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STATE RECORDS, CONFIRMATIONS, AND HABITATS OF ARADIDAE (HEMIPTERA: HETEROPTERA)FROM LOUISIANA, U.S.A.

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ABSTRACT

The Aradidae of Louisiana are poorly known, with only 5 species reported from the state. We examined 251 adult flat bugs from Louisiana in the Louisiana State Arthropod Museum, confirming the presence of 4 species (*Aradus falleni* Stål, *Acaricoris ignotus* Harris and Drake, *Notapictinus aurivilli* (Bergroth), and *Mezira sayi* Kormilev) and adding 14 more in 4 subfamilies (Aneurinae: *Aneurus fiskei* Heidemann, *Aneurus pygmaeus* Kormilev; Aradinae: *Aradus acutus* Say, *Aradus aequalis* Say, *Aradus kormilevi* Heiss, *Aradus ornatus* Say, *Aradus robustus* Uhler; Carventinae: *Neoproxius gypsatus* (Bergroth); Mezirinae: *Neuroctenus pseudonymus* Bergroth, *Neuroctenus simplex* (Uhler), *Mezira emarginata* (Say), *Mezira froeschneri* Davidová-Vilímová et al., *Mezira granulata* (Say), and *Mezira lobata* (Say)) to the state's fauna. Habitats recorded for these species are discussed.

Key Words: flat bug, distribution, habitat, *Aneurus*, *Neuroctenus*, *Neoproxius*

RESUMEN

Los Aradidae de Louisiana han sido poco estudiados y solo cinco species son conocidas para en el estado. Al examinar 251 chinches adultas de Louisiana pertecientes al Louisiana State Arthropod Museum, confirmamos la presencia de cuatro especies (*Aradus falleni* Stål, *Acaricoris ignotus* Harris y Drake, *Notapictinus aurivilli* (Bergroth), y *Mezira sayi* Kormilev) y añadimos catorce más, representando cuatro subfamilias (Aneurinae: *Aneurus fiskei* Heidemann, *Aneurus pygmaeus* Kormilev; Aradinae: *Aradus acutus* Say, *Aradus aequalis* Say, *Aradus kormilevi* Heiss, *Aradus ornatus* Say, *Aradus robustus* Uhler; Carventinae: *Neoproxius gypsatus* (Bergroth); Mezirinae: *Neuroctenus pseudonymus* Bergroth, *Neuroctenus simplex* (Uhler), *Mezira emarginata* (Say), *Mezira froeschneri* Davidová-Vilímová et al., *Mezira granulata* (Say), y *Mezira lobata* (Say)), a la fauna del estado. Los hábitat registrados para estas especies son discutidos.

Translation provided by the authors.

In America North of Mexico, 127 species of Aradidae are known (Davidová-Vilímová et al. 1996; Froeschner 1988; Kormilev & Froeschner 1987; Vásárhelyi 1994). In contrast, the flat bug fauna of Louisiana is poorly known, with only 5 species (*Aradus falleni* Stål, *Aradus quadrilineatus* Say, *Acaricoris ignotus* Harris and Drake, *Notapictinus aurivilli* (Bergroth), and *Mezira sayi* Kormilev) reported before the present study (Davidová-Vilímová et al. 1996; Froeschner 1988). Herein, we report new state records and confirmations of flat bugs from Louisiana on the basis of an examination of material collected from 21 parishes (Fig. 1).

MATERIALS AND METHODS

We examined 251 adult specimens housed in the Louisiana State Arthropod Museum (LSAM), all of which were identified by the senior author. Abbreviated terms in specimen data are indicated in brackets at first usage.

RESULTS AND DISCUSSION

Subfamily Aneurinae Douglas and Scott, 1865

Aneurus Curtis, 1825

The review of north and central American *Aneurus* species by Kormilev (1968) has been superseded by that of Picchi (1977), which stands as the definitive work for this genus in North America, and provides keys to species.

Aneurus fiskei Heidemann

Aneurus fiskei occurs throughout much of eastern North America from Michigan and Connecticut south to Georgia, Texas and Mexico (Froeschner 1988; Picchi 1977). Its occurrence in Louisiana is not unexpected.

