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A New Xantusiid Lizard from the Eocene of Wyoming

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INTRODUCTION

In the collection made by Drs. Paul McGrew and George Gaylord Simpson in southwestern Wyoming are remains of a large and varied squamate fauna. Among these remains is a single dentary that is so characteristic and perfect as to make definite identification possible without the guesswork usual when such fragmentary remains are available.

The pleurodont teeth and general form of the suture lines mark this bone as being lacertilian in relationships. A striking feature in the preservation of this dentary is the lysed bases of the teeth, indicating a non-anguimorph pattern of tooth replacement, which eliminates it from inclusion in any of the anguimorph families as listed by Gilmore (1928, p. 90) and McDowell and Bogert (1954, p. 129, fig. 30). The lizard-like Order Rhynchocephalia and the Agamidae and Chamaeleontidae can also be eliminated from consideration because of their acrodont teeth. The Iguanidae, Polyglyphanodontidae (included correctly by Hoffstetter, 1955, in the Teiidae) and the scincomorph families (Camp, 1923; Scincidae, Anelytropsidae, Feylinidae, Dibamidae, Gerrhosauridae, Lacertidae, Teiidae, and Amphisbaenidae) can be distinguished from the fossil under discussion by the following combination of characters: (1) absence of the backward-projecting external postcoronoid process of the dentary, (2) absence of the lingual shelf, (3) presence of a distinct splenial and dentary, (4) presence of a Meckelian groove, (5) absence of a strong coronoid process on the dentary, and (6) a generally higher number of teeth on the dentary, exceeding 18 in number.

The other remaining possibilities are two gekkotan families, the Gekkonidae and the Pygopodidae, and the Xantusiidae. The first two families can be eliminated because of the absence of a postcoronoid process, a higher number of teeth on the dentary, and the presence of a distinct splenial (McDowell and Bogert, 1954, fig. 24C, incorrectly figure *Coleonyx* without a splenial; see Hecht, 1951, fig. 2B, and McDowell and Bogert, 1954, fig. 23E, for condition in typical Gekkonidae). The only remaining family, the Xantusiidae, and the present fossil share the following combination of characters: (1) non-anguimorph tooth replacement pattern, (2) presence of a postcoronoid process on the dentary, (3) presence of a fused splenio-dentary, (4) presence of a lingual shelf, (5) presence of a strong coronoid process, (6) absence of a Meckelian groove, and (7) relatively low number of teeth on the dentary.

In the family Xantusiidae four genera are now recognized. They are *Cricosaura* Gundlach and Peters of Cuba, *Xantusia* Baird of the southwestern United States and northwestern Mexico, *Lepidophyma* Duméril (includes *Gaigeia* of H. Smith) of Mexico and Central America, and *Impensodens* Langebartel of the Pleistocene of Yucatan. Broili (1938) described a new species of *Ardeosaurus,* a genus placed by Hoffstetter in the Gekkota, which he believed to be an ancestral lizard and perhaps related to the Xantusiidae. Hoffstetter (1953) placed the species *A. schroederi* in a new genus, *Broilisaurus,* a scincomorph. There is actually little in the latter that relates it to the Xantusiidae. Unfortunately the lower jaw is not preserved, but the number of teeth on the upper jaw is almost twice the number in any living xantusiid. As the number of teeth in the upper jaw of most xantusiids is nearly the same as in the lower jaw, we can therefore conclude that the fossil dentary described here is not related immediately to *Broilisaurus* because of its lower number of teeth.

In *Cricosaura* the dental tooth counts range between 17 and 18 as compared to 13 in the fossil dentary. I have not examined the dentary of *Cricosaura,* but there are undoubtedly many other differences in this very distinct form.

