
  - *parkeri* Casey, 1913:242
  - *lacustrina* Casey, 1913:242
  - *obsoleta* Casey, 1913:243
  - *puncticeps* Casey, 1913:243
  - *aurora* Casey, 1913:244
  - *coloradensis* Casey, 1913:244
  - *cavicollis* Casey, 1913:244
  - *scutellata* Casey, 1924:276
- **pratensis** (Laicharting, 1784:172)
  - *strigilata* Fabricius, 1792:341
  - *longiceps* Kirby in Richardson, 1837:187
  - *semimarginata* Randall, 1838:30
  - *fulvipennis* Mannerheim, 1853:251

Brachysomida Casey, 1913:219
- **atra** (LeConte, 1850:323)
  - *morata* Casey, 1913:222
  - *aterrima* Casey, 1924:276
- **californica** (LeConte, 1851 ["1850"]:101)
  - *subaeneus* LeConte, 1851["1850"]:101
  - *tumida* LeConte, 1857:63
  - *fusca* LeConte, 1857:62
  - *subcyanea* LeConte, 1857:63
  - *lugens* LeConte, 1857:62
  - *viola* LeConte, 1860:321
  - *mollipilosa* LeConte, 1860:321
  - *pinguis* LeConte, 1873:210
  - *celestina* Casey, 1913:222
  - *corpulenta* Casey, 1913:222
  - *lanatula* Casey, 1913:224
  - *francisca* Casey, 1913:225
  - *californica proxima* Casey, 1913:225
  - *brevicornis* Casey, 1913:226
  - *trinitatis* Casey, 1913:226
  - *tumidiceps* Casey, 1913:227
  - *caerulea* Casey, 1913:227
  - *caerulea chalybea* Casey, 1913:228
  - *robustula* Casey, 1913:228
  - *protensicollis* Casey, 1913:228
  - *hirsuta* Casey, 1913:228
  - *lepidula* Casey, 1913:229
  - *versicolor* Casey, 1913:229

Centrodera LeConte, 1850:325
- *Rhamnusium*; Haldeman, 1847:58
- *Centrodera (Apatophysis)*; Gressitt, 1947:191

Parapachyta Casey, 1913:216
- **dayi** Leech, 1963:178
- **spurca** (LeConte, 1857:63)
  - *cervinus* Walker, 1866:332
- **nevadica nevadica** LeConte, 1873:205

Cortodera Mulsant, 1863: 572
Acmaeops LeConte, 1850:321 (part)
Leptacmaeops Casey, 1913:219
Leptacmaeops (Acmaeopsilla) Casey, 1913:240
barri Linsley & Chemsak, 1972:120
coniferae Hopping & Hopping, 1947:233
impunctata Hopping & Hopping, 1947:222
longicornis (Kirby in Richardson, 1837: 185)
dorsalis LeConte, 1859:21
vincta LeConte, 1861:356
ligata LeConte, 1873:211
marginalis LeConte, 1857:23
punctiventris Casey, 1913:238
alticola Casey, 1913:239
suturalis Casey 1924:277
oregonensis Hopping & Hopping, 1947:227
harneyensis Hopping & Hopping, 1947:228
bakeri Hopping & Hopping, 1947:229
militaris militaris (LeConte, 1850: 322)
militaris constans Linsley & Chemsak, 1972:110
nitidipennis (Casey, 1913:236)
robusta Hopping & Hopping, 1947:234
spuria (LeConte, 1873:228)
subpilosa (LeConte, 1850:322)
intermedia Casey, 1913:236
lupina LeConte, 1860:321
pugetana Casey, 1913:237
quadriceps Casey, 1913:237

Evodinus LeConte, 1850:325
Brachyta Fairmaire in Jacquelin du Val, 1864:185
monticola vancouveri Casey, 1913:216

