Placodontia is a monophyletic taxon that includes the unarmored Placodontoidea and the armored Cyamodontoidea. Until now, placodontoids were known only from the Middle Triassic of central and southern Europe, whereas cyamodontoids are known from a variety of localities throughout the western and eastern Tethyan faunal provinces, ranging from the Middle through the Upper Triassic (Sues, 1987; Rieppel, 1995, 2000a, b; Rieppel and Zanon, 1997; Li, 2000; Li and Rieppel, 2002). Whereas cyamodontoids are a very diverse group, unarmored placodonts are known from only two monotypic genera, viz. Paraplacodus broilii Peyer, 1931, and Placodus gigas Agassiz, 1833 (Rieppel, 1995, 2000a, b). Phylogenetic analysis shows these two taxa to be the successive sister-groups to the Cyamodontoidea, the tree topology being (Paraplacodus (Placodus, Cyamodontoidea)) (Rieppel, 2000a, b).

Here, we report the first unarmored placodont from outside Europe. The specimen was collected from Anisian deposits in Panxian County, Guizhou Province. The same horizon at the same locality has also yielded the mixosaurid ichthyosaur Mixosaurus panxianensis Li et al., 2006; as well as other vertebrates such as two nothosaurid sauropterygians (Nothosaurus yangjaensis Jiang et al., 2003, 2004, 2005a, b, c; Li, 2003; Li et al., 2004; Li et al., 2006). The sediments that yield the conodonts (Jiang et al., 2003, 2004, 2005a, b, c; Li, 2003; Li et al., 2004, b, c; Li, 2003; Li et al., 2004; Li et al., 2006). Phylogenetic analysis shows these two taxa to be the successive sister-groups to the Cyamodontidae, the tree topology being (Paraplacodus (Placodus, Cyamodontoidea)) (Rieppel, 2000a, b).

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Type Locality—Yangjuan Village, Xinmin District, Panxian County, Guizhou Province, China.

Type Horizon—Upper Member, Guanling Formation; co- nodont biozone of Nicorrella kockeli Tatge, 1956; Pelsonian, Anisian, Middle Triassic (Yang et al., 1999; Sun, 2006).

Derivation of Name—From Latin, “inexpectatus” for unexpected, unforeseen.

Diagnosis—A species in the genus Placodus that differs from the type species Placodus gigas by the prefrontal entering the posterior margin of the external naris; narrow separation of orbit from external naris; orbit high and rounded rather that horizon- tially elongated; anterior postorbital spur projecting into the orbit absent; tooth-bearing part of dentary slender; posterior cervical vertebrae with laterally projecting diaphysis for cervical rib articulation; clavicle slender.

DESCRIPTION

The skull is exposed in right lateral view; it measures 18 cm from the tip of the rostrum to the posterior margin of the quadrat. The profile of the skull is typical for placodontoids, with a...
flat rostrum formed by the premaxillaries set off from the deep orbital and postorbital region by a distinct preorbital step. The external naris is vertically oriented (21 mm long, 30 mm high), and surrounded by the premaxilla (anteroventrally and anteriorly), nasal (anterodorsally), prefrontal (posterodorsally) and the ascending (facial) process of the maxillary (posteriorly and posteroventrally). The premaxilla carries three chisel-shaped and strongly procumbent teeth that are 8 to 9 mm in length. The maxilla carries four flat to rounded maxillary teeth with an anteroposterior width of approximately 10 mm (Fig. 2). The premaxillary and maxillary dentition thus closely resembles that of *Placodus gigas* in tooth count and morphology.

The orbit is 33 mm long and 39 mm high, and hence of distinctly different shape than the elongated orbit of *Placodus gigas* (Rieppel, 1995, 2000a). The prefrontal bridge between the orbit and the external naris is relatively narrower than in *Placodus gigas*. It is formed by the prefrontal and maxillary ascending process, without contribution of the nasal. Instead, the nasal remains separated from the maxillary ascending process by the prefrontal, which enters the posterodorsal margin of the external naris, an important difference from *Placodus gigas*. The nasal, frontal, and parietal are all fused, indicative of an adult age of the specimen. The relatively large pineal foramen is enclosed by the fused parietals and located behind the fronto-parietal suture at the level of the anterior margin of the upper temporal fenestra.

