

2008

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Recommended Citation

Robison, H.; McAllister, C.; Carlton, C.; and Tucker, G. (2008) "Arkansas Endemic Biota: An Update with Additions and Deletions," *Journal of the Arkansas Academy of Science*: Vol. 62, Article 14.

Available at: <https://scholarworks.uark.edu/jaas/vol62/iss1/14>

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The Arkansas Endemic Biota: An Update with Additions and Deletions

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Abstract

It has been over a decade since the publication of Robison and Allen (1995) that provided the definitive list of endemic flora and fauna of Arkansas. The present study brings up-to-date the endemic biota of the state. Since 1995, several new species have been described and new discoveries have been made, adding species to the state biota. Other species are deleted and new distributional information on other state endemics is presented. Specifically, 3 new plant species are added to the state list while 4 plant species are deleted. Sixteen new animal species/subspecies are added to the state list while numerous species are deleted. These changes bring to 110 (10 species of plants and 100 species/subspecies of animals) the total number of Arkansas state endemic plants and animals presently known, which represents a decrease by 7 species from the 117 species reported in 1995.

Introduction

Robison and Allen (1995) published the definitive list of endemic plants and animals of Arkansas. Since it has been over a decade since the appearance of Robison and Allen (1995), it seems entirely appropriate to bring up-to-date the endemic biota of the state. New species have been described and new discoveries have been made, adding species to the state biota. Additional discoveries require deletions of several species previously believed to be state endemics. In this publication, we bring up-to-date the state endemic biota, including new species additions, species requiring deletion, and adding distributional information on other state endemics.

PLANTS

Additions to State Endemic Flora

Order Gentianales

Family Gentianeaceae

Sabatia arkansana Pringle and Witsell 2005 – Pelton's Rose-gentian

Pringle and Witsell (2005) described this new species of rose-gentian from Saline County glades. It occurs on shale glades (on Womble Shale of Middle Ordovician age) in the eastern Ouachita Mountains and on nepheline syenite glades (igneous intrusions of Late Cretaceous age) in the Upper West Gulf Coastal Plain of Saline County.

Order Asterales

Family Asteraceae

Liatris compacta (Torr. & Gray) Rydb. 1931 – Blazing Star

This blazing star is endemic to a portion of the Ouachita Mountains in Arkansas and is thus added to the state list of endemics (http://efloras.org/florataxon.aspx?flora_id=1&taxon_id=250067095) [Flora North America, Vol. 21, p. 517] (http://www.naturalheritage.com/program/rare-species/federally-listed/plant-profiles/blazing_star.asp).

Order Brassicales

Family Brassicaceae

Streptanthus maculatus Hook ssp. *obtusifolius* (Hook.) Rollins 1959 – Claspig Twistflower

This twistflower is added to the Arkansas list of endemic plants. It is known from Faulkner, Garland, Hot Spring, Howard, Montgomery, Polk, Pulaski, and Saline counties. *Streptanthus obtusifolius* was formerly (Kartesz 1994) considered within the range of variability for *S. maculatus* but Kartesz and Meacham (1999) subsequently recognized it as a subspecies. Recent authors have followed the Kartesz lead.

Deletions from State Endemic Flora

Order Jungermanniales

Family Lejeuneaceae

Plagiochila japonica Sande Lac. ex Miquel subspecies *ciliigera* 1959 – Liverwort

The liverwort *Plagiochila japonica* and the subspecies *P. japonica* subsp. *ciliigera* are not currently considered to be separate from *P. sciophila* Nees ex Lindeb. *P. sciophila* is widespread in Asia and in North America is known from the Blue Ridge in the

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Southern Appalachians, the Cumberland Plateau, and a single location in the Ozark Mountains. Heinrichs et al. (2004) summarized the results of their morphological, molecular, and chemical work and presented an updated section and species list for *Plagiochila*. They noted that *Plagiochila* is notorious for variation in gametophytic characters, especially leaf shape and dentation.

Order Caryophyllales

Family Caryophyllaceae

Arenaria muriculata Maguire 1951 – Sandwort

Arenaria muriculata has been lumped (along with several other taxa) as a synonym under *A. muscorum* (Fassett) Shinnars. This group is now treated in the genus *Minuartia* (see Flora of North America website at <http://hua.huh.harvard.edu/FNA/>; Arkansas Vascular Flora Committee 2006). Before the merger, *Arenaria muriculata* had been found in Texas, so regardless of how it is treated, it is no longer endemic only to Arkansas.

Order Cyperales

Family Cyperaceae

Carex opaca (F. J. Hermann) P. E. Rothrock & Reznicek 1972 – Sedge

This sedge has been elevated to full species rank as *Carex opaca* (F. J. Herm.) by Rothrock and Reznicek (2001). It is now known from several other states and should be omitted from the list of state endemics. A distribution map for this species can be seen at the following site: (http://www.efloras.org/object_page.aspx?object_id=9479&flora_id=1)

Order Brassicales

Family Brassicaceae

Cardamine angustata var. *ouachitana* E. B. Smith 1982 – Toothwort

The recently published Checklist of the Vascular Plants of Arkansas (Arkansas Vascular Flora Committee 2006) merges this variety into synonymy with the species. Also, the online database known as ITIS (Integrated Taxonomic Information System; <http://www.itis.gov/>) does not accept this variety but considers it within the range of variation for the species. Similarly, the online database known as MorphoBank (<http://morphobank.geongrid.org/>) does not recognize this taxon. For these reasons, *Cardamine angustata* var. *ouachitana* E.B. Smith is deleted from the list of state endemic plants.

