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Variation and pigmentation in the milliped, *Xystocheir brachymacris* Shelley, 1996, from the northern Sierra Nevada foothills, California, USA (Polydesmida: Xystodesmidae: Xystocheirini)

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**Abstract.** A newly discovered population of *Xystocheir brachymacris* Shelley, 1996 (Polydesmida: Xystodesmidae: Xystocheirini), in Placer County (Co.), California, exhibits an unusual grayish-black color dorsally with mottled, ovoid patches at paranotal bases; it constitutes northern generic and specific range extensions of ~28.4 km (17.6 mi). The gonopods differ from those in the El Dorado Co. population in having shorter/acuminate prefemoral processes and blade-like, rather than spatulate, processes “B” that angle away from the solenomere instead of overhanging it. Additionally, a strong distomedial prefemoral lobe, absent from the El Dorado population, arises from the stem in Placer Co. males. Authorship of Xystocheirini is properly attributed to Hoffman, 1980.

**Key words:** branch, El Dorado Co., Placer Co., process “B”, projection, Sierra Nevada, solenomere, *Xystocheir*.

## Introduction

The endemic milliped genus *Xystocheir* Cook, 1904 (Polydesmida: Xystodesmidae: Xystocheirini), occupies two regions of California – the western and central Coast Range from northern Mendocino to northern Monterey Counties (Cos.) with an allopatric species in San Luis Obispo Co. (SLO), and the western slope and foothills of the Sierra Nevada from El Dorado to Tulare Cos. It surrounds San Francisco and San Pablo Bays, and a subcontinuous “isthmus” extending from Solano to Sacramento Cos. connects the principal areas (Shelley 1996, 2002). Only one sample, the type, exists of the SLO species, but the Pacific Coastal fauna is otherwise well known and copiously represented in United States repositories, particularly in California. Less material exists of the “Sierran” species, and the northernmost – *X. brachymacris* and *X. solenofurcata*, both by Shelley (1996) and inhabiting El Dorado and Amador Cos. – are represented by only four samples each. On 21 February 2014, DJR visited Sugar Pine Reservoir OHV (Off Highway Vehicle) area, Tahoe National Forest, Placer Co., and discovered a population of small-bodied, grayish-black xystodesmids (Fig. 1) unlike any reported. The smooth, glossy dorsums correspond to the condition in *X. brachymacris* in adjacent El Dorado Co., but Shelley (1996) only had access to blanched, preserved specimens when he described the milliped. *Xystocheir* is new to Placer Co., where the known xystodesmids – *Wamokia discordis* and *W. remota*, both by Bucket and Gardner (1968) (Xystocheirini), *Selenocheir sinuata* Shelley, 1994 (Chonaphini), and *Sigmocheir furcata* Shelley, 1995 (Sigmocheirini) (Buckett and Gardner 1968; Shelley 1994, 1995, 1999, 2002; Hoffman 1999) – possess relatively bold, striking colors. The small body-size and dark coloration suggest a new species, but the gonopodal telopodites exhibit the general branching pattern of *X. brachymacris* with different configurations and proportions (Fig. 2–6). We therefore interpret the millipeds as a new population and variant of *X. brachymacris*, which constitute a short northern range extension of the Sierran region. The new individuals alter Shelley’s (1996) diagnosis, so we present a new account that incorporates attributes of this form. Specimens are deposited in the North Carolina State Museum of Natural Sciences, Raleigh.

## Taxonomy

**Order Polydesmida Pocock, 1887**  
**Suborder Leptodesmidea Brölemann, 1916**  
**Superfamily Xystodesmoidea Cook, 1895**  
**Family Xystodesmidae Cook, 1895**  
**Subfamily Xystodesminae Cook, 1895**  
**Tribe Xystocheirini Hoffman, 1980**

Hoffman (1999) mistakenly attributed tribal authorship to Cook without a date, perhaps because he confused this name with Xystodesmidae/inae, which Cook (1895) did author, or because Cook (1904) subsequently authored the genus. However, the first usage of *Xystocheir* at the family-group level was by Hoffman (1980), as he then noted, and authorship is properly attributed to him.

