



A NEW SPECIES OF *PARACAPNIA* FROM CALIFORNIA (PLECOPTERA: CAPNIIDAE)

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ABSTRACT

Paracapnia baumanni sp. n. is described from northern California. The apterous new species is related to *P. humboldta* and *P. boris* by sharing the mesosternal postfurcasternal plates separated from the spinasternum, but the epiproct of the new species is shorter, widest in the middle, and lacking an upturned tip and the female abdominal terga are completely sclerotized.

Keywords: Plecoptera, stonefly, Capniidae, *Paracapnia*, new species

INTRODUCTION

The Nearctic species of the winter stonefly genus *Paracapnia* were reviewed by Stark and Baumann (2004) who recognized five species. Recently, Baumann and Lee (2007) described a sixth species from northern California. Surprisingly, another new species was collected by the second author from rheocrenes or springs in Trinity and Shasta counties, California. The new species belongs apparently to a distinct clade of the genus that includes *P. humboldta* Baumann and Lee and *P. boris* Stark and Baumann by the shared character state of the mesosternal postfurcasternal plates separated from the spinasternum. This character has not been evaluated in the Palearctic species (see Stark and Baumann 2004). Additionally, adults of these three species are apterous.

MATERIAL AND METHODS

Illustrations of the adult were drawn using a Wild M8 stereo dissecting microscope equipped with a lightfield-darkfield base and camera lucida. Electron

micrographs were produced at the Brigham Young University Electron Optics Laboratory using a Philips XL2 ESEM FEG.

The holotype male will be deposited at the USNM (United States National Museum, Smithsonian Institution, Washington, D.C., USA). All other specimens listed in this study are located at the Brigham Young University Collection (BYUC), Provo, Utah, the C.P. Gillette Museum of Arthropod Diversity (CSUC), Colorado State University, Fort Collins, Colorado, and the Jonathan Lee Collection (JJLC), Eureka, California.

RESULTS AND DISCUSSION

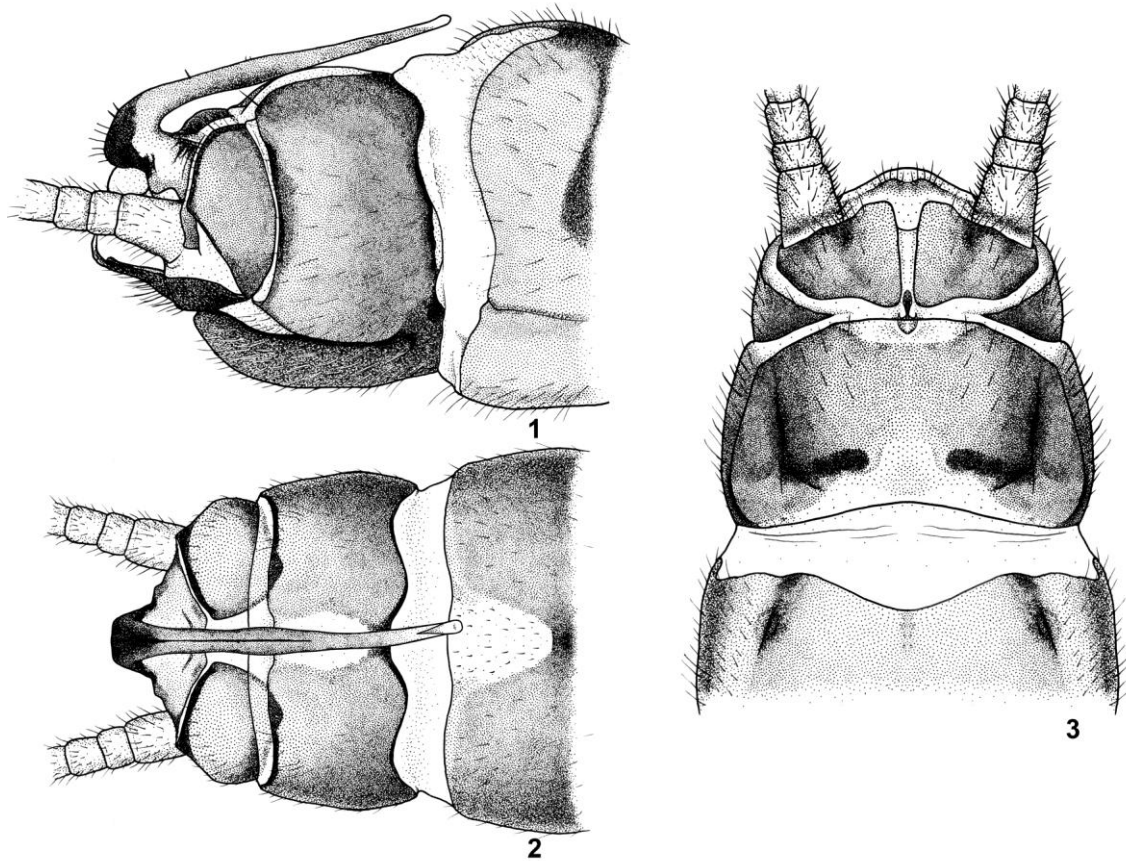
Paracapnia baumanni sp. n.
(Figs. 1-9)