Pachyta Dejean, 1821:112
Argaleus LeConte, 1850:319
Acmaeops; Thomson, 1866:55 (not LeConte, 1850)
Anthophylax; Blessig, 1873:232 (not LeConte, 1850)
Neopachyta Bedel, 1906:93
Pachyta (Linsleyana) Podany, 1964:43
armata LeConte, 1873:207
lamed liturata Kirby in Richardson, 1837:178
nitens LeConte, 1850:319
conflagrata Motschulsky, 1860:147
lamed americana Podany, 1964:50

Pidonia (Ceratopidonia) Linsley & Chemsak, 1976:119
quadrata (Hopping, 1931:233)

Pidonia (Pidonia) Mulsant, 1863:570
Grammoptera; Thomson, 1864:141 (not Audinet-Serville, 1835)
Pseudopidonia Pic, 1900:81
Hapalosalia Casey, 1913:200

[13]*Pidnota*; Bayer & Shenefelt, 1969:5
scripta (LeConte, 1869:384)

Pidonia (Thesalia) Casey, 1891:36
gnathoides (LeConte, 1873:228)
lisa Leng, 1890:108
rubriceps Casey, 1913:198

Piodes LeConte, 1850:318
coriacea LeConte, 1850:318

Pseudogaurotina Plaviltstshikov, 1958:720
Gaurotes Lacordaire, 1869:442 (part)
cressoni cressoni (Bland, 1864:69)
ab. *howdeni* Podany, 1962:237
ab. *amethystina* Podany, 1962:238
ab. *nigrita* Podany, 1962:238
cressoni lecontei (Casey, 1913:219)

Rhagium Fabricius, 1775:182
Stenocorus Geoffroy, 1762:221
Stencorus; Lamarck, 1817:312
Hargium Samouelle, 1819:210
Harpium; Reitter, 1912:6
[14]*Allorhagium* Kolbe, 1884:270
inquisitor inquisitor (Linnaeus, 1758:393)
lineatus Olivier, 1795:13
investigator Mannerheim, 1852:283
californicum Casey, 1913:195
crassipes Casey, 1913:195
parvicorne Casey, 1913:195
boreale Casey, 1913:195
cariniventre Casey, 1913:196
thoracicum Casey, 1913:196
montanum Casey, 1913:197
mexicanum Casey, 1913:197
canadense Podany, 1964:30
americanum Podany, 1964:32
quadricostatum Podany, 1964:34
nigra Podany, 1978:4

Stenocorus Geoffroy, 1762:221
Stenochorus; Reitter, 1912:6
Toxotus Dejean, 1821:112
Anisorus Mulsant, 1863:467
Minaderus Mulsant, 1863:467
Toxotochorus Reitter, 1907:208
Stenocorus (Toxotopsis) Casey, 1913:206
Stenocorus (Eutoxotus) Casey, 1913:206
flavolineatus (LeConte, 1854:18)
flavolimbatus; LeConte, 1857:23
[15]**nubifer** (LeConte, 1859:80)
lateralis Casey, 1891:37
pacificus Casey, 1913:209
tenellus Casey, 1913:210
hesperus Casey, 1913:210
parviceps Casey, 1913:210
truncatulus Casey, 1913:211
apiciventris Casey, 1913:211
rufipennis Casey, 1913:212

[13] Reference missing.
[14] Reference missing.
[15] L&C give Toxotus *nubifer* LeConte, 1860

plagiatus Casey, 1924:273
marginellus Casey, 1924:274
spinosus Hopping, 1940:32
[16]**uteanus** Casey, 1924:273
morio Casey, 1924:274
obtusus (LeConte, 1873:206)
brevicollis Casey, 1913:214
vestitus (Haldeman, 1847:59)
vestitus var. *ater* Leng, 1890:68
virgatus LeConte, 1874:67
aureatus Casey, 1913:213
aureatus gilvicornis Casey, 1913:213
sericatus Casey, 1913:213
subpinguis Casey, 1913:213
oregonensis Casey, 1913:214
flaccidus Casey, 1913:212

