Paranursallia spinosa n. gen., n. sp., a new Upper Cretaceous pycnodontiform fish from the Eurafrican Mesogea

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ABSTRACT
The osteology of the fossil fish *Paranursallia spinosa* n. gen., n. sp., from the marine Upper Cenomanian of Tunisia, is studied in details. The new species belongs to the family Pycnodontidae and the subfamily Nursalliinae. It is closely allied to *"Nursallia" gutturosa* (Arambourg, 1954), a species from the Cenomanian of Morocco, but differs from it by some cranial characters, by the lesser number of scutes in the dorsal ridge and the ventral keel and by the lesser number of principal caudal rays. *Paranursallia spinosa* n. gen., n. sp. differs more markedly from *Nursallia veronae* Blot, 1987 (Middle Eocene, Italy), the type-species of the genus *Nursallia* Blot, 1987, and from *Nursallia tethysensis* Capasso, Abi Saad & Taverne, 2009 (Cenomanian, Lebanon). It is proposed to include *"Nursallia" gutturosa* in the new genus *Paranursallia* n. gen.

KEY WORDS
Pycnodontidae,
Nursalliinae,
Osteology,
relationships,
Cenomanian,
Tunisia,
new genus,
new species.

RÉSUMÉ
Paranusallia spinosa *n. gen., n. sp., un nouveau poisson pycnodontiforme du Crétacé supérieur de la Mésogée eurafricaine.*
L'ostéologie du poisson fossile *Paranursallia spinosa* n. gen., n. sp., du Cénomanien supérieur marin de Tunisie, est étudiée en détails. La nouvelle espèce appartient à la famille des Pycnodontidae et à la sous-famille des Nursalliinae. Elle est proche parente de « *Nursallia* » *gutturosa* (Arambourg, 1954), une espèce du Cénomanien du Maroc, mais en diffère par quelques caractères crâniens, par le moindre nombre d'écussons de la crête dorsale et de la carène ventrale et par le moindre nombre de rayons caudaux principaux. *Paranursallia spinosa* n. gen., n. sp. diffère de façon plus importante de *Nursallia veronae* Blot, 1987 (Éocène, Italie), l'espèce-type du genre *Nursallia* Blot, 1987, et de *Nursallia tethysensis* Capasso, Abi Saad & Taverne, 2009 (Cénomanien, Liban). Il est proposé d'inclure « *Nursallia* » *gutturosa* dans le nouveau genre *Paranursallia* n. gen.

MOTS CLÉS
Pycnodontidae,
Nursalliinae,
ostéologie,
relations,
Cénomanien,
Tunisie,
genre nouveau,
espèce nouvelle.

INTRODUCTION

Thirty years ago, one of us (ML) discovered a small pycnodontiform fish in the Late Cenomanian marine deposits of Dir Oulad Yahia, in the Jebel Bargou, Tunisia. This fossil fish was at that time studied and identified by the fourth author (JG) as a specimen of *Palaeobalistum gutturosum* Arambourg, 1954, a species already known from the Cenomanian beds of the Jebel Tselfat in Morocco (Arambourg 1954) but today doubtfully ranged in the genus *Nursallia* Blot, 1987 (Poyato-Ariza & Wenz 2002: 149).

A recent re-examination of the sample by the first author (L. T.) has revealed that this Tunisian fossil fish represents a new species, close to but however different from "*Nursallia*" *gutturosa*.

The aim of our paper is thus to describe this new pycnodontiform species, to compare it with "*N.*" *gutturosa* and to bring some new light in the problem of the genus *Nursallia*.

MATERIAL AND METHODS

The Tunisian fossil fish hereafter described belongs to the collections of Palaeontology of the Muséum national d'Histoire naturelle de Paris (MNHN.F). Samples from the collections of the same Muséum and of the Museo Civico di Storia Naturale di Verona (MCSNV) and from the Capasso's registred collection in Chieti (CLC) are used for comparison.

The material is studied with a Wild M 5 and a Leika MZ 8 stereomicroscopes. The drawings are made by the first author (LT) with a camera lucida.

LOCATION, GEOLOGICAL FRAMEWORK AND STRATIGRAPHIC POSITION OF THE FOSSIL FISH

The fossil fish specimen was collected in the Dir Oulad Yahia section from north-central Tunisia (Fig. 1). It is located 3 km to the south-east of Bargou (Siliana region) and can be followed along the road of Aïn Zakkar, on the western flank of Jebel Bargou considered as a segment of the Bargou-Serj-Bellouta Range of the Tunisian Central Atlas.

The study area consists of Albian-Turonian marl/limestone alternations, pelagic organic-rich successions interpreted as of a good potential oil source-rocks (Layeb *et al.* 2012; 2013, among others). Palaeogeographically, the study section belongs to the 'Tunisian Trough' (Burollet 1956), a deep marine basin initiated since the Triassic/Jurassic rifting phases, associated to the opening of Neotethys (Guirand & Maurin 1991), to the north-east, and the central Atlantic, to the south-west. During the Late Jurassic-Early Cretaceous times, this domain underwent a major extensional phase that structured the basement in horst and graben systems (Martinez & Truillet 1987). During Upper Aptian, a regional compressional pulsation, induced by a transpressional regime (Ben Ayed & Viguier 1981), affected the north-African platform and led to the individualisation of NE-SW trending faults. Since the Albian times, the basement structure is mainly characterised by the persistence of early Cretaceous graben systems till the latest Cenomanian-early Turonian times that were favorable to the accumulation of organic-rich facies. These are characterised by a high content of mainly marine organic matter and express the global Cretaceous oceanic anoxic events OAE 1 and 2 (Layeb *et al.* 2012; 2013). The organic-rich facies of the Dir Oulad Yahia section (up to 8.7% TOC) include Upper Cenomanian-Lower Turonian oceanic anoxic event-2 signatures (Layeb e*t al.* 2013), now well-known from the Tethyan Realm and elsewhere (e.g., Arthur *et al.* 1987). They belong to the so called Bahloul Formation (Burollet 1956) defined in the Oued Bahloul situated 50 km to the south-west of our section.

Within the Bahloul Formation of Dir Oulad Yahia, three units of a regional correlating value have been distinguished through the lithological column (Fig. 2). A lower unit (U_1) corresponds to more or less laminated brown-black limestones alternating with marly levels. Locally, thin calcisphaere-and-radiolarian bearing siliceous limestones can be interbedded. The middle unit (U_2) is characterised by marly and less laminated limestones. The upper unit (U_3) is composed of alternation of lesser well-laminated limestones yielding a decimmetric siliceous limestone bed and metric microbialite bodies which mark the Cenomanian/Turonian transition (Layeb *et al.* 2013).

Biozonation based on planktonic foraminifera and rare accompanying ammonites indicates that the Bahloul sequence covers the *Whiteinella archaeocretacea* zone, defined in our

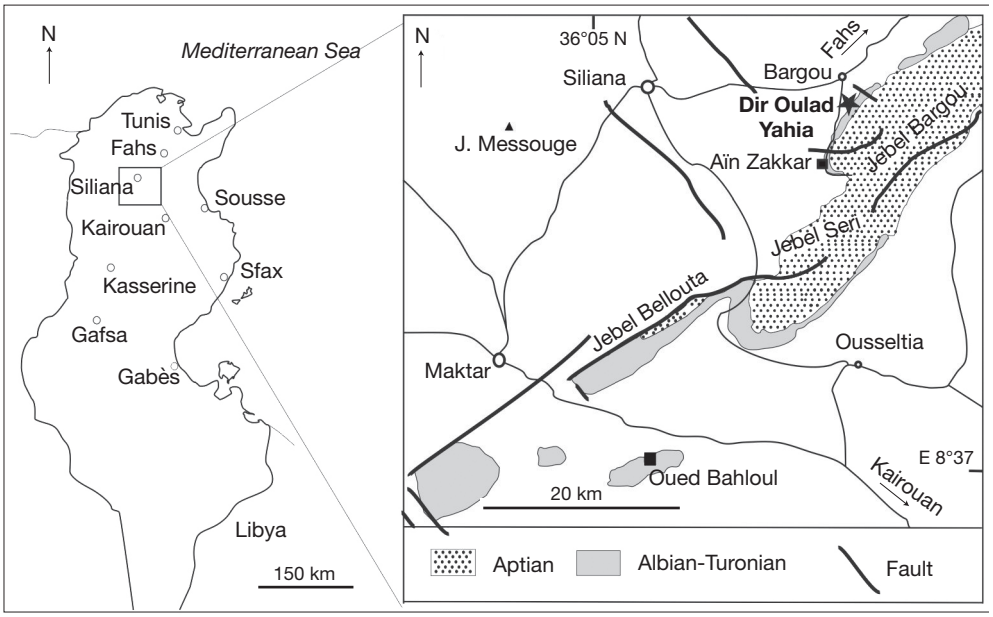

Fig. 1. — Location map of Dir Oulad Yahia in the Jebel Bargou (North Tunisia).

