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Number 11 September 15, 1991

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THE UNIVERSITY OF ALABAMA
TUSCALOOSA, ALABAMA

September 15, 1991

A New Species of *Hydropsyche* (Trichoptera: Hydropsychidae) from Alabama, with Additional State Records for The Curvipalpia

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ABSTRACT: Lago, Paul K. and Steven C. Harris, 1991. A new species of *Hydropsyche* (Trichoptera: Hydropsychidae) from Alabama with additional state records for the Curvipalpia. *Bulletin Alabama Museum of Natural History*, Number 11:1-3, 1 figure. *Hydropsyche alabama*, a new species in the *H. scalaris* group from the Coastal Plain of Alabama, is described and illustrated. New state records for the families Philopotamidae, Polycentropodidae and Hydropsychidae are noted.

Introduction

Members of the genus *Hydropsyche* occur in all faunal regions but the Neotropical (Wiggins, 1977). In North America, approximately 70 species are now known, 22 of which have been reported from Alabama (Lago and Harris, 1987a). Additional collecting of caddisflies with UV light traps throughout Alabama has revealed an undescribed species of *Hydropsyche* and four new state records, namely *Polycentropus chelatus* Ross and Yamamoto (Polycentropodidae), *Chimarra feria* Ross and *C. socia* Hagen (Philopotamidae), and *Hydropsyche cuanis* Ross (Hydropsychidae). *Polycentropus chelatus* was collected in the Piedmont region from Channahatchie Creek, 2.7 km NE of Kent, Elmore County, in March 1989. This species was previously known only from Indiana and Kentucky.

Chimarra feria was collected in Cedar Creek, 4.8 km SE of Hartselle, Morgan County, on 15 June 1988. This record from the Highland Rim Plateau extends the range of the species about 160 km southeast into Alabama (Lago and Harris, 1987b). *Chimarra socia* was collected from Butler Creek, another small stream of the Highland Rim in northwestern Alabama at County Road 61, Lauderdale County, in June 1989. This occurrence extends the range of *C. socia* about 240 km west of its previously reported distribution from the southern extension of the Appalachian Mountains (Lago and Harris, 1987b). *Hydropsyche cuanis* was also collected in north Alabama from the Cumberland Plateau region in the Flint River near the town of Keys Mills, Madison County, in May, 1989. This species is generally

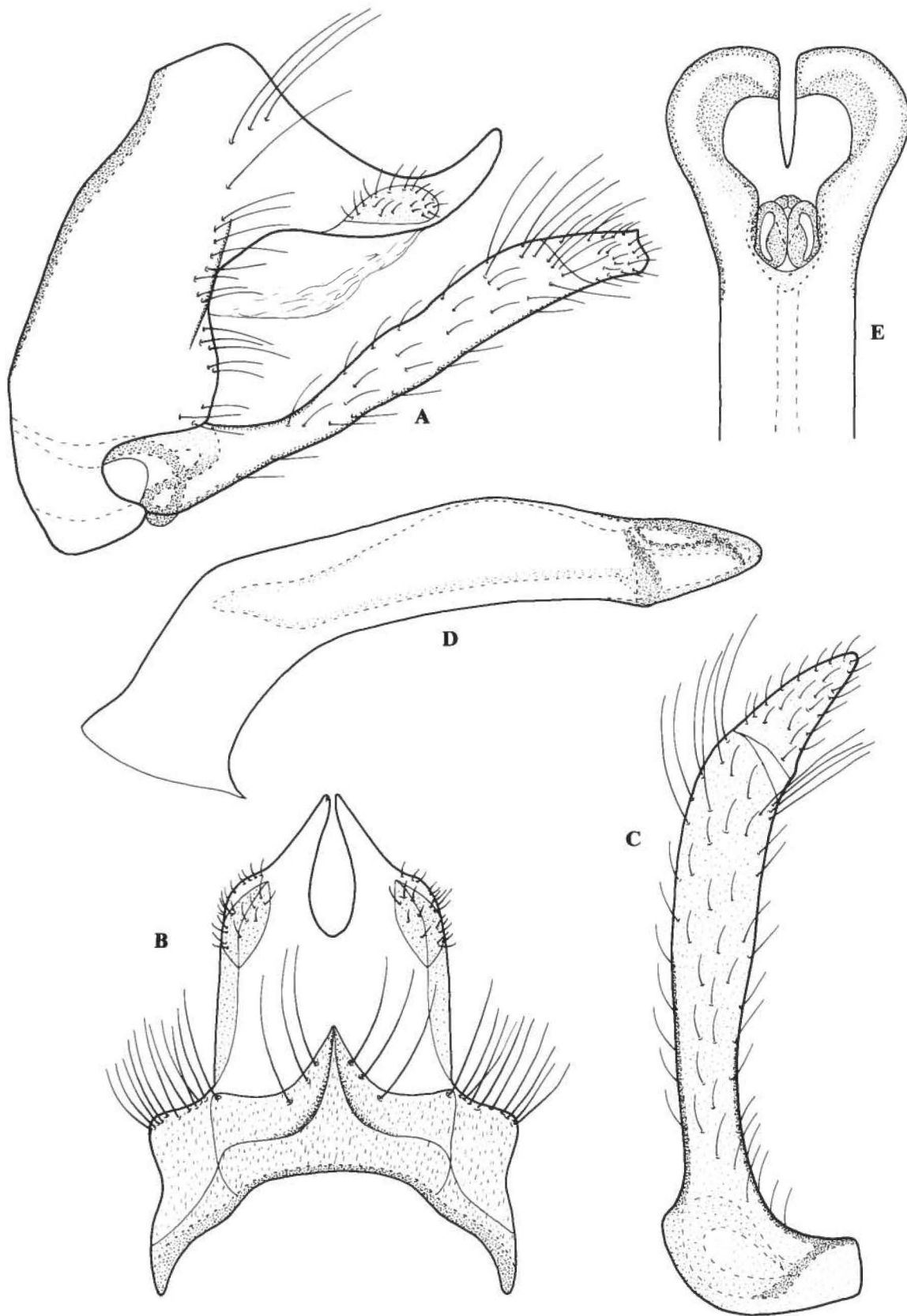


Figure 1. *Hydropsyche alabama*, n. sp., male genitalia. (A) Lateral view; (B) Segments IX, X, dorsal view; (C) Inferior appendage, caudal view; (D) Phallus, lateral view; (E) Apex of phallus, ventral view.

distributed in the central-states, occurring from Minnesota to Michigan and now south to Alabama. The new species of *Hydropsyche* was collected from the East Gulf Coastal Plain in extreme southeastern Alabama along a small, sand-bottomed stream.

Morphological terminology for the new species follows that of Schmid (1980). Type material will be deposited in the National Museum of Natural History, Smithsonian Institution (NMNH), Illinois Natural History Survey (INHS), University of Alabama (UA), and the personal collections of the authors (PKL and SCH).

Hydropsyche alabama, new species
Figure 1

HOLOTYPE.—Male. Alabama. Houston County, Cowarts Creek at unnumbered Co. Hwy., 8.8 km ENE Cottonwood, (Sec. 10, T 1 N, R 28 E), 24 May 1989, T. Shepard and S. McGregor (NMNH).

PARATYPES.—Alabama, same as holotype, 22 males (NMNH, INHS, UA, PKL, SCH).

MALE.—Forewing length 8-8.5 mm. Color brown, forewing uniformly and finely mottled, without obvious bands. Eyes, in dorsal view, less than half as wide as interocular distance (2:5). Abdominal segment IX with median dorsal crest. Tergum X with apex upturned in lateral view and deeply cleft in dorsal aspect forming forceps-like lobes; preanal appendage with large setiferous wart on lateral margin. Inferior appendage in ventral view with basal segment long and straight, apical segment short and curved mesad; in lateral view, apex appears blunt; in caudal view, slightly bowed mesad, distally with apex acute. Phallus tubular; phallobase straight in ventral view, slightly swollen dorsally in lateral view; apex with lateral lobes and slightly elevated mesal dome evenly rounded in profile; in dorsal view, apex slightly wider than phallobase, mesal cavity widely open, cavity somewhat cordiform.

FEMALE.—Unknown.

ETYMOLOGY.—Named for the state of Alabama.

DIAGNOSIS.—This distinctive species is a member of the *Hydropsyche scalaris* group which was most recently reviewed by Flint et al. (1979). In *H. alabama* the apex of tergum X is upturned and deeply cleft, separating the species from others in the *scalaris* group except *H. phalerata* Hagen and *H. aerata* Ross. However, the forceps-like lobes of tergum X, in dorsal aspect, are not as widely separated as in *H. phalerata* and are more linear than either *H. phalerata* or *H. aerata*. The subapical cavity of the phallus is almost completely open, as it is in *H. phalerata*, but in *H. alabama* there is no distinct constriction just anterior to the lateral

lobes (cf. Ross, 1944, fig. 317D) and the apex of the phallus is evenly rounded in lateral view.

Acknowledgments

Stuart McGregor and Tom Shepard of the Geological Survey of Alabama made many of the caddisfly collections resulting in this paper. Bill Garrett provided the material from Channahatchie Creek. Peggy Marsh typed the several drafts of the manuscript. Alex Huryn and Patrick O'Neil kindly read an earlier draft of the paper and offered suggestions.

Literature Cited

- Flint, O.S., Jr., J. R. Voshell, Jr. and C. R. Parker. 1979. The *Hydropsyche scalaris* group in Virginia, with the description of two new species (Trichoptera: Hydropsychidae). Proceedings of the Biological Society of Washington 92:837-862.
- Lago, P. K. and S. C. Harris. 1987a. An annotated list of the Curvivalpia (Trichoptera) of Alabama. Entomological News 98:255-262.
- Lago, P. K. and S. C. Harris. 1987b. The *Chimarra* (Trichoptera: Philopotamidae) of eastern North America with descriptions of three new species. Journal of the New York Entomological Society 95:225-251.
- Ross, H. H. 1944. The caddis flies, or Trichoptera, of Illinois. Bulletin of the Illinois Natural History Survey 23:1-326.
- Schmid, F. 1980. Genera des Trichopteres du Canada et des Etats adjacents, part 7. In: Les insectes et arachnides du Canada. Agriculture Canada, Ottawa, 296 p.

New Caddisflies (Trichoptera) from the Little River Drainage in Northeastern Alabama

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ABSTRACT: Frazer, Kenneth S. and Steven C. Harris, 1991. New caddisflies (Trichoptera) from the Little River drainage in northeastern Alabama. *Bulletin Alabama Museum of Natural History*, Number 11:5-9, 4 figures. The Little River is distinctive among North American rivers as it flows for most of its length on a mountain top. From this drainage in Alabama and Georgia, three new species of Hydroptilidae, *Hydroptila chattanooga*, *H. licina*, and *Neotrichia mentonensis*, and a new species of Polycentropodidae, *Neureclipsis piersoni*, are described and illustrated.

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Introduction

The Little River in northeastern Alabama is geographically unique among rivers in North America, as it flows for nearly its entire length on a mountain top. Originating along the Alabama-Georgia border, the Little River flows southwesterly along the top of Lookout Mountain and cuts a 20 km long canyon, the deepest (180 m) east of the Rocky Mountains. The river is a tributary to the Coosa River and lies entirely within the Cumberland Plateau physiographic region (Sapp and Emplainscourt, 1975), a region that contains the southernmost extension of the Appalachian Highlands. A number of uncommon, rare or endangered plants and animals have been reported from the Little River area (Frazer, 1990) and in recent years the region has been considered for inclusion into the National Park system.

