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Longitarsus: A New Species from Oregon and a New Record for North America (Coleoptera: Chrysomelidae)

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Abstract.—A new species of flea beetle, *Longitarsus nigrocephalus* White, is described from Oregon. *Longitarsus ganglbaueri* Heikertinger is recorded from North America, with discussions on taxonomy, distribution, bionomics, parasitism and biogeography. It is postulated that *L. ganglbaueri* is a naturally occurring Holarctic species.

In October 1971, the flea beetle *Longitarsus jacobaeae* (Waterhouse) was first released in Oregon by the Oregon Department of Agriculture as a biological control agent against tansy ragwort, *Senecio jacobaea* L. During the next six years, approximately 80 releases were made, almost all specimens being from California field collections. Since 1978, the Department has conducted an extensive redistribution program from beetle populations that have built up in western Oregon. Much use has been made of a vacuum device ("D-Vac") for field collections. During the course of this work, two other species of *Longitarsus* were collected in vacuum samples. The first, *L. ganglbaueri* Heikertinger, is a new North American record and exhibits some potential as a biological control agent for tansy ragwort. The second was collected from a single locality and subsequently found to feed on an unrelated host. It is a new species and is described below to further the understanding of the genus *Longitarsus* in the Pacific Northwest.

Longitarsus nigrocephalus White, NEW SPECIES
(Figs. 1–4)

General.—Body about 1.6 times as long as wide, subdepressed. Head black, prothorax dark brown to black; elytra brown, translucent, lightest in tone where flying wings show through; mesosternum, metasternum, abdomen, antennae, and legs brown to red brown; first antennal segment, front legs, middle legs, and hind tarsi usually lightest in tone. Dorsal surface distinctly shiny, with minute and sparse setae.

Head.—Surface above eyes mostly smooth, shiny, but with minute transverse wrinkles; a punctate depression immediately above each eye; interantennal carina moderately developed; coronal sulcus weak to absent, other sulci obsolete. Antennal segments 1 and 11 longest, segments 2 and 3 shortest, segments 5–11 subequal in length.

Dorsal surface.—Pronotum about 1.5 times as wide as long, widest medially, sides arcuate; pronotal surface nearly evenly convex; punctation moderate in size and density, most sparse anteriorly, punctures more or less clearly impressed and separated on an average by 2–3 times diameter of a puncture. Elytra widest medially; punctation larger than that of pronotum, punctures separated on an average by 1–2 times diameter of a puncture; humeri prominent; flying wings fully developed.

Ventral surface.—Abdominal sternites 2, 3, and 4 each before apex with a transversely aligned series of setiferous punctures, irregular in form and sometimes very closely aligned; sternites more or less minutely, transversely wrinkled medially; sides more or less alutaceous; fifth sternite of male with a distinct fovea before apex, fovea absent in female. First tarsal segment of male noticeably wider than second segment; unmodified in female. Hind tibia with a distinct apical spine.

Length: 1.8–2.1 mm.

