

A new ichthyodectid fish from the Lower Cretaceous of Pietraroja (Southern Italy)

M. Signore^{†#}, E.M. Bucci*, C. Pede[†] & C. Barbera[†]

[†]Dipartimento di Scienze della Terra
Università degli Studi di Napoli “Federico II”
Largo S.Marcellino 10, I – 80132 Napoli – Italy

*Istituto di Biostrutture e Bioimmagini del CNR
Via Mezzocannone 16, 80134 Napoli – Italy

Corresponding author: msignore@unina.it

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Abstract

Recent excavations in the *Plattenkalk* of the Civita di Pietraroja (Lower Albian, Southern Italy) have yielded a new representative of the Ichthyodectiformes (Actinopterygii: Teleostei). Although the specimen is still under study, a preliminary report appears to be warranted. Attribution to Ichthyodectiformes is based on the following characters: pronounced mandibular prognathism, triangular supraoccipital crest, hammer-shaped anterior part of the autopalatine articulated with ethmoid and maxilla. This specimen represents the second discovery of ichthyodectid in Pietraroja, and the first showing the anterior part of the body, including an almost complete and articulated skull. Due to its exceptional preservation, this specimen may represent one of the most complete Italian ichthyodectid, and one of the most complete specimens from European Albian as well.

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1. Introduction

The Civita di Pietraraja *Plattenkalk* (Signore, 2004) is well known for its exceptionally preserved fossils. Here, we describe a new fossil fish found recently (October 2004) during a field trip organised by the Università degli Studi di Napoli “Federico II”.

The specimen (figure 1) was found by one of the authors (C.P.) in a waste disposal site near the ‘Parco Geopaleontologico’ in the Civita di Pietraraja area, and brought to the Department of Earth Sciences (Palaeontology Section) of the Università degli Studi di Napoli “Federico II”, where it was partially prepared and photographed. Initial examination showed that only little preparation was necessary. Extensive hit marks, presumably resulting from the use of a rock hammer clearly indicate that the fossil was illegally excavated. The fact that it was found in a waste disposal site might have to do either with its low value on the fossil black market (only the anterior part of the skeleton is preserved) or the difficulty in carrying it due to the sheer size and weight of the slab. This clearly emphasizes the importance of a prompt intervention of local authorities in order to protect the area from future activities related to illegal fossil trading.

2. The specimen

The specimen (figure 1) sits on a massive slab of marly limestone and is exquisitely preserved. All bones are in anatomical connection and comprise an almost complete skull (lacking only the distal part of the supraoccipital crest), a complete dentary and partial surangular in connection with the skull, a complete preopercular and opercular; a complete cleithrum and partial scapula; part of the pectoral fin; and the first 14 vertebrae in connection, complete with ribs and neural arches. Most of the ribs are also covered by organic matter with scale impressions, which may be interpreted as fossilised skin.

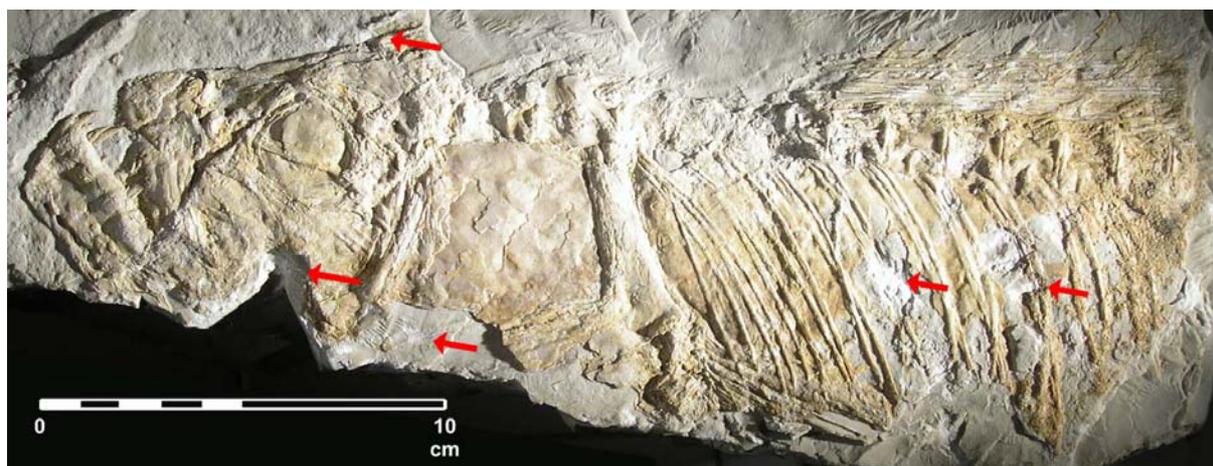


Figure 1. The specimen. The red arrows indicate some of the hammer marks left during illegal excavations. Photograph by M. Signore.