The distinctive and relatively undisturbed nature of the Little River drainage prompted a comprehensive survey of

the caddisfly fauna in 1988 and 1989. This survey (Frazer, 1990), which was based primarily on the collection of adults with ultraviolet light traps, yielded 122 species, four of which were undescribed. These new species, two in the genus *Hydroptila*, one in the genus *Neotrichia*, and one in the genus *Neureclipsis* are herein described and their affinities noted.

Morphological terminology for the new *Hydroptila* and *Neotrichia* follows that of Marshall (1979); and for the *Neureclipsis* that of Schmid (1980). Specimen length, given as a range for the individuals examined, was measured from the tip of the head to the end of the wings. Type material will be deposited at the National Museum of Natural History, Smithsonian Institution (NMNH), Illinois Natural History Survey (INHS), University of Alabama (UA), and the personal collections of the authors (KSF and SCH).

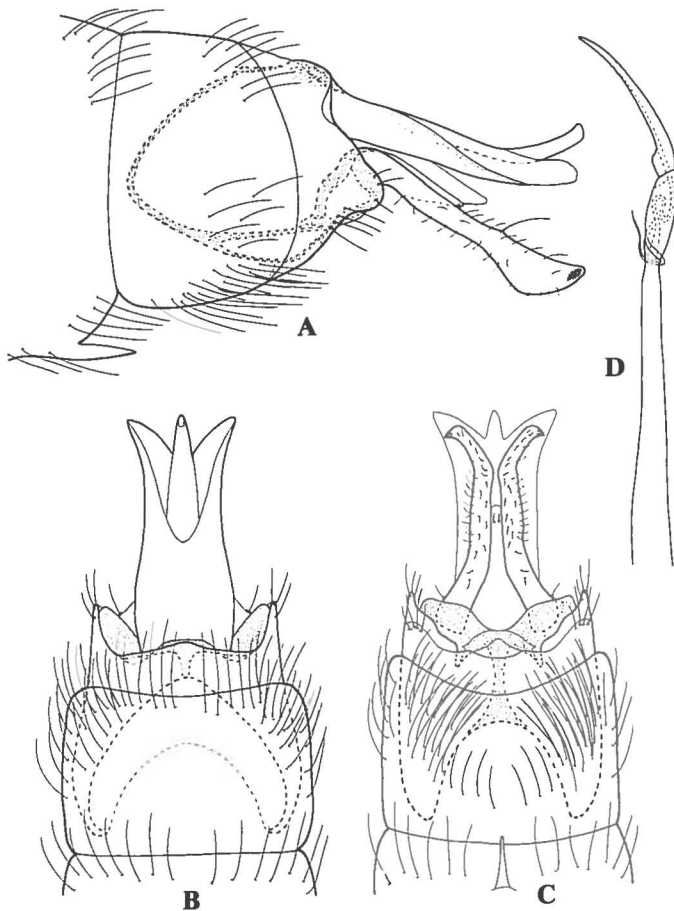


Figure 1. *Hydroptila chattanooga*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

Hydroptila chattanooga, new species
Figure 1

HOLOTYPE.—Male. Alabama, DeKalb County, West Fork of the Little River at Union covered bridge, near Cloudmont Resort (Sec. 9, T 6 S, R 10 E), 22 June 1988, K. S. Frazer (NMNH).

PARATYPES.—Alabama, same as holotype, 197 males (NMNH, INHS, UA); same, but 29 July 1988, 13 males (NMNH); same, but 27 August 1988, 17 males (KSF, SCH); West Fork of the Little River at DeSoto State Park, 50 m downstream mouth of Laurel Creek (Sec. 20, T 6 S, R 10 E), 22 June 1988, K.S. Frazer, 2 males (SCH); same, but 29 July 1988, 26 males (NMHS, INHS); same, but 27 August 1988, 13 males (UA); same, but 21 September 1988, 9 males (KSF, SCH); same, but 28 May 1989, 2 males (SCH); Little River, 1 km upstream Hwy. 35 bridge (Sec. 30, T 7 S, R 10 E), 17 June 1988, K.S. Frazer, 1 male (SCH); same, but 26 August 1988, 18 males (SCH); Ohio, Champaign County, Cedar Run, 24 July 1964, J. L. Williams, 1 male (NMNH); Pennsylvania, Wyoming County, Meshoppen Creek

(41°37'N, 76°02'W), 10 September 1989, E. C. Masteller, 1 male (NMNH).

MALE.—Length 2.3 - 2.6 mm. Antennae 29-segmented. Color brown in alcohol. Venter of abdominal segment VII with short, apicomesal process. Segment VIII generally quadrate in lateral view. Segment IX in lateral aspect rounded anteriorly, extending well into segment VIII, posterior margin widening ventrad; in dorsal and ventral views, deeply incised anteriorly. Segment X in dorsal view trilobed, lateral lobes flared, median lobe narrow, rounded at apex; in lateral view median lobe narrower than lateral lobes and slightly upturned. Subgenital plate extending to midlength of inferior appendages; in ventral view rounded posteriorly, with two setae subapically. Inferior appendages in ventral view narrow over their entire lengths, widely separated basally, slightly converging distally, and diverging laterally to sharply sclerotized apices; laterally somewhat club-shaped and bending ventrad. Phallus with basal portion long and tubular, spiral process encircling bulb-like apex; distal portion approximately 1/2 length of basal portion, wide at base, narrowing and curving slightly to sharp apex.

FEMALE.—Unknown.

ETYMOLOGY.—From the Cherokee name for Lookout Mountain, on which the Little River flows.

DIAGNOSIS.—This species, a member of the *H. consimilis* group of Marshall (1979), although similar to *H. bernerii* Ross in overall appearance, is easily distinguished by the shape of the phallus. In *H. bernerii*, the distal portion of the phallus is strongly curved and sickle-shaped, while in *H. chattanooga* it is at most slightly curved. *Hydroptila chattanooga* can be further separated by the appearance of the inferior appendages in ventral aspect. In *H. bernerii*, these appendages are widely separated basally and strongly convergent apically while in *H. chattanooga* they are nearly straight. In the Little River system, *H. chattanooga* occurs in the main river channel, above the canyon, and in the West Fork. The species records from Ohio and Pennsylvania suggest the species is widely distributed in the Appalachian region.

Hydroptila licina, new species
Figure 2

HOLOTYPE.—Male. Alabama, DeKalb County, West Fork of the Little River at DeSoto State Park, 50 m downstream mouth of Laurel Creek (Sec. 20, T 6 S, R 10 E), 21 September 1988, K.S. Frazer (NMNH).

PARATYPES.—Alabama, same as holotype, 2 males (NMNH, INHS); same, but 27 August 1988, 1 male (UA); West Fork of the Little River at Union covered bridge, near

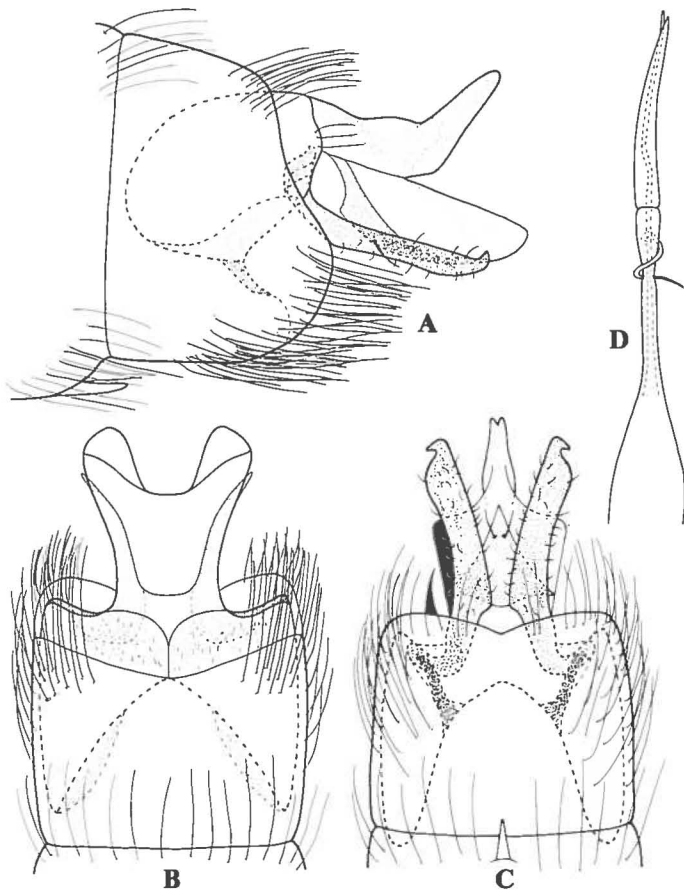


Figure 2. *Hydroptila licina*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

Cloudmont Resort, 29 July 1988, K.S. Frazer, 1 male (SCH); Georgia, Chattooga County, Gilreath Creek at Co. Hwy. 234 bridge (34°34'N, 85°27'W), 21 July 1989, K. S. Frazer, 1 male (KSF).

MALE.—Length 2.2-2.4 mm. Antennae 27-segmented. Color brown in alcohol. Venter of abdominal segment VII with short, apicomesal process. Segment VIII nearly quadrate, venter slightly longer than dorsum. Segment IX small and rounded, largely retracted into segment VIII. Segment X sharply upturned in lateral aspect; in dorsal view deeply incised creating two apical lobes. Subgenital plate large, extending beyond inferior appendages; in ventral view wide basally, narrowing at midlength to notched apex, triangular sclerite anteriorly bearing two setae. Inferior appendages in lateral view uniformly narrow, terminating in small upturned tips; in ventral view widely separated basally then diverging posteriorly, sharply incised subapically on lateral margin. Tubular phallus with basal portion tapering to bulb-like apex, spiral process encircling shaft; distal portion approximately 4/5 length of basal portion, gradually tapering to a pointed tip with protruding ejaculatory duct.

FEMALE.—Unknown.

ETYMOLOGY.—From the Latin “licinus” meaning upturned, referring to the shape of the tenth tergite.

DIAGNOSIS.—*Hydroptila licina* is another member of the large *H. consimilis* group with some similarity to *H. albicornis* Hagen and *H. acuminata* Bueno. The strongly upturned tenth tergite and the large, elongate subgenital plate is unique to *H. licina* and readily distinguishes the species. *Hydroptila licina* was restricted in distribution to the upper reaches of the Little River, in the West Fork and in a small tributary to the East Fork.

Neotrichia mentonensis, new species
Figure 3

HOLOTYPE.—Georgia, Chattooga County, Gilreath Creek at Co. Hwy. 234 bridge (34°34'N, 85°27'W), 21 July 1989, K.S. Frazer (NMNH).

PARATYPES.—Alabama, DeKalb County, West Fork of the Little River at Union covered bridge, near Cloudmont Resort, 22 June 1988, K. S. Frazer, 5 males (NMNH).