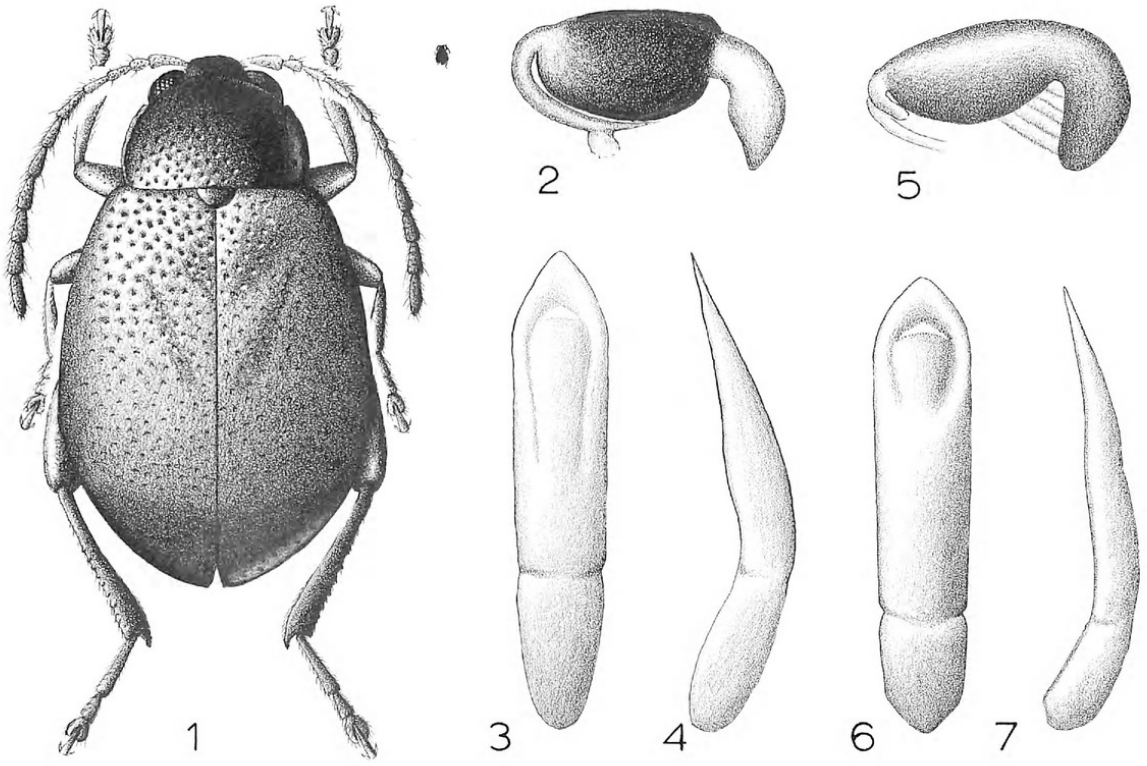
MALE HOLOTYPE (USNM No. 100640), allotype (USNM), and 12 paratypes (5 in USNM, 4 in ODA, 2 in Oregon State Univ. Coll., 1 in Arthur J. Gilbert Coll.) bear the data: Oregon, Yamhill Co., SW, NE Sec. 8, T5S, R8W, 6 air miles NW Grand Ronde Agency, 800′ [244 m], 27/IV–4/V-82; on host plant *Veronica serpyllifolia* var. *humifusa*; R. E. Brown, R. L. Westcott collectors.

The beetles were collected in a low-lying, relatively disturbed habitat in a generally forested area of the Coast Range. All of them were collected with an aspirator from plants which exhibited feeding damage (mostly circular holes in the leaves), primarily those growing in a small open area near the road. According to Munz (1963), *V. serpyllifolia* var. *humifusa* (Dickson) Vahl (Scrophulariaceae) ranges from southern California (mountains) to Alaska, and is found on the Atlantic Coast, South America and Eurasia.

The sexes of *L. nigrocephalus* are readily distinguished by the form of the last abdominal sternite. This structure is regularly arcuate and not foveate in the female, but that of the male is lobed apically and bears a distinct fovea before the apex.

In Hatch (1971:212) this species keys to *L. oregonensis* Horn and, though similar to it in many characters, the two are easily separated by color. *L. oregonensis* is nearly uniformly brown throughout, whereas the head and generally the prothorax of *L. nigrocephalus* are black with the remainder of the body dark to light brown. Details of the color are as follows: In *L. oregonesis* the head, pronotum, elytra, ventral surface, and hind femora are brown to dark brown with the ventral surface the darkest. The elytra are similar to, or a little lighter than the remainder. The antennae, front legs, middle legs, and tibiae and tarsi of hind legs are light brown and the lightest parts of the body. In *L. nigrocephalus* the head is the darkest, generally black, the pronotum is usually paler, and the ventral surface and antennae are also dark. The elytra and hind femora are dark brown to medium brown while the remainder of the legs are medium brown to red brown and are the lightest parts of the body. The three type specimens of *L. oregonensis* range in length from 1.9–2.6 mm, and bear MCZ type number 3856.

There are differences in the male genitalia (Figs. 3–4, 6–7). That of *L. nigrocephalus* in dorsal view has the apex more distinctly pointed and the furrows behind the apical orifice extend much farther posteriorly. In lateral view the male



Figures 1–4. *L. nigrocephalus.* 1. Dorsal view. 2. Spermatheca. 3. Aedeagus, dorsal view. 4. Aedeagus, lateral view. Figures 5–7. *L. oregonensis.* 5. Spermatheca. 6. Aedeagus, dorsal view. 7. Aedeagus, lateral view. Small drawing beside Figure 1 equals actual size.

genitalia of *L. oregonensis* is more slender and sinuate. Males of both species have the fifth sternite foveate apically. There are clear differences in the female spermathecae (Figs. 2 and 5), the most obvious of which is that the spermathecal duct in *L. nigrocephalus* is arcuate while that in *L. oregonensis* is coiled basally.

