A Preliminary Annotated Checklist of Mississippi Mecoptera (Insecta)

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Abstract. We summarize distribution records for 22 Mecoptera species known to occur in Mississippi. These include the first specimens of *Bittacus occidentis* Walker, *B. strigosus* Hagen, *Hylobittacus apicalis* (Hagen) and *Panorpa insolens* Carpenter to be recorded from the state.

Key words. scorpionfly, hangingfly, Panorpidae, Bittacidae, Meropeidae

Introduction

The insect order Mecoptera currently includes 240 North American species placed in five families (Penny 2013). The first major revision of Nearctic panorpids by Carpenter (1931) did not include specific Mississippi records, although he did note that Hine (1901) had reported *Panorpa nuptialis* Gerstaecker from the state. Subsequently, 14 species of Panorpidae and three Bittacidae were listed for Mississippi by Penny (2013), and many of these records are based on studies by Byers (e.g., 1958, 1962a, 1962b, 1973, 1993, 1996). Recently, Schiefer (2015) reported the first records of *Merope tuber* from the state. In this study we compiled records of Mississippi mecopterans from the literature and from the following institutional and individual collections, noted in the text by the acronyms listed below.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABHC</td>
<td>Audrey B. Harrison Collection, Jackson, Mississippi</td>
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<td>BPSC</td>
<td>Bill P. Stark Collection, Mississippi College, Clinton, Mississippi</td>
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<td>Florida State Collection of Arthropods Collection, Gainesville, Florida</td>
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<td>WESC</td>
<td>William E. Smith Collection, Brookhaven, Mississippi</td>
</tr>
</tbody>
</table>
Results

In the following list, state distributions are taken from Byers (1993), Dunford et al. (2007), Flint (2013), Jones (2010), Penny (2013), Schiefer and Dunford (2005), Schiefer (2015), and Somma (2011a).

Family Bittacidae: Hangingflies

*Bittacus occidentis* Walker

*Bittacus occidentis* Walker, 1853: 469. Erie [Pennsylvania]

*Bittacus arizonicus* Banks, 1911: 350. Palmerlee, Arizona, syn. (Carpenter, 1931)

**Distribution.** AL, AR, AZ, DC, DE, IA, IL, IN, KS, KY, MD, MO, NC, NE, NY, OH, OK, PA, SC, SD, TN, TX, VA.

**Published Mississippi Records.** Fig. 46 in Webb et al. (1975) shows Mississippi in the range of this species, but Penny (2013) does not include Mississippi in the states from which records occur.

**New Mississippi Records.**

**Oktibbeha Co.,** Ag. Col., 4 July 1922, H. M. Harris, 1 ♀ (MEMU). Same location, 1920, S.R. Cooley, 1 damaged specimen (MEMU).

**Comments.** These specimens were identified by G.W. Byers in the 1970s. The first specimen listed is intact and in good condition. The second specimen has pest damage, the left hind wing has an apical crossvein, although the other wings do not, and the abdomen is missing. Numerous bittacid specimens have been collected in the vicinity of Starkville, yet this pair, collected in the 1920’s, are the only *B. occidentis* specimens known for the state.

*Bittacus pilicornis* Westwood

*Bittacus pilicornis* Westwood, 1841:196. “America Septentrionale”

**Distribution.** AL, AR, DC, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, MI, MO, MS, NC, NH, NJ, NY, OH, PA, TN, TX, VA, WI, WV.

**Published Mississippi Records.** Fig. 45 insert map in Webb et al. (1975) includes Mississippi in the range of this species, and Byers (1973) reports “… a few teneral adults were present…” at the type locality of *Panorpa vernalis* in Clairolne Co. in April 1972. Byers (1996) includes the following Mississippi records: *Hinds Co.,* locality unknown, 25 April 1981, W. Bicha, 1 ♂. **Lauderdale Co.,** 6 miles east of Meridian, 24 May 1986, W. Bicha, 2 ♀. **Lee Co.,** Tombigbee State Park, SE of Tupelo, 18 May 1993, G.W. Byers, 2 ♂, 6 ♀. Tombigbee State Park, 30 May 1982, W. Bicha, 3 ♀. **Winston Co.,** Tombigbee National Forest, 18 May 1993, G.W. Byers, 1 ♂, 7 ♀.