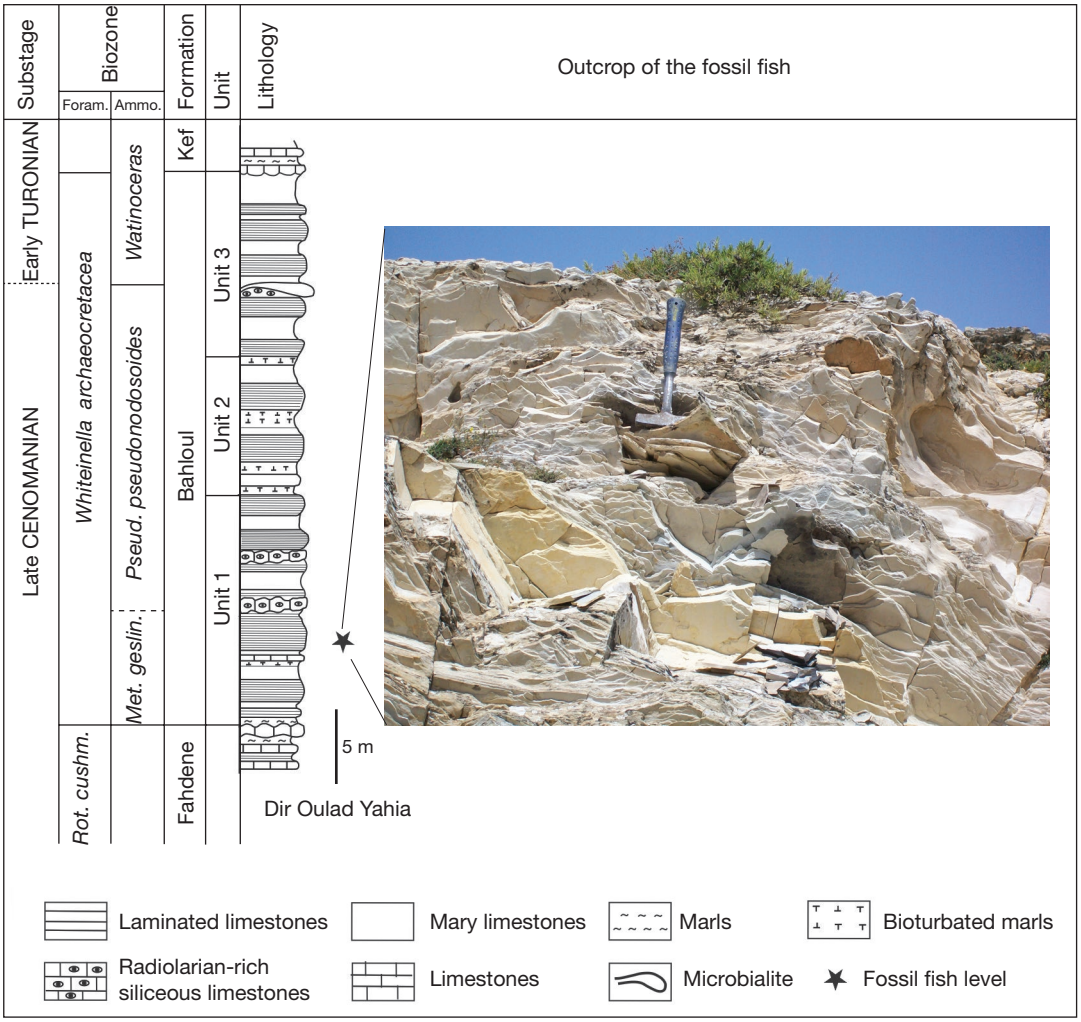

Fig. 2. — Stratigraphic chart showing the *Paranursallia spinosa* level (★) in the Late Cenomanian deposits of Dir Oulad Yahia and the Dir Oulad Yahia quarry.

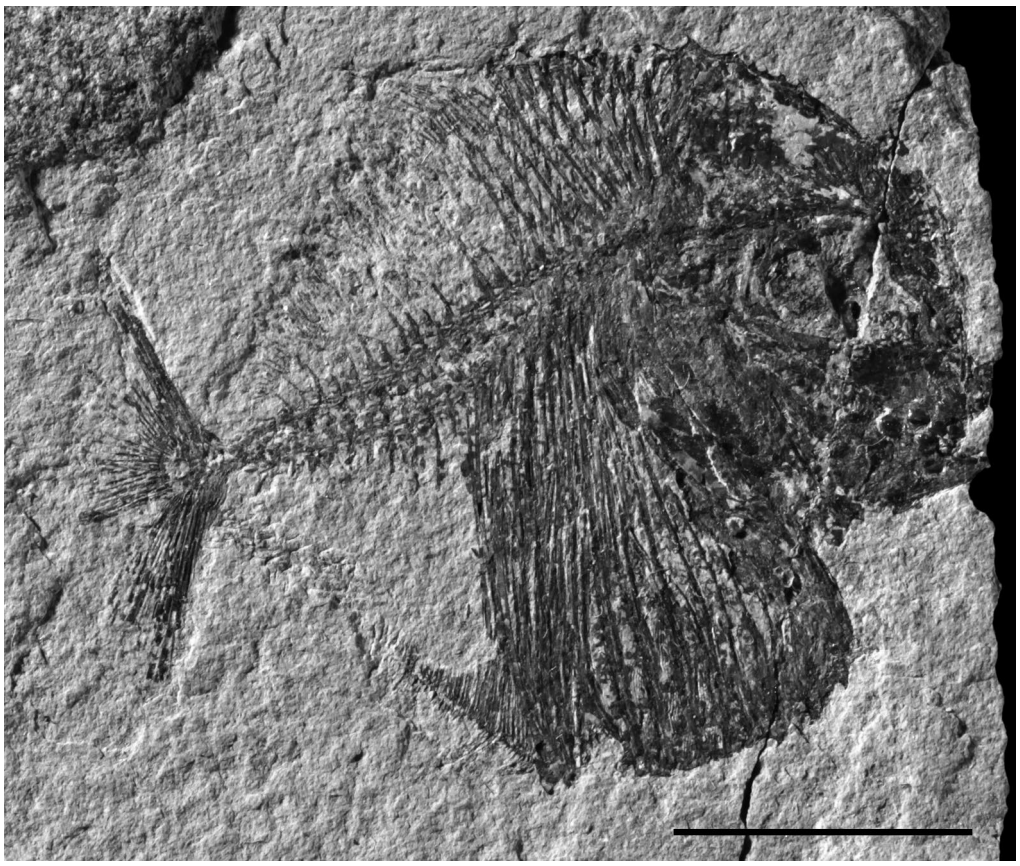

FIG. 3. — *Paranursallia spinosa* n. gen., n. sp. Holotype MNHN.F.PSA214. Scale bar: 1 cm.

section by the index species and by the last occurrence (LO) of *Rotalipora cushmani*, at the base, and the first occurrence (FO) of *Helvetoglobotruncana helvetica*, to the top. In this frame, the stratigraphic position of the fossil fish coincides with the base of the *Whiteinella archaeocretacea* zone, and to the *Metoicoceras geslinianum* ammonite zone, all indicating a Latest Cenomanian age. The good preservation state of the fossil fish is mainly due to the low energy and severe anoxic conditions prevailed during deposition.

