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STATUS OF ENDANGERED MOLLUSKS  
IN CENTRAL NORTH AMERICA

EPIOBLASMA TURGIDULA (LEA, 1858)

August, 1976

U. S. Department of the Interior  
Fish & Wildlife Service  
Bureau of Sport Fisheries & Wildlife  
Washington, D.C. 20240

Contract No. 14-16-0008-755



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by

David H. Stansbery  
The Ohio State University Museum of Zoology  
August 1976

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EPIOBLASMA TURGIDULA (LEA, 1858).

Synonymy of Original Descriptions

Unio turgidulus Lea, 1858. Original Description: Proc. Acad. Nat. Sci. Phila. 10:40. Type Locality: "Cumberland River, Tennessee, Dr. Troost and T. C. Downie. Florence, Alabama. Rev. G. White." Further Description: J. Acad. Nat. Sci. Phila. 5, 1861:62, pl. 5, fig. 211.; 5:193; Obsv. Genus Unio 8 (Part 2), 1862:66-67, pl. 5, fig. 211; 9, 1863:15. Holotype: "Figured holotype USNM 84946 from the former locality." (Johnson 1974:150).

Unio deviatus Reeve, 1864. Original Description: Conchologica Iconica 16: Unio, pl. 15, fig. 61. Type Locality: "Tennessee River" (Haas, 1969:490). Further Description: Anthony, J. G., 1865, Amer. J. Conch. 1(2):156, pl. 12, fig. 2, "Habitat.--Tennessee."

Note

The figure (pl. 73, fig. 2) given by Kuster (1861) for Unio nux Lea, 1852, is not that species but rather a very good reproduction of Epioblasma turgidula Lea, 1858. This is, in fact, the most typical representation I have seen and the only one given in color.

Unio nux Lea, [1852?]. Kuster, 1861, Die Flussperlmuscheln (Unio et Hyria.) in Abbildungen nach der Natur mit Beschreibungen, in Martini and Chemnitz Systematisches Conchylian-Cabinet, Volume 9, Part 2, Section 1:pl. 73, fig. 2.

### Taxonomic Status

The close resemblance of some individuals of E. turgidula to E. capsaeformis (Lea, 1834), E. florentina (Lea, 1857), E. walkeri (Wilson and Clark, 1914), E. curtisi (Utterback, 1915) and E. biemarginata (Lea, 1857) has led some to conclude that it is a synonym of one of these latter species. All of the species mentioned above are members of the Subgenus Capsaeformis and would be expected to resemble each other more closely than they do species in other groups. In my opinion, E. turgidula most closely resembles E. biemarginata. Ortmann (1924:35) first noted this similarity and suggested that E. turgidula might be the headwaters form of E. biemarginata. Intermediate specimens are lacking, however, and both species have been taken from the Tennessee River at the Mussel Shoals in Alabama (Lea, 1957:83) (Lea, 1858:40) indicating that they are not different environmental expressions of the same species.

### Diagnostic Characteristics

This species resembles E. biemarginata most closely but is superficially similar to all the members of the Subgenus Capsaeformis. The male is characterized by the presence of two relatively sharp ridges passing from the umbonal region post-ventrally, upcurved to the lower posterior margin. These ridges delineate the upper and lower limits of the incurrent aperture at the shell margin and define a raised, flattened area on the surface of the disc just posterior to a distinct sulcus. This same flattened area is down curved to the ventral margin in E. biemarginata and absent in the other species of this group. A third ridge on the anterior margin of the sulcus is rounded and distinctly less prominent.

The females of this subgenus are all characterized by an inflated, outcurved mantle expansion in the same region as the sulcus in the male shell. This expansion not only obliterates the sulcus in the female but renders the ridges on either side non-existent or nearly so. This expansion is dark green in E. capsaeformis, green or greenish-brown in E. biemarginata, light yellow in E. florentina, brownish-yellow in E. walkeri and nearly white in E. curtisi. In E. turgidula it is scarcely, if at all, different from the rest of the disc. The light green feeble rays which cover all but the extreme anterior surface of the disc in both sexes are equally developed on the post-ventral expansion of the female shell.

