OSTEOLOGY AND MYOLOGY OF THE CEPHALIC REGION AND PECTORAL GIRDLE OF BUNOCEPHALUS KNERII, AND A DISCUSSION ON THE PHYLOGENETIC RELATIONSHIPS OF THE ASPREDINIDAE (TELEOSTEI: SILURIFORMES)

by

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ABSTRACT

The cephalic and pectoral girdle structures of the aspredinid Bunocephalus knerii (Bunocephalinae) are described and compared with those of representatives of the two other aspredinid subfamilies, Aspredo aspredo (Aspredininae) and Xyliphius magdalenae (Hoployzontinae), as well as with other catfishes. This comparison serves as the foundation for a discussion on the phylogenetic position and autapomorphies of the Aspredinidae. Our observations and comparisons support DE PINNA’S (1996) phylogenetic hypothesis, according to which the Sisoridae of previous authors is a paraphyletic assemblage, with a subunit of it (subsequently named Erethistidae) being more closely related to the Aspredinidae than to the remaining taxa previously allocated to the Sisoridae. In addition, our observations and comparisons pointed out 5 derived characters that are exclusively present in the aspredinid catfishes, and constitute Aspredinidae autapomorphies, namely: 1) origin of retractor tentaculi shifted posteriorly, lying medially to the levator arcus palatini; 2) preopercular with a lateral, well-developed, antero-laterally directed expansion of laminar bone extending anteriorly well beyond the remainder of this bone; 3) medial aponeurosis of hyohyoideus abductor firmly attached to the ventral surface of pectoral girdle; 4) pterotic with highly developed, broad postero-dorso-lateral shelf-like expansion of laminar bone extending laterally well beyond the remainder of the profile of the skull; 5) dilatator operculi originated on both the dorso-lateral surface of the neurocranium and the posterior surface of the hyomandibula.

KEY WORDS: Aspredinidae, autapomorphies, Bunocephalus, catfish, cephalic region, pectoral girdle, phylogenetic relationships, Siluriformes.

INTRODUCTION

The Siluriformes, or catfishes, with approximately 416 genera and over 2500 species, represent about 32% of all freshwater fishes (TEUGELS, 1996). They are “one of the economically important groups of fresh and brackish water fishes in the world: in many countries, they form a significant part of inland fisheries; several species have been introduced in

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fish culture; numerous species are of interest to the aquarium industry where they represent a substantial portion of the world trade” (Teugels, 1996: 10). Among the 35 siluriform families (Ferraris & de Pinna, 1999), the neotropical Aspredinidae, with 3 subfamilies (Aspredininae, Bunocephalinae and Hoplomyzoninae), 12 genera and about 34 species (Friel, 1994; de Pinna, 1998), is surely one of the most complex families, not only from a morphological point of view, but also with respect to their phylogenetic relationships with other catfishes (see de Pinna, 1998: 317-319). In fact, despite the large number of studies dealing with the relationships of these fishes, there is no consensus regarding their phylogenetic position within the siluriforms. The first study dealing, with some detail, with this subject was that of Günther (1864), who placed the aspredinids together with the loricarioids and the sisorids in his “sixth subfamily Siluridae Proteropodes”. Chardon (1967, 1968) also suggested a close relationship between the loricarioids and the aspredinids based on characters of the Weberian apparatus. However, subsequent studies (Baskin, 1973; Howes, 1983b) showed that Chardon’s (1967, 1968) arguments were not convincing, that is, they were not supported by any putative derived synapomorphy. Ferraris (1989) suggested, for the first time, that aspredinids were probably related to Asian taxa, namely to the Akysidae. Mo (1991), in the first explicitly phylogenetic analysis of all siluriform families, placed the aspredinids as either basal to or in a polytomy with a clade containing clariids, heteropneustids, amblycipitids, aksys, sisorids, amphiliids and loricarioids. Somewhat similar hypotheses were suggested subsequently by de Pinna (1993), who placed the Aspredinidae in a polytomy also including the Amblycipitidae, Akysidae, Sisoridae, Amphiliidae and Loricarioida, and by Chen (1994), who placed the Aspredinidae as the sister group of a clade composed of Amblycipitidae, Sisoridae and Akysidae. However, these hypotheses were challenged by the work of Friel (1994), which was principally dedicated to the interrelationships of the aspredinids, but also to the relationships between these fishes and other Siluriformes. Friel (1994) proposed doradoids (see, e.g., de Pinna, 1998) as the closest relatives of aspredinids. This hypothesis was challenged by de Pinna (1996), who considered the Sisoridae of previous authors as a paraphyletic assemblage, with a subunit of it (which he subsequently named Erethistidae) being more closely related to the Aspredinidae than to the remaining taxa previously allocated to the Sisoridae. The relationships of the Aspredinidae have, thus, long been problematical as it was pointed out in a recent, detailed overview concerning the phylogenetic relationships of Neotropical catfishes (de Pinna, 1998), in which the author concluded that “clearly, the position of aspredinids within siluriforms is a complex issue, plagued by some striking morphological homoplasies” (de Pinna, 1998: 319).