

"LOCALITY 84", A NEW CRETACEOUS *KONSERVAT-LAGERSTÄTTE* IN THE JULIAN PREALPS (NE ITALY)

FABIO M. DALLA VECCHIA, JACOPO AMALFITANO, EVELYN KUSTATSCHER & LUCA SIMONETTO

Supplementary Information

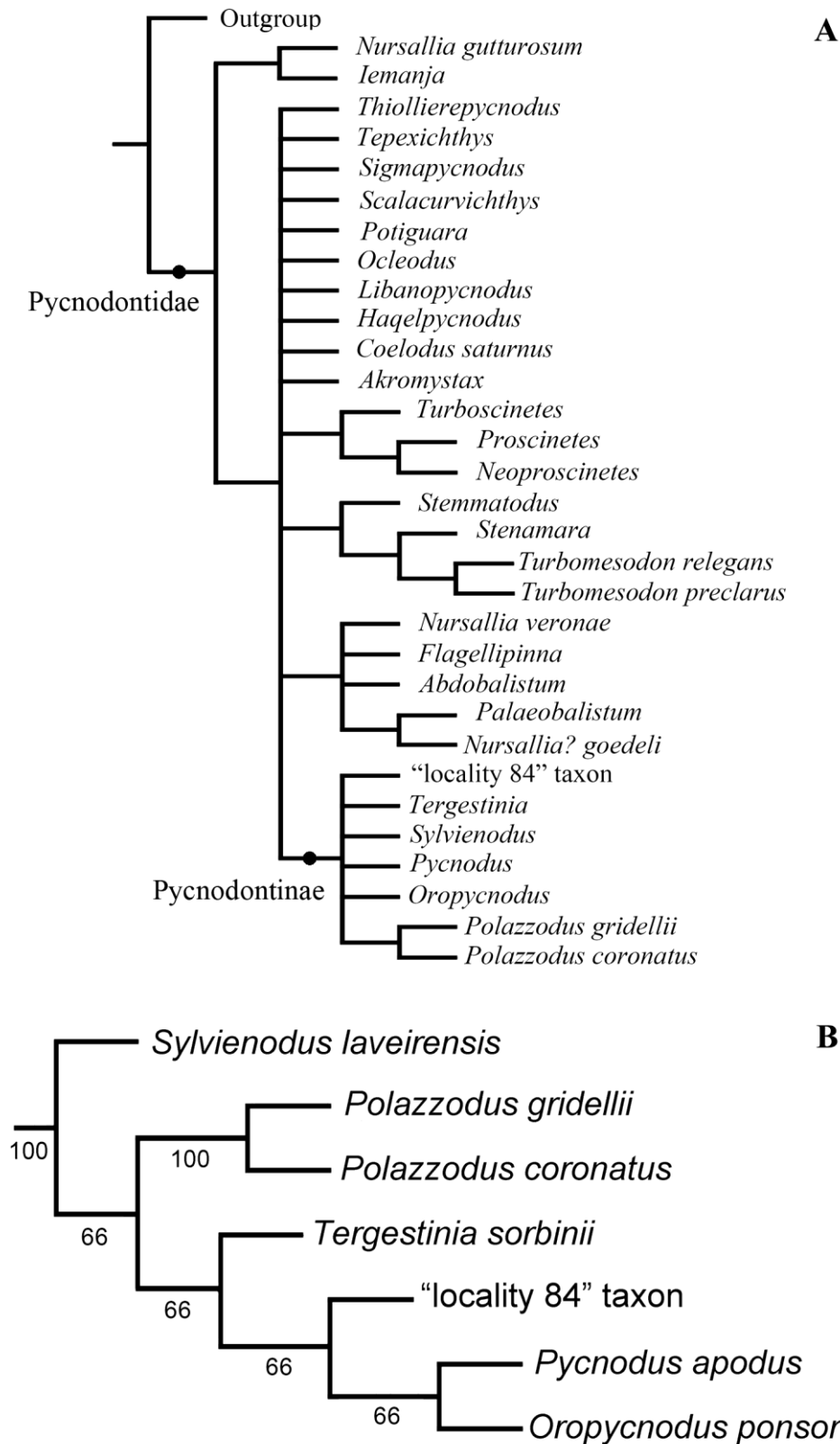
Phylogenetic relationships of the pycnodontiforms from "locality 84"

A phylogenetic analysis was performed to investigate the relationships of the "locality 84" pycnodontiform taxon within the Pycnodontidae. Data matrix is that from Poyato-Ariza (2020) with 31 taxa + "locality 84" taxon and 88 characters. The addition of the "locality 84" taxon produced six equally parsimonious trees with best score 617 steps. The strict consensus tree (CI = 0.313 and RI = 0.325) is poorly resolved and the Montenars taxon falls within a poorly resolved Pycnodontinae (Fig. SI 1A). The 50% majority rule consensus tree (Fig. SI 1B) is 567 steps long, with CI = 0.340 and RI = 0.404. "Locality 84" pycnodontiform results to be the sister taxon of the Pycnodontini (i.e., *Pycnodus* + *Oropycnodus*) and is more derived than *Polazzodus* and *Tergestia* in 66,6% of the equally parsimonious trees. The node "locality 84" taxon + Pycnodontini is supported by five homoplasies (dermocranial fenestra: present; infraorbitals: reduced to tubular ossifications around the infraorbital sensory canal or alternatively anterior infraorbital enlarged; branchiostegal rays: two, thin and separated; number of premaxillary teeth: 2; and number of anal axonosts: 40-49) and two autapomorphies (postcephalic lacuna in the endocranium: present; relative development of hypochordal elements of the caudal endoskeleton: two hypertrophied elements). The "locality 84" taxon is characterized by three homoplasies (number of vomerine tooth rows: three; morphology of prearticular teeth: oval, elongated, long axis of teeth coincident with row axis; and number of epichordal elements of caudal endoskeleton: four or five) and a single autapomorphy (anterior cloacal scales not modified).