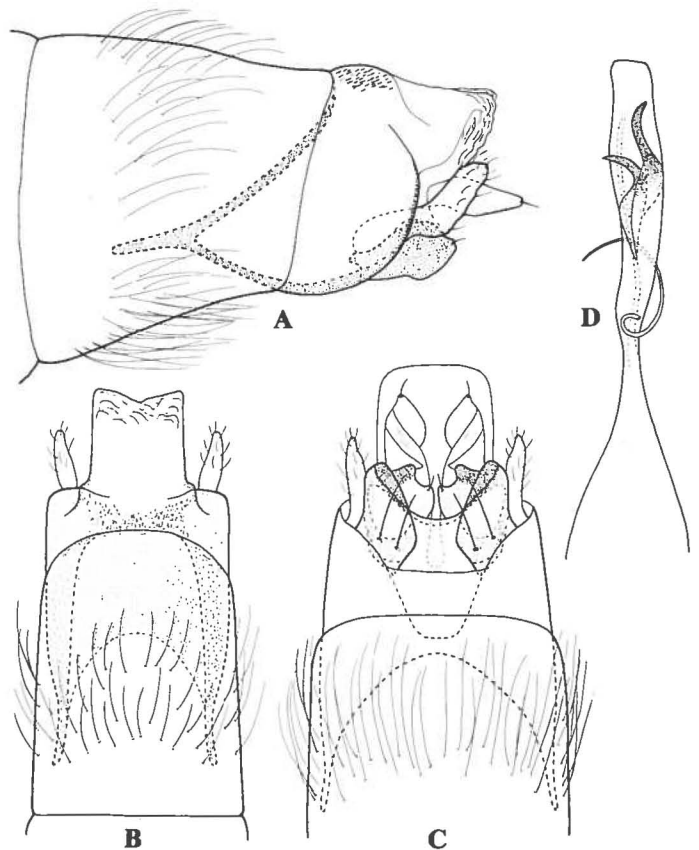


Figure 3. *Neotrichia mentonensis*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

MALE.—Length 1.8-2.0 mm. Antennae 18-segmented. Color brown in alcohol. Segment VIII trapezoidal, tapering posteriorly. In lateral view segment IX rounded posteriorly with elongate anterolateral apodemes; deeply incised both anteriorly and posteriorly in dorsal view; bracteoles originating posteroventrally, curving dorsad to rounded apex. Tergum segment X membranous ventrally with two elongate foldings tipped with setae posteriorly, pair of basal sclerotized processes anteriorly which are incised on the posterior margins. Inferior appendages heavily sclerotized; in lateral view somewhat ovoid, rounded posteriorly, tapered anteriorly; in ventral view boot-shaped with pair of basal setae. Phallus tubular with blunt tip bearing two sinuate subdistal spines; spiral process encircling phallus.

FEMALE.—Unknown.

ETYMOLOGY.—Latin: of Mentone; a town near the headwaters of the Little River.

DIAGNOSIS.—A member of the *Neotrichia collata* species group of Marshall (1979), *N. mentonensis* is most similar to *N. falca* Ross, *N. riegeli* Ross, and *N. alabamensis* Kelley and Harris. In these species, the phallus is similar, bearing a pair of curved, subapical spines. As these spines are free-moving, it is difficult to use phallic structure as a distinctive character. The species are better separated on the configuration of the ventral foldings of segment X and the shape of the inferior appendages. Both *N. alabamensis* and *N. riegeli* have acute processes on the venter of segment X, which in *N. mentonensis* and to some extent in *N. falca* are blunt. In *N. alabamensis* and *N. falca* the posterior margin of the inferior appendages in ventral aspect is mesally incised, while in *N. mentonensis* and *N. riegeli* the margin is entire and generally truncate. However, in *N. mentonensis* the inferior appendages diverge laterally as with *N. alabamensis*, but not in *N. riegeli*. *Neotrichia mentonensis* has only been collected from the headwaters of the Little River in Alabama and Georgia.

Neureclipsis piersoni, new species
Figure 4

HOLOTYPE.—Male. Alabama, DeKalb County, West Fork of the Little River at DeSoto State Park, 50 m downstream mouth of Laurel Creek (Sec. 20, T 6 S, R 10 E), 27 August 1988, K.S. Frazer (NMNH).

PARATYPES.—Alabama, same as holotype, but 22 June 1988, 5 males (NMNH); same, but 29 July 1988, 7 males (INHS); Little River, 1 km upstream Hwy. 35 bridge, 17 June 1988, K.S. Frazer, 2 males (SCH); same, but 29 July 1988; 4 males (SCH); same, but 27 May 1989, 3 males (KSF); same, but 3 October 1989, 1 male (SCH), Little River at Canyonland Park (Sec. 10, T 8 S, R 9 E), 20 May 1988, K.S.

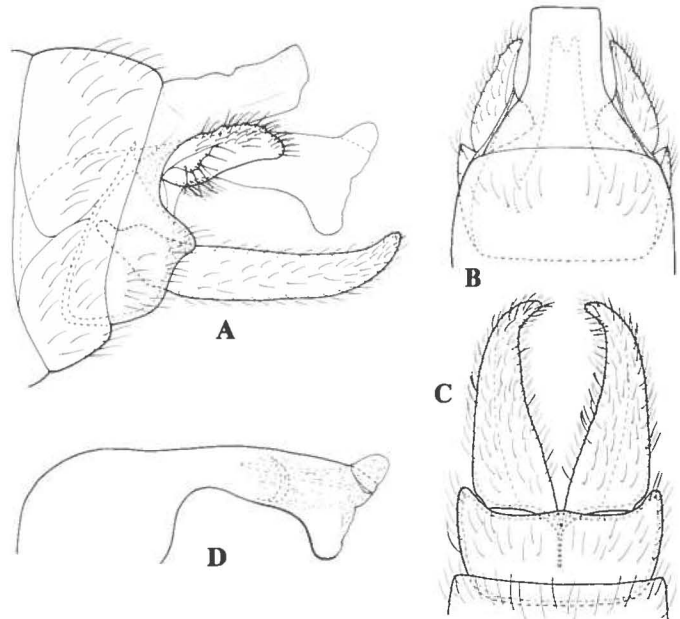


Figure 4. *Neureclipsis piersoni*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, lateral view.

Frazer, 5 males (UA); same, but 17 June 1988, 25 males (NMNH, INHS); same, but 29 July 1988, 3 males (UA); same, but 26 August 1988, 1 male (SCH); same, but 20 September 1988, 3 males (SCH); same, but 3 October 1989, 1 male (KSF); West Fork of the Little River at Union covered bridge, near Cloudmont Resort, 27 August 1988, K.S. Frazer, 1 male (UA); Bear Creek, 125 m upstream Canyon Parkway bridge (Sec. 4, T 8 S, R 9 E), 17 June 1988, K.S. Frazer, 1 male (SCH); same, but 29 July 1988, 1 male (KSF); Georgia, Chattooga County, East Fork of the Little River at Hwy. 48 bridge (34°31'N, 85°30'W), 21 July 1989, K.S. Frazer, 1 male (SCH); Gilreath Creek at Co. Hwy. 234 bridge, 21 July 1989, K.S. Frazer, 1 male (KSF).

MALE.—Length 5.9-8.4 mm. Antennae 45-segmented. In alcohol, wings and dorsum brown with venter and legs straw colored. Segment VIII unmodified. Segment IX partially retracted within segment VIII. Dorsum segment X fused with segment IX, truncate posteriorly; in lateral view membranous basally, extending to blunt apex. Preanal appendages in lateral view ovate, serrate dorsally, bearing numerous setae, small patch of setae on basoventral margin, sclerotized setiferous projection basolaterally; in dorsal view wide basally, tapering to tip. Inferior appendages in lateral view narrow and elongate, slightly upturned distally; in ventral view wide basally, tapering apically, mesal margins slightly concave. Phallus bulbous at base, narrowing posteriorly; two rounded lobes distally, dorsal lobe small, membranous with sclerotization at base, ventral lobe large, lightly sclerotized along ventral margin; crescent-shaped sclerotized internal rod at midlength.

FEMALE.—Unknown.

ETYMOLOGY.—Named in honor of J. Malcolm Pierson in recognition of his contributions to aquatic biology in the southeast.

DIAGNOSIS.—*Neureclipsis piersoni* shows a combination of the genitalic features seen in *N. crepuscularis* (Walker) and *N. melco* Ross. The slender, elongate inferior appendages and shape of the phallus, with the prominent apicoventral lobe, are similar to that of *N. melco*. However, the preanal appendages are not bifid as in *N. melco*, rather they are ovate as in *N. crepuscularis*. In Alabama, *N. melco* is restricted to the East Gulf Coastal Plain, while *N. crepuscularis* is widespread. In the Little River drainage, *N. piersoni* occurred throughout the system, while *N. crepuscularis* was only collected from a single locality (Frazer, 1990).

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The Department of Biology at the University of Alabama and the Geological Survey of Alabama provided supplies and facilities during the study and are gratefully acknowledged. G. M. Ward and R. L. Mayden, of the University of Alabama, provided advice and encouragement during this study. K. McGiffen of the Illinois Natural History Survey provided *Neotrichia* and *Hydroptila* material for species comparisons. O.S. Flint, Jr. kindly allowed the inclusion of material from the National Museum of Natural History in the paper. A. Huryn, of the University of Alabama, and P. O'Neil, of the Geological Survey of Alabama, reviewed a preliminary draft of the manuscript. This publication represents contribution number 168 of the Aquatic Biology Program at the Department of Biology, The University of Alabama.

Literature Cited

- Frazer, K. S. 1990. Caddisflies (Trichoptera) of the Little River drainage in northeastern Alabama. M.S. thesis, The University of Alabama. 268 p.
- Marshall, J. E. 1979. A review of the genera of the Hydroptilidae (Trichoptera). Bulletin of the British Museum (Natural History), Entomology Series. 39:135-239.
- Sapp, C. D. and J. Emplaincourt. 1975. Physiographic regions of Alabama. Alabama Geological Survey Special Map 168.
- Schmid, R. 1980. Genera des Trichopteres du Canada et des Etats adjacents, part 7. In: Les insectes et arachnides du Canada. Agriculture Canada, Ottawa, 296 p.

New Caddisflies (Trichoptera) from Alabama and Florida

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ABSTRACT: Harris, Steven C. 1991. New caddisflies (Trichoptera) from Alabama and Florida. *Bulletin Alabama Museum of Natural History*, Number 11:11-16, 7 figures. Five new species of Trichoptera, *Rhyacophila alabama*, *Hydroptila metteei*, *H. wetumpka*, *H. cheaha*, and *Neotrichia sepulga* from Alabama and one new species from Florida, *Neotrichia armitagei*, are described and illustrated.

Introduction

Although the caddisfly fauna of the southeastern United States is fairly well documented, with checklists compiled for Tennessee (Etnier and Schuster, 1979), North and South Carolina (Unzicker et al., 1982), Kentucky (Resh, 1975), Virginia (Parker and Voshell, 1981), Mississippi and southeastern Louisiana (Holzenthall et al., 1982) and Alabama (Harris and Lago, 1990), ongoing collecting has continued to reveal undescribed species. This paper describes five new species from Alabama, one in the genus *Rhyacophila*, three in the genus *Hydroptila*, and one in the genus *Neotrichia*, and an additional new species in the genus *Neotrichia* from Florida.

Morphological terminology for the new *Rhyacophila* follows that of Schmid (1980); and for the *Hydroptila* and *Neotrichia* that of Marshall (1979). Specimen length was measured from the tip of the head to the end of the wings. When more than one specimen was examined, this length is given as a range. Type material will be deposited at the National Museum of Natural History, Smithsonian Institution (NMNH), Illinois Natural History Survey (INHS), Florida State Collection of Arthropods (FSCA), University of Alabama (UA), and the personal collection of the author (SCH).