The prefrontal meets the postfrontal in the posterior part of the dorsal margin of the orbit. At the anterodorsal corner of the orbit, the prefrontal forms a thickened, anterolaterally projecting rim. The postfrontal defines the anteromedial margin of the upper temporal fenestra, as well as the posterodorsal margin of the orbit, and it forms a ventral process that meets the postorbital in the postorbital arch. The postorbital forms most of the posterior margin of the orbit, and extends posteriorly to form most of the lateral margin of the upper temporal fenestra. Unlike *Placodus gigas* (Rieppel, 1995, 2000a), an anteriorly projecting spur of the postorbital is not present, nor does the postorbital form a deep groove at the posterior margin of the orbit.

The postorbital part of the skull suffered extensive damage in the area behind the orbit and below the lateral margin of the upper temporal fenestra, which obscures most morphological detail. It is clear that the jugal enters the ventral margin of the orbit, and that the squamosal and parietal enclose the posterior part of the upper temporal fenestra. Beyond these observations, however, the exact contours of the jugal and squamosal, and their precise relations to neighbouring bones, cannot be established. In addition, in this damaged cheek region, a concavity appears in the ventral margin of the upper temporal arch between jugal and squamosal, looking like a ventrally opened cheek or temporal emargination which, probably caused by damage, differs from the condition observed in *Placodus gigas*, yet recalls the morphology of the skull of *Paraplacodus* (Rieppel, 1995, 2000a, b). Furthermore, the squamosal narrowly overlaps...
the dorsal head of the quadrate posteroventrally, seemingly forming a short and pointed ventral projection that follows the posterior margin of the dorsal part of the quadrate. The resulting morphology (Fig. 2) seems similar to *Paraplacodus* but different from *Placodus gigas* (Rieppel, 1995, 2000a, b). But whether the ‘open’ cheek and short pointed projection of the squamosal in *Placodus inexpectatus* represent the natural conditions, or are consequences of postmortem damage to the skull, can no longer be ascertained, although the latter seems more probable.

The mandible of *Placodus inexpectatus* is again similar to that of *Placodus gigas*. Sutural details are difficult to ascertain on the laterally exposed right lower jaw ramus. The mandible is preserved in articulation with the quadrate. The coronoid process rises upwards immediately in front of the mandibular articulation, as in *Placodus gigas* (Rieppel, 1995, fig. 30A), but unlike in *Paraplacodus* (Rieppel, 2000b, fig. 3). In addition, the coronoid process is much higher in *Placodus inexpectatus* than in *Paraplacodus*, reaching a similar height as in *Placodus gigas* (Drevermann, 1933, plate 3, fig. 2d). Posterior to the mandibular articulation the lower jaw continues as a massive retroarticular process, another similarity shared with *Placodus gigas*. However, the mandible differs from that of *Placodus gigas* in that the tooth-bearing part of the dentary appears rather lightly built and porous, contrasting the latter’s robustness.

**Postcranial**

Six cervical vertebrae, 19 dorsal, three sacral, and 36 caudal vertebrae can be counted. It is conceivable that the atlas—axis complex is buried in the deeply excavated occiput, which would bring the number of cervical vertebrae up to eight, the same as in *Placodus gigas*, while in *Paraplacodus* there is a minimum of six cervicals (Rieppel, 2000a). The cervical ribs show a freeing anterior process that shifts laterally on the shaft of the rib in the posterior cervical region, as is also the case in *Placodus gigas* (Rieppel, 1995, 2000a, b). Unlike the latter taxon, the dorsal heads of the posterior cervical ribs articulate with the centra via a laterally projecting diapophysis. The transverse processes are distinctly elongated in the dorsal region, as is typical for placodonts in general (Rieppel, 2000a). The dorsal ribs lack an uncinate process as is present in *Paraplacodus* (Rieppel, 1995, 2000a, b). The three sacral vertebrae articulate with sacral ribs that are expanded both proximally and distally. The distal expansion is most prominently expressed in the second sacral rib in *Placodus inexpectatus*, but in the third sacral rib in *Placodus gigas* (Rieppel, 1995, 2000a, b). Free caudal ribs extend backwards to the 11th caudal vertebra.

The chevrons articulate on short pedicels located ventrally on the posterior margin of the caudal vertebral centrum. The chevrons show a distal expansion in the proximal tail region, a distal bifurcation in the middle section of the tail, while the shanks of the distally bifurcated chevrons become aligned with the longitudinal axis of the tail in the posterior tail section. This peculiar morphology of the chevrons is shared by *Paraplacodus*, but is not known for *Placodus gigas* (Rieppel, 1995, 2000a, b).

