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Talpavus and *Entomolestes* (Insectivora, Adapisoricidae)

By Peter Robinson[1]

Marsh (1872, p. 128) described the small insectivore *Talpavus nitidus* from the Bridger Formation, basing his description on a jaw fragment with one-half of the first molar and all of the second, and a second, small associated jaw fragment with a premolar. The latter fragment does not fit the former, is not preserved in the same manner, and the morphology of the premolar is typical of *Peratherium,* not an insectivore. The fragment with the molars is an erinaceoid insectivore. In 1909, Matthew included *Talpavus* in the genus *Nyctitherium* and described a new genus of small insectivores from the Bridger Formation, *Entomolestes,* with *E. grangeri* as the type species. Later (1918) Matthew described a second species of *Entomolestes, E. nitens,* from the older Willwood Formation. McGrew (*in* McGrew and others, 1959, p. 151) and McKenna (1960, pp. 53–58) called attention to the confusion of *Nyctitherium, Entomolestes,* and *Talpavus,* and, later, I (McKenna, Robinson, and Taylor, 1962) separated *Talpavus* from *Nyctitherium,* a position I still support.

Further study has indicated that the confusion is caused by the similarity of *Talpavus nitidus* (=*Nyctitherium nitidum*) to *Entomolestes grangeri.* The two species are very similar and almost the same size. I am therefore figuring both the type specimens and a referred specimen of *T. nitidus* to illustrate the similarities and the differences. Because of the lack of definite association, no upper dentitions are figured or allocated.

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Upper teeth of *E. nitens* are known from the San José Formation, Almagre facies, but the allocation of this species to *Entomolestes* is questioned; it would be placed more accurately in the related genus *Scenopagus.*

Recently McKenna (1960, p. 55) has suggested that *Leipsanolestes* (Simpson, 1928, p. 6, fig. 3), originally described from the late Paleocene deposits at Bear Creek, Montana, should be included in *Entomolestes.* I suggest that this genus should be included in *Talpavus,* which it resembles more closely, because of the well-developed groove on the posterobuccal side of the talonid of P_4 for the occlusion of the paracone of P^4, and because of the shape of the paraconid of the molars.

Abbreviations

A.M.N.H., the American Museum of Natural History
Y.P.M., Peabody Museum of Natural History, Yale University

SYSTEMATICS

CLASS MAMMALIA

ORDER INSECTIVORA

SUPERFAMILY ERINACEOIDEA

FAMILY ADAPISORICIDAE

ENTOMOLESTES MATTHEW, 1909

Figure 1G–I

Type Species: *Entomolestes grangeri* Matthew, 1909, holotype, A.M.N.H. No. 11485, from the Bridger Formation, Bridger B, Grizzly Buttes West, Bridger Basin, Wyoming.

Description: A.M.N.H. No. 11485 is a fragment of the left jaw with P_3–M_3 and five anterior alveoli preserved. P_3 is unicuspid with two roots (not one, as stated in Patterson and McGrew, 1937, and McKenna, 1960), the anterior root below the central portion of the tooth, the posterior below the rear part; the anterior part of the tooth probably overlapped the posterior portion of P_2. P_4 has all three trigonid cusps, a small lingual talonid basin, and a small anterobuccal cingulum. M_1 has a broken trigonid, with paraconid and metaconid missing; the size of the scar indicates that the paraconid was large. The entoconid is tall and the hypoconid worn low in typical erinaceid manner. A hypoconulid was probably present in the unworn condition but is now obliterated by wear. M_2 has a well-developed, low paraconid resembling that of shrews and hedgehogs. The metaconid is broken off, the entoconid is

TABLE 1

MEASUREMENTS (IN MILLIMETERS) OF THE LOWER TEETH OF *Talpavus* AND *Entomolestes*

	Entomolestes grangeri A.M.N.H. No. 11485	*Talpavus nitidus* Y.P.M. No. 13511	*Talpavus nitidus* Y.P.M. No. 16334
P_3			
Length	0.75	—	—
Width	0.42	—	—
P_4			
Length	1.24	—	—
Width	0.75	—	0.82
M_1			
Length	—	—	1.42
Width of trigonid	—	—	0.97
Width of talonid	1.05	1.04	0.97
M_2			
Length	1.39	1.37	—
Width of trigonid	0.91	1.09	—
Width of talonid	0.97	0.98	1.01
M_3			
Length	1.16	—	—
Width of trigonid	—	—	—
Width of talonid	0.71	—	—

high, and a trace of the hypoconulid is preserved. M_3 is smaller than either M_1 or M_2 but has a well-developed paraconid, broken metaconid, and distinct hypoconulid.

The alveolus for P_2 has a figure-8 outline, which indicates that P_2 might have had either two roots or a single root fused from two roots. The four forward alveoli appear to be single.