New Distributional Information

Order Ranunculales

Family Ranunculaceae

Delphinium newtonianum D. M. Moore 1939 – Moore's Delphinium

This state endemic has now been documented from 8 counties including Johnson, Montgomery, Newton, Pike, Polk, Pope, Searcy, and Van Buren (ANHC database; <http://www.naturalheritage.com/program/inventory.asp>).

Order Rosales

Family Rosaceae

Mespilus canescens Phipps 1990 – Stern's Medlar

Phipps (1990) described this species from Slovak in Prairie County as the only American species of its genus. Prior to the discovery of Stern's Medlar, the genus *Mespilus* was comprised of a single species native to western Eurasia but cultivated far beyond that area for its edible fruit and known as medlar. The closely related genus *Crataegus*, on the other hand, was known to include 140-200 or more species of hawthorns throughout the northern hemisphere. A recent paper by Lo et al. (2007), however, provides strong documentation to support a hybrid origin for Stern's Medlar. On the basis of comparative molecular studies, the authors (Lo et al. 2007) propose a hybrid origin from our native species *Crataegus brachyacantha* and the Eurasian *Mespilus germanica*. They further propose that the species should be known as *Crataegus X canescens* (J. B. Phipps) T. A. Dickinson and E. Y. Y. Lo.

A hybrid origin for Stern's Medlar presupposes that a cultivated specimen of medlar came into contact with a native plant of *Crataegus brachyacantha*, the blueberry hawthorn. The blueberry hawthorn is known from several Arkansas counties in the Delta and Coastal Plain regions, but has not been reported from Prairie County, the only known locality for Stern's Medlar. The Slovak area was home to Czechs and other settlers having an Eastern European origin. Although seldom seen today, medlar fruits were much prized in the past and much planted throughout Europe. Cultivation of medlar by one or more of these early settlers is not unexpected.

Order Fagales

Family Fagaceae

Quercus shumardi Buckl. var. *acerifolia* E. J. Palmer 1926 – Maple-Leaved Oak

A recently published volume of *Flora North America* [Volume 3] elevated this taxon to the rank of full species, i.e. *Quercus acerifolia* (E. J. Palmer) N. A.

Stoyhoff & W. J. Hess based upon Stoyhoff and Hess (1990) (http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233501004). Later, Hess and Stoyhoff (1998) completed a morphological comparison of 4 members of the *Quercus shumardii* complex.

The maple-leaved oak was believed to be endemic to Magazine Mountain, Logan County, in the Arkansas River Valley province (Robison and Allen 1988) until 1991. Johnson (1992) extended the known distribution to Pryor Mountain, Montgomery County, and Sugarloaf Mountain, Sebastian County. In 1993 an additional population was discovered on Porter Mountain, Polk County, bringing the total known populations to 4 (Rouw and Johnson 1994).

Order Boraginales

Family Hydrophyllaceae

Hydrophyllum brownei Kral and Bates 1991–Browne's Waterleaf

Travis Marsico evaluated this species in his Master's Thesis (Marsico 2004) at the University of Arkansas-Fayetteville and subsequently published his findings (Marsico 2003, 2006). Browne's Waterleaf was originally known from only one site in Saline County; however, John Pelton and Theo Witsell (pers. comm.) have found several additional stations for this species in Saline County on rich wooded terraces of the Alum Fork and North Fork of the Saline River. In addition to Saline County, it is now known from 7 other Arkansas counties, including Garland, Howard, Montgomery, Pike, Polk, Sevier, and Yell (Marsico 2006).

Order Rubiales

Family Rubiaceae

Galium arkansanum var. *pubiflorum* E.B. Smith 1979 – Arkansas Bedstraw

The Checklist of the Vascular Plants of Arkansas recognizes this variety, although ITIS does not accept this variety, but considers it within the range of variation for the species. We continue to recognize this variety as a separate variety endemic to Arkansas.

Order Asterales

Family Asteraceae

Polymnia cossatotensis A.B. Pittman and V. Bates 1989–Cossatot Leafcup

This plant is an endemic of the Interior Highlands region of Arkansas. It was discovered in 1988 and is only known from 4 sites, Gap and Pryor mountains in Montgomery County and Blaylock and Brush Heap mountains in Polk County (Hardcastle et al. 2007). Because of its extreme rarity, *P. cossatotensis* is listed

as G1 and is considered critically imperiled (NatureServe 2008).

ANIMALS

Additions to State Endemic Fauna

Order Amphipoda (scuds, sideswimmers)

Family Crangonyctidae

Crangonyx aka Zhang and Holsinger 2003

Described by Zhang and Holsinger (2003) from an unmarked stream in Pope County, ca. 0.5 mi (0.8 km) south of Hector on St. Hwy. 27 (USNM 230406 – Holotype. R. Fox. 28 Dec 1970).

Bacturus speleopolis Holsinger, Sawicki, and Graening 2006

Holsinger et al. (2006) described *Bacturus speleopolis*, a large stygobitic amphipod crustacean in the family Crangonychidae from specimens collected in an underground lake in Cave City, Sharp County. Specimens from Marble Falls Cave in Marion County may also be this species.