The gastrals are composed of five elements of which the lateral ones are strongly angulated, as is the case in *Placodus gigas* and *Paraplacodus* (Rieppel, 1995, 2000a, b). A single row of osteoderms extends along the dorsal midline of the body, as is also the case in *Placodus gigas*, but not in *Paraplacodus*, where osteoderms are absent (Rieppel, 1995, 2000a, b). The osteoderms of *Placodus inexpectatus* are almost round and small in the posterior cervical region capping the neural spines, and become larger in the dorsal, sacral, and proximal caudal region, but smaller again in the more distal tail region, further decreasing in size posteriorly and terminating in the gap between the 17th and 18th caudal vertebrae.

The partially exposed right clavicle is a boomerang-shaped element, with its postrolateral shank applied to the medial surface of the scapular blade (Fig. 3). The scapula is a tall, blade-like structure with the glenoid facet located at its posteroventral corner. The curved humerus shows a relatively straight preaxial margin and deeply concave postaxial margin. It is distinctly expanded and flattened distally (Fig. 3). The length of the right humerus is 142 mm, its proximal width is 27 mm wide, its minimal width is 23 mm, and its distal width is 43 mm. The entepicondylar foramen is absent, as is an ectepicondylar foramen or notch. The flattened radius of 79 mm in length is slightly shorter than the ulna, which is 81 mm long. The more robustly built ulna has a biconcave shaft with broadly expanded proximal and distal ends. The more lightly built radius is angulated, and lacks a distinct proximal or distal expansion. The ulna is also more robust than the radius in *Paraplacodus*, but the element is unknown in *Placodus gigas* (Rieppel, 1995, 2000a, b). Two rather small and rounded carpal ossifications, the intermediate with a diameter of 10 mm, and the ulnare of 7 mm width, are present. This differs from *Placodus gigas*, for which a single carpal ossification has been described (Drevermann, 1933), as well as from *Paraplacodus broilii*, which has three or four ossified carpals (Rieppel, 2000b). Of the five metacarpals, the first is only 10 mm long and thus the shortest in the series, while the third and fourth metacarpals are the longest with a length of 31 mm. The phalangeal formula is incompletely preserved but closely approaches the primitive condition 2-3-4-5-3.

The ilium is similar to that in *Placodus gigas* (Rieppel, 1995, 2000a, b). Abbreviations: cl, clavicle; f, femur; fl, fibula; h, humerus; il, ilium; r, radius; sc, scapula; t, tibia; u, ulna. Scale bars equal 10 mm.
located above and between the neural vertebral spines in the dorsal ribs, the tall, blade-like and unconstricted scapula, the posteriorly expanded base, the absence of an uncinate process on the y-shaped (0); complex as described by Rieppel (2000b) for Paraplacodus (1). To strengthen the test of the generic affinities of Placodus inexpectatus, latter character was coded (1) for Paraplacodus, but (0) for all other taxa, including Placodus gigas. The vector for Placodus inexpectatus (in groups of five) is: 10001 0?0?0 000?0 1???? 0????? 0???1111 0?????? 0???? 0?? 0?? 0?? 1111! 0!!1. Pachypleurosaurs, Simosaurus and Nothosaurus constituted the outgroup, Placodus gigas, Phalacrodon (Kotov, in prep.), Macroplacus, Proterodontosaurus, Plauchelys, and Psorophodon were included in the c. Branch-and-bound search yielded one single parsimonious tree (TL = 119; CI = 0.689, RI = 0.706), which is the same as the one discussed in Rieppel (2000b, fig. 10), but with Placodus inexpectatus coming out as sister-taxon of Placodus gigas. The generic affinity of the new placodont with Placodus is thus confirmed.

With the referral of the new species to the genus Placodus, the latter's geographical range is significantly expanded. Previously known exclusively from the lower Anisian to lower Ladinian of central and southern Europe (Rieppel, 1995, Rieppel and Dalla Vecchia, 2001), it is now also known to occur in the Anisian of Panxian, Guizhou Province, southwestern China, indicating that the genus Placodus had a wide geographical distribution within the Tethyan realm during the Middle Triassic. It further enforces the close affinities between the Middle Triassic marine reptile faunas of China and Europe, i.e., of the eastern and western Tethyan faunal provinces.

Acknowledgments—Miss Tian-fen Hu partially prepared the specimen. Projects 40672002 and 40302009 were supported by the National Natural Science Foundation of China. DYJ was supported by the Program for New Century Excellent Talents in University (NCET-07-0015, Ministry of Education of P. R. China). Grant 7886-05 was authorized by the Committee for Research and Exploration of the National Geographic Society. Robin O’Keefe, one anonymous reviewer, and Johannes Müller offer welcome advice and comments.

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Submitted July 25, 2007; accepted February 4, 2008.