Ovatus Group

Members of the Ovatus Group are robust shield-backed katydids, the species being larger in body size on average than those of the other two *Aglaothorax* species Groups. This is the only species Group that contains individuals with green body coloration (Figs. 7–14, Plate 1). The male pronotum is greatly enlarged with thick margins and,

except for *A. gurneyi* with brown tegmina, the tegmina are ivory or white. The prosternal spines are reduced to ridges, are wedge-shaped, or are developed as nipple-like processes. Chaetotaxy (Table 2) is more variable within species (and sometimes also within individuals) than between species. The male supra-anal plate is semicircular, as wide as long to wider than long, the surface flat to concave (Figs. 7–14, Plate 4). The male subgenital plate has parallel to converging lateral carinae and a transverse, rounded, or bilobed posterior margin (Figs. 7–14). The male paraprocts are thick, cylindrical to triangular, and typically (except in *A. segnis* and *A. strobilion*, Figs. 10, 12) with a heavy subapical internal tooth that is mesoventrally or ventrally directed. The titillators are heavy, evenly curved and tapered with sharp tips (Plate 10). The female subgenital plate possesses long digitiform paired lateroposterior processes (Plate 7). The female ovipositor is shorter than the hind femur except in *A. ovatus*, in which it frequently exceeds hind femur length.

The Ovatus Group is distributed in fragmented populations throughout the Mojave and Great Basin Deserts, and also in the western Colorado Desert of Southern California (Fig. 6). Abundance at a given population varies greatly from year to year, with numerous individuals active on climatically favorable years and few to none on poor years. Ovatus Group males produce a loud, frequently repeated song that consists of brief echemes (Fig. 14). Males engage in alternating choruses.

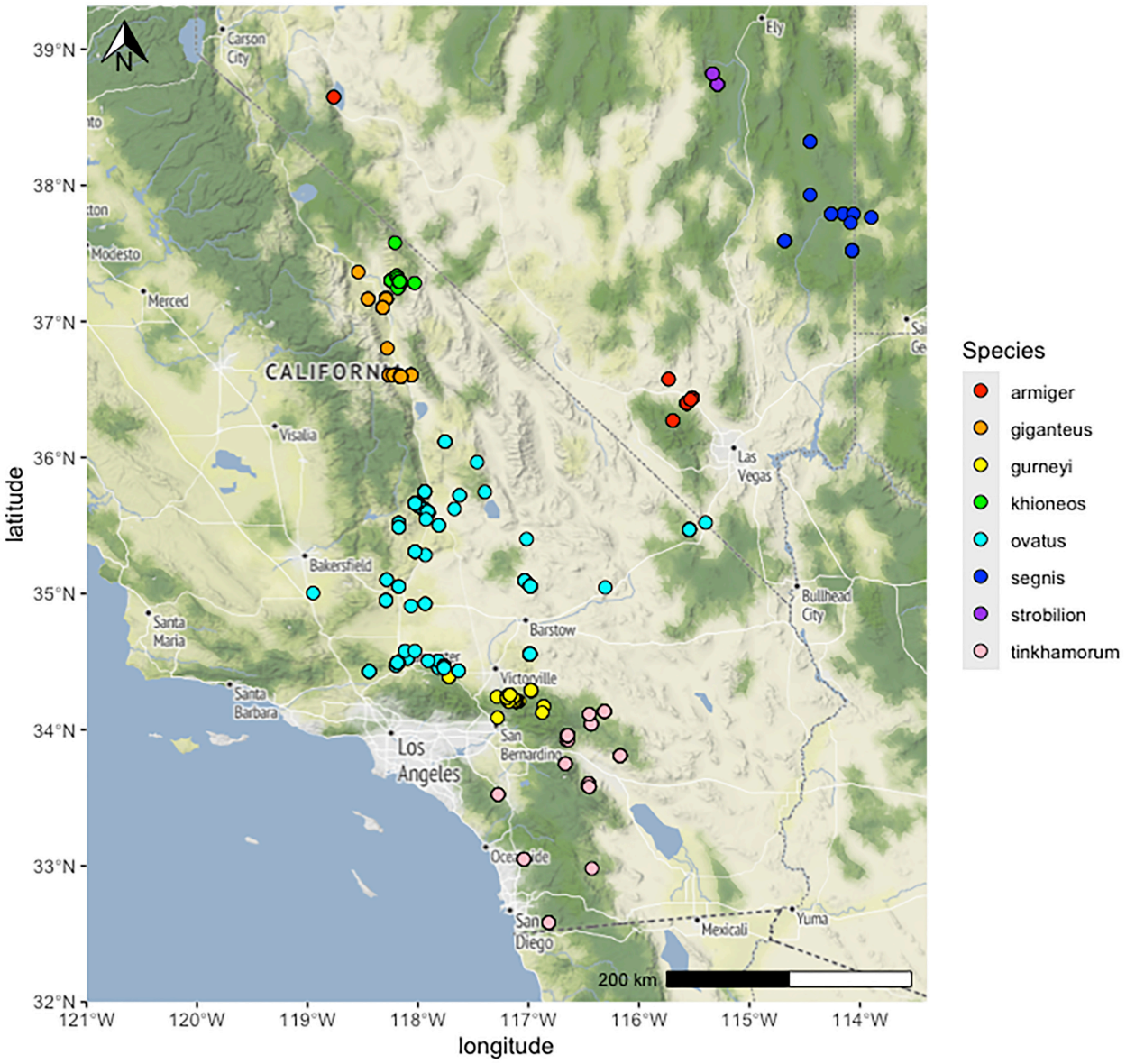


FIGURE 6. Distribution of Ovatus Group species.

TABLE 2. Comparative chaetotaxy of the Ovatus Group.

species	n	forefemur dorsal surface	foretibia auditory foramen	foretibia ventro-anterior margin	foretibia ventro-posterior margin	midfemur dorsal surface	midtibia dorso-anterior margin	midtibia dorso-posterior margin	midtibia ventro-anterior margin	midtibia ventro-posterior margin
ovatus	21	1–6	0–2	6–7	6–7	2–8	2–5	2–7	6–7	5–7
♀	9	0–5	0–2	5–5	6	0–8	1–3	1–5	5–7	6–7
giganteus	4	2–4	0	6	6	3–5	0–2	1–3	5–7	6–7
♀	4	3–6	0–1	6	6	3–8	1–3	1–3	6–7	6–7
tinkhamorum	12	1–6	0–1	6–7	6–7	1–7	2–4	2–4	5–7	5–7
♀	2	1	0–1	6	6	3	3–4	3–4	7	7
segnis	5	1–3	1	6	6	2–4	1–3	2–5	6–7	5–7
♀	2	0–2	1	5–6	6	2–4	2–3	3	6–7	6
armiger	5	0–3	0–1	6	5–6	0–4	1–4	1–4	6–7	6–7
♀	5	1–3	0–1	6	6	1–4	2–4	1–5	7	6–7
strobilion	5	0–1	0–1	6–7	6	1–4	2–4	1–4	7–8	6–8
♀	0	-	-	-	-	-	-	-	-	-
khioneos	3	1–3	0	6	6	0–2	2–3	2–3	7–8	7–8
♀	3	1–2	0–1	6	6	1–5	2–3	1–3	7–8	7
gurneyi	6	0–3	0	6	6	2–5	2–5	1–3	6–7	6–7
♀	8	1–5	0–1	6	6	2–5	2–3	2–4	7	6–7

Aglaothorax ovatus (Scudder, 1899)

Tropizaspis ovata—Scudder, 1899: 84.
Aglaothorax ovatus—Caudell, 1907: 291 (A revision in status).
Aglaothorax ovatus—Tinkham, 1944: 289. (Incorrect synonymy).
Neduba (*Aglaothorax*) *ovata*—Rentz & Birchim, 1968: 69 (A revision in status).
Neduba (*Aglaothorax*) *ovata longicauda*—Rentz & Birchim, 1968: 71 **New junior subjective synonym.**
Fig. 6 (distribution), Fig. 7 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Ovate Shieldback.

History of recognition. Described in *Tropizaspis* from a single male California specimen without a specific locality (Scudder 1899). After *Tropizaspis* fell as a *nomen nudum*, *ovatus* was designated as the type species of *Aglaothorax* (Caudell 1907), initially using the feminine gender. Confused with both *A. gurneyi* and *A. segnis* (Tinkham 1944). Transferred to *Neduba* (*Aglaothorax*) with *armiger* (Rehn & Hebard 1920) and *segnis* (Rehn & Hebard 1920) relegated to subspecies and the description of three new subspecies: *gigantea*, *longicauda*, and *tinkhamorum* (Rentz & Birchim 1968). Transferred back to *Aglaothorax* (Rentz & Colless 1990) where this species is currently classified (Cigliano *et al.* 2025). We raise *armiger, giganteus*, *segnis*, and *tinkhamorum* to species status based on morphological, phylogenetic, and cytogenetic evidence. Intergrades were reported between *ovatus* and *longicauda* (Rentz & Birchim 1968), and after examining large series from many populations, we conclude that more variation exists within than between *longicauda* and *ovatus* and synonymize the former name.

Type material. The holotype male is in the Academy of Natural Sciences of Philadelphia (ANSP). Images of the type are available at OSFO (Cigliano *et al.* 2025). The type locality of *ovatus* was narrowed to northern Los Angeles County (Rentz & Birchim 1968) where the fringes of the Mojave Desert meet the north slope of the San Gabriel Mountains. We specify the vicinity of Llano, Los Angeles County, California, USA as the type locality.

PARATYPES EXAMINED: (n=6) *longicauda* **USA, CA, Kern Co.**, E side of Sierra Nevada below Walker Pass, 35.662453, -118.026740, 1372 m, 28-V-1954, no collector, CAS, 1♀; Walker Pass, 35.662453, -118.026740, 22-VIII-1938, ER Tinkham, CAS, 5♂.

TOPOTYPES EXAMINED: (n=50) *ovatus* **USA, CA, Los Angeles Co.**, 2 miles S of State Highway 138 on County Road 4, 34.47615, -117.81777, 1280 m, 9-VI-1989, d B Weissman, d C Lightfoot, CAS, 3♂; 4.5 miles west of d esert Springs on Highway 138, 35.521625, -115.396298, 1-VI-1957, RX Schick, LACM, 1♂; Bob's Gap, 4 miles north of County Road N4 on Bob's Gap Road, 34.4550, -117.8139, 1300 m, 18-VI-2006, JA Cole, LACM, 2♂; County road N4 near Llano, 34.505828, -117.817841, 1280 m, 6-VIII-1988, d B Weissman & d C Lightfoot, CAS, 1♂; Largo Vista Road (county Road N4) at Fort Tejon Road, 34.46916, -117.76633, 1179 m, 14-VI-2017, JA Cole, LACM, 6♂; same data except JAC, 1♀; Largo Vista Road (county Road N4), 1 mile south of Fort Tejon Road, 34.4530, -117.7649, 1277 m, 22-VI-2008, JA Cole, LACM, 3♂; *longicauda* **USA, CA, Kern Co.**, 1.3 miles E of Walker Pass on State Highway 178, 35.662450, -118.003532, 1460 m, 5-VIII-1988, DB Weissman, DC Lightfoot, CAS, 2♂; Freeman Canyon, 1.5 miles southeast of Walker Pass on SR178, 35.6509, -118.0055, 1470 m, 10-VII-2003, JA Cole, JF Eguizabal, LACM, 3♂, 1♀; same data except JAC, 1♂; Freeman Canyon, 2 miles west of Summit on SR178, 35.6514, -118.0048, 1454 m, 13-14-VII-2005, JA Cole, LACM, 6♂; same data except 24-VI-2008, AMNH, 1♂; same data except JAC 1♂, 1♀; same data except LACM, 1♂, 1 pair in copula; Freeman Canyon, 3.3 miles northwest of SR14 on SR178, 35.62278, -117.95278, 1213 m, 31-V-2023, JA Cole, C Wong, LACM, 1♂; same data except JAC, 1♂, 1♀; Freeman Canyon, SR178 3 miles west of SR14, 35.62019, -117.9502, 1086 m, 28-V-2017, JA Cole, JAC, 2♂; same data except LACM, 3♂; Jawbone Butterbredt Area of Critical Environmental Concern, SR178 at SR14, 35.60239, -117.91468, 1011 m, 28-V-2017, JA Cole; LACM, 4♂; same data except JAC, 2♂; Walker Pass, 35.662453, -118.026740, 1060 m, 18-VIII-1982, d B Weissman, CAS, 2♂.