SYSTEMATIC PALAEONTOLOGY

Subclass ACTINOPTERYGII Klein, 1885
Series NEOPTERYGII Regan, 1923
Division HALECOSTOMI Regan, 1923
sensu Patterson, 1973
Superorder PYCNODONTOMORPHA Nursall, 2010
Order PYCNODONTIFORMES Berg, 1937
sensu Nursall, 2010
Family PYCNODONTIDAE Agassiz, 1833
Subfamily NURSALLIINAE Blot, 1987

Genus *Paranursallia* n. gen.

TYPE SPECIES. — *Paranursallia spinosa* n. sp. (herein designated).

ETYMOLOGY. — From the Greek *para*, near, close to, and the generic name *Nursallia*.

DIAGNOSIS. — Nursalliinae with a large head, a wide orbit and a very short snout. Paired broad prefrontals present. Short mesethmoid. Parasphenoid short and straight. Mandible triangular and as deep as long. Wide dermosphenotic. A large and deep "V"-shaped notch at the ventral junction between the skull and the cleithrum. First neural arches fused in a large synarcual articulated on the rear of the skull. First 7 or 8 neural spines autogenous. 27 to 30 vertebral segments before the epichordal series. Neural and haemal arches interlocked by two pre- and two postzygapophyses. Dorsal and anal fin with about 70 pterygiophores each.

Paranursallia spinosa n. sp.

HOLOTYPE. — Sample MNHN.F.PSA214, a complete specimen in right view (Fig. 3). Total length: 31 mm.

FORMATION AND LOCALITY. — Marine Cenomanian of Dir Oulad Yahia, Jebel Bargou, North Tunisia.

ETYMOLOGY. — From the Latin *spinosus, -a, -um*, spiny, in reference to the spiny upper margin of the dermosupraoccital in the new species.

DIAGNOSIS. — *Paranursallia* n. gen. with a series of small spines on the dermosupraoccipital upper margin. Frontal reaching the parietal. 8 scutes in the dorsal ridge. 8 precloacal and 2 postcloacal scutes in the ventral keel. About 30 principal rays in the caudal fin.

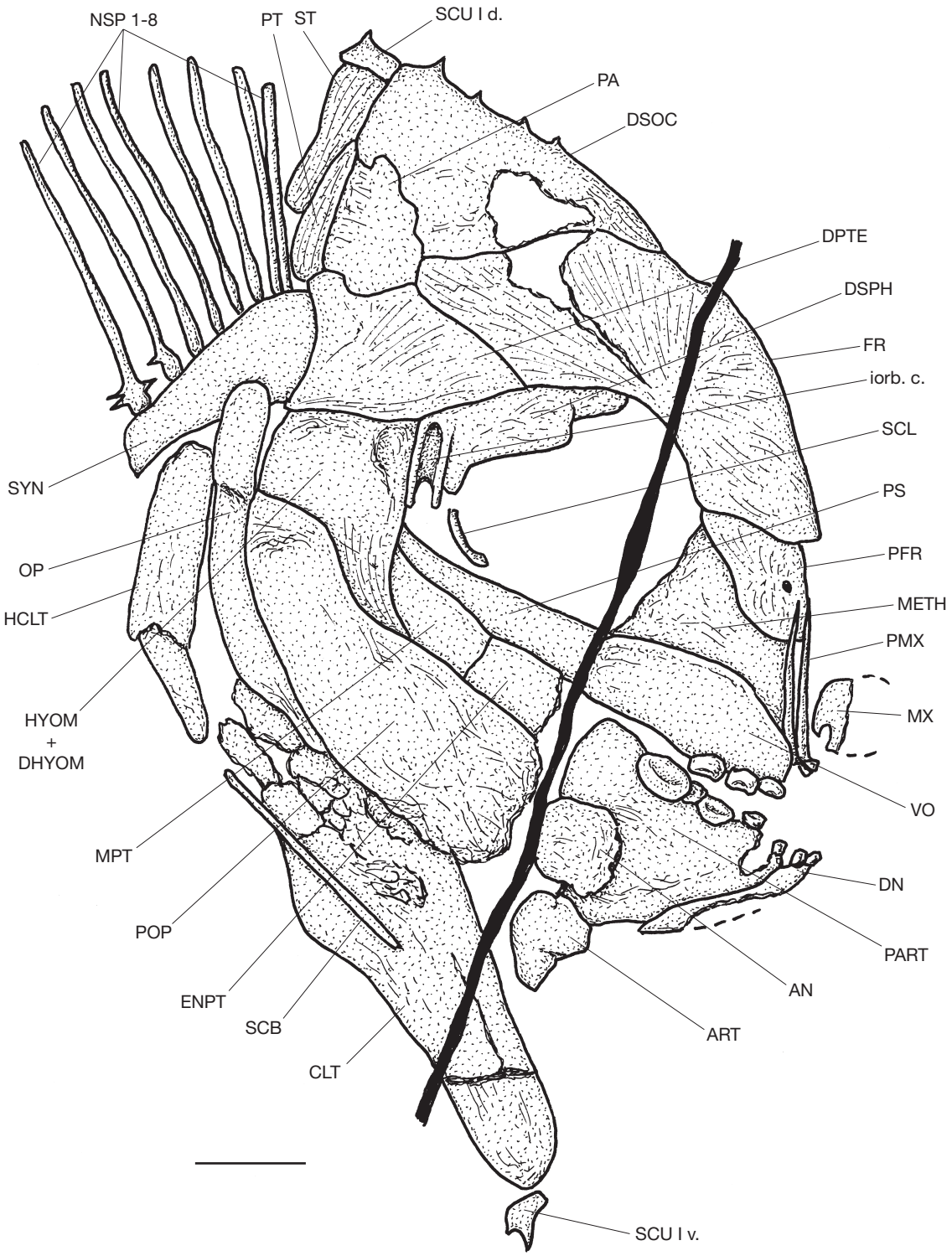

FIG. 4. — *Paranursallia spinosa* n. gen., n. sp., holotype MNHN.F.PSA214, skull, pectoral girdle and beginning of the axial skeleton. Abbreviations: **AN**, angular; **ART**, articular; **CLT**, cleithrum; **DN**, dentary; **DPTE**, dermopterotic; **DSPH**, dermosphenotic; **ENPT**, entopterygoid; **FR**, frontal; **HCLT**, hypercleithrum (= supracleithrum); **HYOM + DHYOM**, hyomandibula + dermhyomandibula; **iorb. c.**, infraorbital sensory canal; **METH**, mesethmoid; **MPT**, metapterygoid; **MX**, maxilla; **NSP 1-8**, neural spines 1 to 8; **PA**, parietal; **PFR**, prefrontal; **PMX**, premaxilla; **POP**, preopercle; **PART**, prearticular; **PS**, parasphenoid; **PT**, posttemporal; **SCB**, scale bar; **SCL**, sclerotic bone; **SCU I d., v.**, dorsal and ventral first scute; **ST**, supratemporal; **SYN**, synarcual (probably including the exocciptals); **VO**, vomer. Scale bar: 2 mm.

