

The phylogenetic relationships of *Rubiesichthys gregalis* and *Gordichthys conquensis* (Ostariophysi, Chanidae), from the Early Cretaceous of Spain

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Abstract

Two small teleostean fishes from the Early Cretaceous of Spain, *Rubiesichthys gregalis* and *Gordichthys conquensis* were considered related to the gonorynchiform family Chanidae when first described. Here, a cladistic analysis was carried out to establish their phylogenetic relationships. The ingroup included living and fossil forms traditionally assigned to the Chanidae, as well as other otophysans. A set of 55 characters of six genera was polarized by outgroup comparison with *Elops* and *Diplomystus*. The results confirm that the Otophysi (represented by the cyprinid *Opsariichthys*) is the sister group to the Gonorynchiformes, which are monophyletic. Within the order Gonorynchiformes, *Chanos* is the sister group to [*Tharrhias* + [*Rubiesichthys* + *Gordichthys*]]. This set of relationships shows that the family Chanidae is a clade; its monophyly is supported by 11 synapomorphies, eight of which are uniquely derived characters. *Rubiesichthys gregalis* and *Gordichthys conquensis* are, therefore, chanid fishes, as previously assigned; in addition, they are sister taxa. This analysis also indicates that some fossil forms are included with the Recent *Chanos* in the family Chanidae. This hypothesis of relationships also implies that fusion within the caudal endoskeleton arose independently in the Chanidae. In addition, the resultant interrelationships present temporal incongruences. These problems reveal the need to re-examine other fossil forms that have been traditionally considered chanids. Such a re-examination would allow clarification of the diagnosis of the family, as well as the phylogenetic relationships within the family, and with other gonorynchiforms.

Introduction

The Lower Cretaceous lithographic limestones of Montsec (Lérida, Spain) and Las Hoyas (Cuenca, Spain) have yielded a rich, diverse ichthyofauna. Recent accounts include: WENZ (1991) and BARALE et al. (in press) for Montsec; SANZ et al. (1988), POYATO-ARIZA (1989), and WENZ & POYATO-ARIZA (in press) for Las Hoyas; and POYATO-ARIZA & WENZ (1990) for the entire Early Cretaceous of Spain. Among the teleosts, two small forms have been previously identified as gonorynchiforms: [1] *Rubiesichthys gregalis* (Fig. 1A) was described by WENZ (1984). This author placed *Rubiesichthys* in the family Chanidae on the basis of several morphological characters. This fish is revised by POYATO-ARIZA (this volume). [2] *Gordichthys conquensis* (Fig. 1B), Las Hoyas endemic, was described and provisionally placed as an incertae sedis gonorynchiform by POYATO-ARIZA (1994), suggesting affinity to the Chanidae. POYATO-ARIZA (1991) studied *Gordichthys* and revised *Rubiesichthys*, proposing a hypothesis of their phylogenetic relationships; the cladistic analysis conducted in that work included both fossil and Recent gonorynchiform fishes. The present paper brings new data to address this problem.

The family Chanidae contains one Recent form, the milkfish, *Chanos chanos*. The genus *Chanos* was created by LACEPÈDE (1803) as a substitute for *Mugil chanos* FORSSKÅL (1775) (see HUREAU & MONOD 1973: 322 for spelling of FORSSKÅL). Most of the fossil taxa traditionally placed in the family Chanidae are from Early Cretaceous sediments. In addition to the Spanish forms, the following Early Cretaceous fish have been placed in the Chanidae: *Aethalionopsis robustus* (TRAQUAIR 1911, GAUDANT 1966, TAVERNE

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