Measurements. (mm, ♂n=21, ♀n=9) Hind femur ♂17.39–20.96, ♀19.49–23.55, pronotum total length ♂11.60–14.61, ♀12.17–15.70, prozona length ♂5.41–6.70, ♀5.73–7.45, metazona dorsal length ♂6.19–8.10, ♀6.41–8.30, pronotum constriction width ♂3.37–4.60, ♀4.00–4.82, metazona dorsal width ♂7.64–9.83, ♀8.60–10.28, head width ♂5.27–6.79, ♀6.05–7.80, ovipositor length ♀17.88–28.84.

Distribution. Distributed widely but locally across the Mojave Desert of California from the desert floor (624 m, JA Cole, LACM) to high elevations (1470 m, JA Cole & JF Eguizabal, LACM).

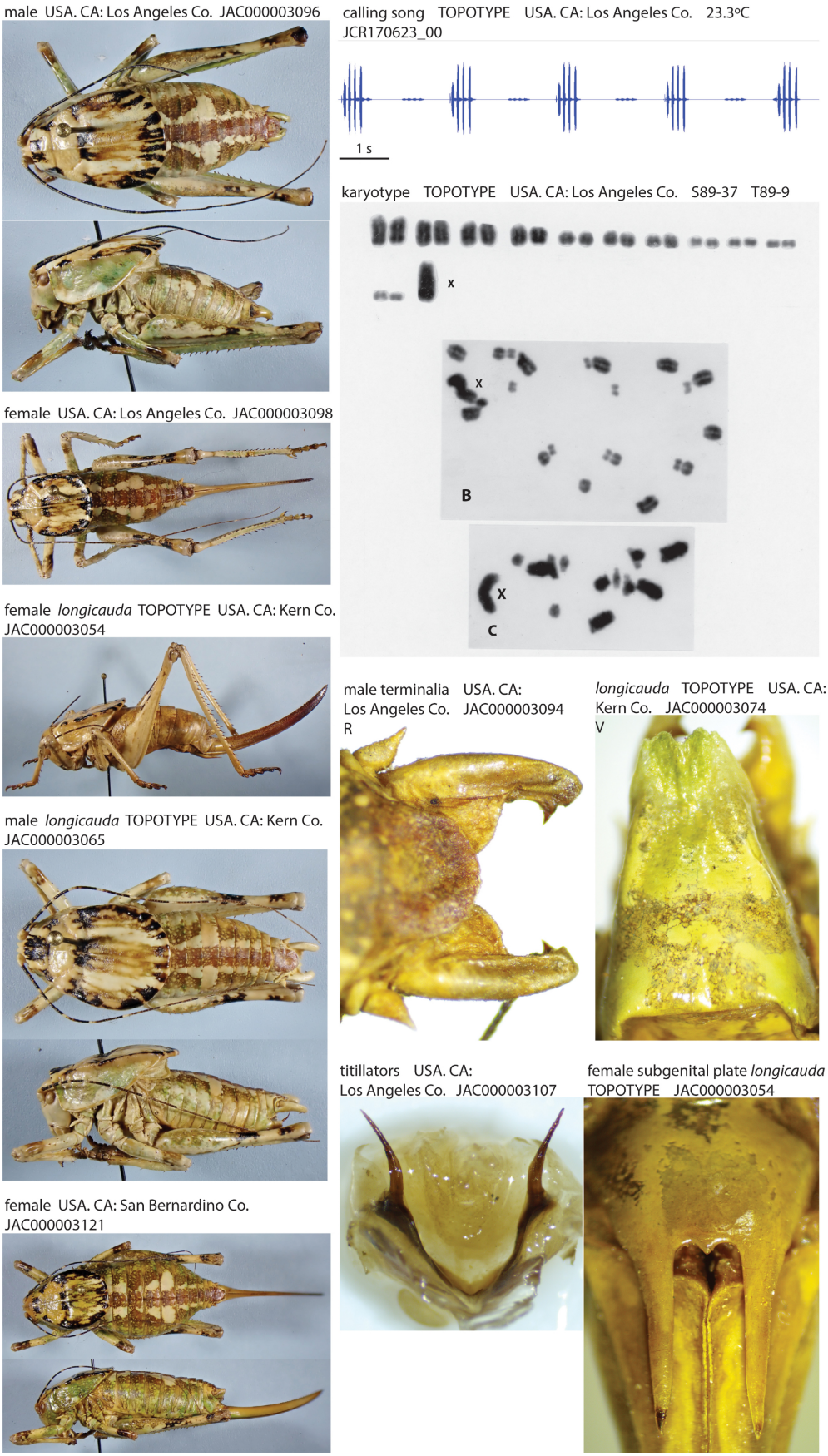


FIGURE 7. *A. ovatus* male and female habitus, calling song, male and female terminalia, and karyotype. Idiogram top panel A shows 2n♂=23 karyotype; B. Mitotic plate showing all 23 chromosomes; C. Metaphase I. On all 3 photos, single X chromosome is marked.

Habitat. Creosote desert, pinyon-juniper, and Joshua tree woodlands. On California juniper (*Juniperus californica* Carriere), Mormon Tea (*Ephedra* spp.), Creosote Bush (*Larrea tridentata* (DC.) Coville), Cholla (*Opuntia* spp.), and Joshua Tree (*Yucca brevifolia*). Generally found in low bushes but may be arboreal in Joshua trees and junipers. When disturbed at night, *A. ovatus* retreat into thorny vegetation or towards the base of yucca leaves.

Seasonal occurrence. Adults active from spring (9-V-1941, EC VanDyke, CAS) into fall (13-X-1995, G Pratt, CAS). Nymphs from April (15-IV-1957, DM Horton, LACM). Adult activity commences earlier in the season at low elevations.

Stridulatory file. (n=21) length 4.00–5.70 mm, 68–107 teeth, tooth density 18.5±1.9 (14.4–21.4) teeth/mm.

Song. (n=86) Loud, incessant song with frequently produced echemes ("chirps"). The calling song was onomatopoeically described as "zic-zic-zic, zic-zic-zic-zic" (Tinkham 1944) which corresponds to one 3 and one 4 pulse train echeme, respectively. Pulse trains 80±20 ms in length repeat at a rate of 9.16±0.96 s^{-1}. Mean peak frequency is 14.13±3.02 kHz, with ultrasonic peak frequencies as high as 23.75 kHz revealed in recordings with high frequency equipment. Variable length echemes group on average 6±11 pulse trains. Males tend to begin a bout of singing with isolated pulse trains and add pulse trains to echemes as singing continues. In rare circumstances males may produce large numbers of pulse trains in an echeme, such as after separating from a female post-mating. The maximum pulse train number that we have observed in an echeme is 106. Echemes are repeated frequently, being separated by 1–5 s (mean 1.87±0.79 s) silent intervals. Males may produce irregular bouts of song at dusk, with onset of calling in one instance timed exactly at sundown. Wary males cease singing some distance from an observer and are sensitive to white light. Males are alternating chorusers. When in proximity, males produce only 1–2 pulse trains that may constitute an aggressive interaction. Males may stridulate loudly when handled.

Karyotype. (n=9) 2n♂=23(22t+Xt), topotype T89-9 (S89-37).

Recognition. Morphology, coloration, geography. Body ground coloration most often green but also may be tan or light brown. The abdominal dorsum has a longitudinal reddish stripe and the tegmina are white, unlike *A. gurneyi* in which the body coloration is always wood brown, the abdomen lacks a dorsal reddish stripe, and the tegmina are brown. The pronotum has broad longitudinal white stripes and fine brown stripes on the disk, lacking in all other Ovatus Group species which have at most fine black streaks on the disk; *A. armiger* and *A. tinkhamorum* have the center of the pronotal disk largely unmarked. The *A. ovatus* male paraproct process has a subapical, ventrally directed heavy tooth in contrast with the apical tooth and slender processes of *A. segnis* and *A. strobilion*. The prozona is not heavily rugose like that of *A. giganteus*. The *A. ovatus* ovipositor is typically longer than the hind femur; all other Ovatus Group species have the ovipositor shorter than the hind femur. The distribution of this species encompasses the Mojave Desert ecosystem.

Notes. This is the iconic Shield-backed Katydid featured in field guides (e.g. Capinera *et al.* 2004) as an exemplary orthopteran of the Mojave Desert. Isolation at higher elevations around the periphery of the desert as pinyon-juniper habitats retreated due to warming climate was advanced as a biogeographical hypothesis (Rentz & Birchim 1968). This hypothesis is partially supported by phylogeographic structure (Figs. 2–4) that may reflect geographic isolation. Expanded sampling shows that *A. ovatus* is not limited to the fringes of the Mojave Desert, but occupies a wide range of elevations from 600 to 1500 m. Although the habitat of this katydid occurs over a wide geographic expanse, populations of *A. ovatus* are scattered, which may be the result of localized extinction, the hottest parts of the desert no longer being habitable by the lineage, coupled with low dispersal ability.

Subspecies *longicauda* applied to populations from the Scodie Mountains at the extreme southeastern corner of the Sierra Nevada at Walker Pass, Kern County, California, where to the east pinyon-juniper habitats descend through Joshua Tree woodland down to creosote desert. The subspecific epithet described the long ovipositors in females of this population, which approach 30 mm in length while ovipositors of *A. ovatu*s range from 18–23 mm in length. Ovipositors are longer than the hind femur in both *longicauda* and *A. ovatus*, but scaling by hind femur length as a proxy for body size diminishes the apparent extremes: *longicauda* ovipositors are 15-20% longer than the hind femur, while *A. ovatus* ovipositors are 1-10% longer. Extreme ovipositor length in *longicauda* thus correlates with massive female body size. Morphological intermediates were reported between southern Sierra Nevada and nominate Mojave Desert *A. ovatus* (Rentz & Birchim 1968), and *longicauda* exemplars were scattered among the phylogeographic structure of the Ovatus Group populations (Figs. 2–4). We therefore abandon *longicauda* as a subspecific category.

We describe a mating sequence in a Los Angeles County population that adds to what is known of mating in this species (Rentz & Birchim 1968). During pair formation and while the female was orienting, the male

emitted brief pulse trains, often in pairs, that were of qualitatively low amplitude (not measured). The female then mounted the male, whereupon the male paraprocts grasped the base of the female subgenital plate and held on throughout copulation. During copulation the male titillator arms periodically scraped against the female ovipositor. Spermatophore transfer took approximately 2 min. When pairs separated, the males sometimes made a long series of loud pulse trains.

