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David E. Ruiter  
*Littleton, Colorado*

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A NEW SPECIES AND NEW SYNONYM IN THE GENUS PSYCHORONIA (LIMNEPHILIDAE), WITH SIGNIFICANT RECORDS FOR CADDISFLIES (TRICHOPTERA) FROM WESTERN NORTH AMERICA

David E. Ruiter

The discovery of a new species of Psychoronia in New Mexico has led to a review of the other 2 species in the genus and a resultant synonymy. Additional work at small, isolated habitats in the arid West will undoubtedly result in the discovery of additional new species of Trichoptera. These isolated distributions also emphasize the need to protect such habitats whenever possible.

Two species previously have been placed in the genus Psychoronia, P. brevipennis (Banks 1904) and P. costalis (Banks 1901). Wiggins (1975) provided rationale for maintaining the genus Psychoronia and figured the adults of P. costalis. Wiggins (1975) also noted the similarity of the 2 species and illustrated the larvae of P. costalis (Wiggins 1977). Psychoronia brevipennis is known only from the female holotype. During preparation for this paper I attempted to collect at/near the New Mexico type localities for both P. brevipennis and P. costalis. The top of the Las Vegas Range (the type locality of P. costalis) is located west of Las Vegas, New Mexico, and just west of Beulah. The type locality of P. brevipennis is also located west of Las Vegas near the former townsite of Beulah (2438 m). I could not locate populations of Psychoronia at or near the Beulah townsite. Based on discussions with residents in the area and the condition of existing aquatic habitats, it appears that many typical P. costalis habitats (headwater springs and very small streams) were altered/destroyed to create water supplies for recreational homes being built in the area.

Based on examination of the lectotype and paratype males in the type series of P. costalis (MCZ #11676), the single female holotype of P. brevipennis (MCZ #11657), and numerous series of P. costalis specimens from Colorado, P. brevipennis, as Wiggins (1975) suggested, is a new junior synonym of costalis. The holotype female of P. brevipennis is small (about 8 mm from head to apex of abdomen) when compared to female specimens of P. costalis from Colorado (up to 14 mm total length). However, terminalia of the P. brevipennis holotype are well within the variability seen in P. costalis females. Banks' (1904) indication that the wing membrane of P. brevipennis does not have hairs is in error. The membrane of the wing is clothed with strong, upright hairs as I indicated for P. costalis (Ruiter 1995). The wing membrane of the new species described below also has a few upright hairs, although the majority of the hairs on the membrane are fine and recumbent, similar to the genus Hesperophylax.

Terminology for genital structures follows that of Schmid (1980).

Psychoronia brooksi, new species

(Figs. 1–10)

The discovery of this new species occurred while I was looking for P. brevipennis. The occurrence of Psychoronia in this habitat, a small, high-velocity stream, was totally unexpected as my previous collections of Psychoronia had been only from headwater spring

120 South Grant Street, Littleton, CO 80121.
sources. This collection is another example of a species occurring on an isolated mountain in the southwestern United States. This species is named for Bill Brooks, a comrade with numerous interests, one of which is occasionally collecting caddisflies.

ADULT.—Wings and body yellowish brown; forewing membrane patterned, with pale areas margined with darker brown (Fig. 1), wing membrane with numerous long, upright and recumbent setae, nearly as long as those on wing veins. Wings of female extending beyond apex of abdomen, as long as wings of male. Length from front of head to end of forewings 16–18 mm. Spurs 1–3–4.

MALE (Figs. 2–4).—Tergite VIII with an apical patch of large, upright spines (in *P. costalis* this patch comprises slender, recumbent spines). Segment IX separated dorsally, with widest portion slightly above the mid-lateral line. Inferior appendages large, directed dorsocaudad. Segment X with intermediate appendages fused into triangular structure surrounding anal opening in caudal view, its dorsal apex extended into narrow, slightly bifid process (in *P. costalis* the apex of the intermediate appendages is acute and recurved). Superior appendages large, mesally concave, dorsally slightly concave with blunt apices; extending caudal nearly to apices of inferior appendages. Phallic parameres each terminated in several long, strongly sclerotized spines divided completely to base of paramere, the dorsal portion a thick, sinuous spine, curving laterad apically and apex with minute serrations along dorsal margin, the ventral aedeagal spines straight, clumped at their base (in *P. costalis* the parameres are shorter and the dorsal portion is composed of short, fused spines).