The type specimen of *E. grangeri* is the only specimen of that species known to me. The specimen is from an old individual, if the wear on the teeth is an accurate measure of age and not the result of malocclusion. McKenna (1960, p. 55) called attention to the single-rooted P_3 of *Entomolestes*. In *E. grangeri* this tooth is double-rooted, although the two roots fuse below the crown and are difficult to distinguish in external view. *Leipsanolestes* (Simpson, 1928, p. 6) is clearly related to *Entomolestes,* as noted by McKenna (1960, p. 55), but I believe that it is more closely related to *Talpavus* because of the enlarged talonid of P_4, which is distinct from the reduced talonid of *E. grangeri.* In a sense, the distinctions seem small, because all these genera (*Talpavus, Entomolestes, Leipsanolestes, Scenopagus*) are related. *Talpavus* and *Leipsanolestes* appear to be the more primitive forms, and I would include *Leipsanolestes* in *Talpavus* rather

than in *Entomolestes.* Most of the species are unknown from definitely associated upper teeth. Only *Scenopagus edenensis* and *Entomolestes nitens* (which I think should be included in *Scenopagus*) are known from associated upper dentitions of which the allocation is probable (in the former case, collections from Tabernacle Butte, Bridger Formation, and Powder Wash, Green River Formation; in the latter, from Quarry 88 in the Almagre facies of the San José Formation). I assume, however, that upper molars of all would be quite similar because of the similarity of the lower molars; the differences will be in the antemolar dentition.

The five anterior alveoli of *E. grangeri* pose a problem in the homologies of the teeth that filled them. I am inclined to agree with McKenna that they were filled with single-rooted teeth except for P_3. If no loss in dentition be assumed, these would be I_{2-3}, C_1, P_{1-3}. There is enough of the symphysis missing to accommodate I_1. If P_{1-2} are truly single-rooted teeth, *Entomolestes* would have evolved sufficiently by early Bridgerian time to have been quite distinct from its more conservative contemporaries *Talpavus* and *Scenopagus.*

One of the peculiar characters of *Entomolestes* is its well-developed, low paraconid, visible on M_{2-3}, broken off on M_1. *Talpavus,* on the other hand, has a narrow, compressed paraconid. In this respect, and in the morphology of P_4, *Talpavus* resembles, and is probably related to, *Ankylodon,* and *Entomolestes* resembles a soricid. Indeed, if the antemolar teeth in *Entomolestes* were in a stage of reduction of size and root number, then it might be a logical step in the development of shrews. However, as many erinaceids also have a reduced anterior dentition, *Entomolestes* could well belong in the ancestry of the erinaceids as well, as suggested by Patterson and McGrew (1937, p. 268), McKenna (1960), and others. I do not, however, believe that *Entomolestes* has passed the erinaceid grade of development, and therefore I agree with Van Valen's (1967) allocation of the genus to the Adapisoricidae within the Erinaceoidea. In particular, the anterior alveoli lack indications of an enlarged incisor characteristic of the Erinaceidae and found, in less well-developed state, in *Scenopagus priscus* (Y.P.M. No. 15254).

TALPAVUS MARSH, 1872

Figure 1A-F

PROBABLE SYNONYM: *Leipsanolestes* Simpson, 1928.

TYPE SPECIES: *Talpavus nitidus* Marsh, 1872, holotype, Y.P.M. No. 13511, from the Bridger Formation, upper beds, Henry's Fork, Wyoming; and referred specimen, Y.P.M. No. 16334, from Dry Creek, Wyoming, Bridger Formation, probably the upper beds.

