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A Revised List of Arkansas Terrestrial Mollusks with Notes on the Geographic Distribution of Species

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Abstract

A revised list of Arkansas terrestrial mollusks is presented, based on the authors' collections, incorporating data from the scientific literature and taking into account recent changes in taxonomy and species concepts. 144 species are recorded for Arkansas, of which 127 represent the autochthonous fauna of the state. The biogeographical position of Arkansas is reflected in its land mollusks, i.e., approximately 40% of Arkansas species are also widely distributed in the United States east of the Rocky Mountains, 12% are more widely distributed to the north, 11% are typical of the Gulf Coastal Plain, 14% form a "Mid Western" assemblage and 18% are endemic to the Ouachita-Ozark regions of Arkansas, Oklahoma and Missouri. The remaining 5% are species for which the geographic distribution is unclear. Diversity of Arkansas land mollusks is apparently due to the conjunction of these geographical zones within the state. Taxonomic problems exist for the genera Mesomphix and Paravitrea (family Zonitidae) and Succinea (family Succineidae) in Arkansas.

Introduction

Distribution of the land mollusks of the United States is poorly understood, especially in Arkansas. The most recent summary of Arkansas mollusks is that of Gordon (1980) who listed all mollusks, terrestrial and freshwater, then known from the state. His list of terrestrial mollusks is based primarily on that of Hubricht (1972). However, more recent data for land mollusks can be abstracted from Hubricht (1985). Hubricht's (1985) data are based primarily on his enormous collecting experience. However, he excluded species in the earlier literature (i.e., pre-Pilsbry, 1940-1948) that appeared to be outside of their main range and those species that appear to be alien introductions. He also revised his identification of some forms between his 1972 and 1985 publications. The later publication also reflects changes in taxonomy. We present an updated list of Arkansas land mollusks with comments on species that cause identification or taxonomic problems or are of restricted distribution.

Materials and Methods

The list of Arkansas land mollusks is based primarily on the authors' collections during 1995-1998. Collections were made at over 300 sites in all Arkansas counties except Craighead and Sebastian counties. Collection sites included all major habitat types within the state. These include margins of bayous, streams, and major rivers, bottomland wood-

land and headwaters swamp in the Delta and Gulf Coastal Plain, prairies (notably the black soil prairies of southwestern Arkansas), and a wide range of woodland sites (bluffs, gullies, boulder talus) throughout Crowley's Ridge, and the Ouachita and Ozark mountains. In general, localities were under federal or state ownership, i.e., national forests and parks, state parks, and state natural areas. Collections were also made in lands managed by The Nature Conservancy and Arkansas Natural Heritage Commission.

Identification was made by reference to Pilsbry (1940-1948), Emberton (1988, 1991, 1995), Burch (1980), and the collections in the Field Museum of Natural History, Chicago, and the Academy of Natural Sciences, Philadelphia. For the family Succineidae (genera Oxyloma, Succinea and Cattinella), where examination of genital anatomy is critical for accurate identification, specimens were drowned overnight in water and preserved in 70% ethanol for subsequent dissection. Voucher material is at present in the authors' possession and will be deposited in the University Museum, University of Arkansas at Fayetteville, and the Field Museum of Natural History, Chicago.

In the list of Arkansas land mollusks that follows, we have incorporated Emberton's (1995) taxonomic revision of the family Polygyridae and names given by the American Fisheries Society (1988). Otherwise, we have followed the arrangement of Hubricht (1985). Notes on problems of species identification are given. Records from Pilsbry (1940-1948) and Hubricht (1962, 1985) are included in the list.
Results and Discussion

Some problems of taxonomy must be addressed before an analysis of the biogeographical relationships of Arkansas terrestrial mollusks can be made:

1. Most Carychium sp. in the state are referable to Carychium exile. Smaller and less striate forms that seem to be Carychium mexicanum occur with C. exile in southwestern Arkansas. The problem of species recognition in Carychium is discussed by Burch and Van Devender (1980).

2. Cochlicopa lucta sensu stricto (Cionella lucta of Gordon (1980) has not been seen in the state. Since it was not the practice to distinguish between species of Cochlicopa in the past, we assume that Gordon's record refers to Cochlicopa morsaana. Hubricht does not record C. lucta for Arkansas.