EAST BATON ROUGE Parish: Baton Rouge [BR], Place Du Plantier Apts., Yellow sticky board trap in Cypress tree,18-IV-1986, E. G. Riley (1 ♀); BR, at mercury vapor and black light [MV & BL],

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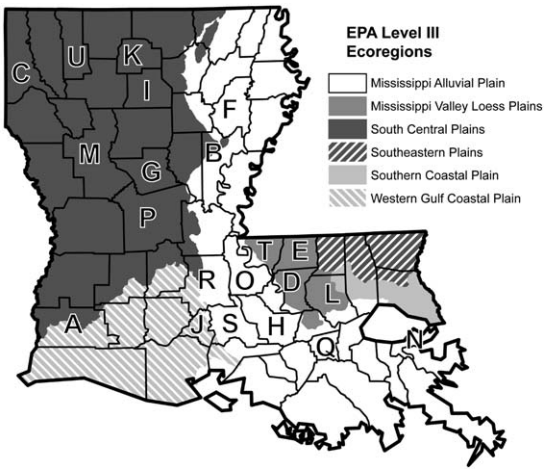


Fig. 1. Map of Louisiana, showing 21 parishes from which we report Aradidae in the present study. Parish: A-Calcasieu, B-Catahoula, C-Caddo, D- East Baton Rouge, E-East Feliciana, F-Franklin, G-Grant, H-Iberville, I-Jackson, J-Lafayette, K-Lincoln L-Livingston, M-Natchitoches, N-Orleans, O-Pointe Coupee, P-Rapides, Q-St. James, R-St. Landry, S-St. Martin, T-West Feliciana, U-Webster. U. S. EPA level III ecoregions adapted from Daigle et al. (2006).

8-V-1987, D. A. Rider (1 ♀); BR, under bark of dead limb, 26-I-1991, M. S. Strother (1 ♀); BR, on pecan trunk, 14-X-1979, Andeab Berhane (2 ♀, 1 ♂).

Aneurus pygmaeus Kormilev

Aneurus pygmaeus has a southern distribution, having been reported from Georgia and Florida to Texas, from Arkansas, and also from California (Froeschner 1988; Picchi 1977; Taylor & McPherson 1989a), but it has not previously been reported from Louisiana.

NATCHITOCHES Parish: Kisatchie National Forest [KNF], 31°28'59"N 93°04'28"W, barking tree, 5-IV-2003, A. Cline (1 ♀, 1 ♂).

Subfamily Aradinae Amyot and Serville, 1843
Aradus Fabricius, 1803

This large genus is represented in North America north of Mexico by 84 species (Froeschner 1988; Vásárhelyi 1994). Parshley's (1921) monograph is still the definitive work and useful for identifications, although more than 20 new species have been described from the region since that time. An adult male collected from a pitfall trap at Palustris Experiment Station (Evangeline Parish) is not included here as it requires further study, and may represent a new species near *Aradus inornatus* Uhler and *Aradus blaisdelli* Van Duzee.

Aradus acutus Say

Aradus acutus is a common, widespread species reported from Alaska and Maine south to California, Texas, and Florida (Froeschner 1988; Parshley 1921; Matsuda 1977), but it has not been previously reported from Louisiana.

CADDO Parish: 14-III-1944, R. L. Stone (2 ♀♀, 2 ♂♂); LINCOLN Parish: Ruston, 26-IV-1941, W. W. Wirth (1 ♀); WEBSTER Parish: Shongaloo, 23-XII-1939, Newsom (5 ♀♀, 2 ♂♂).

Aradus aequalis Say

Aradus aequalis is relatively infrequently collected, but occurs from Maine, Quebec, and Ontario south to Illinois and Virginia. It also has been reported from Texas (Froeschner 1988; Parshley 1921; Matsuda 1977). Its occurrence in Louisiana constitutes a significant range extension into the southeastern United States, and the coloration of this specimen deviates slightly from the descriptions given by Say (1832) and Parshley (1921). Parshley (1921) gives the coloration of this species as "Brown; broad lateral margins and posterior region of pronotum, margins of scutellum at middle, basal expansions of corium and neighboring veins, posterior margins of connexival segments, and inner margins of genital lobes, yellowish; membrane with irregularly reticulate pale markings; legs yellow, femora and tibiae with broad brown band at middle." The Louisiana specimen has little if any yellow on the pronotum, and only the apical third of the scutellum is yellowish, not the margins of the scutellum at the middle. The brown bands on the tibiae and femora indicated by Parshley (1921) are quite faint.

WEST FELICIANA Parish: Feliciana Preserve 6 mi. ESE of St. Francisville, 30°47'N 91°15'W, flight intercept trap, 10-30-III-1996, D. Pashley (1 ♀).

Aradus falleni Stål

Aradus falleni is the most widespread aradid species in the Western Hemisphere. It occurs from British Columbia and Connecticut, throughout much of the United States and into Mexico and Brazil (Froeschner 1988; Parshley 1921). We confirm its presence in Louisiana with these records.

NATCHITOCHES Parish: KNF, Red Dirt Wildlife Management Area [WMA], MV & BL, 23-VI-1990, V. L. Moseley (1 ♀); KNF, 2 mi. E Red Bluff Cgd, MV & BL, 17-18-VI-1988, C. B. Barr (1 ♀).

