

Neogene Süßwasserfischfauna Anatoliens - ein Schlüssel zum Verständnis der (Palaeo-) Biogeographie europäischer Süßwasserfische

Neogene freshwater fishes from Anatolia – a key for understanding the (palaeo-)biogeography of European freshwater fishes

BÖHME, M., REICHENBACHER, B. & SCHULZ-MIRBACH, T.
LMU München

Up to now the fossil record and the fossil history of the Anatolian bioprovince is poorly known. We present a preliminary report of Neogene Anatolian freshwater fishes based on the re-evaluation of material, which was collected during the German browncoal exploration in the 1960s and 1970s (cf. Rutte & Becker-Platen 1981, Menzel & Becker-Platen 1981). In total, fossil material (isolated bones, teeth, otolithes) from 150 localities was reinvestigated. We have found nine families of primary and secondary freshwater fishes: Cyprinidae, Cobitidae, Clariidae, Siluridae, Cyprinodontidae, Centropomidae, Ambassidae, Eleotridae, Gobiidae.

Based on this freshwater fish record six major periods can be distinguished:

- A. 24 - ~18 My (Aquitanian – middle Burdigalian, MN1-MN3):**
Two cyprinid subfamilies (Gobioninae, Leuciscinae), one ambassid species (*Dapalis cappadocensi*) and one eleotrid species are present.
- B. ~18 – 13.5 Ma (late Burdigalian – middle Serravallian, MN4-MN6):**
Among the cyprinid subfamilies, Gobioninae disappear and Barbinae appear for the first time (aff. *Cyprinion*, aff. *Schizothorax* or another primitive member of *Barbus* s.str.). Leuciscinae are represented by *Phoxinellus* vel *Pseudophoxinus*. For the first time two cyprinodontid species occur (*Aphanius chios*, *A. sickenbergi*), which seem to be restricted to the time interval of MN 5-6. Gobiidae also occur.
- C. 13.5 – 11.1 Ma (middle to late Serravallian, MN7/8):**
Barbinae (aff. *Schizothorax*) and Leuciscinae are still present, but *Leuciscus* replaces *Phoxinellus* vel *Pseudophoxinus*. Cobitidae (*Cobitis*) appear for the first time. Cyprinodontids are represented by a new *Aphanius* species and probably by a primitive member of the *Kosswigichthys* lineage (both undescribed so far)
- D. 11.1 - ~9 Ma (lower Tortonian, MN9-MN10):**
Barbinae and Leuciscinae are still present, but *Luciobarbus* replaces aff. *Schizothorax* and *Phoxinellus* vel *Pseudophoxinus* replaces *Leuciscus*. Clariidae (*Clarias* vel *Heterobranchus*) and Centropomidae (*Lates*) appear for the first time. Cyprinodontids are represented by several species.
- E. ~9 – 5.3 Ma (upper Tortonian – Messinian, MN11-MN13):**
Luciobarbus, Leuciscinae (*Phoxinellus* vel *Pseudophoxinus*, *Leuciscus*, *Chondrostoma*) and several cyprinodontids could be recognized.

F. ~5.3 Ma – ~ 2.0 Ma (Pliocene, MN14-MN15):

Barbinae (*Luciobarbus*, *Barbus*, *Capoeta*), Leuciscinae (*Phoxinellus* vel *Pseudophoxinus*, *Leuciscus*, *Chondrostoma*, *Scardinius* vel *Rutilus*) and Cyprinodontidae (*Aphanius* div. spec., aff. *Kosswigichthys*) are present.

During the oldest period A, the fish fauna reveals palaeobiogeographic relations to the fish faunas of the Paratethys region of Central Europe. This is also true during period B but with the appearance of aff. *Cyprinion* and aff. *Schizothorax* (both Barbinae) also affinities to Central Asia faunas are recognizable. During period C no clear faunal affinities to Central Europe and Asia can be observed, thus we conclude an endemic character of the Anatolian fish fauna. During that period, the *Kosswigichthys* lineage may have evolved. We found South-Asian and African affinities for the fish fauna of period D, based on the occurrence of *Luciobarbus*, *Lates* and Clariidae. During period E, affinities to Greece and the Mediterranean area occur, probably due to the Messinian event. The fish fauna of time period F reveals clear affinities to the Recent faunas of Anatolia and Mesopotamia. HRBEK & MEYER (2003), DURAND et al. (2002), ZARDOYA & DOADRIO (1999) suggested a palaeobiogeography based on molecular studies on *Aphanius* species and *Barbus* species. However, our study of fossil *Aphanius* and *Barbus* of Anatolia may help to refine and re-evaluate this story.

HRBEK & MEYER, A. (2003): Closing of the Tethys sea and the phylogeny of Eurasian killyfishes (Cyprinodontiformes, Cyprinodontidae).- J. Evol. Biol., 16 (1): 17-36.

DURAND, J.-D., TSIGENOUPOLUS, C. S., ÜNLÜ, E. & BERREBI, P. (2002): Phylogeny and Biogeography of the family Cyprinidae in the Middle East inferred from cytochrom b DNA – Evolutionary significance of this region.- Mol. Phylogenet. Evol. 22 (2002): 91-100.

ZARDOYA, R. & DOADRIO, I. (1999): Molecular evidence on the evolutionary and biogeographical patterns of European Cyprinidae.- J. Mol. Evol. 49 (1999): 227-237.