FEMALE (Figs. 5–7).—Ventromesal sclerotized spur on sternite VI absent. Abdominal sternal setae equal in thickness to tergal setae. Tergite IX bandlike, separated by faint suture from its very small ventrolateral lobes; ventrolateral lobes widely separated ventrally by broad, slightly sclerotized supragenital plate. Median lobe of vulval scale clavate, with broad, truncate apex, not extending caudal as far as apices of lateral lobes. Segment X fused to tergite IX and with apex tubular; its dorsal margin slightly cleft, its ventral margin concave, entire. Appendages of segment X located dorsolaterally, extending well beyond its apex, triangular in dorsal, ventral, and lateral views (in *P. costalis* the appendages of segment X are very short, not extending to apex of X).

LARVA (Figs. 8–10).—Most characters typical of Limnephilini (Wiggins 1977). Mandibles each with cutting edge entire, except for single subapical tooth (in *P. costalis* mandibles with numerous apical teeth). Head and thoracic sclerites dark, nearly black, with faint muscle scars on head. Primary setae absent from anterior pronotal margin (in *P. costalis* primary setae are present and equally spaced). Dorsal and ventral gills present on abdominal segments 2–7, most with 3–5 filaments; lateral gills present only on segments 2 and 3, most specimens with 2 filaments for each lateral gill. Abdominal dorsal chloride epithelia absent, ventral chloride epithelia large, present on segments 2–7.

CASES.—The larval case is made of sand grains, only slightly tapered from wide anterior end to posterior, and slightly curved. Pupal case (17–20 mm) made of larger rock particles similar to that of *P. costalis* (see Wiggins 1977, Fig. 10.46), nearly straight, not tapered. Several cases have incorporated occasional live fingernail clams.


DIAGNOSIS.—Males of *P. brooksi* can be separated readily from *P. costalis* by the stiff, dark spines on tergite VIII versus the fine, hairlike spines on tergite VIII of *P. costalis*. In addition, phallic parameres of *P. brooksi* are at least twice as long as those of *P. costalis*. Females of *P. brooksi* have normal length wings that extend well beyond the abdomen, while wings of all females of *P. costalis* I have examined do not extend beyond the 5th abdominal segment and usually do not exceed...
Figs. 1–7. Psychoronta brooksi forewing and genitalia: 1, right side forewing; 2, male genitalia, left lateral view; 3, male aedeagus, left lateral view; 4, male genitalia, caudal view; 5, female genitalia, left lateral view; 6, female genitalia, ventral view; 7, female genitalia, dorsal view (VIII - tergite VIII segment, VIIIs - sternite VIII segment, IXt - tergite IX segment, IXvi - ventrolateral lobe IX segment, X - X segment, app. - appendage, inf. - inferior appendage, int. - intermediate appendage, sgp. - supragenital plate, sup. - superior appendage, vs. - vulval scale).
the 5th abdominal segment. Appendages of the female *P. brooksi* segment X extend posteriorly well beyond the apex of segment X, while those of *P. costalis* do not reach the apex of segment X. Larvae of the 2 species can be separated based on the setae of the pronotum: *P. costalis* has several evenly spaced setae along the anterior margin of the pronotum (see Wiggins 1977, Fig. 10.46), whereas these setae are absent in *P. brooksi*.

**REMARKS.**—The occurrence of a macropterous female *Psychoronia* conflicts with the primary character Banks (1916) used to define the genus: “female short-winged.” Wiggins (1977) separated *Psychoronia* larvae from *Hesperophylax* based on the lack of lateral gills beyond segment 3 in *Psychoronia*. This character seems to be valid for *P. brooksi*, although *P. brooksi* larvae usually have the posterior lateral gill branched. I have also seen occasional
Colorado *P. costalis* larvae with branched lateral gills. Another character that appears to separate *Psychoronia* larvae from *Hesperophylax* is the reduced number of primary setae along the anterior pronotal margin of *Psychoronia*. In *Hesperophylax* the primary setae are numerous and not evenly spaced.

*Psychoronia brooksi* is known only from the type collection, which consisted of numerous larvae and pupae. Adults were reared from pupae by placing the pupae in plastic bags along with a piece of damp moss. The bags were transported in a cooler on ice for about a week and then placed in a home refrigerator. Adults started emerging in the refrigerator about a month later. Larvae were numerous throughout all but the highest velocity habitats of the North Fork Rio Ruidoso. This flowing-water habitat, along with the scraper mandibles of the larvae, is unusual for most members of the Limnephilini, but similar to that of *Hesperophylax*. The stream had a maximum width of about 2.5 m at the time of collection. Pupae were located in aggregations of 5 to 10 along the lateral margins of the largest boulders I could turn over in the stream, just below the water-substrate interface. This is often the same type of habitat where *Hesperophylax* pupae are found. This is not usually the case for Colorado *P. costalis* pupae, which are often lying scattered throughout the vegetation of headwater seepage area habitats, although they may be attached to rocks and sticks. I have not seen *P. costalis* in streams larger than about 0.4 m wide; they are most often found within <3 m of the headwater spring source. There also seems to be some type of habitat partitioning between *P. costalis* and *Hesperophylax*. Whereas *Hesperophylax occidentalis* (Banks) is very common in high-altitude Colorado headwater seepage areas, in those seepage areas which contain *P. costalis*, *H. occidentalis* is found further downstream in the outlet stream. A single *Hesperophylax* sp. larva (along with larvae of *Lepidostoma* sp. and *Oligophlebodes* sp.) was collected along with the *P. brooksi* larvae.