Aradus kormilevi Heiss

Aradus kormilevi is widespread in North America, ranging from British Columbia and New Brunswick south to California, Texas, and

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Florida (Froeschner 1988; Heiss 1980), but has not previously been reported from Louisiana. Three Louisiana specimens, 2 brachypterous females and 1 macropterous male, reside in the Louisiana State Arthropod Museum. This species, along with *Aradus antennalis* Parshley which occurs in the western United States and Canada, is unusual among the North American *Aradus* species in that it is thought to feed on living pines, whereas the remaining 82 species occur on dead trees and are thought to be mycetophagous (Usinger & Matsuda 1959).

EAST BATON ROUGE Parish: BR, under bark, 24-IX-1976, M. T. Smith (1 ♀); BR, LSU Campus, 30°24'49"N 91°10'47"W, sweeping vegetation, 24-III-2005, D. Bustamante (1 ♂); NATCHITOCHES Parish: KNF, Red Dirt WMA, 19-20-IV-1985, E. G. Riley (1 ♀).

Aradus ornatus Say

Aradus ornatus is reported from Indiana to Pennsylvania, south to Virginia (Parshley 1921), as well as New York (Drake 1923) and Georgia (Froeschner 1988). Emergence traps captured 24 adults (11 ♀♀, 13 ♂♂) of this distinctive but uncommonly collected species in 2 areas of West Feliciana Parish from 17 samples of dead woody debris (limbs) with obvious signs of decay, collected from the ground, with samples comprised either of 1-2.5 inch diameter limbs probably dead for more than 1 year, or of 2.5- to 10-inch diameter limbs with loose bark and fungal staining but still structurally sound (Mike Ferro, personal communication, Jan 2008). Blatchley (1926) reports 1 male of this species "taken from beneath bark of an oak log" in Indiana. This is the first record of *A. ornatus* from Louisiana, and the second from the southeastern United States.

WEST FELICIANA Parish: Feliciana Preserve: 30°47.607'N 91°15.272'W, 25-III to 22-IV-2007, LN14A-CWD Rear 1, M. Ferro (1 ♀); 30°46.647'N 91°15.210'W, 25-III to 22-IV-2007, LN22A-CWD Rear 1, M. Ferro (1 ♀, 1 ♂); 30°46.647'N 91°15.210'W, 25-III to 22-IV-2007, LN22C-CWD Rear 1, M. Ferro (1 ♂); 30°46.647'N 91°15.210'W, 25-III to 22-IV-2007, LN23A-CWD Rear 1, M. Ferro (1 ♀); 30°47.760'N 91°15.356'W, 25-III to 22-IV-2007, LN32A-CWD Rear 1, M. Ferro (2 ♂♂); 30°47.760'N W91°15.356'W, 25-III to 22-IV-2007, LN32C-CWD Rear 1, M. Ferro (1 ♀); Tunica Hills WMA: 30°56.261'N 91°30.522'W, 25-III to 22-IV-2007, LP11A-CWD Rear 1, M. Ferro (1 ♀); 30°56.261'N 91°30.522'W, 25-III to 22-IV-2007, LP12A-CWD Rear 1, M. Ferro (1 ♂); 30°56.261'N 91°30.522'W, 25-III to 22-IV-2007, LP14B-CWD Rear 1, M. Ferro (1 ♀); 30º55.826'N 91º31.260'W, 25-III to 22-IV-2007, LP22A-CWD Rear 1, M. Ferro (1 ♂); 30°55.826'N 91°31.260'W, 25-III to 22-IV-2007, LP22B-CWD Rear 1, M. Ferro (1 ♂); 30°55.826'N 91°31.260'W, 25-III to 22-IV-2007, LP24A-CWD Rear 1, M. Ferro (1 ♂); 30°55.826'N 91°31.260'W, 25-III to 22-IV-2007, LP24C-CWD Rear 1, M. Ferro (4 ♀♀, 2 ♂♂); 30°59.702'N 91°32.716'W, 25-III to 22-IV-2007, LP31B-CWD Rear 1, M. Ferro (1 ♂); 30°59.702'N 91°32.716'W, 25-III to 22-IV-2007, LP32B-CWD Rear 1, M. Ferro (1 ♂); 30°59.702'N 91°32.716'W, 25-III to 22-IV-2007, LP33C-CWD Rear 1, M. Ferro (1 ♂); 30°59.702'N 91°32.716'W, 25-III to 22-IV-2007, LP34B-CWD Rear 1, M. Ferro (1 ♀).