Tribe Oxymirini Danilevsky, 1997

Neanthophylax Linsley & Chemsak, 1972:78
Anthophilax Horn in Leng, 1890:98 (part)
mirificus (Bland, 1865:382)
venustus Bland, 1865:383
costaricensis Bates, 1885:277
pubicollis Linsley & Chemsak, 1972:81
tenebrosus tenebrosus (LeConte, 1873:208)
tenebrosus nigrolineatus (Van Dyke, 1917:36)
tenebrosus orientalis Linsley & Chemsak, 1972:81

Tribe Encyclopini LeConte, 1873:326

Encyclops Newman, 1838:392
californicus[17] Van Dyke, 1920: 45

Leptalia LeConte, 1873:204
macilenta (Mannerheim, 1853: 253)
frankenhaeuseri Mannerheim, 1853
fuscicollis LeConte, 1857

[18]Tribe Rhamnusiini Sama, 2009:383

Enoploderes Faldermann, 1837:309
Pyrotrichus LeConte, 1862:41
Xylostylon Reitter, 1879:82
vitticollis LeConte, 1862:41
cribripennis Casey, 1913:198

Tribe Xylosteini Reitter, 1913:5

Pseudoxylosteus Sama, 1993:12
ornatus (LeConte, 1873:20

[16] *uteanus* Casey and *morio* Casey are treated as junior synonyms of *S. nubifer* in Bezark and Monné (2013)

[17] *Encyclops* is masculine. Bezark and Monné (2013) lists *E. californica* Van Dyke introduced by Linsley and Chemsak (1972).

[18] See Cebeci & Özdikmen (2010).

References for Original Descriptions of Taxa

Audinet-Serville, J. G. 1835. Nouvelle classification de la famille des longicornes (suite). Ann. Soc. Entomol. France, (1)4:5-100.

Bates, H. W. 1885. Biologia Centrali-Americana, Insecta; Coleoptera, suppl. to Longicornia, London, 5:249-436, pls. 17-24.

Bedel, L. 1906. Synonymes de coléoptères palearctiques. Bull. Soc. Entomol. Fr., 1906:91-93.

Blanchard, C.E. 1845. Histoire des insectes, traitant de leurs moeurs et de leurs métamorphoses en général, et comprenant une nouvelle classification fondée sur leurs rapports naturels. 2:163. http://archive.org/details/histoirenaturell02blan

Bland, J. H. B. 1862. Descriptions of several supposed new species of Cerambycidae in the collection of the Entomological Society of Philadelphia, with observations of some already described. Proceedings of the Entomological Society of Philadelphia, 1:267-276.

Casey, T. L. 1891. Coleopterological notices III. Annals of the New York Academy of Sciences, 6:9-214. <Biodiversity History Library>

Casey, T. L. 1893. Coleopterological notices V. Annals of the New York Academy of Sciences, 7:281-606, 1 pl.

Casey, T. L. 1913. Further studies amongst the American Longicornia. Memoirs on the Coleoptera, 4:193-388. <Link to Biodiversity Heritage Library> <PDF>

Casey, T. L. 1924. Additions to the known Coleoptera of North America. Memoirs on the Coleoptera, 11:1-347. <Openlibrary.org> <PDF>

Chevrolat, L. A. A. 1855. Description de vingt et une espèces nouvelles de coléoptères longicornes. Revue et Mag. Zool., (2)7:178-187

Couper, W. 1864. List of Coleoptera and Diptera taken at Quebec, and other parts of lower Canada. Trans. Lit. Hist. Soc. Quebec, (n.s.) 3:27-36.

Danilevsky ML (1997) [new taxa] In: Althoff J, Danilevsky ML: Seznam kozličev (Coleoptera, Cerambycoidea) Europe. A check-list of longicorn beetles (Coleoptera, Cerambycoidea) of Europe. Slovensko Entomološko Društvo Štefana Michielija, Ljubljana, 64 pp.

