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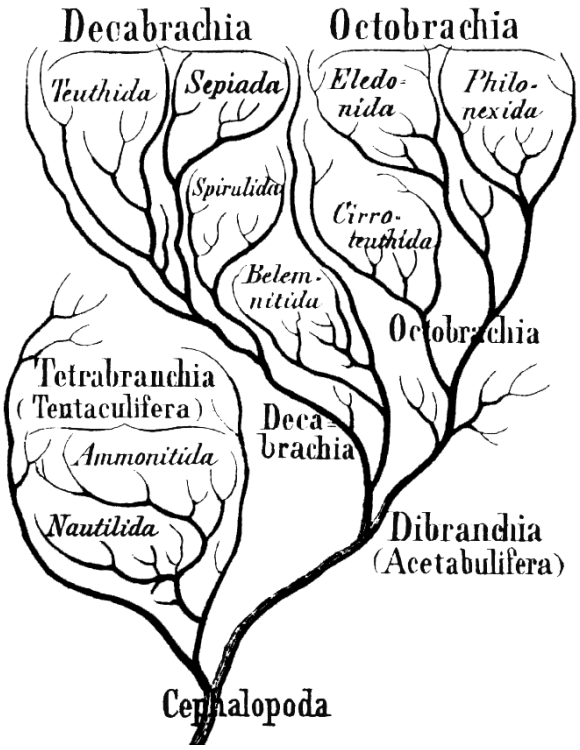

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THE CORRECT TAXON NAME, AUTHORSHIP, AND PUBLICATION DATE OF EXTANT TEN-ARMED COLEOIDS

René Hoffmann

Department of Earth Sciences, Ruhr-Universität Bochum, Institute of Geology, Mineralogy, and Geophysics, Universitätsstrasse 150, D-44801 Bochum, Germany, e-mail: rene.hoffmann@rub.de

ABSTRACT

A variety of conflicting names with different authorship is available and has been repeatedly cited for living ten-armed coleoid cephalopods. Here, I review the primary literature and show the correct name, authorship, and date for ten-armed coleoids.

Key words: Decembrachiata, Decapoda, Decabrachia, Decapodiformes, Decabrachiomorpha

INTRODUCTION

Recent cephalopods can be classified into two major taxa based on the presence of an outer shell (Nautiloidea) or the absence of such a shell (Coleoidea). Within the Coleoidea, a distinction exists between the Decabrachia (arm crown composed of five pairs of arms, the fourth pair, i.e., ventro-lateral arms, being differentiated as a pair of long tentacles), and the Vampyropoda (arm crown composed of four or five pairs of arms, the second pair, i.e. dorso-lateral arms, being differentiated as "retractile filaments" [Pseudoctobrachia: Vampyromorpha] or being definitively suppressed [Octobrachia]) (Boletzky, 1999). Ten-armed extant coleoid cephalopods comprise about 95 genera, 450 species, 31 families (Tree of Life Web Project 04 July 2012): the majority of extant cephalopods, including the well known genera *Sepia*, *Loligo*, *Architeuthis*, and *Spirula*. A survey of available literature dealing with these representatives reveals a considerable amount of confusion regarding the correct name and authorship for the taxon representing all ten-armed coleoids. In a few cases, more than one name was used in the same article without any explanations for doing so, e.g., Nishiguchi and Mapes (2008) with Decembrachiata, Decabrachia and Decapodiformes. In other cases, the same author has used different names in different publications, e.g., Haas (2002a, 2002b). The extant ten-armed coleoids represent a taxon that is characterized by the modification of the fourth arm pair into tentacles and the presence of stalked suckers with horny sucker rings. Ten-armed coleoids first appeared during the Carboniferous. For different classification schemes of higher coleoid taxa the reader is referred to the summary in Jereb and Roper (2005).

The available names, with author and date of publication (with the **bold** entry being the correct one as advocated herein) that have been used in recent years, are listed below in chronological order of appearance:

Decapoda Leach, 1817 – (Grimpe, 1921, mentioned by Engeser, 1990)

Decapodiformes Leach, 1817 – (Young, Vecchione, & Donovan, 1998; Lindgren & Daly, 2007; Allcock, Cooke, & Strugnell, 2011; The Tree of Life Web Project: http://tolweb.org/Decapodiformes/19404 from 06.01.2014)

Decapoda Leach, 1818 – (Grimpe, 1922; Roger In: Piveteau, 1952; Engeser & Bandel, 1988; Košták, 2003)

Decabrachia Haeckel, 1866 – (Doguzhaeva, Mapes, & Mutvei, 2003; Nixon & Young, 2003)

Decembrachiata Winckworth, 1932 – (Taxonomicon, website of T. Engeser about "Fossil Coleoidea" from 1998, Nishiguchi & Mapes, 2008; Mapes & others, 2010; mis-spelled Decembranchiata in Košták 2002).