Scorings for "locality 84" taxon

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00333100

The Nexus file of the matrix is in the Supplementary material.

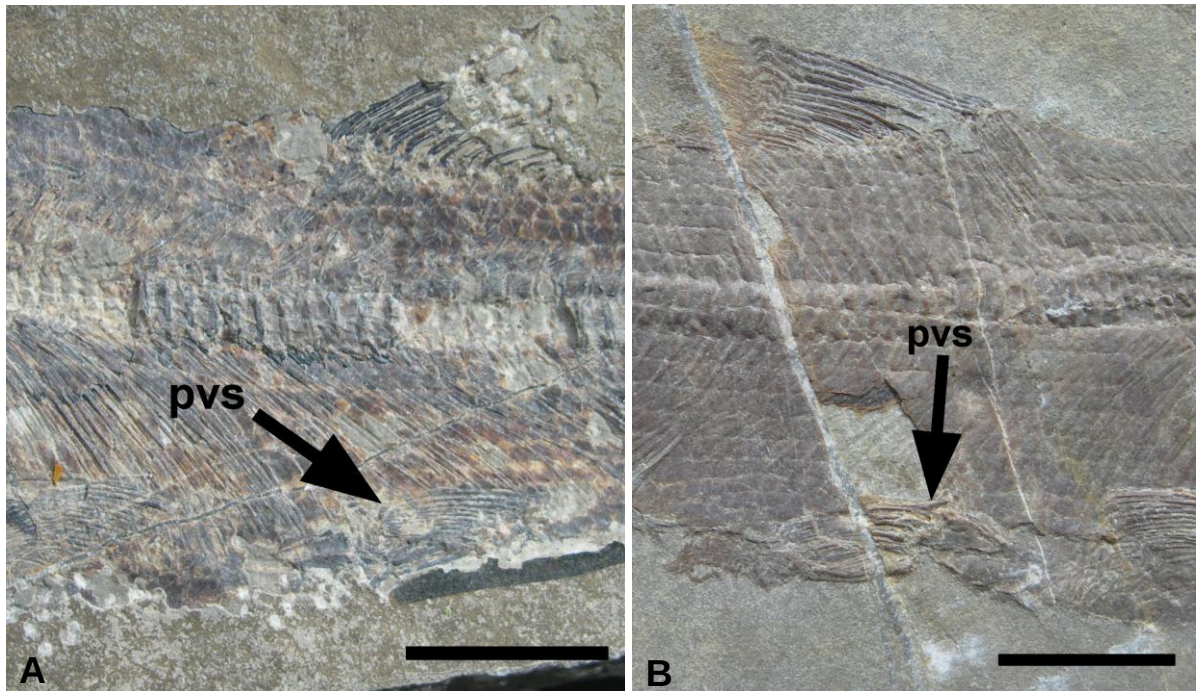


SI Fig. 1 - Strict consensus (A) and 50% majority rule (B) trees retrieved from the analysis performed for this study (see Materials, terminology and methods) showing the phylogenetic relationships of "locality 84" taxon within the Pycnodontidae (A) and within the Pycnodontinae (B). In B, the numbers on nodes indicate the percentage of trees that recovered the node; "locality 84" taxon results to be the sister taxon of the Pycnodontini (i.e., *Pycnodus apodus* + *Oropycnodus ponsorti*).

