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A REVIEW OF STONEFLY (INSECTA; PLECOPTERA) TAXONOMIC RESEARCH IN ALABAMA, WITH NEW STATE RECORDS AND AN UPDATED CHECKLIST

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ABSTRACT
A brief review of the literature on the taxonomy of Alabama Plecoptera is presented. New state records of *Leuctra sibleyi* Claassen, *Zealeuctra claasseni* (Frison), *Perlesta decipiens* (Walsh), and *Isoperla decepta* Frison are provided and an updated checklist of 107 Alabama stonefly species is included.

Keywords: Plecoptera, stoneflies, Alabama, new records, checklist

INTRODUCTION

The first stonefly species described from type localities in Alabama did not occur until approximately 40 years ago, with *Taeniopteryx lonicera* (Ricker & Ross 1968) and *Allocapnia polemistis* (Ross & Ricker 1971). The first inclusive treatment of the stonefly species of Alabama was completed by Audrey James in 1972 as an unpublished doctoral dissertation. Species-level taxonomic keys were provided for males and females, and distribution maps were included for each of the 52 species recorded from the state at that time. She included six species from Alabama as manuscript names, of which four (*Leuctra alabama*, *L. alta*, *L. cottaquilla*, and *Isoperla davisi*) were formally described by her in 1974. A fifth manuscript species (*L. crossi*) was later described in James (1976) based largely on material she had initially referred to as *L. alexanderi* Hanson in James (1972). Two additional species of *Isoperla* were proposed as manuscript names in James (1972). One species (manuscript name of *I. scotti*) has since been described and renamed *I. jamesae* by Grubbs & Szczytko (2010) and the second species will be included in an upcoming review of the eastern North America Isoperlinae (Szczytko & Kondratieff, in preparation).

Following James' work, Stark & Szczytko (1976) and Surdick (1981) described *Beloneuria jamesae* and *Alloperla hamata*, respectively, from Alabama. Sixteen new state records were listed in Stark & Harris (1986), increasing the then-known total to 71 species, and Young et al. (1989) added the first state record for the nemourid genus *Ostrocerca* (*O. truncata* (Claassen)). Harris et al. (1996) updated this total to 76 species based on new state records and taxonomic updates, incorporating new species discoveries by Stark & Lentz (1988; *Neoperla harrisi*) and Kondratieff & Kirchner (1996; *Hansonoperla cheaha*). Baumann (1996) described *Amphinemura alabama* from northern Alabama, Smith & Stark (1998) described *N. coosa* from central Alabama, and Stark (2004) reported on a tentative new state record of *Acroneuria petersi* Stark & Gaufin based only on females. Surdick & Stark (2004) described *A. prognoides* from southern Alabama and provided a new state record for *A. caudata* Frison, and Harrison & Stark (2010) supplied the first record of *Leuctra triloba* Claassen. Recent

collecting efforts by the author in the northern portion of the state, and collaborative research with Andrew L. Sheldon in the Talladega National Forest region, has resulted in several new species discoveries and new state records (Grubbs 2005, 2006, 2008, 2010; Grubbs & DeWalt 2008; Grubbs & Sheldon 2008, 2009). At present, 21 species of stoneflies have type localities in Alabama (Table 1).

RESULTS

Four new records, an amended state record, and an updated checklist of the stoneflies reported from Alabama are presented below. Specimens are deposited in the Center for Biodiversity Studies, Western Kentucky University (WKU) and the Stark Collection, Mississippi College, Clinton, Mississippi (BPS).

Table 1. List of stonefly species with Alabama type localities.

Family	Species	County	Reference
Capniidae	*Allocapnia menawa* Grubbs & Sheldon	Clay	Grubbs & Sheldon 2008
	A. muskogee Grubbs & Sheldon	Cleburne	Grubbs & Sheldon 2008
	A. polemistis Ross & Ricker	Walker	Ross & Ricker 1971
	A. sano Grubbs	Madison	Grubbs 2006
	A. tsalagi Grubbs	Jackson	Grubbs 2008
Leuctridae	*Leuctra alabama* James	Jackson	James 1974
	L. alta James	Calhoun	James 1974
	L. cottaquilla James	Calhoun	James 1974
	L. crossi James	Calhoun	James 1976
	L. pinhoti Grubbs & Sheldon	Cleburne	Grubbs & Sheldon 2009
	Zealeuctra talladega Grubbs	Clay	Grubbs 2005
Nemouridae	*Amphinemura alabama* Baumann	Limestone	Baumann 1996
Taeniopterygidae	*Taeniopteryx lonicera* Ricker & Ross	Blount	Ricker & Ross 1968
Chloroperlidae	*Alloperla hamata* Surdick	Jackson	Surdick 1981
	A. prognoides Surdick & Stark	Baldwin	Surdick 2004
Perlidae	*Beloneuria jamesae* Stark & Szczytko	Clay	Stark & Szczytko 1976
	Hansonoperla cheaha Kondratieff & Kirchner	Cleburne	Kondratieff & Kirchner 1996
	Neoperla coosa Smith & Stark	Chilton	Smith & Stark 1998
	N. harrisi Stark & Lentz	Lauderdale	Stark & Lentz 1988
Perlodidae	*Isoperla davisi* James	Tallapoosa	James 1974
	I. jamesae Grubbs & Szczytko	Lauderdale	Grubbs & Szczytko 2010

