Phylum Acanthocephala Kohlreuther, 1771

Class Archiacanthocephala Meyer, 1931

Order Apororhynchina
   Family Apororhynchidae (1 genus, 7 species)

Order Gigantorhynchina
   Family Gigantorhynchidae (2 genera, 59 species)

Order Moniliformida
   Family Moniliformidae (3 genera, 18 species)

Order Oligacanthorhynchina
   Family Oligacanthorhynchidae (9 genera, 93 species)

Class Eoacanthocephala Van Cleave, 1936

Order Gyroacanthocephala
   Family Quadrigrvridae (12 genera, 98 species)

Order Neoechinorhynchina
   Family Dendronucleatidae (1 genus, 3 species)
   Family Neoechinorhynchidae (16 genera, 145 species)
   Family Tenuisentidae (2 genera, 2 species)

Class Polycanthocephala Amin, 1987

Order Polycanthorhynchida Amin, 1987
   Family Polycanthorhynchidae (1 genus, 4 species)

Class Palaeacanthocephala Meyer, 1931

Order Echinorhynchina Southwell and Macfie, 1925
   Family Arhythmacanthidae (7 genera, 40 species)
   Family Cavisomidae (10 genera, 28 species)

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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 & Cobb 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

5. This assignment was supported, but not commented on, by García-Varela & González-Oliver (2008). The basal position of Polyacanthocephala constitutes a new order within Eoacanthocephala that would be placed basal to those orders currently assigned to the class.

6. The four species of Polycanthorhynchus Travassos, 1920 classically have been assigned a family within the Palaeacanthocephala (see Amin 1985). Later, Amin (1987) erected the class Polycanthocephala with one order, one family, and one genus (Polycanthorhynchidae) 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 Polycanthocephala 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 Polycanthocephala 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, Polycanthocephala is considered herein as a putative class sensu Amin 1987.

7. The four species of Polycanthorhynchus Travassos, 1920 classically have been assigned a family within the Palaeacanthocephala (see Amin 1985). Later, Amin (1987) erected the class Polycanthocephala with one order, one family, and one genus (Polycanthorhynchidae) 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 Polycanthocephala 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 Polycanthocephala 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, Polycanthocephala is considered herein as a putative class sensu Amin 1987.

8. Hypoechinorhynchinae was considered to be a junior synonym of Arhythmacanthidae by Pichelin (1999), who transferred Hypoechinorhynchinae 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)
Family Fessissetidae (1 genus, 6 species)
Family Heteracanthocephalidae (2 genera, 7 species)
Family Illiosentidae (14 genera, 51 species)
Family Pomphorhynchidae (5 genera, 50 species)
Family Rhadinorhynchidae (25 genera, 119 species)

Order Polymorphida Petrochenko, 1956
Family Centrorhynchidae (3 genera, 107 species)
Family Plagiorhynchidae (8 genera, 78 species)
Family Polymorphidae (13 genera, 145 species)

Order Heteromorphida Amin and Van Ha, 2011
Family Pyriryhynchidae (1 genus, 1 species)

† Unplaced fossil taxa
† Zhijinitidae Qian, 1978 (3 genera, 5 species)

Cited references

Amin, O.M. (1987) Key to the families and subfamilies of Acanthocephala, with the erection of a new class (Polyacanthocephala) and a new order (Polyacanthorhyncha). Journal of Parasitology, 73, 1216–1219.

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. Özdkimen (2008) discovered that Qiu
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 identifiable 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 Bisrhynchus dimorphus (Schmidt, 1775) García-Varela, Pérez-Ponce de León, Armen, 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 (Elick & Wotte, 2003), but at least is interesting to contemplate the possibility.


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