The presence of 10-mm larval cases and 20-mm pupal cases in late May suggests a 2-yr life cycle for *P. brooksi*. In Colorado *P. costalis* emerges from late July through early September, and I have not seen evidence of small larvae being present during emergence, therefore suggesting a univoltine life cycle for *P. costalis*.

**ADDITIONAL RECORDS AND NOTES ON WESTERN NORTH AMERICAN CADDISFLIES**

The following are additional distributional records for western North American caddisflies. Special recognition goes to the following institutions/individuals for providing most of these specimens: Colorado State University, C.P. Gillette Museum of Arthropod Diversity, B.C. Kondratieff (CSU); University of Wyoming, R.J. Lavigne (UW); Purdue University, A. Provonska (PU); Brigham Young University, Monte L. Bean Life Science Museum, R.W. Baumann (BYU); Illinois Natural History Survey, K.A. Methven (INHS); California Academy of Sciences, V.F. Lee (CAS); Dean Blinn (DB); G.Z. Jacobi (GZJ); and S.R. Moulton II (SRM).

**Apataniidae**

*Apatania shoshone* Banks 1924. ALASKA: Katmai Peninsula; at lights, Alaskan River, Alaskan Lodge, W.G. Downs, 22 August 1987, 2M 1F (DER).

*Apatania zonella* (Zetterstedt) 1840. WYOMING: Albany County, Meadow Creek at Glacier Lakes, Medicine Bow National Forest, H. Copeland, 29 June 1987, 1F; West Glacier Lake, Medicine Bow National Forest, B.C. Kondratieff & W.B. Painter, 21 July 1987, 1F; Glacier Lakes, T. Ebert, 4 July 1988, 3F (CSU); Carbon County, swept from herbage near edge of Lake Marie, 20 km W of Centennial, P.H. Arnaud, Jr, 1 August 1973, 1F (CAS).

**Brachycentridae**


**Glossosomatidae**

*Agapetus boulderensis* Milne 1936. NEW MEXICO: Colfax County, creek, U.S. 64, west of Cimarron, M. Harris, 8 August 1990, 11M 1F (CSU).

Protoptila coloma Ross 1941. WYOMING: Park County, Firehole River, near Old Faithful, B.C. Kondratieff, 8 June 1987, 15M (CSU); Teton County, Gibbon River, Gibbon Falls Picnic Ground, Yellowstone National Park, R.J. Lavigne, 13 July 1989, 3M (UW).

Goeridae


Hydropsychidae


Hydropsyche occidentalis Banks 1900. NEVADA: Washoe County, Truckee River, Verdi Fish Hatchery, R.W. Baumann, 10 May 1983, 1M (BYU); SOUTH DAKOTA: Bennett County, 10 mi E of Martin, LaCreek National Wildlife Refuge, P.A. Opler, 26 May 1990, 1M 1F; Fall River County, Hot Springs, B.C. Kondratieff, 15 July 1988, 11M (CSU).


Hydroptilidae


Hydroptila ajax Ross 1938. CALIFORNIA: Riverside County, Colorado River, Route 95, B.C. Kondratieff & R.W. Baumann, 20 June 1988, 2M (CSU). This appears to be a significant western extension of records for this species.

Hydroptila angusta Ross 1938. WYOMING: Crook County, Belle Fourche River, Hulett, B.C. Kondratieff & R.W. Baumann, 15 July 1997, 1M (CSU). This extends the distribution of this species further northwest.


Hydroptila salmo Ross 1941. WYOMING: Carbon County, Medicine Bow River, about 2 mi E of Elk Mountain on Interstate 80, R.J. Lavigne, 23 August 1982, 5M (UW).

Leucotrichia pictipes (Banks) 1911. SOUTH DAKOTA: Fall River County, Fall River, Hot Springs, B.C. Kondratieff, 15 July 1988, 10M 4F; 5 February 1995, 6M 1F (CSU).


Ochrotrichia tarsalis (Hagen) 1861. SOUTH DAKOTA: Fall River County, Fall River, Hot Springs,
Orthotrichia aegerfasciella (Chambers) 1873. COLORADO: Larimer County, black light trap, Mail Creek, P.A. Opler, 18 August 1988, 1F; 10 August 1989, 2M (CSU). This appears to be the westernmost collection for this species.