Diplopoda (millipeds)

Order Callipodida

Family Abacionidae

Abacion wilhelminae Shelley, McAllister, and Hollis 2003

It had been over 60 years since the fourth species of *Abacion* had been described when *A. wilhelminae* was discovered, an Arkansas endemic in Polk County. The type locality is in Polk County at the Pioneer Cemetery Historical Site, along AR Hwy 88 on Rich Mountain, approximately 1.5 mi (2.4 km) W Queen Wilhelmina State Park (Shelley et al. 2003). The species is known only from the type locality and 2 other sites at about 2,900 ft (884 m) elevation on Rich Mountain in Polk County. Two other species of *Abacion*, including *A. tessellatum* Rafineque and *A. texense* (Loomis) have also been reported from Rich Mountain (Shelley 1984). It is believed that *A. wilhelminae* is endemic to the western periphery of the Ouachita Physiographic Province, perhaps including LeFlore County, Oklahoma (Shelley et al. 2003). However, intensive collecting by one of us (CM) along the western portion of that range has yet to yield a specimen.

Order Chordeumatida

Family Trichopetalidae

Causeyella causeyae Shear 2003

This species was collected from several caves in the Ozarks of Arkansas and it appears to occur on both sides of the White River (Shear 2003). The holotype is unpigmented and eyeless and was collected in

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Independence County at Foushee Cave, 6 mi (9.7 km) west of Locust Grove. The overall geographic distribution includes Independence, Izard, and Stone counties.

Causeyella youngsteadtorum Shear 2003

In their survey of north Arkansas caves, Youngsteadt and Youngsteadt (1978) recorded this species from Potato Cave, Searcy County. Shear (2003) notes that except for one record, *C. youngsteadtorum* occurs south of the White River, but north of the Buffalo River. The type locality is in Boone County at Brewer Cave. The overall distribution includes Boone, Newton, and Searcy counties.

Order Odonata (dragonflies)**Family Cordulegastridae**

Cordulegaster talaria Tennessen 2004 - Ouachita Spiketail

This new dragonfly was described from a first-order tributary of the Caddo River at Caddo Gap in Montgomery County (Tennessen 2004). It was also reported from a site in Garland County and is considered endemic to the Ouachita Mountains of western Arkansas. Habitat of this new odonate is densely-shaded small seeps.

Order Rodentia**Family Geomyidae**

Geomys bursarius ozarkensis Elrod, Zimmerman, Sudman, and Heidt 2000 – Ozark Mountain Pocket Gopher

Based on nucleotide sequence analysis of the cytochrome-*b* gene of mtDNA and analyses of cranial morphology, Elrod et al. (2000) described a new subspecies of pocket gopher from 3 mi (4.8 km) S of Melbourne in Izard County. It is currently known from extreme southern Izard County and possibly northeastern Stone County. Habitat includes sandy, deep soils of the floodplain of the White River.

Crustaceans - New Records or Changes in Nomenclature**Order Isopoda****Family Asellidae**

Lirceus bicuspidatus Hubricht and Mackin 1949

This isopod was previous known from 8 Arkansas counties, including Conway, Jackson, Logan, Newton, Pope, Pulaski, Searcy, and Yell (Robison and Allen 1995). Graening et al. (2007) added Independence, Johnson, Saline, and Stone to the list of counties inhabited by *L. bicuspidatus*. The species is endemic to 12 counties of the state.

Millipeds - New Records or Changes in Nomenclature**Diplopoda****Order Polydesmida****Family Xystodesmidae**

Boraria profuga (Causey) Hoffman and Shear 1969

syn. *Cibularia profuga* (Causey) 1955

There are 3 species in the genus (see Hoffman 1999). This xystodesmid is probably endemic to the Ouachita uplift of the state.

Nannaria davidcauseyi (Causey) 1950

The species was originally described in the genus *Mimuloria* (Chamberlin 1928). The holotype is from near Jasper, Newton County.

Nannaria depalmai (Causey) 1950

The species was originally described in the genus *Castanaria* (Causey 1950) and later transferred to *Mimuloria*. Most recently it has been placed in the genus *Nannaria* (Chamberlin 1918). The holotype is from 2 mi (3.2 km) S Lake Leatherwood, Carroll County.

Family Eurymerodesmidae

Eurymerodesmus compressus Causey 1952

Shelley (1990) designated a male neotype from 6 mi (9.7 km) west of El Dorado, Union County.

Eurymerodesmus goodi Causey 1952

The type locality is in Polk County; Shelley (1990) added Montgomery County to the range of this millipede.

Eurymerodesmus newtonus Chamberlin 1942

syn. *Eurymerodesmus bentonus* Causey 1950

Shelley (1990) synonymized *E. bentonus* with *E. newtonus*. The type locality remains the same and the range now includes Benton, Newton, and Washington counties.

Eurymerodesmus polkensis (Causey) Shelley 1990

syn. *Paresmus polkensis* Causey 1952

Shelley (1990) proposed the new combination above for *P. polkensis*. The species is now known from Montgomery, Polk (type locality), and Scott counties (Shelley 1990).