Material examined. (n=149) **All USA, CA, Inyo Co.**, Argus Mountains, NE of Ridgecrest, 35.622456, -117.670897, 1790 m, 7-16-IX-1995, GF Pratt, CAS, 1♂; Argus Range, Birchum Spring, 35.966502, -117.466261, 13-X-1995, G Pratt, CAS, 1♀; Argus, 35.747177, -117.395335, 18-VII-1973, K Beany, CAS, 1♂; China Lake NAWS, Haiwee Spring, 36.116988, -117.756274, 6-VI-2003, G Pratt, C Pierce, CAS, 2♂; China Lake NAWS, Lower Haiwee Spring, 36.116988, -117.756274, 18-V-1996, G Pratt, J Emmel, CAS, 1♂; China Lake NAWS, Mtn. Springs Cyn., 35.722282, -117.624163, 17-VII-1998, G Pratt, M van Tilborg, CAS, 1♂; China Lake NWC, Birchum Spring, 35.722282, -117.624163, 5-VIII-1995, G Pratt, C Pierce, CAS, 1♂; **Kern Co**., 10 miles S of Inyokern, 35.501852, -117.812567, 7-VI-1962, GH Nelson and family, CAS, 2♀; 3 miles W of junction Hwys 178 and 14 on Hwy 178, 35.61919, -117.94957, 1158 m, 9-VI-1983, d B Weissman, CAS, 5♂; 3.7 mi. E Sopp Rd & Powerline Rd., 16-VI-1998, G Pratt, E van Baal, CAS, 2♂; 32 miles N of Mojave, 35.516665, -118.173965, 1006 m, 9-VI-1983, d B Weissman, CAS, 5♂, 1♀; 5 miles W of junction Hwys 178 and 14 on Hwy 178, 35.63757, -117.97683, 1341 m, 9-VI-1983, d B Weissman, CAS, 6♂, 1♀; about 0.5 miles S of junction Hwys 14 and 178 on Hwy 14, 35.59455, -117.90621, 945 m, 9-VI-1983, d B Weissman, CAS, 4♂; about 10 miles NW of Inyokern, Short Canyon, 35.749397, -117.938780, 1158 m, 9-VI-1983, d B Weissman, CAS, 7♂; Edwards AFB, East Rosamond Hills, 34.909421, -118.063683, 2-V-1996, G Pratt, B d eyhers, CAS, 1♂; Jawbone Canyon, 35.308294, -118.025905, 789 m, 8-VII-1973, E Rau, LACM, 2♂, 1♀; jct. Backus Road and Tehachapi Willow Springs Road, 34.95072, -118.29014, 725 m, 28-V-2009, d B Weissman, d C Lightfoot, CAS, 3♂; Mojave d esert, Randsburg, 35.2833, -117.9333, 27-V-1073, AJ Gaudin, CSUN, 1♀; Red Rock Canyon Park, on plateau N of park off Highway 14, 30 mi. N Mojave, 35.487653, -118.173965, 28-VI-1976, PH Sullivan, CAS, 1♂, 1♀; Sierra Nevada, Jawbone Canyon, 35.308294, -118.025905, 23-V-2017, MM d ickson, CSUN 1♂; SR14, 4.5 miles south of SR178, 35.54594, -117.92847, 933 m, 28-V-2009, d B Weissman, d C Lightfoot, CAS, 1♂; Tehachapi Pass, 35.10219, -118.28369, 13-V-1953, LACM, 2♂; Wheeler Ridge, 35.004413, -118.949546, 294 m, 13-V-1953, LACM, 1♂; **Los Angeles Co.**, Los Angeles, 1-VII, Coquillett, USNM, 1♂; same data except VII, Coquillett, USNM, 1♂; Acton Canyon, Sierra Hwy., 0.5 mi. E Crown Valley Rd., 34.473883, -188.199520 915 m, 20-VI-2003, JN Hogue, JA Cole, CSUN, 3♂; Edwards AFB, 165th St, 34.926088, -117.935068, 7-V-1997, G Pratt, C Pierce, CAS, 2♂; Mint Canyon, 34.429162, -118.442305, 15-V-1962, S Nakagawa, CSUN, 3♂; same data except V-1962, Frolich, CSUN, 1♀; Mojave, -35.052470, -118.173964, 840 m, 15-IV-1957, d M Horton, LACM, 1♂; Old Nadeau Road at Pearblossom Highway, 5 miles south of Palmdale, 34.5236, -118.0956, 903 m, 13-VI-2003, JA Cole, LACM, 2♂; Palmdale, 34.579434, -118.116461, 9-V-1941, EC Vand yke, CAS, 1♂; Palmdale, 5 miles east, 34.579403, -118.028361, 29-IV-1956, F Sala, LACM, 1♀; Sierra Highway, 0.6 miles west of Crown Valley Road, Acton, 34.4936, -118.1834, 929 m, 13-VI-2003, JA Cole, J Hogue, LACM, 1♂; same data except 17-VI-2003, JA Cole, J Hogue, LACM, 3♂; same data except JAC, 1♂; same data except 18-19-VI-2008, JA Cole, LACM, 4♂; same data except 20-VI-2003, JA Cole, J Hogue, AMNH, 1♂, 1♀; same data except JAC, 1♂; same data except LACM, 1♀; same data except 23-VI-2005, JA Cole, LACM, 5♂; same data except 21-VI-2018, JA Cole, JAC, 1♂; same data except 25-V-2017, JA Cole, LACM, 5♂, 1♀; same data except JAC, 2♂, 1♀; Sierra Highway, 0.6 miles west of Crown Valley Road, Acton, 34.49393, -118.18736, 870 m, 29-VI-2003, d B Weissman, CAS, 13♂, 1♀; **San Bernardino Co.**, China Lake NAWS, Eagle Crags, Mesquite Spring, 35.401136, -117.017850, 9-VI-1995, G Pratt, C Pierce, CAS, 1♂; Coolgardie Road, 3.3 miles northwest of Copper City Road, 33.09538, -117.03453, 1095 m, 15-VI-2019, JA Cole, LACM, 3♂; same data except JAC, 1♂; Copper City Road, 4.7 miles north of Irwin Road, Barstow, 35.05157, -116.98058, 1131 m, 15-VI-2019, JA Cole, JAC, 1♂; Copper City Road, 5 miles north of Irwin Road, Barstow, 35.05585, -116.98421, 1160 m, 15-VI-2019, JA Cole, LACM, 4♂; same data except JAC, 1♂; d esert Springs, 34.4333, -117.6333, 11-V-1955, no collector, CAS, 1♀; d esert Springs, 34.4333, -117.6333, 1219 m, 25-VI-1956, ER Tinkham, CAS, 3♂; Granite Mountains wash, 2 miles southwest of SR247 off Spinel Street, 34.5574, -116.9882, 1004 m, 1-2-V-2013, JA Cole, LACM, 11♂; same data except JAC, 1♀; Mojave River, 35.045321, -116.305388, 1-VII-1937, R Miller, CAS, 1♀; Mountain Pass, 35.470260, -115.544998, 1400 m, 4-VIII-1991, d B Weissman, d C Lightfoot, CAS, 6♂, 1♀.

Aglaothorax giganteus (Rentz & Birchim, 1968) stat. rev.

Neduba (*Aglaothorax*) *ovata gigantea*—Rentz & Birchim, 1968: 77.
Aglaothorax segnis—Tinkham, 1944: 291 (Incorrect synonymy).
Aglaothorax giganteus **stat. rev.** (Revised to species status with corrected gender).
Fig. 6 (distribution), Fig. 8 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Gigantic Shieldback.

History of recognition. Described as a subspecies of *Neduba* (*Aglaothorax*) *ovata* (Rentz & Birchim 1968). Confused with *A. segnis* (Tinkham 1944). Returned to *Aglaothorax* (Rentz & Colles 1990) where this species remains as a subspecies of *A. ovatus* (Cigliano *et al.* 2025). We elevate *A. giganteus* to species rank based on morphology, geography, and phylogeny.

Type material. The holotype male in ANSP is from 8 miles west of Lone Pine on the eastern slope of the Sierra Nevada, Inyo County, California, USA. Images of the holotype and allotype are available at OSFO (Cigliano *et al.* 2025). PARATYPES EXAMINED: (n=39) **USA, CA, Inyo Co.**, 11 mi. W Lone Pine, 36.605879, -118.261588, 19-VII-1961, d C Rentz, LACM, 1♂; same data except, 6-VII-1961, d C Rentz, LACM, 1♀; Big Pine Canyon, 37.164931, -118.289546, 16-VIII-1938, ER Tinkham, CAS, 24♂; Big Pine Canyon, Big Pine, 37.164931, -118.289546, 4-VIIII-1931, ER Tinkham, CAS, 4♂; Big Pine Cyn, 9 mi W Big Pine, 37.164818, -118.453317, 25-VIII-1957, ER Tinkham, CAS, 2♂, 1♀; Lone Pine Canyon, 36.60611, -118.06194, 20-VIII-1938, ER Tinkham, CAS, 5♂; Lone Pine, 36.606044, -118.062865, 28-VII-1940, LC Kiutert, CAS, 1♂. TOPOTy PES EXAMINEd (n=34): **USA, CA, Inyo Co**., 11 mi. W Lone Pine, 36.605879, -118.261588, no date, ER Tinkham, CAS, 2♂; 6.8 M W Big Pine on road to Sage Flat Camp, 37.164931, -118.289623, 2042 m, 28-VIII-1996, DB Weissman, BI Weissman, d CF Rentz, CAS, 2♂; 7 miles W Lone Pine on road to Whitney Portal, 36.605957, -118.207391, 1785 m, 5-VIII-1978, d B Weissman, CAS, 1♂; 7-8 miles W of Lone Pine on Whitney Portal, 36.605957, -118.207391, 1785 m, 18-VIII-1982, d B Weissman, CAS, 2♂, 1♀; 9 mi. W Lone Pine, 36.605934, -118.225457, 8-VII-1961, JK d rew, CAS, 1♂, 1♀; Whitney Portal Road, 4.8 miles west of Lone Pine, 36.59500, -118.15194, 1558 m, 10-VII-2019, JA Cole, J Bailey, JAC, 2♂; Whitney Portal Road, 6 miles west of Lone Pine, 36.5949, -118.1563, 1611 m, 8-9-VII-2008, JA Cole, AMNH, 2♂; same data except JAC, 4♂; same data except LACM, 8♂; Whitney Portal Road, 6 miles west of Lone Pine, 36.59511, -118.16033, 1636 m, 1-VII-2017, JA Cole, LACM, 4♂; same data except JAC 3♂, 1♀.

Measurements. (mm, ♂n=4, ♀n=2) Hind femur ♂18.65–20.45, ♀20.53–22.75, pronotum total length ♂13.95–15.10, ♀14.95–16.23, prozona length ♂6.08–6.90, ♀7.14–8.09, metazona dorsal length ♂7.60–8.64, ♀7.76–8.69, pronotum constriction width ♂4.30–4.70, ♀3.80–5.40, metazona dorsal width ♂9.10–9.40, ♀9.65–10.91, head width ♂6.05–6.20, ♀6.48–7.64, ovipositor length ♀20.88–23.30.

Distribution. Eastern Sierra Nevada at moderate to high elevations.

Habitat. Desert scrub and pinyon-juniper woodland. Taken from Big Sagebrush (*Artemisia tridentata* Nutt.), Crucifixion Thorn (*Castela emoryi*), Singleleaf Pinyon (*Pinus monophylla* Torr. & Frém.), and Stansbury Cliffrose (*Purshia stansburiana* (Torr.) Henrickson). Inhabits elevations between 1500 and 2000 m.

Seasonal occurrence. Summer (1-VII-2017, JA Cole, LACM) through fall (9-X-1995, DB Weissman & VF Lee, CAS).

Stridulatory file. (n=4) length 5.00–5.55 mm, 83–98 teeth, tooth density 17.7±0.9 (16.6–18.7) teeth/mm.

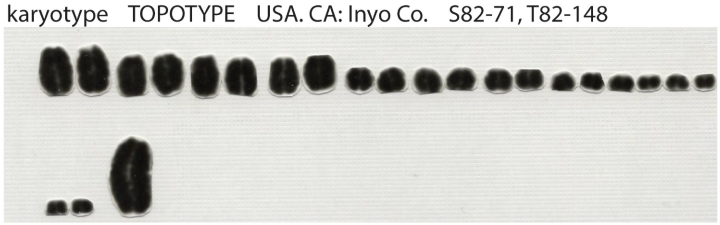
Song. (n=15). Loud song of frequently repeated echemes as in *A. ovatus*. Pulse trains 60±20 ms in length are repeated at a rate of 9.52±0.88 s^{-1}. Mean peak frequency is 12.26±3.41 kHz, with high frequency recordings finding peak frequency energy as high as 19.46 kHz. Echemes group 2–6 (mean 3±1) pulse trains with 0.79–3.02 (mean 1.88±0.64) s silent intervals between echemes. At McMurray Meadows, Inyo County, California on 11-VII-2003, a 100 m transect was made along a chorus. Four males were found, each in large *Purshia* bushes, spaced from their nearest neighbors by 25 to 50 m. Singing males were not common and, at this date early in the season, may have been among the first males to mature at this high elevation site.

Karyotype. (n=3) 2n♂=23 (22t+Xt), topotype T82-148 (S82-71).

male TOPOTYPE USA. CA: Inyo Co.
JAC00000115

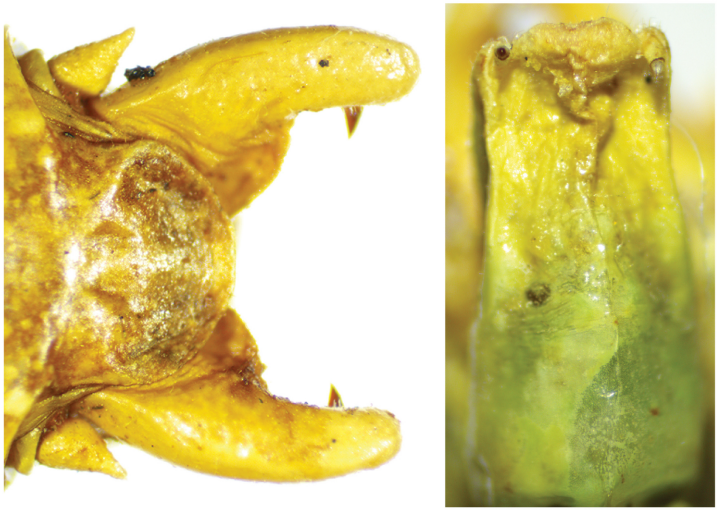
calling song TOPOTYPE USA. CA: Inyo Co. 25.0ºC JCR08LO-03

karyotype TOPOTYPE USA. CA: Inyo Co. S82-71, T82-148



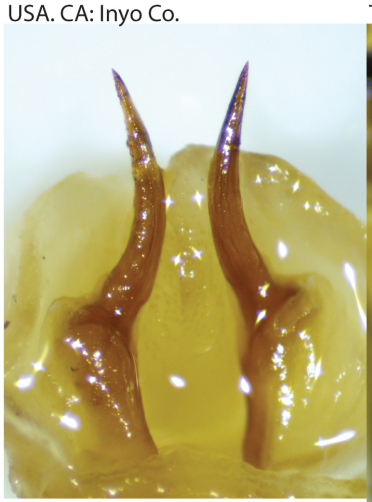
female TOPOTYPE USA. CA: Inyo Co.
JAC000003031

male terminalia TOPOTYPE USA. CA: Inyo Co.
JAC000003035 S82-71
R V



male USA. CA: Inyo Co. JAC000003046

titillator PARATYPE
USA. CA: Inyo Co.



female subgenital plate
TOPOTYPE JAC000003031

FIGURE 8. *A. giganteus* male and female habitus, calling song, male and female terminalia, and karyotype.

