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ANNOTATED CHECKLISTS OF FISHES

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Family Amblyopsidae Bonaparte 1846

cavefishes

By

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The Amblyopsidae is a small, mostly subterranean family of freshwater fishes endemic to the eastern and central United States. Body shape is gobylike, head large. Mouth usually oblique with lower jaw protruding beyond upper. Eye development varies from externally visible eyes to rudimentary eyes hidden under the skin. No spines present in fins, except first ray in dorsal fin of *Typhlichthys subterraneus* reported as spinous. Single dorsal fin with 7–12 rays. Anal fin with 7–11 rays. Shapes of dorsal and anal fins similar. Dorsal fin origin anterior to anal fin origin. Pectoral fins with 9–12 rays. Pelvic fins present with 3–5 rays (usually 4) in *Amblyopsis spelaea*, absent in remaining five species. Caudal fin elliptical, lanceolate, or rounded. Fin rays branched, except in *Speoplatyrhinus poulsoni*. Postcleithrum present or absent. Scales cycloid, small and embedded. Branchiostegal rays 6. Gill rakers present in some species, reported as absent in *Chologaster cornuta* and *Forbesichthys agassizii*. Swim bladder present. Urogenital opening and anus located in front of the pelvic fins in the thoracic region in adults. Lateral line absent, sensory papillae (neuromasts) arranged in distinct, short rows on the head, body, and even caudal fin in some species. Pyloric caeca 2–4, in two opposing rows. Pigment usually lacking or sparse on body and fins of typically subterranean species, present in other two species. All species are small, with maximum total lengths of about 76–127 mm (3–5 in). (Sources: Cox 1905 [ref. 27513], Woods and Inger 1957 [ref. 27380], McAllister 1968 [ref. 26854], Cooper and Kuehne 1974 [ref. 904], Etnier and Starnes 1994 [ref. 22809], Jenkins and Burkhead 1994 [ref. 21581].)

Presently four genera and six species are recognized as valid. The species are entirely subterranean with the exception of *Forbesichthys agassizii*, a spring-dwelling species (subterranean and epigeal) and the epigeal *Chologaster cornuta*. The most recent, published taxonomic study of amblyopsids was by Woods and Inger (1957 [ref. 27380]). Since then the only change to the taxonomic state of this group has been the addition of one new species. However, further studies of amblyopsids might reveal some cryptic or overlooked species.

No fossil taxa have been reported for the family. The Amblyopsidae has been considered closely related to either the Aphredoderidae or the Percopsidae (Rosen 1962 [ref. 5403], Rosen and Patterson 1969 [ref. 27330], Patterson 1981 [ref. 27325], Rosen 1985 [ref. 27270], Patterson and Rosen 1989 [ref. 27307]), except by Murray and Wilson (1999 [ref. 27269]) who placed amblyopsids as a sister group of a group containing the Pediculati, the genus *Ophidion*, and the Carapidae. Two characters, a segmented premaxilla

and the positions of the anus and urogenital pore, are shared between amblyopsids and aphredoderids. One of us (WJP) recently has considered the possibility that amblyopsids could be related to gobioids because of the similarities in body morphology (especially when compared with troglomorphic gobioids), patterns of neuromasts on the body, and distribution of the amblyopsids in relation to the former Mississippi embayment (Woods and Inger 1957 [ref. 27380]). McAllister (1968:116 [ref. 26854]) also mentioned characters that suggested a gobioid-amblyopsid connection; however, a more detailed comparison based on morphological and genetic characteristics is needed to test this hypothesis.

The family-group names were used first by Bonaparte (1846:5 [ref. 519]), who spelled them Amblyopsidae and Amblyopsini. The family names Heteropygii and Hypsaeidae were used by Tellkamp (1844 [ref. 27512], 1845 [ref. 27515]) and Storer (1846 [ref. 18840]), respectively; however, these names were not formed from the stem of an available genus-group name and are not available according to Article 11.7.1.1 of the International Code of Zoological Nomenclature.