Dejean, P. F. M. A. 1821. Catalogue de la collection de coléoptères de M. le baron Dejean. Crevot Libr., Paris, France. viii + 136 pp. + 11 pp.

Des Gozis, M. 1886. Recherche de l'espèce typique de quelques anciens genres rectifications synonymiques et notes diverses. 36 pp. Montlucon-Imprimerie Herbin.

Fabricius, J. C. 1775. Systema entomologiae, sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus. Flensburgi et Lipsiae, 832 pp.

Fabricius, J. C. 1792. Entomologia systematica, emendata et aucta. Secundum classes ordines, genera, species adjectis synonymis, locis, observationibus, descriptionibus. Hafniae, 1: xx + 538 pp.

Fairmaire, L. 1864. In P. N. Jacquelin du Val, Genera des Coléoptères d'Europe comprenant leur classification en famille naturelle. 4:1-295, 376 figs., 78 pls.

Faldermann F. 1837. Fauna entomologica transcaucasica. Coleoptera. II. // Nouv. Mém. Soc. Nat. Mosc. 1837. Vol. 5. P. 1–433 + tab. 1–15.

Fall, H. C. 1907. Descriptions of new species. Transactions of the American Entomological Society, 33: 218-272. <Biodiversity History Library>

Geoffroy, E. L. 1762. Histoire abrégée des insectes qui se trouvent aux environs de dans laquelle ces animaux sont rangés suivant un ordre méthodique. Durand. 1: xxviii + 523 pp., pls I-X.

Gressitt, J. L. 1947. Notes on the Lepturinae (Coleoptera: Cerambycidae). Proceedings Ent. Soc. Wash. 49 (7), 190-192.

Haldeman, S. S. 1847. Material towards a history of the Coleoptera Longicornia of the United States. Transactions of the American Philosophical Society, 10:27-66. <Biodiversity History Library>

Hippisley, W. W. 1922. Notes on northern British Columbian Coleoptera. The Canadian Entomologist, 54: 63-66. <Biodiversity History Library> <PDF>

Hopping, R. 1922. New species of the old genus Leptura and allied genera. Can. Entomol., 54(7): 162 – 166. <Biodiversity History Library>

Hopping, R. 1928. Some notes on examination of types of Coleoptera in the LeConte and Casey collections. Can. Entomol., 60(1):6-8.

Hopping, R. 1931. New Coleoptera from Western Canada III. The Canadian Entomologist, 63(10):233-238.

Hopping, R. 1937. The Lepturini of America North of Mexico. Part II. National Museum of Canada. (Biological Series) (22)85:1-27, 6 pls.

Hopping, R. 1940. New Lepturini. Pan-Pacific Entomologist, 16(1):32-4

Hopping, R. and G. R. Hopping. 1947. The Lepturini of America North of Mexico. Part III. Cortodera. Entomol. Agric., 27:220-236, 6 figs.

Horn, G. H. 1881. *In Monthly Proceedings.* Two new species of Desmocerus. Transactions of the American Entomological Society, 9: vii-viii.

Horn, G. H. 1884. In C. W. Leng, Synopses of Coleoptera. Bull. Brooklyn Entomol. Soc., 7(1):7-11.

Horn, G. H. 1886. Notes from the Museum at Cambridge. Trans. Amer. Entomol. Soc., 13: xi-xvi, 12 figs.

Horn, G. H. 1890. In C. W. Leng, Synopses of Cerambycidae. Entomologica Amer., 6(5):97-98.

Kirby, W. 1837. The Insects. Coleoptera. In J. Richardson, W. Swainson, and W. Kirby, Fauna Boreali Americana; or the Zoology of the Northern Parts of British America: containing descriptions of the objects of natural history collected on the Late Northern Land Expedition, under the command of Captain Sir John Franklis, R. N. Norwich, Josiah Fletcher. 249 pp. <Biodiversity History Library>

Lacordaire, T. 1869. Histoire Naturelle des Insectes. Genera des coléoptères, vol. 8, 552 pp.