Rhyacophila alabama, new species Figures 1, 2

HOLOTYPE.—Male. Alabama, Jackson County, small tributary to Hurricane Creek, 5.9 km N end Co. Hwy. 141 (Sec. 3, T 15 S, R 4 E), 1 June 1989, S. Harris and S. McGregor (NMNH).

PARATYPES.—Alabama, same as holotype, 109 males (NMNH, INHS, UA, FSCA, SCH), 3 females (NMNH, INHS).

MALE.—Length 8.5-10.5 mm. Head and thorax brown in alcohol, legs yellow-brown, wings light brown with mottled appearance. Segment VII with small ventro-mesal projection. Segment IX narrow ventrally, thickened at line of articulation with inferior appendages; dorsal apical lobe short, only extending to the anterior margin of segment X, nearly truncate distally in dorsal view. Segment X with posterior margin incised in lateral view; in caudal view rectangular, with elongate setae on dorsal margin and short, stout setae on posterior surface. Anal sclerite elongate in lateral view, narrow basal portion extending to posterior of

segment IX, distal portion enlarged with apical lobes rounded, with membranous folds ventrally; in caudal and dorsal views apical lobes rounded and narrowly separated, with seta-bearing membranous folds laterally. Inferior appendages with ventral lobe elongate and rounded apically, bearing dense patch of peg-like setae on dorsal surface; dorsal lobe about half length of ventral lobe and broadly rounded, bearing long setae apically. Phallic apparatus large with spiniform paramere, aedeagus lightly sclerotized and sharply upturned at apex.

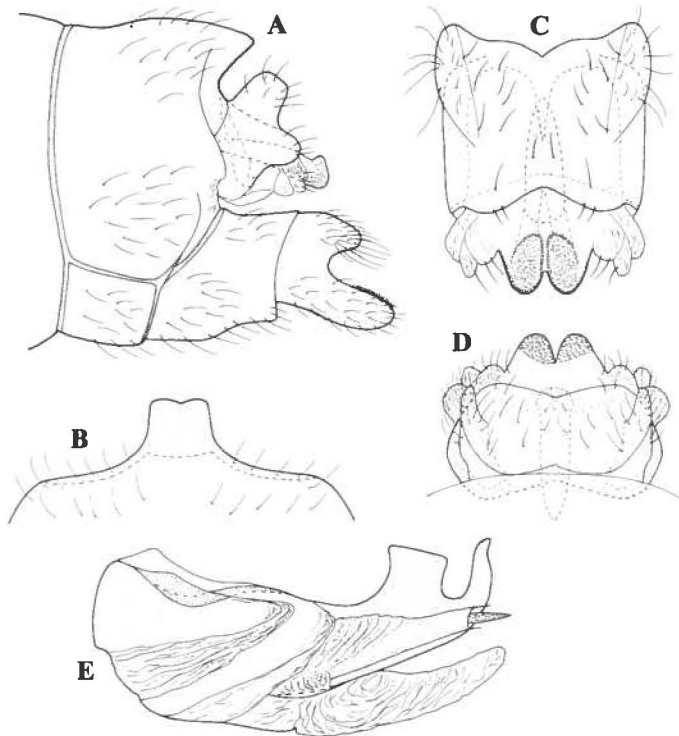


Figure 1. *Rhyacophila alabama* n. sp., male genitalia. (A) Lateral view; (B) Apical lobe of segment IX, dorsal view; (C) Segment X and anal sclerites, caudal view; (D) Segment X and anal sclerites, dorsal view; (E) Phallic apparatus, lateral view.

FEMALE.—Length 9.5-10.5 mm. Overall appearance and coloration similar to male. Abdominal segment VIII in lateral view with narrow, elongate projection from postero-ventral margin; in ventral view narrowing posteriorly with shallow mesal incision; dorsally with broad, rounded mesal incision on posterior margin. Vaginal sclerites brown; terminal sclerite elongate, in lateral view narrow posteriorly, rounded anteriorly, in ventral view rectangular, slightly sinuate on lateral margins; lateral sclerites oval in lateral view, constricted anteriorly at attachment to rounded anterior sclerites, in ventral view narrowly separated, rectangular in shape, about 1/3 length of terminal sclerite.

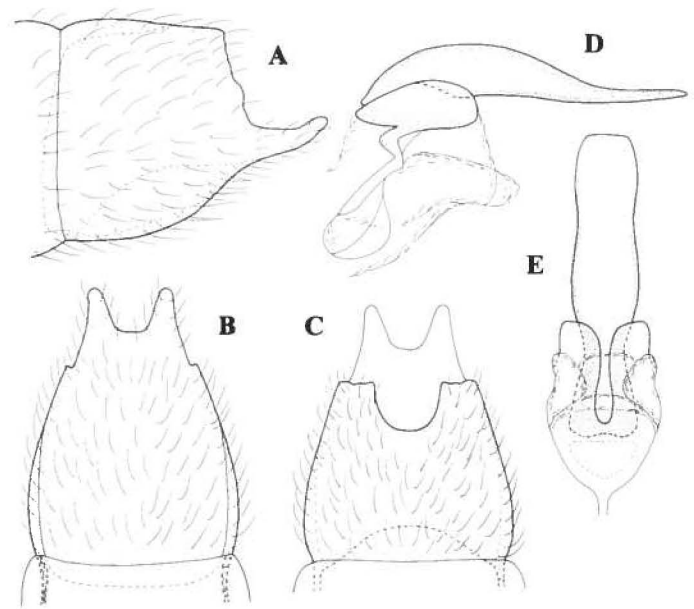


Figure 2. *Rhyacophila alabama*, n. sp., female genitalia. (A) Segment VIII, lateral view; (B) Segment VIII, ventral view; (C) Segment VIII, dorsal view; (D) Vaginal sclerites, lateral view; (E) Vaginal sclerites, ventral view.

ETYMOLOGY.—Named for the state of Alabama.

DIAGNOSIS.—This species, a member of the *Rhyacophila invaria* group of Schmid (1970), is most similar to *R. banksi* Ross and *R. parantra* Ross. These species have in common an elongate anal sclerite with small apical lobes and similarly shaped inferior appendages. The short dorsomesal lobe of segment IX is distinctive for *R. alabama* and easily separates it from both *R. banksi* and *R. parantra*. The lobe is truncate dorsally, as it is in *R. parantra*. However in both *R. parantra* and *R. banksi*, this dorsal lobe is distinct in lateral view and extends over segment X. In *R. alabama* this lobe is not clearly evident in lateral view and only extends to the anterior margin of segment X. The females of the three species are also similar, but distinctive. Both *R. banksi* and *R. alabama* have segment VIII with an elongate posteroventral projection, which is lacking in *R. parantra*. However in *R. banksi* these projections are very thin in ventral view and the mesal incision is deep, while in *R. alabama* the incision is more shallow and the projections are wider. The species was collected along a small, rocky tributary emerging from a steep hillside.

Hydroptila metteei, new species

Figure 3

HOLOTYPE.—Male. Alabama, Houston County, Cowarts Creek at unnumbered Co. Hwy., 8.8 km ENE Cottonwood (Sec. 10, T 1 N., R 28 E), 24 May 1989, T. Shepard and S. McGregor (NMNH).

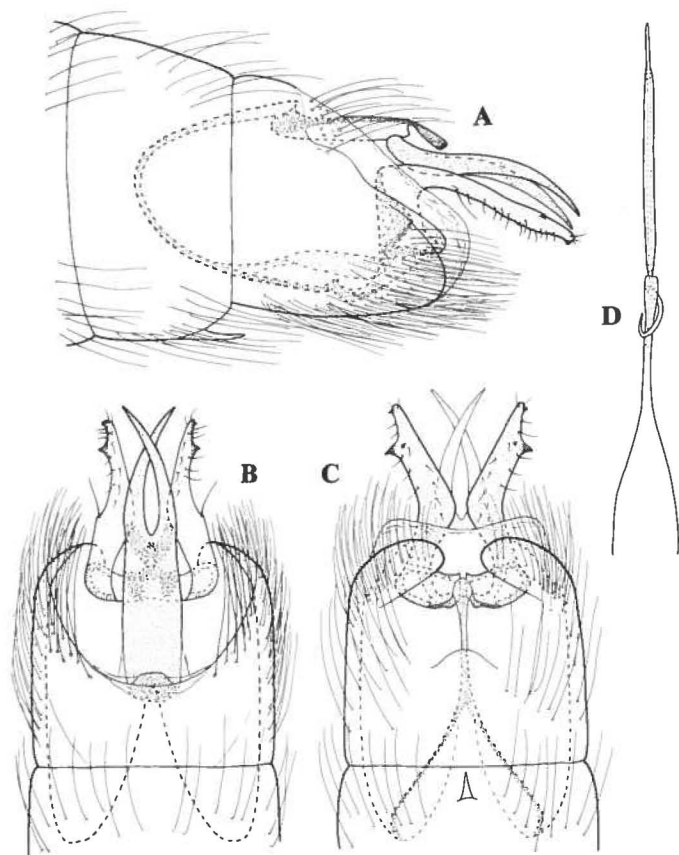


Figure 3. *Hydroptila metteei*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

PARATYPE.—Alabama, Geneva County, Wrights Creek at Co. Hwy. 14, 3.2 km SW Fadette (Sec. 30, T 1 N, R 25 E), 24 May 1989, T. Shepard and S. McGregor, 1 male (NMNH).

MALE.—Length 2.7-2.9 mm. Antennae 28-segmented. Brown in alcohol. Abdominal segment VII with short, apicomeral process. Segment VIII somewhat triangular in lateral view, narrow dorsally and widening ventrally; dorsally reduced to a narrow bridge; ventrally with posterolateral margins produced into thin lobes. Segment IX completely retracted within VIII; dorsally deeply incised and reduced to a narrow bridge. Segment X complex; in lateral view dorsum thin with finger-like apical projection, ventrally produced into a pair of sclerotized tapering processes (intermediate appendages) which are longer than the dorsal portion, and curving ventrad; in dorsal view basal portion narrow, distal processes tapering to acute tips and crossing. Inferior appendages narrow in lateral view, gently bending ventrad; ventrally widely separated basally, converging near midlength then diverging laterally, small spine at apex with large spine subapically. Phallus long and thin, bearing spiral process at midlength, ejaculatory duct protruding at apex.

ETYMOLOGY.—Named for Dr. M. F. "Scott" Mettee, Jr. in recognition of his contributions to aquatic biology in Alabama.

DIAGNOSIS.—A member of the *Hydroptila waubesiana* group of Marshall (1979), *H. metteei* is very similar to *H. tridentata* Holzenthal and Kelley in the overall appearance of the genitalia. It differs from this species and other members of the group in the configuration of segment X. In *H. tridentata* the apicoventral processes of segment X (intermediate appendages) are short, about 1/3 the length of the dorsal portion, and sinuate, while in *H. metteei* these processes are elongate, greater than the length of the dorsal portion, and sword like. *Hydroptila metteei* has only been collected in small, sandy streams of the lower Coastal Plain in Alabama, while *H. tridentata* is known only from two localities in South Carolina.

Hydroptila wetumpka, new species

Figure 4

HOLOTYPE.—Male. Alabama, Elmore County, Corn Creek at Hwy. 14, 4.8 km ENE Wetumpka (Sec. 9, T 18 N, R 19 E), 24 June 1987, S. Harris and P. O'Neil (NMNH).

