

Dyer Mountain Rdg., 40.239055N, 121.03246W, 2279 m, 27-VIII-1968, FL Blanc, CSCA; 1♂, Laufman Campground, Plumas National Forest, 3.5 mi. S of Milford on Milford Grade Rd., 40.135N, 120.3483W, 1554 m, 13-14-VIII-2002, JA Cole, LACM; 1♂, same data except JA Cole, JAC; 2♂, same data except 18-VII-2012, JA Cole, LACM; 5♂, same data except 8-VIII-2014, JA Cole, DB Weissman, LACM; **Plumas Co.**, 1♂, Almanor, 40.217386N, 121.17413W, 1377 m, 16-VII-1940, no collector, CAS; 2♂, Hallsted Campground, 0.25 mi. W of Twain on SR 70, 40.0174N, 121.0745W, 864 m, 1-4-VII-2000, JA Cole, LACM; 3♂, same data except 13-16-VII-2004, JA Cole, LACM; 1♂, 2♀, same data except JAC; 1♂, same data except 15-17-VIII-1997, JA Cole, LACM; 4♀, same data except 7-10-IX-2001, JA Cole, LACM; 1♂, same data except 15-17-VIII-1998, JA Cole, LACM; 1♂, Johnsville, 39.76073N, 120.695498W, 1573 m, 16-VII-1973, RA Belmont, BMED; 1♂, same data except 9-VIII-1961, JS Buckett, BMED; 1♂, same data except 25-VIII-1961, JS Buckett, BMED; 1♂, same data except 9-X-1974, H Pini, BMED; 1♀, Meadow Valley, 39.929612N, 121.060791W, 1153 m, 30-X-1954, B Forbs, BMED; 2♂ adults, 1♂ nymph, same data except 5-VII-1924, EC Van Dyke, CAS; 1♀, Quincy, 39.936836N, 120.947176W, 27-IX-1967, J Badaj, CSCA; **Shasta Co.**, 1♂, Bridge Bay Rd., yacht area, 40.75611N, 122.32167W, 4-VIII-1980, no collector, CAS; 1♂, Burney Fall, 41.010716N, 121.652765W, 853 m, 10-XI-1948, HP Chandler, CAS; 1♂, Crystal Lake, 40.934999N, 121.556861W, 1585 m, 2-IX-1953, HP Chandler, CAS; 1♀ nymph, Hat Creek, 40.829684N, 121.508994W, 1003 m, 10-VII-1952, GF Pronin, CAS; 2♂, same data except 11-VIII-1964, RE Pinger, CSCA; 1♀, same data except 19-VIII-1951, no collector, CAS; 1♀ nymph, same data except 20-VIII-1951, GF Pronin, CAS; 1♂, 4♀, same data except 22-VII-1965, S Seminoff, CSCA; 1♀ nymph, same data except 23-VI-1951, GF Pronin, CAS; 1♂, same data except 25-VIII-1951, GF Pronin, CAS; 1♀ nymph, Iron Mountain Mine, 40.675427N, 122.52807W, 305 m, 30-VII-1947, HP Chandler, CAS; 1♂, Lamoine, 40.977927N, 122.430847W, 377 m, 2-IX-1970, RE Whipp, CSCA; 1♀, Whiskeytown, 40.63876N, 122.559737W, 390 m, 10-X-1976, TR Haig, CSCA; **Siskiyou Co.**, in addition to type material (above), 1♀, Castle Lake, 41.227294N, 122.383254W, 1554 m, IX-1953, HP Chandler, CAS; 1♀, Dunsmuir, 41.208209N, 122.271953W, 698 m, 7-VII-1970, V Pierce, CSCA; 1♀, Specimen Gulch, 41.13986N, 123.124485W, 25-VII-1967, AD & GJ Keuter, CAS; **Tehama Co.**, 1♂ nymph, 7 mi. NE Red Bluff, 40.25019N, 122.141936W, 4-IV-1961, T Gallion, CSCA; 11♂, 1♀, Potato Patch Campground, Lassen National Forest, 21.5 mi. SW of Chester off SR36 and SR32, 40.1894N, 121.5315W, 1128 m, 19-20-VII-2012, JA Cole, LACM; 4♂, same data except JAC; ♂3, ♀2, same data except 7-VIII-2014, JA Cole, DB Weissman, CAS.

