

# Biogeographic Affinities of Belize Mayflies (Insecta: Ephemeroptera)

## ABSTRACT

Twenty-four species of mayflies are known from Belize, based on historical records. This is the lowest species richness for any Central American country, except for the comparably sized El Salvador, which has only eight species known to occur there. Based on research from neighboring Nicaragua and southern Mexico, we expect the species richness of Belize to be much greater than currently reported; 56 species are known from Nicaragua, and 140 species are known from all of Central America. Field work during spring and summer 2016 will help us to increase the number of species known from Belize. Many Belize species also exist in the United States, showing lasting effects of the natural historical movement patterns that have been called the Great American Interchange. We compare the similarities between Belize and mayfly species to the north and south.

## BACKGROUND

Ecological studies of differing climates are usually based on differing latitudes; the lower latitudes usually containing the warmer climates. These warmer climates have the studying benefit of supplying a large biodiversity to researchers who can then take samples of the flora and fauna to compare to those in other areas. The country of Belize should contain a representation of both North American and South American insects, as well as some unique to the region, however research there is lacking. Only 24 species of mayflies are known from Belize (McCafferty & Jacobus, 2016). These species are only a small portion of those occupying the region; currently 140 species are known from all of Central America. Many of the same species present in the United States are thought to exist in Belize, however due to the higher rates of species adaptation in the tropics, there is the likelihood that variations will be found. It is also possible that native species may be found in Belize that there are variations of in the United States, showing natural historical movement patterns (e.g., Fig. 1).

## DISCUSSION

From the materials available, a list of 10 species have been found to exist both in Belize as well as north of Mexico. *Callibaetis floridanus* (McCafferty, 2004, 2011) and *C. punctilinus* (McCafferty & Lugo-Ortiz, 1995) have both been found in northern North America as well as Belize. As these are the only two *Callibaetis* species known from Belize, it is assumed that this genus is well shared with the rest of North America, and we would expect to find *C. montanus* and *C. pictus* as well. These species are found in the bordering country of Guatemala. *Falleon quilleri* was reported to have been found in both Belize and to be widespread in the U.S. (Lugo-Ortiz & McCafferty 1996). *Farrodes texanus*, *Isonychia sicca*, *Labiobaetis apache*, and *Paracloodes minutus*. *Leptohyphes zalope* and *Vacupernius packeri* were found to be in Belize and the United states (McCafferty et al, 2004; McCafferty 2008) as well as *Traverella promifrons* (Baumgardner, 2005). As with the *Callibaetis* genus, it is highly likely that more species from the other intercontinental genera will be found.

## (Insecta: Ephemeroptera)

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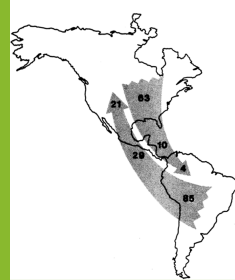


Fig. 1. A map of intercontinental mayfly species interchange (McCafferty, 1998).

## Checklist of Species Currently Known from Belize (\*species also found north of Mexico)

1. *Abletemetes dicinctus* (Allen & Brusca, 1973)
2. *Americabaetis pleturus* (Lugo-Ortiz & McCafferty, 1994)
3. *Baetodes fuscipes* Cohen & Allen, 1972
4. *Baetodes tritus* Cohen & Allen, 1972
5. *Callibaetis floridanus* Banks, 1900 \*
6. *Callibaetis punctilinus* McCafferty & Provonsha, 1993 \*
7. *Camelobaetidium arriaga* (Traver & Edmunds, 1968)
8. *Camelobaetidium kondratieffi* Lugo-Ortiz & McCafferty, 1995
9. *Campsurus cuspidatus* Eaton, 1871
10. *Epeorus packeri* Allen & Cohen, 1977
11. *Euthyplocia hecuba* (Hagen, 1861) (Fig. 2)
12. *Falleon quilleri* (Dodds, 1923) \*
13. *Falleon sageae* McCafferty, 2008
14. *Farrodes texanus* Davis, 1987 \*
15. *Isonychia sicca* (Walsh, 1862) \*
16. *Latineosus cayo* Sun & McCafferty, 2008
17. *Leptohyphes apache* Allen, 1967 \*
18. *Leptohyphes zalope* Traver, 1958 \*
19. *Maccaffertium mexicanum mexicanum* (Ulmer, 1920)
20. *Paracloodes minutus* (Daggy, 1945) \*
21. *Thraulodes packeri* Traver & Edmunds, 1967
22. *Thraulodes zonalis* Traver & Edmunds, 1967
23. *Traverella promifrons* Lugo-Ortiz & McCafferty, 1996 \*
24. *Vacupernius packeri* (Allen, 1967) \*

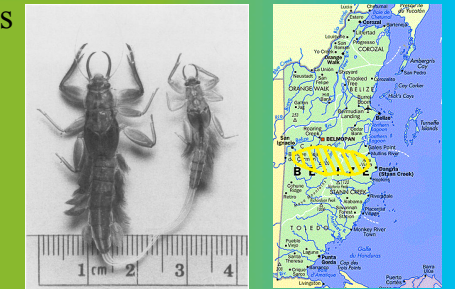


Fig. 2. A mayfly larva, *E. hecuba*. Fig. 3. Sites of planned 2016 field studies. (Sweeney et al, 1995)

## FIELDWORK PLANNED FOR 2016

The field component of this trip will take place near the Toucan Ridge Ecology and Education Society hosting center (Fig. 3). The expedition will cover a range of sampling westward to the Mountain Pine Ridge Forest Reserve and southward into the Cockscomb Basin Forest Reserve. These areas will represent differing biogeographic regions of Belize and give better diversity to the possible species found.

## ACKNOWLEDGMENTS

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