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New records of Ephemeroptera (Insecta) for Jamaica and the Dominican Republic.

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Abstract

With the exception of Cuba, the fauna of Ephemeroptera on the islands of the Greater Antilles is poorly known. For Cuba, the largest island, there are presently records of 35 extant taxa. Twenty-three taxa have been reported from Puerto Rico, five from Jamaica, and only three from Hispaniola. Hispaniola, a mountainous island with several peaks reaching elevations between 2000 and 3100 m, would be expected to have a rich fauna. Our objective is to begin to document this diversity. Here we give new distribution records for species of Ephemeroptera representing the families Baetidae, Caenidae and Euthyplociidae from Jamaica and Hispaniola. Seven genera are cited for the first time, the range of seven species previously known only from Cuba is expanded, and another five apparently new species are referenced.

Key words: Ephemeroptera, Greater Antilles, Jamaica, Hispaniola, new records.

Introduction

The present state of knowledge of the four islands of the Greater Antilles may be summarized as follows. The fauna of Cuba is best studied, with six families and 35 species and subspecies. Three families and 22 species are from known from Puerto Rico (Traver, 1938; Lugo-Ortiz and McCafferty, 1994), two families and three species from Hispaniola (Peters, 1971; Allen, 1973), and two families and three species from Jamaica (Peters, 1971; Allen, 1973). This paper expands our knowledge of the Ephemeroptera of Hispaniola and Jamaica, with emphasis on species common to both islands.

Material and Methods

We examined and identified nymphs and adults deposited in the collection of Ephemeroptera at Florida A&M University (FAMU). Using GoogleEarth we estimated the approximate altitude from data on locality labels in meters above sea level (m).

Results

Three genera of Baetidae (*Americabaetis, Callibaetis* and *Fallceon*) with probably three new species are reported from Jamaica for the first time (Table 1). Similarly, we give records from Hispaniola of three genera of Baetidae (*Cloeodes, Fallceon* and

Paracloeodes), one genus of Caenidae (*Caenis*), and one genus of Euthyplociidae (*Mesoplocia*) (Table 1).

Family Baetidae

Thirteen species are known from the island of Cuba (González et al., 2007; Kluge, 1991, 1992ab), but there are no reports of this family from Hispaniola and only one from Jamaica. New records follow.

1. *Americabaetis* sp. (probably a new species)

Jamaica: 4 nymphs, Trelawny Parish, Martha Brae River, Good Hope, 24.ix.1963, cols. W.L. Peters and T.H. Farr, approx. 150 m.

This is probably a new species. It differs from *A. naranjoi* (Kluge) from Cuba, in that the inner lobe of the labial palp is much longer and nearly reaches the apex of the distal segment. This extends the record of the family and genus to Jamaica

2. *Callibaetis floridanus* Banks 1900

Callibaetis completa Banks 1930
Callibaetis completa; Kluge 1991
Callibaetis floridanus; Lugo-Ortiz and McCafferty 1996

Jamaica: one female, St. Andrews, Long Mt, N.E. slope, 30.vii.1955, col. T.H. Farr, altitude ca. 160 m; 16 nymphs, Trelawny Parish, Farm Pond, Good Hope, 24.ix.1963, cols. W.L. Peters and T.H. Farr.

This record extends the distribution of this species to Jamaica.

3. *Callibaetis* sp. 1 (probably a new species)

Jamaica: 2 females, St. Andrews Parish, Royal Botanical Garden (Hope), vi.1958, cols. M.W. Sanderson and T.H. Farr.

These females differ from *C. floridanus* in the shape of the head and the absence of a dark longitudinal band on the anterior margin of the forewing; however, there is a pale transverse apical mark.

4. *Callibaetis* sp. 2 (probably a new species)

Jamaica: one female, St. Andrews Parish, Cross Roads, 15.i.1959, P.O.B., CAWS, altitude ca. 100 m.

The female has the dark anterior band on the forewings as discussed above, but the head in dorsal view is different from that of *C. floridanus*.

5. *Cloeodes inferior* Kluge 1991

Dominican Republic: one male, La Vega Prov., waterfall, 6 mi N on Constanza Road from Rt. 1, 27.vi.1998, col. R.E. Woodruff, at black light, approx. 1300 m.

