

Plauditus cestus (Provonsha & McCafferty, 1982) (Insecta: Ephemeroptera: Baetidae): New records from Virginia and the Northwest Territories, with notes on color variation

Melissa R. Gorski, Autumn D. E. Fox, Jordan I. McQueen and Luke M. Jacobus*

Indiana University Purdue University Columbus (IUPUC), 4601 Central Ave., Columbus, Indiana, 47203, USA.

* Corresponding author. E-mail: lukemjacobus@alumni.purdue.edu

Abstract: *Plauditus cestus* (Provonsha & McCafferty, 1982) is widespread in eastern and central North America. We provide new data from Virginia that fill a gap in the range of distribution and new data from the Northwest Territories that extend the range of the species by over 1900 km to the northwest. The Northwest Territories specimen represents a new larval color variant, with pronounced coloration of abdominal segment 6. We emphasize the need for additional sampling of aquatic habitats in the Far North.

Key words: Baetidae, Ephemeroptera, North America, *Plauditus cestus*, distribution

The small minnow mayfly genus *Plauditus* Lugo-Ortiz & McCafferty, 1998a (Insecta: Ephemeroptera: Baetidae) is endemic to North America. Lugo-Ortiz and McCafferty (1998a) designated *Pseudocloeon cestum* Provonsha & McCafferty, 1982 as the type species of the genus. *Plauditus cestus* has a wide range of distribution in the eastern and midwestern United States and Canada, but it has been reported as far west as Idaho and Wyoming, where it is apparently quite rare (McCafferty *et al.* 2012).

Plauditus cestus can be distinguished from other *Plauditus* species in the larval stage by having antennae that are relatively short, only being about as long as the head capsule, and a highly attenuate vestigial median caudal filament (Provonsha and McCafferty 1982: Figure 8). All other *Plauditus* larvae have the antennae at least 1.5× the length of the head capsule, often much longer, and the median vestigial caudal filament more robust. When the antennae are broken and missing, abdominal coloration sometimes can be used to identify the species; *P. cestus* usually has a generally pale abdomen, with no prominent ventral spots, that is more or less encircled by a brown band, often on segment 5. Placement of this coloration is somewhat variable, however, and we report an additional color variant herein. The male adults of *P. cestus* are distinguished from other *Plauditus* species by the following combination of characters: medial spots on posterior margins of abdominal sterna entirely absent; lateral tracheation marks on abdominal sterna absent; genital forceps segment 3 length

less than 2.5× width; and distinct orange-brown maculation absent from posterior margins of middle abdominal terga.

Plauditus cestus has been reported from the following states and provinces in North America (Figure 1): Arkansas (Provonsha and McCafferty 1982; McCafferty *et al.* 2010), Colorado (McCafferty *et al.* 1993), Georgia (McCafferty *et al.* 2004), Idaho (Lugo-Ortiz and McCafferty 1998b), Illinois (Randolph and McCafferty 1998), Indiana (Randolph and McCafferty 1998), Iowa (McCafferty *et al.* 2003), Kansas (McCafferty and Jacobus 2008), Kentucky (Lugo-Ortiz and McCafferty 1998b; Randolph and McCafferty 1998), Manitoba (McCafferty *et al.* 2004), Massachusetts (Whitmore 2008), Missouri (Sarver and Kondratieff 1997), New Hampshire (Chandler *et al.* 2006), New York (Jacobus and McCafferty 2001; McCafferty and Jacobus 2001; Myers *et al.* 2011), North Carolina (Pescador *et al.* 1999; McCafferty 2009), North Dakota (Guenther and McCafferty 2005), Ohio (Bolton 2010), Ontario (Lugo-Ortiz and McCafferty 1998b; McCafferty and Randolph 1998), Saskatchewan

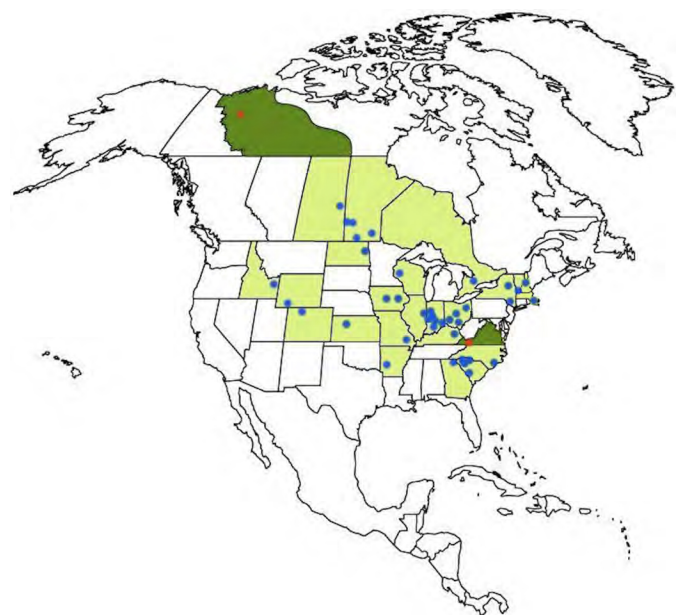


Figure 1. Distribution of *Plauditus cestus*. Previous records are indicated by light-colored state or territory and blue dots. New records detailed here are indicated by dark-colored state or territory and red dots.