Material examined. Holotype ♂, and 19♂, 18♀ paratypes, USA California, Trinity Co., unnamed spring, Hwy 299, mile 16.23, 8-II-2010, J.J. Lee CSUC, (Holotype and allotype USNM, BYUC, CSUC, JJLC,

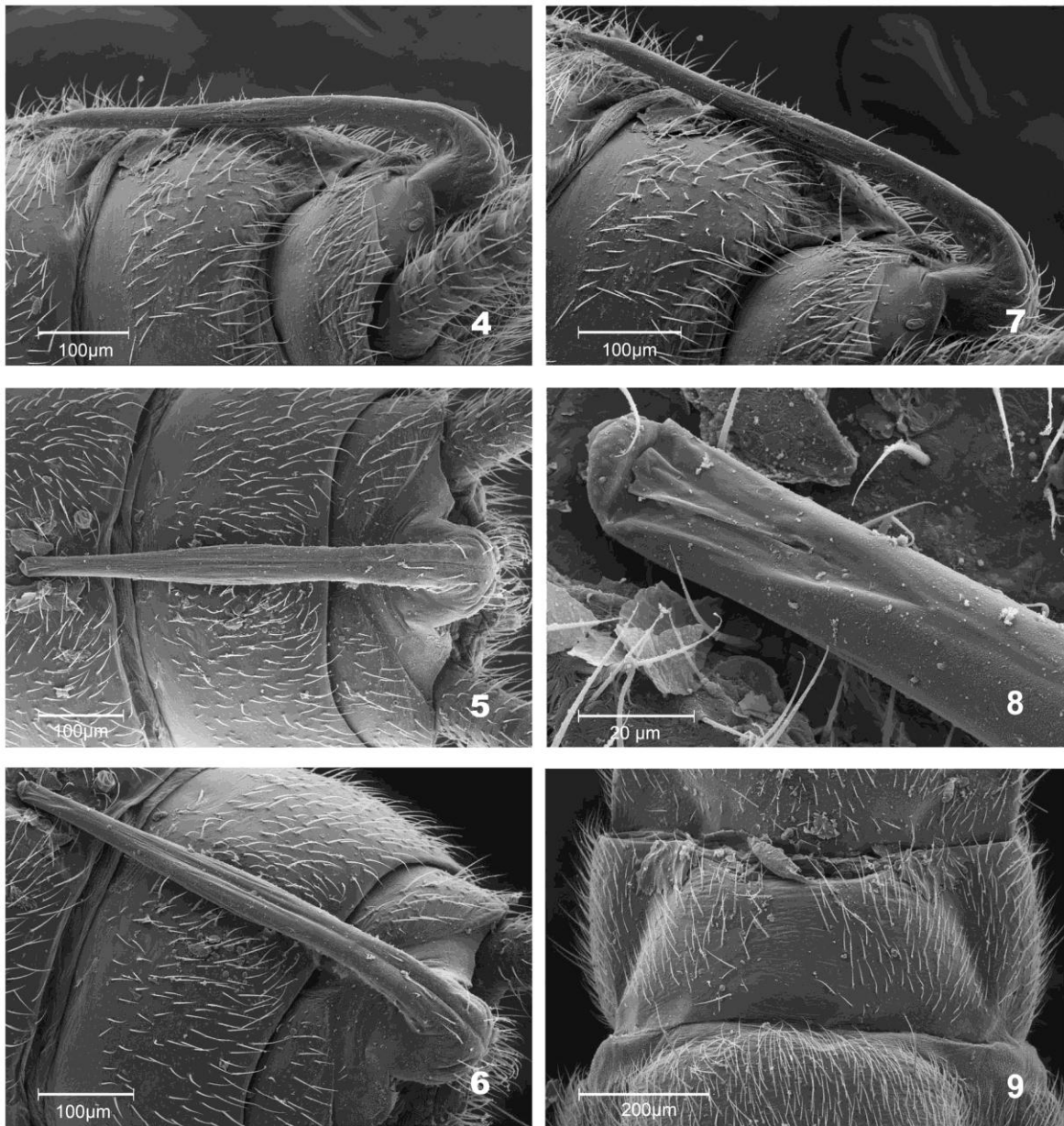
paratypes BYUC, JJLC). Additional paratypes: USA, California, Trinity Co., creek, Crystal Creek Road, 25-I-85, D.R. Lauck, 1♀ (BYUC); same location as holotype, 10-II-10, J.J. Lee, 21♂, 11♀ (JJLC); unnamed spring, Hwy 299, mile 14.61, 10-II-10, J.J. Lee, 16♂, 10♀ (JJLC); Shasta Co., creek, Castle Crags State Park, Castle Creek Rd, mile 1.2, 18-II-10, J.J. Lee, 30♂, 15♀ (BYUC, CSUC, JJLC); tributary of creek, Castle Crags State Park, Castle Creek Rd, mile 1.5, 18-II-10, J.J. Lee, 9♂, 23♀ (JJLC).

