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FOSSIL FISHES FROM THE BESANO FORMATION (MIDDLE TRIASSIC, NORTHERN ITALY) IN THE COLLECTION OF MUSEO CIVICO DI STORIA NATURALE DI MILANO: PRELIMINARY RESULTS. 1): COMPOSITION OF THE FAUNA

The Besano Formation (= Grenzbitumenzone of Swiss authors), cropping out in an area across the boundary between Italy and Canton Ticino (Switzerland), consists of 17 m thick alternation of black shales and dolomitic layers dated at Anisian-Ladinian boundary. Fossils in the Besano area (Varese, Lombardy) were first discovered in the last century by Italian palaeontologists; in this century the formation was extensively studied by Swiss authors.

The original collection of Besano fossils, stored in the Milano Museum was almost completely destroyed during the II World War. A program of field works in Besano, in order to arrange a new collection, began in 1975 in locality Rio Ponticelli. In autumn 1985 a new excavation was undertaken in locality Sasso Caldo and it is still going on. About 1500 fossil specimens, both invertebrates and vertebrates (reptiles and fishes), were so far found , working on a 40 m2 bed surface (Pinna & Teruzzi 1991; Teruzzi & Dal Sasso 1995).

As it has been stressed by several authors (De Alessandri, 1910; Brough, 1939; Zorn, 1971; Rieber,1973; Kuhn-Schnyder 1974; Rieppel 1980, 1981, 1985a, 1985b, 1992 Bürgin, 1990, 1992), the ichthyofauna of the Besano Formation is very rich both in number of genera and specimens: neopterygians and basal actinopterygians are well represented, as well as sharks and coelacanths. This fauna, together with the other Middle Triassic fish faunas from the Western Lombardy and Canton Ticino is basic to understand and follow the evolution of the fishes in such a crucial time for their radiation.

About 550 fish specimens stored in the collections of the Milano Museum were used for this study: they come from the first 71 layers of the series cropping out at Sasso Caldo. The determinations, which have to be considered provisional, are at generic or suprageneric level, being the specimens mostly incomplete: only a detailed study of each genera will allow to give a precise taxonomic position. When possible, it has been followed the nomenclature adopted by Brough (1939) and by Bürgin (1992) for the basal actinopterygians. The number of specimens, most of which are still to be prepared, and the lacking of data about the exact stratigraphical position for part of the older material, allow for the moment to make only some hypotheses which can be used as starting-point for further studies.

As a whole, this fauna is dominated by the presence of basal actinopterygians, especially perleidiforms and peltopleuriforms; paleonisciforms, well represented by several species of the genus *Ptycholepis*, are also common (Bürgin 1992). The genus *Saurichthys* is represented by a considerable number of specimens (Rieppel 1985b, 1992). Noteworthy is the presence of neopterygians, which are found in this sample with at least ten different

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genera: some of them have been already described by De Alessandri (1910), but the kind of preservation of the material and the lack of data about basal neopterygians makes difficult to give a precise systematic position to these forms; characteristic are also the genera *Placopleurus*, *Pholidopleurus* and "*Gracilignathychthys*" and numerous teeth of sharks proves the diffusion of this group at least in the lower levels of the series. Coelacanths are also found, but their remains are rare (fig.1).

The layers have been subdivided in five groups (71÷ 69, 68÷ 62, 61÷ 46, 45÷ 15, <13): for each one of them the composition of the fauna, kind of preservation of the specimens and the lithology was given. Apart from some genera represented by too few specimens (e.g. coelacanths, *Bobasatrania*) or groups too common for being significant such as paleonisciforms, at least three different assemblages have been tentatively recognised, with genera characterising certain layers and others found throughout the series but in different proportions (fig.1). The first assemblage, from layer 71 to 69, is made up of the genera *Saurichthys*, *Pholidopleurus*, "*Gracilignathichthys*" and sharks. The second one, from layer 68 to 46, is characterised by the massive presence of the perleidiforms and peltopleuriforms, together with the genus *Placopleurus*; in the higher levels, from 45 to <13 indicatively, one can recognise the last assemblage made of neopterygians, *Saurichthys* and *Habroichthys*.

It is worthy to note the relative distribution of the genera characterising the different levels (fig. 2): *Pholidopleurus* ,"*Gracilignathichthys*", sharks and *Saurichthys* characterise the levels 71-69 while peltopleuriforms, perleidiforms and *Placopleurus* are represented by few specimens (fig.2). The group of layers 68-62 are characterised by the decrease in number of *Pholidopleurus*, "*Gracilignathichthys*", *Saurichthys* and sharks, while the so called "subholosteans" (peltopleuriforms, except *Habroichthys*, and perleidiforms) plus *Placopleurus* reach more than 60% of the whole fauna. In correspondence of this group of layers the presence of *Habroichthys* becomes significant and the number of specimens of *Saurichthys* increases again while neopterygians appear. When *Saurichthys*, *Habroichthys* and neopterygians show the higher number of specimens (group of levels 45-15), peltopleuriforms, perleidiforms and *Placopleurus* are poorly represented again.