## Genus *Xystocheir* Cook, 1904

### *Xystocheir brachymacris* Shelley, 1996

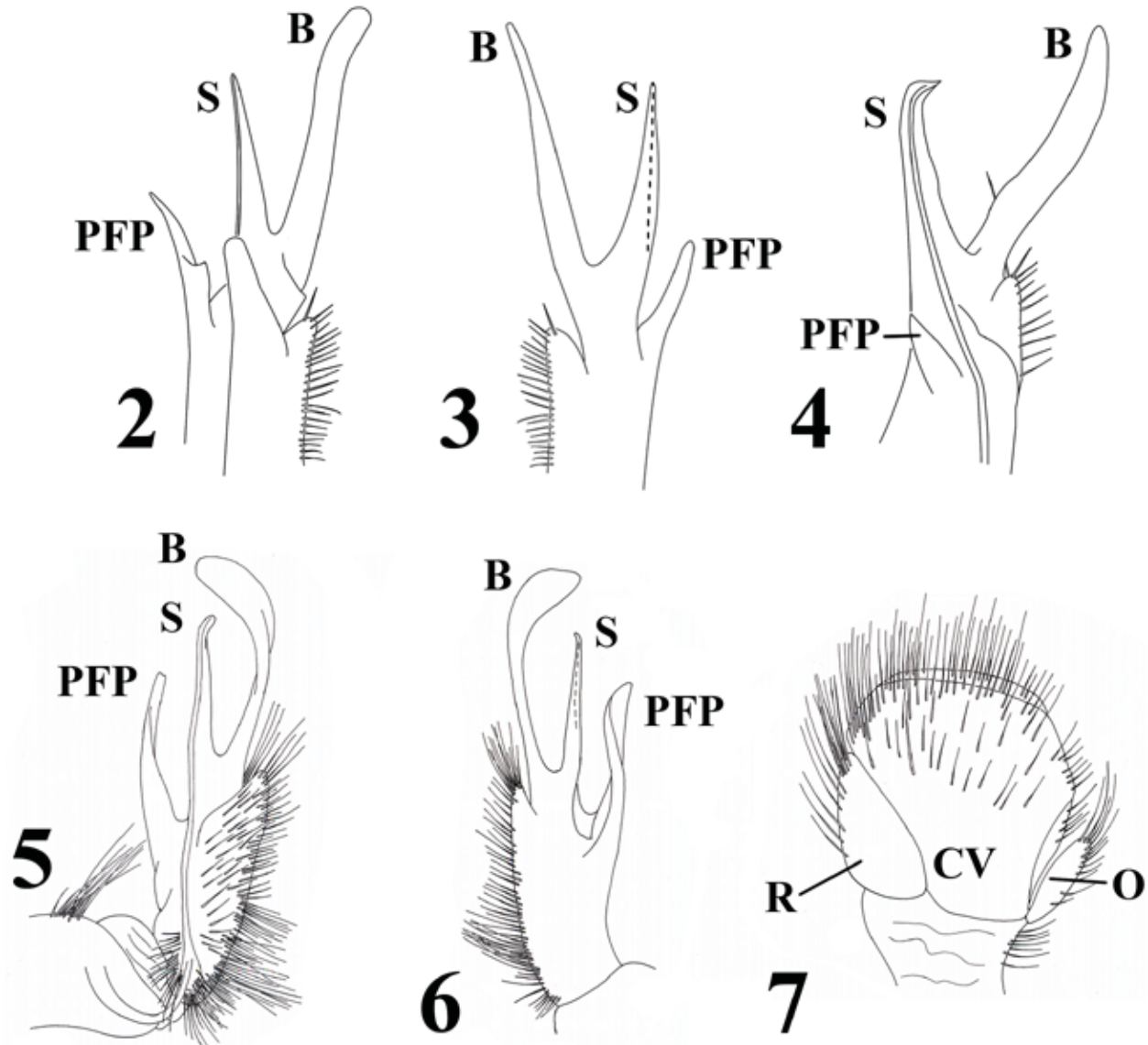
*Xystocheir brachymacris* Shelley, 1996: 1353–1354, fig. 39–41; 2002: 111. Hoffman 1999: 381.  
Figures 1–7

**Type specimens.** Male holotype and two male and one female paratypes (National Museum of Natural History, Smithsonian Institution, Washington, DC) collected by W. D. Shepard, 19 April 1992, ca. 1.6 km (1.0 mi) NE Pacific House, El Dorado Co., California.