**New Mississippi Records.**


Comments. Byers (1996) indicates, B. pilicornis is relatively common throughout its range. In central Mississippi, it emerges slightly earlier than other Bittacus (earliest records from 4 May) and is more abundant than B. punctiger with which it often co-occurs.

Bittacus punctiger Westwood

Bittacus punctiger Westwood, 1841:195. Georgia

Distribution. AL, DC, FL, GA, IL, IN, MD, MS, NC, SC, TN, TX, VA, WV.

Published Mississippi Records. The insert map (Fig. 44) in Webb et al. (1975) includes Mississippi in the range of this species and Byers (1996) gives the following record: Lauderdale Co., 6 miles east of Meridian, 24 May 1986, W. Bicha, 1 ♀. Byers (1962a) includes a single record from Oktibbeha Co., State College, no date, 1 specimen without abdomen.

Comments. Bittacus punctiger is known from Wilkinson Co. in the far southwestern region of the state to Marshall Co., in the northern tier of counties, and from Warren Co., near the western boundary with Louisiana, to Lauderdale Co., near the eastern boundary with Alabama. The species, though seldom common, was collected with B. pilicornis, B. stigmaterus and B. strigosus at the Jeffers Hollow Road site, with B. pilicornis and B. strigosus at the Woods Road site, north of Teshiva Creek in Yazoo Co., and the Caseyville site in Lincoln Co., and with B. pilicornis and B. stigmaterus at the Robbins Lane site in Lawrence Co.

Bittacus stigmaterus Say

Bittacus stigmaterus Say, 1823:164. Fort Osage, Missouri
Bittacus pallidipennis Westwood, 1841:195. Unknown locality, syn. (Hagen 1861)

Distribution. CT, DC, FL, GA, IA, IL, IN, KS, KY, LA, MD, MI, MO, MS, NC, NE, NY, OH, OK, SC, TN, TX, VA.

Published Mississippi Records. The insert map (Fig. 48) in Webb et al. (1975) includes Mississippi in the range of this species.


Bittacus strigosus Hagen


Distribution. AL, AR, CT, DC, IA, IL, IN, KS, KY, MA, MB, MD, MI, MN, MO, MT, NC, ND, NE, NH, NJ, NY, OH, OK, PA, PQ, SC, TN, VA, VT, WV, WY.

Published Mississippi Records. The insert map (Fig. 47) in Webb et al. (1975) includes Mississippi in the range of this species, however Penny (2013) does not list Mississippi in its known distribution.

Hylobittacus apicalis (Hagen)

Bittacus apicalis Hagen, 1861: 248. Southern Illinois
Haplodictyus incertus Navás, 1926:59. Wilmerding, Pennsylvania, syn. (Carpenter, 1932)

Distribution. AL, AR, GA, IL, IN, KY, MI, MO, NC, NY, OH, OR, PA, TN, VA, WV.

Published Mississippi Records. Webb et al. (1975) in the Fig. 43 inset map shows the species range passing along the northern border of the state. Penny (2013) does not include Mississippi in its known distribution.


Comments. This species is recognized by the dark wing tips of the adults, and was not previously reported from the state.

Family Meropidae: Earwigflies

Merope tuber Newman

Merope tuber Newman, 1838:180. Trenton Falls, New Jersey

Distribution. AL, AR, DC, FL, GA, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, MS, NC, NJ, NY, OK, ON, PA, VA, WS, WV.

Published Mississippi Records. Schiefer (2015) reported this species at five Mississippi sites. Counties in which the species has been collected include Lincoln, Noxubee, Oktibbeha, Pearl River and Wayne.

New Mississippi Records. None available.