Decabrachia Boettger, 1952 – (Engeser, 1990; Sweeney & Roper, 1998; Ax, 1999; Boletzky, 1999; Santos & Haimovici, 2002; Haas, 1989, 1997, 2002a, 2003; Doguzhaeva, Mapes, & Mutvei, 2003; Ruppert, Fox, & Barnes, 2004; Fuchs, 2006; Westheide & Rieger, 2007)

Decapodiformes Young, Vecchione, & Donovan, 1998 – (Bizikov, 2008)

Decabrachiomorpha Haas, 2002b – (Fuchs, 2006)

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DISCUSSION

The confusion over the correct name and its author and date of publication has deep roots, including mis-citing. The ICZN does not govern higher taxonomic categories, so the criteria for identifying the correct name, author and date of publication are simple: the first usage of the word for ten-armed extant coleoids that is not in conflict with other taxon names, e.g., for arthropods, and that was used to combine the same group of animals as understood today. The purpose of this contribution is not to trace down the origin of all the variant citations, nor to advocate a particular concept or definition for ten-armed extant coleoids, but instead to point out the correct name, author and date combination and the supporting reasons.

Leach

In his third volume of "The Zoological Miscellany; being descriptions of new or interesting Animals" published in 1817, W. E. Leach used the taxa Octopoda and Decapoda. It is generally accepted that Leach first introduced the taxon Octopoda, in which he included *Octopus*, *Polypus* and *Ocythoe*. Engeser (1990:162) mentioned that the widely used name Decapoda Leach, 1818 is a younger homonym for Decapoda Leach, 1817, which he used for Crustacea, and therefore should be replaced by Decabrachia Boettger, 1952. Leach (1817:137, 140) defined his Decapoda as: "*Pedes 10: par quartum aliis multo longius. Corpus pteratum.*" Leach (1817) included in his Decapoda *Sepiola*, *Cranchia*, *Sepia* and *Loligo* i.e., he did not used Decapoda for crustaceans. In a list (web address: http://www.itis.gov/servlet/SingleRpt/RefRpt?search_type=author&search_id=author_id&search_id_value=21460) that summarized all taxa names established by Leach, the name Decapoda does not occur. The discussed work of Leach was published only 20 years after the taxon Cephalopoda was first introduced by Cuvier (1797); however, it remains uncertain if Leach (1817) was the first author to use the term Decapoda to refer to ten-armed coleoids. However, Decapoda Leach (1817) represents a younger homonym of Decapoda Latreille, 1802, and the latter was used for crustaceans. Therefore, the use of Decapoda, whether Leach (1817) or (1818), for cephalopods should be avoided. Another taxon name ascribed to Leach (1817) is Decapodiformes (compare Tree of Life Web Project 04 July 2012). As a result of intense literature review, it turned out that the name Decapodiformes first appeared in a publication by Young, Vecchione, and Donovan (1998) without presenting an author and date for that taxon. Decapodiformes was therein introduced as sister taxon for Octopodiformes. Octopodiformes was introduced by Berthold and Engeser (1987) but, in favor for Octopoda, is not in use today. Leach (1817, 1818) used Decapodiformes neither for cephalopods nor for arthropods.

Accordingly, it seems most likely that Young, Vecchione, and Donovan (1998) introduced Decapodiformes (S.V. Boletzky, personal communication 2013) and represents another homonym for ten-armed coleoids. Surprisingly, that taxon name was not used by Young and Vecchione (1996).