Laicharting, J. N. von. 1784. Verzeichniss und Beschreibung der Tyroler-Insecten. II Theil. Zürich. Johann Caspar Füessly, pp. 1-176.

Lamarck, Jean-Baptiste. 1817. Histoire naturelle des animaux sans vertèbres...l'exposition des principes fondamentaux de la Par M. de Lamarck. Tome 4. March, 1817. pp. 1-603. <Biodiversity History Library> <PDF>

Latreille, P. A. 1802. Histoire naturelle, générale et particulière des crustacés et des insectes. Ouvrage faisant suite à l'histoire naturelle générale et particulière, composée par Leclerc de Buffon, et rédigée par C.S. Sonnini, membre de plusieurs sociétés savantes. Familles naturelles des genres. Tome troisième. F. Dufart, Paris, xii + 13–467 + [1] pp. [An X (title page, =1802); Nov 1802 (Evenhuis 1997)]

Latreille, P. A. 1829. Crustacés, Arachnides et Insectes. In Cuvier, G. L. C. D. Le Règne Animal distribué d'aprés son organization, pour servir de base à l'histoire naturelle des animaux, et d'introduction à l'Anatomie comparée, deuxième edition, 4: 28 + 584 pp., 4 pls.

LeConte, J. L. 1850. General remarks upon the Coleoptera of Lake Superior. pp. 201-242. In: Agassiz, J.L R. *Lake Superior: its physical character, vegetation, and animals, compared with those of other and similar regions, with a narrative of the tour, by J. Eliott Cabot. And contributions by other scientific gentleman.* Boston: Gould, Kendall and Lincoln. x +428 pp. + 8 pl.

LeConte, J. L. 1850. An attempt to classify the longicorn Coleoptera of the part of America, north of Mexico. Journal of the Academy of Natural Sciences of Philadelphia, (2)1: 311-340; 2:5-38. <Biodiversity History Library> <PDF-1> <PDF-2>

[19]LeConte, J. L. 1851. An attempt to classify the longicorn Coleoptera of the part of America, north of Mexico. Journal of the Academy of Natural Sciences of Philadelphia, (2)2:99-112. <Biodiversity History Library>

LeConte, J. L. 1854. Descriptions of some new Coleoptera from Oregon, collected by Dr. J. G. Cooper on the North Pacific R. R. expedition under Gov. J. J. Stevens. Proceedings of the Academy of Natural Sciences of Philadelphia, 7:16-20. <Biodiversity History Library> <PDF>

LeConte, J. L. 1857. Report upon Insects collected on the survey. In, Report of Explorations and Surveys to ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific Ocean. Made under the Direction of the Secretary of War, in

[19] *G. molybdica* (LeConte, 1851("1850") and *B. californica* (LeConte, 1851 ("1850"). The ("1850") is due to an appendix (on page 101) that amends pages from LeConte (1850). The reference is cited as 1851 because, in a footnote in the table of contents, it is indicated that LeConte had pre-prints in December of 1851, although the article was published 1852.

1853-5, according to Acts of Congress of March 3, 1853, May 31, 1854 and August 5, 1854, 12:1-72, 2 pls. <Making of America Books> <pg.64.gif> <pg.65.gif>

LeConte, J. L. 1859. The Coleoptera of Kansas and eastern New Mexico. Smithsonian Contributions to Knowledge, 11(6):1-58. <Biodiversity History Library> <PDF>

LeConte, J. L. 1859. Catalogue of the Coleoptera of Fort Tejon, California. Proceedings of the Academy of Natural Sciences of Philadelphia, 11:69-90. <Biodiversity History Library> <PDF>

LeConte, J. L. 1860. Notes on Coleoptera found at Fort Simpson, Mackenzie River, with remarks on northern species. Proceedings of the Academy of Natural Sciences of Philadelphia, 12:315-321.