Cavefish feed on invertebrates primarily. *Amblyopsis spelaea* has been reported as a branchial brooder, and photomicrographs of embryos and larvae of this species have been presented (Eigenmann 1900 [ref. 27483], 1909 [ref. 27497]), but little is known about the spawning behavior and reproductive ecology of the cavefishes. Some species might pass eggs directly from the urogenital opening to the branchial cavity (Jenkins and Burkhead 1994 [ref. 21581], Poly and Wetzel 2003 [ref. 26902]). The most recent information about cavefish biology was by Ross and Rohde (2003 [ref. 27459]) for *Chologaster cornuta*, which exhibits sexual dimorphism and, it appears from the available evidence, most likely is not a branchial brooder.

The four obligate subterranean (stygobitic) species are all at risk. *Amblyopsis spelaea* and *Typhlichthys subterraneus* are still widespread in two and seven states, respectively, but they are in habitats that can be rapidly affected by deleterious conditions. *Amblyopsis rosae* has suffered a substantial loss of former range, and there appears to be only one large population. This species is listed as Vulnerable (criteria C2a) by the International Union for Conservation of Nature and Natural Resources (IUCN). *Speoplatyrhinus poulsoni* is known from only one site in Alabama and is listed as Critically Endangered (criteria C2b) by the IUCN and as Federally Endangered by the U.S. Fish and Wildlife Service (Proudlove 2001 [ref. 27499], Kuhajda and Mayden 2001 [ref. 27518]).

Genus *Amblyopsis* DeKay 1842

Amblyopsis DeKay 1842:187 [ref. 1098]. Type species *Amblyopsis spelaeus* DeKay 1842. Type by monotypy.

Troglichthys Eigenmann 1899:282 [3 of separate] [ref. 27378]. Type species *Typhlichthys rosae* Eigenmann 1898. Type by monotypy.

REMARKS: The name *Troglichthys* appeared in many papers by Eigenmann in 1899 (e.g., [ref. 27362]), but we believe Eigenmann (1899 [ref. 27378]) was the earliest published record, and Jordan (1920 [ref. 4905]) also cited this publication as the source for the name. The name appeared on page 282 [3 of separate] as *Troglichthys* but in the caption to Fig. 1 on page 281 [1 of separate] was spelled *Troglichtys*, which we interpret as a misspelling. The name *Troglichthys* is available from the reference indicated here according to Articles 12.2.5 and 12.2.7 of the International Code of Zoological Nomenclature.

***Amblyopsis rosae* (Eigenmann 1898)**

Typhlichthys rosae Eigenmann 1898:227 [ref. 21218] (subterranean streams west of the Mississippi [Sarcoxis, Jasper Co., Missouri], U.S.A.). Syntypes: (2) ex MCZ 27585 (orig. 13 in lot, now 11 [all nontypes]); the 2 original syntypes were destroyed (see Remarks).

DISTRIBUTION: Missouri, Oklahoma, Arkansas, and possibly also Kansas, U.S.A.

REMARKS: The original description dates to 1898, and the name *Typhlichthys rosae* appeared in several of Eigenmann's papers during 1898 (Eigenmann 1898 [ref. 27471], [ref. 21218], [ref. 27363], [ref. 11094]). The thirteenth annual meeting of the Indiana Academy of Science was held

29–30 December 1897, and the date of printing on the volume is 1898 (Eigenmann 1898:231 [ref. 11094]). A definite publication date could not be found for this volume, but other Proceedings volumes were published in midyear or later (e.g., Proceedings for 1893 dated August 1894 on cover), and the Proceedings for 1897 was listed in the “Publications Received” section of the February 1899 *American Naturalist* (v. 33 [no. 386], mailed 4 Feb. 1899; the January issue, v. 33 [no. 385] was mailed 11 Jan. 1899).

There was no mention of type specimens until Eigenmann noted that Samuel Garman had sent him two specimens collected from Missouri and that the “...specimens kindly sent by Mr. Garman, in the course of examination, have been reduced to sections ...” (Eigenmann 1899 [ref. 27378]; 1899:248, 250 [ref. 1216]). Because other specimens obtained later by Eigenmann were collected after the original description was published, these (BMNH 1898.10.31.19–21, 1898.10.31.22–23; CAS 80840 [ex IU 11458] (4)) cannot be considered part of the syntype series. Nor can any other specimens in MCZ 27585, from which the two syntypes likely were removed, or others mentioned in Garman (1889 [ref. 27514]) or other publications be considered syntypes because they did not form any part of the description given by Eigenmann (1898:227 [ref. 21218]). There is no definitive evidence, such as from correspondence, that the two syntypes were from MCZ 27585; however, the collection data and the fact that two specimens were removed from the lot are indications that the syntypes were from this lot. An account of the collection sites and habits of the type and nontype specimens of *A. rosae* from Missouri was given by Garman (1889 [ref. 27514]), who referred to them as *T. subterraneus*.