3. Gastrocopta mcclungi was described as [sub]fossil from upper Pleistocene deposits in Phillips County, Kansas. (Hanna and Johnston, 1913). Pilsbry (1948) regarded G. mcclungi as a variation of Gastrocopta procera sterkiana, but it is clear that he was referring to material from the southwestern United States (possibly subfossil), i.e., west of Arkansas. Judging from his illustrations and comments, and from our examination of material in the Academy of Natural Sciences, Philadelphia, the southwestern form of "mcclungi" belongs to the Gastrocopta procera/sterkiana aggregate. Hubricht (1985) gives Gastrocopta sterkiana specific status but essentially follows Pilsbry's views. In addition to his comments, Pilsbry (1948) illustrated but did not otherwise mention G. mcclungi from Rogers, Benton County, Arkansas. Examination of Pilsbry's specimen, which is the only one in the Academy's collection, confirmed its identity with our form and that it is a form distinct from both G. procera and G. sterkiana. Figures of the type specimen of G. mcclungi (Hanna and Johnston, 1913) are not sufficiently detailed to establish whether G. mcclungi sensu Hanna and Johnston is the same as the living Arkansas form. We have not examined the type specimen.

4. Hubricht (1985) states that at least two species are included in the Columella simplex aggregate. Two forms appear to be distinguishable in Arkansas: a smaller form and a larger, more cylindrical form, the latter with strong, regular striation. The larger form may be that described as Columella edentata var. turritella (see Pilsbry, 1948).

5. Hubricht (1985) records only Oxyloma sullannum for Arkansas, and this species certainly occurs in the state. However, several populations of Oxyloma are referable to Oxyloma retusa both in their shell form and genital morphology, notably in the long, spirally twisted vas deferens of O. retusa as illustrated by Pilsbry (1948) and confirmed by the authors' dissection of specimens from Arkansas and Joliet, Illinois.

6. Hubricht (1985) includes Succinea ovalis, S. indiana, S.
ulus. In the absence of convincing contradictory evidence, we regard Arkansas Discus as patulus.

10. Hubricht (1972) listed Helicodiscus jacksoni for Arkansas, and, thus, it is included in Gordon (1980). However, Hubricht (1985) lists H. jacksoni as a synonym of Hawaiia alachuanus, and H. jacksoni is not included in our list.

11. Specimens of Punctum that are clearly P. minutissimum or P. vitreum occur in the state. Others are not readily separable into either form, bearing the lamellar sculpture of P. vitreum but lacking the distinction between major and minor riblets.

12. European slugs of the families Limacidae, Milacidae, and Arionidae are presumed introductions. Gordon (1980) listed Lehmannia poirieri, presumably having taken it from Hubricht (1972). This is a synonym for L. valentiana, which is given in our list.

13. Glycyphalina indentata appears to be an aggregate of species that differ anatomically but with little or no shell differences (Hubricht, 1985). The group has not been dissected adequately for separation of the species.

14. The specific identities of Arkansas Mesomphix (Omphalina) forms cupreus, cupreus ozarkensis and capnodes are uncertain. Hubricht (1985) regards Mesomphix cupreus ozarkensis as M. capnodes. Pilsbry (1946) records M. cupreus for the state with M. cupreus ozarkensis as a possible subspecies. All mature specimens of Arkansas Mesomphix (Omphalina) collected by the authors are M. friabilis. Nevertheless, we have provisionally retained M. cupreus as an Arkansas species. We therefore list M. cupreus, M. friabilis, M. capnodes and Mesomphix (Mesomphix) globosus for the state.

15. Pilsbry’s separation of Arkansas Paravitrea (sections Paravitrea and Paramwitrea) into signifiancs and simpsoni does not seem to accommodate well all Arkansas specimens. Forms similar to the Paravitrea capsella species aggregate (Hubricht, 1985) occur in the state, some of which have a resemblance in their shells to P. lacteodens. The localized occurrence of Paravitrea petrophiia in Arkansas and the southern Appalachian Mountains (Hubricht, 1985) is anomalous. This presents the only instance of a species endemic to both of these regions. Revision of Arkansas Paravitrea spp. requires preserved material from throughout the southeastern United States.

16. Venridens demissus is separable into two forms: V. demissus sensu stricte, recorded from Jefferson County by Hubricht (1985), and forms from further west that are referred to as Venridens brishti. In the western Ouachita Mountains, V. brishti is represented by a large form reminiscent of Venridens acerra. Although strikingly different from shells further east within the Ouachita Mountains, this is regarded as a large form of the (sub)species brishti (Pilsbry, 1946).