This species appears to be native to North America and not introduced. It cannot be satisfactorily identified using the keys of Gressitt and Kimoto (1963), Mohr (1966), Kevan (1967) or Samuelson (1973), so does not appear to be part of the faunas covered by them.

The specific name of this species refers to the dark head.

Longitarsus ganglbaueri Heikertinger

This species first came to our attention through Sharon Rose, now with Montana State University, who collected adults on *Senecio jacobaea* about 7 km S Jordan, Linn Co., 14-VII-76. Subsequently, specimens were collected from a number of additional localities in western Oregon and a sample was sent to Sharon L. Shute, British Museum (Natural History), who identified the species as *L. ganglbaueri.* Her determination was confirmed by Carlo Leonardi, Museo Civico di Storia Naturale, Milano. Richard E. White (USNM) and Eric H. Smith (Field Museum of Natural History) compared specimens to identified and unidentified North American species under their care, finding none conspecific. Apparently *L. ganglbaueri* has not been described from the U.S. under a different name. Eric Smith (in litt.) suggested that it might match "*Longitarsus* sp." of Couplet 2 in Hatch (1971:212). The two Hatch specimens of this taxon (Oregon State University

Coll.) had been sent to Carlo Leonardi who supposedly determined them both as *L. ganglbaueri*; however, one of us (RLW) has examined them and only the specimen from Lake of the Woods had been identified as this species. The only specimen from Bly (13-VI-45) that was located bore no determination label, is a female (Hatch recorded the Bly specimen as a male) and definitely is not *L. ganglbaueri.*

Taxonomy

Hatches description of *L. ganglbaueri* (1971:212, Couplet 2) well typifies the species, but considerable variation exists. The elytra and pronotum vary from light brownish-yellow to reddish-yellow, with the pronotum almost always a darker shade which may be more red or brown than yellow. The head and venter are always darker, usually distinctly so, varying from light brownish-red to black-brown. The antennae, forelegs and middle legs are light brownish-yellow, the apical antennal segments often infuscated. The hindlegs, notably the femora, are usually darker, more reddish. The most diagnostic feature of *L. ganglbaueri* is the darkened sutural area of the elytra; however on some specimens only the suture itself is "darkened," being suffused with light brownish-red. The sutural darkening varies to almost black (diffusing to a much lighter brown laterally) and to about ¼ mm in width. Often it is much wider from about the basal ⅕ to near the apex of the elytra. According to Carlo Leonardi (in litt.) sutural darkening appears to be a reliable character in *L. ganglbaueri,* while in the closely related *L. gracilis* Kutsch it is seasonally progressive; the newly formed adult is completely yellowish, darkening later.

Considerable variation occurs in the pronotal punctation and sculpturing. Punctation is usually fine to very fine, shallow, moderately to sparsely placed, vague or obsolete at the sides, and the pronotal surface is not or only vaguely microreticulate. However, variation ranges to extremes: 1) the punctures are subequal to those of the elytra and the surface is distinctly microreticulate (therefore less shining); 2) punctures obsolete and surface sculpture lacking. Usually the surface is smooth, but occasionally it is vaguely rugose. Elytral punctation is very uniform, with moderately dense punctures which are almost always very distinctly larger and deeper than those of the pronotum.

A sample of specimens was found to range in length from 1.74–2.31 mm (n = 40, $\bar{Y}$ = 1.99 mm): males, 1.74–2.05 mm (n = 20, $\bar{Y}$ = 1.93); females, 1.92–2.31 mm (n = 20, $\bar{Y}$ = 2.05 mm).

Distribution

According to Mohr (1962), *L. ganglbaueri* occurs from Ireland and southern Sweden to Spain, Italy and the Balkan Peninsula; and in the Caucasus, "Ussurigebiet" and, questionably, Japan. "Ussurigebiet" translates to Ussuri Territory, which undoubtedly meant somewhere in the vicinity of the Ussuri River (48°N, 135°E) along the China/Russia border north of Vladivostok. Gressitt and Kimoto (1963:857) did not mention this in their only reference to *L. ganglbaueri,* in their synonymy under *L. lewisii* (Baly): "*Longitarsus ganglbaueri* Heikertinger = ? *lewisii*: Hktgr. & Csiki, 1939, Col. Cat. 166:128 (Japan, S. Sachalin)." Shute (1980) found that British specimens determined as *L. ganglbaueri* had been misidentified; therefore, some doubt must be cast on its occurrence in Ireland.