This is a new record for the species from Hispaniola.

6. *Cloeodes superior* Kluge 1991

Dominican Republic: 1 nymphs, Río Camu, 19 km NE of Jarabacoa,12.vi.1969, cols. Flint and Gómez, approx. 100 m.

This is a new record for the species from Hispaniola.

7. *Fallceon longifolius* (Kluge 1992)

Baetis (*Fallceon*) *longifolius* Kluge 1992
Fallceon longifolius; McCafferty and Waltz 1994, González-Lazo and Salles 2007

Jamaica: 6 nymphs, Clarendon, Rio Minho at Grantham, 12.ii.1964, col. D.C. Melhadeo.

Like the Cuban species, the gills of the sixth abdominal segment are very long and reach the middle of the eighth segment. This is a new generic record for Jamaica.

8. *Fallceon nikitai* McCafferty and Lugo-Ortiz 1994

Baetis (Fallceon) poeyi; Kluge 1992b
Fallceon nikitai McCafferty and Lugo-Ortiz 1994

Dominican Republic: 8 male imagos, Prov. La Vega, 5 km W Manabao, Paso de la Perra, Finca Eladio Fernández, 15.v.2001, col. R.E. Woodruff, at black light, 950 m. These specimens have a hook-shaped costal projection on the hind wing.

Jamaica: 15 nymphs, Clarendon, Rio Minho at Grantham, 12–II–1964, col. D.C. Melhadeo; 2 nymphs, Clarendon, Rio Minho at Frankfield, 6.iii.1968, cols. T.H. Farr and A. Barrett; 2 nymphs, St. Andrews Parish, Stream W. of Silverhill Gap, 5.12.1975, col. R.W. Flowers.

These records expand the distribution of the species to Hispaniola and Jamaica.

9. *Fallceon planifrons* (Kluge 1992)

Baetis (Caribaetis) planifrons Kluge 1992
Fallceon planifrons; Lugo-Ortiz, McCafferty and Waltz 1994

Jamaica: about 100 nymphs, Clarendon, Rio Minho at Grantham, 12.ii.1964, col. D.C. Melhadeo. This represents a new species records for Jamaica.

10. *Paracloeodes* sp. (probably a new species)

Dominican Republic: hundreds of male and female imagos and subimagos, La Alta Gracia, Laguna Nisibon at Río Maimon, 18.vi.1988, cols. R. Woodruff and P. Frey, at black light.

Kluge (1991) described *P. lilliputian* only from female adults and nymphs, and the Dominican species may represent a new species but a comparison of male imagos is not possible. The female differs from the Cuban species in the coloration of abdominal terga, venation (especially the position of cross veins), and the length of the head. This is a new generic record for Hispaniola.

Family Caenidae

This family is known from Cuba, Jamaica and Puerto Rico.

1. *Caenis* sp. (probably a new species)

Dominican Republic: 2 nymphs, San Cristobal, 5.ix.1966, col. L.H. Rolston.

These nymphs appear to differ from those of *C. cubensis* Malzacher *et al.* (described from Cuba) by the color pattern on the vertex of the head and thorax. This represents a new record for the family and genus from Hispaniola.

Family Euthyplociidae

The only record of this family from the Antilles is one species of *Mesoplocia* from Cuba.

1. *Mesoplocia inaccessibile* (Kluge and Naranjo)

Euthyplocia inaccessibile Kluge and Naranjo 1994
Mesoplocia inaccesibile; Domínguez *et al*. 2006

Dominican Republic: 2 male imagos (both well preserved), La Vega Prov., waterfall, 6 mi N on

Constanza Road from Rt. 1, 27.vi.1998, col. R.E. Woodruff.

These specimens from Hispaniola correspond almost exactly to the Cuban species. Adults were collected at light near a pool with shallow margins at the foot of a waterfall at an altitude of approximately 1300 m (personal communication from R.E. Woodruff), a habitat similar to the type locality of the species in Cuba. This is a new record of the family, genus and species for Hispaniola.

Family Leptohyphidae

1. *Tricorythodes rolstoni* (Allen 1973)

Leptohyphes rolstoni Allen 1973
Vacupernius rolstoni; Wiersema and McCafferty 2000

Dominican Republic: 4 nymphs, 19 km NE of Jarabacoa, approximately 660 m, 12.vi.1969, cols. Flint and Gómez.