Eurymerodesmus pulaski (Causey) Shelley 1990

syn. *Leptodesmus hispidipes* Bollman 1888; *Paresmus pulaski* Causey 1950

Shelley (1990) proposed the new combination above for *P. pulaski*. The species distribution was restricted to Pulaski County (Shelley 1990). Robison

and Allen (1995, fig. 7.35) incorrectly added Grant County to the distribution. However, one of us (CTM) collected a male and 2 females from Shannon Hills, Saline County, on 26 December 2006, now deposited in the North Carolina State Museum of Natural Sciences (McAllister et al. 2008).

Order Julida

Family Parajulidae

Okliulus beveli Causey 1953

The genus includes 3 species, *O. carpenteri* Causey from Oklahoma, *O. foliatus* Loomis from Louisiana, and *O. beveli* Causey, known only from Junction City, Union County, Arkansas (Hoffman 1999). The latter site is situated on the Arkansas/Louisiana line, and finding specimens south of that line would remove this species from the Arkansas list of endemics.

Order Polyzoniida

Family Polyzoniidae

Petaserpes bikermani (Causey) Shelley 1998

syn. *Polyzonium bikermani* Causey 1951

A holotype was apparently not received at the Academy of Natural Sciences of Philadelphia (ANSP); Shelley (1998) selected a lectotype from paratype series at the FSCA. Shelley (1998) placed *Polyzonium* in the genus *Petaserpes*.

Order Chordeumatida

Family Cleidogonidae

Cleidogona arkansana Causey 1954

The holotype is possibly lost; *C. arkansana* may be a synonym of *C. unita* (see Shear 1972). This millipede is restricted in range to the type locality in Dallas County.

Tiganogona (= *Ozarkogona*) *glebosa* (Causey 1951) Shear 1972

The type specimen, formerly deposited in the ANSP, was lost in postal transit (Shear 1972; Hoffman 1999). Known only from 2 localities in Washington County (Shear 1972).

Tiganogona (= *Ozarkogona*) *ladymani* (Causey 1952) Shear 1972

The holotype is not at the American Museum of Natural History and its current location is unknown (Hoffman 1999). It is one of the few millipedes restricted to extreme northeastern Arkansas in Clay County.

Tiganogona moesta (Causey 1951)

The type specimen, formerly deposited in the ANSP, was lost in postal transit (Shear 1972). Known

only from 2 localities in the state, Carroll and Washington counties.

Tiganogona (= *Ofcookgonia*) *stewartae* (Causey 1951) Shear 1972

The holotype, formerly deposited in the ANSP, was lost in postal transit (Hoffman 1999). Known only from Sebastian County.

Family Trichopetalidae

Trigenotyia parca (Causey 1951) Shear 1972

The genus currently includes 4 species, *T. parca* in northwestern Arkansas (Carroll Madison, Newton, and Washington counties) and 3 other species in northeastern, south-central, and east-central Oklahoma (McAllister and Shelley 2003; Shear 2003). The former is typically found in caves and the type locality is at Blue Spring, Carroll County (Shear 2003). Interestingly, this locality is just inside the Arkansas border and less than 0.16 mi (0.25 km) from the Stone County, Missouri, line. We concur with Shear (2003) who suggested *T. parca* will probably be found in Oklahoma and Missouri, which would remove it as an Arkansas endemic.

Insects - New Records or Changes in Nomenclature

Class Insecta (insects)

Order Diplura (diplurans)

Family Japygidae

Occasjapyx carltoni Allen 1988

McAllister and Carlton (2005) added a second record from a single specimen collected by CTM in Independence County, 6.1 mi (9.8 km) north of Pleasant Plains off US167 at Blevins Cave along Powers Creek. The specimen was collected within the twilight zone of the cave and is deposited in the invertebrate collection of the Louisiana State Arthropod Museum, Baton Rouge. This dipluran was originally described by Allen (1998) who reported it from a tributary of the Buffalo River in Newton County.

Order Microcoryphia (jumping bristletails)

Family Machilidae

Pedetontus gershneri Allen 1995

Allen (1995) described *P. gershneri* from Mossback Ridge on Magazine Mountain near Paris, Logan County. This species is found on the moist forest floor or among deciduous leaves or sometimes among coniferous pine needles mixed with deciduous leaves.

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Order Collembola (springtails)

Family Entomobryidae

Pseudosinella dubia Christiansen 1960

Christiansen (1960) described this species from specimens collected in several rock crevices in the Devil's Den area of southwestern Washington County. Nothing is known about its life history.

Order Hemiptera (true bugs)

Family Miridae

Lopidea arkansae Knight 1965

This plant bug was described by Knight (1965) based on specimens from Garland County on 21 May 1952. It is allied to *L. davisii* Knight, but differs in the deep red color, also with short appressed, simple yellowish pubescence; male claspers distinctive of the species (Knight 1965, Fig. 8). Holotype male was collected 21 May 1952 in Garland County, "on hardy *Phlox*."

Order Coleoptera (beetles)

Family Staphylinidae

Pseudactium magazinensis Carlton and Chandler 1994 (a short winged mold beetle)

Carlton and Chandler (1994) described this beetle based on a small number of specimens collected from forest litter samples from Mt. Magazine, Logan County. The species can be identified based on male secondary sexual characters and genitalic details.

Pseudactium ursum Carlton 1995 (a short winged mold beetle)

Carlton (1995) described this second endemic *Pseudactium* species based on a small number of specimens collected in flight intercept traps and forest litter samples from the vicinity of Erby, Buffalo National River, Newton County. As with the previous species, identification is based on male secondary sexual and aedeagal characters.