17. Details of the Neohelix albolabris/Neohelix allenii complex are discussed by Emberton (1988).

18. Records of Xolotrema obstricta (listed by Gordon, 1980) are referable to Xolotrema occidentalis. Our collections of X. occidentalis display a range of shell form from that of the acutely keeled X. obstricta to bluntly keeled forms similar to Xolotrema fosteri. Although all of these bear the characteristic coarse shell ribbing and reduced apertural dentition of X. occidentalis (Pilsbry, 1940), none correspond exactly to the type of the anykeeled form, and none of the described species has been dissected by Hubricht (1988) and closely resembles X. fosteri in genital anatomy. However, this material also does not agree in form with the type material, being similar in shell shape to X. fosteri. We have never seen live adults of the acutely keeled forms, and we have never seen a dissected. Emberton points out the need to investigate this problem, but preserved material is not available. Because of the general similarity in shell shape of X. obstricta of the southern Appalachians to some of the acutely keeled X. occidentalis, the Arkansas record of Gordon (1980) is regarded as an error of identification.

19. Stenotemnta caddeoense is referred to as a subspecies of Stenotemnta unciferum by Pilsbry (1940) and Hubricht (1985). However, Emberton (1995) lists Stenotemnta caddeoense as a separate species.

20. Polygyrta triodontoides is recorded for Arkansas by Pilsbry (1940) but not by Hubricht (1985). The form is not included in Emberton (1995), but because of the close similarity of its shell to that of Linisa texesiana, presumably, it belongs to the genus Linisa.

21. Examination of Hubricht’s Millereilex lithica from Arkansas and our specimens of Millerelix dorfeuilliana from throughout the state does not lead to the conviction that M. lithica is a species distinct from M. dorfeuilliana. It possibly represents one extreme of a cline. Millerelix dorfeuilliana is very variable (Branson, 1970) in shape and development of the parietal tooth and in size and placement of the upper lip tooth (separating characters of M. lithica). Additionally, a species of Millereilex distinct from all other Polygyrina of the United States has recently been found in the state by the authors.

22. Millereilex deltoidea and M. simpsoni are regarded as forms of M. jacksoni by Pilsbry (1940) but as separate species by Hubricht (1985) and Emberton (1995).

23. Inflectarius edentatus is regarded as a form of Inflectarius inflectus by Pilsbry (1940) and Hubricht (1985) but as a separate species by Emberton (1995).

The above considerations were used in compiling our list of terrestrial mollusks of Arkansas. Gordon (1980) lists 107 terrestrial species of Gastropoda for Arkansas, Hubricht (1985) lists 96 and we list 144. Of the 144 species given in Table 1, nine have been recorded only from river drift or as subfossil and may not, therefore, be living in the state. Of
the remaining 135, 109 were found living in the state by the authors, four species were seen as dead (but recent) shells and 22 were not seen in the state by the authors (Table 1). Of the 135 species noted above, five represent alien slug introductions and three are apparent adventive populations. Thus, the Arkansas autocothonous fauna, as presently understood, consists of 127 species.

The increase of 48 species compared with the most recent summary (Hubricht, 1985) includes 22 additional native species, the remainder being forms listed in earlier literature or apparently introduced aliens not included by Hubricht. Of these, three represent species in the process of description by the authors; one, Neohelix albolaris bogani, was not described until 1988 (Emberton, 1988). Most of the remaining 18 species not recorded previously for the state are minute forms that have been overlooked. Of these, Vertigo gouldi, and V. mearemeensis represent records that are significant extensions of the ranges presented by Hubricht (1985).

Using Hubricht's (1985) distributions of land molluscs for the eastern United States (i.e., east of the Rocky Mountains), the Arkansas forms appear to group into five broad categories, viz:

1. A group of species of generally widespread occurrence in the eastern United States of which some forms are absent from, or of restricted distribution in the Atlantic and Gulf Coastal plains (approximately 40%).

2. Species of general distribution in the northern tier of states extending south into the Appalachian, Cumberland and Ozark Mountains (approximately 12%).

3. A group of species that are widespread in the Gulf Coastal Plain and absent or of restricted distribution further north (approximately 11%).

4. Species that show a mid-western distribution, i.e., those that occur in a broad band from Louisiana and Texas (east of the Edwards Plateau) to the western Great Lakes (approximately 14%).

5. Species endemic to the Ozark/Ouachita Mountains (approximately 18%).

6. The remaining 5% are species for which the geographical distribution is unclear.

Thus, the diversity of Arkansas land Molluscs is apparently due to the conjunction of these biogeographical zones within the state.