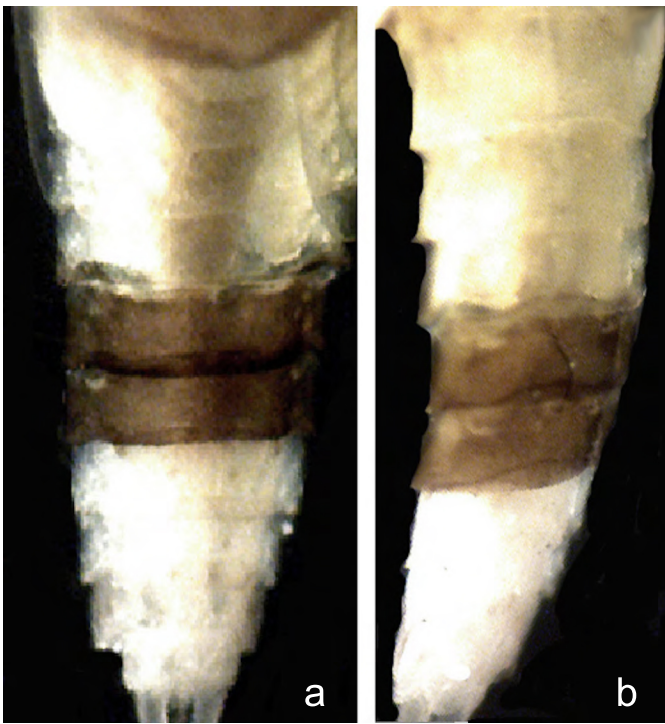


Figure 2. *Plauditus cestus* larva from Bosworth Creek, Northwest Territories, Canada; a) dorsal view of abdomen; b) sublateral view of abdominal sterna (note lighter anterolateral coloration).

(Webb *et al.* 2004; Miyazaki and Lehmkühl 2011), South Carolina (McCafferty and Meyer 2008), Vermont (Lugo-Ortiz and McCafferty 1998b), Wisconsin (Randolph and McCafferty 1998; McCafferty and Jacobus 2001) and Wyoming (McCafferty *et al.* 2012).

We report here new data for Virginia [one larva, Montgomery County, Laurel Creek at Sowers Rd NE (Route 705), upstream of confluence with Little River, 37°00'15" N, 80°22'43" W, 15 June 2003, J.M. Webb, L.M. Jacobus, deposited in the Purdue University Entomological Research Collection (PERC), West Lafayette, Indiana, USA]. This record is not unexpected, given the distribution of the species in nearby eastern Kentucky and also in the adjacent state of North Carolina (Randolph and McCafferty 1998; McCafferty 2009) (see Figure 1).

More remarkable are new distribution data from the Northwest Territories of Canada [one larva, Bosworth Creek, access upstream of upper bridge, along cutline about 300 m, Mackenzie Basin, Norman Range Ecoregion, Taiga Plains Ecozone, 65°17'41" N, 126°53'01" W, 56 m altitude, 31 August 2011, Crew 1, Lucie Sliva, PERC]. The discovery of this population extends the range of the species by over 1900 km to the northwest from east-central Saskatchewan (Webb *et al.* 2004) (see Figure 1). The collection site is less than 150 km south of the Arctic Circle.

The specimen on which these data are based (Figure 2) demonstrates the expression of an abdominal coloration that has not yet been documented: abdominal segments 5 and 6 are predominantly dark brown with light brown in the corners of each segment, both dorsally (Figure 2a) and ventrally (Figure 2b). Such extensive dark coloration for segment 6 has not been reported for *P. cestus* before, but some very light shading of this segment is apparent in the illustration

that accompanied the original description of the species (Provonsha and McCafferty 1982: Figure 8). The dark coloration of abdominal segments usually involves only one or both of segments 5 and 9; sometimes the abdomen is devoid of dark banding altogether; and sometimes only segment 1 or a combination of segments 1 and 5 have dark coloration (Provonsha and McCafferty 1982; Lugo-Ortiz and McCafferty 1998b; McCafferty and Waltz 1998; McCafferty and Jacobus 2001, 2008).

We did not make correlations between color variants and geographic location. We recommend that this be explored with more extensive collections of long series of specimens from individual locales from throughout the range of the species, although we note that at least two different color variants have been collected together (*e.g.*, McCafferty and Jacobus 2001). South Carolina specimens previously reported that have sterna with small subdermal medial spots (Lugo-Ortiz and McCafferty 1998b; McCafferty and Jacobus 2001) may require re-evaluation of their specific determination in light of subsequent species redescription, DNA barcoding studies and modifications of species concepts (*e.g.*, McCafferty and Waltz 1998; McCafferty and Jacobus 2001, 2008; Webb *et al.* 2012; Jacobus, pers. obs.).

Harper and Harper (1981) listed and briefly described some Baetidae specimens from the Far North that were not identified to species. Some of these might represent adults of *P. cestus*, but none of these were from the Northwest Territories. Further collection of baseline data for Far Northern sites, such as the Northwest Territories, is sorely needed not only to document taxa new to science, but also to help recognize changes in community associations due to alterations in habitat and climate (*e.g.*, Zhou *et al.* 2009; Bowman *et al.* 2010; McCafferty 2011; Rinella *et al.* 2012).

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