Family Carabidae

Anillinus magazinensis Sokolov and Carlton 2004 (a ground beetle)

Sokolov and Carlton (in Sokolov et al. 2004) described *A. magazinensis* based on specimens from Mount Magazine, Logan County.

Anillinus robisoni Sokolov and Carlton 2004 (a ground beetle)

Sokolov and Carlton (in Sokolov et al. 2004) described *A. robisoni* from 5 mi (8 km) SW of Big Fork, Polk County. The distribution of this endemic is the southern parts of the Ouachita National Forest in the vicinity of Shady Lake and Bard Springs

Recreation Area near the boundary of Polk and Montgomery counties. Habitat of this beetle is deep forest litter in hardwood and pine/hardwood forests.

Anillinus tishechkini Sokolov and Carlton 2004 (a ground beetle)

Sokolov and Carlton (in Sokolov et al. 2004) described *A. tishechkini* from a single locality on Winona Forest Drive, ca. 10 mi (16.1 km) west of Lake Sylvia, Perry County, Arkansas. Habitat is litter in rocky upland pine/hardwood forest along a ridge top having extensive sandstone outcrops and small bluffs.

Anillinus is a large and growing genus of microcarabids with localized distributions across much of southeastern US, with a hotspot of species diversity in the southern Appalachian Mountains. Two additional species were described by Sokolov and Carlton (Sokolov et al. 2004) from nearby Latimer County, Oklahoma. A new species was recently discovered in southwestern Missouri and a suspected new species is known from a single female specimen collected near Fayetteville (Washington County) by Richard Leschen (pers. comm.). Arkansas undoubtedly harbors additional new species of *Anillinus*.

Family Dytiscidae

Heterosternuta phobeae Wolfe and Harp 2003 (a predaceous diving beetle)

Wolfe and Harp (2003) described *H. phobeae* from specimens collected at Bear Creek at US65, Searcy County, on 30 May 1988 by G. L. Harp. This endemic is known from only second, third, and fourth order tributaries to the Buffalo River in the Ozark Mountains of north-central Arkansas. It was also collected from Newton County: Beech Creek at St. Hwy. 74, 0.8 mi. (1.3 km) south of Boxley, 1 July 1992; Little Buffalo River 4 mi (6.4 km) upstream from Parthenon on 30 June 1992; and Smith Creek at St. Hwy. 21 ca. 2 mi (3.2 km) south of Boxley on 1 July 1992. It is known from 4 additional localities in Searcy County.

Deletions from State Endemic Fauna

Order Decapoda

Family Cambaridae (crayfishes)

Procambarus ferrugineus Hobbs and Robison 1988

Procambarus ferrugineus is no longer considered a species but rather has been synonymized with *P. liberorum* (Crandall et al. 2008).

Procambarus liberorum Fitzpatrick 1978 – Osage Burrowing Crayfish

This crayfish was originally described by Fitzpatrick (1978) and later additional distributional

information was supplied by Hobbs and Robison (1988). This species should be deleted from the Arkansas list of endemics as it was recently found in Oklahoma by Robison and McAllister (2007).

Class Diplopoda (millipeds)

Order Spirostreptida

Family Cambalidae

Cambala arkansana Chamberlin 1942

Originally thought to be endemic to Randolph County (Chamberlin 1942), this milliped has been synonymized by Shelley (1979) with *C. minor* Bollman. The species has a vast range extending from extreme western Virginia to eastern Oklahoma, south through Kentucky and Tennessee to Louisiana (Shelley 1979).

Order Chordeumatida

Family Branneriidae

Branneria bonoculus Shear 2003

Originally reported only from an unknown site in Nevada County, Arkansas (Shear 2003b), this milliped was recently reported from Marion County, Texas, by McAllister et al. (2009). Further sampling may reveal a more extensive range.

Order Polydesmida

Family Sphaeriodesmidae

Desmonus pudicus (Bollman 1888) Causey 1958

syn. *Sphaeriodesmus pudicus* Bollman 1888

Originally thought to be endemic to the state in Clark and Pulaski counties (Causey 1958) but now reported from numerous sites in Louisiana, Missouri, Oklahoma, Texas, and Nuevo León, Mexico (Shelley 2000).

Family Xystodesmidae

Pleurolooma flavipes Rafinesque 1820

syn. *Zinaria miribilia* Causey 1951

The species was synonymized by Shelley (1980) as it is now considered an aggressive and successful taxon within and out of the state.

Family Euryuridae

Auturus evides (Bollman 1887)

syn. *Auturus florus* Causey 1950

Causey (1950) originally reported this milliped from Newton County. However, it is widespread in the central United States, from Oklahoma to Arkansas, and north to southeastern Minnesota (Shelley 1982).

Eurymerodesmus angularis Causey 1951

Originally thought to be endemic to Prairie County, Shelley (1990) added additional records for Arkansas,

as well as new records from Louisiana, Mississippi and Missouri. More recently, McAllister et al. (2004) and McAllister and Shelley (2008) added 3 records from Texas and 1 from Louisiana, respectively.

