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NEW ACTINOPTERYGIAN FISHES (OSTEICHTHYES) FROM THE LOWER MERIDE LIMESTONES (LOWER LADINIAN) OF AQUA DEL GHIFFO (MONTE SAN GIORGIO, SOUTHERN SWITZERLAND)

Introduction

The area of Monte San Giorgio (Southern Switzerland) is well known for its exquisitely preserved fish and reptile remains from the Alpine Middle Triassic (Kuhn-Schnyder, 1974; Bürgin et al., 1989; Felber, Furrer & Tintori, 1996). The specimens found so far are from five different fossiliferous horizons (Furrer, 1995b: fig. 2) and show, especially among the actinopterygian fishes, an impressive taxonomic diversity (e.g. Bürgin, 1992; 1999a & b). At present about 2'500 specimens of reptiles and about 3'000 specimens of fishes are stored at the Paläontologische Institut und Museum, University of Zürich (PIMUZ). The greater part of the material has been found in the bituminous shales of the so-called Grenzbitumenzone (Besano-Formation of Italian authors). Since 1995 three small-scale excavations have taken place in the Lower Meride Limestone at the locality Aqua del Ghiffo (see Furrer this volume), where in the past time almost only fossil reptiles have been collected (Peyer, 1931; Sander, 1989). The aim of the present paper is to give a list of the actinopterygian fishes found so far in the lower Meride Limestone beds Cava inferiore and Cava superiore at this locality and to compare it with other newly discovered contemporaneous localities in the Eastern parts of Switzerland (see Bürgin et al., 1991; Furrer, 1995; Bürgin, 1999a).

The lower Meride Limestones are an about 200 m thick alternation of micritic limestones, finely laminated organic matter rich black shales and marls. Among the sequence three fossiliferous beds can be identified: The Cava inferiore, the Cava superiore and the Cassina beds (e.g. Sander, 1989; Furrer, 1995b). From these beds several hundred specimens of the pachypleurosaurs *Neusticosaurus peyeri*, *Neusticosaurus pusillus*, *Neusticosaurus edwardsii* and a single specimen of the large sauropterygian *Ceresiosaurus calcagnii* have been described (Peyer, 1931; Sander, 1989). Additional vertebrate fossils previously studied are twelve specimens of *Saurichthys curionii* and three specimens of *Saurichthys macrocephalus* (Rieppel, 1985; 1992). Another more than 200 *Saurichthys* specimens remain to be prepared and described (Rieppel, 1992). Among the smaller and medium sized actinopterygians the following taxa have already been described: *Ctenognathichthys bellotti*, *Peltoperleidus triseriis*, *Dipteronotus ornatus*, *Luganoia lepisosteus*, *Peltopleurus rugosus*, *Peltopleurus* sp., *Peripeltopleurus vexillipinnis* and *Habroichtys minimus* (Bürgin, 1992).

A systematic list of the actinopterygian fishes found in the lower Meride Limestones of Monte San Giorgio

The first actinopterygians from the Lower Meride Limestones of Monte San Giorgio have

been found in 1930. Most of the localities were mining attempts turned into paleontological excavations (Sander 1989). Although in these times, the focus was clearly on the reptiles, fish fossils have only occasionally been collected. Starting in 1995 and followed in 1996 and 1997 respectively, three small scale excavation at the locality Aqua del Ghiffo were carried out by scientists of the Paläontologische Museum der Universität Zürich. One result of these excavations is the below published list of the actinopterygian fishes found so far in the Cava inferiore and Cava superiore beds. A detailed description of the specimens will be published in the near future (Bürgin, in prep.).

	Cava inferiore	Cava superiore
Subclass Actinopterygii		
Order Saurichthyiformes		
Family Saurichthyidae		
<i>Saurichthys curionii</i>	AdG (1)	
<i>Saurichthys macrocephalus</i>	AdG (1), Ca (1)	
<i>Saurichthys</i> sp.	AdG (3)	AdG (2)
Order Perleidiformes		
Family Perleididae		
<i>Peltoperleidus triserius</i>	AdG (1), Ca (1)	
<i>Ctenognathichthys bellottii</i>	VSe (1)	
Family Cleithrolepididae		
<i>Dipteronotus ornatus</i>	VSe (1)	
Family Luganoiidae		
<i>Luganoia lepisosteoides</i>	VSe (1)	
Order Peltopleuriformes		
Family Peltopleuridae		
<i>Peltopleurus rugosus</i>	AdG (6), Afe (3)	
<i>Peltopleurus</i> cf. <i>lissocephalus</i>	AdG (1), VSe (1)	
<i>Peltopleurus</i> sp.	AdG (3)	
<i>Peripeltopleurus vexillipinnis</i>	Ca (2)	
<i>Habroichthys minimus</i>	AdG (2), Afe (2), Ca (1)	
<i>Habroichthys</i> sp.	AdG (2)	
Infraclass Neopterygii		
Subdivision Halecomorphi		
Order Semionotiformes		
Family Eosemionotidae		
<i>Eosemionotus</i> sp.	AdG (12), Afe (2), VSe (1)	
Family Semionotidae <i>sensu</i>		
<i>Archaeosemionotus</i> sp.	AdG (4), Afe (2), VSe (4), Ca (2)	
Family Macrosemiidae		
<i>Legnonotus</i> sp. indet.	AdG (1)	