Comments. The records listed by Schiefer (2015) represent the first for the state and document the presence of this unusual species across much of the eastern Gulf Coastal Plain. Schiefer and Dunford (2005) recently reported populations of the species in Alabama, and Dunford et al. (2007) and Somma (2011a) reported the species distribution in Florida. Mississippi specimens were collected from early May to mid June (Schiefer 2015).

Family Panorpidae: Scorpionflies

Panorpa americana Swederus

Panorpa americana Swederus, 1787:279. Georgia

Distribution. AL, DE, FL, GA, LA, MS, NJ, NC, SC, VA.


Comments. This species is regarded primarily as an autumnal emerger by Byers (1993), but as he notes, a few specimens were reported by Carpenter (1939) from early June at Yonah Mountain, Georgia. Mississippi records also include a single June collection of a male from Oktibbeha County, and an unusual January specimen collected by H.V. Weems, Jr. from Lafayette County in 1948.

Panorpa anomala Carpenter

Panorpa anomala Carpenter, 1931:245. Leavenworth Co., Kansas

Distribution. AR, IA, IL, IN, KS, LA, MI, MO, MS, WI.

Published Mississippi Records. Fig. 186 insert map in Webb et al. (1975) includes Mississippi in the range of this species, and Byers (1973) reports 9 specimens collected in Grenada Co., at Grenada, in June 1971, and indicates specimens of P. anomala were abundant at the type locality of P. vernalis in Claiborne Co. in April, 1972, and also present at the same site in September, 1977. Byers (1962a) reported a single male from State College, Oktibbeha Co. 2 May 1959.


Comments. Mississippi records are from mid April through mid June with a record of a single female collected in Lafayette County on July 1.

Panorpa banksi Hine

Panorpa affinis Banks, 1895:315. Preoccupied
Panorpa chelata Carpenter, 1931:251. Wollaston, Massachusetts, syn. (Byers 1974)

Distribution. GA, IA, IL, IN, KY, MA, ME, MI, MS, NC, NY, SC.

Published Mississippi Records. Recorded from the state by Penny (2013).
**Panorpa capillata** Byers

*Panorpa capillata* Byers, 1996: 520. Auburn University Forestry Research Station, Hwy 43, 10 miles N of Fayette, Fayette Co., Alabama

**Distribution.** AL, AR, KY, MS, TN.


**Comments.** Specimens of this species were collected from mid April through early June.

**Panorpa choctaw** Byers


**Distribution.** AL, AR, GA, KY, MO, MS, OK, TN.


**Comments.** The Franklin Co. record is based on the southwestern-most specimen collected from the state. The apical spine on the dististylo cup is scarcely developed and the ventral parameres, while as long as in typical *P. choctaw*, lack a setal fringe along the outer margin. Byers (1993) notes the former feature in Arkansas and Oklahoma populations, however the ventral parameres are said to be shorter.
than those of populations east of the Mississippi River. The specimen was previously determined as *P. virginica* Banks by Penny.

**Panorpa confinis Byers**


**Distribution.** AL, MS.


**Comments.** As Byers (1993) notes, the flight period of this species includes the spring months of April through June and fall months of September through November.

**Panorpa confusa Westwood**

*Panorpa confusa* Westwood, 1841: 190. Massachusetts

*Panorpa rufescens* Rambur, 1842: 330. Laurel Lake near Jacksonville, Vermont, syn. (Somma 2011b)

**Comments.** Carpenter (1931), using an erroneous 1846 date for Westwood's study, placed *P. confusa* as a junior synonym of *P. rufescens*. Subsequently, this species has been listed from Mississippi (and other areas) by various authors as *P. rufescens*, and Webb et al. (1975) shows its range overlapping the eastern boundary of the state in Fig. 181. Somma (2011b, 2012) corrected the publication date for Westwood's article from 1846 to 1841 which established priority for *P. confusa* over *P. rufescens*. Byers (1993) proposed a new species name, *P. ferruginea*, for southeastern populations once included under *P. rufescens* (= *P. confusa*). Accordingly, no valid specimens of *P. confusa* are known for the state, and those previously referred to as *P. rufescens* are listed as *P. ferruginea*.