Neduba cascadia Cole, Weissman, & Lightfoot, sp. n.

Fig. 9 (distribution), Fig. 17 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 1F–H (live habitus), Plate 4H (male calling song), Plate 7E (male ventral sclerite), Plate 11H (female subgenital plate).

Common name. Cascade Shieldback.

History of recognition. None.

Type material. HOLOTYPE MALE: **USA, OR, Jackson Co.**, Wildcat Campground, Hyatt Lake Complex, Cascade-Siskiyou National Monument, 42.18283N, 122.44775W, 1531 m, 27-29-VII-2016, JA Cole, JAC000002023 [specimen barcode], DNA218 [genomic], SING0616 [DNA extraction], JCR160727_02 [recording], 125 [teeth], 3.7 [mm stridulatory file length], tegmen in gelcap below specimen, deposited in CAS, Entomology type #19708.

PARATYPES (n = 12): 5♂, same data as holotype, LACM; 4♂, same data as holotype, CAS; 1♂, same data as holotype, JAC; 1♀, same data as holotype except 28-VIII-2019, DB Weissman & DC Lightfoot, CAS; 1♀, Woodruff Meadow, 30 mi. SW Crater L., 42.885125N, 122.509206W, 6-VIII-1960, JR Helfer, CAS.

Measurements. (mm, ♂n = 7, ♀n = 1) Hind femur ♂18.05–18.95 ♀19.91, pronotum total length ♂9.20–9.81, ♀8.85, prozona length ♂3.01–4.65, ♀4.55, metazona dorsal length ♂5.10–6.80, ♀4.30, pronotum constriction width ♂2.07–2.30, ♀2.55, metazona dorsal width ♂6.50–7.25, ♀6.49, head width ♂4.10–4.68, ♀5.02, ovipositor length ♀16.00.

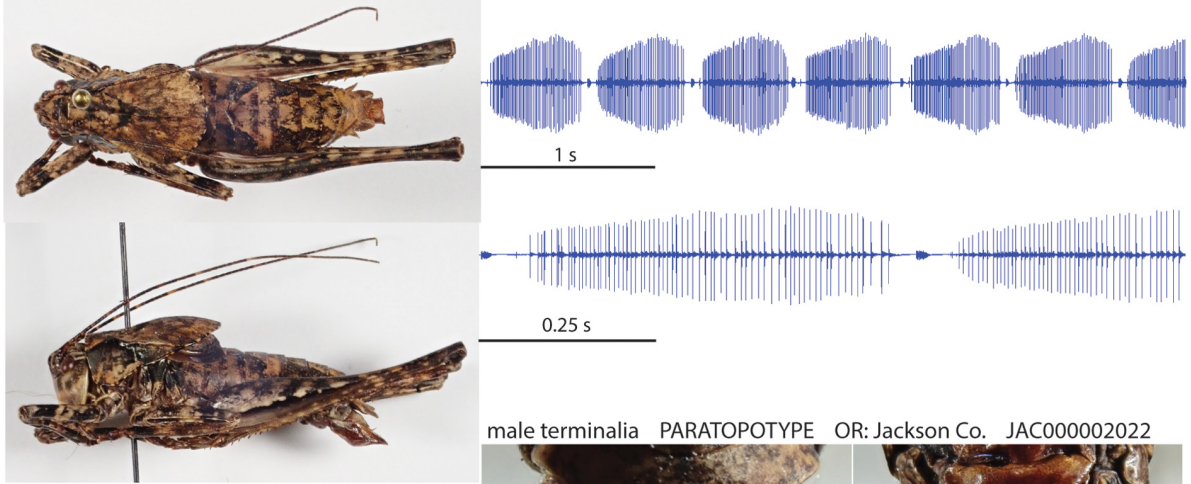
Distribution. Southern Cascade and Siskiyou mountain ranges of southern Oregon.