HOLOTYPE MORPHOMETRIC DATA

In percentage (%) of the standard length (26 mm):

Length of the head (opercle included) 47.7%
Depth of the head (in the occipital region) 62.1%
Maximal depth of the body 93.9%
Prepelvic length 47.0%
Predorsal length 66.7%
Preanal length 57.6%

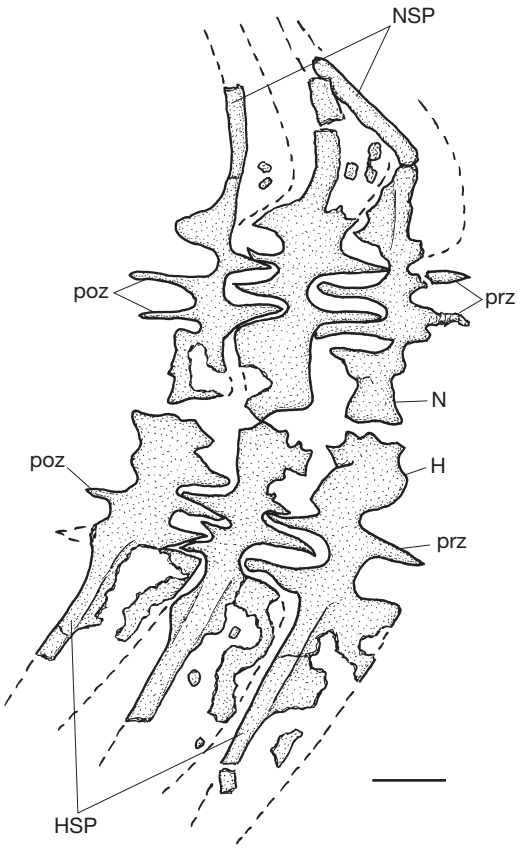

Fig. 5. — *Paranursallia spinosa* n. gen., n. sp. Holotype MNHN.F.PSA214. Vertebral segments 19 to 21. Abbreviations: **H**, haemal arch; **HSP**, haemal spine; **N**, neural arch; **NSP**, neural spine; **poz**: postzygapophysis; **prz**, prezygapophysis. Scale bar: 0.5 mm.

Osteology

The skull (Fig. 4)

The head is large in comparison to the body size. The skull is deeper than long, with a rounded frontal border. The orbit is large and the snout very short, with its anterior border vertically oriented. The dermal bones are slightly ornamented with some thin ridges. The endocranial bones are not visible, except the mesethmoid. The mandibular lower margin and the cleithral anterior margin meet at almost a right angle, forming a large "V"-shaped notch at the junction between the head and the abdomen.

The mesethmoid is bulky but very short. The bone is partly covered by a pair of broad but short prefrontals. The vomer is massive. Only three vomerian teeth are preserved. They are molariform and belong to the right lateral row.

The skull roof is formed by the dermosupraoccipital and the paired frontals, parietals and dermopterotics. The frontal is long, broad and curved. Posteriorly, it sutures not only with the dermosupraoccipital and the dermopterotic but also reaches the rather small parietal. The dermosupraoccipital is a large bone. Its dorsal margin bears four small spines. There is no temporal fenestra and no brush-like process on the parietal. The autosphenotic is entirely hidden by the hyomandibula and the dermosphenotic. The sensory canals on the skull roof are not visible.

The parasphenoid is short, straight and toothless. No trace of the other sphenoid bones is visible in the orbit.

A part of the metapterygoid and of the entopterygoid appears between the preopercle and the parasphenoid. The quadrate and the symplectic are not preserved.

The long and very thin premaxilla bears two incisiform teeth. Only a small fragment of the maxilla is preserved. The mandible is triangular in shape and as deep as long. The dentary is reduced to its ventral branch. It bears two incisiform teeth. Five molariform teeth are visible on the upper margin of the large preaticular. Their size increases from before to behind. The angular and articular are well developed.

A very large dermosphenotic forms the upper border of the orbit. It bears the top of the infraorbital sensory canal. No other bone of the orbital ring is preserved. A fragment of a sclerotic bone is visible just above the parasphenoid.

The preopercle is much larger than the exposed part of the fused hyomandibula and dermohyomandibula. The opercle is long and narrow. No trace branchiostegal rays is visible.

The hyoid bar and the branchial skeleton are unknown.

The girdles (Figs 4; 8)

The posttemporal is a small narrow bone pressed against the posterior margin of the parietal. The hypercleithrum (= supracleithrum) is a deep bone. The ventral branch of the cleithrum is long but rather narrow (cf. Nursall 1996: fig. 11a). Some very small fragments of the pectoral fin are present but the number of rays is not determinable.

A few short and very thin pelvic rays are preserved in the cloacal vestibule. The pelvic bones are not visible.

The axial skeleton (Fig. 5)

Starting from the caudal region, the vertebral axis progressively elevates to reach anteriorly the level of the orbit dorsal border. The vertebrae are constituted by dorsal and ventral arcocentra. No chordacentrum or autocentrum is present. The neural and haemal arches do not completely surround the notochord. The first neural arches are fused together. They form a large synarcual articulated to the rear of the skull and probably including the two exocciptals. There are 27 neural spines before the epichordal series and 14 haemal spines before the hypochordal elements. Most neural and haemal spines bear an anterior sagittal thin bony wing. The anteriormost 8 neural spines are autogenous, devoid of anterior sagittal flange and rest on the synarcual. The two last neural spines and the four last haemal spines before the caudal skeleton are much shorter than the preceding ones. Posteriorly to the synarcual, the neural arches are interlocked together by two pre- and two postzygapophyses. The same system exists on the haemal arches in caudal region of the fish. A few ribs are visible between the scales in the abdominal region but their exact number is not known. The postcoelomic bone is a long and rather thin bone reaching both the vertebral axis and the ventral margin of the fish.

The dorsal and anal fin (Figs 3; 8)

The dorsal and anal fins are badly preserved. The dorsal fin shape is unknown. The anal fin shape is strip-like and corresponds to the A2 type of Poyato-Ariza & Wenz (2002: fig. 34).

