

Phylum **Acanthocephala** Kohlreuther, 1771^{1 2 3}

Class **Archiacanthocephala** Meyer, 1931^{4 5}

Order **Apororhynchida**

Family **Apororhynchidae** (1 genus, 7 species)

Order **Gigantorhynchida**

Family **Gigantorhynchidae** (2 genera, 59 species)

Order **Moniliformida**

Family **Moniliformidae** (3 genera, 18 species)

Order **Oligacanthorhynchida**

Family **Oligacanthorhynchidae** (9 genera, 93 species)⁶

Class **Eoacanthocephala** Van Cleave, 1936

Order **Gyracanthocephala**

Family **Quadrigroridae** (12 genera, 98 species)

Order **Neoechinorhynchida**

Family **Dendronucleatidae** (1 genus, 3 species)

Family **Neoechinorhynchidae** (16 genera, 145 species)

Family **Tenuisentidae** (2 genera, 2 species)

Class **Polyacanthocephala** Amin, 1987⁷

Order **Polyacanthorhynchida** Amin, 1987

Family **Polyacanthorhynchidae** (1 genus, 4 species)

Class **Palaeacanthocephala** Meyer, 1931

Order **Echinorhynchida** Southwell and Macfie, 1925

Family **Arhythmacanthidae** (7 genera, 40 species)⁸

Family **Cavisomidae** (10 genera, 28 species)⁹

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1. **BY** Scott Monks and Dennis J. Richardson (for full author addresses, see the list after **References**). The title of this contribution should be cited as “Phylum Acanthocephala Kohlreuther, 1771 *In*: Zhang, Z.-Q. (Ed.) *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*”. At the time this was written, recent Acanthocephala includes 4 classes, 10 orders, 22 families, 147 genera, and 1194 species; fossil taxa includes 1 family, 3 genera, and 5 species
 2. Amin (1985) and Golvan (1994) were used for an initial list of species. Only known valid species are included; species inquirenda, incertae sedis, etc., are not included. Because of the nature of the list, subgenera and subspecies were not taken into account. Any omissions to this list are unintentional and any taxonomic errors are the responsibility of the authors.
 3. The increased number of recent descriptions of acanthocephalans is an indicator that the number of species listed herein is vastly underestimated, particularly in groups that parasitize marine fish. As well, the assignment of species to particular groups is currently in flux, with some authors synonymizing groups (for example, Pichelin & Cribb 2001) and others disagreeing with those decisions (Amin *et al.* 2011a, for example, as an opposing view), compounding the problem. The application of molecular techniques is also changing, and sometimes confirming, classical views on the phylogenetic history of the phylum (see references below), so one should expect many organizational changes in the near future.
 4. A phylogenetic study of 22 species of Acanthocephala by Monks (2001) did not support Archiacanthocephala as a monophyletic group, but the author did not discount recognition of the class because his study mainly focused on Palaeacanthocephala. The molecular evidence of García-Varela *et al.* (2000) provided strong support for the monophyly of the class as a sister group to the clade (Palaeacanthocephala + Eoacanthocephala + Palaeacanthocephala).
 5. Archiacanthocephala has been considered to represent a phylogenetic and numerical relic of a much larger clade that might have parasitized now-extinct species of definitive hosts (ancestors of mammals and birds) (see Monks 2001), an hypothesis that has not been tested by any more comprehensive morphological or a molecular analysis. Analyses that includes calibration of a molecular clock or comparison of the relative number of sequence changes in various taxa might shed further light on this possibility. A second hypothesis that is suggested by the comparison of archiacanthocephalans with other much more speciose groups that also contain species that parasitize birds (Centrorhynchidae, Plagiorhynchidae, Polymorphidae, etc.) is that these latter groups may be of more recent origin than the Archiacanthocephala, a possibility which also should be amendable to study using molecular techniques.
 6. In addition to the species included herein, eggs of an undescribed species of *Echinopardalis* Travassos, 1918 have been reported from coprolites (Noroña *et al.* 1994). The contribution of this area of research to our knowledge of the taxonomy of the Acanthocephala has not been fully explored (see Wilke & Hall 1975 and Reinhard 1990 for some basic information on this area of study).
 7. The four species of *Polyacanthorhynchus* Travassos, 1920 classically have been assigned a family within the Palaeacanthocephala (see Amin 1985). Later, Amin (1987) erected the class Polyacanthocephala with one order, one family, and one genus (*Polyacanthorhynchus*) for these four species. Molecular analyses by García-Varela *et al.* (2002) placed the proposed Class as a sister group to the Class Eoacanthocephala, a sister clade to Palaeacanthocephala. However, these authors (García-Varela *et al.* 2002) noted that they could not exclude the possibility that Polyacanthocephala constitutes a new order within Eoacanthocephala that would be placed basal to those orders currently assigned to the class. This assignment was supported, but not commented on, by García-Varela & González-Oliver (2008). The basal position of Polyacanthocephala in this arrangement supported by the studies mentioned above could be interpreted in either manner, but no other studies have provided an objective reason to favor one interpretation over the other; pending future studies, Polyacanthocephala is considered herein as a putative class *sensu* Amin 1987.
 8. Hypoechinorhynchidae was considered to be a junior synonym of Arhythmacanthidae by Pichelin (1999), who transferred *Hypoechinorhynchus* Yamaguti, 1939 to the Subfamily Arhythmacanthinae; to date, this arrangement has remained unquestioned so it is followed herein.