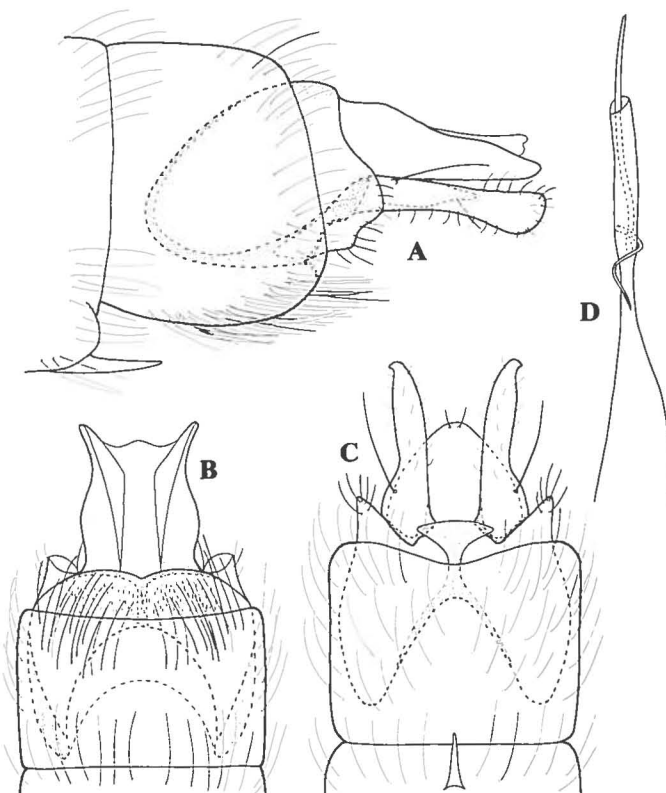


Figure 4. *Hydroptila wetumpka*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

MALE.—Length 2.4 mm. Antennae 27-segmented. Brown in alcohol. Abdominal segment VII with short, apicomesal process. Segment VIII quadrate in lateral view. Segment IX narrow in lateral view, slightly emarginate on posterior margin, extending anteriorly into segment VIII; deeply incised anteriorly in dorsal and ventral aspects. Segment X elongate, in lateral view tapering distally to rounded apex; dorsally with lateral margins lightly sclerotized, slightly emarginate apically with lateral tips diverging. Subgenital plate in lateral view narrowing apically, bearing pair of ventral setae; in ventral view wide basally, rounded distally with pair of mesal setae subapically. Inferior appendages in lateral view nearly straight and parallel-sided, about same length as segment X; in ventral view widely separated basally and nearly straight, curving laterally at apex to acute tip, shouldered basolaterally and bearing an elongate seta. Phallus tubular, with spiral process at midlength, ejaculatory duct protruding well beyond apex.

ETYMOLOGY.—Named for the city of Wetumpka which is located near the type locality.

DIAGNOSIS.—*Hydroptila wetumpka* in overall appearance resembles several species in the *H. consimilis* group of Marshall (1979), notably *H. circangula* Harris, *H. setigera* Harris, *H. carolae* Holzenthal and Kelley, and *H. scolops* Ross. These species share in common with *H. wetumpka* the basolateral shouldering of the inferior appendages and only by a combination of genitalic features can *H. wetumpka* be distinguished. In *H. circangula* and *H. carolae* the subgenital plate in ventral aspect narrows to an apical projection, while in *H. wetumpka* the subgenital plate is rounded apically. The phallus of *H. wetumpka* has a protruding ejaculatory duct, similar to that seen in *H. circangula*, but in *H. setigera* and *H. scolops* the ejaculatory duct does not protrude apically. *Hydroptila wetumpka* has only been collected from a small, rocky stream of the Piedmont region of Alabama.

Hydroptila cheaha, new species
Figure 5

HOLOTYPE.—Male. Alabama, Talladega County, Dry Creek at Co. Hwy. 234, Talladega National Forest, 4.8 km SW Waldo (Sec. 23, T 19 S, R 5 E), 1 June 1988, S. C. Harris (NMNH).

MALE.—Length 2.6 mm. Antennae 27-segmented. Brown in alcohol. Abdominal segment VII with short apicomesal process. Segment VIII narrowing posteriorly in lateral view, bearing several heavy setae at the apical margin; generally quadrate in dorsal and ventral views, broadly emarginate on posterior margin. Segment IX completely retracted within segment VIII, deeply incised anteriorly. Tergum X triangular, retracted within segment VIII

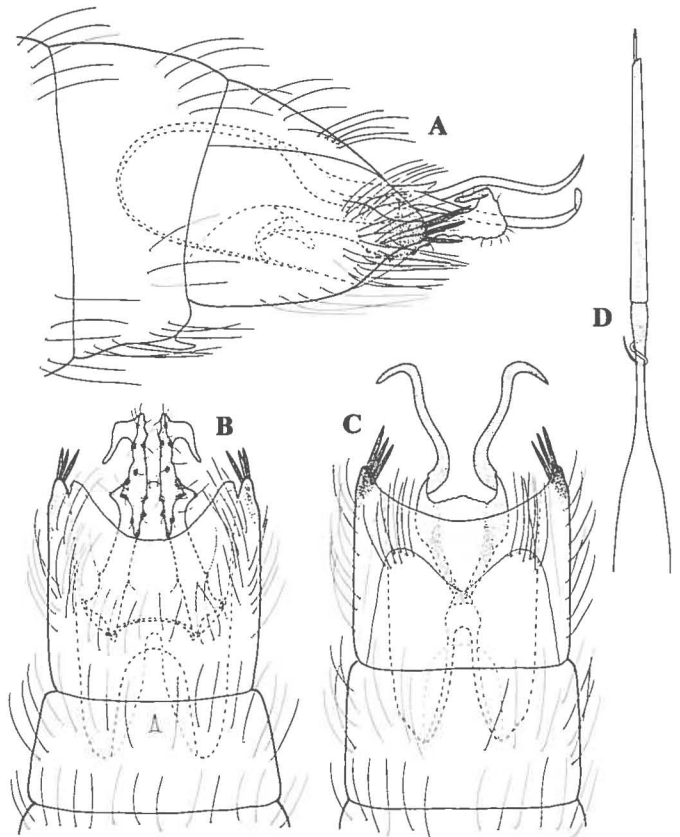


Figure 5. *Hydroptila cheaha*, n. sp., male genitalia. (A) Lateral view; (B) Ventral view; (C) Dorsal view; (D) Phallus, ventral view.

anteriorly, posteriorly with lateral margins developed as acute points, each bearing ventrally an elongate, sclerotized process (intermediate appendage) which bends laterally near apex. Inferior appendages elongate and complex; in lateral view basal portion nearly straight and parallel-sided, retracted within segment VIII, distal portion widening, upturned at apex with anteriorly directed process; in ventral view, basal half retracted within segment VIII and widely separated, distal half converging toward apex which bends antero-laterally, large lateral tooth at midlength, ventrally directed process in apical half which bears numerous sclerotized points. Phallus simple, narrow over length, spiral process near apex of basal portion, ejaculatory duct protruding apically.

ETYMOLOGY.—Named for Cheaha Mountain near the type locality.

DIAGNOSIS.—The elongate, forked tenth tergum and presence of heavy spines on the apical margin of segment VIII seen in *H. cheaha* is characteristic of several members of the *H. waubesiana* group, notably *H. patriciae* Harris, *H. lagoi* Harris, *H. lonchera* Blickle and Morse, and *H. ouachita* Holzenthal and Kelley. The structure of the inferior

appendages, however, easily distinguishes *H. cheaha* from closely related species. *Hydroptila cheaha* was collected along a small, rocky stream of the lower Appalachians. Repeated attempts to collect additional material were unsuccessful.

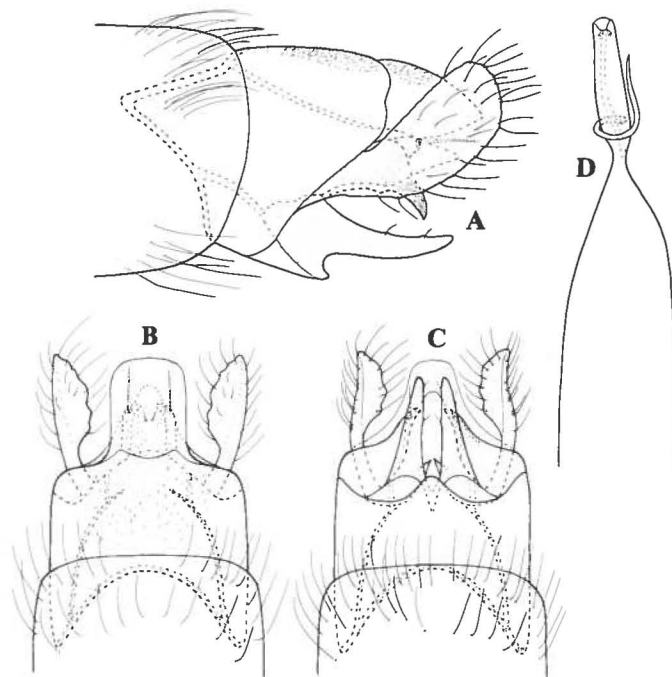


Figure 6. *Neotrichia sepulga*, n. sp., male genitalia. (A) Lateral view; (B) Dorsal view; (C) Ventral view; (D) Phallus, ventral view.

Neotrichia sepulga, new species
Figure 6

HOLOTYPE.—Male. Alabama, Butler County, Duck Creek off Co. Hwy. 7, 3.2 km W Mt. Olive (Sec. 17, T 7 N, R 12 E), 7 June 1989, T. Shepard and S. McGregor (NMNH).

MALE.—Length 1.4 mm. Antennae 20-segmented. Brown in alcohol. Abdominal segment VIII quadrate. Segment IX trapezoidal in lateral view, anteriorly tapering dorsad to acute apex and extending midway into segment VIII, spatulate bracteoles posteroventrally, curving slightly dorsad and extending beyond tip of segment X; dorsally segment IX broad emarginate anteriorly, posteriorly slightly emarginate mesally; bracteoles narrow basally, widening distally; in ventral view segment IX with lateral excisions on posterior margin, sclerotized processes extending mesad from lateral margins, narrowing to acute apices, in lateral view these processes taper to an acute tip with curves downward, dorsally these processes bear a projection tipped with a stout seta. Subgenital plate in lateral

view narrowing distally; in ventral view wide basally, tapering to a rounded apex; pair of subapical mesal setae visible in dorsal view. Inferior appendages sclerotized; generally falcate in lateral view; in ventral view narrowly triangular, tapering distally to rounded apex. Phallus wide at base, tubular distally, bearing spiral process above medial constriction.

ETYMOLOGY.—Named for the Sepulga River of which Duck Creek is a tributary.

DIAGNOSIS.—A member of the large *Neotrichia collata* group of Marshall (1979), *N. sepulga* appears to be most similar to *N. downsi* Ruitter, but it also shares some characteristics with *N. okopa* Ross, *N. osmena* Ross, *N. sonora* Ross, and *N. arkansasensis* Mathis and Bowles. *Neotrichia sepulga*, *N. downsi* and *N. osmena* all have segment X gently tapering in lateral view; while in *N. sonora*, *N. arkansasensis* and to some extent *N. okopa*, the tenth tergum narrows to an acute apex and bears thin, pointed ventrolateral processes. Both *N. sepulga* and *N. downsi* have inferior appendages which similarly narrow distally to an acute apex in lateral aspect. However in *N. downsi*, the sclerotized inner processes of segment IX are blunt apically, similar to that seen in *N. osmena*, while in *N. sepulga* these processes are acutely pointed apically and curved ventrad. The species is only known from the type locality in the Lime Hills region of the East Gulf Coastal Plain of Alabama. The Lime Hills region is characterized by limestone outcroppings and the streams of this region have high gradients with hard substrates.