Recognition. Large body size, pronotum 14–15 mm long in male, a size range beginning at the maximum size of male *A. ovatus*. Red-brown middorsal abdominal stripe and white tegmina, unlike the unstriped abdomen, wood-brown body, and brown tegmina of *A. gurneyi*. Male paraproct process with a heavy, subapical, ventrally directed tooth, unlike the apical mesally directed tooth of *A. segnis* and *A. strobilion*. Pronotum heavily and irregularly rugose on prozona; the only other Ovatus Group species that approaches this condition is *A. tinkhamorum*, but in that species the prozona appears warty rather than wrinkled. *A. giganteus* males have an abrupt, strong elevation of the metazona after the transverse sulcus unlike all other Ovatus Group species. Pronotum with abundant longitudinal black streaks on disk; no broad white longitudinal stripes as in *A. ovatus*, and not with reduced black streaking on disk as in *A. armiger* and *A. tinkhamorum*. Female body size overlaps with *A. ovatus*, but in that species the ovipositor tends to be longer than the hind femur.

Notes. The concatenated phylogenetic consensus (Fig. 4) found a monophyletic *A. giganteus* but paraphyletic relationships were observed with nDNA (Fig. 2) and mtDNA (Fig. 3) gene trees. The original description (Rentz & Birchim 1968) expounds upon this species. Among the discussion, a courtship-copulation sequence was described, and variation between years was hypothesized to be dependent upon variable climate in their arid habitat. We noticed variation in abundance over years as well: the katydids were abundant during collecting events in 2003, 2008, and 2017, all wetter than average years for California that accompanied El Niño Southern Oscillation (ENSO) events, the 2017 event being a particularly strong one. During those years katydids could be found generally throughout the habitat on all types of vegetation. An increase in the number of eggs broken from diapause and increased survivorship due to an abundance of vegetation for food and water are non-mutually exclusive hypotheses for the population booms.

Material examined. (n=11) **All USA, CA, Inyo Co.**, 4.3 miles W of Independence, off Onion Valley Road, 36.802685, -118.277974, 1770 m, 9-X-1995, d B Weissman, VF Lee, CAS, 1♂; Buttermilk Brea, 8 miles west of Bishop, 37.363451, -118.541063, 1981 m, 3-VII-1973, KE Stager, LACM, 1♀; McMurray Meadows Road, 3.0 miles south of Glacier Lodge Road, 6 miles southwest of Big Pine, 37.1023, -118.3196, 13-VII-2003, JA Cole, JF Eguizabal, LACM, 6♂; same data except JAC, 2♂; same data except 4-VIII-2004, JA Cole, LACM, 1♂.

Aglaothorax tinkhamorum (Rentz & Birchim, 1968) stat. rev.

Neduba (*Aglaothorax*) *ovata tinkhamorum*—Rentz & Birchim, 1968: 81.
Aglaothorax segnis—Tinkham, 1944: 291 (Incorrect synonymy).
Aglaothorax tinkhamorum **stat. rev.** (Revised to species status).
Fig. 6 (distribution), Fig. 9 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Tinkham's Shieldback.

History of recognition. Described as a subspecies of *Neduba* (*Aglaothorax*) *ovata* (Rentz & Birchim 1968). Returned to *Aglaothorax* (Rentz & Colless 1990) where this species remains as a subspecies of *A. ovatus* (Cigliano *et al.* 2025). We elevate *A. tinkhamorum* to species rank based on morphology, geography, and phylogeny.

Type material. The holotype male in ANSP is from Pinyon Flats along state highway 74 at 4000 feet in the Santa Rosa Mountains, Riverside County, California, USA. Images of the holotype and allotype are available at OSFO (Cigliano *et al.* 2025). PARATYPES EXAMINED: (n=6) **USA, CA, Riverside Co.**, Santa Rosa Mtns, Pinyon Flats, 33.524192, -117.276148, 1219 m, 13-IX-1957, ER Tinkham, CAS, 3♂; **San Bernardino Co.**, Little San Bernardino Mountains, 1 mi. W of Yucca Valley, 34.114173, -116.449759, 999 m, 30-VI-1953, ER Tinkham, CAS, 3♂.

TOPOTYPES EXAMINED: (n=28) **USA, CA, Riverside Co.**, Cactus Spring Trailhead, 0.4 mi. S of SR74 on Pinyon Flats Sta. Rd., 33.5804, -116.4507, 1200 m, 28-29-VI-2004, JA Cole, JF Eguizabal, LACM, 1♂; Pinyon Flat Campground, 14 miles southwest of Palm Desert on SR74, 33.5856, -116.4570, 1219 m, 27-28-VI-2005, JA Cole, AMNH, 1♂; same data except LACM, 5♂; same data except 28-29-VI-2003, JA Cole, AMNH, 1♂; same data except LACM, 4♂; same data except 3-4-VII-2008, JA Cole, LACM, 7♂; Pinyon Flat, San Jacinto Mountains, 33.7500, -116.6667, 27-V-1939, ER Tinkham, CAS, 1♀ nymph; same data except 29-VI-1975, ER Tinkham, CAS, 2♂; Pinyon Flats, intersection of Pinyon d rive and Hwy 74, 33.603360, -116.455847, 1158 m, 26-VIII-1982, d B Weissman, CAS, 5♂; Ribbonwood Equestrian Campground, Santa Rosa Mountains, 33.58000, -116.45167, 1234 m, 26-VIII-2020, JA Cole, J Bailey, LACM, 1♂.

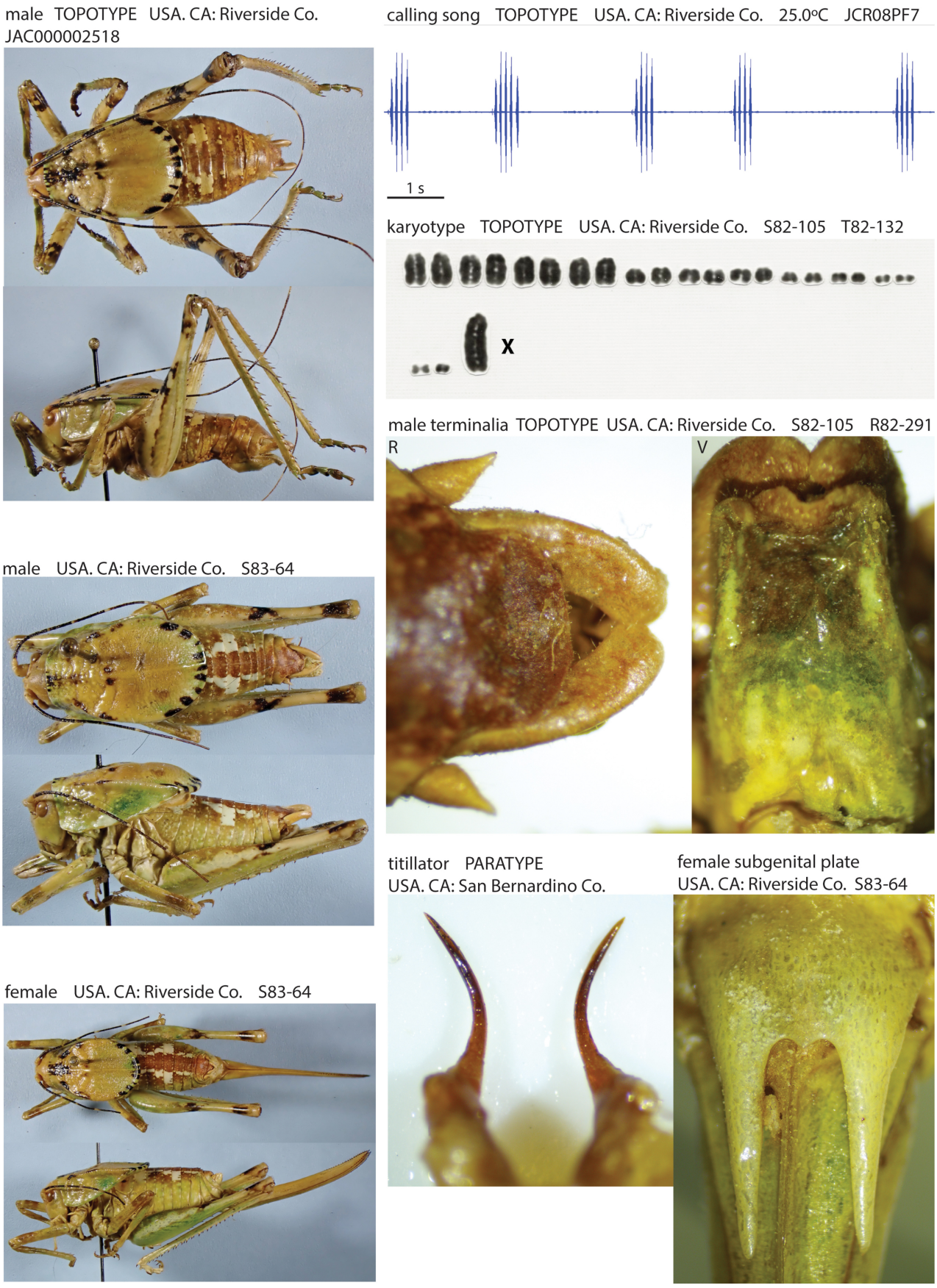


FIGURE 9. *A. tinkhamorum* male and female habitus, calling song, male and female terminalia, and karyotype. Idiogram shows karyotype 2n♂=23. Marked X chromosome is largest in complement.

Measurements. (mm, ♂n=12, ♀n=2) Hind femur ♂16.00–20.59, ♀20.85–21.46, pronotum total length ♂11.75–15.08, ♀12.95–13.43, prozona length ♂5.10–6.21, ♀6.26–6.79, metazona dorsal length ♂6.65–8.99, ♀6.16–7.17, pronotum constriction width ♂3.65–4.90, ♀3.80–4.44, metazona dorsal width ♂7.76–9.85, ♀8.79–9.15, head width ♂4.95–6.19, ♀6.30–6.83, ovipositor length ♀20.15–21.35.

Distribution. Southern California mountain ranges bordering the Colorado Desert including the Santa Rosa and Little San Bernardino Mountains.

Habitat. Pinyon-juniper and yucca woodland. Type series taken from Parry Pinyon (*Pinus quadrifolia* Par. ex Sudlow) and Joshua Tree. Also recorded from *Ceanothus* sp.

Seasonal occurrence. Late spring (29-V-1963, EL Sleeper, CAS) through summer and into fall (21-IX-1962, RC Stephens, CAS). Nymphs through late spring (27-V-1939, ER Tinkham, CAS).

Stridulatory file. (n=12) length 3.90–6.30 mm, 89–113 teeth, tooth density 20.3±1.8 (17.8–23.0) teeth/mm.

Song. (n=36) A loud calling song that consists of echemes ("chirps") as in other Ovatus Group species. Males may call with single pulse trains before sunset. Pulse trains 70±20 ms in length are repeated at a rate of 9.08±1.23 s^{-1}. Mean peak frequency is 13.83±4.79 kHz; recordings with ultrasonic equipment found significant sound energy in the ultrasonic, with peak frequencies as high as 26.19 kHz. Echemes group 3±1 (range 1–6) pulse trains. Echemes are separated by silent intervals that last 1–5 (mean 2.48±0.91) s. At the type locality on 28–29 June 2004, JAC observed alternating choruses of seven nearest neighbor males, each situated in its own juniper tree, on a cool 16.6ºC summer night. Males perched between 1.85–2.10 m above the ground. The average spacing between males was 15.8 m, with the closest pair situated 0.6 m apart. Two of the seven junipers harbored two males each, but only one male in each case was acoustically active. This suggests that males may employ satellite behavior (reviewed in Greenfield 2002) to intercept females that are phonotaxing to calling males.

Karyotype. (n=7) 2n♂=23 (22t+Xt), topotype T82-132 (S82-105).