Male. Apterous. Body length 5.0-5.5 mm. General color brown to black. Seventh tergum elevated mesally, membranous posteromedially. Eighth tergum anteriorly elevated mesally, membranous medially. Ninth tergum slightly sclerotized medially.

Mesosternal postfurcasternal plates separated from the spinasternum. Epiproct tubular, elongate, ca. 550 µm, in dorsal aspect margins subparallel, widest medially, opening at apex rotated clockwise ca. 40°; in lateral aspect slightly flattened, ventroapical margin not upturned, membranous seminal duct ca. apical 1/8 of apex, apparently lacking feather-like projections (Figs. 1-2, 4-8). Cerci long 15-16 segments. **Female.** Apterous. Body length 6.0-7.5 mm. General color brown to black. All terga complete, not divided mesally. Mesosternal postfurcasternal plates separated from the spinasternum. Subgenital plate broadly emarginated to slightly emarginated, not separated laterally by a membrane (Figs. 3, 9). Cerci long 15-16 segments.



Figs. 1-3. *Paracapnia baumannii*: 1. Male terminalia, lateral. 2. Male terminalia, dorsal. 3. Female terminalia, ventral.



Figs. 4-9. *Paracapnia baumannii*: 4. Male terminalia, epiproct, lateral. 5. Male terminalia, epiproct, dorsal. 6. Male terminalia, epiproct, slightly oblique view. 7. Male terminalia, epiproct, lateral. 8. Epiproct tip, dorsal. 9. Female subgenital plate, ventral.

Etymology. This species is named in the honor of our friend and colleague, Dr. Richard W. Baumann, Brigham Young University, who has spent his long and productive professional career studying the stoneflies of western North American, including the genus *Paracapnia*.

Diagnosis. *Paracapnia baumannii* shares the character state of the mesosternal postfurcasternal plates separated narrowly from the spinasternum both with *P. humboldta* and *P. boris*, also California species. In the male, the epiproct of *P. baumannii* is shorter, ca. 550 µm in length and widest medially, lacking an

upturned apex (Figs. 1-2, 4-8), whereas in *P. humboldta*, the epiproct is longer, ca. 675 µm, subequal in width from base to apex, angling off center and slightly upturned at the apex. The epiproct of *P. boris* has a distinct upturned apex and the membranous seminal duct and associated feather-like projections occurs at about ½ the dorsal length of the epiproct, whereas in *P. baumanni* the membranous area is near the apex and apparently lacks the associated feather-like projections (Fig. 8). The membranous seminal duct is reduced to almost the epiproct apex in *P. humboldta* (see Fig. 2 in Baumann and Lee 2007). The female of *P. baumanni* can be immediately distinguished from both *P. humboldta* and *P. boris* by all terga being completely sclerotized, not medially separated by membrane. The subgenital plate is similar to *P. boris* but not separated laterally by a membrane (Figs. 3, 9), as in *P. boris*.

Remarks. It is interesting to note that *Capnia fialai* described by Nelson and Baumann could be placed in *Paracapnia* (Nelson and Baumann 1990) sharing the character state of the epiproct with a dorsomedial membranous area. *Capnia fialai* also shares with *P. baumanni*, *P. boris*, and *P. humboldta* the apterous condition of the adults and the mesosternal postfurcasternal plates separated narrowly from the spinasternum. A comprehensive phylogenetic study of the species presently included in *Paracapnia* and close relatives is necessary to resolve the potential paraphyly of the genus as originally defined by Hansen (1946).

Four species of the seven known Nearctic species of *Paracapnia* are now known from California (Stark and Baumann 2004, Baumann and Lee 2007). It is suggested that additional rheocrene habitats be sampled throughout northern California to discover the distribution of the *P. boris* complex of species.

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