Leptohyphes rolstoni Allen is presently referred to the *Trichorythodes sacculobranchis*-group of Kluge and Naranjo (1990).

2. *Tricorythodes jamaicensis* (Allen 1973)

Leptohyphes jamaicensis Allen 1973

Tricorythodes is a genus which needs further revision. This extends the distribution of *Tricorythodes* to Hispaniola and Jamaica.

Table 1. New species records for Hispaniola and Jamaica

SPECIES	HISPANIOLA	JAMAICA
Family BAETIDAE		
Americabaetis sp. (probably new)		X
Callibaetis floridanus		X
Callibaetis sp. 1 (probably new)		X
Callibaetis sp. 2 (probably new)		X
Cloeodes inferior	X	
Cloeodes superior	X	
Fallceon longifolius		X
Fallceon nikitai	X	X
Fallceon planifrons		X
Paracloeodes sp. (probably new)	X	
Family CAENIDAE		
Caenis sp. (probably new)	X	
Family EUTHYPLOCIIDAE		
Mesoplocia inaccessibile	X	

Table 2. Distribution of the 75 taxa (57 named and 18 cited to genus) of Ephemeroptera from the Greater Antilles (Cuba, Puerto Rico, Hispaniola, and Jamaica). For Cuba, the distribution is given by region (Nuñez 1989): W (Occidentale, Western), Ctr (Centrale, Central), C-E (Centrale-Orientale, Central-East), E (Orientale, Eastern). *Species reported for the first time in this work, determination by Carlos Naranjo 2010; ? Doubtful; † Fossil species in Dominican amber.

Species	CUBA				HISPANIOLA	JAMAICA	PUERTO RICO
	W	Ctr	C-E	E			
BAETIDAE							
Americabaetis boriquensis (Lugo-Ortiz & McCafferty)							X
Americabetis naranjoi (Kluge)		X	X	X			
Americabaetis sp. prob. new						X*	
"Baetis" sp. 1 of Traver 1938							X
"Baetis" sp. 2 of Traver 1938							X
Callibaetis floridanus (Banks)	X	X	X	X		X*	X
Callibaetis sp. Traver 1938							X
Callibaetis sp. 1 prob. new						X*	
Callibaetis sp. 2 prob. new						X*	
Cloeodes consignatus Traver							X
Cloeodes inferior Kluge	X	X	X	X	X*		
Cloeodes maculipes Traver							X
Cloeodes superior Kluge		X		X	X*		
Cloeodes sp. of Traver 1938							X
Cloeodes sp. 1 of Traver 1938							X
Cloeodes sp. of Poinar 1992					X†		
Fallceon alcarrazae (Kluge)				X			
Fallceon garcianus (Traver)						X	X
Fallceon grandis González-Lazo & Salles				X			
Fallceon longifolius (Kluge)				X		X*	
Fallceon nikitai McCafferty & Lugo-Ortiz	X	X	X	X	X*	X*	
Fallceon planifrons (Kluge)	X	X	X	X		X*	
Fallceon poeyi (Eaton)	X						
Fallceon sextus (Kluge)				X			
Fallceon testudineus (Kluge)				X			
Paracloeodes lilliputian Kluge			X	X			
Paracloeodes portoricensis (Traver)							X
Paracloeodes sp. prob. new					X*		
CAENIDAE							
Insulibrachys needhami Soldán	X						
Caenis cubensis Malzacher et al.	X	X	X	X			
Caenis sp. prob. new					X*		