Haeckel

Only a few authors (see list above) cited Haeckel (1866) as responsible for introducing the name Decabrachia for ten-armed coleoids. In his "Allgemeine Entwicklungsgeschichte der Organismen part 2" Haeckel described, on two pages, the Cephalopoda (Tintenfische) which he divided into two groups: Tetrabranchia and Dibranchia. On page CXVI, Haeckel presented a description of his Dibranchia that has 14 lines and is repeated here in parts: "...Sie zerfällt in die beiden Ordnungen der Decabrachien und Octobrachien. Die Decabrachien (Belemnitiden, Spiruliden, Sepiaden und Teuthiden) haben die Subclasse während der Secundär-Zeit wohl allein vertreten, beginnen im Jura (vielleicht schon in der Trias?) und erreichen ebendaselbst (oder in der Kreide?) ihre Acme, worauf sie in der Teritär-Zeit abhehmen." [The subclass Dibranchia is subdivided in Decabrachiens and Octobrachiens. Decabrachians (belemnitids, spirulids, sepiads and teuthids) represents the subclass (Dibranchia) during the secondary-time (Mesozoic), starting during the Jurassic (or probably Triassic?) and reach a maximum diversity (acme) during that time (or in the Cretaceous?), and decline afterwards during the Tertiary time]. From Haeckel's (1866) description, it becomes clear that the author had a well-defined group in mind, avoided the name Decapoda which he used in the same book for crustaceans, and therefore is the correct author for the name Decabrachia. Haeckels (1866) tree showing the phylogeny of the mollusca including Decabrachia and Octobrachia was recently figured in Donovan and Fuchs (2012, p. 7, Fig. 1).

Winckworth

Winckworth (1932) introduced the term Decembrachiata for ten-armed coleoids. However, this name was only rarely used by subsequent authors (see list above) and is, therefore, little known. Engeser (1998) incorrectly argued for a replacement of Decapoda Leach by Decembrachiata instead of Decabrachia, because Engeser (1998) erroneously cited Boettger (1952) as author for the Decabrachia.

Boettger

In his explanatory note 22, Boettger (1952:290) indicated: "Decapoda, the name currently used to designate an order of dibranchiate cephalopods, is inapplicable because it was originally created for a crustacean suborder within the Malacostraca. I propose the new name Decabrachia as a replacement for the name Decapoda in cephalopods. In consequence, the name Octopoda will be replaced by Octobrachia, Palaeoctopoda by Palaeoctobrachia." For the term Decabrachia Boettger (1952:268), it is important to note that it is not used *sensu* Fioroni (1981) because of the inclusion of the Vampyromorpha. Herein, I follow the classification scheme presented by Boletzky (1999), who excluded the Vampyromorpha from Decabrachia. Decabrachia is the most used term in recent literature and also dominantly used in textbooks, e.g., Ax's (1999) "System of metazoan" or Westheide and Rieger (2007) "Special Zoology". Since the taxon Decapoda (Leach, 1817) is widely accepted as representing the younger homonym of Latreille's (1802), the name Decabrachia is now becoming increasingly accepted as a name for ten-armed coleoids. However, it is not clear why Boettger (1952) introduced the name Decabrachia independently from Haeckel (1866), a work that Boettger (1952:251) cited for the Biogenetic Law – the incorrect hypothesis that ontogeny recapitulated phylogeny developed by Haeckel. It seems that Boettger (1952) has simply overlooked the use of the name Decabrachia by Haeckel (1866).

Haas

Fuchs (2006) correctly synonymized Decabrachiomorpha Haas, 2002b and Decapodiformes Young, Vecchione, and Donovan, 1998 in favor of Decabrachia. The taxon Decabrachiomorpha should be avoided. At the same time, Haas (2002b) introduced the taxon Octobrachiomorpha, which is also unnecessary (see Boletzky, 1999) because the taxon Vampyropoda is available for the sister taxa Vampyromorpha and Octopoda. Haas (2002b) did not present authorship and date for the taxon Decabrachiomorpha; furthermore, that taxon did not appear in the literature before the publication of Haas (2002b). Haas (2002b) introduced both Octo- and Decabrachiomorpha taxa without presenting a differential diagnosis, i.e., differences to Octopoda, nor reasons for doing so. Surprisingly, Haas (2003) used the taxa Octo- and Decabrachia in favor of his own creation.

CONCLUSION

It has been shown that Decapoda Leach, 1817 is a younger homonym of Decapoda Latreille, 1802 and should be avoided. Here, I favor the name Decabrachia for ten-armed coleoids. The correct author and date is Decabrachia Haeckel, 1866. Therefore, Decabrachia Haeckel, 1866 has priority over Decembrachiata Winckworth, 1932 and over Decabrachia Boettger, 1952. Hence, it has been demonstrated that Decabrachia was more often used in widely distributed zoological textbooks. It is suggested here to use Decabrachia and avoid the use of Decembrachiata. Both e Decapodiformes and Decabrachiomorpha represent younger homonyms of Decabrachia and their use should be avoided in the future.

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