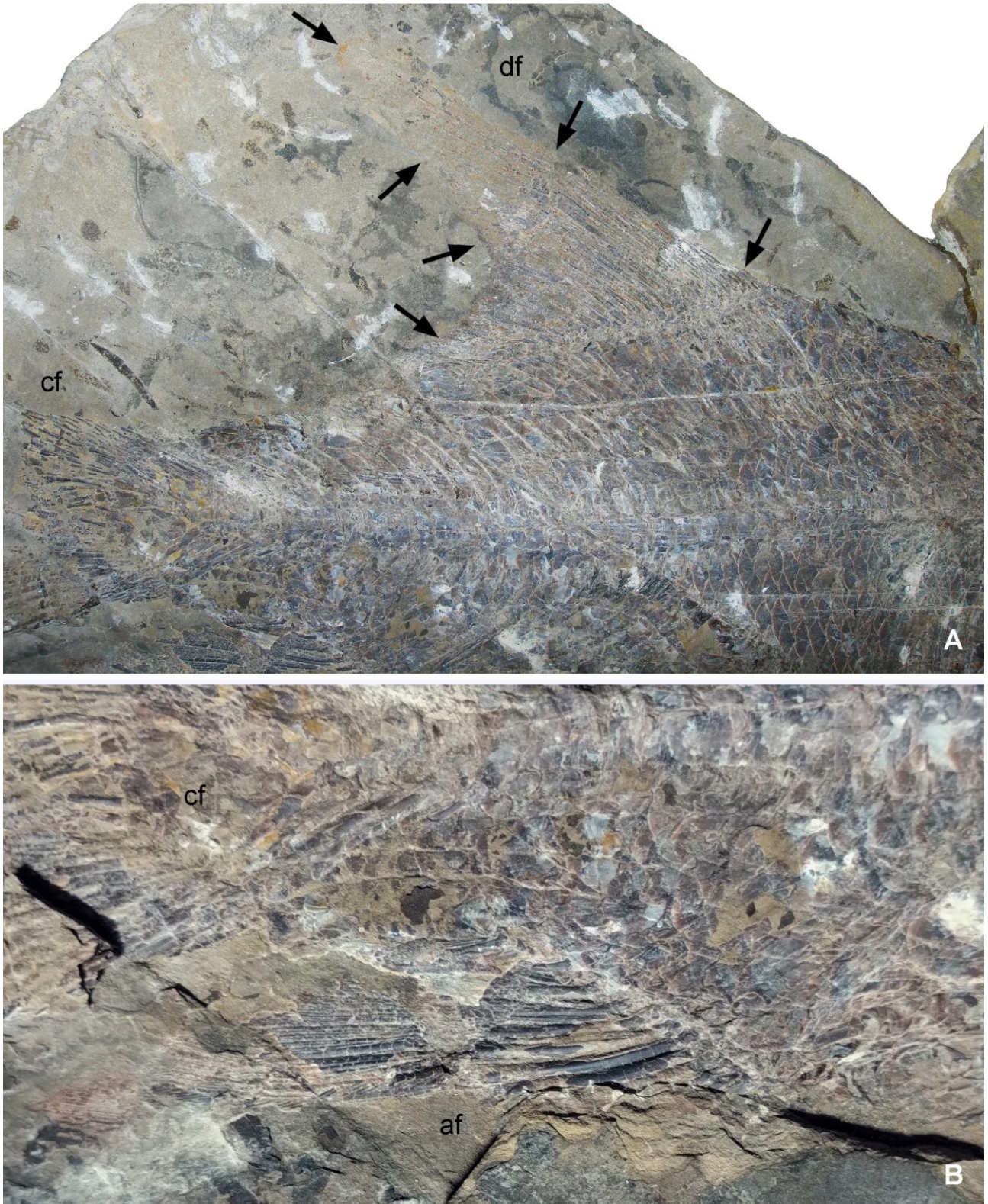
Supplementary figures



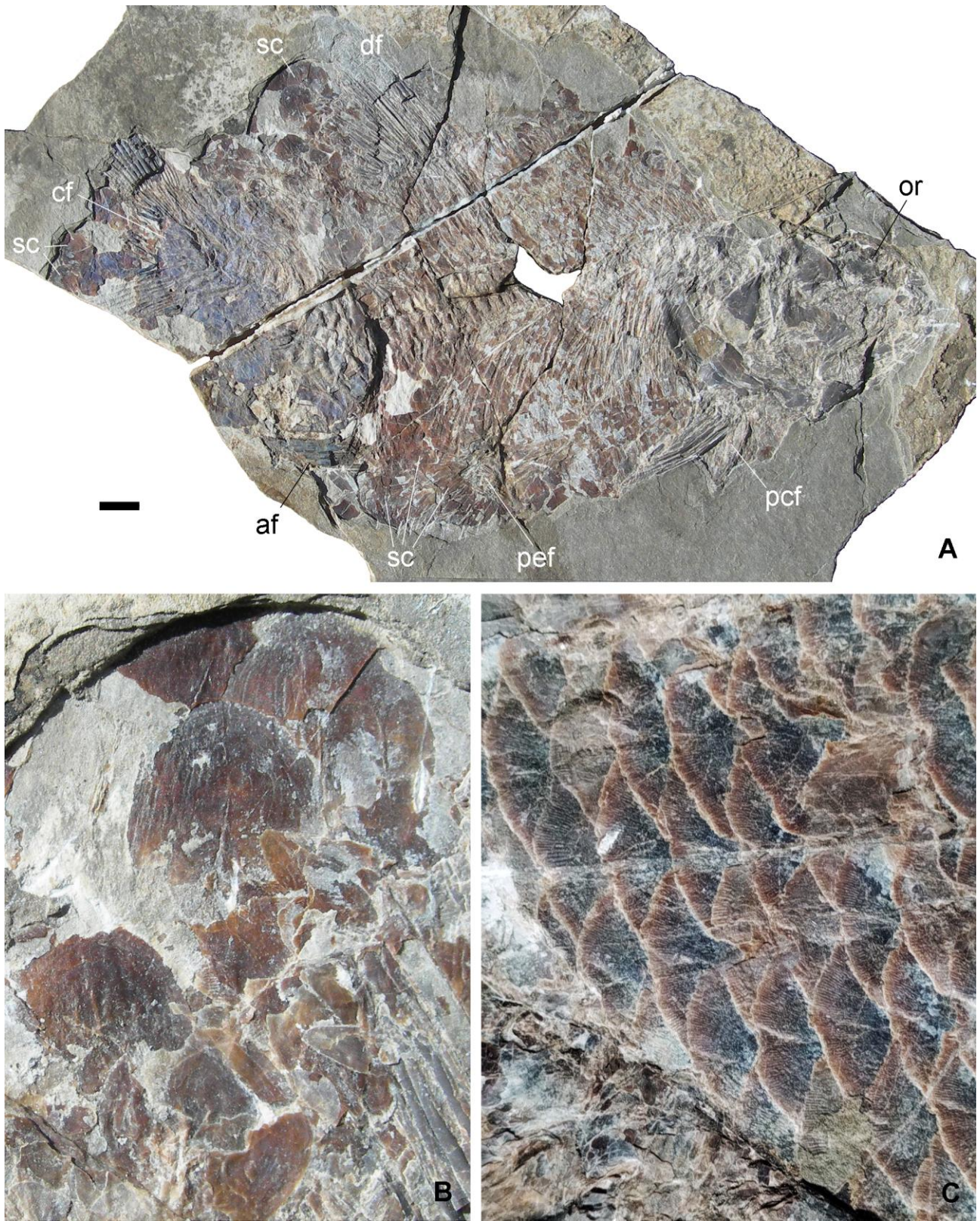
SI Fig. 2 – Detail of the elopiform MFSN 38942 with arrows indicating the pectoral splint. Abbreviations: pcs, pectoral splint. Scale bar equals 1 cm.