Aradus robustus Uhler

Aradus robustus occurs from Maine, Ontario, and Nebraska south to Texas and Florida (Froeshner 1988; Leschen & Taylor 1987; Parshley 1921), and is one of the most commonly collected *Aradus* species in North America. Parshley (1921) designated a new variety of this species, which is treated by Kormilev & Froeschner (1987) and Froeschner (1988) as a subspecies, *Aradus robustus insignis* Parshley, 1921, in accordance with the 1985 International Code of Zoological Nomenclature. However, Parshley (1921) noted that *A. r. insignis* was a color variant of "no geographical significance." Although some of the Louisiana material has the reddish-brown abdomen characteristic of *A. r. insignis*, we have refrained from using the subspecific designation because these animals need further study to clarify the taxonomic relevance of the observed variation. This is the first published record for *A. robustus* in Louisiana, but it's presence is not unexpected.

EAST BATON ROUGE Parish: BR, 29-I-1977, D. W. Brown (1 ♀); EAST FELICIANA Parish: 3-VI-1979, C. B. Barr (1 ♂); FRANKLIN Parish: Macon Ridge Res. Sta., Flight intercept trap, 21-III-2003, R. H. Gable, (1 ♀); IBERVILLE Parish: St. Gabriel, in dead log, 11-IV-1991, M. S. Strother, (1 ♀, 2 ♂♂).

Subfamily Carventinae Usinger, 1950

Of the 39 genera (Kormilev & Froeschner 1987; Grillo Ravelo 1988) of Carventinae only 2 are known to occur in North America north of Mexico (*Acaricoris*, *Neoproxius*). In contrast to the other subfamilies, for which most genera are typically encountered under bark or in flight or light traps, nearly all of Carventinae in the United States for which habitat data are recorded have been collected from Berlese or litter samples (Taylor & Lewis 1989; Taylor & McPherson 1989b, and see below). A key to the apterous Aradidae of North and South America is provided by Drake & Kormilev (1958), and to the genera of neotropical Carventinae is provided by Kormilev & Doesburg (1977) and by Grillo Ravelo (1988).

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Acaricoris Harris and Drake, 1944

This is an entirely wingless genus whose members occur primarily in the tropical and subtropical Americas, with only 2 species, *Acaricoris floridus* Drake and *A. ignotus* occurring north of Mexico (Harris & Drake 1944; Drake 1957).

Acaricoris ignotus Harris and Drake

Acaricoris ignotus occurs from Texas and Arkansas to Georgia and Florida (Froeschner 1988; Taylor & Lewis 1989; Taylor & McPherson 1989b). It previously has been reported from Louisiana (Drake & Kormilev 1958), and additional records are provided here.

WEST FELICIANA Parish: 30°47'N 91°15'W, mixed pine hdwd Berlese, [no date], J. L. Fassbender (1 ♀); Tunica Hills WMA, 30°56'32"N 91°29'75"W, Berlese, 1-II-2003, S. A. Gil, B. W. Collier, A. M. Sanchez (1 ♀).

Neoproxius Usinger and Matsuda, 1959

Usinger & Matsuda's (1959) subgenus *Neoproxius* was elevated to generic status by Kormilev & Froeschner (1987). This genus is distributed across South and Central America, with only 2 species in America north of Mexico: *Neoproxius schwarzii* (Heidemann), which is known from Cuba (Grillo Ravelo 1988) and Tampa, Florida, and *Neoproxius gypsatus* (Bergroth). The 2 North American species are keyed by Blatchley (1926), while Usinger & Matsuda (1959) key 4, and Kormilev (1982b) keys 11 of the 13 *Neoproxius* species listed by Kormilev & Froeschner (1987).

Neoproxius gypsatus (Bergroth)

Neoproxius gypsatus is known from Florida, Panama, and Venezuela (Blatchley 1926; Froeschner 1988; Taylor & McPherson 1989b). The occurrence of *N. gypsatus* in Louisiana is a notable range extension to the west, and suggests that the species ought to be encountered in Mississippi and Alabama.

EAST BATON ROUGE Parish: 5-IV-1979, C. B. Barr (1 ♀); WEST FELICIANA Parish: Feliciana Preserve 6 mi. ESE of St. Francisville, 30°47'N 91°15'W, litter sample from ravine, 18-XI-1995, C. Carlton (4 ♀♀, 3 ♂♂).

Subfamily Mezirinae Oshanin, 1908

Five genera of Mezirinae occur in America north of Mexico, 3 of which are reported here. The remaining 2 genera are each represented by a single species in the United States: *Aphleboderrhis pubescens* (Walker) 1873 is reported from Texas and South America (Froeschner 1988), and *Nannium pusio* Heidemann 1909 is known only from Ohio. A specimen from Feliciana Preserve, West Feliciana Parish, may represent an undescribed species, and is not included here.