Recognition. Morphology, geography. The abdomen has a longitudinal red-brown stripe and the tegmina are white, unlike the wood-brown abdomen and tegmina of *A. gurneyi*. The male paraproct processes have a subapical ventrally directed tooth, unlike the apical tooth found in *A. segnis* and *A. strobilion*. Body ground color in life usually a rich green against which contrasts a yellow pronotal disk. The pronotal disk has a pair of central black spots and lacks black longitudinal streaking and never has any broad white longitudinal stripes as in *A. ovatus*. *A. armiger* has reduced black streaking on the pronotal disk, but the male supra-anal plate is longer than wide in that species but as long as wide in *A. tinkhamorum*. Geographically, *A. tinkhamorum* occurs where the Peninsular Ranges meet the Colorado Desert in California.

Notes. This species replaces *A. ovatus* to the south along the fringes of the Colorado Desert. At the type locality *A. hulodomus* is sympatric where chaparral vegetation is interspersed with pinyon-juniper. Genetics (Figs. 2–4) found this species more closely related to the eastern Mojave species *A. armiger*, *A. segnis*, and *A. strobilion* than to the western Mojave *A. ovatus*.

Material examined. (n=65) **All USA, CA, Riverside Co.**, 1 mi. W Whitewater Canyon, 33.92655, -116.65886, IV-1972, ER Tinkham, CAS, 1♀; Berdoo Canyon, 33.810156, -116.170507, 1-VII-1975, ER Tinkham, CAS, 3♂, 2♀; Cactus Spring Trailhead, 0.4 mi. S of SR74 on Pinyon Flats Sta. Rd., 33.5804, -116.4507, 1200 m, 28-29-VI-2004, JA Cole, JF Eguizabal, LACM, 5♂; mouth of Whitewater Canyon, 33.92424, -116.64175, 21-VI-1973, ER Tinkham, CAS, 1♀; LACM, 1♂; Upper Berdoo Canyon, Little San Bernardino Mtns, 33.810156, -116.170507, 1-VII-1975, ER Tinkham, CAS, 1♂; Whitewater Canyon, 33.9579, -116.6463, 396 m, 20-VI-1974, ER Tinkham, CAS, 3♂, 1♀; same data except 4-VI-1975, ER Tinkham, CAS, 2♂; same data except 7-VI-1983, d B Weissman, CAS, 11♂, 1♀; same data except late IV-early V, ER Tinkham, CAS, 1♂; same data except no date, ER Tinkham, CAS, 8♂; same data except 431 m, 27-VI-2005, JA Cole, LACM, 2♂; same data except 21-IV-1973, VV Omotov, LACM, 1♂; Whitewater Canyon, NW of Palm Springs, 33.9579, -116.6463, 396 m, 24-IV-1982, d B Weissman, CAS, 1♂; **San Bernardino Co.,** 5 mi S yucca Valley, 34.041633, -116.432235, VII-1971, ER Tinkham, CAS, 3♂, 1♀; Joshua Tree NM, L Covington Flat, 34.134728, -116.313066, 21-IX-1962, RC Stephens, CAS, 1♀; same data except 30-VII-1960, J Geest, CAS, 1♂; Joshua Tree NM, Long Cyn Cholla Br., 34.134728, -116.313066, 29-V-1963, EL Sleeper, CAS, 1♂; Joshua Tree NM, Pleasant Valley Quail Guzzler, 34.134728, -116.313066, 10-VI-1966, EL Sleeper, SL Jenkins, CAS, 1♂; Joshua Tree NM, U Covington Flat, 34.134728, -116.313066, 22-VII-1960, EL Sleeper, CAS, 1♂; same data except 8-VII-1960, EL Sleeper, CAS, 1♂; Little San Bernardino Mountains, 1 mi. W of yucca Valley, 34.114173, -116.449759, 999 m, 30-VI-1953, ER Tinkham, CAS, 1♂; **San Diego Co.,** County Road S22 SW of Borrego Springs, 33.048669, -117.041941, 370-1040 m, 3-VI-1989, DB Weissman, DC Lightfoot,

CAS, 2♂; Culp Cyn, 5 mi. W Borrego Springs, 33.048669, -117.041941, 28-VI-1975, ER Tinkham, CAS, 2♂; Mason Valley, 32.980881, -116.426682, 23-V-1943, JH Comstock, LACM, 1♀; San y sidro Mountains, 32.5833, -116.8167, no date, ER Tinkham, CAS, 3♂; same data except 3-VI-1975, ER Tinkham, CAS, 2♂.

Aglaothorax segnis Rehn & Hebard, 1920 comb. restored

Aglaothorax segnis—Rehn & Hebard, 1920: 225.
Aglaothorax segnis—Tinkham, 1944: 291 (Incorrect synonymy).
Neduba (*Aglaothorax*) *ovata segnis*—Rentz & Birchim, 1968: 85 (A change in status).
Aglaothorax segnis **comb. restored** (Restored to species status as proposed by Rehn & Hebard, 1920).
Fig. 6 (distribution), Fig. 10 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Sluggish Shieldback.

History of recognition. Described in *Aglaothorax* (Rehn & Hebard 1920). Name erroneously applied to eastern Sierra Nevada populations that belong to both *A. giganteus* and *A. ovatus* (Tinkham 1944). Transferred to *Neduba* (*Aglaothorax*) and relegated to a subspecies of *ovatus* (Rentz & Birchim 1968). Returned to *Aglaothorax* (Rentz & Colless 1990) where this species remains as a subspecies of *A. ovatus* (Cigliano *et al.* 2025). Based on phylogenetic and cytogenetic evidence, we elevate *A. segnis* to species rank, reinstating the taxonomic status of this species as originally described.

Type material. The holotype male housed at ANSP is from Crestline, Lincoln County, Nevada, taken from Joshua tree at 6000 feet elevation. Images of the type are available at OSFO (Cigliano *et al.* 2025). TOPOTYPES EXAMINED: (n=10) **USA, NV, Lincoln Co.**, 13 miles E Panaca on State Highway 319, 37.790280, -114.150913, 1950 m, 11-VIII-1988, d B Weissman, d C Lightfoot, CAS, 1♂, 1♀; 16 miles E Panaca Summit, 37.764601, -113.897074, 11-VIII-1988, d B Weissman, d C Lightfoot, CAS, 1♂; 18 miles E Panaca on State Highway 319, 37.790059, -114.059173, 1720 m, 11-VIII-1988, d B Weissman, d C Lightfoot, CAS, 1♂; 7 miles E of Panaca, 37.790450, -114.260999, 1829 m, 20-VIII-1982, d B Weissman, CAS, 2♂; Beaver d am State Park, 37.521362, -114.072202, 12-IX-1973, RC Bechtel, GM Nishida, Nd AC, 4♂.

Measurements. (mm, ♂n=5, ♀n=2) Hind femur ♂16.65–17.35, ♀19.40–20.74, pronotum total length ♂11.15–13.99, ♀13.34–14.35, prozona length ♂4.56–5.66, ♀5.62–6.15, metazona dorsal length ♂6.59–8.44, ♀7.72–8.20, pronotum constriction width ♂2.97–3.90, ♀3.69–5.00, metazona dorsal width ♂7.35–8.75, ♀8.50–9.25, head width ♂5.06–5.62, ♀6.05–6.67, ovipositor length ♀19.41–20.41.

Distribution. Mountain ranges of southeastern Nevada at high elevation. The type locality is in the Cedar Range. Other populations are known from the Clover Mountains and Bristol Range.

Habitat. Pinyon-juniper woodland. Taken from high branches of Utah Juniper (*Juniperus osteosperma* (Torr.) Little).

Seasonal occurrence. Limited records suggest mid- to late summer adult activity (4-VIII-2005, JA Cole, LACM) that extends into Fall (12-IX-1973, RC Bechtel & GM Nishida, CAS).

Stridulatory file. (n=5) length 4.85–5.10 mm, 102–117 teeth, tooth density 21.7±1.1 (20.6–23.4) teeth/mm.

Song. (n=18) Brief echemes ("chirps") similar to *A. armiger*. Pulse trains 50±10 ms in length are repeated at a rate of 10.1±1.52 s^{-1}. Mean peak frequency is 14.13±2.77 kHz; high frequency recordings show song energy at the ultrasonic boundary at 20.25 kHz. Echemes group 3±1 pulse trains with 0.71–3.56 (mean 1.53±0.75) s of silence between echemes.

Karyotype. (n=6) 2n♂=24 (22t+Xty t), topotype T88-43 (S88-93).

Recognition. Morphology, geography, and karyotype. *A. segnis* is separated from all Ovatus Group species except *A. strobilion* and most *A. gurneyi* by the apical, mesally directed tooth on the male paraproct process; rarely, the cercus terminates in a double tooth, with one of the two teeth positioned apically. All other Ovatus Group species have a subapical ventrally directed tooth. The male paraproct in *A. segnis* is about three times as long as wide, as opposed to thick and about twice as long as wide in other Ovatus Group species. The *A. segnis* male supra-anal plate is wider than long and reflexed caudally, a condition like that of *A. armiger* and *A. strobilion* but unlike *A. giganteus*, *A. khioneos*, *A. ovatu*s, and *A tinkhamorum*, which have supra-anal plates that are as long as wide. *A. segnis* and *A. strobilion* have abundant longitudinal black streaks on the pronotal disk, unlike the disk of *A. armiger* which typically has reduced black marking. The *A. segnis* pronotum is broader than that of *A. strobilion*, with a concomitant increase

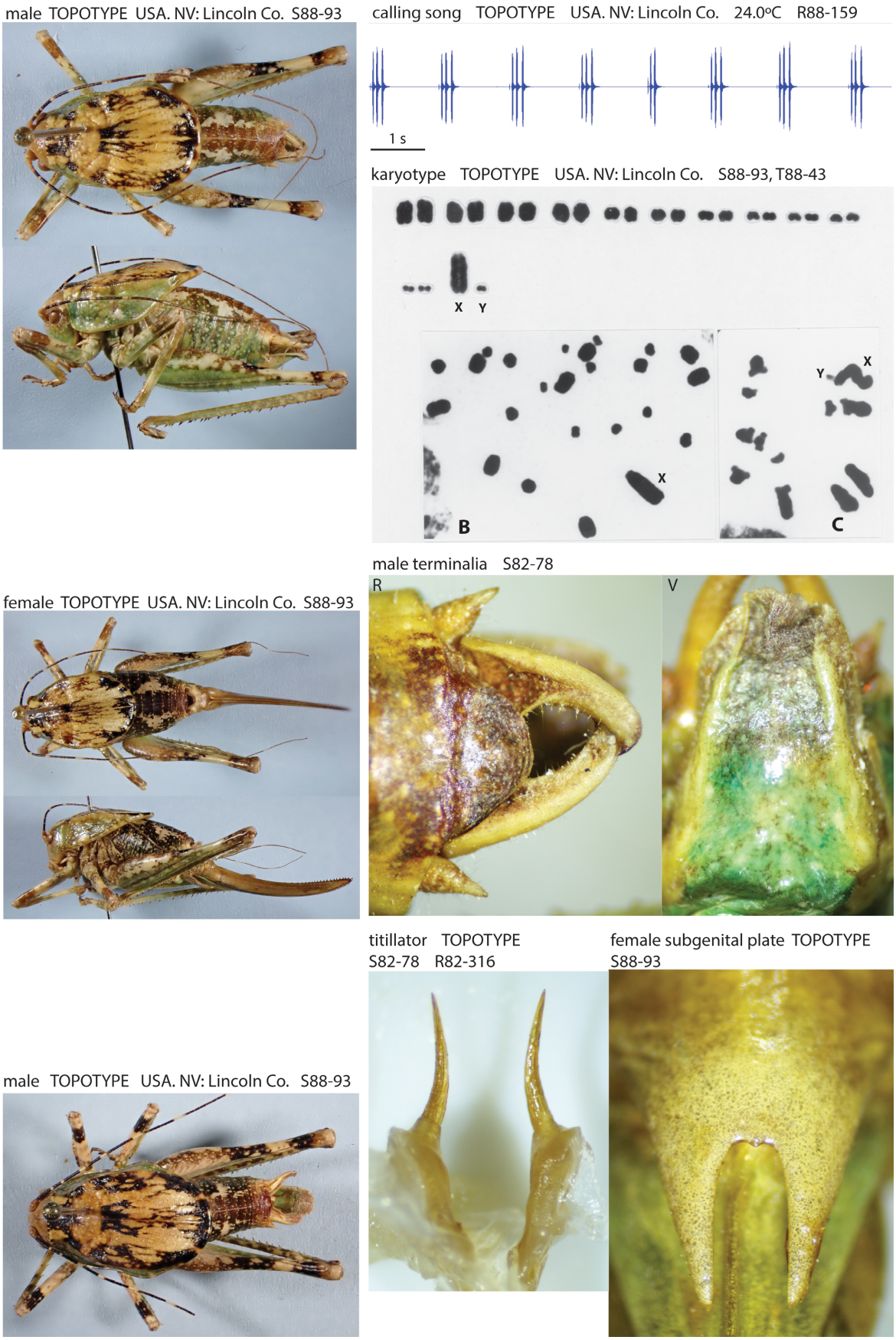


FIGURE 10. *A. segnis* male and female habitus, calling song, male and female terminalia, and karyotype. Idiogram top panel shows karyotype 2n♂=24; B. Plate showing all 24 chromosomes; C. Metaphase I, showing 11 autosomal pairs and associated XY pair.

in the ratio of the pronotal constriction width to metazona width in the former versus the latter (*A. segnis* 2.24–2.47 vs. *A. strobilion* 1.97–2.20). Female *A. segnis* have the shortest subgenital plate lateral processes of any Ovatus Group species (although females of *A. strobilion* are unknown). Geographically, *A. segnis* occupies mountain ranges in the northeasternmost extent of the Mojave Desert where that desert interdigitates with the Great Basin Desert. The 2n♂=24 karyotype is shared only with *A. gurneyi*; all other Ovatus Group species have 2n♂=23, including *A. strobilion*, which superficially resembles this species.