New state records

***Leuctra sibleyi* Claassen** is distributed broadly across the eastern Nearctic region (DeWalt et al. 2010). This headwater species was collected recently in northwestern Alabama, representing a new state record and a southwestern range extension.
Material examined. U.S.A., Alabama, Colbert Co., tributary to Ross Branch, CR 1, 6 km SE Waterloo, 4 May 2008, S.A. Grubbs, 1♂ (WKU); Lauderdale Co., Second Creek, CR 126 at CR 1, 9 km NE Waterloo, 4 May 2008, S.A. Grubbs, 1♂ (WKU).

***Zealeuctra claasseni* (Frison)** has been recorded from Kansas east to West Virginia and south to Texas (Ricker & Ross 1969; DeWalt et al. 2010). This upland stream species has been collected recently from northwestern Alabama, representing a new state record.
Material examined. U.S.A., Alabama, Lauderdale Co., CR 14, Gravelly Springs, ca. 0.5 mi W Natchez Trace Parkway, 15 March 2010, B.P. Stark, 1♂ (BPS).

***Perlesta decipiens* (Walsh)** is a variable species that is widely distributed across the central and eastern U.S. (Stark 2004; DeWalt et al. 2010). This species is common in large streams and small rivers in the Talladega National Forest region in east-central Alabama, and is likely distributed broadly across the northern and central portions of the state.
Material examined. U.S.A., Alabama, Calhoun Co., Terrapin Creek, U.S. 278 at CR 33, 4 km NE Piedmont, 17 May 2008, S.A. Grubbs, 2♂, 3♀ (WKU); Clay Co., Enitachopco Creek, CR 35, 9 km ESE Millersville, 17 May 2008, S.A. Grubbs, 3♂, 6♀ (WKU); Talladega Co., Smelley Creek, CR 234 26 May 2006, A.L. Sheldon, 4♂, 8♀ (WKU).

***Isoperla decepta* Frison** has been reported from southern Ontario south to Kentucky and Missouri (DeWalt et al. 2010). This species has been recently collected in northern Alabama, representing a new state record and a small southern range extension.
Material examined. U.S.A., Alabama, Lauderdale Co., Anderson Creek, 6 km NE Rogersville, 21 April 2002, S.A. Grubbs, 1♂, 6♀ (WKU); Limestone Co., Cairo Branch, Elk River, 16 km NE Rogersville, 21 April 2002, S.A. Grubbs, 3♂, 5♂, 3 nymphs (WKU).

Amended state record

***Sweltsa hoffmani* Kondratieff & Kirchner**

Grubbs & Sheldon (2008) provided the first confirmed Alabama state record of *Sweltsa onkos* (Ricker) from Talladega National Forest. Kondratieff & Kirchner (2009) has since partitioned this species into a northern and eastern form (*S. onkos*) known from Atlantic Canada south to Virginia and recently-described second species (*S. hoffmani*) distributed from western New York south to eastern Tennessee. This specimen has since been reexamined and determined as *S. hoffmani*. The prior Alabama records (James 1972, Stark & Harris 1986, Surdick 2004) for *Sweltsa* (as *S. mediana* (Banks)) were based on females, yet are likely *S. hoffmani*. Females of *S. hoffmani*, *S. mediana*, and *S. onkos* are very difficult to distinguish and the distribution of *S. mediana* is in the southern Appalachian Mountains only from southwestern Virginia south to northwestern South Carolina. In addition, a second state record of *S. hoffmani* is now confirmed from the far northwestern portion of the state.
Material examined. U.S.A., Alabama, Cleburne Co., small stream draining Dugger Mountain, Talladega National Forest, 22 May 2006, A.L. Sheldon, 1♂ (WKU); Colbert Co., tributary to Ross Branch, CR 1, 6 km SE Waterloo, 4 May 2008, S.A. Grubbs, 1♂ (WKU).