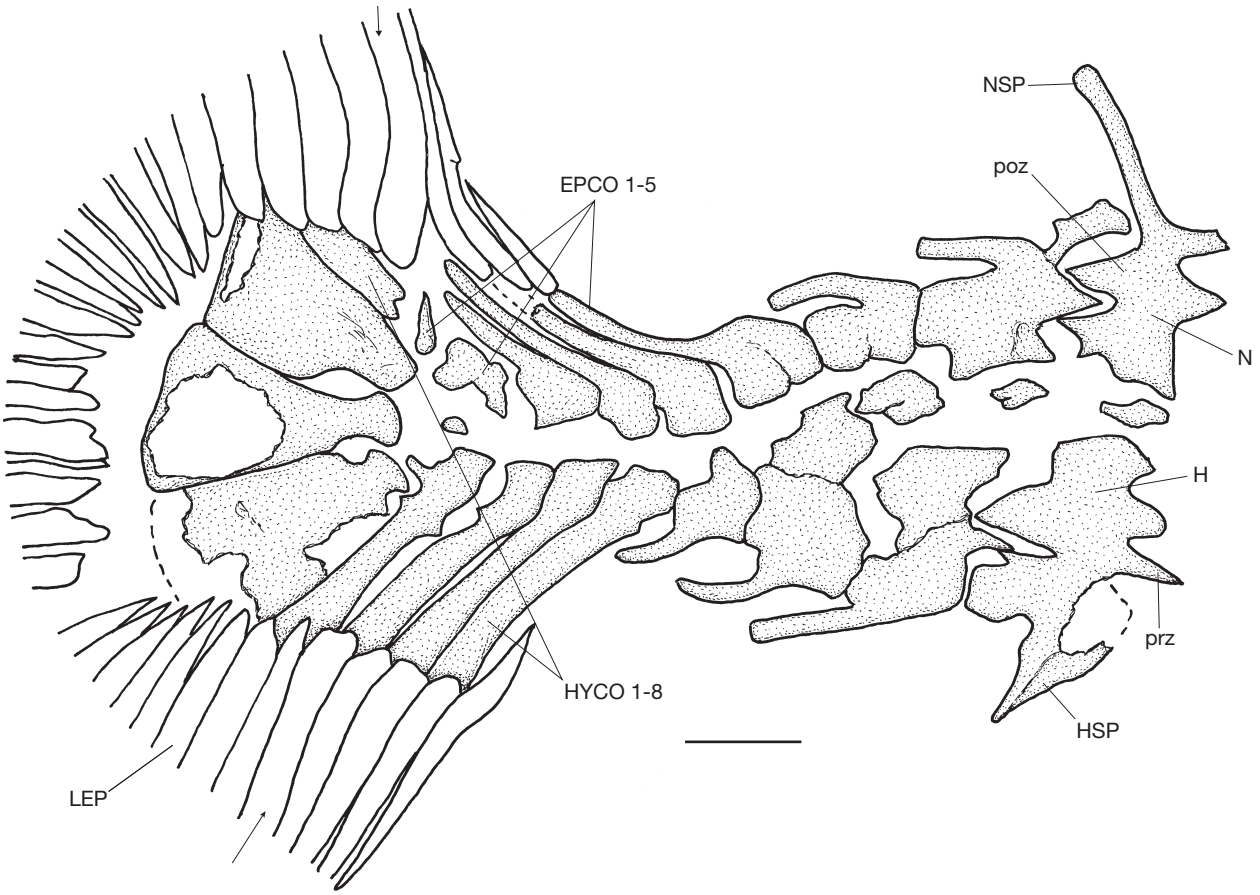

FIG. 6. — *Paranursallia spinosa* n. gen., n. sp. Holotype MNHN.F.PSA214. Caudal skeleton. Abbreviations: **EPCO 1-5**, epichordals 1 to 5; **H**, haemal arch; **HSP**, haemal spine; **HYCO 1-8**, hypochordals 1 to 8; **LEP**, caudal rays; **N**, neural arch; **NSP**, neural spine; **poz**, postzygapophysis; **prz**, prezygapophysis. The two arrows point on the more external principal caudal rays. Scale bar: 0.5 mm.

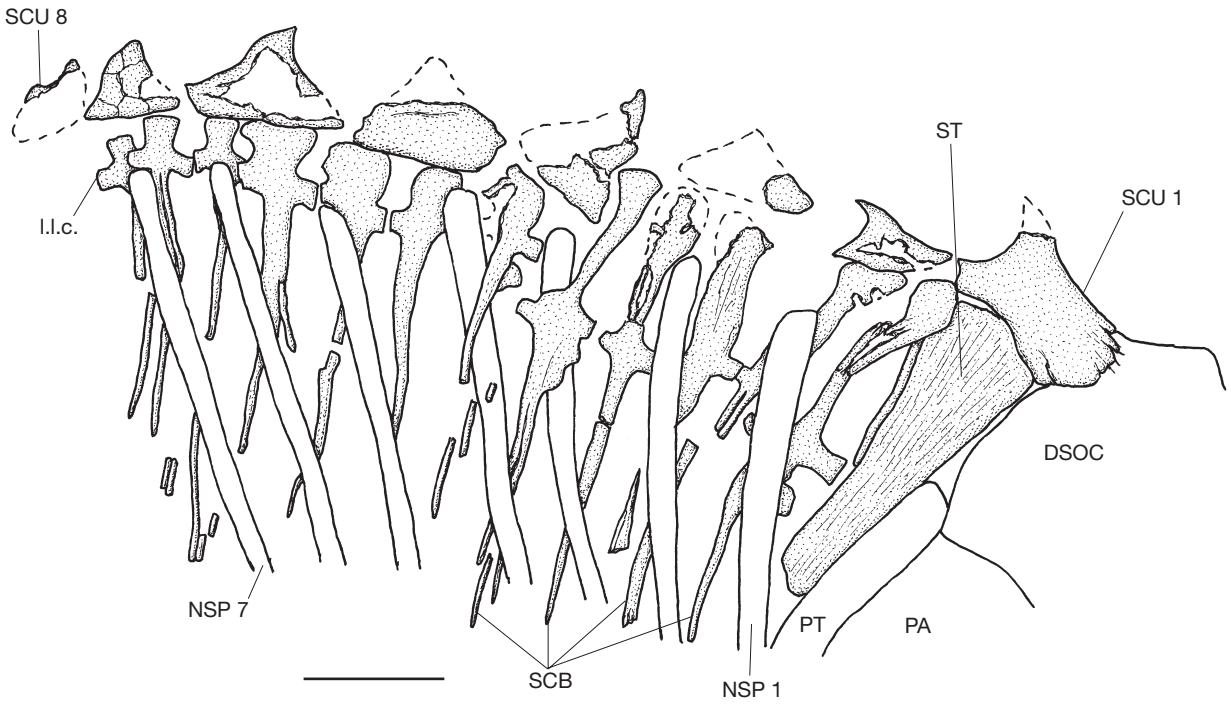

FIG. 7. — *Paranursallia spinosa* n. gen., n. sp. Holotype MNHN.F.PSA214. The dorsal ridge scutes. Abbreviations: **DSOC**, dermosupraoccipital; **l. l. c.**: lateral line canal; **NSP 1-7**, neural spines 1 to 7; **PA**: parietal; **PT**: posttemporal; **SCB**, scale bars; **SCU 1-8**, dorsal ridge scutes 1 to 8; **ST**, supratemporal (= extrascapular). Scale bar: 1 mm.

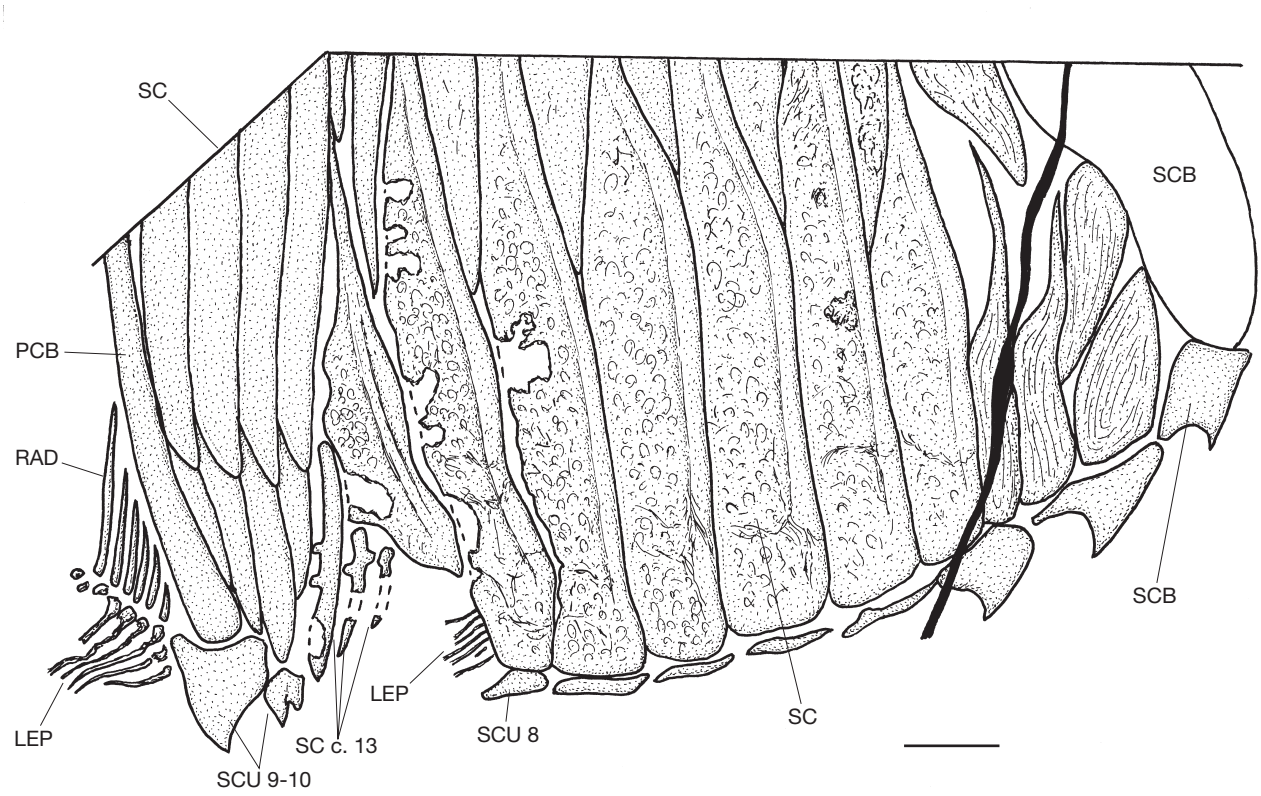

FIG. 8. — *Paranursallia spinosa* gen. and sp. nov. Holotype MNHN.F.PSA214. The ventral keel scutes, the ventral and cloacal scales and the beginning of the anal fin. Abbreviations: **CLT**, cleithrum; **LEP**, pelvic and anal fins rays; **PCB**, postcoelomic bone; **RAD**, anal pterygiophores; **SC**, ventral scales of the abdominal region; **SC c.1-3**, cloacal scales 1 to 3; **SCU 1-8**, precloacal ventral keel scutes 1 to 8; **SCU 9-10**, postcloacal ventral keel scutes. Scale bar: 1 mm.