Regarding the endemic land molluscs, the mountains of western Arkansas and adjacent regions of Oklahoma and Missouri have long been known to be an area of considerable endemicism (Pilsbry and Ferriss, 1906; Pilsbry, 1940; Gordon, 1980). Endemic species include forms that occur in both the Ouachita and Ozark Mountains, forms that are restricted to either the Ouachita or Ozark Mountains, and a group of five species endemic to Arkansas. The area around the White and Buffalo Rivers contains the largest concentration of Arkansas endemics.

The survival of these localized forms and, particularly, that of species apparently restricted to the state, is of some concern. Of the five state endemics, Inflectarius magazinis is afforded federal protection on the basis of a single extended site on Mount Magazine. Similarly, one site for Patera clenchi is protected within Mount Nebo State Park, Yell County. However, all populations of Millereix peregrina and Xolotrema occidentalis known to the authors are outside of protected sites such as state or national parks. Paravitrea aulacogyra is still known from only a single specimen. (Pilsbry, 1946).

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Table 1. Arkansas terrestrial Molluscs. ¹Not seen alive by the authors, ²apparently alien introduction, ³Arkansas records appear to represent adventive populations, ⁴Arkansas records are from river drift, ⁵subfossil.

| Family Helcinidae       | Helicina orbiculata (Say, 1818)                        |
| Family Pomatiopsidae    | Pomatiopsis lapidaria (Say, 1817)                      |
| Family Carychiidae      | Carychiium mexicanum Pilsbry, 1891                    |
|                         | C. exile I. Lea, 1842                                 |
| Family Cochlicopidae    | Cochlicopa morseana (Doherty, 1878)                   |
| Family Valloniidae      | Vallonia perspectiva Sterki, 1892                     |
|                         | V. parvula Sterki, 1893                               |
| Family Pupillidae       | Pupoides albilaris (C.B. Adams, 1821)                 |
|                         | Gastrocopta armifera (Say, 1821)                      |
|                         | G. contracta (Say, 1822)                              |
|                         | G. holzingeri (Sterki, 1889)                          |
|                         | G. pentodon (Say, 1821)                               |