This kind of distribution could be indicative of environmental changes, with alternation of groups typical of complex habitats (the hemidurophagous perleidiforms and peltopleuriforms) and others needing more open waters (e.g. *Saurichthys* and "*Gracilignathichthys*"): the study of the rest of the material from the lower layers and the comparison with the faunal associations from stratigraphically controlled Swiss localities is necessary to prove the ground of this hypothesis. The identification of different faunal assemblages within this part of the unit is not surprising, considering the time span represented by the series; moreover, studies, still in progress, on other Ladinian fish faunas from Lombardy and Canton Ticino had already stressed the presence of different assemblages within units such as the Perledo-Varenna Formation and Meride Limestone (Tintori 1998; Tintori & Lombardo in press; Tintori et al. in press).

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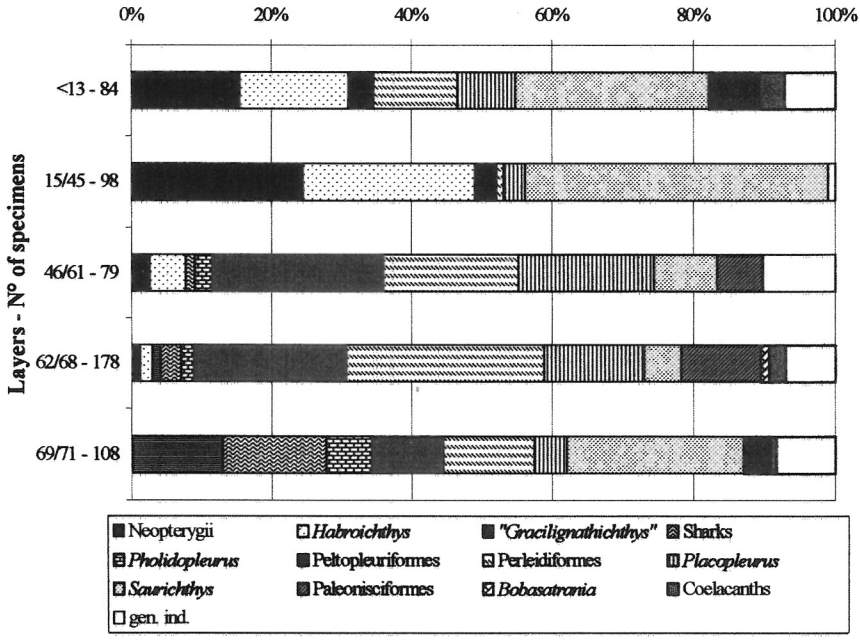

Fig. 1: composition of the fauna

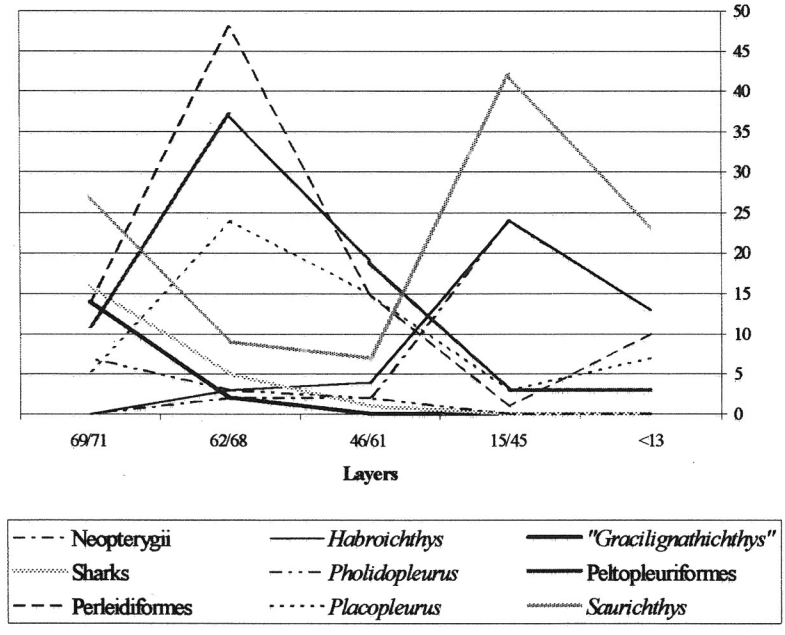

Fig. 2: distribution of characteristic groups.