Habitat. Understory and edges of coniferous forest.

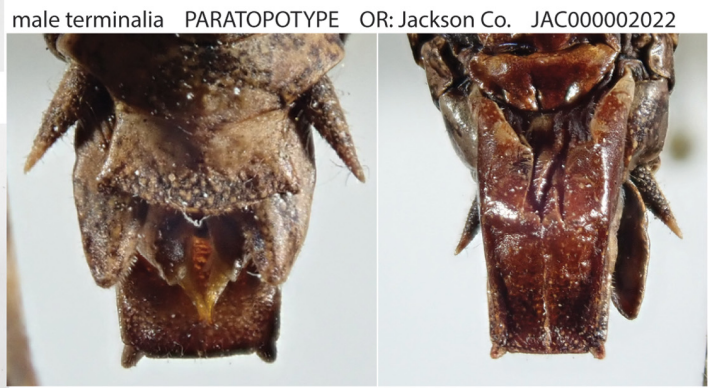
Seasonal occurrence. Scant records are from mid-July through late August. Adult activity probably lasts from midsummer through fall until first frosts.

Stridulatory file. (n = 4) length 3.4–3.7 mm, 125–133 teeth, tooth density 36.7 ± 2.1 (33.8–38.8) teeth/mm.

male HOLOTYPE OR: Jackson Co. JAC000002023 calling song PARATOPOTYPE OR: Jackson Co. 19.9°C JCR160727-01



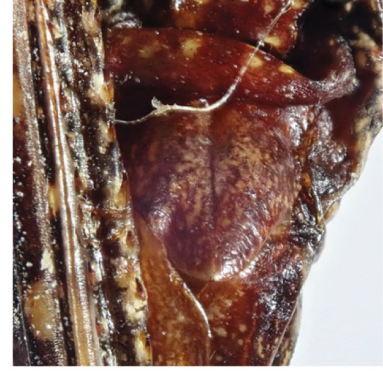
female PARATOPOTYPE OR: Jackson Co. JAC000002032



ventral sclerite TOPOTYPE JAC000002025



female terminalia JAC000002032



male PARATOPOTYPE OR: Jackson Co. JAC000002030



karyotype PARATOPOTYPE OR: Jackson Co. S19-70 T19-16

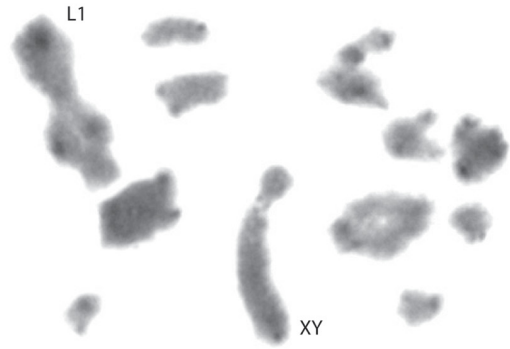


FIGURE 17. *N. cascadia* male and female habitus, calling song, male and female terminalia, karyotype.

Song. (n = 6) Typical Convexa Clade “zwee-zwee” song type but with a significantly slower PTR of $1.8 \pm 0.1 \text{ s}^{-1}$ (ANCOVA $P = 1.08 \times 10^{-5}$) and longer MPTL of $498.2 \pm 65.5 \text{ ms}$ (ANCOVA $P = 4.27 \times 10^{-11}$) than all other Convexa Clade taxa. PTF is $13.9 \pm 2.2 \text{ kHz}$.

Karyotype. (n=2) $2n \text{♂} = 26 (2m + 22t + Xt + Yt)$ T19-16, S19-90, paratopotype.