***Amblyopsis spelaea* DeKay 1842**

Amblyopsis spelaeus DeKay 1842:187 [ref. 1098] (Mammoth Cave, Kentucky, U.S.A.). Holotype (unique): Cabinet of the Lyceum of Natural History, New York (whereabouts unknown, presumed lost or destroyed).

DISTRIBUTION: Indiana and Kentucky, U.S.A.

REMARKS: Robert A. Daniels (NYSM) has searched extensively for DeKay’s type specimens of fishes, which are not in the NYSM collection.

Genus *Chologaster* Agassiz 1853

Chologaster Agassiz 1853:135 [ref. 67]. Type species *Chologaster cornutus* Agassiz 1853. Type by monotypy.

***Chologaster cornuta* Agassiz 1853**

Chologaster cornutus Agassiz 1853:135 [ref. 67] (ditches of the rice fields, Waccamaw, South Carolina, U.S.A.). Syntypes: MCZ 776 (3).

Chologaster avitus Jordan & Jenkins in Jordan 1889:356, Pl. 44 (fig. 8) [ref. 10478] (outlet of Lake Drummond, Dismal Swamp, near Suffolk, Virginia, U.S.A.). Lectotype: USNM 39864 (1 of 6).

DISTRIBUTION: Atlantic Coast drainages from Virginia to Georgia, U.S.A.

REMARKS: The lectotype of *Chologaster avitus* was established (as figured specimen referred to by “drawing . . . from the type”) in caption to Pl. 115 (fig. 305) under *Chologaster cornutus* in Jordan and Evermann (1900:3257 [ref. 2446]). The name *Chologaster avitus* also appeared in Jordan (1889:98, 116, Pl. 14 (fig. 8) [ref. 10563]), although credited to Jordan and Jenkins and not as an original description.

Genus *Forbesichthys* Jordan 1929

Forbesichthys Jordan 1929:68 [ref. 2431]. Type species *Chologaster papilliferus* Forbes 1882. Type by being a replacement name.

Forbesella Jordan & Evermann 1927:503 [ref. 2453]. Type species *Chologaster papilliferus* Forbes 1882. Type by original designation (also monotypic).

REMARKS: *Forbesella* Jordan & Evermann 1927 was preoccupied by *Forbesella* Herdman 1891 in tunicates (Herdman 1891:578 [ref. 27496]) and was replaced by *Forbesichthys* Jordan 1929. This genus is considered a junior synonym of *Chologaster* by some authors.

***Forbesichthys agassizii* (Putnam 1872)**

Chologaster agassizii Putnam 1872:23, 30, Pl. 2 (figs. 4-4a) [ref. 14135] (from a well, Lebanon, Tennessee, U.S.A.). Holotype (unique): MCZ 777

Chologaster papilliferus Forbes 1882:2 [ref. 14293] (from a spring at the base of a limestone bluff, Union Co., Illinois, U.S.A.). Syntypes: (8) INHS 26953 (3), 86467 (1); MCZ 25180 (1); SU 626 (1); whereabouts unknown for remaining two syntypes.

DISTRIBUTION: Portions of Tennessee, Kentucky, Illinois, and Missouri, U.S.A.

REMARKS: The name *agassizii* is often misspelled as *agassizi*.

Genus *Speoplatyrhinus* Cooper & Kuehne 1974

Speoplatyrhinus Cooper & Kuehne 1974:487 [ref. 904]. Type species *Speoplatyrhinus poulsoni* Cooper & Kuehne 1974. Type by original designation (also monotypic).

***Speoplatyrhinus poulsoni* Cooper & Kuehne 1974**

Speoplatyrhinus poulsoni Cooper & Kuehne 1974:491, Figs. 1a-b, 2a-c, 3a, 4, 5a [ref. 904] (Key Cave, Lauderdale Co., Alabama, U.S.A.). Holotype: USNM 204999.