LeConte, J. L. 1861. New species of Coleoptera inhabiting the Pacific District of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia, 13:338-359. <Biodiversity History Library> <PDF>

LeConte, J. L. 1862. Note on the classification of Cerambycidae with descriptions of new species. Proceedings of the Academy of Natural Sciences of Philadelphia, 14:38-43.

LeConte, J. L. 1869. List of the Coleoptera collected in Vancouver's Island by Henry and Joseph Matthews with descriptions of some new species. The Annals and Magazine of Natural History. (4)4:369-385. <Biodiversity History Library> <PDF>

LeConte, J. L. 1873a. New species of North American Coleoptera. Prepared for the Smithsonian Institution. Part II. Smithsonian Miscellaneous Collections. 11(264):169-240. <Biodiversity History Library> <PDF>

LeConte, J. L. 1873b. Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. Part II. Smithsonian Miscellaneous Collections. 11(265):279-348. <Biodiversity History Library> <PDF>

LeConte, J. L. 1874. Descriptions of new Coleoptera chiefly from the Pacific slope of North America. Transactions of the American Entomological Society, 5:43-72. <Biodiversity History Library> <PDF>

LeConte, J. L. 1875. Descriptions of new Coleoptera of the United States with notes on geographical distribution. Transactions of the American Entomological Society, 5:169-176.

Leech, H. B. 1963. Centrodera spurca (LeConte) and two new species resembling it, with biological and other notes. Proceedings of the California Academy of Sciences, 32:149-218, 28 figs.

Leng, C. W. 1890. Synopses of Cerambycidae. Entomol. Americana, 6: 9-13, 65-69, 97-98,04-110, 156-160,185-200, 213-214.

Linnaeus, C. (Carl von Linné). 1758. Systema Naturae per regna tria naturae secundum classes, ordines, genera, species. cum characteribus, differentiis, synonymis, locis. (ed. 10). Holmiae. Laur. Salvius. 1: iii + 824 pp.

Linsley, E. G., and J. A. Chemsak. 1972. Cerambycidae of North America. Part VI. No. 1. Taxonomy and Classification of the Subfamily Lepturinae. University of California Publications in Entomology 69, xiii+138 pp, 2 pl.

Linsley, E.G. and J.A. Chemsak. 1976. Cerambycidae of North America. Part VI, No.2. Taxonomy and Classification of the Subfamily Lepturinae. University of California Publications in Entomology 80, 186 pp.

Mannerheim, C.G. von. 1852. Zweiter Nachtrag zur Käfer-Fauna der Nord-Amerikanischen Länder des Russischen Reiches. Bull. Soc. Imp. Natur. Moscou, 25(2):283-387.

Mannerheim, C. G. von. 1853. Dritter Nachtrag zur Käfer-Fauna der Nord-Amerikanischen Länder des Russischen Reiches. Bull. Soc. Imp. Natur. Moscou, 26(2):96-273.

Miroshnikov, A. I., 1998: A new classification of longicorn beetles of the Anoplodera complex, tribe Lepturini Coleoptera, Cerambycidae of Holarctic fauna. I. Entomologicheskoe Obozrenie 77(2): 384-420. [English Translation: *Entomological Reivew,* Vol. 78, No. 4, 1998, pp. 437--465.]

Moltschulsky, V. von. 1860. Coléoptères de la Sibérie orientale et en particulier des rives de l'Amour, in Schrenk, Reisen und Forschungen im Amurlande, 2:77-257.

Mulsant, E. 1863. Histoire naturelle des Coléoptères de France. Longicornes. 2e. ed. Ann. Soc. Imp. Agric Hist. Nat. Industrie, Lyon, p. 1-590. <Hathitrust> <PDF>

Newman, E. 1838. Entomological notes. Entomol. Mag., 5: 168-182; 372-402; 483-500, 3 figs.

Nicolay, A. S. 1917. A synopsis of the Anthophylax of North America. Journal of the New York Entomological Society, 25(1):38-44. <Biodiversity History Library>

Olivier, A. G. 1795. Entomologie, ou Histoire Naturelle des Insectes, avec leurs Caractères Génériques et Spécifiques, leur Description, leur Synonymie et leur Figure Illuminée. Coléoptères. 4:1-519, 72 pls.