The present fossil differs from the genus *Lepidophyma* by its smaller size and heavier form, lower number of simple teeth, and the presence of a deeper depression on the splenio-dentary. The genus *Lepidophyma* is distinguished by the fact that the more posterior teeth have secondary cusps which are placed laterally and internally to the main cusps. The total number of teeth varies in this genus between 14 and 18, although the actual variation within a given species is much less. The dentary of the adults of *Lepidophyma* is at least one and a half times the length of that of the fossil, and its width and massiveness are approximately one and one-quarter times those of the fossil. On the internal surface of the mandible of *Lepidophyma* there is a very shallow depression in the region of the splenio-dentary foramina which is probably the insertion of the M. geniohyoideus (Camp, 1923). In the fossil the splenio-dentary depression is much deeper and more extensive than in *Lepidophyma*. The fossil resembles *Lepidophyma* in the general form of the postcoronoid process and the extent of the insertion of M. adductor mandibulae externus superficialis (Lakjer, 1926).

Langebartel (1953) described from a single, articulated, nearly complete fossil dentary and coronoid a new genus, *Impensodens*. An examination of the type of this new genus reveals certain marked similarities to the genus *Lepidophyma* and certain differences. Langebartel (1953) states that *Impensodens* is distinguished by its 11 or 12 teeth on the dentary, sharply defined grooves on the posterior teeth, and a unique external coronoid-dentary suture line. A count of the teeth on the type reveals that there are certainly 12 teeth on the dentary. The most anterior portion of the dentary is missing, and the missing portion may have borne another one or possibly two teeth. A comparison of the external coronoid-dentary suture line reveals no unique differences as stated by Langebartel or as indicated by his illustrations. There are apparently two significant differences between *Impensodens* and the specimens of *Lepidophyma* available. The form and massiveness of *Impensodens* mandibles are greater than those available of *Lepidophyma*. The grooving on the posterior teeth and the structure of the cusps on these same teeth are not correctly depicted in the illustrations of Langebartel (1953). There are three cusps, as in *Lepidophyma*, which are badly worn in the type of *Impensodens*. The groove lying between the internal lateral cusps is more extensive ventrally than in *Lepidophyma*. The splenio-dentary depression, the insertion for the M. adductor mandibulae externus superficialis, and the postcoronoid process are as in *Lepidophyma*. It is therefore concluded that *Impensodens* actually represents a distinct species of the genus *Lepidophyma*. The fossil species of Langebartel, *L. arizeloglyphus*, differs from the Eocene fossil in the same manner as do the other members of the genus *Lepidophyma*.

The fossil dentary described herein most resembles that of the genus *Xantusia* in tooth count. The total variation of the dentary tooth count in *Xantusia* ranges between 12 and 16. As far as the dentary is concerned, the most distinct member of the genus *Xantusia* is *X. riversiana* Cope of San Nicolas, San Clemente, and Santa Barbara islands off southern California. The three smaller species, *X. vigilis* Baird, *X. arizonae* Klauber, and *X. henshawi* Stejneger of the southwestern United States, are most similar to one another. The present fossil is most similar in tooth count to *X. vigilis* (12–14, mean 12.6) and *X. arizonae* (12–14, mean 13.1); *X. henshawi* has a slightly higher tooth count (13–16, mean 14.8) than the two preceding species. The present fossil differs from the three smallest species of the genus by its larger size, more massive form, its distinct splenio-dentary depression (which is lacking in the smaller species of *Xantusia*), and its distinct groove for its adductor mandibulae (which is lacking in the three smallest species). *Xantusia riversiana* resembles the present fossil in tooth count (13–14, mean 13.3), massiveness, robustness of the teeth, distinctness of the splenio-dentary depression, and the groove for the levator mandibulae externus superficialis. It differs in its larger size and the distinctly trifid condition of the teeth in which the three cusps are all placed in a single line. A single fossil from the Rancho La Brea tar pits has been ascribed by Brattstrom (1953) to *X. vigilis,* but in the text he states that the teeth are trifid. No members of this species have trifid teeth. Dr. Jay Savage has examined (personal communication) this specimen and has determined it as belonging to another family, the Iguanidae. It therefore can be concluded that the Eocene fossil is distinct from any living or fossil genus or species of the family Xantusiidae.