Neuroctenus Feiber, 1860

Six species of *Neuroctenus* occur in America north of Mexico. Four of them are keyed by Blatchley (1926) and Torre-Beuno (1939), and a key to 5 species is provided by Kormilev (1982a). Vásárhelyi (1994) was apparently unaware of Kormilev's (1982a) key when he described *Neuroctenus unistellatus* Vásárhelyi from central Texas.

Neuroctenus pseudonymus Bergroth

Neuroctenus pseudonymus Bergroth is reported from Indiana and the District of Columbia southwest to Texas and Tennessee (Froeschner 1988). Its occurrence in Louisiana represents a southeastern range extension. It is distinguished by the large, rounded paratergites of the female (Kormilev 1982a) and the distinct transverse ridge on connexivum VII of the males.

WEST FELICIANA Parish: Tunica, 8-IV-1977, M. L. Israel (1 ♀).; Tunica Hills W of Weyanoke, MV & BL, 18-V-1985, C. B. Barr (1 ♂); Tunica Hills W of Weyanoke T1S R4W, on dead log *Quercus nigra*, 8-V-1986, J. E. Barr (1 ♂); 30°55'N 91°30'W, hardwood Berlese, 18-V-1999, J. L. Fassbender (1 ♀).

Neuroctenus simplex (Uhler)

Neuroctenus simplex is the most widespread and common of the North American *Neuroctenus* species, occurring from Montana and Maine south to Texas, Florida, and Cuba (Froeschner 1988). *Neuroctenus unistellatus* is closely related to *N. simplex* (Vásárhelyi 1994), and the ranges of these 2 species in North America need reevaluation. *Neuroctenus simplex* appears to be common and widespread in Louisiana.

CADDO Parish: 14-III-1948, R. L. Stone (1 ♂); Shreveport, on rotting log, 12-II-1991, V. L. Moseley (1 ♀); CALCASIEU Parish: Charles City [=Lake Charles], 14-IX-1993, W. W. Wirth (1 ♂); EAST BATON ROUGE Parish: BR, 23-I-1983, D. A. Rider (5 ♀♀, 3 ♂♂); BR, 22-II-1976, D. W. Ragsdale (1 ♀, 1♂); BR, Oak Log, 30-XI-1978, W. E. Blust (1 ♀, 2 ♂♂); GRANT Parish: Gray Branch, SW of Breezy Hill off Hwy. 123, under bark, 28-VII-1982, C. B. Barr (1 ♂); WEBSTER Parish: Shongaloo, 23-XII-1939, Newsom (1 ♂); WEST FELICIANA Parish: Tunica Hills W of Weyanoke, T1S R4W, at night on dead log *Quercus nigra*, 8-V-1986, J. E. Barr (1 ♀, 1 ♂).

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Notapictinus Usinger and Matsuda, 1959

This genus comprises 40 species, occurring primarily in South and Central America (Kormilev & Froeschner 1987). Only *N. aurivilli* occurs in the United States.

Notapictinus aurivilli (Bergroth)

Notapictinus aurivilli has been reported from Florida, Georgia, and Bayou Sara (West Feliciana Parish), Louisiana (Blatchley 1926; Froeschner 1988; Taylor & McPherson 1989b). Here we provide 1 new parish record for Louisiana.

ST. LANDRY Parish: 2-XI-1971, D. C. Herzog (1 ♀, 1 ♂); WEST FELICIANA Parish: Feliciana Preserve 6 mi. ESE of St. Francisville, 30°45'N 91°16'W, Berlese, 6-III-1996, C. Carlton (1 ♂).

Mezira Amyot and Serville, 1843

Ten species of this large genus (more than 160 species) are known from America north of Mexico. Blatchley (1926) keys 4 species from the eastern United States. Seven of the United States species of *Mezira* are keyed by Usinger (1936) and Torre Bueno (1939). Kormilev's (1971) key to 89 New World *Mezira* species includes 6 from America north of Mexico. Kormilev (1982c) keyed 3 and Davidová-Vilímová et al. (1996) keyed 4 small *Mezira* species. However, the 3 relatively recent descriptions (*Mezira smithi* Kormilev, *Mezira froescheneri* Davidová-Vilímová et al. 1996, and *M. sayi*) make previous distributional information questionable, especially for the 4 smaller *Mezira* species.

Mezira emarginata (Say)

Mezira emarginata has been recorded from 9 states, from North Carolina and Florida west to Nevada and California, as well as Mexico (Froeschner 1988), but it has not previously been reported from Louisiana. It's occurrence in Louisiana is not unexpected.