**Color** (of Placer Co. population) (Fig. 1). Collum, metaterga, and paranota subuniformly glossy grayish-black with lightly speckled ovoid areas adjacent to paranotal bases, pigmentation extending onto caudolateral paranotal extensions and medial surfaces of peritremata; lateral margins of peritremata and caudal edges of metaterga light gray; epiproct speckled dark gray. Epicranium speckled dark gray, continuing through interantennal region and entire lengths of frons and genae; antennae somewhat translucent light gray, sterna and legs translucent whitish.



**Figure 1.** Dorsal view of Placer Co. male of *X. brachymacris*.



**Figures 2–7.** Genitalia of *X. brachymacris*. 2–4). Male from Placer Co. 2) Telopodite of left gonopod, medial view. 3) The same, lateral view. 4) The same, anteriomedial view. 5–6) El Dorado Co. male. 5) Left gonopod, medial view. 6) Telopodite of the same, lateral view. 7) Cyphopod of El Dorado Co. female. B, process “B”; CV, caudal valve; O, operculum; pfp, prefemoral process; R, receptacle; S, solenomere. Figures 5–7 reproduced from Shelley (1996, fig. 39–41) with permission of NRC Research Press.

**Diagnosis.** Epicranium and metaterga smooth and glossy or lightly granular throughout body, without trace of papillation; sides of collum not uplifted; caudolateral paranotal corners subacuminate and slightly prolonged, extending directly caudad or hooked gently mediad. Gonopodal prefemoral process a distinct projection, widely detached from telopodital stem, long and upright, blade-like or spiniform, extending to around midlengths of acropodal branches, apically broad or narrow. Acropodite with two terminal branches, process “A” absent; solenomere positioned between prefemoral process and branch “B”, extending to around  $\frac{3}{4}$  length of latter, upright but curving/bending slightly caudad apically; process “B” either entirely blade-like and angling caudad and away from solenomere distally, or narrow basally, expanding beyond midlength, and curving broadly anteriad over distal extremity of solenomere, distally spatulate, apically broad (Fig. 2–6). Cyphopod without lateral accessory body (Fig. 7).

**Variation.** Measurable males from Placer Co. (n=4) vary from 24.0–29.7 mm in length and 4.2–5.6 mm in width; females (n=4) vary from 26.8–27.3 mm in length and 5.5–5.7 mm in width.

The prefemoral process is a distinct structure, well separated from the telopodital stem, in both the El Dorado and Placer populations, being broad and extending beyond midlength of the solenomere in the former and subspiniform and terminating short of midlength in the latter (Fig. 1–3, 5–6). The basic generic acropodital pattern consists of three distal branches with the solenomere between the anterior and caudal projections, labeled “A” and “B,” respectively. Branch “A” is absent in *X. brachymacris*, so the solenomere is anterior and situated between the prefemoral process and branch “B.” In El Dorado forms (Fig. 5–6), “B” is elongate, distally expanded/spatulate, and overhangs the solenomere that curves toward it apically; the projection is blade-like and angles caudad away from the solenomere in Placer Co. males (Fig. 2–4). In both populations, the prefemoral region of the telopodital stem extends distad as a hirsute lobe on the caudal side beyond the origin of the acropodite, and in Placer Co. forms, it connects basally with a longer and broader anteriorly directed lobe. The only noticeable variation among El Dorado specimens is a broader, more expanded prefemoral process, curving slightly caudad, on the male from Blodgett Forest, El Dorado Co.