Pic, Maurice. 1900. Contributions à l'étude des Longicornes. L'Echange, No. 191: 81-83.

[20]Pic, Maurice. 1922. Diagnoses de coléoptères exotiques (suite). L'Échange, 37(405):11.

Plavilstshikov, N. N., 1958. Novyi dalnevostochnyi vid *Gaurotes* J. Lec. (Coleoptera, Cerambycidae). Entomologicheskoe Obozrenie, 37:720-723.

Podany, C. 1961. Monographie der Gattung Alosterna Muls. (Stenocorini). Mitt. Entomol. Ges., (N. F.) 11:27-33

Podany, C. 1962. Monographie des genus Gaurotes J. Lec. Mitt. Müncher Entomol. Gessels., 52:219-252, pls. 4-5

Podany, C. 1964. Monographie des genus Rhagium Fabricius (Stenocorini). Acta zool. Mex., 7(1 3):1-55, 7 pls.

Randall, J. W. 1838. Description of new species of coleopterous insects inhabiting the State of Maine. Boston J. Nat. Hist., 2(1):1-33.

Reitter, E. 1913. Fauna Germanica. Die Käfer des Deutschen Reiches. Nach der analytischen Methode bearbeitet. IV. Band. K. G. Lutz, Stuttgart, 236 pp. + pls. 129–152. [1912 (title page); 1913 (Zool. Record; Arch. Naturg. 80B); Feb 1914 (Ent. Litteraturbl.); 1 Mar 1914 (Ent. Bericht. 4 (76): 62)]

Sama, G. 1993. Notes sur les Xylosteini Reitter. Biocosme Mésogéen, Nice, 10(1): 7-15, 6 figs.

Say, T. 1826. Descriptions of new species of coleopterous insects inhabiting the United States. Journal of the Academy of Natural Sciences of Philadelphia, 5(2):237-284. <Biodiversity History Library> <PDF>

[20]Unverified. **Appears in L&C (1976) as**: *Leptura miquelonensis* Pic, 1922, L'Exchange, 37(405):11.

B&M (2013): Pic, M. 1921. Diagnoses de coléoptères exotiques (suite). L'Échange, 37(409):10-12.

Schaeffer, C. F. A. 1908. List of the longicorn Coleoptera collected on the Museum expedition to Brownsville, Texas and the Huachuca Mts., Arizona, with descriptions of new genera and species and notes on known species. Sci. Bull. Mus. Brooklyn Inst. Arts Sciences, 1(12):325-352.

Swaine, J. M. & R. Hopping. 1928. The Lepturini of America North of Mexico. Part I. Bull. Nat. Mus. Canada, (Biol. Serv.) (14)52:1-97, 13 pls.

Thomson, J. 1864. Systema cerambycidarum où expose de tous les genres compris dans la famille des cérambycids et familles limitrophes. Mem. Soc. R. Sci. Liège, 19: 1-540.

Thomson, C.G. 1866. Skandinaviens Coleoptera, 8. 409 + 75 pp. Lund.

Van Dyke, E. C. 1917. A new species of the genus Anthophilax LeC. Journal of the New York Entomological Society, 25(1):36-37. <Biodiversity History Library> <PDF>

Van Dyke, E. C. 1920. Description of new species of Cerambycidae from the Pacific coast of North America, with notes concerning others. Bull. Brooklyn Entomol. Soc., 15(2-3):33-48.

Walker, F. 1866. Appendix, in J. K. Lord, The Naturalist in Vancouver Island and British Columbia. London, Richard Bentley, 2: x + 375 pp., 4 pls. (Walker's Appendix, p. 289-375).

Webb, J. L. 1905. Description of a new species of Desmocerus with a synoptic table of the genus. Proc. Entomol. Soc. Wash., 7(2-3):104-105.