CADDO Parish: 4-I-1948, R. L. Stone (1 ♀, 2 ♂♂); EAST BATON ROUGE Parish: Baker, 30-VIII-1934, H. M. Harris (4 ♀♀); BR, 29-I-1977, D. W. Brown (5 ♀♀, 5 ♂♂); BR, 5-XII-1982, D. A. Rider (14 ♀♀, 6 ♂♂); BR, in house, 10-III-1927, O. W. Rosewall (1 ♀); IBERVILLE Parish: St. Gabriel Res. Farm, under bark of dead sugarberry *Celtis laevigata* Wild., 11-IV-1991, V. Moseley and M. S. Strother (1 ♀, 2 ♂♂); ORLEANS Parish: New Orleans, LA Nature Center, Blk.lt.trap, 25-IV to 4-V-1984, C. B. Barr (1 ♀); ST. JAMES Parish: 18-IV-1972, (1 ♀); ST. LANDRY Parish: duff, 25-III-1980, L. D. Newsom (1 ♀).

Mezira froeschneri Davidová-Vilímová, Taylor and McPherson

Mezira froeschneri was described from specimens collected via Berlese sampling of hardwood litter in northern Florida (Davidová-Vilímová et al. 1996), the single specimen recorded here adds a second state to the species distribution, and its occurrence in a pitfall traps is also suggestive of a ground-dwelling, probably leaf litter, habitat. Based on this new record, it also should be found in Mississippi and Alabama.

WEST FELICIANA Parish: 15 mi. E. St. Francisville, Feliciana Preserve, pitfall trap, 2-VI-1995, D. Colby and D. Landau (1 ♀).

Mezira granulata (Say)

Mezira granulata has been widely reported from 15 primarily eastern states and Mexico, and occurs from Maryland and Florida west to Illinois and Texas, as well as Arizona and Mexico (Davidová-Vilímová et al. 1996; Froeschner 1988; Taylor & McPherson 1989a). Further evaluation of *M. granulata*'s range since the description of *M. froeschneri* is warranted. Although its occurrence in Louisiana is not unexpected, it is somewhat surprising that only 1 specimen from the state is present in the LSAM, given that the species occurs in Florida and Arkansas (Davidová-Vilímová et al. 1996; Taylor & McPherson 1989a).

CATAHOULA Parish: Sicily Island Hills WMA, 7-V-1987, C. B. Barr (1 ♀).

Mezira lobata (Say)

Mezira lobata occurs primarily in eastern North America, from New York and Florida west to Illinois, Missouri, and Texas, as well as California, Canada, and Mexico (Froeschner 1988). This is the first record of *M. lobata* from Louisiana.

EAST BATON ROUGE Parish: BR, 29-I-1977, D. W. Brown (3 ♀♀, 1 ♂); BR, oak log, 30-XI-1978, W. E. Blust (1 ♀); BR, Mississippi R. levee, under bark, 31-VIII-1996, T. Clarke (2 ♂♂); 1.2 mi S of Central on LA Hwy. 3034, C. B. Barr (1 ♂); Ben Hur Res. Farm, dead log, 12-III-1999, R. Costello (1 ♀); Bluebonnet Swamp, under bark, 20-IV-2005, J. Hamm & S. Tewari (2 ♀♀); Zachary, Sunshine Rd., under bark, 13-XI-1992, J. T. McBride (1 ♀, 5 ♂♂); IBERVILLE Parish: St. Gabriel, in dead log, 11-IV-1991, M. S. Strother (3 ♀♀, 2 ♂♂); St. Gabriel, sweeping vegetation, 16-IV-2005, L. Eisenberg (1 ♀); LAFAYETTE Parish: Lafayette, 28-III-1967, D. A. Neal (1 ♀); LIVINGSTON Parish: Hogbranch Crk at US 190, 30-I-1983, D. A. Rider (3 ♀♀, 3 ♂♂); ORLEANS Parish: 12-III-1982, G. L. Stone (1 ♀); POINTE COUPEE Parish: 18-IV-1975, D. F. Clower (1 ♀); RAPIDES Parish: Camp Beauregard, "@ large," 12-IX-2004, E. Ott (1 ♂); WEST FELICIANA Parish: Elm Park, 24-IV-1966 (1 ♀);

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Feliciana Preserve 6 mi. ESE of St. Francisville, 30°47'N 91°16'W, flight intercept trap, 1-10-IV-1996, C. Carlton (1 ♀); Feliciana Preserve, 30°47'N 91°16'W, 9-10-IV-2005, ENTM 4005 Class (1 ♀).

Mezira sayi Kormilev

Mezira sayi has been reported from 10 states, from North Carolina and Florida west to Illinois and Texas (Davidová-Vilímová et al. 1996; Froeschner 1988; Taylor & McPherson 1989a), and was reported from Louisiana by Davidová-Vilímová et al. (1996) without specific locality data. Here, we reexamine the same, and additional, material, providing distribution data. This is the most commonly encountered of the small *Mezira* species in the state. It is most often found under the bark.