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(segue)

	Cava inferiore	Cava superiore
Order Ionoscopiformes		
Family Ophiopsidae		
<i>Besania micrognathus</i>	AdG (5), Afe (1)	AdG (1)
Order & Family incertae sedis		
<i>Ducanichthys aculeatus</i>	AdG (2)	
Order & family incertae sedis		
<i>Placopleurus</i> sp. indet.	AdG (2)	
<i>Placopleurus besanensis</i>	Afe (1)	
Order & family incertae sedis		
Undescribed genus & species	AdG (1)	
Abbreviations: AdG = Aqua del Ghiffo, Afe = Aquaferruginosa, Ca = Cascinello, VSe = Val Serrata. The number in brackets indicates the total number of specimens found so far.		

Discussion

Sedimentological and palaeontological observations hint to a deeper basin environment of the Lower Meride Limestones. Fine grained carbonate mud and clay must have been deposited well below the normal wave base (Furrer, 1995b). Remains of ammonoids, pelagic bivalves and radiolarians suggest even periods with stenohaline surface waters. Most interesting is the abundancy of small actinopterygian taxa. This abundancy may be explained either with the neighbourhood of a richly structured habitat, such as a reef zone or the presence of species which lived in scholls in the surface waters. Of special interest is the first finding of a small specimen (*Legnonotus* sp.) with a well preserved stomach content (crustacean shells). This find allows further suggestions about the potential prey and feeding habits of many of the small actinopterygians from Monte San Giorgio.

A comparison of the actinopterygians found in the Cava inferiore and Cava superiore beds with fish faunas of Besano (Brough, 1939; Bürgin 1991) and of the Prosanto formation in Eastern Switzerland (Bürgin et al., 1991) show some remarkable similarities. There are some species-level similarities, e.g. *Peltopleurus rugosus*, *Peltopleurus lissocephalus* and *Besania micrognathus* from Besano and with *Ducanichthys aculeatus* with the Prosanto formation.

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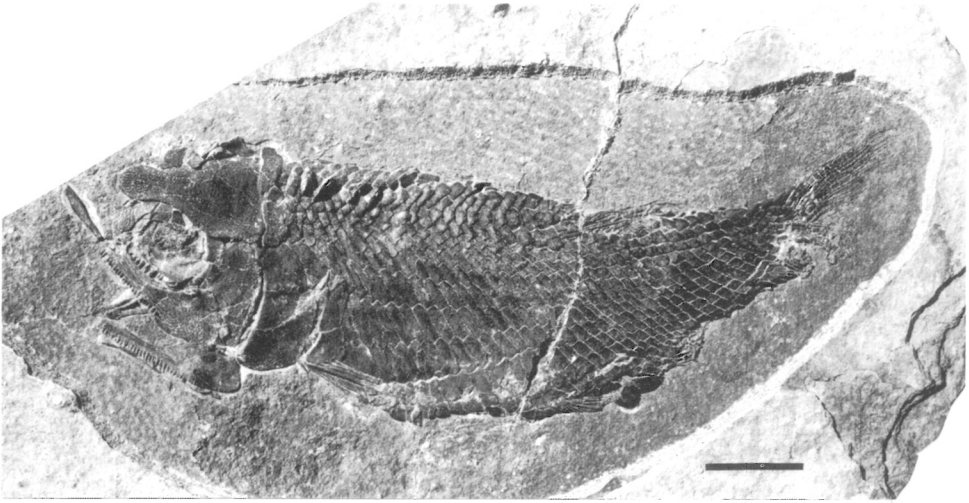


Fig. 1 *Peltoperleidus triserius*, PIMUZ T 5198, Aqua del Ghiffo, Cava inferiore beds. Scale bar indicates 10 mm.

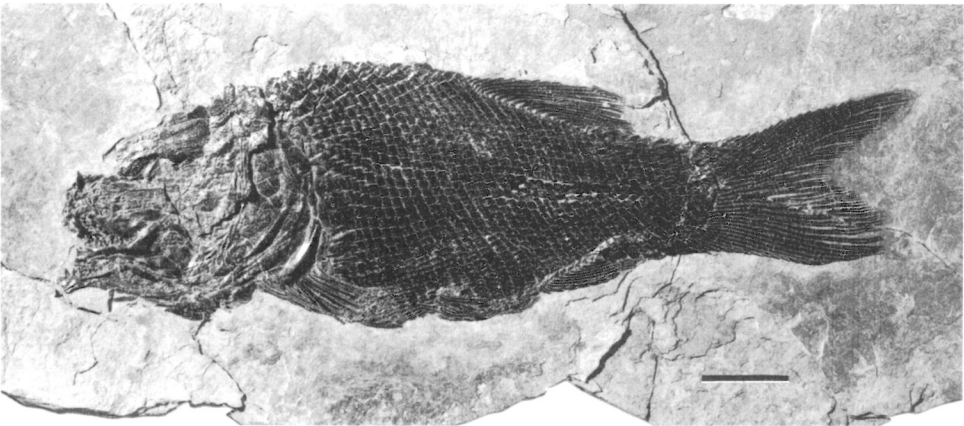


Fig. 2 *Archaeosemionotus* sp., PMIZ T 5189, Aqua del Ghiffo, Cava inferiore beds. Scale bar indicates 10 mm.