Neotrichia armitagei, new species
Figure 7

HOLOTYPE.—Male. Florida, Okaloosa County, Turkey Gobble Creek at Base Rd. 211, Eglin Air Force Base, 11.2 km NW Niceville, 15 August 1985, B. J. Armitage (NMNH).

PARATYPES.—Florida, Okaloosa County, Rogue Creek at Base Rd. 233, Eglin Air Force Base, 5.3 km NW Niceville, 14 August 1985, B. J. Armitage and M. K. Ward, 1 male (NMNH), unnamed tributary to Turkey Creek at Base Rd 603, Eglin Air Force Base, 8 km NW Niceville, 14 August 1985, B. J. Armitage and M. K. Ward, 1 male (INHS).

MALE.—Length 1.5-1.8 mm. Antennae 18-segmented. Brown in alcohol. Abdominal segment VIII trapezoidal, tapering posteriorly. Segment IX in lateral view with posterior margin rounded mesally, anteriorly tapering to ventrolateral apodemes which extend into segment VII; ventrally, emarginate on posterior margin, deeply incised anteriorly; dorsally fused with segment X; bracteoles on posteroventral margin, club-shaped in lateral view, extending to midlength of segment X, uniformly narrow in ventral

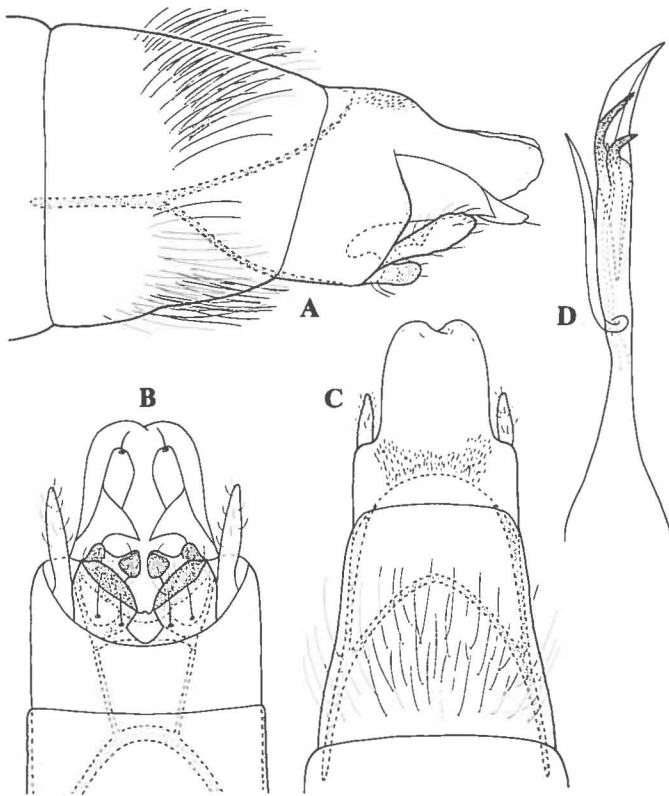


Figure 7. *Neotrichia armitagei*, n. sp., male genitalia. (A) Lateral view; (B) Ventral view; (C) Dorsal view; (D) Phallus, ventral view.

view. Segment X in dorsal view quadrate, membranous dorsally, slightly emarginate apically; ventrally with pair of seta-bearing foldings, which are acutely pointed inward at base, and a pair of basal sclerotized processes which are mesally incised on the posterior margin. Inferior appendages sclerotized; in lateral view short and narrow, rounded distally; in ventral view nearly quadrate, but diverging laterally on posterior margin, pair of elongate setae basally. Phallus tubular, narrowing to acute apex, pair of sclerotized subapical spines curving laterad, spiral process at midlength.

ETYMOLOGY.—Named for Dr. Brian Armitage, who collected the type series; in recognition of his contributions to the study of caddisflies.

DIAGNOSIS.—Another member of the *Neotrichia collata* group, *N. armitagei* is most similar to *N. riegeli* Ross, although it also displays some of the characteristics of *N. alabamensis* Kelley and Harris, *N. falca* Ross, and *N. mentonensis* Frazer and Harris. Both *N. armitagei* and *N. riegeli* have similarly shaped quadrate inferior appendages, as seen in ventral view. However in *N. riegeli* the posterior margins of the inferior appendages are truncate, while in

N. armitagei these margins are angled. The basal foldings of segment X in *N. armitagei* are similar to those of *N. mentonensis* but they differ in configuration. *Neotrichia armitagei* is likely endemic to small streams of the panhandle region of Florida as are a number of other caddisflies (Harris and Armitage, 1987).

Acknowledgments

Stuart McGregor, Tom Shepard and Pat O'Neil of the Geological Survey of Alabama assisted in the caddisfly collections in Alabama. Brian Armitage provided the collections from Florida. Kathryn McGiffen of the Illinois Natural History Survey kindly made available specimens of *Rhyacophila banksi*, *R. parantra*, *Neotrichia riegeli* and *N. falca* for comparison. David Etnier of the University of Tennessee also loaned *Rhyacophila banksi* and *R. parantra* material for examination. The efforts of Alex Huryn of the University of Alabama and Pat O'Neil in reviewing early drafts of the manuscript are appreciated. Peggy Marsh typed the numerous drafts of the paper and is due my thanks.

Literature Cited

- Etnier, D. A. and G. A. Schuster. 1979. An annotated list of Trichoptera (caddisflies) of Tennessee. *Journal of the Tennessee Academy of Science* 54:15-22.
- Harris, S. C. and B. J. Armitage. 1987. New Hydroptilidae (Trichoptera) from Florida. *Entomological News* 98:106-110.
- Harris, S. C. and P. K. Lago. 1990. Annotated checklist of the Rhyacophiloidea and Integripalpia (Trichoptera) of Alabama. *Entomological News* 101:57-66.
- Holzenthal, R. W., S. C. Harris, and P. K. Lago. 1982. An annotated checklist of the caddisflies (Trichoptera) of Mississippi and southeastern Louisiana, Part III: Limnephiloidea and conclusions. *Proceedings of the Entomological Society of Washington* 84:513-523.
- Marshall, J. E. 1979. A review of the genera of the Hydroptilidae (Trichoptera). *Bulletin of the British Museum (Natural History), Entomology Series* 39:135-232.
- Parker, C. R. and J. R. Voshell, Jr. 1981. A preliminary checklist of the caddisflies (Trichoptera) of Virginia. *Journal of the Georgia Entomological Society* 16:1-7.
- Resh, V. H. 1975. A distributional study of the caddisflies of Kentucky. *Transactions of the Kentucky Academy of Sciences* 36:6-16.
- Schmid, F. 1970. Le genre *Rhyacophila* et la famille des Rhyacophilidae (Trichoptera). *Memoirs of the Entomological Society of Canada* 60:1-230.
- Schmid, F. 1980. Genera des Trichopteres du Canada et des Etats adjacents, part 7. In: *Les insectes et arachnides du Canada*. Agriculture Canada, Ottawa, 296 p.
- Unzicker, J. W., V. H. Resh, and J. C. Morse. 1982. Trichoptera, p. 9.1-9.138. In: A. R. Brigham, W. V. Brigham, and A. Gnilka (eds.). *Aquatic insects and oligochaetes of North and South Carolina*. Midwest Aquatic Enterprises, Mahomet, Illinois.

Survey of the Trichoptera in the Little River Drainage of Northeastern Alabama

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ABSTRACT: Frazer, Kenneth S., Steven C. Harris, and G. Milton Ward, 1991. Survey of the Trichoptera in the Little River drainage of northeastern Alabama. *Bulletin Alabama Museum of Natural History*, Number 11:17-22, 3 tables, 1 figure. One hundred twenty-two species of caddisflies in 15 families and 44 genera were collected from the Little River drainage in northeastern Alabama. Six species appear to be endemic to the Little River with three others restricted to this drainage within the state. The family Hydroptilidae is represented by the most species, followed by Leptoceridae, Hydropsychidae, and Polycentropodidae.

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Introduction

The Little River in northeastern Alabama is geographically unique among rivers in North America, as it flows for nearly its entire length on a mountain top. Originating along the Alabama-Georgia border at an elevation of about 600 m, the Little River flows southwesterly along the top of Lookout Mountain (Fig. 1) and drains an area of 518 km². Approximately 24 km upstream from its entrance into Weiss Lake, the river flows over a 20 m waterfall (Little River Falls) and, as it flows south cuts a 20 km long canyon, the deepest (180 m) east of the Rocky Mountains.

A part of the Coosa River system, the Little River lies entirely within the Cumberland Plateau physiographic region (Sapp and Emplincourt, 1975), a region that contains the southernmost extension of the Appalachian Highlands. Much of the Little River basin lies on sandstone which results in the waters being low in alkalinity, slightly acidic and low in dissolved minerals. Water quality is generally good, although several tributaries draining farms exhibit high levels of nitrogen (Table 1). A number of uncommon, rare or

endangered plants and animals have been reported from the Little River area (Frazer, 1990) and in recent years the region has been considered for inclusion into the National Park system.

Despite the distinctive nature of the Little River, aquatic insects of the drainage have been little studied. A limited number of collections from the basin (Harris et al., 1991) revealed several species of caddisflies endemic to the Little River. This suggested the need for a more intensive survey which was conducted in 1988 and 1989.

Methods

A total of 25 sites were selected for study, eight of which were sampled at least monthly; the remainder only once or at irregular intervals. Collecting sites were chosen to include a range of stream orders, substrate composition, and channel morphometry (Table 2). Adult caddisflies were collected primarily with UV light traps placed along the channel and operated for 1-1½ hours after dusk from March through

Table 1. Average values for selected water quality parameters collected monthly from the Little River drainage, August 1988-July 1989.

Parameter	MAIN CHANNEL OF LITTLE RIVER			WEST FORK OF LITTLE RIVER		TRIBUTARIES TO LITTLE RIVER		
	Canyon Mouth	Canyonland Park	Highway 35	DeSoto State Park	Cloudmont Resort	Johnnies Creek	Bear Creek	Wolf Creek
Temperature (°C)	15.9	15.9	15.8	14.9	15.2	16.0	15.3	16.3
Dissolved Oxygen (mg/l)	9.5	9.8	9.6	9.8	9.7	9.6	9.6	9.4
pH	6.4	6.3	5.9	5.7	5.6	6.4	6.4	6.3
Alkalinity (mg/l as CaCO ₃)	4.9	4.8	4.8	3.4	3.3	7.0	5.9	7.8
Conductivity (µmhos/cm)	21.4	20.0	18.6	13.3	13.4	23.5	22.2	28.7
Nitrate (NO ₃ -N) (µg-N/l)	190.3	139.5	62.9	74.5	69.8	379.5	155.5	561.2
Nitrite (NO ₂ -N) (µg-N/l)	0.66	0.18	1.18	0.47	1.04	1.43	0.70	2.58
Ammonia (NH ₄ -N) (µg-N/l)	71.3	22.5	18.7	15.6	16.0	52.7	21.6	84.2
Ortho-Phosphorus (PO ₄ -P) (µg-P/l)	6.03	6.63	4.53	5.30	3.76	9.43	7.20	8.77

October. Aerial nets were also used to sweep vegetation and immatures were collected from the streambeds to record those species missed in the light traps. Temperature, dissolved oxygen, alkalinity, conductance, pH, nitrogen and phosphorous were determined monthly from August 1988 to July 1989 at eight sites in the main channel, the West Fork, and major tributaries according to the methodology in Frazer (1990).