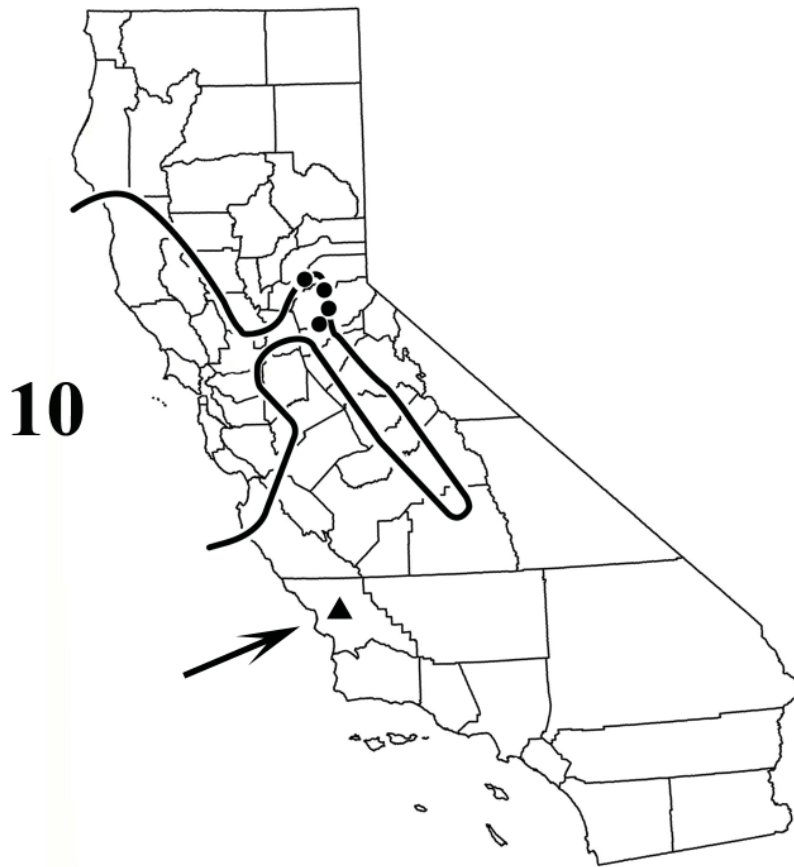
**Ecology.** The Blodgett Forest male was found under a log; the Placer Co. specimens were concentrated in a 2–3 sq. m. (20–30 sq. ft.) surface area near a stream in a mixed alder/conifer forest (Fig. 8–9). Individuals were collected at 7:30 PM, approximately one hour after dark, in mixed-conifer/alder litter within about 9.2 m (30 ft.) of Pagge Creek, a perennial stream. Tree species in order of dominance were ponderosa pine (*Pinus ponderosa* Douglas), incense cedar (*Calocedrus decurrens* (Torr.)), Douglas fir (*Pseudotsuga menziesii* (Mirb.)), white fir (*Abies concolor* (Gordon)), and white alder (*Alnus rhombifolia* Nutt.). Soil beneath the litter, where no specimens were found, consisted of loose sandy clay loam.

**Distribution.** We present (Fig. 10) an updated distribution map of *Xystocheir* with localities of *X. brachymacris*, the northernmost Sierran species, shown by black dots. Localities in Placer and El Dorado Cos. are approximately 28.4 km (17.6 mi) apart and separated by the Rubicon and Middle Fork American rivers; the Placer Co. specimens therefore extend the generic and specific ranges by this dimension. In addition to the types, the following samples were examined:

CALIFORNIA: *El Dorado Co.*, 20.8 km (13 mi) E Georgetown, Blodgett Forest, M, 6 May 1972, J. B. Heppner (FSCA); and Snowline Camp, along U.S. Hwy. 50 just W Pollock Pines, M, 21 June 1948, J. W. MacSwain (CAS). *Placer Co.*, 20 km (12.5 mi) NE Foresthill, Sugar Pine OHV area, Tahoe National Forest (39° 7' 4.06" N, 120° 45' 30.30" W), 1,186 m (3,890 ft.), 7M, 21 February 2014, D. J. Ross (NCSM), and M, 4 F, 1 March 2014, D. J. Ross (NCSM).



**Figures 8–9.** Broad environmental views of the riparian, mixed alder/conifer habitat at the Placer Co. *X. brachymacris* locality. **8)** Side view showing sample area (arrow) on level ground above slope to Pagge Creek. **9)** View looking up Pagge Creek with collecting area at right edge of photo.



**Figure 10.** Distribution of *Xystocheir*. Dots, *X. brachymacris*. Triangle, denoted by the arrow, *X. bistipita* Shelley, 2006, the allopatric species in San Luis Obispo Co.

**Remarks.** Representatives of *Xystocheir* do not display the bold colors characteristic of other California xystodesmid genera; theirs tend to be subtle and muted, like soft light orange, green, and olive (Shelley 1996). The drab, gray coloration of Placer Co. *X. brachymacris* is consistent with the generic pattern but distinctive in being unique to this population; whether it is also shown by El Dorado specimens is unknown.

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