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G. tappaniana (C.B. Adams, 1842)
G. corticaria (Say, 1816)
G. procera (Gould, 1840)
G. sterciana (Pilsbry, 1912)
G. rugicola (Say, 1821)1,3
Gastrocopta sp. nov. [?] cf. mucchungi
Hanna and Johnston, 1913
G. cristata (Pilsbry and Vanatta, 1900)4
G. pellucida (Pfeiffer, 1841)4
Vertigo milium (Gould, 1840)
V. osariana Sterki, 1890
V. rugulosa Sterki, 1890
V. oralis Sterki, 1898
V. teskeya Hubricht, 1961
V. ova (Say, 1822)
V. tridentata Wolf, 1870
V. gouldi (A. Binney, 1843)
V. meramecensis Van Den Merwe, 1979
Columella simplex (Gould, 1841)
Family Strobilopsidae
Strobilops labrinthicus (Say, 1817)
S. texiansis Pilsbry and Ferriss, 1906
S. aeneus Pilsbry, 1926
Family Succineidae
Oxylopa reatum (L. Lea, 1834)
O. salleanum (Pfeiffer, 1849)
Succinea ovalis Say, 1817
S. indiana Pilsbry, 1905
S. groenovarii L. Lea, 1837
S. unicolor Tryon, 1866
S. forshayi L. Lea, 1864
S. luteola Gould, 1848
Cattinella avara (Say, 1824)
C. oklahomarum (Webb, 1953)
C. wanda (Webb, 1953)1
Family Philomyidae
Philomyxus carolinicus (Bosc, 1802)
Megapallifera mutabilis (Hubricht, 1951)
M. ragdalei (Webb, 1950)1
Pallifera marmorea Pilsbry, 1948
Family Discidae
Anguispira alternata (Say, 1816)
A. strongyloides (Pfeiffer, 1854)
A. kochi (Pfeiffer, 1821)1
Discus cronkitei (Newcomb, 1865)1,5
D. patulus (Deshayes, 1830)
Family Helicodiscidae
Helicodiscus tridens (Morrison, 1935)4
H. eigenmanni Pilsbry, 19004
H. notius Hubricht, 1962
H. parallelus (Say, 1817)
H. roundyi (Morrison, 1935)4
H. singleanus (Pilsbry, 1890)
H. inermis H.B. Baker, 19294
H. nummus (Vanatta, 1899)4
Family Punctidae
Punctum minutissimum (I. Lea, 1841)
P. vitreum H.B. Baker, 1930
Family Limacidae
Limax flavus (Linnaeus, 1758)2
L. maximus Linnaeus, 17582
Deroceras laeve (Müller, 1774)2
Lehmannia valentiana (Féussus, 1821)1,2
Family Milacidae
Milax gagates (Draparnaud, 1801)1,2
Family Arionidae
Arion subfuscus (Draparnaud, 1805)2
Family Zonitidae
Nesovitrea electrina (Gould, 1841)1
Glycyphalinia wheatey (Bland, 1833)
G. roeneri (Pilsbry and Ferriss, 1906)4
G. indenata (Say, 1823)
G. solida (H.B. Baker, 1930)
G. luticola Hubricht, 1966
G. umbilicata (Cockerell, 1893)
G. lewisiana (Clapp, 1908)1
Mesomphix globosus (MacMillan, 1940)
M. friabilis (W.B. Binney, 1857)
M. cupreus (Rafinesque, 1831)1
M. capnodes (W.G. Binney, 1857)
Paravirrata multidentata (A. Binney, 1840)
P. signifera (Bland, 1866)
P. simpsoni (Pilsbry, 1899)
P. petrophila (Bland, 1883)
P. aulacogyra (Pilsbry and Ferriss, 1906)4
Paravireta sp. nov. [?] cf. lacteodens
Hauvettia minuscula (A. Binney, 1840)
H. alachiwa (Dall, 1885)
Ventridens demissus (A. Binney, 1843)
V. brittsi (Pilsbry, 1892)
V. ligera (Say, 1821)
Zonitoides arboreus (Say, 1816)
Striatura meridionalis (Pilsbry and Ferriss, 1906)
Family Helicarionidae
Euconulus cherinthus trochulus (Say, 1821)
E. denatus (Sterki, 1893)
Guppya sterktii (Dall, 1888)
Family Haplotrematidae
Haplotrema concavum (Say, 1821)
Family Bulimulidae
Rabdopus dealbatus (Say, 1821)
Family Polygyridae
Webbhelix multilineata (Say, 1821)
Neohelix divesta (Gould, 1848)
N. albolaris bogani Emberton, 1988
N. alleli (Sampson, 1883)
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Xolotrema fisterti (F.C. Baker, 1932)  
X. carolinensis (L. Lea, 1834)  
X. occidentalis (Pilsbry and Ferriss, 1907)  
X. denotata (Férussac, 1821)  
Triodopsis cingulida Call, 1886  
T. vulosa (Gould, 1848)  
T. hopetenaes (Shuttleworth, 1852)  
T. neglecta (Pilsbry, 1899)  
Allogona profunda (Say, 1821)  
Euchemotrema fraternum (Pilsbry, 1900)  
E. leai aliciae (Pilsbry, 1893)  
Stenotrema pilshy (Ferriss, 1900)  
S. labrosum (Bland, 1862)  
S. stenotrema (Fleger, 1842)  
S. unciferum (Pilsbry, 1900)  
S. caddoense (Archer, 1935)  
S. blandianum (Pilsbry, 1903)  
Linita texastiana (Moricand, 1833)  
L. triodontoides (Bland, 1861)  
Praticolella berlandieriana (Moricand, 1833)

Millerelis dorcufulliana (l. Lea, 1838)  
M. lithica (Hubricht, 1961)  
M. jacksoni (Bland, 1866)  
M. deltoidea (Simpson, 1899)  
M. simpsoni (Pilsbry and Ferriss, 1907)  
M. peregrina (Rehder, 1932)  
Millerelis sp. nov.

Daedalochila leporina (Gould, 1848)  
Patera binneyana (Pilsbry, 1899)  
P. clenchii (Rehder, 1932)  
P. indianorum (Pilsbry, 1899)  
P. kiowaensis (Simpson, 1888)  
P. roemeri (Pfeiffer, 1848)  
Inflectarius magazinensis (Pilsbry and Ferriss, 1907)  
I. inflectus (Say, 1821)  
I. edentatus (Sampson, 1889)  
Mesodon elevatus (Say, 1821)  
M. zaletus (A. Binney, 1837)  
M. clausus (Say, 1821)  
M. thyroidus (Say, 1816)

Literature Cited