Caenis sp. 1 of Traver 1938							X
Caenis sp. 2 of Traver 1938							X
Caenis sp. 3 of Traver 1938							X
Caenis sp. of Weeks et al. 2003						X	
EUTHYPLOCIIDAE							
Mesoplocia inaccessibile (Kluge & Naranjo)				X	X*		
LEPTOHYPHIDAE							
Tricorythodes cubensis Kluge & Naranjo	X	X	X	X			
Tricorythodes grallator Kluge & Naranjo	X	X	X	X			
Tricorythodes jamaicensis (Allen)						X	
Tricorythodes montanus Kluge & Naranjo				*X*			
Tricorythodes rolstoni (Allen)					*X*		
Tricorythodes sacculobranchis Kluge & Naranjo	*X*	*X*	*X*	*X*			
Tricorythodes sierramaestrae Kluge & Naranjo				*X*			
LEPTOPHLEBIIDAE							
Borinquena carmencita Traver							*X*
Borinquena ? coeciliana † Staniczek					*X†*		
Borinquena contradicens Traver							*X*
Borinquena maculata † Staniczek					*X†*		
Borinquena parva † Staniczek					*X†*		
Borinquena sextus (Kluge)				*X*			
Careospina annulata Peters					*X*		
Careospina baconaoi (Kluge)	*X*			*X*			
Careospina evanescens (Kluge)				*X*			
Careospina hespera hespera Peters & Alayo	*X*						
C. hespera sierramaestrae (Kluge)				*X*			
Careospina minuta Peters		*X*					
Farrodes bimaculatus Peters & Alayo	*X*	*X*	*X*	*X*			
Farrode hyalinus Peters						*X*	
Farrodes taino Lugo-Ortiz & McCafferty							*X*
Hagenulitis hitchingsi † Staniczek					*X†*		
Hagenulopsis sp. of Peters & Domínguez 2001							*X*
Hagenulus caligatus Eaton	*X*						
Hagenulus eatoni Banks					*X*		
Hagenulus jamaicensis Peters						*X*	
Hagenulus morrisonae Peters & Alayo		*X*	*X*	*X*			
Hagenulus rangelae Peters							*X*
Neohagenulus julio Traver							*X*
Neohagenulus luteolus Traver							*X*
Neohagenulus tinctus Traver							*X*

Neohagenulus sp. 1 of Traver 1938					*X*
Neohagenulus sp. 2 of Traver 1938					*X*
Poecilophlebia pacoi (Kluge)		*X*			
Traverina cubensis Peters & Alayo	*X*				
Traverina oriente (Kluge)		*X*			
Turquinophlebia grandis (Kluge)		*X*			
OLIGONEURIIDAE					
Lachlania abnormis Hagen	*X?*				
TOTAL TAXA	*35*	*14*	*12*	*24*	

Discussion

Previous to this work, 13 extant species of Baetidae were known from Cuba (González et al., 2007; Kluge, 1991, 1992a,b), 10 species from Puerto Rico (Traver, 1938), one from Jamaica (Weeks et al., 2003), and none from Hispaniola. For Caenidae, the family was represented by two named species in Cuba (the rare *Insulibrachys needhami* Soldán and the abundant, very common, short-lived *Caenis cubensis*), three unnamed species in Puerto Rico (Traver, 1938), one unnamed species from Jamaica (Weeks et al., 2003), and nothing from Hispaniola. Euthyplociidae were recorded only from Cuba. Including the present records (Table 1), a total of 75 species and subspecies have been reported from the islands of the Greater Antilles (Table 2). Of these, five are extinct and one (*Lachlania abnormis* Hagen) is either extinct or, possibly, a record based on a mislabeled specimen as it not been found since its original description in 1868. This gives a present total of 69 species.

In addition to the seven new distribution records for Hispaniola and Jamaica and a possible five new species, it is evident that more collections are needed from a greater variety of ecosystems and altitudes. In particular, Hispaniola is expected to host a larger number of species because of its higher elevations with many potential habitats. Pico Duarte on Hispaniola is over 3000 m in altitude, much higher than Pico Real del Turquino (1974 m, the highest elevation in Cuba). Blue Mountain Peak in Jamaica (2256 m) is also higher than any Cuban mountain. This conclusion is further supported by the low index of biological similarity between these two islands and the other two islands of the Greater Antilles. For example, there are no species in common between Puerto Rico and Hispaniola and only one between Puerto Rico and Jamaica. Between Jamaica and Hispaniola which are close geographically, there is only a similarity of 10% (2 species in common). The similarity between Cuba (especially the Eastern Region) and Hispaniola is highest (4 species in common) because of the geographical proximity and the land connection which existed at the Eocene–Oligocene border some 35 to 38 million years ago (Iturralde-Vinent and MacPhee, 1999).

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