Based on a preliminary sedimentary analysis, it seems that the slab belongs to the fish levels of the Cretaceous *Plattenkalk* (Bravi, 1996; Signore, In press). However, in the Pietraraja outcrop the Lower Cretaceous *Plattenkalk* sediments are overlain (with a depositional hiatus) by Miocene pelagic sediments (D’Argenio, 1963; Catenacci & Manfredini, 1963; Carannante, 1982; Bravi, 1996; Signore, 1996, 2004, In press). A Miocene age for the new specimen can be ruled out by sedimentological analysis. Furthermore, the slab includes a rudist preserved near the fish (figure 2). Similar rudists are only found in the Lower Cretaceous of Pietraraja, particularly within the area of the ‘Geopaleontological Park’ (D’Argenio, 1963; Signore, In press). The specimen measures about 30 cm from the tip of the premaxilla to the most posterior preserved vertebra. Excavation has caused some damages to the dorsal portion of the skull (but with the loss of only the distal part of the supraoccipital crest) and to the ventral portion of the mandibula (with the complete loss of the angular and almost complete loss of the surangular).

The pectoral girdle lacks part of the scapula but it is otherwise complete. Only the proximal portion of the pectoral fin is preserved. About 14 articulated vertebrae are preserved, which are missing only the distal parts of the neurapophyses as a result of excavation. Most of the ribs are still covered by organic tissue (presumably skin), and at the level of the most posterior vertebrae and associated ribs several scale impressions are visible. Under UV light (wavelength: 254 nm) details of soft tissue appear greatly enhanced (figure 3).