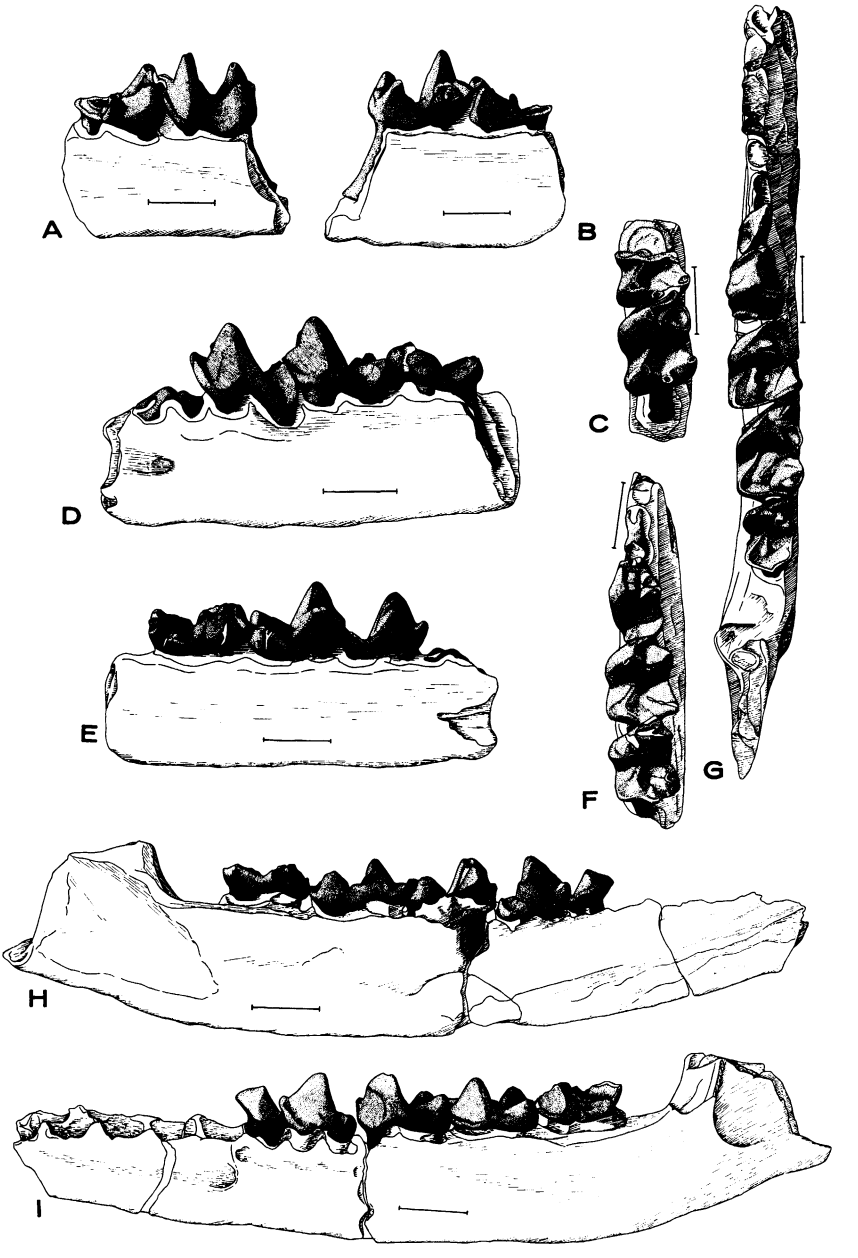

FIG. 1. A–C. Y.P.M. No. 13511, holotype of *Talpavus nitidus*. A. Buccal view. B. Lingual view. C. Occlusal view. D–F. Y.P.M. No. 16334, referred specimen of *Talpavus nitidus*. D. Buccal view. E. Lingual view. F. Occlusal view. G–I. A.M.N.H. No. 11485, holotype of *Entomolestes grangeri*. G. Occlusal view. H. Lingual view. I. Buccal view. The small bar beside or on each drawing represents a 1-mm. scale at gum line.

DESCRIPTION: Based on the holotype, Y.P.M. No. 13511, a left talonid of M_1 and M_2, and Y.P.M. No. 16334, a left P_4–M_2 with roots of P_3. P_3 is a relatively large tooth with well-developed roots. P_4 has three trigonid cusps, with the metaconid almost as large as the protoconid. The talonid is larger proportionally than in *Entomolestes* but does not have a talonid basin; a large buccal groove is present for the occlusion of the paracone of P^4, a characteristic similar to that of *Nyctitherium velox* and *Leptacodon tener.* The posterobuccal margin of the tooth is depressed as in nyctitheres. M_1 and M_2 are similar to each other, with an anteroposteriorly compressed paraconid (unlike *Entomolestes*) and with the erinaceid-like high entoconid and hypoconulid near the midline. The hypoconid is high in young individuals (the type) and wears flat with age (Y.P.M. No. 16334) in a similar fashion to that in *Scenopagus* and *Entomolestes.* The development of P_4 distinguishes *Talpavus* from *Scenopagus.* In size, *Talpavus nitidus* and *Entomolestes grangeri* are similar; identifying specimens on the basis of the molar dentition alone would be difficult if the paraconids were missing. The development of the paraconid is significantly different in the two genera and probably indicative of the initiation of quite different evolutionary trends.

Entomolestes grangeri and *Talpavus nitidus* are considered to be two different members of the family Adapisoricidae. Because of the morphology of the molars and the reduction of the anterior dentition, including the number of roots per tooth, *Entomolestes grangeri* is considered a possible ancestor of the Soricidae or a structural stage through which the ancestor of the shrews might have passed. *Entomolestes* is also considered a possible ancestor of the Erinaceidae (a view long held by others). *Talpavus nitidus* is considered to be related to more general adapisoricids such as *Scenopagus* (including *Entomolestes nitens* within that genus), and to be a prior synonym of *Leipsanolestes* Simpson, 1928. *Talpavus* preserves an indication of a large conical paracone on P^4 which is probably a primitive erinaceoid character.

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