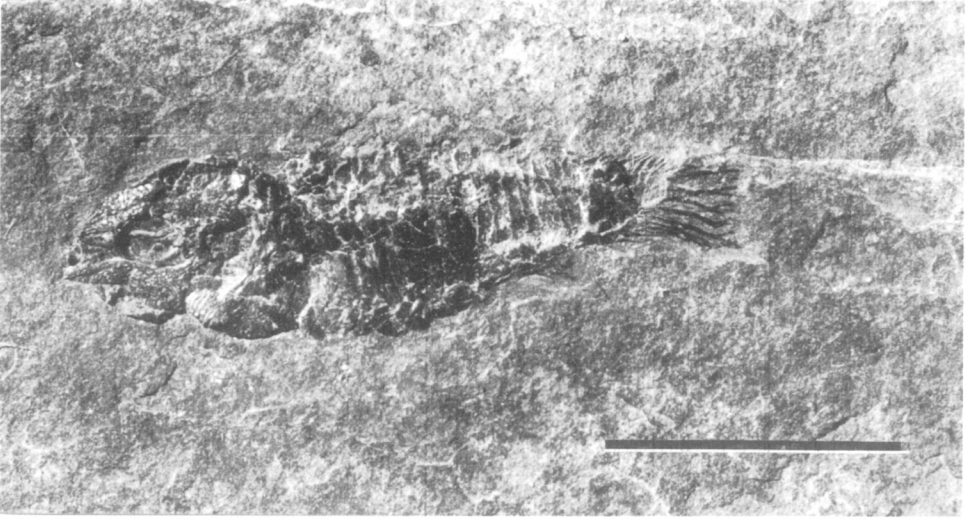


Fig. 3 *Ducanichthys aculeatus*, PIMUZ T 5220, Aqua del Ghiffo, Cava inferiore beds. Scale bar indicates 10 mm.

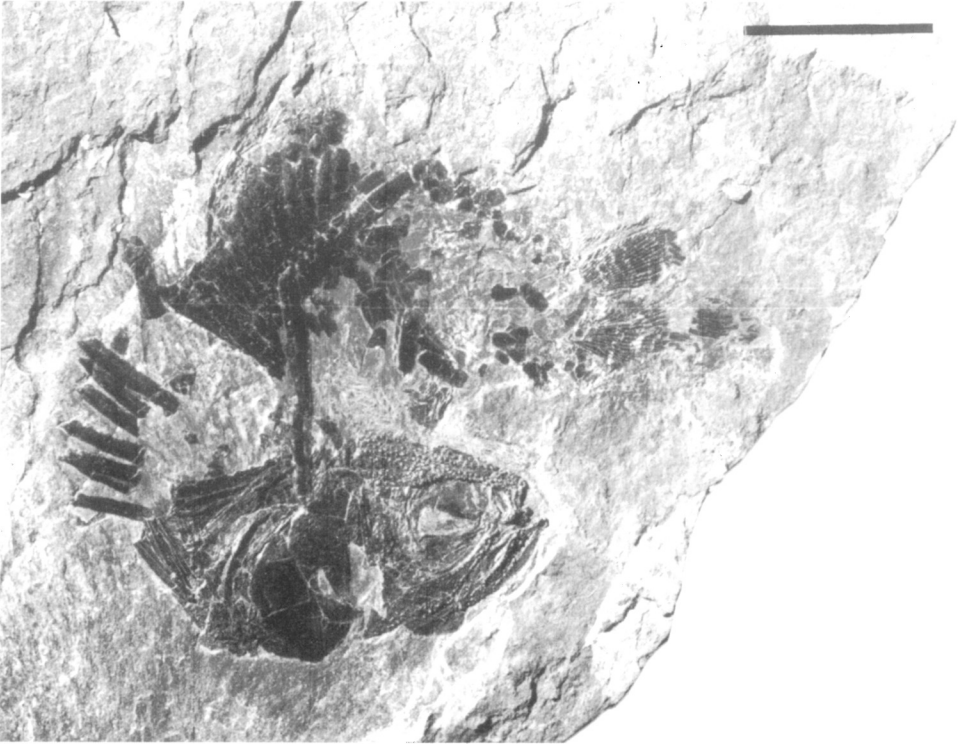


Fig. 4 *Placopleurus* sp. nov., PIMUZ T 5217, Aqua del Ghiffo, Cava inferiore beds. Scale bar indicates 10 mm.