The plate of E. turgidula given by Kuester (1861) is an excellent reproduction of the male (although labelled Unio nux Lea). Lea's figure of the type (1861), also a male, is not as typical as that of Kuester. The plate of Unio deviatus Anthony (1865) is the only illustration of the female I have ever seen (I have not seen Reeve, 1864) and is fairly representative of the species although the umbones appear unnaturally high and swollen. Although this species is variable within itself, I have seen no intermediate forms between it and others in this or other groups.

#### Former Distribution

The type locality of U. turgidulus is the "Cumberland River, Tennessee" and "Florence, Alabama" [Tennessee River or tributary] (Lea, 1858). The female, described as Unio deviatus by Reeve (1864: pl. 15, fig. 61) and by Anthony (1865:156), is recorded from the "Tennessee River" and "Tennessee" respectively. Hinkley and Marsh (Marsh 1885:5-6) collected U. turgidulus, listed also as U. deviatus, from the Duck River at

Columbia, Maury County, Tennessee. Call (1885:27, 54) lists its distribution as "Cumberland and Duck rivers, Tennessee" that same year. Harper's (1886:13) catalogue gives the range as simply "Tenn." Wilson and Clark (1914) apparently found no evidence of E. turgidula in their study of the Cumberland River system nor did Neel and Allen (1964) in their survey of the upper Cumberland basin before its impoundment. An examination of the literature does not reveal any specific site records for E. turgidula in the Cumberland River system, and one questions the validity of the "Cumberland River, Tennessee" given in the original description (Lea, 1858:40). This record becomes especially tenuous in view of the fact that the lower Tennessee River was occasionally referred to as the Cumberland River in the early years.

The identity of U. deviatus as the female of U. turgidulus may have been discovered by Walker (1910:78-81) since he includes deviatus in his keys to both male and female Truncilla (=Epioblasma) and does not mention turgidulus.

In Simpson (1914:30) E. turgidula is listed as a synonym of Truncilla florentina (=Epioblasma florentina), and the distribution of the combined species is restricted to "Tennessee River drainage. Cumberland River." The female of E. turgidula is listed by Simpson (1914:31) as a separate species, Truncilla deviatus (=Unio deviatu)s but, here again, the distribution is noted as "Cumberland and Tennessee Rivers."

Ortmann (1918:590) correctly identified U. deviatus as the female of U. turgidulus and notes that the early literature provides only one definite locality, Florence, Lauderdale County, Alabama--the type locale of U. turgidula, for this species. This is not quite the case since the specimens taken by Hinkley and Marsh in September, 1884, were obtained

from the Duck River at Columbia, Maury County, Tennessee (Marsh 1885:1), and a later Hinkley record (1906:52) has this species from "Shoal creek, Florence, Ala." Even so, his point that the distribution was very poorly known was well taken.

In the course of his survey of the upper Tennessee drainage, Ortmann (1918:591) discovered populations of E. turgidula "in the Holston proper from Knox Co. up to Austin Mill, Hawkins Co., Tenn." and "also in Emory River, Harriman, Roane Co., Tenn." Later surveys revealed additional populations in the Duck River at Shelbyville, Tennessee (Ortmann 1924:35). Further searching by Ortmann (1925:361) brought to light a record of E. turgidula from Bear Creek, Burleson, Alabama. He also expresses the opinion that E. curtisi Frierson and Utterback, 1916, is a synonym of this species--this opinion being shared with Walker (1922:69). The examination of recently collected living specimens of E. curtisi confirms their similarity to but their distinctness from other members of this complex. In the years since Ortmann's work, several additional studies of naiad distribution have been made in the Tennessee System (van der Schalie 1939, 1973 ; Isom and Yokley 1968a, 1968b/; Isom 1965, 1968, 1969, 1970;/Stansbery 1972; Stansbery and Clench 1974, 1975).