Family Eurymerodesmidae

Eurymerodesmus dubius Chamberlin 1943

The type locality is in Pike County (Chamberlin 1943). Other sites in the state include Bradley, Clark, Garland, Hot Spring, Nevada, Ouachita, and Saline counties, with a disjunct record in Louisiana (Shelley 1990). Recently, McAllister et al. (2002b) added a record for Hempstead County and McAllister et al. (2002a) reported the species from Oklahoma for the first time.

Eurymerodesmus newtonus Chamberlin 1942

See account herein for *E. bentonus*.

Eurymerodesmus oliphantus Chamberlin 1942

The range was formerly thought to be restricted to Jackson County (Chamberlin 1942); however, Shelley (1990) reports records for Missouri and southern Illinois.

Eurymerodesmus schmidti Chamberlin 1943

Originally reported to be restricted to Polk County, this species has been synonymized with *E. birdi birdi* (Shelley 1990). The latter has an extensive distribution that includes several counties in the state as well as Kansas, Louisiana, Mississippi, Missouri, and Texas (Shelley 1990). McAllister et al. (2002a) reported *E. b. birdi* from Lafayette County and LeFlore County, Oklahoma, and McAllister et al. (2003) also reported specimens from Madison and Yell counties. More recently, McAllister and Shelley (2008) provided new records for *E. b. birdi* from Scott County, Cherokee County, Kansas, and Cass and Harrison counties, Texas.

Order Pseudoscorpiones

Family Chernetidae

Pseudoscorpions

Pseudozaona (= *Hesperochnes*) *occidentalis* (Hoff and Bosterli 1956)

This pseudoscorpion was originally described from Fincher Cave, Washington County (Hoff and Bosterli 1956). Muchmore (1974) extensively revised the pseudoscorpion genus *Herperochnes* and placed *Pseudozaona occidentalis* within it. Because *H. occidentalis* (Hoff and Bosterli) has now been documented from Missouri, Ohio, Oklahoma, and Texas, this pseudoscorpion is herein deleted from the list of Arkansas endemic species.

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New Distributional Information

Order Decapoda (shrimps and crayfishes)

Family Cambaridae

Bouchardina robisoni Hobbs 1977 – Bayou Bodcau Crayfish

Bouchardina robisoni was described by Hobbs (1977) from specimens collected in Lafayette County. Robison (2006) reviewed the status and distribution of this endemic crayfish and added records from Columbia, Hempstead, Howard, and Nevada counties to its known distributional range. On the basis of Robison's report, Taylor et al. (2007) gave the crayfish a conservation status of threatened.

Cambaris causeyi Reimer 1966– Boston Mountains Crayfish

Discovered by H. H. Hobbs, Jr. in 1941 in Pope County and later described by Reimer (1966), this crayfish was known until 1992 from only 6 localities in Pope and Stone counties. Robison and Leeds (1996) found this species in 40 different localities in 5 new counties including Madison, Johnson, Franklin, Newton, and Searcy counties across northern Arkansas in the Ozark Mountains.

Fallicambarus gilpini Hobbs and Robison 1988 – Jefferson County Crayfish

Robison and Wagner (2005) reviewed the status of *F. gilpini* and discovered that this crayfish was not confined to the 3 localities reported by Hobbs and Robison (1988). The distribution now includes 8 localities in 2 Arkansas counties, Jefferson and Cleveland (see Robison and Wagner 2005).

Fallicambarus harpi Hobbs and Robison 1985 – Ouachita Burrowing Crayfish

Robison and Crump (2004) reviewed the status and distribution for this state endemic and found it to be a much more widely distributed crayfish than previously believed. They reported 12 new populations of this crayfish in Montgomery, Hot Spring, Garland, and Pike counties. Previously, it had been known from a single location in Pike County (Hobbs and Robison 1985).

Fallicambarus petilicarpus Hobbs and Robison 1989 – Slenderwrist Burrowing Crayfish

Hobbs and Robison (1989) described *Fallicambarus petilicarpus* from a single locality in western Union County. Later, Robison (2001) reviewed the status and distribution of this state endemic and found it to be rare and never abundant locally. He added Columbia County to the known distribution of this crayfish.

Summary

Since the publication of Robison and Allen (1995), significant changes in our knowledge of the endemic biota of the state have occurred. Included among these changes are the addition of 3 new plant species (*Sabatia arkansae*, *Streptanthus maculatus obtusifolius*, and *Liatris compacta*) to the state list and the deletion of 4 plant species (*Plagiochila japonica ciliigera*, *Arenaria muriculata*, *Carex opaca*, and *Cardamine augustata ouachitana*). In addition, we have summarized the new distributional information on various plant endemics that is now available.

Sixteen new animal species/subspecies have been added to the state endemic list, including 3 species of millipeds (*Abacion wilhelminae*, *Causeyella causeyae*, *Causeyella youngsteadtorum*), 2 amphipods (*Crangonyx aka*, *Bacturus speolopsis*), 1 bristletail (*Pedetontus gershneri*), 1 springtail (*Pseudosinella dubia*), 1 dragonfly (*Cordulegaster talaria*), 1 plant bug (*Lopidea arkansae*), 6 beetles (*Pseudactium magazinensis*, *P. ursum*, *Anillinus magazinensis*, *A. robisoni*, *A. tishechkini*, and *Heterosternuta phoebeae*), and 1 gopher (*Geomys bursarius ozarkensis*). Deletions from the 1995 original list include 2 crayfishes (*Procambarus ferrugenus* and *P. liberorum*) and numerous millipeds.