**Panorpa consuetudinis Snodgrass**

*Panorpa consuetudinis* Snodgrass, 1927:77. Takoma Park, Maryland

*Panorpa elaborata* Carpenter, 1931:239. Falls Church, Virginia, syn. (Byers 1974)

**Distribution.** AL, CT, DC, DE, MD, MS, NC, NJ, NY, OH, PA, SC, VA.

**Published Mississippi Records.** Fig. 187 in Webb et al. (1975) shows the range of *P. consuetudinis* includes Mississippi. Byers (1962a) reported 1 male (as *P. elaborata* Carpenter) from Alcorn Co., 11 miles SE Corinth, 7 June 1958.

**Panorpa ferruginea** Byers, 1993

*Panorpa ferruginea* Byers, 1993:78. Chambers Co., Alabama, 1 mile N Fairfax

**Distribution.** AL, GA, MS.

**Published Mississippi Records.** 1 site on Map 5, Byers (1993). Byers (1993) includes paratype specimens of the species from Alcorn Co., 11 miles SE Corinth, 7 June 1958, G.W. Byers, 2 ♂, 3 ♀. Previously (Byers 1962a) listed these specimens as *P. rufescens* (see *P. confusa* discussion above).

**New Mississippi Records.** None available.

**Panorpa insolens** Carpenter

*Panorpa insolens* Carpenter, 1935:106: Cincinnati, Ohio

**Distribution.** AR, GA, IA, IL, IN, KS, KY, MI, MN, MO, NC, OH, SC, TN, UT, VA, WI, WV.

**Published Mississippi Records.** None available.


**Comments.** Although this species is uncommon in the state, a few specimens have been taken in April and in September-October.

**Panorpa isolata** Carpenter

*Panorpa isolata* Carpenter, 1931:241. Stone Mountain, Georgia

**Distribution.** AL, DC, GA, KY, MS, NC, PA, SC, TN.

**Published Mississippi Records.** Recorded in Byers (1993) from Tishomingo and Yalobusha counties, without specific locality data, in May.


**Comments.** Byers (1993) reports spring and fall emergence of this species in several southeastern states, however, the only autumnal Mississippi record is based on a male and female collected by W. Bicha from Lee County in September, 1986.
Panorpa lugubris Swederus

Panorpa lugubris Swederus, 1787:279. “America Septentrionale”

Distribution. AL, FL, GA, LA, MS, NC, SC, VA.

Published Mississippi Records. Four sites in SE Mississippi on Map 1, Byers (1993) and Byers (1962a) reported 1 ♀, 1 ♀ from Wiggins, Harrison Co., 26 October 1929, J.P. Kislanko.


Comments. Evans and Flint (2009) found Virginia specimens of this relatively uncommon species to be abundant in low vegetation in areas of mixed longleaf and pond pines. Specimens were elusive and active primarily during narrow windows of favorable thermal conditions. Byers (1993) states “…the range of lugubris and nuptialis meet but do not overlap.” Our Lafayette Co. specimen, if labeled correctly, might provide an exception to this. Unfortunately, the collection data are incomplete, and the circumstances of its presumed collection in Lafayette County are unknown to us. Specimens are typically found in the autumnal emergence period.

Panorpa nuptialis Gerstaecker

Panorpa nuptialis Gerstaecker, 1863:187. Texas

Distribution. AL, AR, KS, LA, MS, MO, OK, TX.

Published Mississippi Records. Eight sites plotted on Map 1, Byers (1993), and Webb et al. (1975) shows Mississippi in the range of this species (Fig. 165). Hine (1901) also recorded the species from the state.