Lepidostomatidae


Lepidostoma cascadense (Milne) 1936. NEW MEXICO: Taos County, Red River at Zwergel Dam, G.Z. Jacobi, 29 July 1980, 1M (CZJ).

Leptoceridae

Ceraclea annullicornis (Stephens) 1836. WYOMING: Carbon County, Big Creek, 3 mi above confluence with North Platte River, D. Rees, 27 June 1988, 3M 3F (CSU); Park County, Slough Creek Campground, Yellowstone National Park, R.J. Lavigne, 2 August 1990, 2M 2F (UW).

Oecetis cinerascens (Hagen) 1861. COLORADO: Baca County, Picture Canyon, B.C. Kondratieff, 15 June 1994, 1M (CSU).

Oecetis immobiles (Hagen) 1861. COLORADO: Saguache County, at lights, Russell Lakes State Wildlife Area, R. Durfee, 6 July 1994, 3M; 17 July 1994, 1M 3F; 8 August 1994, 2M 8F (CSU). These appear to be the southwestermost records for this species.

Linnephiilidae

Asynarchus circaea (Ross & Merkley) 1952. WYOMING: Big Horn County, Meadowlark Lake, Bighorn National Forest, M.W. Sanderson, 24 August 1954, 1M (INHS); Fremont County, Golden Lakes, Middle Fork Bull Lake Creek, D. Rees, 6 August 1996, 2M (CSU); Teton County, Lewis Lake, Yellowstone National Park, R.J. Lavigne, 31 July 1990, 1M (UW).


Asynarchus mutatus (Hagen) 1861. UTAH: Duchesne County, White Rocks River below Chepeta Lake, Ashley National Forest, R.C. Mower, 20 July 1984, 1M; Summit County, China Meadows, Uinta Mountains, R.W. Baumann & B.J. Sargent, 14 July 1986, 2M (BYU). These collections represent a significant southern distributional extension for this species. It seems that the Uinta Mountain area of Utah contains many interesting distributional records (see discussion under Hydatophylax hesperus).

Chyrantha centralis (Banks) 1900. NEVADA: Elko County, stream above Angel Lake, Ruby Mountains, R.W. Baumann, 3 August 1990, 1M 1F (BYU).

Clisteroncia flavicolis (Banks) 1900. WASHINGTON: Chelan County, Minotaur Creek, 10 mi W of Wenatchee Lake, site #6, in uncut timber (north and south of Rd 2728), J.R. Wood, 14 July 1976, 1M (DER). This appears to be the most southern record for this species.
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Glyphopsyche irrorata (Fabricius). WASHINGTON: Kittitas County, Teanaway River, Hwy 10, 4 mi S of Cle Elum, R.W. Baumann & S.D. Smith, 6 May 1982, 1F (BYU).

Hydatophylass hesperus (Banks) 1914. UTAH: Wasatch County, Bryant Fork Creek, Strawberry Reservoir, M. Whiting, S. Wells, & L. Liu, 14 June 1989, 1M (BYU). This record is based on a 1989 collection. Subsequent to that collection the entire drainage, including the headwater springs, was rotenoned in an attempt to restore a nonnative sport fishery in a downstream reservoir. The Bryant Fork Creek locality was revisited in 1995 and 1996 and no caddisflies were located. In an effort to create/maintain a nonnative sport fishery, it is likely that isolated native aquatic species within this drainage, such as Hydatophylass hesperus, have been eliminated.


Limnephilus sansoni Banks 1918. Ruiter (1995) indicated that the Colorado record of Dodds and Hisaw (1925) was questionable and did not include Limnephilus sansoni from Colorado. I have now seen specimens from Grand County, Colorado, on the opposite (western) side of the Continental Divide from the locality reported by Dodds and Hisaw. Grand County, Green Mountain Employee Area, Rocky Mountain National Park, P.A. Opler, 30 August 1997, 6M 2F (CSU).

Psychoglypha prita (Milne) 1935. The record for Psychoglypha ornatae (Ross) 1936 from Teton County, Wyoming (Ruiter and Lavigne 1985) is an error. These specimens are Psychoglypha prita (Milne) 1935. Teton County, Taggart Creek, 7000 feet, H.E. Evans, 6 October 1983, 25M (CSU).

Psychoglypha schuh Denning 1970. WYOMING: Sublette County, Lead Creek, D.E. Ruiter, 25 October 1995, 3M (DER). This appears to be only the 2nd collection reported for this species. Type locality is in Nevada.

Polycentropodidae


Polycentropus crassicornis Walker 1852. MONTANA: Rosebud County, Colstrip, quicktrap TF R2 Q33, Leetham, 20 June 1975, 1M (DER).


Rhyacophilidae


_____. 1980. Genera des Trichoptères du Canada et des États adjacents: les insectes et arachnides du Canada,


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