Notes. This species inhabits remote areas and is thus seldom encountered. Individuals perch high in large trees and are thus difficult to collect when found. The 2n♂=24 karyotype is shared with another sky island endemic Ovatus Group species, *A. gurneyi* of the California Transverse Ranges.

Material examined. (n=7) **All USA, NV, Lincoln Co.**, 27 mi. N Pioche on Hwy. 93, 38.32116, -114.452214, 1981 m, 20-VIII-1982, d B Weissman, CAS, 2♂; Hwy. 319, 1.9 miles west of Utah State Line, 37.72564, -114.0844, 1804 m, 19-VIII-2009, d B Weissman, d C Lightfoot, CAS, 1♂; Oak Spring Summit Picnic Area, along US93, 9.3 mi. E of Caliente, 37.5923, -114.6828, 1901 m, 4-VIII-2005, JA Cole, LACM, 1♂; same data except JAC, 2♂; Pioche, 37.929685, -114.452214, 1848 m, 20-VIII-1958, RC Bechtel, Nd AC, 1♀.

Aglaothorax armiger Rehn & Hebard, 1920 comb. restored

Aglaothorax armiger—Rehn & Hebard, 1920: 229.
Aglaothorax armiger—Tinkham, 1944: 292.
Neduba (*Aglaothorax*) *ovata armiger*—Rentz & Birchim 1968: 83 (A change in status).
Aglaothorax armiger **comb. restored** (Restored to species status as proposed by Rehn & Hebard, 1920).
Fig. 6 (distribution), Fig. 11 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Armored Shieldback.

History of recognition. Described in *Aglaothorax* (Rehn & Hebard 1920). Correctly identified and associated with type material by Tinkham (1944). Transferred to *Neduba* (*Aglaothorax*) and relegated to a subspecies of *N. (A.) ovata* (Rentz & Birchim 1968). Transferred back to *Aglaothorax* (Rentz & Colless 1990) where this species is currently classified as an *A. ovatus* subspecies (Cigliano *et al.* 2025). We elevate *A. armiger* to species rank based on phylogenetic and morphological evidence, reinstating the taxonomic status of this species as originally described.

Type material. The holotype male deposited in ANSP is from Lee Canyon, Spring Mountains, Clark County, Nevada, taken from Joshua tree at 6000 feet elevation. Images of the holotype and allotype are available at OSFO (Cigliano *et al.* 2025). TOPOTYPES EXAMINED: (n=29) **USA, NV, Clark Co.**, Charleston Peak, 36.272185, -115.695019, 15-VIII-1931, ER Tinkham, CAS, 1♂; same data except 20-X-1939, ER Tinkham, CAS, 2♂; Lee Canyon Road between mileposts 6 and 9, 36.399963, -115.567516, 15-VIII-1998, DB Weissman, DC Lightfoot, CAS, 1♂; Lee Canyon Road, 36.399963, -115.567516, 1100-2200 m, 21-VII-1990, d B Weissman, d C Lightfoot, CAS, 3♂, 3♀; Lee Canyon Road, 4 miles southwest of US95, 36.43806, -115.51806, 1320 m, 8-VI-2023, JA Cole, AMNH, 1♂, 1♀; same data except LACM 2♂, 2♀; same data except JAC, 2♂, 2♀; Lee Canyon Road, 5.2 miles southwest of US95, 36.42624, -115.53464, 1426 m, 15-VI-2018, JA Cole, LACM, 1♂; Lee Canyon, 36.399963, -115.567516, 1830 m, 2-VIII-1991, d B Weissman, d C Lightfoot, CAS, 1♂; Lee Canyon, 36.399963, -115.567516, 6300-7500’ m, 30-VIII-1986, d B Weissman, d I Weissman, d CF Rentz, CAS, 5♂, 2♀.

Measurements. (mm, ♂n=5 , ♀n=5) Hind femur ♂16.20–17.80, ♀19.10–20.37, pronotum total length ♂11.07–12.80, ♀12.79–14.80, prozona length ♂4.51–5.80, ♀6.18–6.61, metazona dorsal length ♂6.56–7.00, ♀6.61–8.19, pronotum constriction width ♂3.40–3.90, ♀4.15–4.93, metazona dorsal width ♂7.24–8.05, ♀8.15–9.75, head width ♂5.22–6.00, ♀6.40–6.68, ovipositor length ♀17.65–20.47.

Distribution. Eastern Mojave Desert in Nevada. The type locality is along the eastern slope of the Charleston Mountains, Clark County.

Habitat. Joshua Tree and pinyon-juniper woodlands. The description states that occurrence at the type locality was restricted to Joshua tree woodland, where they were found 4–8 feet above the ground, and found most often at 5–6 feet hiding in the dry leaves at the base of green leaves (Rehn & Hebard 1920). Topotype specimens were later taken from juniper and mixed conifer woodlands (Tinkham 1944). We found them on Joshua Trees and yucca at night, sometimes 4 m above the ground.

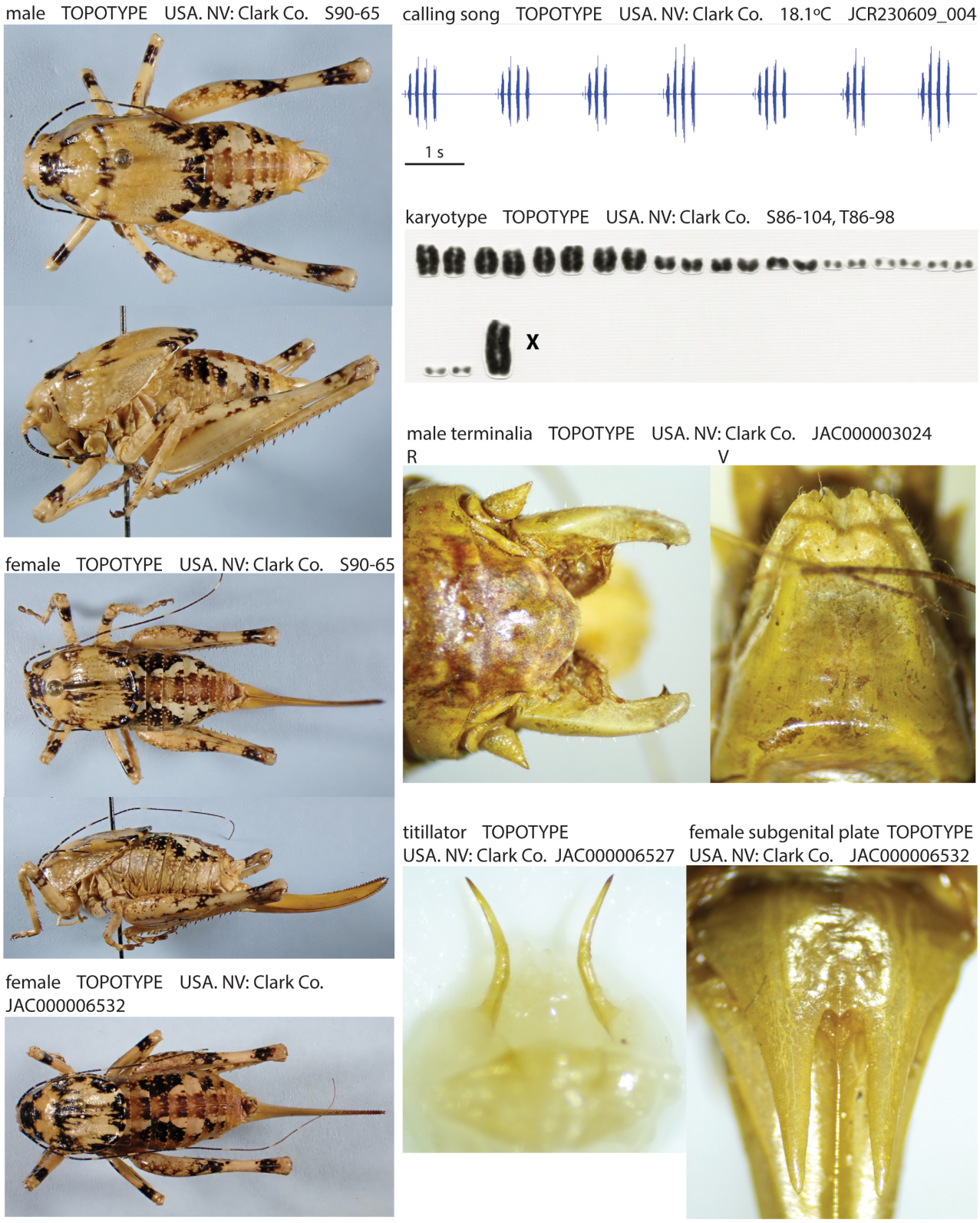


FIGURE 11. *A. armiger* male and female habitus, calling song, male and female terminalia, and karyotype. Idiogram shows karyotype 2n♂=23. Marked X chromosome is largest in complement.

Seasonal occurrence. Summer (8-VI-2023, JA Cole, LACM) through Fall (20-X-1939, ER Tinkham, CAS), maturing earlier at lower elevations. Nymphs alongside adults in late spring (8-VI-2023, JA Cole, LACM), with one female observed eclosing that night.

Stridulatory file. (n=5) length 3.90–4.80 mm, 94–106 teeth, tooth density 23.1±1.4 (20.8–24.1) teeth/mm.

Song. (n=7) Sporadic song that consists of single pulse trains or brief echemes. Pulse trains 50 ms in length are repeated at a rate of 10.26±0.97 s^{-1}. Mean peak frequency is 11.58±0.83 kHz. Males may produce pulse trains alone or group them into echemes containing 1–4 (mean 3±1) pulse trains. Isolated pulse trains are more likely to occur at the onset of singing or after a male is disturbed. Silent intervals between echemes last 1–6 (mean 2.16±1.70) s. The original description mentions intermittent sound production during an afternoon (Rehn & Hebard 1920).

Karyotype. (n=5) 2n♂=23(22t+Xt), S86-104, T86-98, topotype.

Recognition. Morphology, coloration, geography. Ground color is generally tan or yellow, unlike the rich green that is common in other Ovatus Group species or the wood-brown coloration of *A. gurneyi*. The abdominal dorsum has a reddish stripe and the tegmina are white, unlike the wood-brown unstriped abdomen and brown tegmina of *A. gurneyi*. The male supra-anal plate of *A. armiger* is wider than long in contrast to *A. giganteus*, *A. khioneos*, *A. ovatus*, and *A. tinkhamorum*, which have supra-anal plates that are as long as wide. From 16 to 18 mm long, the hind femora appear shorter than those of *A. giganteus*, *A. ovatus*, and *A. tinkhamorum*. The male paraproct process is about twice as long as wide, cylindrical, and with a subapical ventrally directed heavy triangular tooth, unlike the apical tooth on the slenderer processes of *A. segnis* and *A. strobilion*. Black markings are generally reduced on the pronotal disk to a central pair of black spots and perhaps limited black streaking, a coloration otherwise approached only by *A. tinkhamorum*.

Notes. The type locality of *A. armiger*, Lee Canyon, is a sky island in the eastern Mojave Desert that is known for its endemism, and as a biodiversity hotspot for Orthoptera in particular (Rentz 1972). *A. armiger* populations are distributed to the east of Mount Charleston in the rain shadow. White Mountains, California populations classified as this species (Rentz & Birchim 1968) are here described as new (see *A. khioneos* species account below).