With these changes considered, we document a total of 110 taxa (species and subspecies) of plants and animals as endemic to the state of Arkansas, including 10 species of plants and 100 species of animals (Table 1). The animals are dominated by 91 invertebrates, which include 2 annelid worms, 8 snails, 3 mussels, 21 crustaceans, (4 amphipods, 4 isopods, and 13 crayfishes), 20 myriapods (millipeds and centipedes and symphylans), 1 pseudoscorpion, and 37 insects (4 diplurans, 1 dragonfly, 2 mayflies, 5 caddisflies, 8 stoneflies, 15 beetles, and 2 true bugs). Only 8 vertebrates are endemic to Arkansas including 5 fishes, 2 salamanders, and 1 pocket gopher (Table 1). The latest tally represents a decrease of 7 in state endemics from the 117 taxa (11 plants and 106 animals) reported by Robison and Allen (1995) to 110 documented in this report.

Table 1. Arkansas Endemic Biota.

Plants	<i>Delphinium newtonianum</i> D.M. Moore – Moore’s Delphinium <i>Heuchera villosa</i> Michx. var. <i>arkansana</i> (Rydberg) E.B. Smith – Arkansas Alumroot <i>Mespilus canescens</i> Phipps – Stern’s Medlar <i>Quercus shumardi</i> Buckl. var. <i>acerifolia</i> E.J. Palmer – Maple-Leaved Oak <i>Hydrophyllum brownei</i> Kral and Bates – Browne’s Waterleaf <i>Liatris compacta</i> (Torr. & Gray) Rybd. – Blazing Star <i>Streptanthus maculatus obtusifolius</i> Hook – Claspig Twistflower <i>Galium arkansasum</i> var. <i>pubiflorum</i> E.B. Smith – Arkansas Bedstraw <i>Polymnia cossatotensis</i> A.B. Pittman and V. Bates – Cossatot Leafcup <i>Sabatia arkansana</i> Pringle and Witsell – Pelton’s Rose-gentian
Animals	
Annelida (Oligochaeta) – Segmented Worms	<i>Diplocardia meansi</i> Gates – Earthworm <i>Diplocardia sylvicola</i> Gates – Earthworm
Mollusca (Gastropoda) – Snails and Slugs	<i>Somatogyrus amnicoloides</i> Walker – Ouachita Pebblesnail <i>Somatogyrus crassilabris</i> Walker – Thicklipped Pebblesnail <i>Somatogyrus wheeleri</i> Walker – Channelled Pebblesnail <i>Ammicola cora</i> Hubricht – Foushee Cavesnail <i>Paravitrea aulacogyra</i> (Pilsbry and Ferriss) – Mt. Magazine Supercoil <i>Polygyra peregrine</i> Rehder – White Liptooth <i>Mesodon clenchi</i> (Rehder) – Calico Rock Oval <i>Mesodon magazinensis</i> (Pilsbry and Ferriss) – Magazine Mountain Shagreen
Mollusca (Bivalvia) – Mussels and Clams	<i>Lampsilis powellii</i> (Lea) – Arkansas Fatmucket <i>Lampsilis strecheri</i> Frierson – Speckled Pocketbook <i>Villosa arkansasensis</i> (Lea) – Ouachita Creekshell
Amphipoda – Amphipods and Scuds	<i>Stygobromus elatus</i> (Holsinger) – Magazine Mountain Amphipod <i>Stygobromus montanus</i> (Holsinger) – Rich Mountain Amphipod <i>Crangonyx aka</i> Zhang and Holsinger – Amphipod <i>Bacturus speleopolis</i> Holsinger, Sawicki, and Graening – Amphipod
Isopoda – Freshwater Isopods and Pill Bugs	<i>Caecidotea fonticulus</i> Lewis – Abernathy Spring Isopod <i>Caecidotea holti</i> Fleming <i>Lirceus bicuspidatus</i> Hubricht and Mackin <i>Lirceus bidentatus</i> Hubricht and Mackin
Decapoda – Shrimps and Crayfishes	<i>Bouchardina robisoni</i> Hobbs – Bayou Bodcau Crayfish <i>Cambarus aculabrum</i> Hobbs and Brown – Benton County Cave Crayfish <i>Cambaris causeyi</i> Reimer – Boston Mountains Crayfish <i>Cambarus zophonastes</i> Hobbs and Bedinger – Hell Creek Cave Crayfish <i>Fallicambarus harpi</i> Hobbs and Robison – Ouachita Burrowing Crayfish <i>Fallicambarus caesius</i> Hobbs – Timberlands Burrowing Crayfish <i>Fallicambarus jeanae</i> Hobbs – Daisy Burrowing Crayfish <i>Fallicambarus gilpini</i> Hobbs and Robison – Jefferson County Crayfish <i>Fallicambarus petilicarpus</i> Hobbs and Robison – Slenderwrist Burrowing Crayfish <i>Fallicambarus strawni</i> (Reimer) – Saline Burrowing Crayfish <i>Orconectes acares</i> Fitzpatrick – Redspotted Stream Crayfish <i>Procambarus regalis</i> Hobbs and Robison – Regal Burrowing Crayfish <i>Procambarus reimeri</i> Hobbs – Irons Fork Burrowing Crayfish
Myriapoda – Millipeds and relatives	<i>Abacion wilhelminae</i> Shelley, McAllister and Hollis <i>Boraria profuga</i> (Causey) <i>Causeyella causeyae</i> Shear <i>Causeyella youngsteadtorum</i> Shear <i>Cleidogona arkansana</i> Causey <i>Eurymerodesmus compressus</i> Causey <i>Eurymerodesmus goodi</i> Causey <i>Eurymerodesmus newtonius</i> Chamberlin <i>Eurymerodesmus polkensis</i> (Causey) <i>Eurymerodesmus pulaski</i> (Causey) <i>Hanseniella ouachiticha</i> Allen <i>Nannaria davidcauseyi</i> (Causey) <i>Nannaria depalmai</i> (Causey)