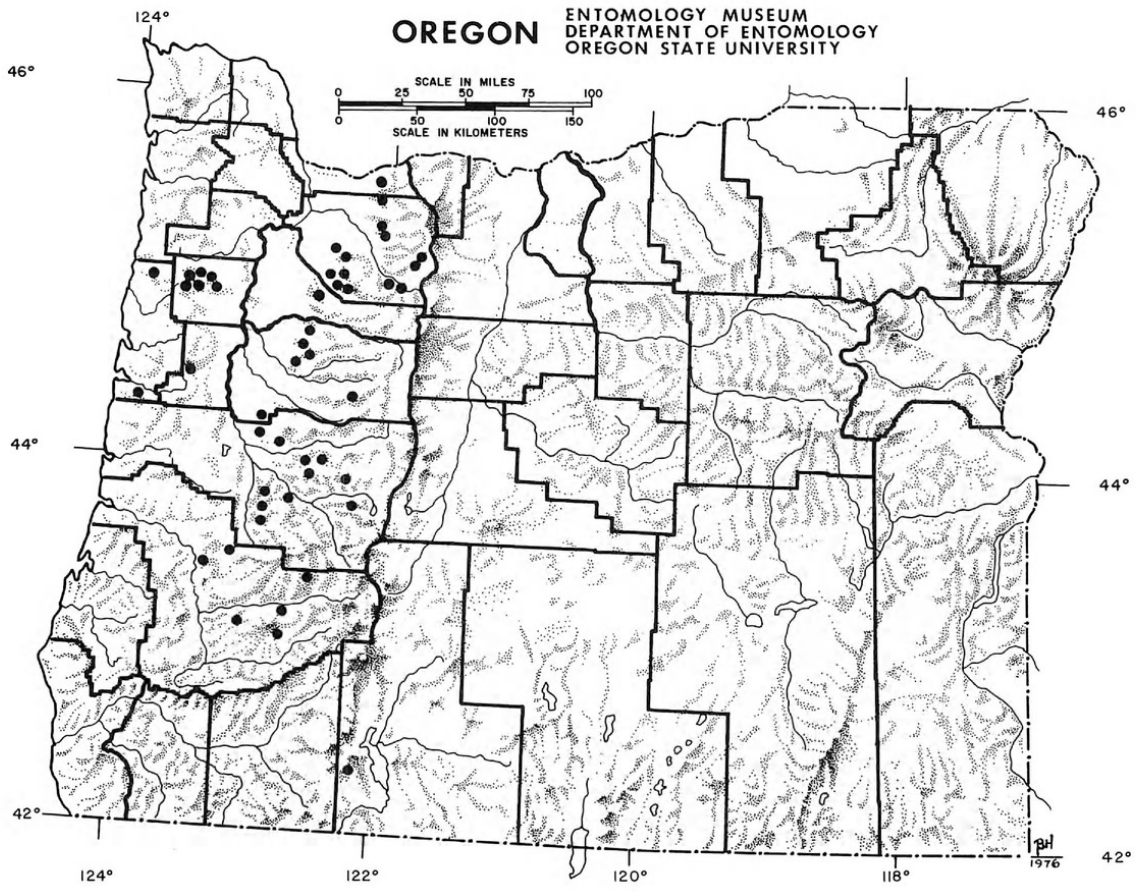


Figure 8. Distribution of *Longitarsus ganglbaueri* in Oregon.

