

## A NEW SPECIES OF *CAPNIA* (PLECOPTERA: CAPNIIDAE) FROM THE ROCKY MOUNTAINS OF COLORADO<sup>1</sup>

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**ABSTRACT:** *Capnia arapahoe* is described from specimens collected from the Front Range of the Rocky Mountains in Colorado. Figures are included for important taxonomic features. Phylogenetic relationships of this species to others in the genus are discussed. Ecological notes and other associated Plecoptera are also given.

The genus *Capnia* in the Nearctic region consists of about 50 species in western and boreal North America. The senior author's studies on the North American fauna have indicated many undescribed species, including 15 new species from California (Nelson and Baumann, 1987). During an investigation of the winter stoneflies of Colorado, another undescribed species was discovered.

### *Capnia arapahoe*, new species

Figs. 1-4.

**Description.** Male, body length 4.9mm; macropterous, length of forewing 5.0mm, length of hindwing 4.2mm; abdominal terga one through six unmodified, tergum seven with medial tuberculate knob, tergum eight divided medially by membranous area one-third width of segment, tergum nine with medial patch of membrane. Epiproct fusiform (Figs. 2-3), 0.64mm long and 0.10mm at greatest width, tip of epiproct with pair of short horns separated distally from main tube; epiproct recurved slightly (Figs. 1, 4), without distinct declivities; tip of epiproct slightly upturned, epiproct in relaxed specimen nearly reaching posterior margin of tergum eight; medial groove extending from apex approximately one-half length of epiproct.

**Material.** Male holotype, Colorado, Larimer Co., Elkhorn Creek at junction of Highway 14, 22 miles west of Fort Collins, 2012 m (6600'), 3 April 1987, B.C. Kondratieff and P. Zwick; deposited in United States National Museum. Male paratype, Colorado, Larimer Co., Young Gulch, above Ansel Watrous Campground, 1768 m (5800'), 22 March 1986, B.C. Kondratieff, deposited in the Brigham Young University Insect Collection at the M.L. Bean Museum.

The paratype is proportionately larger than the holotype, body length 5.6mm, forewing length 5.4mm, hindwing length (deformed) 4.2mm, epiproct length 0.70mm, and epiproct width 0.12mm, but agrees with the holotype in other details.

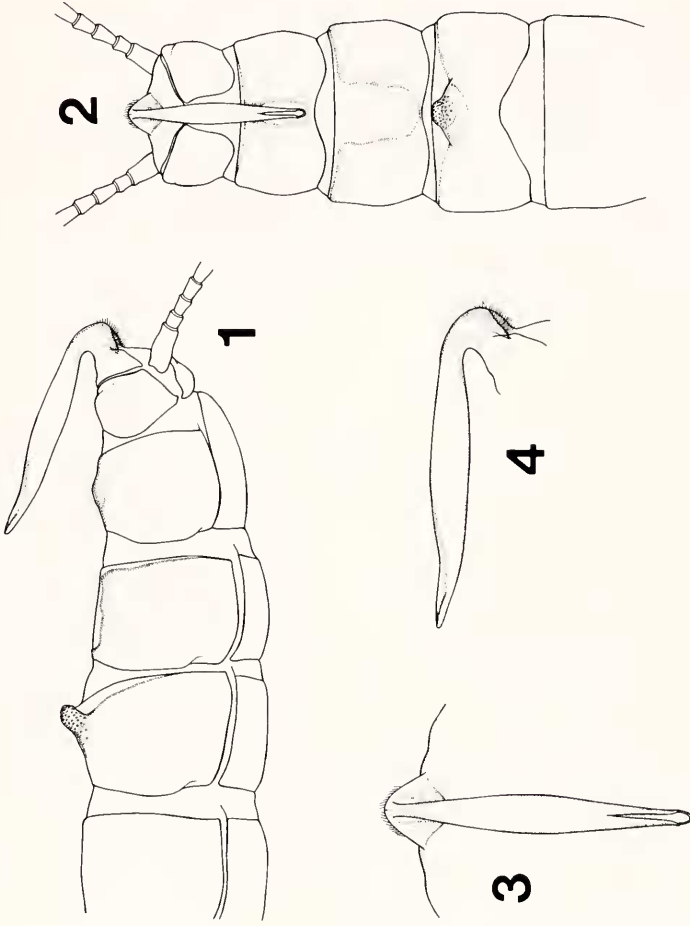
The female and immature stages are unknown.

**Etymology.** This species is named in honor of the Arapahoe Indians. The Cache la Poudre Valley at the eastern end of the Rocky Mountains was a favorite haunt of these natives of Colorado. The name is used as a noun in apposition.

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Figures 1-4. *Capnia arapahoe* new species. 1, male terminalia, lateral view. 2, male terminalia, dorsal view. 3, epiproct, dorsal view. 4, epiproct, lateral view.

**Diagnosis.** *Capnia arapahoe* is placed in the Decepta group (Nelson and Baumann, 1987) based on the presence of a well-differentiated tergal knob on abdominal segment seven and on the presence of horns on the tip of the epiproct. It differs from other members of the group in lacking a mesal bulbous expansion of the epiproct, and in the slim profile of the epiproct in both dorsal and lateral aspects. Members of the Decepta group include: *C. coyote* Nelson and Baumann, *C. decepta* (Banks), *C. pileata* Jewett, *C. sequoia* Nelson and Baumann, *C. teresa* Claassen, *C. tumida* Claassen, and *C. utahensis* Gaufin and Jewett. This species may be confused with *C. confusa* Claassen based on the general shape of the epiproct, but can be distinguished from *C. confusa* by the presence of a tuberculate knob on tergum seven and an epiproct which recurves slightly and bears horns.

**Remarks.** Both streams where this species has been collected are small tributaries of the Cache la Poudre River and are typical of the Front Range of the Rocky Mountains of Colorado. The upper reaches are typified by steep slopes and canyons with ponderosa pine dominating the sparse riparian vegetation, whereas the lower reaches near the confluence with the river are more open in topography with cottonwood, willow, and box elder trees occurring along the stream margins. The substrate consists of pebble, cobble, and areas of bedrock. In summer and fall, sections of both streams become intermittent.

Other species of winter stoneflies collected in association with *C. arapahoe* include *C. confusa* Claassen, *C. decepta* (Banks), *C. gracilaria* Claassen, *Capnura wanica* (Frison), *Zapada cinctipes* (Banks), and *Prostoia besametsa* (Ricker).

Numerous visits to the Young Gulch locality have failed to yield any additional specimens. The discovery of the female may provide additional insight into the phylogeny of the Decepta group.

**Phylogenetic and zoogeographic relationships.** The relationships among the species in the Decepta group were analyzed using the IBM PC version of the PAUP program (Swofford, 1985) with the Barberi group serving as the outgroup. The resulting tree placed *C. arapahoe* as the sister group to the remaining species in the group. The nearest relatives of *C. arapahoe* were *C. utahensis* and *C. sequoia*. This is interesting because the present ranges of these species are about 400 miles (640 km) from the localities where *C. arapahoe* has been collected while *C. decepta*, a more distantly related species, occurs in the same streams at the same time.

## ACKNOWLEDGMENTS

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## LITERATURE CITED

- Nelson, C.R. and R. W. Baumann. 1987. New winter stoneflies of the genus *Capnia* (Plecoptera: Capniidae) with notes and an annotated checklist of the Capniidae of California. *Entomography* 5: 485-521.
- Swofford, D.L. 1985. PAUP, Phylogenetic Analysis Using Parsimony, version 2.4 software for IBM-PC computer. Illinois Natural History Survey.
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