DESCRIPTION

PALAEOXANTUSIA, NEW GENUS

Generic Diagnosis: A xantusiid lizard distinguished from the smaller members of the genus *Xantusia* by its smaller size, more robust dentary, its distinct splenio-dentary depression, and groove for the adductor mandibulae externus superficialis; from *X. riversiana* by its smaller size and its lack of the secondary lateral internal cusps and slightly lower tooth count; from *Cricosaura* by its larger size and lower number of teeth.

Palaeoxantusia fera, new species[1]

Species Diagnosis: Same as for the genus.

Type Locality: West End of Elk Mountain, S.W. ¼ sect. 34, T. 29 N., R. 105 W., Sublette County, Wyoming.

Horizon: Late Bridgerian, "Middle Eocene."

Formation: "Bridger."

Description of Holotype (A.M.N.H. No. 3815): A robust, slightly curved left dentary, which is 9.6 mm. in length (measured from the ex-

[1] This species is named in honor of Dr. Jay Savage of Pomona College who has aided in the identification.

ternal postcoronoid process to the symphysis of the rami) and armed with 13 teeth, although two are missing and represented only by tooth sockets. The teeth are pleurodont, conical, robust, and rounded at the apex. Below the teeth on the internal surface there is a distinct shelf with a groove. At the base of most of the teeth are concavities evidently hollowed out by missing replacement teeth and therefore indicative of a non-anguimorph type of tooth replacement. Alternate teeth are apparently in the same state of replacement, as, for example, teeth numbers 13, 11, 9, 6, 4, and 2 (counting from the front to the rear). In these teeth about one-quarter of the tooth height has been lysed.

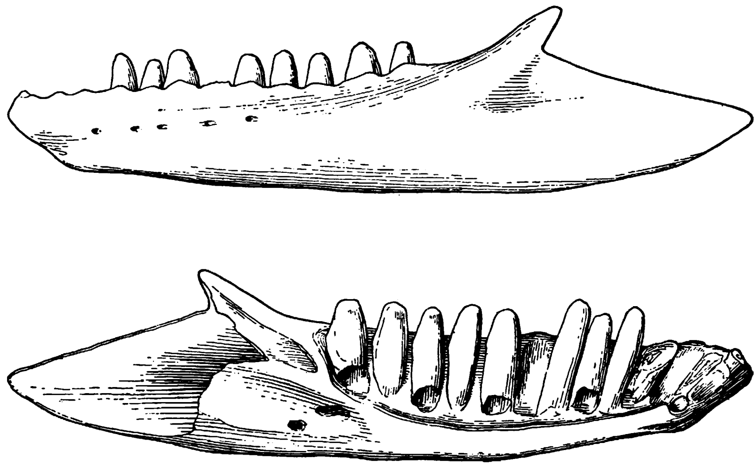

FIG. 1. External (upper) and internal (lower) lateral views of the dentary of *Palaeoxantusia fera*, A.M.N.H. No. 3815. × 10.

At the posterior border of the dentary rises a prominent strong coronoid process. The internal surface of the coronoid process is incised with a groove for the reception of the coronoid bone which overlaps the dentary at this point in the complete jaw. The coronoid incision reaches the posterior border of the lingual shelf of the dentary. Beneath the coronoid incision is a shallow groove or incision which is the area of overlap for the angular bone. At the anterior and ventral limits of the angular lie two foramina, which characteristically mark the splenio-dentary suture in many lizards. There is no evidence of a distinct splenial, and this bone is completely fused with the dentary. The region of the splenio-dentary suture is a rather deep depression in which are the splenio-dentary foramina. This may be the insertion of the M. geniohyoideus. Properly the entire bone should be called the splenio-dentary.