The distribution of *L. ganglbaueri* in Oregon (Fig. 8) was compiled mostly from extensive "D-Vac" collections (from *S. jacobaea,* unless otherwise indicated below) made by Weed Control personnel of the Oregon Department of Agriculture and identified by R. L. Westcott. Specimens bearing the following data are located in the collection of the Oregon Department of Agriculture: CLACKAMAS CO., Sec. 13, T3S, R5E, 600 m, 23-IV-81; Sec. 1, T5S, R8E, 1050 m, nr. Timothy Lake, 8-V-80, on *Senecio pseudaureus*; SW Sec. 9, T6S, R4E, 850 m, Lukens Creek, 9-IX-80; NW Sec. 6, T7S, R3E, 400 m, S. Molalla River, 4-IX-80; SW Sec. 21, T7S, R3E, 600 m, Copperhead Creek, 4-IX-80. POLK CO., Sec. 1, T7S, R7W, 300 m, Mill Creek Ridge, 20-V/15-VI-77, on *S. jacobaea* & *S. sylvaticus.* LINN CO., Sec. 19, T10S, R2E, 6 air mi S Lyons, 29-XI-77; Sec. 30, T10S, R2E, 600 m, 27-I-78; Sec. 5, T11S, R2E, 1000 m, vic. Bilyeu Creek, 27-I-78. LANE CO., Sec. 13, T16S, R3W, 600 m, nr. McGowan Creek, 17/31-I-78; Sec. 9, T17S, R1W, 350 m, 2½ mi N Walterville, 20/31-I-78; NW Sec. 17, T18S, R3E, 500 m, 12-VI-80; SE, NW Sec. 23, T18S, R1E, 600 m, 29-IV-80; SE Sec. 11, T19S, R4E, 1050 m, 10-IX-80; Sec. 35, T20S, R2W, 600 m, 30-IV-81; Sec. 5, T20S, R1W, 350 m, 28-III-78; NE Sec. 21 and NW Sec. 35, T21S, R2W, 350 and 750 m, Perkins Creek & vic. Dorena, 10-IX-80. DOUGLAS CO., Sec. 10, T25S, R2E, 1000 m, 15-IX-80; Sec. 27, T27S, R3W, 500 m, Peel Creek, 7-IV-81. Specimens from these or additional localities depicted in Figure 8 have been deposited in collections under the care of aforementioned specialists; and of California State

Collection of Arthropods, University of Idaho, Oregon State University, D. G. Furth and A. R. Gilbert.

The only other known occurrence of *L. ganglbaueri* in North America is based on a specimen from CANADA, Manitoba, Glenlea, 18-V-78, coll. 35, "D-Vac" sample, H. G. Wylie. It was determined by Eric H. Smith and deposited in the Canadian National Collection. According to Glenn Wylie (in litt.) the sample was taken from *Urtica gracilis* Aiton (no feeding injury observed on this plant) growing in a deciduous woodland.

Bionomics

European foodplants for *L. ganglbaueri* listed by Mohr (1962) are *Senecio viscosus* L. and *S. vulgaris* L., and Leonardi (in litt.) provided *S. jacobaea.* In western Oregon it is widespread and locally very abundant on *S. jacobaea,* as evidenced by collections, numerous adult feeding observations and abundant leaf damage. Adults have been observed feeding on *S. sylvaticus* L. in Polk Co., Mill Creek Ridge and on *S. triangularis* Hooker near Timothy Lake.

In Oregon we have found *L. ganglbaueri* to be rather evenly distributed between elevations ranging from 250–1100 m, strongly suggesting that here it is a foothill and mountain species. Despite extensive "D-Vac" sampling, we have not found it below 250 m. The only occurrence above 1100 m of which we are aware is the specimen from Lake of the Woods (1525 m). A sample of German and Austrian localities listed by Mohr (1962) suggests an elevational range of less than 100 m to less than 1000 m, most between 100–500 m.

Adults of this flea beetle have been observed and/or collected in Oregon during all months except December, appearing to be most abundant from mid-January to April and during September; however, this interpretation likely is biased, as no extensive effort was made to sample various sites during all months, nor to correlate the elevational differences.

Additional observations include mating on 15/28-III-78 at Butte Creek, Clackamas Co., 300 m and Rickreall Creek, Polk Co., 460 m, respectively. At the latter site, on 12-VII, late instar larvae, pupae and teneral adults were associated with *S. jacobaea* in the soil, up to 14/plant; a similar association with *S. pseudaureus* was made 26-VII near Timothy Lake, Clackamas Co., 1050 m. At Rickreall Creek, 15-VI, adults were found on the plants, but no stages were found in crowns, leaf petioles or in the soil. No check was made to determine if larval feeding takes place within the roots.

Observations at Timothy Lake indicate that *L. ganglbaueri* is more abundant early in the season on *S. pseudaureus,* when it is in the rosette stage, than on *S. jacobaea*; however, later in the season, as *S. pseudaureus* sends up an inflorescence (and by which time this plant has been heavily fed upon), the beetle is more abundant on *S. jacobaea.*

In some areas observed, *L. ganglbaueri* seems to have a marked deleterious effect on the growth of tansy ragwort.