Material examined. (n=4) **All USA, NV, Clark Co.**, Willow Creek, 36.576070, -115.732522, 1820 m, 16-VI-1985, JB Knight, Nd AC, 2♂; **Mineral Co.**, Cottonwood Creek, 38.648524, -118.762961, 2286 m, 9-VIII-1990, RC Bechtel, JB Knight, Sd Cichowlaz, Nd AC, 2♂.

Aglaothorax strobilion Cole, Weissman, and Lightfoot, sp. nov.

Fig. 6 (distribution), Fig. 12 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song)

Common name. Currant Shieldback.

History of recognition. Noted as intergrades between *armiger* and *segnis* with small body size (Rentz & Birchim 1968). We describe this population as a new species based on cytogenetic, morphological, and phylogenetic evidence, and also the remote, isolated geography.

Type material. HOLOTYPE MALE: **USA, NV, Nye Co.**, Currant Summit, 38.82081, -115.33528, 1950 m, 19-VIII-2009, DB Weissman, DC Lightfoot, CAS S09-140, R09-211, D36, T09-7, SING0371, deposited at CAS, Entomology type #20383. PARATYPES (n=8) **USA, NV, Nye Co.**, 9.9 M E Currant on Hwy. 6, 38.742013, -115.290742, 2042 m, 29-VIII-1986, d B Weissman, BI Weissman, d CF Rentz, CAS, 6♂; same data as holotype, CAS, 2♂.

Measurements. (mm, ♂n=5) Hind femur ♂14.86–17.58, pronotum total length ♂9.85–11.73, prozona length ♂4.26–5.13, metazona dorsal length ♂5.59–6.60, pronotum constriction width ♂3.37–3.75, metazona dorsal width ♂6.80–7.62, head width ♂5.06–5.62.

Distribution. Limited records are from the Currant Mountain Wilderness in the White Pine Range, Humboldt-Toiyabe National Forest, Nevada.

Habitat. Pinyon-juniper woodland at high elevations, from 1950–2050 m. Sings from high in junipers.

Seasonal occurrence. Limited records suggest late summer adult activity (19-VIII-2009, DB Weissman & DC Lightfoot, CAS to 29-VIII-1986, DB Weissman, BI Weissman, DCF Rentz, CAS). Adult activity late in the season corresponds with high elevation habitat.

Stridulatory file. (n=5) length 3.90–4.15 mm, 85–107 teeth, tooth density 24.5±2.3 (20.7–26.6) teeth/mm.

Song. (n=2) Pulse trains 50±10 ms in length are repeated at a rate of 9.65±0.57 s^{-1}. Mean peak frequency is 11.45±1.71 kHz. Echemes group 2–4 (mean 3±1) pulse trains with 0.93–1.77 (mean 1.35±0.60) s of silence between echemes.

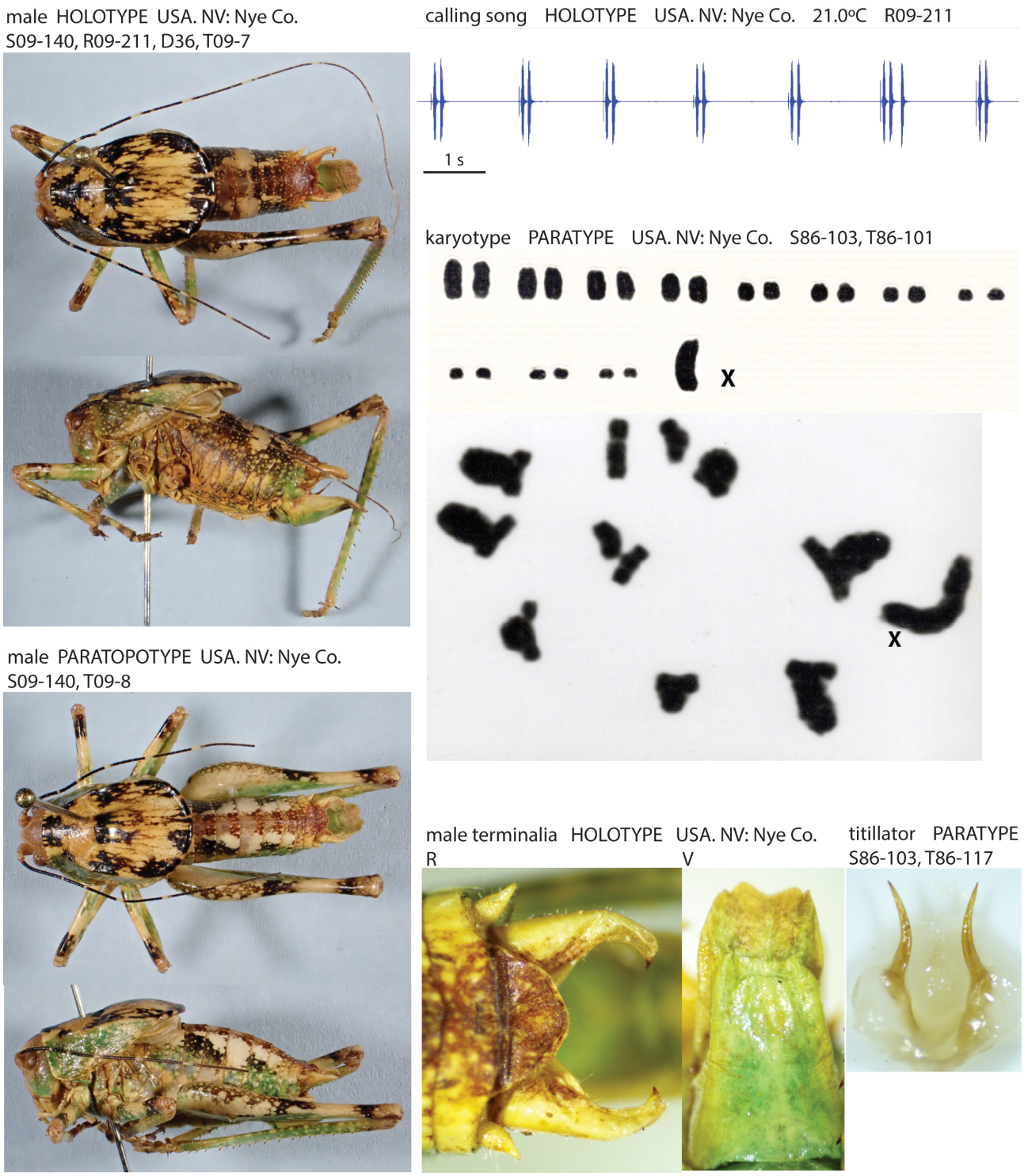


FIGURE 12. *A. strobilion* male habitus, calling song, terminalia, and karyotype.

Karyotype. (n=5) 2n♂=23 (22t+Xt), S86-103, T86-101, paratype.

Recognition. Morphology, karyotype. Small body size for Ovatus Group, pronotum length 10–12 mm. Similar in habitus to *A. segnis* but smaller. Like *A. segnis* and unlike all other Ovata Group species, including *A. armiger*, paraproct process with apical, mesally directed tooth. Paraproct processes shorter in *A. strobilion,* about 2 times as long as wide, than *A. segnis* in which those processes are about 3 times as long as wide. Pronotal disk with abundant black longitudinal streaks unlike *A. armiger*, which has reduced black streaking on pronotal disk. Karyotype 2n♂=23, typical for Ovatus Group but unlike 2n♂=24 *A. segn*is. Female unknown.

Etymology. Gr. *strobilion* a small pinecone. Refers to the small body size and pinyon-juniper habitat preference.

Notes. This population highlights the need for additional fieldwork in the mountains of the Nevada Basin and Range province, where endemics may yet be found on remote mountain island habitats. The impetus to delve further into this population came from its classification as an intergrade (Rentz & Birchim 1968). Karyotyping showed that this population (Fig. 12) did not have the same chromosome complement as *A. segnis* (Fig. 10). The concatenated phylogenetic hypothesis found this population more closely related to *A. armiger* (Fig. 4), with which it shares the typical 2n♂=23 karyotype, than with the karyotypically divergent *A. segnis*. The type locality of *A. strobilion* is separated from that of *A. segnis* by about 150 km and from that of *A. armiger* by approximately 280 km (Fig. 6). A distinct constellation of characters, together with its geographic isolation, prompted specific distinction.

Material examined. See Type Material above.

Aglaothorax khioneos Cole, Weissman, and Lightfoot, sp. nov.

Fig. 6 (distribution), Fig. 13 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song)

Common name. White Mountains Shieldback.

History of recognition. Previously treated as a population of *N.* (*A.*) *armiger* (Rentz & Birchim 1968). We describe this population as new based on morphological and phylogenetic evidence.

Type material. HOLOTYPE MALE: **USA, CA, Inyo Co.**, Cedar Flat Group Camps, Inyo National Forest, jct. SR168 and White Mountain Road, 37.28385, -118.15546, 2276 m, 17-VII-2023, JA Cole, C Wong, DNA814, SING1435, JCR230817_003, deposited at CAS, Entomology type #20384. PARATYPES: (n=27) **USA, CA, Inyo Co.,** same data as holotype, LACM, 6♂; SR168 and White Mountain Road, 37.28200, -118.02999, 2224 m, 23-VIII-2019, JA Cole, J Bailey, SA d owning, LACM, 1♂; Westgard Pass, 10 miles east of Big Pine on SR168, 37.2491, -118.1753, 1968 m, 15-VIII-2002, JA Cole, LACM, 1♂; Westgard Pass, 9.5 miles east of Big Pine on SR168, 37.2458, -118.1853, 1887 m, 13-VII-2003, JA Cole, JF Eguizabal, LACM, 1♂; White Mountain Road, 1.2 miles NW of SR168, 37.29290, -118.16749, 2283 m, 11-IX-2016, JA Cole, J Bailey, LACM, 3♂, 1♀; same data except 17-IX-2017, JA Cole, K Halsey, JAC, 1♂; 4-5 miles W of Westgard Pass, 37.300172, -118.245132, 1968 m, 19-VIII-1982, d B Weissman, CAS, 5♂, 1♀; Grandview Campground, 19 miles northeast of Big Pine off SR168 and White Mountain Road, 37.3332, -118.1923, 2610 m, 2-3-VIII-2005, JA Cole, LACM, 2♂; same data except 5-VIII-2004, JA Cole, LACM, 2♂; Pinyon Picnic Area, 4 miles north of SR168 on White Mountain Road, 37.3143, -118.1811, 2353 m, 2-VIII-2005, JA Cole, AMNH, 1♂; same data except LACM, 1♂; **Mono Co.,** White Mountains, 37.578355, -118.207943, 14-VIII-1985, d M Martinelli, CAS, 1♀.

Measurements. (mm, ♂n=3, ♀n=3) Hind femur ♂17.51–17.96, ♀18.70–20.72, pronotum total length ♂12.01–12.64, ♀11.68–12.84, prozona length ♂5.21–5.53, ♀5.86–6.08, metazona dorsal length ♂6.62–7.22, ♀5.82–6.85, pronotum constriction width ♂3.69–4.20, ♀4.05–4.35, metazona dorsal width ♂7.86–8.10, ♀8.25–9.15, head width ♂5.34–5.54, ♀6.14–6.36, ovipositor length ♀17.15–18.35.

Distribution. White Mountains of California at high elevations above 1900 m.

Habitat. Pinyon-juniper woodland, arboreal on Utah Juniper (*Juniperus osteosperma*) and Pinyon Pine. Most males called from higher than 3 m in Pinyon Pines and junipers.

On favorable years populations occur in washes down to 1880 m elevation.

Seasonal occurrence. Summer (13-VII-2003, JA Cole, JF Eguizabal, LACM) into Fall (17-IX-2017, JA Cole, K Halsey, LACM). Late onset of adult activity due to high elevation occurrence.

Stridulatory file. (n=3) length 4.50–4.70 mm, 88–102 teeth, tooth density 20.6±1.4 (19.6–22.2) teeth/mm.

Song. (n=27). Pulse trains 40±10 ms in length repeat at a rate of 9.6±1.0 s^{-1}. Mean peak frequency is 13.98±2.30 kHz, with peak frequencies as high as 17.54 kHz in high frequency recordings. Echemes contain 2–5 pulse trains, with 1–3 (mean 1.65±0.60) s silent intervals between echemes.