List of Species

A total of 23,720 specimens examined from 106 collections yielded the 122 species listed below. Arrangement of species follows that of Weaver and Morse (1986). Sites at which the species were collected are given numerically and correspond to Figure 1, followed by months collected with the number of individuals examined in parenthesis. New state records are indicated by an asterisk. Voucher specimens are deposited in the University of Alabama Insect Collection and in the personal collection of the senior author.

Suborder Annulipalpia

Infraorder Curvivalpia

Superfamily Hydropsychoidea

Family HYDROPSYCHIDAE

Cheumatopsyche campyla Ross. 12. October. (2).

Cheumatopsyche geora Denning. 2, 6, 8-11, 13, 15, 17-20, 24. April-September. (372).

Cheumatopsyche harwoodi Denning. 17, 19, 22. April, June, July. (45).

Cheumatopsyche helma Ross. 17. June. (3).

Cheumatopsyche oxa Ross. 3, 4, 8, 15, 18. April, June, October. (30).

Cheumatopsyche pasella Ross. 3, 6, 10, 11, 13, 15, 17, 18, 24. May-July. (15).

Cheumatopsyche pettiti (Banks). 2, 4, 6, 8-11, 13, 14, 17, 19, 22, 24, 25. March-October. (77).

Cheumatopsyche pinaca Ross. 24. July. (2).

Diplectrona modesta Banks. 1, 7, 9, 10, 11, 13, 17. May, June. (17).

Hydropsyche betteni Ross. 7-9, 11, 13, 14, 17, 19, 20, 25. April-October. (147).

Hydropsyche cheilonis Ross. 2. June. (1).

Hydropsyche depravata Hagen. 3. June. (22).

Hydropsyche dicantha Ross. 2-4, 6, 8-11, 13-15, 17-20, 22-24. April-October. (1233).

Hydropsyche sparna Ross. 3, 6, 8, 9, 11, 13, 17, 24. April-August. (51).

Hydropsyche venularis Banks. 6. June. (1).

Macrostemum zebratum Hagen. 6, 10, 15, 17, 19. May-September. (815).

Family POLYCENTROPODIDAE

Cernotina calcea Ross. 6, 8, 10, 15. May-July, September. (14).

Cernotina spicata Ross. 3, 4, 6, 8-11, 13, 15, 17-25. May-September. (329).

Cyrnellus fraternus (Banks). 2, 3, 6, 8, 10, 13, 15, 17, 22, 24. May-September. (65).

Neureclipsis crepuscularis (Walker). 17. June. (10).

Table 2. General characteristics of collection sites from the Little River drainage.

Site	Stream	Receiving Catchment	Number of Collections	Stream Order	Depth (m)	Width (m)
1	Unnamed Tributary (Cherokee Co.)	Wolf Creek	1	2	0.75	3.5
2	Wolf Creek (Cherokee Co.)	Weiss Lake	1	3	1.25	5.0
3	Spring Creek	Weiss Lake	1	1	1.0	2.5
4	Spring Creek	Weiss Lake	1	1	0.5	2.0
5	Little River	Weiss Lake	2	5	1.75	40.0
6	Little River	Weiss Lake	9	5	3.5	30.0
7	Unnamed Tributary (intermittent)	Little River	1	-	0.1	0.25
8	Johnnies Creek	Little River	10	4	2.0	7.0
9	Johnnies Creek	Little River	1	4	1.5	10.0
10	Little River	Weiss Lake	13	5	3.5	20.0
11	Bear Creek	Little River	2	3	0.25	3.0
12	Unnamed Tributary (intermittent)	Bear Creek	3	-	0.5	1.5
13	Bear Creek	Little River	10	3	1.5	7.0
14	Wolf Creek (De Kalb Co.)	Little River	9	3	1.0	5.0
15	Little River	Weiss Lake	9	5	1.0	35.0
16	Yellow Creek	Little River	1	3	0.5	4.0
17	West Fork Little River	Little River	13	4	2.0	10.0
18	Laurel Creek	West Fork Little River	3	1	1.25	4.0
19	West Fork Little River	Little River	9	4	2.0	10.0
20	West Fork Little River	Little River	2	4	0.25	12.0
21	West Fork Little River	Little River	1	4	1.0	4.0
22	East Fork of West Fork Little River	West Fork Little River	1	3	0.5	2.5
23	East Fork Little River	Little River	1	4	2.0	7.0
24	East Fork Little River	Little River	1	4	0.75	3.0
25	Gilreath Creek	East Fork Little River	1	4	0.5	2.5

Neureclipsis piersoni Frazer and Harris. 10, 13, 15, 17, 19, 24, 25. May-October. (65).
Nyctiophylax affinis (Banks). 8, 10, 13, 14, 17, 19, 20, 24. May-September. (53).
Nyctiophylax barrorum Morse. 6, 8-11, 13-15, 17, 19, 20, 23, 24. May-August. (192).
Nyctiophylax celta Denning. 10, 15, 17, 19. May-September. (40).
Nyctiophylax denningi Morse. 1, 8-11, 13, 14, 17. April-September. (238).
Phylocentropus placidus (Banks). 15. July, September. (2).
Polycentropus blicklei Ross and Yamamoto. 3. June. (1).

Polycentropus cinereus Hagen. 6, 9, 11, 13, 14, 17. May-August. (10).
Polycentropus confusus Hagen. 1-3, 6, 8-15, 17, 19, 20, 24, 25. April-October. (356).
Polycentropus elarus Ross. 11-14, 25. April-August, October. (26).
Polycentropus nascotius Ross. 22, 25. July. (5).

Family PSYCHOMYIIDAE

Lype diversa (Banks). 3, 8, 22, 24, 25. June, July, September. (43).
Psychomyia flavida Hagen. 3, 17. June. (11).

Superfamily Philopotamoidea

Family PHILOPOTAMIDAE

Chimarra aterrima Hagen. 2-4, 8, 13, 14, 17, 19, 20, 25. April, June-September. (130).
Chimarra obscura (Walker). 2, 3, 6, 8-11, 13-15, 17, 19, 23-25. May-October. (6851).
Dolophilodes distinctus (Walker). 5, 8, 10, 12-14. March-May, July, October. (23).
Wormaldia moesta (Banks). 8, 9, 11, 14, 17. May, June. (19).
Wormaldia shawnee (Ross). 17. May. (9).
Wormaldia thyria Denning*. 10, 11, 14, 15, 17. May, June. (40).

Infraorder Spicipalpia

Superfamily Hydroptiloidea

Family GLOSSOSOMATIDAE

Agapetus spinosus Etnier and Way. 13, 17, 19. May, June. (22).
Glossosoma nigrrior Banks. 3, 5. June. (16).

Family HYDROPTILIDAE

Dibusa angata Ross. 15, 19. April. (10).
Hydroptila alabama Harris and Kelley. 8, 10, 22, 24. June, July. (5).
Hydroptila armata Ross. 3, 4, 10, 14. May, June. (4).
Hydroptila callia Denning. 8-10, 15, 17, 19. May-September. (10).
Hydroptila chattanooga Frazer and Harris. 15, 17, 19. May-September. (303).
Hydroptila delineata Morton. 6, 8, 9, 15, 17. April, June-September. (44).
Hydroptila gunda Milne. 2, 6, 8-11, 13. April, June-September. (31).
Hydroptila hamata Morton. 2-4, 6, 8-10, 13, 17, 19. April-October. (132).
Hydroptila licina Frazer and Harris. 17, 19, 25. July-September. (5).
Hydroptila micropotamis Harris. 4, 8, 10, 11, 13, 15, 17, 19, 20, 24. May-October. (352).
Hydroptila novicola Blickle and Morse. 8, 13, 14. April, June-August, October. (59).

- Hydroptila oneili* Harris. 2, 8, 13, 14, 25. May-October. (56).
Hydroptila paramoena Harris. 2, 6, 8-11, 13-15, 17, 19, 20, 22, 24. April-October. (924).
Hydroptila quinola Ross. 25. July. (1).
Hydroptila talladega Harris. 25. July. (2).
Hydroptila waubesiana Betten. 2, 4, 8-10, 13, 15, 17, 19, 24. June-September. (71).
Mayatrachia ayama Mosely. 4, 6, 10, 11, 13-15, 17-20. June-October. (985).
Neotrichia collata Morton. 13, 17, 19. June. (34).
Neotrichia mentonensis Frazer and Harris. 19, 25. June, July. (6).
Neotrichia minutisimella (Chambers). 17, 19. June-August. (7).
Neotrichia okopa Ross. 10, 15, 17-19. May-August. (189).
Neotrichia vibrans Ross. 17, 19, 24. June, July. (73).
Ochrotrichia riesi Ross. 8. July. (1).
Ochrotrichia tarsalis (Hagen). 17. August. (1).
Orthotrichia aegerfasciella (Chambers). 1, 3, 6, 8, 10, 11, 13-15, 17-20, 24. May-September. (334).
Oxyethira forcipata Mosely. 8, 10, 13, 15, 17, 19, 24. May-October. (26).
Oxyethira glasa (Ross). 13, 15, 19. July-September. (8).
Oxyethira grisea Betten. 2, 22, 24, 25. June, July. (12).
Oxyethira pallida (Banks). 2, 6, 8, 10, 13-15, 17-19. May-October. (85).
Oxyethira rivicola Blickle and Morse. 2-4, 6, 8-11, 13-15, 17, 19-22, 24, 25. April-October. (820).
Oxyethira zeronia Ross. 2, 8, 10, 11, 13-17, 19, 23-25. April-October. (298).
Stactobiella delira (Ross). 13-15, 17, 19. April. (27).
Stactobiella palmata (Ross). 8, 13, 15, 17. May, June. (19).

Superfamily Rhyacophiloidea
 Family RHYACOPHILIDAE

- Rhyacophila carolina* Banks. 8-11, 13-15, 17, 19, 24. April-July, October. (160).
Rhyacophila glaberrima Ulmer. 8, 10, 12-14, 17. August-October. (19).
Rhyacophila ledra Ross. 14. May. (2).
Rhyacophila lobifera Betten. 6, 8, 10, 17, 19. April. (46).

Suborder Integripalpia
 Infraorder Brevitentoria
 Superfamily Leptoceroidea
 Family LEPTOCERIDAE

- Ceraclea alabamae* Harris. 6, 8-11, 13, 15, 17, 19, 20. June-August. (520).
Ceraclea alces (Ross). 4, 6, 8-11, 15, 17, 19, 20. May-September. (520).
Ceraclea cancellata (Betten). 3, 4, 6, 8-11, 13, 15, 17, 19, 20. May-August. (956).
Ceraclea diluta (Hagen). 17. May. (1).
Ceraclea flava (Banks). 6, 9, 10, 15. May, June. (29).
Ceraclea maculata (Banks). 6, 8, 10, 11, 13-15, 17, 19, 20. May-September. (241).

