

## REFERRAL OF THE FOSSIL LIZARD *SCELOPORUS HOLMANI* (LATE PLIOCENE OF NORTH-CENTRAL KANSAS) TO THE GENUS *PHRYNOSOMA*

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**ABSTRACT:** *Sceloporus holmani* from the late Pliocene of north-central Kansas, USA, is referred to the genus *Phrynosoma*. The fossil record of *Phrynosoma* is discussed.

**Key words:** Reptilia; Sauria; Iguanidae; *Phrynosoma holmani*; Pliocene; Kansas

*SCELOPORUS holmani* (Iguanidae) was first described from the Pliocene (late Blancan Land Mammal Age) White Rock Fauna of north-central Kansas by Eshelman (1975). Reexamination of the paratype (UMMP V61390; right dentary) indicates that this lizard is a horned lizard and should be placed in the genus *Phrynosoma*. The original description and illustration, locality

data, known distribution, and etymology are presented in Eshelman (1975). Measurements and a description of UMMP V61390 are also in Eshelman (1975). The fossil was compared with reference skeletons in the collection of T. R. Van Devender, including various *Sceloporus*, all United States species of *Phrynosoma*, and several Mexican species (*P. asio*, *P. ditmarsii*, *P. orbiculare*).

*Phrynosoma holmani* (Eshelman)  
comb. nov.

**Amended diagnosis.**—A species of *Phrynosoma* with the following unique combination of characters: (1) primitive tall teeth with transversely expanded tooth bases and reduced tricuspid crowns, (2) dentary very deep, especially anteriorly, (3) ventral surface of dentary flattened, (4) ventrolateral surface of dentary strongly angled, (5) well developed depressions of muscle scars on anterior end of ventral surface and the dorsolateral surface of the posterior end of dentary, (6) Meckel's canal not fused, constricted in middle of dentary, and medially located on anterior end of dentary, and (7) area around dentary symphysis well developed above and below Meckel's canal.

**Remarks.**—The fossil has teeth that are relatively tall with transversely expanded tooth bases and tricuspid crowns, and a relatively deep dentary as in *Sceloporus* and primitive species of *Phrynosoma*. The secondary cusps are more reduced than in *Sceloporus* and resemble the relatively narrow crowns of the extant horned lizards *Phrynosoma douglassi* and *Phrynosoma orbiculare*. The teeth of *P. holmani* are taller than any extant species of *Phrynosoma*, indicating a varied insectivorous diet. More advanced extant species such as *Phrynosoma modestum* and *Phrynosoma solare* specialize in eating ants and have teeth that are reduced to simple conical pegs.

The dentary of *P. holmani* is relatively deeper, especially anteriorly, than in the extant species of *Phrynosoma*. The ventral surface of the dentary in *P. holmani* is relatively flat as in *Phrynosoma* rather than in *Sceloporus*. The ventrolateral surface of the dentary in *P. holmani* is strongly angled as in the extant species, *Phrynosoma cornutum*, *P. modestum*, and *Phrynosoma platyrhinos*. The dentaries of *Sceloporus*, *P. douglassi*, *P. orbiculare*, and the extinct early Pleistocene species *Phrynosoma adinognathus* from Kansas (Rickart, 1976) are rounded on this surface. Depressions of muscle scars on the anterior end of the ventral surface and dor-

solateral surface of the posterior end of the dentary are well developed in *P. holmani*. The anterior surface depression is well developed in *Phrynosoma* but not *Sceloporus*. The depression on the posterior dorsolateral surface is similar to the condition in large *Sceloporus* and *P. cornutum* but less well developed in *Phrynosoma ditmarsii*, *P. douglassi*, and *P. orbiculare*. In *P. holmani*, Meckel's canal is medial, open, and constricted in the middle of the dentary as in *Sceloporus*, *P. ditmarsii*, *P. douglassi*, and *P. orbiculare*. Meckel's canal is open with little constriction in the middle as in *P. cornutum*, *P. platyrhinos*, and *P. solare*. Meckel's canal is located medially on the anterior end of the lingual surface of the dentary in *P. holmani* as in *Phrynosoma* and not ventrally as in *Sceloporus*. The dentary symphysis is well developed above and below Meckel's canal in *P. holmani*. The dental gutter and labial parapet are well developed in *P. holmani* and similar to those of *P. douglassi*.

#### DISCUSSION

The earliest fossil *Phrynosoma* are primitive forms reported as *Phrynosoma* ?*douglassi* from the middle Miocene (Hemingfordian Land Mammal Age) Split Rock Formation, Wyoming (Robinson and Van Devender, 1973), and as *Phrynosoma* sp. from the middle Miocene (late Barstovian Land Mammal Age) lower Valentine Formation, Nebraska (Estes and Tihen, 1964). By the late Pliocene, *P. cornutum* had evolved and was found in the Rexroad (early Blancan Land Mammal Age; Oelrich, 1954) and Saw Rock (early Blancan; Etheridge, 1960) faunas, Kansas, the Beck Ranch fauna, Texas (early Blancan; Rogers, 1976), and the Sand Draw fauna, Nebraska (late Blancan; Holman, 1972). *Phrynosoma holmani* from the White Rock fauna (late Blancan), Kansas, is an extinct species that has a combination of primitive and derived characters. Apparently none of the living species is derived from *P. holmani*. *Phrynosoma adinognathus* from the early Pleistocene (early Irvingtonian Land Mammal Age) Borchers

fauna, Kansas, is a robust relative of *P. douglassi* (Rickart, 1976). The dentary of a female *P. douglassi* of record size (SVL = 115 mm; TRV 1004) from Chihuahua, Mexico, is as large as in *P. adinognathus* but is not as thick. When the relationship between Pleistocene climates and robustness in reptiles and amphibians is better understood, *P. adinognathus* may be shown to be conspecific with *P. douglassi*. The only extinct late Pleistocene (Rancholabrean Land Mammal Age) species is *P. josecitensis* from San Josecito Cavern, Nuevo Leon, Mexico, (Brattstrom, 1955). It is a bizarre species represented by a single squamosal with four horns (CIT-LACM 5116, holotype, reexamined). Although the number of squamosal horns is similar to *P. solare*, and the internal shapes of the squamosal are similar to *Phrynosoma coronatum*, *P. josecitensis* may not be closely related to any extant species. A number of fossil *Phrynosoma* from Rancholabrean and Holocene deposits from central and southwestern United States have been referred to extant species.

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