CALCASIEU Parish: Sam Houston St. Pk., 30°19'N 93°16'W, sifting, 11-II-2003, A. R. Cline and S. T. Dash (1 ♀, 1 ♂); CATAHOULA Parish: Sicily Island Hills WMA, 7-V-1987, C. B. Barr (7 ♀♀, 8 ♂♂); EAST BATON ROUGE Parish: Place Du Plantier Apts., flight trap, 15-III-1984, E. G. Riley (1 ♀); BR, 5-III-1991, M. Sean Strother (2 ♀♀, 1 ♂); Bluebonnet Swamp, under bark, 4-II-2001, J. E. Light (5 ♂♂); Bluebonnet Swamp, sweeping, 12-IV-2005, P. Jayasimha (1 ♂); Greenwell Springs, 30°29'44"N, 90°59'34"W, under bark, 4-II-2001, S. A. Gil (4 ♀♀, 4 ♂♂); Zachary, Sunshine Rd., under bark, 13-XI-1992, J. T. McBride (2 ♀♀, 2 ♂♂); FRANKLIN Parish: N.E. Research Sta. Winnsboro, sweeping soybean, 23-IX-1994, C. F. Grymes and D. E. Fairbanks (1 ♀); IBERVILLE Parish: St. Gabriel, near river road, under bark, 13-IX-1996, J. Adamczyk (1 ♂); JACKSON Parish: Schoolhouse Spring, R1W T17 NNE Sec.12, 6 mi. N Eros 14-15-IV-1988, C. B. Barr (1 ♂); ST. LANDRY Parish: 5 mi E. of Washington on Hwy 103, on dead log, 3-XI-1990, V. L. Moseley (4 ♀♀, 3 ♂♂); under bark, 3-XI-1990, M. S. Hicks (1 ♂); ST. MARTIN Parish: 4 mi. S. of Belle River, sticky trap in swamp, 13-X-1994, D. A. Duerr II (1 ♂); WEST FELICIANA Parish: Feliciana Preserve 6 mi. ESE of St. Francisville, 30°47'N 91°15'W, flight intercept trap, 10-30-III-1996, D. Pashley (2 ♂♂); Feliciana Preserve, 15 mi. East of St. Francisville, under bark, 28-IX-1996, G. Turano (1 ♀); Feliciana Preserve, 30°47'N 91°15'W, 9-10-IV-2005, ENTM 4005 Class (1 ♀); Tunica Hills .5 mi W of Weyanoke, MV & BL, 15-VIII-1986, C. B. Barr (1 ♂); Tunica Hills W of Weyanoke, T1S R4W, collected under bark, 3-V-1985, C. B. Barr (2 ♂♂); Tunica Hills W of Weyanoke, T1S R4W, on dead log *Quercus nigra*, 8-V-1986, J. E. Barr (6 ♀♀, 5 ♂♂); Tunica Hills area, under bark, 28-IX-1996, G. Turano (1 ♀).

Habitat Associations

Usinger & Matsuda (1959, pp. 35-42) summarized the literature on habitat data for Aradidae, including host tree records and flight records. Subsequent work on the North American aradid fauna has resulted in very modest additions to this information (Deyrup & Mosley 2004; Taylor & Lewis 1989; Taylor & McPherson 1989a,b; McPherson & Weber 1981). Some additional information can be gleaned from the material examined in this study. For all taxa combined, nearly half of the specimens examined (47% or 119 individuals) had no habitat data whatsoever on the specimen labels, while the remaining 52% (132 specimens) had some minimal habitat data. For specimens with habitat data, 59% (78 specimens) were associated with trees. Half (39) of these were found under bark: *A. fiskei* (1), *A. pygmaeus* (2), *M. emarginata* (3), *M. lobata* (10), and *M. sayi* (23), and this is where Aradidae are most frequently encountered in temperate North America. The remaining specimens associated with trees were mostly recorded from in, on, or under dead wood—descriptions that likely include subcortical collections. These include *A. robustus* (3), *M. lobata* (7), *M. sayi* (18), *N. pseudonymus* (1), and *N. simplex* (6). With the exception of *M. emarginata*, all of these species previously have been recorded from under bark or in association with dead wood (Leschen & Taylor (1987): *A. robustus*; Picchi (1977): *A. pygmaeus*; Taylor & McPherson (1989a): *M. lobata*, *M. sayi*, *N. simplex*; Taylor & McPherson (1989b): *M. sayi*; summarized in Usinger & Matsuda (1959): *A. fiskei*, *M. lobata*, *N. pseudonymous*, and *N. simplex*)).