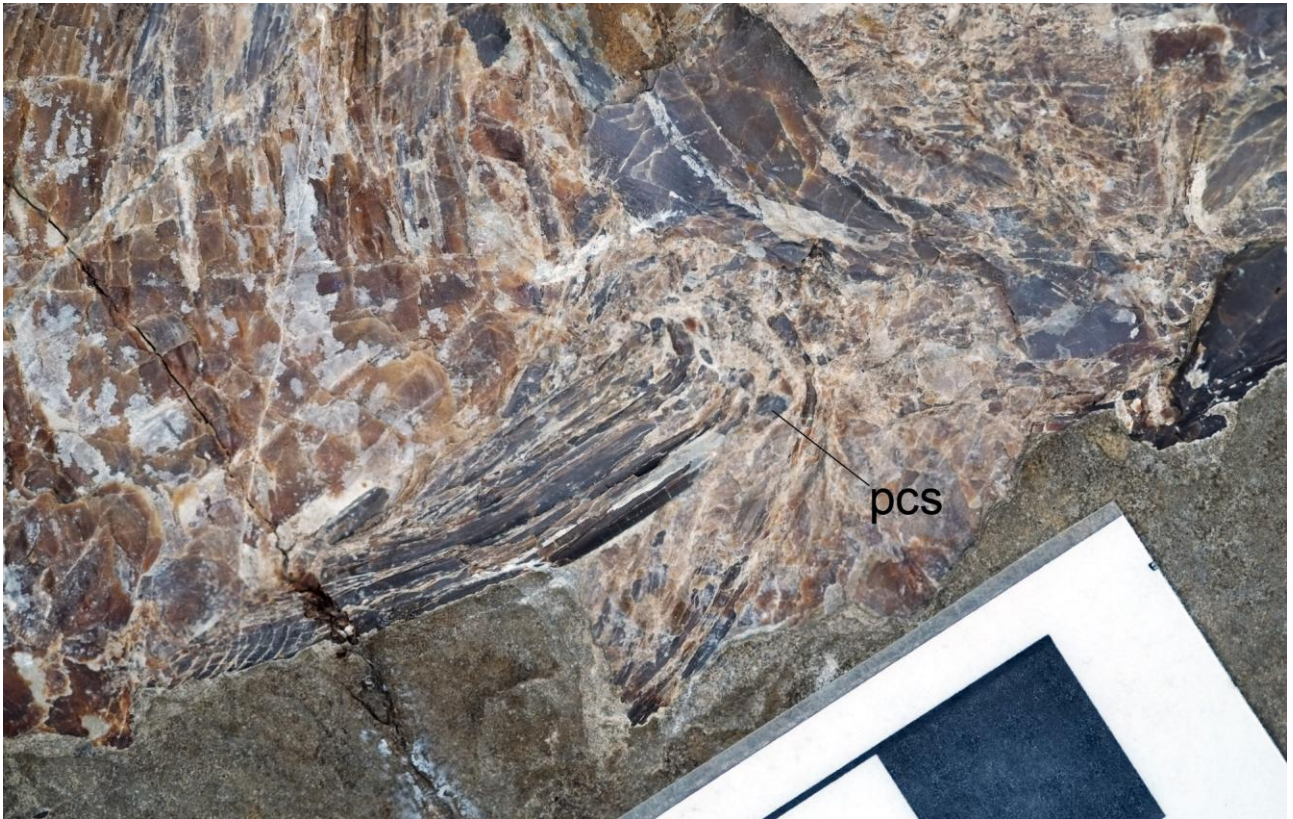
SI Fig. 3 – Details of the elopiforms MFSN 38972 and 38973. Arrows indicate the pelvic splint. A) MFSN 38972 and B) MFSN 38973. Scale bars equal 1 cm. Abbreviations: pvs, pelvic splint.