Recognition. The male ventral sclerite of *N. cascadia* has a blunt apex with scattered large tubercles and a short lateral process that blends into the shaft by an obtuse angle. This contrasts with *N. convexa* and *N. longiplutea*, both distributed to the south, which have the ventral sclerite apex low if not flat and a long lateral process with numerous fine tubercles that are arranged in rows. *N. steindachneri* to the north has a mushroom-shaped ventral sclerite with few large tubercles and a blunt, recurved lateral process. The female subgenital plate is unique among the Convexa Clade in having straight apical margins. The slow PTR separates the song of *N. cascadia* from all other Carinata Group species; *N. steindachneri* to the north has the fastest PTR in this species Group.

Etymology. *cascadia*, reflecting the southern Cascade Range distribution.

Notes. The distribution of this species lies between that of *N. steindachneri* to the north and *N. convexa* to the south. Further studies are needed to determine the limits of the ranges of northern Carinata Group taxa. Museum specimens from intermediate localities are nymphs and are only tentatively identified as this species. The calling songs and genitalia of all three species differ, so sympatry may be expected if these differences confer reproductive isolation. That calling song extremes of PTR occur in two species with adjacent ranges suggests prezygotic reproductive isolation mediated by calling song.

Material examined. In addition to type material (above), QUESTIONABLE PLACEMENT (n = 3): **USA, OR, Jackson Co.**, 2♀ nymphs, Little Applegate River, 42.198722N, 123.045356W, 701 m, 6-VIII-1950, B Malkin, CAS; 1♀ nymph, Union Creek, 42.906905N, 122.445598W, 7-31-VIII-1950, B Malkin, CAS.

Neduba steindachneri (Herman, 1874)

Fig. 9 (distribution), Fig. 18 (male and female habitus, calling song, male and female terminalia, karyotype), Plate 1E (live habitus), Plate 4I (male calling song), Plate 7D (male ventral sclerite), Plate 9I (male titillators), Plate 11I (female subgenital plate).

Common name. Steindachner’s Shieldback.

History of recognition. Originally described in *Tropizaspis* from Fox Island, Puget Sound, Washington. Caudell (1907) synonymized this species under *N. carinata*. This species was subsequently removed from synonymy on the basis of the wide distance between type localities, but without examination of specimens (Rentz & Birchim 1968). **NEW COMBINATION:** *N. picturata* (Scudder 1899) is transferred under the synonymy of this species, rather than *N. diabolica*, given the type was collected during the Northwestern Boundary Survey (Caudell 1907). This survey, from 1857-1861, was led by B.R. Kennerly, along the 409-mile-long Canadian-US border between the Rocky Mountains and Point Roberts on coastal Washington.

Type material. The syntype series of males and females is in NMW Vienna. Lectotype male here chosen as the adult whose images appear, along with collection labels, on the OSFO (Cigliano *et al.* 2020). Label data of this specimen is as follows:

Small square label: “Stein-/dachner /1869[typed]/Califor [handwritten over label]

Wide rectangular label [handwritten]: Type n. sp. steindachneri/Fox Island Pouget Sound/1874 (<http://orthoptera.speciesfile.org/Common/basic/ShowImage.aspx?TaxonNameID=1141747&ImageID=208936>)

TOPOTYPES EXAMINED (n = 4): WA, Pierce Co., 4♂, Puget Sound, Fox Island, 47.235925N, 122.626948W, 16-VIII-1986, DB Weissman, CAS

Measurements. (mm, ♂n = 20, ♀n = 1) Hind femur ♂16.72–21.00, ♀19.80, pronotum total length ♂7.61–9.55, ♀7.56, prozona length ♂3.34–4.41, ♀1.94, metazona dorsal length ♂4.15–5.83, ♀5.62, pronotum constriction width ♂1.95–2.55, ♀2.60, metazona dorsal width ♂5.65–6.90, ♀5.50, head width ♂3.71–4.45, ♀4.69, ovipositor length ♀14.18.

Distribution. Central Oregon Cascade and Coast Ranges north to coastal British Columbia.

Habitat. Understory of fir and fir-oak forests. On grasses, low branches, *Ribes*, and leaf litter.

Seasonal occurrence. Summer through fall, from July (6-VII-1926, CL Hubbs, CAS) through September (19-IX-2015, JA Cole, LACM).