None of these have yielded additional records of E. turgidula, however, nor have they confirmed the continued existence of the species at sites previously listed.

#### Recent Distribution

During the period from 1960 to the present, my field work has been largely devoted to building up a research collection of naiad mollusks. A substantial part of this effort was directed toward locating populations of species poorly represented in existing collections. Epioblasma

turgidula was one of these species. This was one of the reasons for beginning the study of the Duck River in central Tennessee in 1964. A single specimen (OSUM 15070) was collected five miles east of Shelbyville in 1964, and an additional specimen (OSUM 33840) was taken 11.5 miles east of Shelbyville in 1972. Following the work by Isom and Yokley (1968b) a large amount of the material upon which their study was based was deposited in the Ohio State Museum. When these collections were processed (circa /1972-1973), three additional lots of E. turgidula were discovered. They are as follows:

OSUM 33100	1.5 mi. NE of Normandy, Coffee Co., Tn.	8 Sept. 1965
OSUM 33109	at Normandy, 11.5 mi. E of Shelbyville, Bedford Co., Tn.	8 Sept. 1965
OSUM 33128	Dement Bridge, 9.4 mi. E of Shelbyville, Bedford Co., Tn.	8 Sept. 1965

The only specimens collected since 1925 appear to be the five lots listed above--all are from the upper Duck River above Shelbyville in Bedford and Coffee counties in Tennessee.

Mississippi River

Ohio River

Tennessee River

Duck River 1964 (OSUM 15070); 1965 (OSUM 33100, 33109, 33128), 1972 (OSUM 33840).

The only recent evidence of the continued existence of this species has come from the Duck River above Shelbyville. Extensive collecting throughout the Duck River system has not located additional material, but our efforts continue.

#### Possible Reasons For Current Status

An examination of the change in distribution of E. turgidula over



the past half century reveals its apparent elimination from all of its former range with the exception of the Duck River above Shelbyville. The population(s) of the Holston River may have been eliminated by the effluent of the chemical industry at Saltville upstream on the North Fork. The Emory River has been the recipient of strip mine run-off for some years and has apparently lost most of its mollusk fauna. Isom and Yokley (1968a:192) found no evidence of this species in their study of the Bear Creek naiades. They did note the loss of 16 of the 24 species collected from this stream by H. H. Smith before 1925, deposited (at least in part) in the Carnegie Museum, and reported by Ortman that year. Isom and Yokley (1968a:194) observe that "the decline of Cumberlandian species seem to indicate the effects of impoundment on the fauna of the unimpounded portions of the same stream." This likelihood deserves serious consideration and further study. The same explanation may serve to explain the disappearance of this and other Cumberlandian species from Shoal Creek near Florence, Lauderdale County, Alabama.

In the Duck River E. turgidula appears to be gone downstream from Shelbyville although the evidence of its existence in this especially diverse section of the river is restricted to only two collections. This species, as is the case with most Cumberlandian species, appears to be highly intolerant of the kinds of environmental changes being effected by man over the past century or more. The clearing of the Duck River valley for cultivation, the initiation of the use of pesticides and/or the modest development of small industries in the vicinity of Shelbyville may have been effective in removing this species from this part of the river.

Potential Threats

The construction of high dams at Normandy and Columbia on the Duck River may well render this species extinct. These threats combined with increasing varieties and greater amounts of pollutants make the continued survival of this rare species very doubtful.