DISTRIBUTION: Known only from the type locality in Alabama, U.S.A.

Genus *Typhlichthys* Girard 1859

Typhlichthys Girard 1859:63 [ref. 1821]. Type species *Typhlichthys subterraneus* Girard 1859. Type by monotypy.

***Typhlichthys subterraneus* Girard 1859**

Typhlichthys subterraneus Girard 1859:63 [ref. 1821] (from a well near Bowling Green, Warren Co., Kentucky, U.S.A.). Syntypes: USNM 8563 (3).

Typhlichthys wyandotte Eigenmann 1905:63 [ref. 11106] (from a well near Corydon, north of Ohio R., Indiana, U.S.A.). Holotype (unique): CAS 91988 [ex IU 4646] (poor condition).

Typhlichthys osborni Eigenmann 1905:65, Figs. 3-4 [ref. 11106] (Horse Cave, Kentucky, U.S.A.). Syntypes: (42) CAS 78370 [ex IU 11459] (1), 91980 [ex IU 11460] (4), 91981 [ex IU 11461] (1), 91982 [ex IU 11462] (2, poor condition), whereabouts unknown for remaining 34 specimens.

DISTRIBUTION: Portions of Alabama, Georgia, Tennessee, Kentucky, Indiana, Missouri, and Arkansas, U.S.A.

REMARKS: Recently, the holotype of *T. wyandotte* and some of the syntypes of *T. osborni* were discovered by the authors in the CAS ichthyology collection.

Summary Lists

Genus-Group Names of Family Amblyopsidae

Amblyopsis DeKay 1842 = *Amblyopsis* DeKay 1842

Chologaster Agassiz 1853 = *Chologaster* Agassiz 1853

Forbesella Jordan & Evermann 1927 = *Forbesichthys* Jordan 1929

Forbesichthys Jordan 1929 = *Forbesichthys* Jordan 1929

Speoplatyrhinus Cooper & Kuehne 1974 = *Speoplatyrhinus* Cooper & Kuehne 1974

Troglichthys Eigenmann 1899 = *Amblyopsis* DeKay 1842

Typhlichthys Girard 1859 = *Typhlichthys* Girard 1859

Incertae Sedis Genus-Group Names

None

Unavailable Genus-Group Names

None

Species-Group Names of Family Amblyopsidae

agassizii, *Chologaster* Putnam 1872 = *Forbesichthys agassizii* (Putnam 1872)
avitus, *Chologaster* Jordan & Jenkins 1889 = *Chologaster cornuta* Agassiz 1853
cornutus, *Chologaster* Agassiz 1853 = *Chologaster cornuta* Agassiz 1853
osborni, *Typhlichthys* Eigenmann 1905 = *Typhlichthys subterraneus* Girard 1859
papilliferus, *Chologaster* Forbes 1882 = *Forbesichthys agassizii* (Putnam 1872)
poulsoni, *Speoplatyrhinus* Cooper & Kuehne 1974 = *Speoplatyrhinus poulsoni* Cooper & Kuehne 1974
rosae, *Typhlichthys* Eigenmann 1898 = *Amblyopsis rosae* (Eigenmann 1898)
spelaeus, *Amblyopsis* DeKay 1842 = *Amblyopsis spelaea* DeKay 1842
subterraneus, *Typhlichthys* Girard 1859 = *Typhlichthys subterraneus* Girard 1859
wyandotte, *Typhlichthys* Eigenmann 1905 = *Typhlichthys subterraneus* Girard 1859

Incertae Sedis Species-Group Names

None

Unavailable Species-Group Names

arkansasus, *Amblyopsis rosae* Romero 1998 [ref. 26048]. Nomen nudum. Name mentioned without distinguishing features for a Middle Arkansas R. drainage “subspecies.” In the synonymy of *Amblyopsis rosae* (Eigenmann 1898).
eigenmanni, *Typhlichthys* Hubbs 1938:265 [ref. 2248]. Nomen nudum. In the synonymy of *Typhlichthys subterraneus* Girard 1859.
whitae, *Amblyopsis rosae* Romero 1998 [ref. 26048]. Nomen nudum. Name mentioned without distinguishing features for a White R. “subspecies.” In the synonymy of *Amblyopsis rosae* (Eigenmann 1898).

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Acknowledgments

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