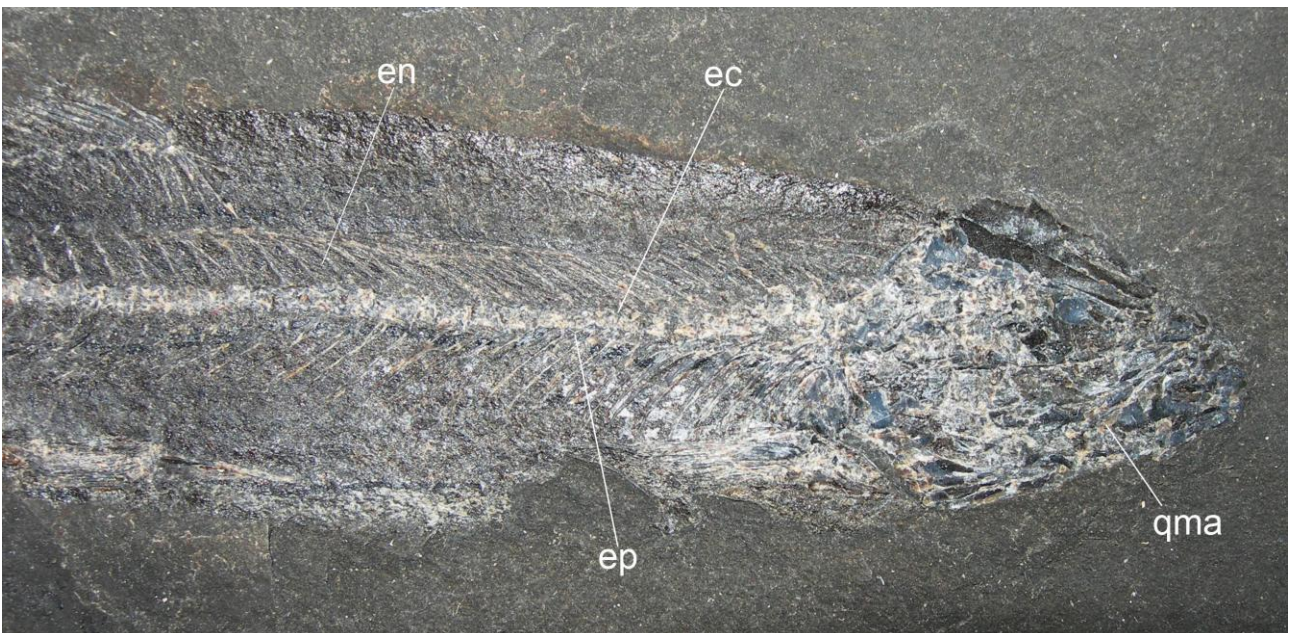
SI Fig. 4 – Putative Albuliformes, fins of MFSN 38920. A) Dorsal fin (arrows indicate its margin); and B) pelvic fin. Abbreviations: af, anal fin; cf, caudal fin; df, dorsal fin. For dimensions, see Fig. 4E.



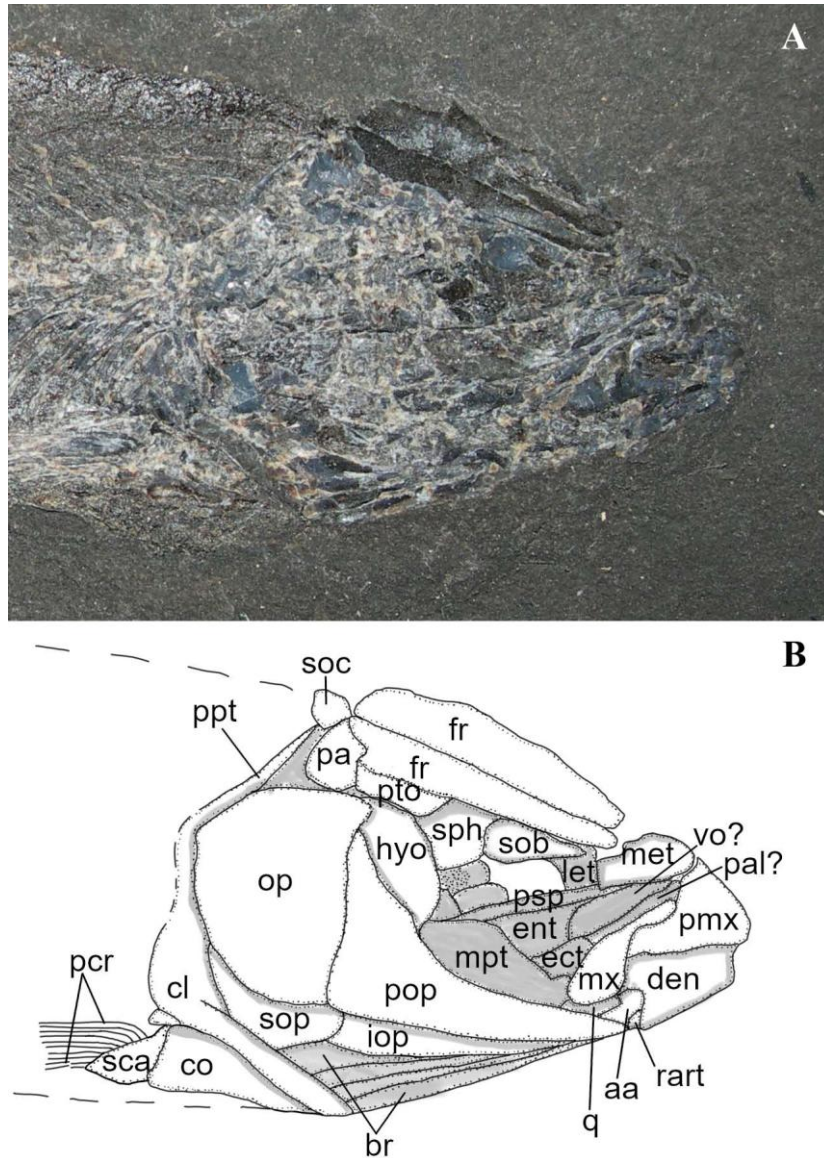
SI Fig. 5 – Putative Albuliformes. A) MFSN 38991; B) Detail of the scales of MFSN 38991; and C) detail of the scales of MFSN 38920. Abbreviations: af, anal fin; cf, caudal fin; df, dorsal fin; or, orbit; pcf, pelvic fin; pef, pelvic fin; sc, scales. The scale bar in A equals 10 mm.