Checklist of Alabama Plecoptera (order follows DeWalt et al. 2010)

With the additions and the amendments listed above, the total number of species recorded from Alabama currently stands at 107. The *Isoperla* list, however, should be viewed as incomplete until the eastern North America Isoperlinae (Szczytko & Kondratieff, in preparation) study has been completed. James (1972) also reported *I. holochlora* (Klapálek) and *Hydroperla crosbyi* (Needham & Claassen; as *Isogenus crosbyi*) from Alabama, but neither is listed below. Stark & Harris (1986) skeptically omitted the *I. holochlora* record, a position that I am similarly and conservatively following here, and the *H. crosbyi* record was based on a single female that has not been located and reexamined.

Superfamily Group Euholognatha

Family Capniidae

Allocapnia aurora Ricker
A. granulata (Claassen)
A. menawa Grubbs & Sheldon
A. muskogee Grubbs & Sheldon
A. mystica Frison
A. nivicola (Fitch)
A. polemistis Ross & Ricker
A. recta (Claassen)
A. rickeri Frison
A. sano Grubbs
A. smithi Ross & Ricker
A. tennessa Ross & Ricker
A. tsalagi Grubbs
A. virginiana Frison
Nemocapnia carolina Banks

Family Leuctridae

Leuctra alabama James
L. alta James
L. biloba Claassen
L. carolinensis Claassen
L. cottaquilla James
L. crossi James
L. ferruginea (Walker)
L. grandis Banks
L. moha Ricker
L. pinhoti Grubbs & Sheldon
L. rickeri James
L. sibleyi Claassen
L. tenuis (Pictet)
L. triloba Claassen
L. usdi Grubbs
Paraleuctra sara (Claassen)
Zealeuctra claasseni (Frison)
Z. fraxina Ricker & Ross
Z. talladega Grubbs

Family Nemouridae

Amphinemura alabama Baumann
A. appalachia Baumann
A. delosa (Ricker)
A. mockfordi (Ricker)
A. nigritta (Provancher)
A. wui (Claassen)
Ostrocerca truncata (Claassen)

Prostoia completa (Walker)
Shipsa rotunda (Claassen)
Soyedina alexandria Grubbs

Family Taeniopterygidae
Oemopteryx contorta (Needham & Claassen)
Strophopteryx fasciata (Burmeister)
Taeniopteryx burksi Ricker & Ross
T. lita Frison
T. lonicera Ricker & Ross
T. maura (Pictet)
T. metequi Ricker & Ross
T. ugola Ricker & Ross

Superfamily Group Systellognatha
Family Chloroperlidae
Alloperla atlantica Baumann
A. caudata Frison
A. chloris Frison
A. hamata Surdick
A. idei (Ricker)
A. prognoides Surdick & Stark
A. usa Ricker
Haploperla brevis (Banks)
Sweltsa hoffmani Kondratieff & Kirchner

Family Perlidae
Acroneuria abnormis (Newman)
A. arenosa (Pictet)
A. carolinensis (Banks)
A. evoluta Klapálek
A. filicis Frison
A. frisoni Stark & Brown
A. perplexa Frison
A. petersi Stark & Gaufin
Agnetina annulipes (Hagen)
A. flavescens (Walsh)
Attaneuria ruralis (Hagen)
Beloneuria jamesae Stark & Szczytko
Eccoptura xanthenes (Newman)
Hansonoperla cheaha Kondratieff & Kirchner
Neoperla carlsoni Stark & Baumann
N. catharae Stark & Baumann
N. clymene (Newman)
N. coosa Smith & Stark
N. harrisi Stark & Lentz
N. occipitalis (Pictet)
N. stewarti Stark & Baumann

Paragnetina fumosa (Banks)
P. kansensis (Banks)
Perlesta decipiens (Walsh)
P. placida (Hagen)
P. shawnee Grubbs
P. teaysia Kirchner & Kondratieff
Perlinella drymo (Newman)
P. ephyre (Newman)
P. zwicki Kondratieff, Kirchner & Stewart

Family Perlodidae
Clioperla clio (Newman)
Diploperla duplicata (Banks)
D. robusta Stark & Gaufin
Helopicus bogaloosa Stark & Ray
H. subvarians (Banks)
Isoperla bilineata (Say)
I. davisi James
I. decepta Frison
I. dicala Frison
I. jamesae Grubbs & Szczytko
Remenus bilobatus (Needham & Claassen)

Family Peltoperlidae
Tallaperla cornelia (Needham & Smith)
T. laurie (Ricker)
T. maria (Needham & Smith)

Family Pteronarcyidae
Pteronarcys biloba Newman
P. dorsata (Say)

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