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Table 1. Continued

Myriapoda – Millipeds and relatives	<i>Okliulus beveli</i> (Causey) <i>Petaserpes bikermani</i> (Causey) <i>Tiganogona glebosa</i> (Causey) <i>Tiganogona ladymani</i> (Causey) <i>Tiganogona moesta</i> (Causey) <i>Tiganogona steuartae</i> (Causey) <i>Trigenotyia parca</i> (Causey)
Pseudoscorpionida– Pseudoscorpions	<i>Microcreagris ozarkensis</i> (Hoff)
Diplura – Diplurans	<i>Catajapyx ewingi</i> (Fox) <i>Occasjapyx carltoni</i> Allen <i>Podocampa inverterata</i> (Allen) <i>Clivocampa solus</i> (Allen)
Odonata – Dragonflies	<i>Cordulegaster talaria</i> Tennessen
Ephemeroptera – Mayflies	<i>Dannella provonshai</i> McCafferty <i>Paraleptophlebia calcarica</i> Robotham and Allen
Plecoptera – Stoneflies	<i>Allocaupnia warreni</i> Ross and Yamamoto <i>Allocaupnia ozarkana</i> Ross <i>Allocaupnia oribata</i> Poulton and Stewart <i>Alloperla Ouachita</i> Stark and Stewart <i>Alloperla caddo</i> Poulton and Stewart <i>Isoperla szczytkoi</i> Poulton and Stewart <i>Zealeuctra wachita</i> Ricker and Ross <i>Leuctra paleo</i> Poulton and Stewart
Hemiptera – True bugs	<i>Acalypta susana</i> Allen, Carlton, and Tedder – Lace Bug <i>Lopidea arkansae</i> Knight – Plant Bug
Coleoptera – Beetles	<i>Scaphinotus</i> (s.str.) <i>parisiana</i> Allen and Carlton <i>Scaphinotus (Nomaretus) infletus</i> Allen and Carlton <i>Rhadine ozarkensis</i> Sanderson and Miller <i>Evarthus parasodalis</i> Freitag <i>Anillinus magazinensis</i> Sokolov and Carlton <i>Anillinus robisoni</i> Sokolov and Carlton <i>Anillinus tishechkini</i> Sokolov and Carlton <i>Hydroporus sulphurius</i> Matta and Wolfe <i>Arianops sandersoni</i> Barr <i>Arianops copelandi</i> Carlton <i>Pseudactium magazinensis</i> Carlton and Chandler <i>Pseudactium ursum</i> Chandler <i>Ouachitychus parvovulus</i> Chandler <i>Pachybrachis pinicola</i> Rouse and Medvedev – Leaf Beetle <i>Lema maculicollis</i> ab. <i>inornata</i> Rouse and Medvedev <i>Heterosternuta phoebeae</i> Wolfe and Harp – Predaceous diving beetle
Trichoptera – Caddisflies	<i>Paduniella nearctica</i> Flint <i>Paucicalcarica ozarkensis</i> Matthis and Bowles <i>Ochrotrichia robisoni</i> Frazer and Harris <i>Agapetus medicus</i> Ross <i>Helicopsyche limnella</i> Ross
Osteichthyes – Bony Fishes	<i>Noturus lachneri</i> Taylor – Ouachita Madtom <i>Noturus taylori</i> Douglas – Caddo Madtom <i>Etheostoma moorei</i> Raney and Suttkus – Yellowcheek Darter <i>Etheostoma pallidorsum</i> Distler and Metcalf – Paleback Darter <i>Etheostoma fragi</i> Distler – Strawberry River Orangethroat Darter
Amphibia (Caudata: Plethodontidae) – Salamanders	<i>Plethodon caddoensis</i> Pope and Pope – Caddo Mountain Salamander <i>Plethodon fourchensis</i> Duncan and Highton – Fourche Mountain Salamander
Mammalia (Rodentia: Geomyidae)– Mammals	<i>Geomys bursarius ozarkensis</i> Elrod, Zimmerman, Sudman, and Heidt – Ozark Mountain Pocket Gopher

Acknowledgments

Special thanks to the following for their help with reviewing the manuscript and/or furnishing updated information on various Arkansas endemic species: Steve Chordas (Ohio State University), Betty Crump (USDA Forest Service), Paul Davison (University of North Alabama), Johnnie L. Gentry (University of Arkansas-Fayetteville), G. O. Graening (California State University, Sacramento), George L. Harp (Arkansas State University), John L. Holsinger (Old Dominion University), Dan Marsh (Greenwood, Arkansas), and Theo Witsell (Arkansas Natural Heritage Commission).

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