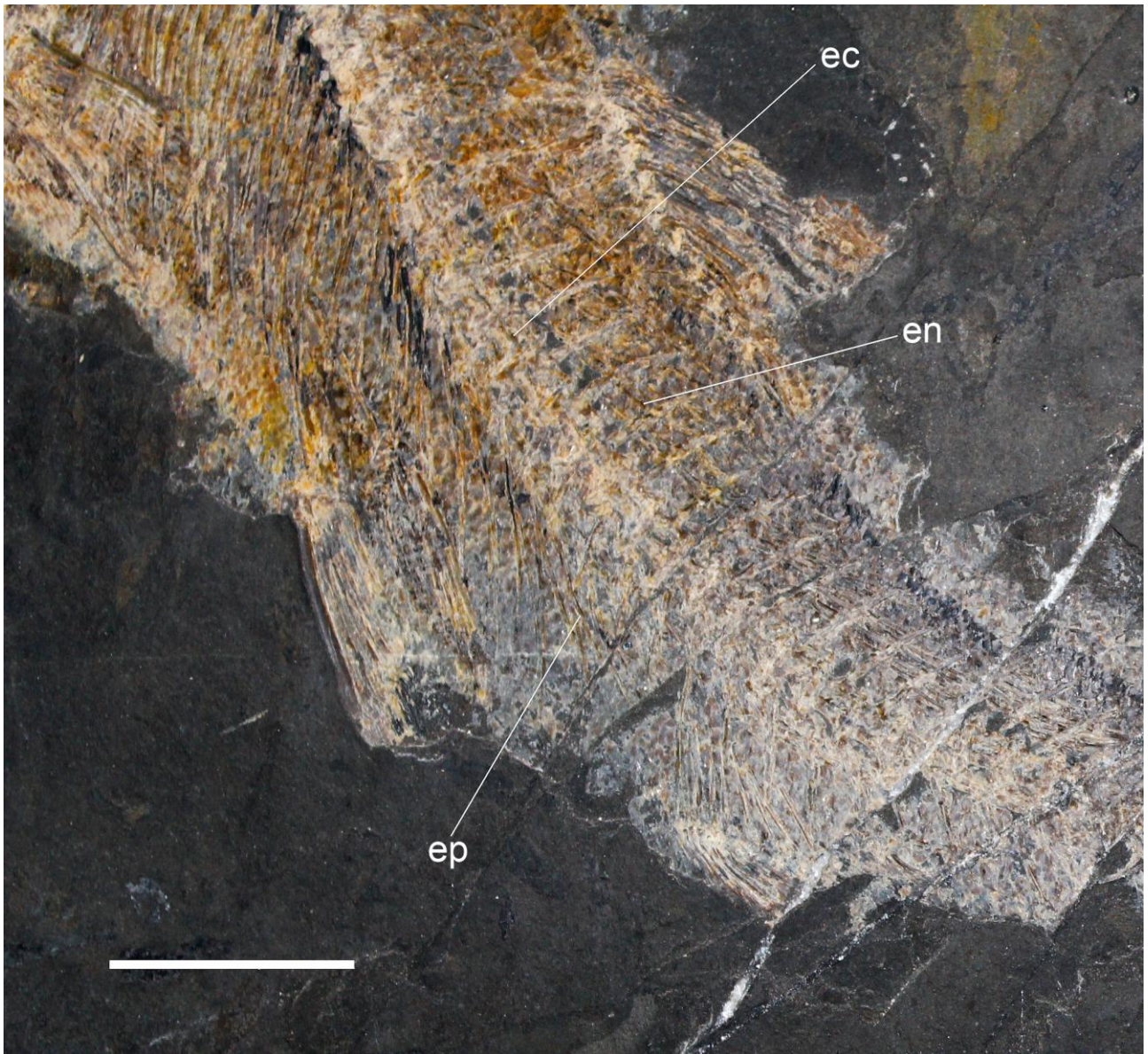
SI Fig. 6 – Putative Albuliformes, MFSN 38991. Detail of the pectoral fin. Abbreviations: pcs, pectoral splint.