Beneath the lingual shelf there are no other foramina between the splenio-dentary foramina and the single foramen lying beneath and posterior to the symphysis. Behind the level of the coronoid process, there is no bone on the internal surface of the dentary, and is evidently the area which was originally covered by the angular and surangular. At this level

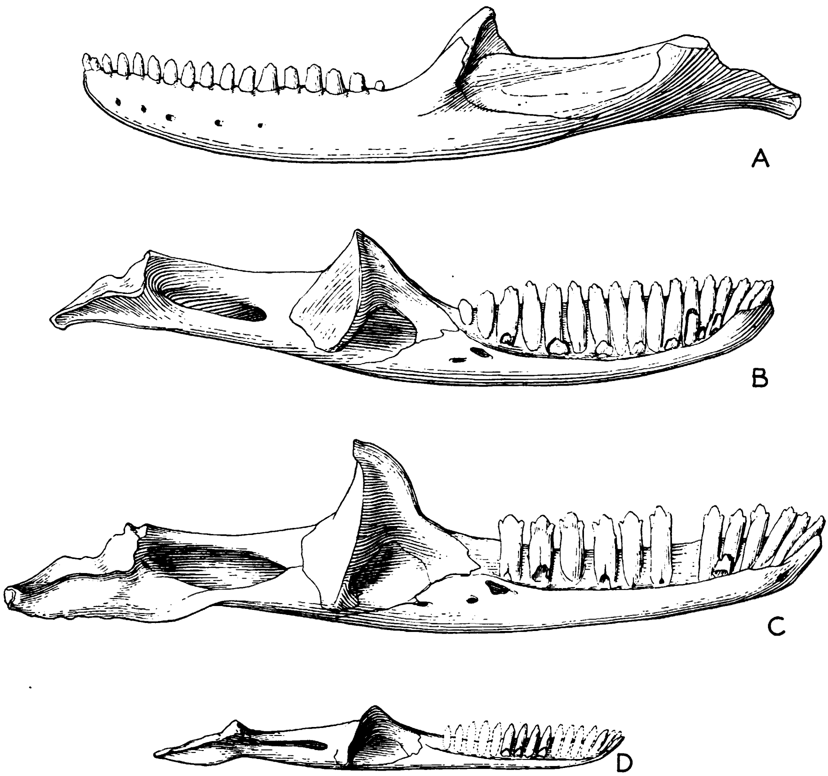

FIG. 2. Lower jaws. A. *Lepidophyma smithi*, University of Illinois Museum of Natural History No. 10962, external lateral view. B. Same specimen, internal lateral view. C. *Xantusia riversiana*, A.M.N.H. (A.R.) No. 20755, internal lateral view. D. *Xantusia henshawi*, A.M.N.H. (A.R.) No. 69030, internal lateral view. All figures × 5.

the internal surface of the postcoronoid process of the dentary is visible.

The external surface of the dentary is almost straight in outline except for a gentle curve at the anterior eighth of the jaw and a ventral curvature. The nutritive foramina are five in number and placed mid-laterally and beneath teeth numbers 4, 6, 7, 8, and 9. There is a shallow groove on the external surface of the dentary directly beneath the base of the coronoid process which is for insertion of the adductor mandibulae externus superficialis of Lakjer (1926). This groove does not extend onto the postcoronoid process posterior to the level of the posterior limits of the coronoid process. The postcoronoid process is strong and well developed and extends one-fifth of the entire length of the dentary. The apex of the postcoronoid process occurs at the level of ventral curvature, so that the ventral portion of the postcoronoid process is concealed in lateral view owing to the ventral curvature.

CONCLUSIONS

The splenio-dentary of the Xantusiidae is a distinctive feature of the family, and as a result fossils are readily identifiable. There are now two correctly identified fossil remains of the family, *Lepidophyma arizeloglyphus* and *Palaeoxantusia fera*. The latter fossil, *P. fera,* indicates that the *Lepidophyma* and *Xantusia riversiana* line was established by early Tertiary times. A dentary identified by Brattstrom (1953) as *Xantusia vigilis* is definitely misidentified, and actually is an iguanid.

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