Of the remaining records with habitat data, 4 specimens were obtained by sweeping: *A. kormilevi* (sweeping vegetation [1]), *M. lobata* (sweeping vegetation [1]), and *M. sayi* (sweeping [1], sweeping soybean [1]). Two specimens were collected from sticky traps: *A. fiskei* (yellow sticky board trap in cypress tree [1]), *M. sayi* (sticky trap in swamp [1]). Davidová-Vilímová et al. (1996) also report *M. sayi* from a sticky trap in Georgia, and Picchi (1977) recorded *A. fiskei* in flight in the District of Columbia. Three specimens were taken in pitfall traps, including 2, an *Aradus* sp. and an apterous Carventinae, which may be undescribed species, while the third, *M. froeschneri*, is otherwise known only from Berlese litter samples in northern Florida (Davidová-Vilímová et al. 1996). Specimens from habitats given as "Berlese," "duff," "sifting," and "litter sample" included *A. ignotus* [2], *N. gypsatus* [7], *N. pseudonymus* [1], *N. aurivilli* [1], *M. emarginata* [1], and *M. sayi* [2], and these litter habitats are probably very important at least for *A. ignotus*, which was also recorded from similar habitat by Taylor & Lewis (1989) and for *N. aurivilli* and *N. gypsatus*, which were both reported from Berlese litter samples by Taylor & McPherson (1989b). *Aradus ornatus* is notable in that all 24 specimens (18% of the 132 specimens with habitat data) were recovered by emergence traps to collect them from fallen, de-

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TABLE 1. SUMMARY OF KNOWN OCCURRENCE OF ARADID SPECIES IN LOUISIANA PARISHES, WITH STATE RECORDS INDICATED.

Subfamily / Species	State Record	Calcasieu	Catahoula	Caddo	East Baton Rouge	East Feliciana	Franklin	Grant	Iberville	Jackson	Lafayette	Lincoln	Livingston	Natchitoches	Orleans	Pointe Coupee	Rapides	St. James	St. Landry	St. Martin	West Feliciana	Wester	Total
		Parish																					
Aneurinae																							
Aneurus fiskei	x	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1
Aneurus pygmaeus	x	·	·	·	·	·	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	1
Aradinae																							
Aradus acutus	x	·	·	+	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	+	3
Aradus aequalis	x	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	1
Aradus falleni	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	·	·	·	·	·	+	·	1
Aradus kormilevi	x	·	·	·	+	·	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	2
Aradus ornatus	x	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	1
Aradus robustus	x	·	·	·	+	+	+	·	+	·	·	·	·	·	·	·	·	·	+	+	·	·	4
Carventinae																							
Acaricoris ignotus	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	1
Neoproxius gypsatus	x	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	2
Mezirinae																							
Neuroctenus pseudonymus	x	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	1
Neuroctenus simplex	x	+	·	+	+	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	+	+	6
Notapictinus aurivilli	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	+	·	2
Mezira emarginata	x	·	·	+	+	·	·	·	+	·	·	·	·	·	+	·	·	+	+	·	·	·	6
Mezira froescheneri	x	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	+	·	1
Mezira granulata	x	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1
Mezira lobata	x	·	·	·	+	·	·	·	+	·	+	·	+	·	+	+	+	·	·	·	+	·	8
Mezira sayi	·	+	+	·	+	·	+	·	+	+	·	·	·	·	·	·	·	·	+	+	+	·	9
Total Number of Species	14	2	2	3	8	1	2	1	4	1	1	1	1	3	2	1	1	1	3	1	10	2	

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caying twigs and limbs. Two species were collected from flight traps, including *A. robustus* (flight intercept trap [1]), and *M. sayi* (flight trap [1], flight intercept trap [2]). Finally, 2 species were captured at lights: *A. fiskei* (at mercury vapor and black light [1]) and *M. emarginata* (black light trap [1]).

Distribution of Collections

We have documented 14 new state records and confirmed 4 of the 5 species of Aradidae previously reported from Louisiana (Table 1). This material includes the first record of the subfamily Aneurinae, and first records for the genera *Aneurus*, *Neuroctenus*, and *Neoproxius* from the state. Specimens are recorded from 21 parishes, only about one third of the 64 parishes in Louisiana. Sampling in parishes in direct contact with the Gulf of Mexico largely has not been done. Coverage of ecoregions (Daigle et al. 2006) is fairly good in the upper two thirds of the Mississippi Alluvial Plain, the South Central Plains, and the Mississippi Valley Loess Plains (Fig. 1). Few records are reported from the Western Gulf Coastal Plain, and none come from either the South Central or Southeastern plains. We suspect that additional species of Aradidae should be found in the state, especially with focus on under-sampled regions and habits, especially leaf litter.

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