A few rays and 63 complete or fragmentary pterygiophores are visible in the dorsal fin but the last ones are missing. The total number of dorsal pterygiophores must be about 70. Some rays and the first 33 pterygiophores of the anal fin are preserved. The total length of the anal fin basis represents 13.2 mm and the 33 preserved pterygiophores cover 5.9 mm of this length. We can thus estimate that the complete anal fin was supported by 73 pterygiophores.

The caudal skeleton (Fig. 6)

The caudal peduncle is short, with reduced neural and haemal spines. The caudal endoskeleton contains 5 epichordal and 8 hypochordal elements. The neural arches of the epichordal series bear long but thin neural spines, except the fifth one that is short and broken away from its neural arch. The first four hypochordal elements are well developed, all together long and rather broad. The fifth, sixth and seventh hypochordals are hypertrophied. These three elements have approximately the same width. The eighth hypochordal is not enlarged. No urodermal is visible but this apparent absence is perhaps due to the taphonomic events.

The caudal fin is of the vertical type (Poyato-Ariza & Wenz 2002: fig. 36 F). There are 29 principal rays, 3 dorsal and 4 ventral procurrent rays.

Squamation (Figs 7; 8)

There are flank scales only in the abdominal region of the body. In the ventralmost area of the *situs viscerum*, the scales are complete, slightly ornamented and articulated together. There are 9 rows of these large and broad body scales before the cloaca and 4 rows of narrower scales behind the cloaca. One smaller scale overhangs the cloaca and three small scales are visible in the cloacal vestibule. No bifid cloacal scale is present. The other body scales are reduced to scale bars.

The dorsal ridge is formed by a series of 8 scutes, each of them bearing one median spine. Only a very small part of the eighth element is preserved. The first dorsal scute is larger than the others. It is articulated with the dermosupraoccipital and rests on the dorsal margin of the supratemporal. Two scale bars are associated with each other dorsal scute. These dorsal scale bars bear a small transverse tube for the lateral line sensory canal.

The ventral keel contains 10 scutes, 8 before and 2 behind the cloaca. The first three and the two postcloacal scutes bear a median spine. The first ventral scute is located just below the cleithrum and the last one below the postcoelomic bone.

DISCUSSION

PARANURSALLIA SPINOSA N. GEN., N. SP. WITHIN PYCNODONTIFORMES

Paranursallia spinosa n. gen., n. sp. exhibits a few characters allowing to locate precisely the species within the pycno-

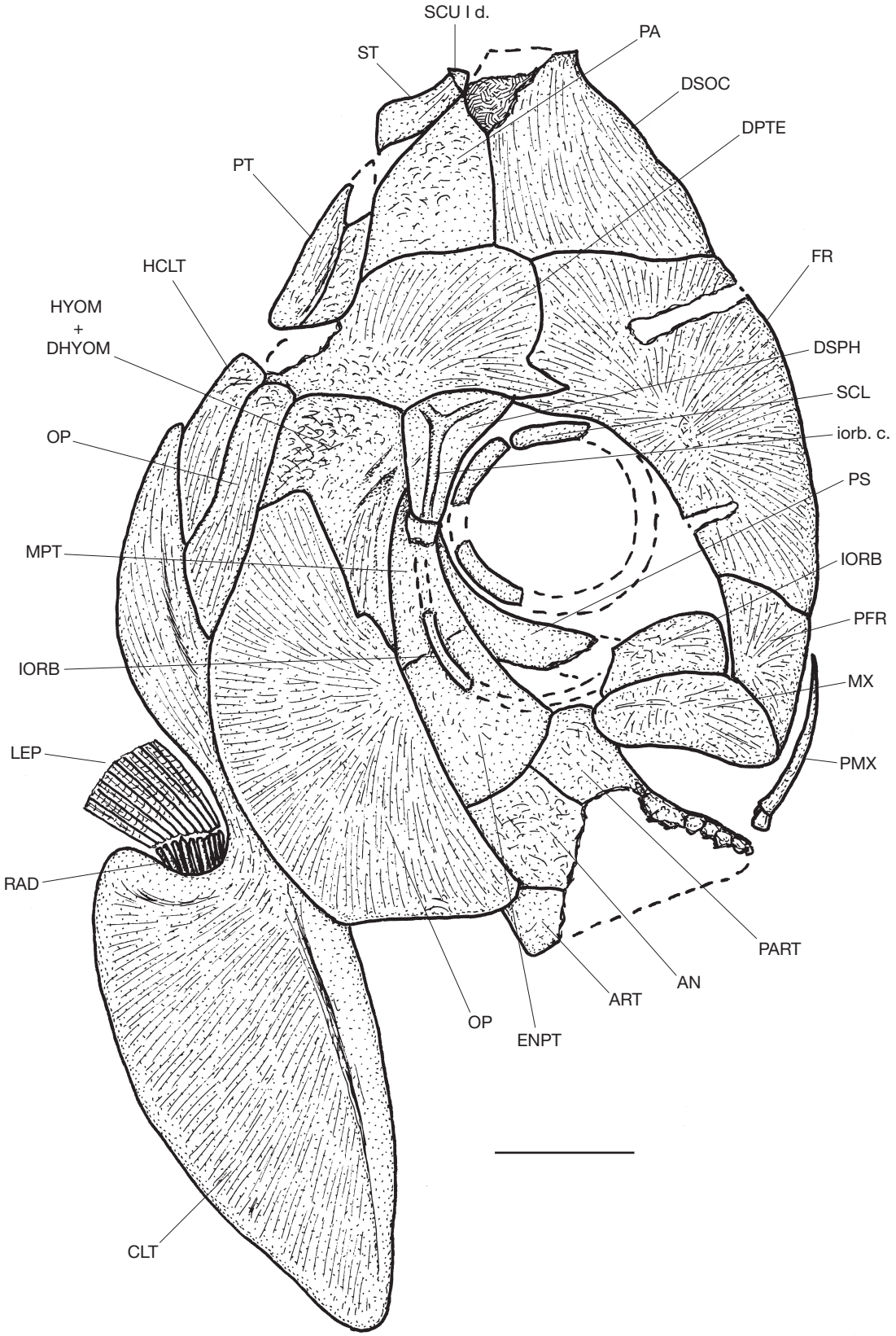

FIG. 9. — *Paranursallia gutturosa* (Arambourg, 1954). Paratype MNHN.F.T231G. Skull and pectoral girdle. Abbreviations: as in figure 5 and **IORB**, infraorbital; **LEP**, pectoral rays; **RAD**, pectoral pterygiophores. Scale bar: 5 mm.