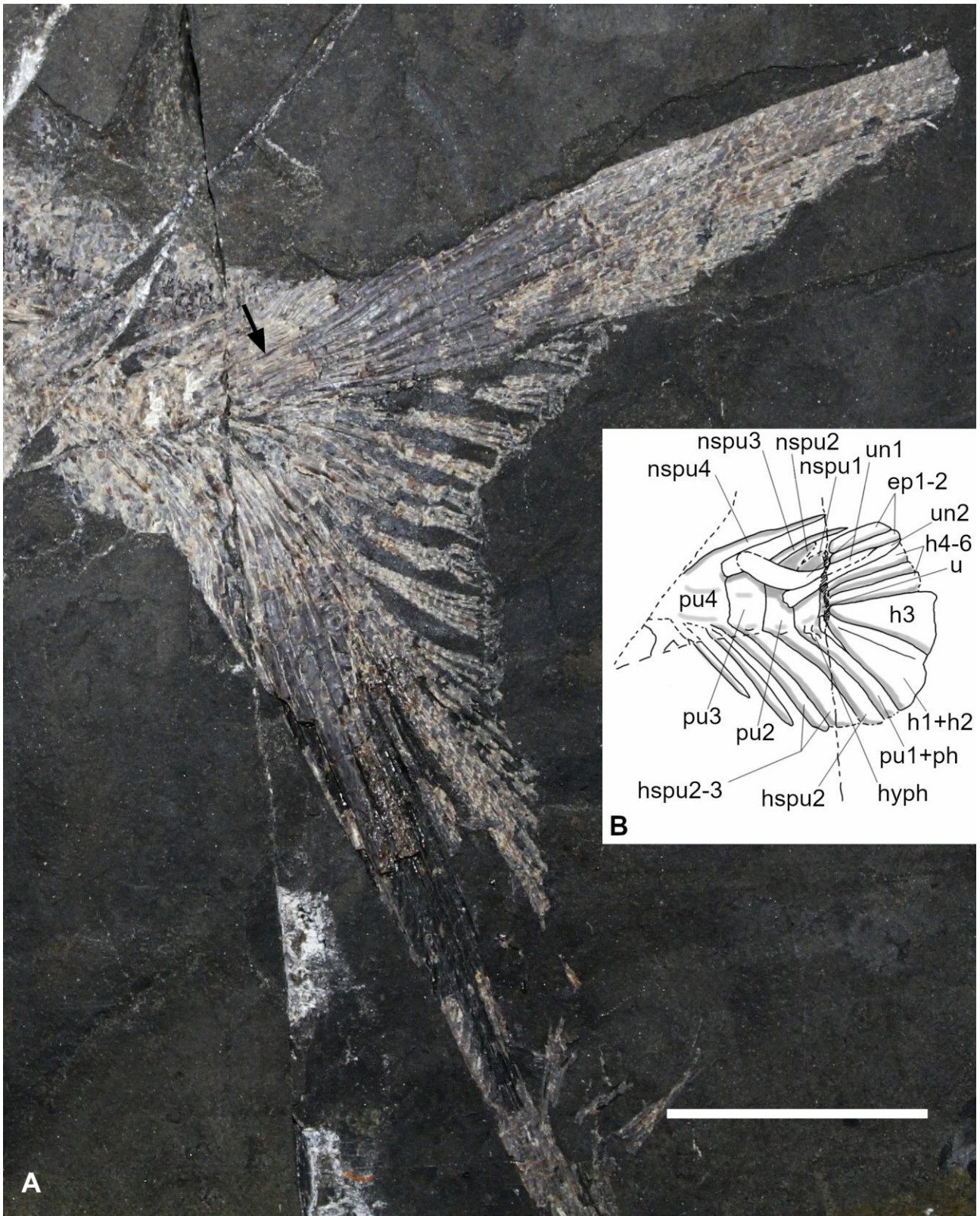
SI Fig. 7 – Gonorhynchiformes, Chanidae, MFSN 38944. The three sets of intermuscular bones and the quadrate-mandibular articulation displaced anteriorly to the level of the orbit are shown. Abbreviations: ec, epicentrals; en, epineurals; ep, epipleurals; qmq, quadrate-mandibular articulation.