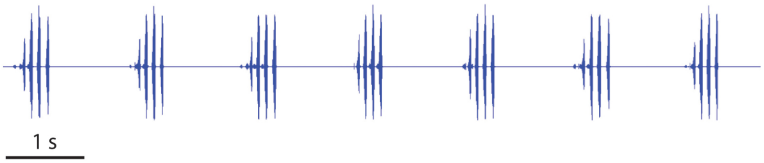
Karyotype. (n=3) 2n♂=23 (22t+Xt), S82-75, T82-149, 150, 163.

male HOLOTYPE USA. CA: Inyo Co. JAC000006537

female PARATOPOTYPE USA. CA: Inyo Co. JAC000006543

male PARATOPOTYPE USA. CA: Inyo Co. JAC000006540

calling song PARATYPE USA. CA: Inyo Co. 25.0ºC JAC05GV2-06

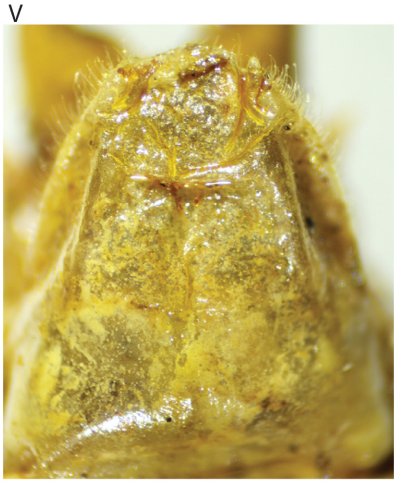


karyotype PARATYPE USA. CA: Inyo Co. S82-75, T82-150

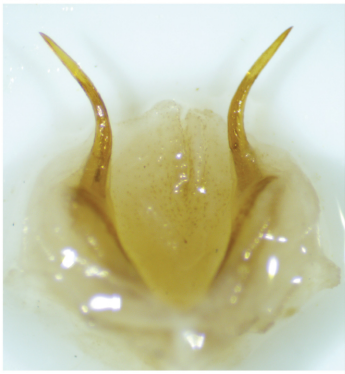
male terminalia PARATOPOTYPE USA. CA: Inyo Co. JAC000003020

R

V



titillator PARATYPE JAC000003019



female subgenital plate PARATOPOTYPE JAC000003022

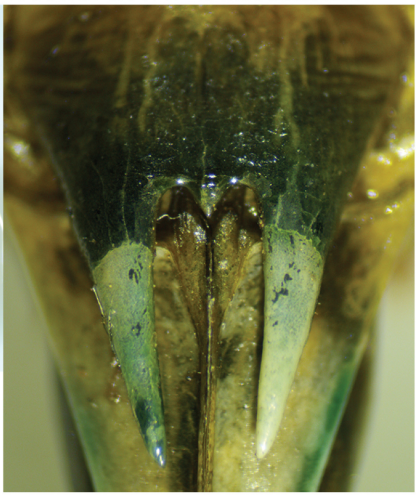


FIGURE 13. *A. khioneos* male and female habitus, calling song, male and female terminalia, and karyotype.

Recognition. Morphology, karyotype. Body usually green (may be tan at lower elevations), abdomen with longitudinal dorsal red stripe; body is wood brown without a dorsal abdominal stripe in *A. gurneyi* and usually tan in *A. armiger*. Black streaks present on the center of the pronotal disk, which are commonly limited to the periphery of the disk in *A. armiger.* Pronotum without white stripes as in *A. ovatus*. Male paraproct process with subapical ventrally directed tooth, unlike the apical, mesally directed tooth of *A. segnis* and *A. strobilion*. Male pronotum is not heavily rugose as in *A. giganteus* and *A. tinkhamorum*.

Etymology. Gr. *khioneos* snowy white. Descriptive of the White Mountains type locality.

Notes. Gene trees found conflicting relationships of this lineage: nDNA (Fig. 2) found *A. khioneos* related to *A. ovatus* and *A. giganteus*, while mtDNA (Fig. 3) found relationship with the eastern Mojave *A. armiger*, *A. segnis*, *A. strobilion*, and Colorado Desert *A. tinkhamorum*. The White Mountains are geographically situated between the Spring Mountains of Nevada and the Sierra Nevada of California, suggesting a hypothesis of gene flow when Ovatus Group populations were panmictic.

Material examined. See Type Material above.

Aglaothorax gurneyi (Rentz & Birchim, 1968)

Aglaothorax ovatus—Tinkham, 1944: 289 (Incorrect synonymy).
Neduba (*Aglaothorax*) *gurneyi*—Rentz & Birchim, 1968: 65.
Fig. 6 (distribution), Fig. 14 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 4 (male terminalia), Plate 7 (female subgenital plate), Plate 10 (male titillators), Plate 14 (male calling song).

Common name. Gurney's Shieldback.

History of recognition. Confused with *A. ovatus* (Tinkham 1944) before description. Described in *Neduba* (*Aglaothorax*) (Rentz & Birchim 1968). Returned to *Aglaothorax* (Rentz & Colless 1990) where it is currently classified (Cigliano *et al.* 2025). See Cigliano *et al.* (2025) for complete synonymy.

Type material. The holotype male deposited in ANSP is from Lake Arrowhead in the San Bernardino Mountains, San Bernardino County, California. Images of the type are available at OSFO (Cigliano *et al.* 2025). PARATYPES EXAMINED: (n=5), **USA, CA, San Bernardino Co.,** Barton Flats, 34.172509, -116.863083, 1937 m, 21-VIII-1936, no collector, CAS, 1♀; Lake Arrowhead, 34.248340, -117.189208, 22-VIII-1958, P. Paige, CAS, 1♂; same data except IX-1958, P Palge, CAS, 1♂; same data except VII-1958, no collector, CAS, 1♂; San Bernardino Mountains, 4 mi. W of Running Springs, 34.207766, -117.179377, 2195 m, 12-X-1952, ER Tinkham, CAS, 1♂; TOPOTYPES EXAMINED: (n=11) **USA, CA, San Bernardino Co.,** San Bernardino Mountains, 0.8 mi. E of Lake Arrowhead City on Hwy 173, 34.248339, -117.175167, 1520 m, 20-VII-1992, d B Weissman, CAS, 2♂, 2♀; SR173 near Old Mill Road, Cedar Glen, 34.2562, -117.1683, 1900 m, 12-VII-2002, JA Cole, AMNH, 1♂, 1♀; same data except LACM, 2♂, 3♀.

Measurements. (mm, ♂n=6, ♀n=8) Hind femur ♂18.04–19.80, ♀19.84–22.60, pronotum total length ♂12.15–13.40, ♀11.35–13.10, prozona length ♂4.77–5.48, ♀5.25–7.54, metazona dorsal length ♂6.82–8.18, ♀5.05–7.50, pronotum constriction width ♂3.35–3.75, ♀2.94–4.77, metazona dorsal width ♂8.05–9.20, ♀7.21–8.80, head width ♂5.40–5.90, ♀5.25–6.74, ovipositor length ♀16.75–19.45.

Distribution. San Bernardino and San Gabriel Mountains of the Transverse Ranges of Southern California.

Habitat. Coniferous forest understory. Taken from *Ceanothus* spp., Whorl-leaf Penstemon (*Keckiella* sp.), peavines (*Lathyrus* sp.), *Pinus* spp., and California Black Oak (*Quercus kelloggii* Newberry). Hides in leaf litter at the base of vegetation during the day. Several males (S89-56) collected singing at night from piles of brown twigs on the ground. Males also heard in the canopy.

Seasonal occurrence. Summer (7-VII-2004, JA Cole, LACM) through Fall (12-X-1952, ER Tinkham, CAS), adults presumably active until first freezing weather. Nymphs present into summer (1-VII, no collector, CAS).

Stridulatory file. (n=6) length 4.75–5.30 mm, 93–105 teeth, tooth density 19.3±0.8 (18.2–20.2) teeth/mm.

Song. (n=28) Frequently repeated single pulse trains or echemes that consist of no more than two pulse trains. Pulse trains last 70±20 s and repeat at a rate of 8.20±0.94 s^{-1}. Mean peak frequency is 12.41±3.08 kHz, with high frequency recordings showing peak frequencies as high as 18.93 kHz. The silent interval between echemes lasts 0.41–0.94 (mean 0.70±0.11) s.

Karyotype. (n=5) 2n♂=24 (22t+Xty t), T89-38 (S89-56).

FIGURE 14. *A. gurneyi* male and female habitus, calling song, male and female terminalia, and karyotype. Idiogram shows karyotype 2n♂=24. Sex chromosomes X and y are marked.

Recognition. Morphology, song, geography, habitat, karyotype. Body color wood-brown instead of the green, yellow, or tan of other Ovatus Group species, and without a reddish middorsal abdominal stripe. Tegmina brown instead of white as in other Ovatus Group species. Calling song with maximum of 2 pulse trains/echeme. Geography and habitat unique among Ovatus Group species: high elevation coniferous woodland in San Gabriel and San Bernardino Mountains as opposed to desert shrubland, pinyon-juniper, or Joshua tree woodland. Karyotype 2n♂=24 shared only with *A. segnis* among the Ovatus Group species.

Notes. This species is sister to all other members of the Ovatus Group (Figs. 2–4; Cole 2016) suggesting that this is a relict lineage that has been isolated in the sky islands of the San Bernardino and San Gabriel Mountains for some time. Populations are sympatric with *A. hulodomus* in the San Bernardino Mountains where chaparral meets mixed woodland. This is the only Ovatus Group species that inhabits mesic mixed woodlands. Males call from a variety of heights, most commonly on the forest floor but also in low bushes and high in conifers and oaks. Singing males may be difficult to approach surrounded by dry oak and pine leaf litter, the disturbance of which renders the singer silent for many minutes.

Material examined. (n=51) **Los Angeles Co.**, Mescal Picnic Area, Angeles National Forest, 5 miles northwest of Wrightwood on County Road N4 (Big Pines Highway), 34.3901, -117.7206, 1868 m, 16-VII-2002, JA Cole, 1♂, 1♀ JAC; same data except 7-VII-2004, 2♂, LACM; same data except 8-IX-2008, 4♂, LACM; same data except 1♂ JAC; **San Bernardino Co.**, 0.7 mi. W of Skyforest on Hwy. 18, 34.235284, -117.191491, 1707 m, 17-VIII-1982, d B Weissman, CAS, 2♂; Arrowbear Lake, 34.21106, -117.08507, 1867 m, 19-20-VII-2013, JA Cole, JF Eguizabal, 1♂ song record; Barton Flats, 34.172509, -116.863083, 1937 m, 1-VII-1936, no collector, CAS, 1♀; Camp O-ongo, near Running Springs, 34.207786, -117.109205, 25-30-VIII-1968, CL Hogue, LACM, 2♂; same data except 28-31-VIII-1967, CL Hogue, LACM, 2♂; same data except 16-22-VIII-1980, CL & JN Hogue, LACM, 1♂, 1♀; same data except 24-25-VIII-1981, CL & JN Hogue, LACM, 1♂; same data except 1-IX-1970, CL Hogue, LACM, 1♂; same data except 21-27-VIII-1982, JN Hogue, CSUN, 1♂; same data except 23-VIII-1979, JN Hogue, CSUN, 1♂; same data except 25-VIII-1975, JN Hogue, CSUN, 2♂, 1♀; same data except 27-VIII-1975, JN Hogue, CSUN, 1♂; same data except 29-VIII-1973, JN Hogue, CSUN, 1♂; Crestline, 34.241951, -117.285599, 1439 m, 2-IX-1933, W Brandler, LACM, 1♀; Hanna Flat Campground, San Bernardino National Forest, 34.28778, -116.97556, 2152 m, 10-11-VIII-2022, JA Cole, C Wong, LACM, 1♂; same data except JAC, 2♂; same data except 10-VIII-2023, JA Cole, C Wong, JAC, 1♂; Hanna Flat, San Bernardino National Forest, 34.28945, -116.97948, 4-IX-1953, A Menke, LACM, 1♂; Running Springs, 34.21518, -117.12670 1913 m, 19-20-VII-2013, JA Cole, JF Ramirez, LACM, 5♂, 2♀, 1 pair in copula; San Bernardino Mountains, 2.5 mi. NW of Running Springs on Hwy. 18, 34.233429, -117.140217, 1829 m, 17-VIII-1982, d B Weissman, CAS, 5♂; San Bernardino Mountains, State Highway 18, 0.7 mi. W & E of Skyforest, 34.235284, -117.191491, 1750 m, 26-VII-1989, DB & DW Weissman, CAS, 5♂; San Bernardino, 34.088624, -117.280598, 9-VIII-1978, ER Tinkham, CAS, 1♂; Tiron, San Bernardino Mountains, 34.125566, -116.876415, 1829 m, 1-XI-1982, ER Tinkham, CAS, 1♂;

ERRONEOUS LABELS: (n=2) **USA, CA, San Bernardino Co.**, Blythe, 33.610302, -114.596346, 81 m, 1-VIII-1933, LJ Muchmore, LACM, 1♂, 1♀.