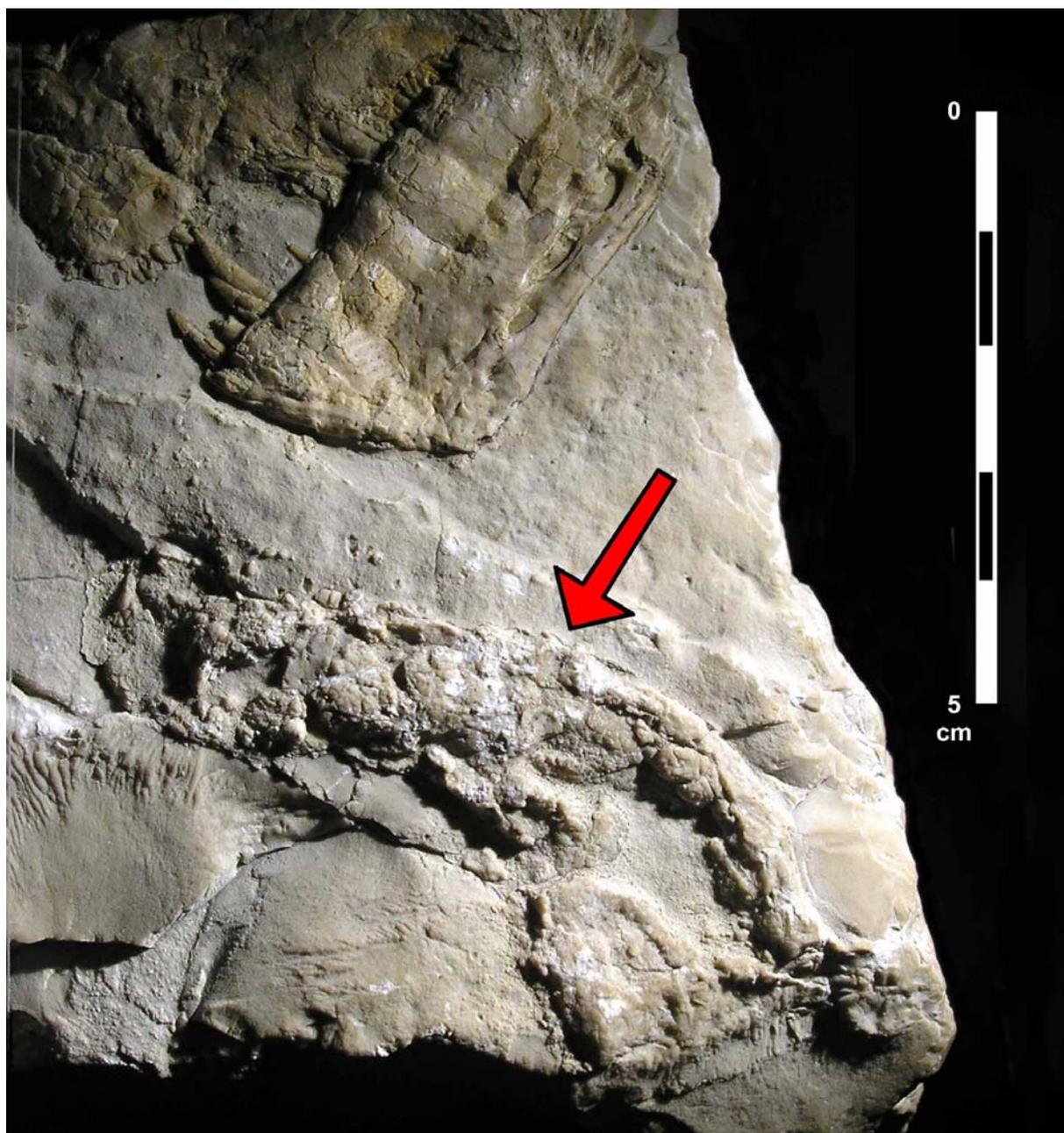


Figure 2. A rudist, very poorly preserved, is visible on the specimen (red arrow). Photograph by M. Signore.

Chemical analyses of several sections of the bones and soft tissues are currently being undertaken in order to gain additional information on the specimen itself and on the modalities of preservation. Such analyses are the first of their kind as concerns Pietraraja specimens, and their results are likely to impact considerably our understanding of the taphonomy and taphonomic environment of the Pietraraja *Plattenkalk*.

3. Taxonomic notes

The fossil is assigned to the Order Ichthyodectiformes Bardack & Sprinkle, 1969, Suborder Ichthyodectioidei Romer, 1966, Family Ichthyodectidae Crook, 1892 on the basis of several diagnostic apomorphies (see Taverne & Chanet, 2000, and references therein):

- Ethmopalatines well developed (*sensu* Taverne & Chanet, 2000), and articulated with mesethmoid and lateroethmoids
- Pronounced mandibular prognathism

- Triangular supraoccipital crest
- Broad sclerotic plates
- Anterior part of the autopalatine hammer-shaped, articulated with ethmoid and maxilla
- Extensive ventral development of one of the infraorbitals, possibly the third, covering metapterygoid and quadrate