Eureka Springs, 15 October 1993, J.W. Meek, 1 ♀ (UMIC).
Pontotoc Co., Natchez Trace mile 250, 34° 07’ 40” N, 88° 50’ 18” W, 10 October 2009, J.G. Hill, 1 ♀ (MEMU).
Rankin Co., 1 mile SE Brandon, 19 October 2002, B. Jackson, 1 ♂ (UMIC).

Comments. This is the largest, most widely distributed and most colorful *Panorpa* in the state. Byers (1993) noted its occurrence in grassy patches in sparse woods, in forest edges and in open grassland. Adult collections in the state are known from late July through November.

*Panorpa rufa* Gray

*Panorpa rufa* Gray, 1832:323. Georgia

Distribution. AL, FL, GA, MS, NC, SC.

Published Mississippi Records. Two sites on Map 2, Byers (1993). These plots are probably based on the specimens in the MEMU identified by Byers from these locations. George Co., 4.5 miles NNW Lucedale, T1S, R6W, Sec 6 SE, 29-30 October 1989, T.L. Schiefer. Jasper Co., 2 miles SE Paulding, T2N, R12E, Sec 13 NE, 30 October 1989, T.L. Schiefer.

New Mississippi Records. None available.

Comments. Byers (1993) comments on the elusiveness of this species and notes it is known from only 18 total sites, all in the southeastern United States. In Florida they recently have been collected from upland xeric habitat (Somma et al. 2014, L. Somma personal communication 2014). The only state records are from specimens collected in late October.

*Panorpa rupeculana* Byers

*Panorpa rupeculana* Byers, 1993:86. Pulaski Co., Arkansas, Burns Park, I-40, NW Little Rock

Distribution. AR, LA, MS.


**Panorpa vernalis** Byers

*Panorpa vernalis*: Byers, 1993:88. Fall collection records
*Panorpa vernalis*: Jones, 2010:2. Texas records and comments on variation

**Distribution.** AR, LA, MS, TX.

**Published Mississippi Records.** Byers (1973) includes the holotype ♂, allotype ♀, 18 ♂, 7 ♀ paratypes from the type locality, Claiborne Co., Rocky Springs, Natchez Trace Parkway, 24 April 1972, G.W. Byers, a single female paratype from the same site collected 23 April 1972, and a male paratype specimen collected at the same site on 27 April 1969 by B. Mather. Byers (1993) also records 3 ♂, 2 ♀ collected from the type locality on 23 September 1977.


**Discussion**

These results indicate a minimum of 22 species in three families occur in the state, which compares favorably with the mecopteran fauna reported for Arkansas (16 species, 3 families, Robison et al. 1997), California (9 species, 3 families, Penny 2006), Florida (12 species, 3 families, Somma and Dunford 2008, Somma 2011a), Illinois (17 species, 4 families, Webb et al. 1975), Kentucky (17 species, 3 families, Byers and Covell 1981), Michigan (20 species, 4 families, Thornhill and Johnson 1974), and Maryland (11 species collected on or adjacent to Plummers Island (Flint 2008)). North Carolina, one of the states with highest Nearctic mecopteran diversity, has 29 species in 4 families included on Penny’s (2013) list. Table 1 presents a checklist along with flight periods for the Mecoptera species known for Mississippi.

**Acknowledgments**

We thank the following individuals for their suggestions and assistance in providing literature and collection records: Wesley Bicha (Oliver Springs, Tennessee), Dimitry Dmitriev (Illinois Natural History Survey), Oliver S. Flint (United States National Museum of Natural History), Terence L. Schiefer (Mississippi Entomological Museum), Louis A. Somma (Florida State Collection of Arthropods). Many of the specimens listed above were identified by George W. Byers (Snow Entomological Museum), Wesley Bicha, Oliver S. Flint, Norman D. Penny (California Academy of Sciences), and the late Donald W. Webb (Illinois Natural History Survey). Louis Somma and Wesley Bicha provided very helpful reviews of this manuscript.

**Literature Cited**


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Review Editor Jennifer Zaspel.

Table 1. Monthly flight period summary for twenty-two species of Mecoptera in Mississippi.

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