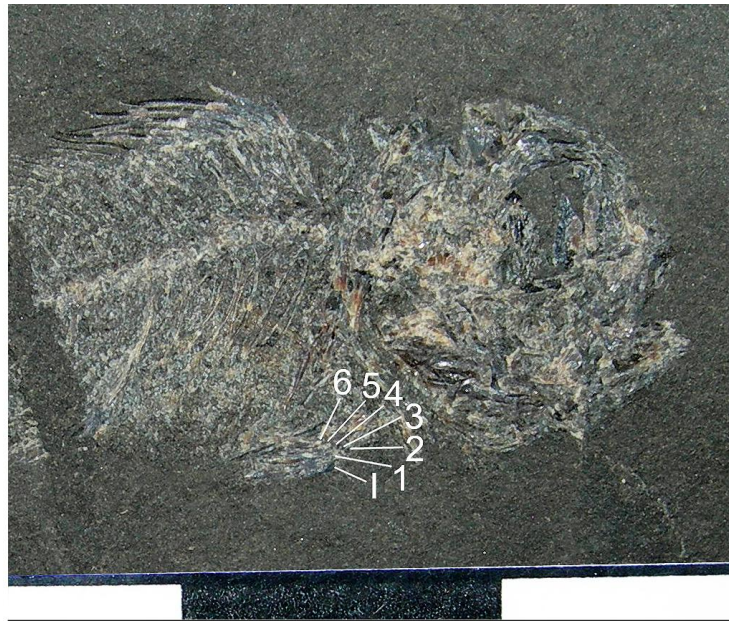
SI Fig. 8 – Gonorhynchiformes, Chanidae, MFSN 38944. Detail of the skull. A) Photograph, B) interpretative drawing. Abbreviations: aa, anguloarticular; br, branchisternal rays; cl, cleithrum; co, coracoid; den, dentary; ect, ectopterygoid; ent, entopterygoid; fr, frontal; iop, interopercle; let, lateral ethmoid; met, mesethmoid; mx, maxilla; op, opercle; pa, parietal; pcr, pectoral-fin rays; pal, palatine; pmx, premaxilla; pop, preopercle; ppt, posttemporal; psp, parasphenoid; pto, pterotic; q, quadrate; sca, scapula; sob, supraorbital; soc, supraoccipital; sop, subopercle; sph, sphenotic; rart, retroarticular; and vo, vomer.



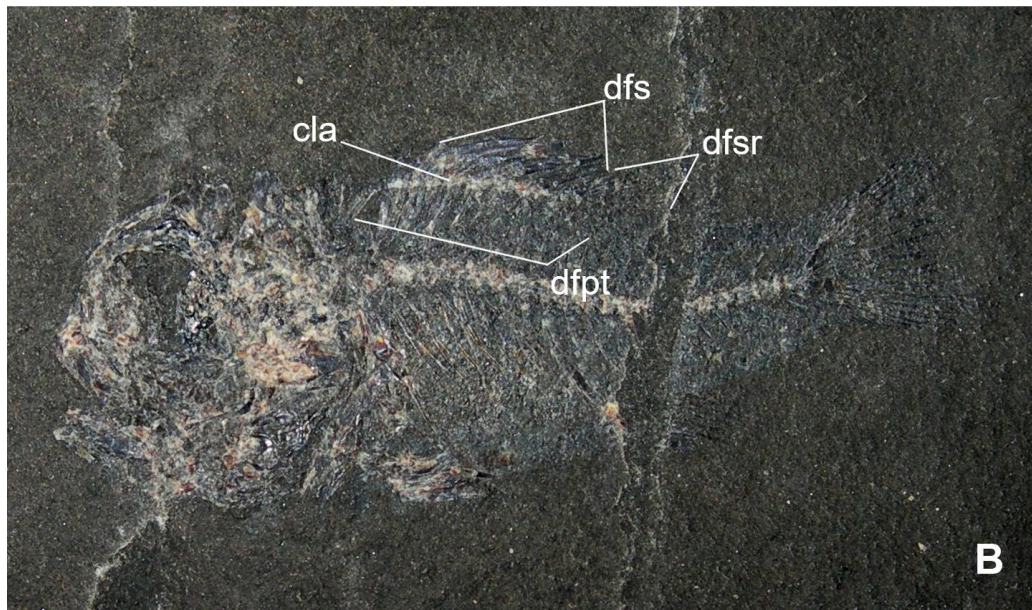
SI Fig. 9 - Crossognathiformes, Pachyrhizodontidae, MFSN 38921. Detail of the trunk with the three sets of intermuscular bones. Abbreviations: ec, epicentrals; en, epineurals; and ep, epipleurals. The scale bar equals 20 mm.



SI Fig. 10 - Crossognathiformes, Pachyrhizodontidae, MFSN 38921. Detail of the caudal fin. A) Photograph, with the arrow indicating the hypurostegic principal rays, B) interpretative drawing of the caudal skeleton with rays omitted. Black dashed lines and black-shaded areas represent fractures and missing parts. Abbreviations: ep, epural; h, hypural; hspu, haemal spine of the preural centrum; hyph, parhypurapophysis; nspu, neural spine of the preural centrum; pu, preural centrum; ph, parhypural; u, ural centrum. The scale bar equals 20 mm.



A



B

SI Fig. 11 – Beryciformes, MFSN 38994/43671. A) MFSN 38994, count of the rays of the pelvic fin; B) MFSN 43671, dorsal fin articulation. Abbreviations: 1-6, soft rays of the pelvic fin; I, first spiny ray of the pelvic fin; cla, chain-link articulation of dorsal-fin spines; dfs, dorsal-fin spines; dfsr, dorsal-fin soft rays; and dfpt, dorsal-fin pterygiophores.



SI Fig. 12 – ?Percomorphacea, MFSN 43751. Details of the fins. Abbreviations: 1-5, soft rays of the pelvic fin; I, first spiny ray of the pelvic fin; af, anal fin; and df, dorsal fin. Scale bar equals 1 cm.

REFERENCES

Poyato-Ariza F.J. (2020) - Studies on pycnodont fishes (II): revision of the subfamily Pycnodontinae, with special reference to Italian forms. *Rivista Italiana di Paleontologia Stratigrafia*, 126(2): 447-473.