- Family **Transvenidae** (3 genera, 7 species)
- Family **Echinorhynchidae** (8 genera, 126 species)^{10 11}
- Family **Fessisentidae** (1 genus, 6 species)
- Family **Heteracanthocephalidae** (2 genera, 7 species)¹²
- Family **Illiosentidae** (14 genera, 51 species)^{13 14}
- Family **Pomphorhynchidae** (5 genera, 50 species)
- Family **Rhadinorhynchidae** (25 genera, 119 species)¹⁵
- Order **Polymorphida** Petrochenko, 1956
 - Family **Centrorhynchidae** (3 genera, 107 species)¹⁶
 - Family **Plagiorhynchidae** (8 genera, 78 species)¹⁷
 - Family **Polymorphidae** (13 genera, 145 species)¹⁸
- Order **Heteramorphida** Amin and Van Ha, 2011
 - Family **Pyrirhynchidae** (1 genus, 1 species)
- † Unplaced fossil taxa¹⁹
 - † **Zhijinitidae** Qian, 1978 (3 genera, 5 species)

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9. The status of Diplosentidae was reviewed by Pichelin & Cribb (2001), who synonymized that family with Cavisomidae. Taxonomic decisions concerning these taxa can be found in that work.
10. Özdikmen (2008) discovered that Qiu *et al.* (1983) had used the name *Acanthocephalus* Qiu, H., *et al.*, 1983 for a genus of trilobites and corrected this synonymy.
11. It has been acknowledged formally that there are species of *Echinorhynchus* Zoega in Muller, 1776 that have gone unrecognized (Wayland *et al.* 2005), but systematists have resisted putting specific names for the members of the species complex, even though they are known to represent identifiably separate entities. If, in the future, these forms are described as species instead of morphotypes (see Wayland 2010), the number of species assigned to this family, and others (see Martínez-Aquino *et al.* 2009 for another example), may increase greatly.
12. Pichelin *et al.* (2002) reviewed the Heteracanthocephalidae and established the current arrangement of the family.
13. Members of Illiosentidae have been reorganized several times since the conception of the concept by Golvan (1960). The general scheme proposed by Monks (2001), to recognize both *Tegorhynchus* Van Cleave, 1921 and *Illiosentis* Van Cleave and Lincicome, 1939, is followed herein; this proposal was further supported by Monks & Pulido-Flores (2002).
14. The results of the analysis by Monks (2001) suggested that *Leptorhynchoides* Kostylev, 1924 should be assigned to Illiosentidae. This was supported by García-Varela & González-Oliver (2008), who further suggested that *Pseudoleptorhynchoides* Salgado-Maldonado, 1976 should also be part of Illiosentidae. It is interesting that each of the three genera, *Illiosentis*, *Leptorhynchoides*, and *Pseudoleptorhynchoides*, were originally proposed as members of Rhadinorhynchidae. Although this has received little discussion in the literature, that arrangement is followed herein (but see Pichelin & Cribb 2001 for another perspective).
15. Rhadinorhynchidae has suffered the same taxonomic fortune as Illiosentidae, and their fates, in terms of taxa assigned to one or the other, have always been intertwined. Amin *et al.* (2011b) provided a review of *Rhadinorhynchus* Lühe, 1911 and recommended that *Raorhynchus* Tripathi, 1959 be considered as a junior synonym of the former genus pending a revision of the latter; *Raorhynchus* is still considered valid herein pending the aforementioned revision.
16. Centrorhynchidae, particularly *Centrorhynchus* Van Cleave, 1916, contains numerous species that originally were described from only a few individuals. Many of those species have been reported only once and their identity currently is unclear (see Richardson *et al.* 2010 for a recent example). Amin *et al.* (2010) suggested that *Sphaerirostris* Golvan, 1956 also undoubtedly contains synonyms. Thus, the family is in need of revision, which would alter the number of taxa included herein.
17. Amin *et al.* (1999) and Lisitsyna (2010) have provided partial reviews of the family.
18. As noted by Sardella *et al.* (2005), the controversy over the synonymy of *Hexaglandula* Petrochenko, 1950 with *Polymorphus* Lühe, 1911 has existed for some time. Amin (1992) formally placed the species then assigned to *Hexaglandula* in *Polymorphus*, but Nickol *et al.* (2002) defended the recognition of both genera on the basis of morphological and life-cycle data. The continued recognition of the 2 taxa as separate entities has been supported by García-Varela & Pérez-Ponce de León (2008) using molecular data. More recent studies (García-Varela *et al.* 2011) identified *Hexaglandula corynosoma* (Travassos, 1915) Petrochenko, 1958, among the taxa included in their study, as sister taxa to *Ibirhynchus dimorpha* (Schmidt, 1973) García-Varela, Pérez-Ponce de León, Aznar, and Nadler, 2011.
19. Several fossil taxa from the Cambrian have been suggested as proto-acanthocephalans or ancestral forms (Qian & Yin 1984). It is unclear how many “acanthocephalan” taxa might be included in this or other families (Elicki & Wotte, 2003), but it at least is interesting to contemplate the possibility.

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