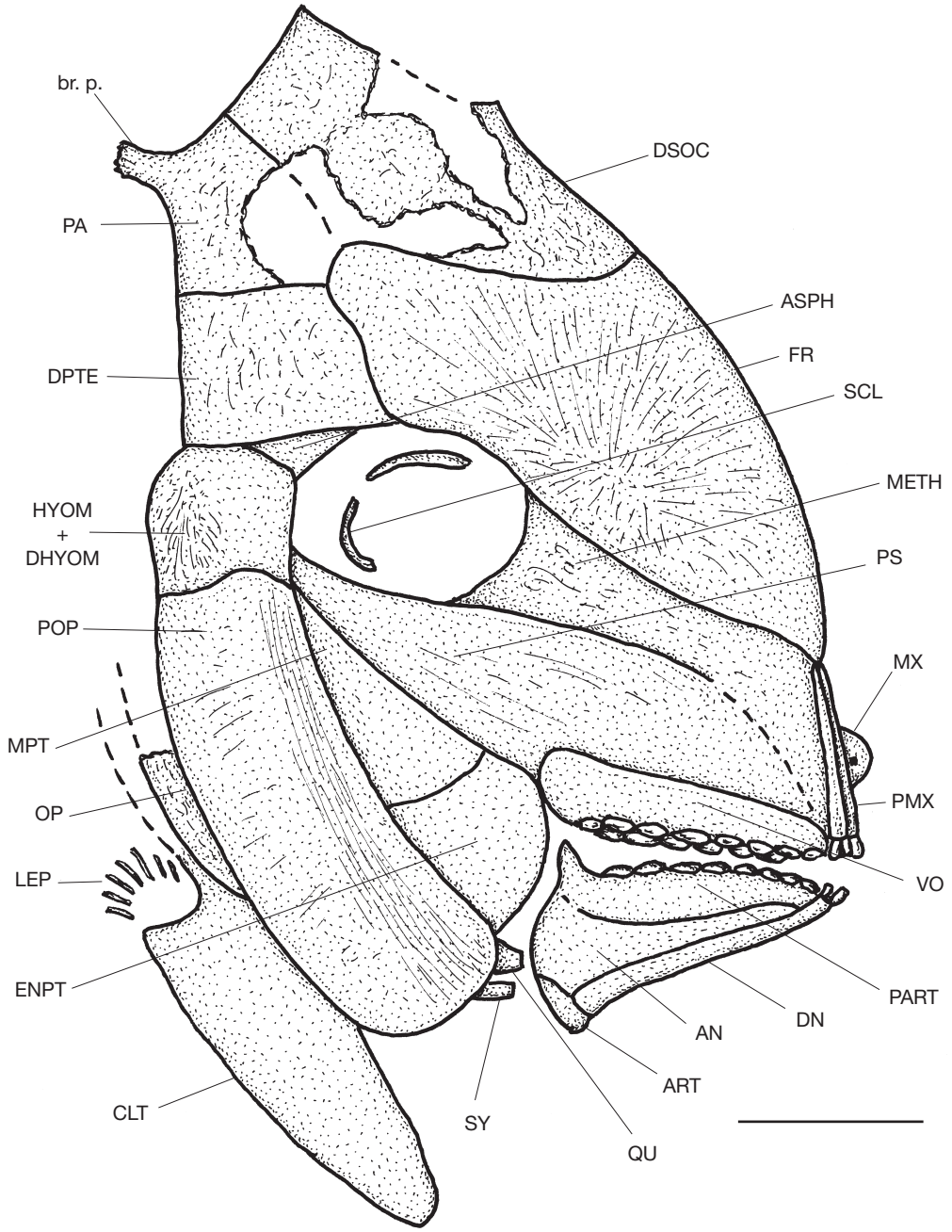

Fig. 10. — *Nursallia veronae* Blot, 1987, holotype MCSNV II D 172, 173, skull and pectoral girdle. Abbreviations: **ASPH**, autosphenotic; **br. p.**, brush-like process of the parieta; **QU**, quadrate; **SY**, symplectic; other abbreviations: see Figures 5 and 10. Scale bar: 2 mm.

dontiform phylogenetic tree: 1) the frontal is broad and curved; 2) the neural and haemal arches are interdigitated in a complex way; 3) the neural and haemal spines immediately preceding the epichordal and hypochordal series are reduced; 4) there is more than 50 pterygiophores in the dorsal and anal fins; 5) there are three hypertrophied elements within the hypochordal series; and 6) the caudal fin is vertical. The conjunction of these six apomorphies is typical of the subfamily Nursalliinae (Poyato-Ariza & Wenz 2002: 243, node 25).

Paranursallia spinosa n. gen., n. sp. within Nursalliinae (Figs 8-12)

Paranursallia spinosa n. gen., n. sp. possesses a very short snout and a large and deep "V"-shaped notch at the ventral junction between the head and the cleithrum. "*Nursallia*" *gutturosa* from the Cenomanian of Morocco, *Nursallia veronae* Blot, 1987 from the Eocene of Italy and *Nursallia tethysensis* Capasso, Abi Saad & Taverne, 2009 from the Cenomanian of Lebanon share these two apomorphies (Figs 4; 9-11). The other Nursalliinae have a longer snout and do not exhibit

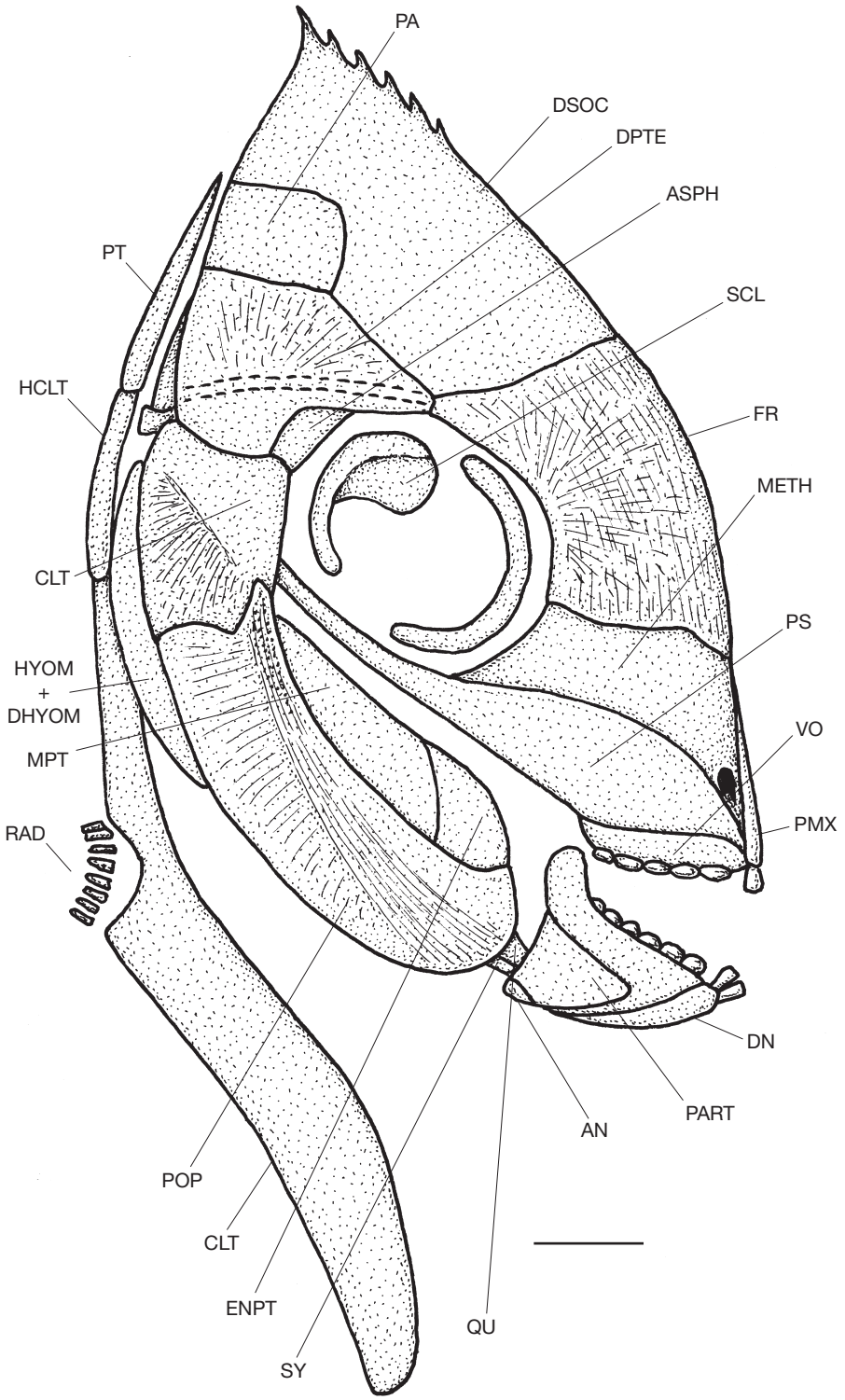

FIG. 11. — *Nursallia tethysensis* Capasso, Abi Saad & Taverne, 2009. Skull and pectoral girdle (modified from Capasso *et al.* 2009: fig. 4). Abbreviations: see Figures 5 and 10. Scale bar: 2 mm.