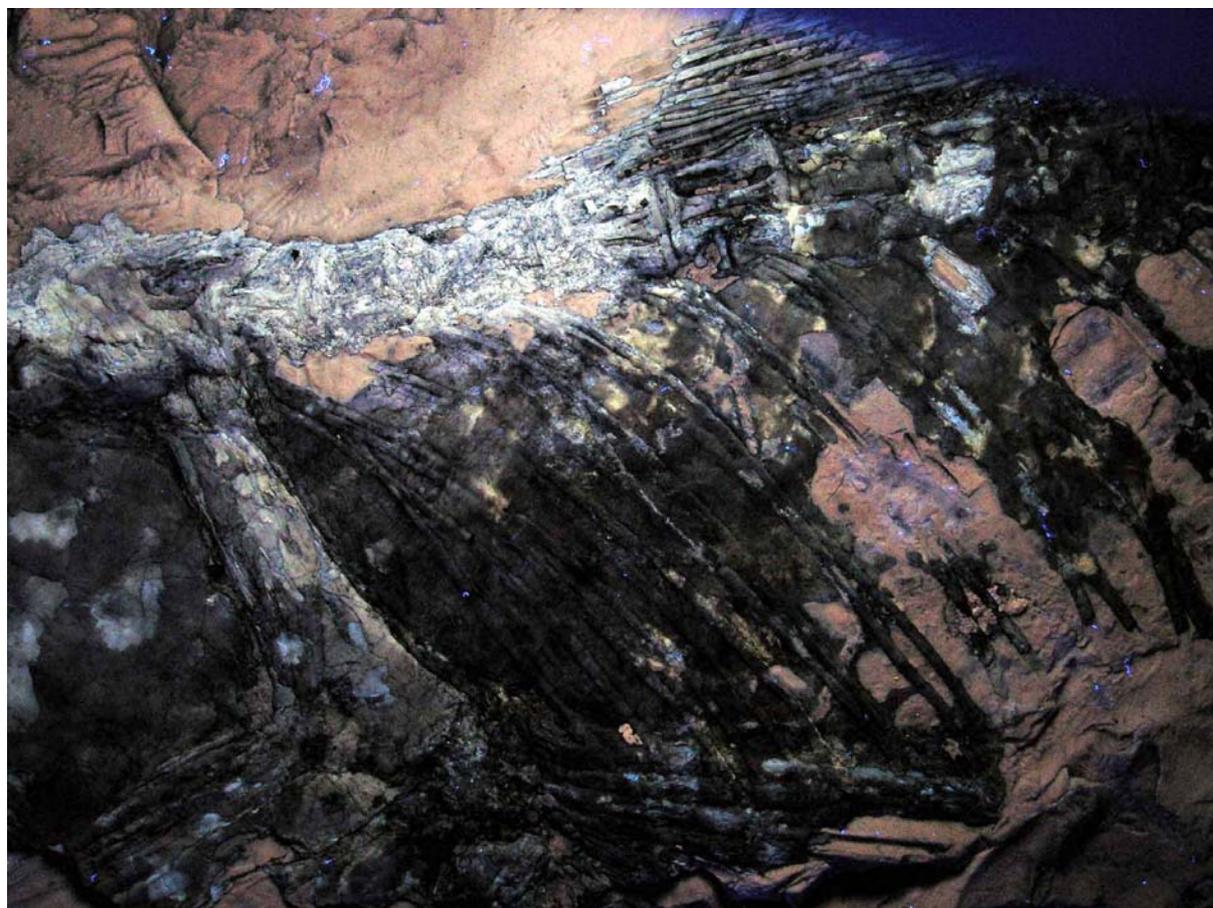


Figure 3. Detail of the ribs under 254 nm U.V. light illumination. The preserved skin appears black, while the bare bones appear whitish. Photograph by M. Signore.

These characters place the new specimen undoubtedly inside Ichthyodectidae. However, further analyses are needed to clarify its position within this family in more detail. Preliminary observations indicate that the specimen does not belong to any known genus of Ichthyodectidae. Furthermore, several characters indicate that this specimen may be a derived ichthyodectid. In particular, the pectoral fin is strongly ossified and stout, subdivided in a narrow and stout anterior part and a dichotomised posterior part, where the rays are clearly visible. The premaxilla and maxilla are strong and well-developed and articulated, even though at this point we cannot ascertain precisely whether the articulation was mobile or not (although it looks mobile); the very large opercular, and great depth of the dentary are also typical of derived Ichthyodectidae (Taverne & Chanet, 2000).

We exclude assignment to the Saurodontinae on the basis of the lack of a predentary. The other two autoapomorphies of the Saurodontinae (alveoli or foramina on the underside of the teeth in the internal part of the jaws, and more than 100 vertebrae) cannot be observed, so that it can be assumed that this specimen belongs to the subfamily Ichthyodectinae.

The only other ichthyodectid from Pietraraja, described by D'Erasmus (1914–15) and assigned to *Chirocentrites coroninii*, is known only from the posterior two thirds of the postcranium. Attribution of the new specimen to *Chirocentrites* (Haeckel, 1850) can be, however, ruled out, on the basis of several skull characters. The different shape and size of dentary, which is deeper in the new specimen than in *Chirocentrites*. The premaxillary is more developed dorsoventrally than antero-caudally in the new specimen. Furthermore, the maxillary is deeper in the new specimen than in *Chirocentrites*. There are larger dentary teeth, and a series of at least four very large foramina placed in a shallow groove on the inferior part of the dentary, just above another much smaller groove of foramina.

4. Conclusion

Several cranial characters show that the new specimen recently recovered from the Lower Albian of Pietraraja belongs to the Family Ichthyodectidae, and it is not a Saurodontinae (*sensu* Taverne & Chanet, 2000), thus it may belong to the Ichthyodectinae (*sensu* Taverne & Chanet, 2000) or may represent a sister group of the more derived Ichthyodectidae. Furthermore, comparison with known genera of Ichthyodectidae indicate that this specimen may represent a new genus of ichthyodectid. If this is the case, then further comparison with the only other ichthyodectid described from Pietraraja (D'Erasmus, 1914–15) is needed, in order to ascertain whether they both belong to the same genus.

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