SQUAMULES OF OSTEOGLOSSID FISH FROM THE INTERTRAPPEAN BEDS OF PARGI, ANDHRA PRADESH

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ABSTRACT

Morphologically variable isolated plates of osteoglossid scales have been reported from the intertrappean beds of Pargi, Andhra Pradesh and are considered to have close affinities to the genus *Phareodus*.

INTRODUCTION

Fossil osteoglossids were first reported from India by Hora[1] from the Intertrappean Beds of Deothan and Kheri. He documented a fragmentary scale (12 mm in length) consisting of numerous mosaic-like plates varying in shape from rectangular, rhombic to polygonal. This scale has been referred to the genus *Musperia*. Subsequently, mosaic plates of osteoglossids representing the genus *Phareodus* have been reported from the Intertrappean Beds of Nagpur[2] and Asifabad[3]. Similar plates are also known to occur in the Lameta Formation of Jabalpur (Tripathi, personal communication) and the Middle Eocene Subathu Formation of Jammu and Kashmir (Jolly, personal communication). The present paper is the first report from the Intertrappeans exposed west of Hyderabad.

The scale plates described were recovered from an ossiferous horizon exposed about 12 km NE of Pargi, Rangareddi District, Andhra Pradesh. Here the base of the intertrappean section is constituted by Deccan basalt of 3 m thickness, which is bouldery in nature due to spheroidal weathering . Overlying the basal basaltic flow is a soft, unfossiliferous whitish yellow mudstone bed measuring up to 30 cm in thickness. The mudstone is in turn overlain conformably by a 10 cm thick brownish-pink-coloured marl with abundant shell pieces. This is the main ossiferous horizon from which a large number of scale plates and dental remains of osteoglossids, otoliths, dental remains of crocodiles and vertebrae of snakes were recovered. A hard white claystone bed of 5 cm thickness enclosing numerous scales of *Lepisosteus* overlies the brownish pink marl. The topmost part of the section is covered by a 20 cm thick weathered, soft, greenish-coloured basalt.

The microvertebrates were obtained by screen-washing the sediments in water. The sediments were first dried in sunlight and then immersed in water for about 2 hr. Since the marl is very soft, it dissolves quickly in water. The dissolved material is washed in running water with different sets of sieves till the clay content is completely washed out. The residue left over in the sieves after washing was sorted under microscope for microvertebrate fossils. A large number of microvertebrates was recovered in this fashion among which the scale plates belonging to the osteoglossid fish are predominant.

MORPHOLOGY OF THE SCALES

The scale plates from Pargi are quadrangular, rhombic or polygonal in outline and range in size from 1.1 mm to 2.7 mm. On the basis of their external ornamentation, the scales can be divided into two types. In the first type, the external surface is ornamented with very fine, granular tubercles either irregularly oriented (figure 1 t, u) or arranged in regular concentric lines (figure 1 b, m, r, v). However, in the second type, the scale plates are relatively large and their external surface is ornamented with widely separated large tubercles (figure 1 c, e, h, k, o, p, w, y). In all the plates the internal surface is in the form of a concave basin whose margins are raised in the form of a rim. The rim is developed mainly due to differential mineralization in the scale. The marginal rim in all the specimens exhibit well-developed growth lines both on the external and internal surfaces (figure 1, a, d, f, g, i, j, n, q, s). With a few exceptions, the internal surface is smooth in all finely tuberculated plates whereas in coarsely tuberculated forms it shows a few widely spaced tubercles or reliefs with a transverse pore in the centre (figure 1, d, i, n, s, x). There are five fragmentary scales in which more than two plates are arranged in a mosaic like fashion as they are usually found in a complete scale (figure 1, g, j, n, s).

There are also a few fragmentary jaws of osteoglossids with well-preserved teeth, in addition to the scale plates. In these jaw elements, the length-height ratio varies from 5:1 to 9:1. The teeth

Figure 1a-y. Isolated plates of scales of *Phareodus*. **a** × 22; **d, f, l, q, u** × 23; **g** × 20; **i** × 19; **j, n, s** × 18; **x** × 11— internal surface. **b** × 22; **c, e, m, r, t** × 23; **h, y** × 20; **k, o** × 18; **p** × 17; **v** × 24; **w** × 11.— external surface.

are slender, consisting of a conical apical crown and a slightly curved narrow basal part.

DISCUSSION

The living members of the family Osteoglossidae are known from the freshwaters of South America (*Osteoglossum* and *Arapaima*), Africa (*Heterotis*), Siam (*Scleropages*) and Australia (*Scleropages*).

In the present collection scales having a fine granular external surface resemble those of the anterior part of the African genus *Heterotis* and the scales with large, irregular tubercles compare favourably to those of the posterior part of the South American genus *Arapaima*. But in *Arapaima* the inner surface of the scales is not concave as in the present forms.

Fossil osteoglossids are widely known only from the southern continents. Stratigraphic distribution of the family Osteoglossidae is given below.

Musperia—Eocene of Sumatra[4]; Eocene Intertrappen Beds of Deothan and Kheri[1].

Phareodus—Palaeocene of Australia[5]; Eocene of Pakistan[6]; Cretaceous Intertrappean Beds of Nagpur and Asifabad[2,3].

Scleropages—Eocene of Sumatra[4]; Neogene of Australia[5].

Brychaetus—Eocene of Morocco[7]; Palaeocene of Niger[8].

Opsithrissops—Palaeocene of Turkey[9].

The scale plates from the Intertrappeans of Pargi differ from the genus *Musperia* in having an external ornamentation made up of fine granular tubercles, sometimes arranged in concentric lines and also in possessing slender maxillary teeth.

They also differ from *Scleropages* in which the maxillae are as long 25 times their height, whereas in the present forms the maxillae are relatively short (5–9 times longer than height) and the scales are not homogeneous as in *Scleropages*. The present specimens could not be compared with *Brychaetus* and *Opsithrissops* as these two genera are represented by poorly preserved material.

Phareodus is the only genus to which the present forms show close affinities in possessing the two types of scale ornamentation described, and slender, tubular teeth made up of an apical triangular crown in the form of a cap, a narrow slightly curved basal part and relatively short jaws. Scales with similar morphological features are also known from the Late Cretaceous El Molino Formation of Bolivia and have been referred to the genus *Phareodus* based on their association with the maxillae of *Phareodus*[6].

Though scale plates with fine tubercular ornamentation have been reported from the Intertrappean Beds of Asifabad[3] and Nagpur[2], the second type of scale plates with coarse tubercles is not known. They have also been referred to the genus *Phareodus*.

It is thus evident that the present scale plates are clearly distinguishable from those of *Musperia*, *Scleropages*, *Brychaetus* and *Opsithrissops* in their morphological features and appear to be closely related to the genus *Phareodus*.

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