the deep ventral "V"-shaped notch (see Blot 1987: pls 26, 27, 30, 31 for *Abdobalistum thyrsus* Poyato-Ariza & Wenz, 2002 and *Palaeobalistum orbiculatum* Blainville, 1818, both from the Eocene of Italy; pers. obs. on specimens CLC S-11, S-356a, b, S-375 and S-477 for "*Nursallia*" *goedeli* (Heckel, 1854) from the Cenomanian of Lebanon).

Paranursallia spinosa n. gen., n. sp. appears to be more closely related to "*Nursallia*" *gutturosa* than to *N. veronae* and *N. tethysensis*. Both North African species possess broad paired prefrontals covering the mesethmoid (Figs 4; 9). They also have the first neural arches fused in a large synarcual including the exoccipitals and articulated with the rear of the skull (Fig. 4;

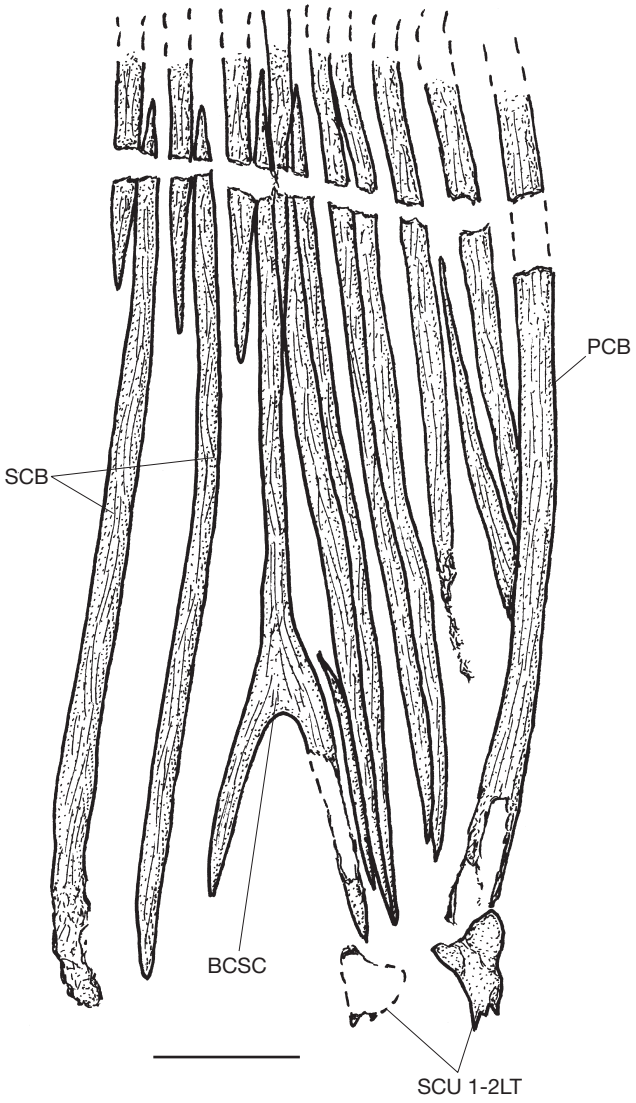

Fig. 12. — *Nursallia tethysensis* Capasso, Abi Saad & Taverne, 2009, paratype CLC S-136, scales of the cloacal region. Abbreviations: **BCSC**, bifid cloacal scale; **PCB**, postcoelomic bone; **SCB**, scale bars; **SCU 1-2**, pstcloacal ventral keel scutes. Scale bar: 2 mm.

Arambourg 1954: pl. 1, fig. 4). Their mandible is triangular and as deep as long (Figs 4, 9). A prefrontal and a synarcual do not exist in *N. veronae* (Fig. 10; Blot 1987: pl. 35) and *N. tethysensis* (Fig. 11; Capasso *et al.* 2009: fig. 3). These two last species possess a mandible longer than deep (Fig. 11; Blot 1987: fig. 52).

Thus, on the basis of the preceding three characters, we propose to remove "*Nursallia*" *gutturosa* from the genus *Nursallia* and to include henceforth this species in our new genus *Paranursallia* n. gen.

A bifid cloacal scale is present in *N. veronae* (Poyato-Ariza & Wenz 2002: 203) and in *N. tethysensis* (Fig. 12). Such a bifid scale does not exist in *P. spinosa* n. gen., n. sp. (Fig. 8). That is another difference separating the new species from *N. veronae* and *N. tethysensis*. The situation is unknown in *P. gutturosa*.

Paranursallia spinosa n. gen., n. sp. and *Paranursallia gutturosa*

In spite of their close resemblance, *Paranursallia spinosa* n. gen., n. sp. and *Paranursallia gutturosa* can not be confounded. The two species differ from each other by a series of characters. In *P. gutturosa*, the dermosupraoccipital upper margin is devoid of spines or bears only one spine (four spines in *P. spinosa* n. gen., n. sp.), the frontal does not reach the parietal (the two bones are in contact in *P. spinosa* n. gen., n. sp.), the caudal fin contains about 40 principal rays (29 in *P. spinosa* n. gen., n. sp.) and the dorsal ridge and the ventral keel are respectively composed by around 20 scutes (8 scutes in *P. spinosa* n. gen., n. sp.) and 15 to 17 scutes (10 scutes in *P. spinosa* n. gen., n. sp.). The preopercle and the ventral branch of the cleithrum are comparatively broader and the parietal larger in *P. gutturosa* than in *P. spinosa* n. gen., n. sp. Inversely, the dermosphenotic is larger and the opercle longer in *P. spinosa* n. gen., n. sp. than in *P. gutturosa*.

Geographical and stratigraphical distribution of *Paranursallia* n. gen.

Until now, *Paranursallia spinosa* n. gen., n. sp. is only known in the Cenomanian of Tunisia but *Paranursallia gutturosa* has been reported in three localities outside of Morocco, i.e. the Cenomanian of Floresta in Sicily (Leonardi 1966), the Cenomanian-Turonian of Cinto Euganeo in Italy (Sorbini 1976) and the Cenomanian of Passo del Furlo also in Italy (Capasso 2006).

In the specimens from Sicily, the dermosupraoccipital upper margin bears a series of small spines and the caudal fin is composed of about 30 principal rays (Leonardi 1966: pl. 1, figs 2, 3, 4). Thus, this material must be referred to *P. spinosa* n. gen., n. sp. and not to *P. gutturosa*.

The samples from Cinto Euganeo are too incomplete to allow a specific determination (Sorbini 1976: pls 7, 8).

The specimen from Passo del Furlo belongs to the species *P. gutturosa*. Indeed, its dermosupraoccipital upper margin is devoid of spines and its frontal does not reach the parietal (LT pers. obs.). The record of the genus *Paranursallia* n. gen. is thus centered in the western part of the Eurafrican Tethysean realm during the Cenomanian-Turonian age.

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