- Ceraclea neffi* (Resh). 6, 8, 10, 11, 13, 15, 17. May, June. (216).
Ceraclea nepha (Ross). 8-11, 13, 15, 17, 19. May, June. (65).
Ceraclea protonepha Morse and Ross. 6, 8-11, 13, 15, 17. May, June. (290).
Ceraclea resurgens (Walker). 17, 19. April. (3).
Ceraclea tarsipunctata (Vorhies). 2, 3, 6, 8-11, 13, 15, 17, 18, 23. May, June. (872).
Ceraclea transversa (Hagen). 3, 8-10, 14, 15, 17, 19. April-August. (90).
Mystacides sepulchralis (Walker). 9, 11, 13, 14, 17, 23, 24. May-August. (75).
Nectopsyche pavidata (Hagen). 3, 4, 6, 8-11, 13, 15, 17, 23-25. May-August, October. (42).
Oecetis cinerascens (Hagen). 8, 19. June, September. (3).
Oecetis ditissa Ross. 1-3, 6, 8-10, 13-15, 17-19. May-October. (72).
Oecetis inconspicua (Walker). 1-4, 6, 8, 10, 11, 13-15, 17-20, 22, 24, 25. May-October. (1223).
Oecetis nocturna Ross. 1, 3, 6, 8, 10, 11, 13-15, 17, 19, 24. May-October. (1437).
Oecetis osteni Milne. 19, 20. June, August. (5).
Oecetis persimilis (Banks). 3, 6, 8-10, 13-15, 17, 19, 24. May-September. (167).
Oecetis scala Milne. 10, 15, 17, 19. June, July, September. (97).
Oecetis sphyra Ross. 15. June. (1).
Triaenodes cumberlandensis Etnier and Way. 17, 19, 22. June, July. (57).
Triaenodes ignitus (Walker). 3, 8, 22. June, July. (12).
Triaenodes injustus (Hagen). 17. June, August. (2).
Triaenodes marginatus Sibley. 3. June. (9).
Triaenodes pernus Ross. 9, 13, 17, 19. June, July. (26).
Triaenodes tardus Milne. 8, 10, 15, 19. May-July, September, October. (9).

Family MOLANNIDAE

- Molanna blenda* Sibley. 14. July. (1).
Molanna ulmerina Navas. 13. August. (1).

Infraorder Plenitentoria

Superfamily Limnephiloidea
 Family BRACHYCENTRIDAE

- Micrasema rusticum* (Hagen). 15. April. (2).
Micrasema wataga Ross. 8, 10, 11, 14, 15, 17, 19. April-August, October. (99).

Family LEPIDOSTOMATIDAE

- Lepidostoma griseum* (Banks)*. 16. October. (1).
Lepidostoma togatum (Hagen). 8, 10. May. (5).
Lepidostoma weaveri Harris. 17, 19. March, April. (17).
Theliopsyche melas Edwards. 18. June. (1).

Family GOERIDAE

- Goera calcarata* Banks. 3. June. (9).

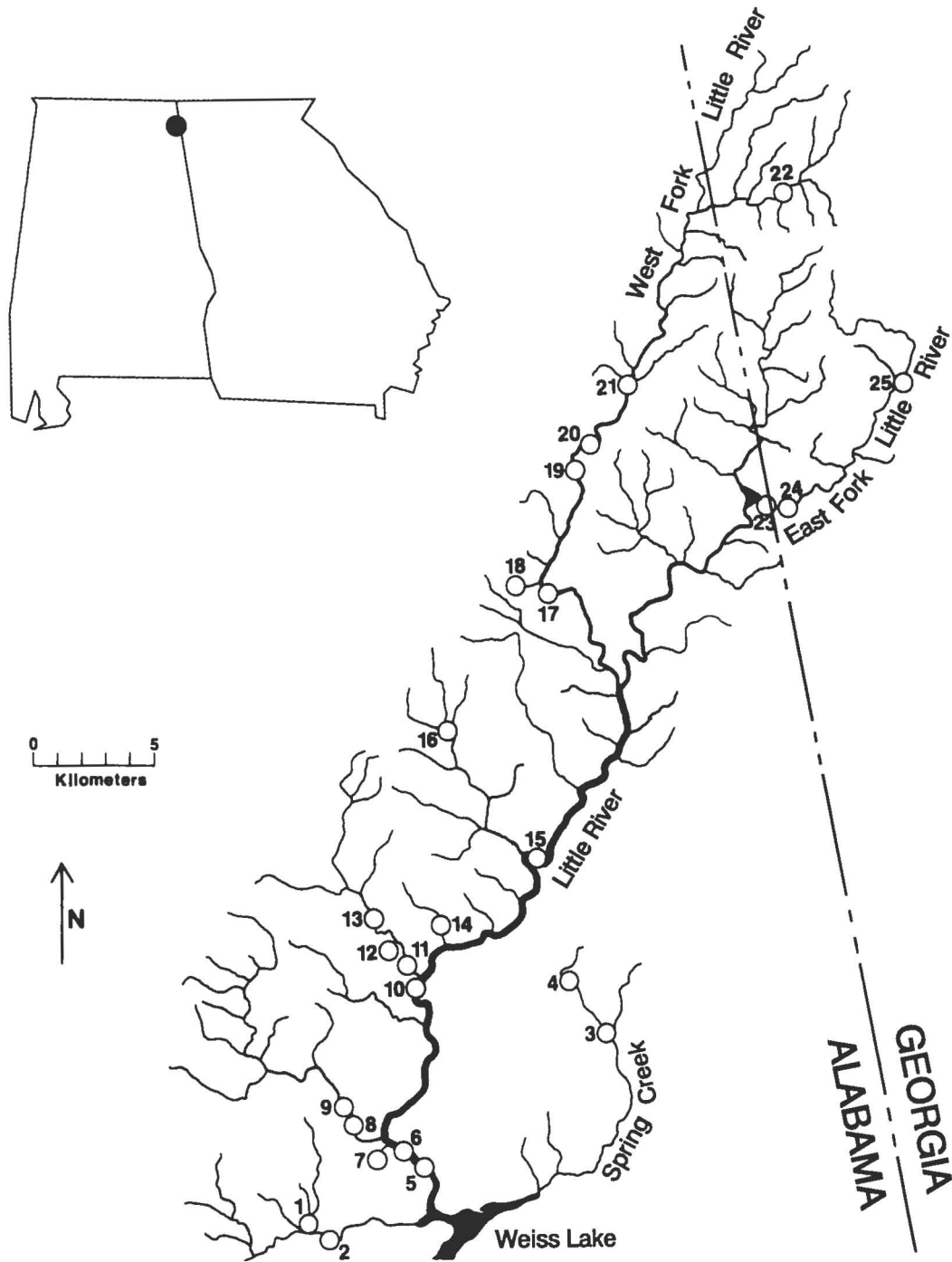


Figure 1. Little River drainage in Alabama and Georgia with location and identification number of collection sites.

Family LIMNEPHILIDAE

- Hydatophylax argus* (Harris). 18. April. (1 larva).
Ironoquia punctatissima (Walker). 12. October. (1).
Pycnopsyche scabripennis (Rambur). 16, 17. October. (2).

Family UENOIDEAE

- Neophylax* n. sp. 12. October. (6).

Superfamily Phryganeioidea

Family PHRYGANEIDAE

- Agrypnia vestita* (Walker). 10. October. (1).
Phryganea sayi Milne*. 13, 19. August. (2).
Ptilostomis ocellifera (Walker). 3. June. (1).

Summary

To date, 122 species of caddisflies are recorded from the Little River system, representing 15 families and 44 genera. Hydroptilidae (33 species), Leptoceridae (28), Hydropsychidae (16), and Polycentropodidae (15) accounted for 75% of the species collected. The dominance of these four families is typical of caddisflies in Alabama (Harris and Lago, 1990), and in other southeastern states and drainages (Holzenthal et al., 1982; Morse et al., 1980). These same four families are noted for their ability to exploit warm water habitats typical of Alabama.

The number of species and individuals collected was greatest from May to August. The largest number of species and individuals were collected in June, but this may be misleading since this month coincided with the highest number of both collections and localities (Table 3). Diversity and abundance were low in both the spring and fall, although several species were only collected during these periods.

Table 3. Number of caddisfly species and individuals collected from all localities in the Little River drainage.

Month	Number of Species	Number of Individuals	Total Collections	Total Localities
February	0	0	1	1
March	3	13	14	9
April	28	504	10	10
May	60	4,119	11	8
June	90	8,696	22	18
July	71	4,528	12	12
August	56	3,122	9	9
September	44	2,236	8	8
October	33	487	19	11
Total	122	23,705	106	*25

* = total number of different localities.

The number of species occurring in the Little River basin is close to that reported from other southeastern systems of similar size. Morse et al. (1980) reported 108 species from Upper Three Runs Creek (492 km²), a Coastal Plain system in South Carolina. Another study by Morse et al. (1989) in the Lake Jocassee catchment (380 km²) in North and South

Carolina reported 123 species. This basin is located in the Cumberland Plateau physiographic region as is the Little River.

Although the species totals for the Little River do not suggest an extremely rich caddisfly fauna, the number of species restricted to the drainage is noteworthy. Six species (*Neureclipsis piersoni*, *Hydroptila licina*, *H. micropotamis*, *Neotrichia mentonensis*, *Ceraclea alabamiae*, and *Neophylax* n. sp.) appear to be endemic to the drainage, while three others (*Hydroptila chattanooga*, *Wormaldia thyria*, and *Ceraclea alces*) appear to be restricted to the drainage within Alabama. In comparison, only two caddisfly species are endemic to the Cahaba River system in Alabama and another four are restricted to this drainage in the state (Harris et al., 1991). However, the area drained by the Cahaba River (4700 km²) is close to an order of magnitude higher than that drained by the Little River.

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Literature Cited

- Frazer, K. S. 1990. Caddisflies (Trichoptera) of the Little River drainage in northeastern Alabama. M.S. thesis, University of Alabama. 268 p.
- Harris, S. C. and P. K. Lago. 1990. Annotated checklist of the Rhyacophiloidea and Integripalpia (Trichoptera) of Alabama. *Entomological News* 101:57-66.
- Harris, S. C., P. E. O'Neil and P. K. Lago. 1991. Caddisflies of Alabama. Alabama Geological Survey Bulletin 142. In Press.
- Holzenthal, R. W., S. C. Harris, and P. K. Lago. 1982. An annotated checklist of the caddisflies (Trichoptera) of Mississippi and southeastern Louisiana. Part III: Limnephiloidea and conclusions. *Proceedings of the Entomological Society of Washington* 84:513-520.
- Morse, J. C., J. W. Chapin, D. D. Herlong, and R. S. Harvey. 1980. Aquatic Insects of Upper Three Runs Creek, Savannah River Plant, South Carolina. Part I: Orders other than Diptera. *Journal of the Georgia Entomological Society* 15:73-101.
- Morse, J. C., S. W. Hamilton, and K. M. Hoffman. 1989. Aquatic Insects of Lake Jocassee catchment in North and South Carolina, with descriptions of four new species of caddisflies (Trichoptera). *Journal of the Elisha Mitchell Scientific Society* 105:14-33.
- Sapp, C. D. and J. Emplaincourt. 1975. Physiographic regions of Alabama. Alabama Geological Survey Map 168.
- Weaver, J. S., III and J. C. Morse. 1986. Evolution of feeding and case making behavior in Trichoptera. *Journal of the North American Benthological Society* 5:150-158.

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