Parasitism

Parasitism of adult *L. ganglbaueri* was observed in a sample of 23 males, 17 females from Lane Co., NE, NW Sec. 19, T16S, R2W, 31-I-78. A single hymenopterous larva was found inside the abdominal cavity in each of 11 males, 3 females;

another male contained 2 parasites. Total percentage of parasitism was 37.5 (52.2 in males, 18.2 in females). Seven *L. jacobaeae* examined were free of parasites. During the fall, 1978, specimens from the same locality were examined with negative results; however, unlike those dissected earlier, the beetles had been kept alive in a greenhouse and were not examined until they were found dead in their cages. No adult parasites were reared.

From the same site, 13 male, 7 female *L. ganglbaueri* were collected 24-X-80; 15 male, 7 female, 13-IV-81, and examined the same day as collected. No parasites were found. Parasitism has not been noted at any other site, although very few beetles have been checked. Research on parasitism of this species and the implied potential for parasitism of *L. jacobaeae* is needed to assess possible deleterious effects on biological control programs aimed against tansy ragwort.

Biogeography

The following criteria suggest that *L. ganglbaueri* is a naturally occurring Holarctic species: 1) While of widespread occurrence in western Oregon, it appears confined to foothill and mountainous regions; 2) The earliest collection record (Lake of the Woods, Klamath Co., 1945) represents the southernmost and altitudinal (1525 m) extreme of distribution, the least likely general area for an introduction; 3) Its association with native *Senecio* spp. at Timothy Lake (see under "BIONOMICS"): When *S. jacobaea* was first discovered here (1978) it appeared to be a very recent invader and no evidence of *L. ganglbaueri* was found on this plant; however, when samples were collected during 1979 a few beetles were found. Since that time, *L. ganglbaueri* has increased in abundance on tansy ragwort at this locality.

The above factors suggest a montane species of originally limited and sporadic distribution which has successfully exploited a new and very favorable introduced host (tansy ragwort), which itself has rapidly colonized extensive forested areas disturbed by man. Further support for this Holarctic thesis is the apparent occurrence of *L. ganglbaueri* in northeast Asia and the find in Manitoba, Canada. Of course, substantiating evidence is needed in the form of collecting, particularly in Asia, Washington and/or British Columbia. Likely, if insect collectors stalked their prey with "D-Vacs" we would have a much better understanding of *L. ganglbaueri.*

If *L. ganglbaueri* is an immigrant species, its widespread occurrence argues for a very early introduction. Also, it would seem necessary that it move rapidly from the most likely site(s) of introduction (lowland areas of major commerce), where today it apparently does not exist. It would have had to exploit a widespread and favorable host, such as tansy ragwort. According to Isaacson (1976), this weed was first collected in Oregon during 1922 on a ballast dump in Portland. By 1941 it was established widely enough to be of concern, though it is doubtful if it was common in the foothill and mountainous regions by this time (Robert B. Hawkes, pers. comm.).

It seems impossible that the beetle could nearly have kept pace with the weed, or that populations of tansy ragwort necessary to explain the current distribution of *L. ganglbaueri* have existed much more than 40 years. An excellent discussion of immigrant vs. natural occurrences, and the mechanisms for dispersal, was presented by Lindroth (1957).

L. ganglbaueri is winged, but we have never observed it to fly. So too is *L. jacobaeae,* which has been even more extensively observed in the field and only rarely seen to fly, even after much prodding. Our observations are in accord with Shute (1980) for various species of *Longitarsus,* although as she says, "flight ability and the factors which induce flight have not been studied in *Longitarsus.*"

The only evidence for dispersal capability of *L. ganglbaueri* is indirect and perhaps tenuous. It comes from observing the release of 200 *L. jacobaeae* at a site in Curry Co., from which the beetle spread at the average rate of 2.2 km/year over 6½ years. These beetles were limited in their westward movement by ocean, eastward by mountainous areas largely devoid of hosts. The distance from the northernmost Oregon record for *L. ganglbaueri* (which, considering the state's geography and history, certainly is much closer to any probable area of introduction) to the southernmost (collected in 1945!) is approximately 375 km.

Acknowledgments

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