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INSERT THE FOLLOWING TWO LITERATURE CITATIONS ON PAGE 9 IN PROPER ALPHABETICAL ORDER:

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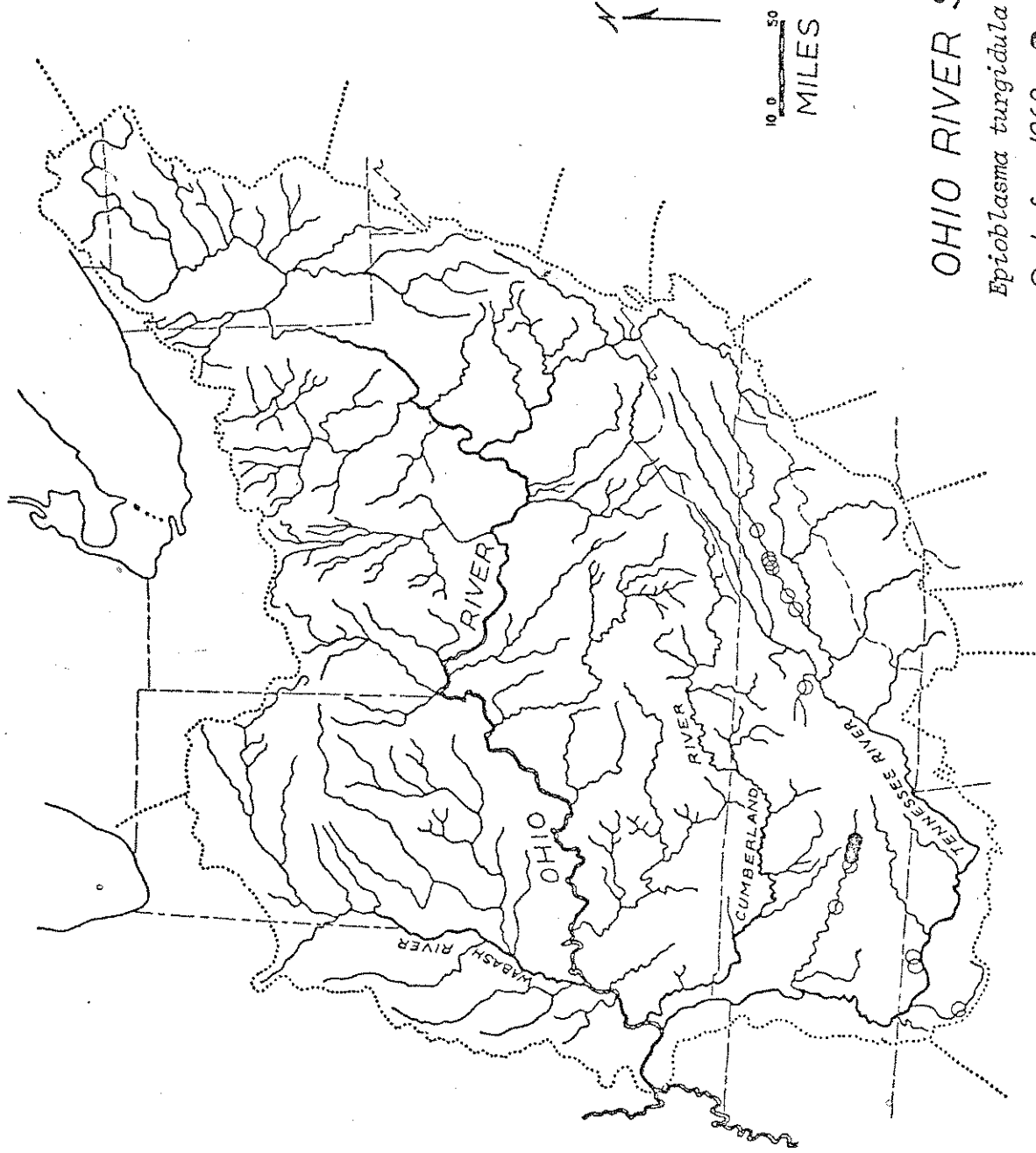
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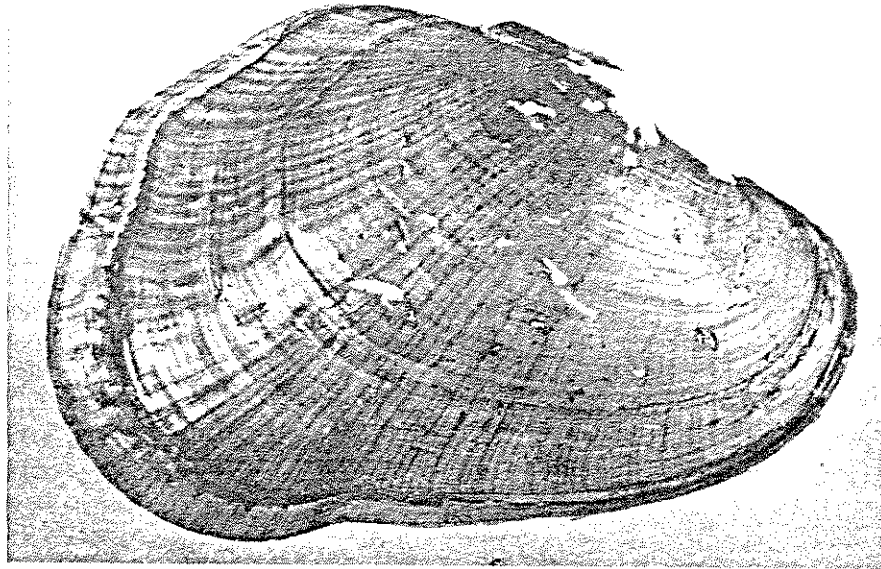
# OHIO RIVER SYSTEM

*Epioblasma turgidula* (Lea, 1858).

○ = before 1960   ● = 1960-1976

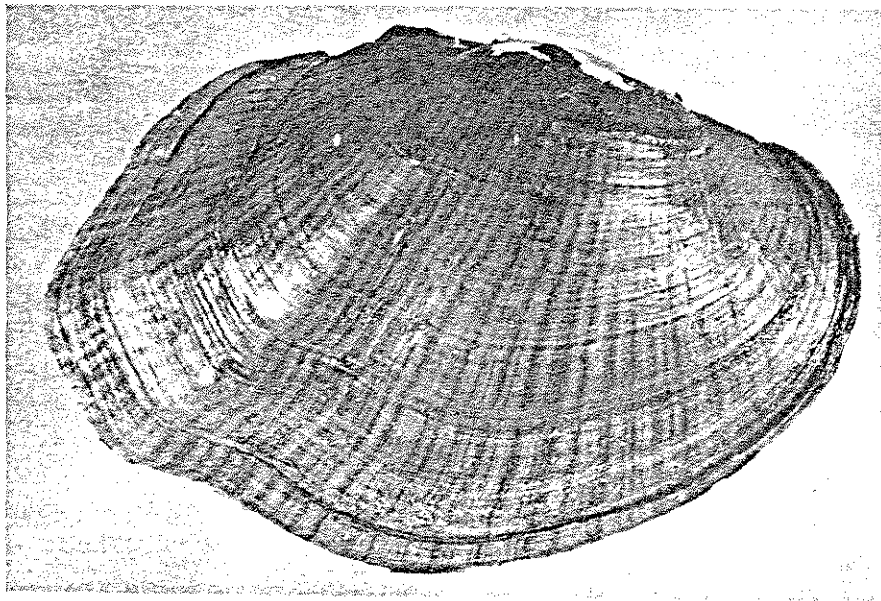
KGB 1976





*Epioblasma turgidula* (Lea, 1858).

OSUM 33109.37, female, Duck River at  
Normandy, Bedford Co., Tennessee.  
8 Sept. 1965. L=37, H=24, W=16 mm.



*Epioblasma turgidula* (Lea, 1858).

OSUM 33109.38, male, Duck River at  
Normandy, Bedford Co., Tennessee.  
8 Sept. 1965. L=37, H=24, W=17 mm.