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PALEOCENE MULTITUBERCULATES FROM MONGOLIA¹

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In 1925 Matthew and Granger² described as *Prionessus lucifer* the lower jaw, without teeth, of a small multituberculate. This specimen, collected in 1923, is from the Gashato Formation which was referred to the Paleocene—a reference rendered still more probable by later discoveries. In 1925 further collections were made, including the specimens of multituberculates here described.

Prionessus lucifer Matthew and Granger, 1925

New material of this species consists of a lower jaw with broken M_1 and complete but worn M_2 (A. M. No. 21710), a palate with all of the molars (A. M. No. 21717), and some isolated teeth and fragments (A. M. No. 21724). As is generally the case in the later multituberculates, M_1 is narrower and longer than M_2 . The tooth is too worn and broken for an accurate count, but the cusp number was relatively small, possibly about five outer and four inner cusps. M_2 is subtriangular, with three outer and two inner cusps, giving the formula 3:2. The cusps are large, rather quadrate, relatively simple. The two posterior cusps of the outer row are imperfectly separated at their bases.

In the upper jaw there is a single premolar root immediately anterior to M^1 . The specimen is broken anterior to this point, but the reduction of the single lower premolar suggests a similar condition in the upper jaw, as in *Tæniolabis* ("*Polymastodon*"). The cusp formula of M^1 appears to be 6:7:5. Outer and middle rows are of approximately the same length, but the latter has the greater width. The inner row narrows and becomes ridge-like anteriorly and does not quite reach the anterior end of the tooth. The cusps are simple, with no definite indication of the secondary furrows and ridges characteristic of most American Cretaceous and Paleocene multituberculates, although these may have been removed by wear. M^2 is about as wide and long, and like the opposing lower tooth is subtriangular, but with the shortest

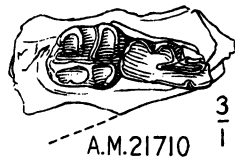


Fig. 1. *Prionessus lucifer* Matthew and Granger. Part of right lower jaw with M_{1-2} , A. M. No. 21710. Crown view, three times natural size.

¹Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 86.

²Amer. Mus. Novitates, No. 139.

cusps—row external. The external row is represented by a single cusp, rounded externally, concave on its inner or median surface. From its apex a ridge passes anterointernally to form a cusp-like wall at the anterior end of the mid-row. Posterior to this, in this row, are two large cusps. The inner row consists of three large nearly conical cusps. The formula may be written 1:3:3, although the anteromedian cusp is obscure.

The palate itself is crushed, but some character can be made out. The posterior (palatine?) portion is pierced by several irregular foramina, but there do not appear to be any true palatal vacuities between the molars or posterior premolars.¹

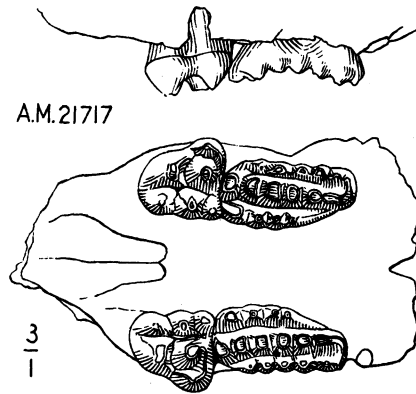


Fig. 2. *Prionessus lucifer* Matthew and Granger. Part of skull with all molars, A. M. No. 21717. Palatal and partial right lateral views, three times natural size.

The choanæ are rather narrow and extend forward to a point about opposite the middle of M^2 . The anterior root of the zygoma appears to have been just anterior to M^1 , which, on comparison with *Ptilodus* and *Tæniolabis*, agrees with the other indications of an abbreviated ante-molar region in *Prionessus*.

*Sphenopsalis*² *nobilis*, new genus and species

TYPE.—A. M. No. 21736, an isolated left M^2 . Collected in 1925.

HORIZON AND LOCALITY.—Gashato Formation at Shabarakh Usu, Mongolia.

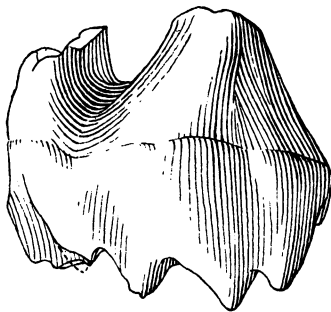
DIAGNOSIS.—Cusp formula of M^2 1:2:4. This tooth nearly as large as in *Tæniolabis taënsis*, width 11.0 mm., length about 14 mm. Single outer cusp an antero-internal-posteroexternal crest, almost wholly anterior to the outer part of the antero-median cusp. The latter developed as a large, oblique, curved crest beginning at the midpoint of the anterior border and rising to an apex near the midpoint of the external border. Immediately posterior to this, another cusp nearly parallel to it and of similar character but slightly smaller and more transverse. The inner

¹Vacuities are present in *Ptilodus*. Broom reported them in *Tæniolabis*, but restudy suggests that they are absent in this genus.

²σφην, wedge, ψαλις, scissors, in allusion to the cuneiform shearing cusps and suggestive of its ally *Catopsalis*.

cuspid row consisting of four cusps, the second and third the longest, their bases united internally, apices along the internal margin, the posterior three somewhat produced into crests which run anteroexternally.

In addition to the type, there are several fragments of teeth apparently of this genus. One (A. M. No. 21715) is the anterior end of a first lower molar, perhaps of the left side. It indicates a width for this tooth of seven or eight millimeters. The cusps are in two rows and are simple, without secondary ridging or grooving, and like those of M^2 are produced into oblique crests, those of the external row



A.M. 21736

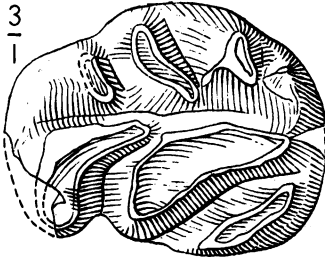
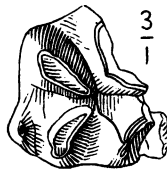
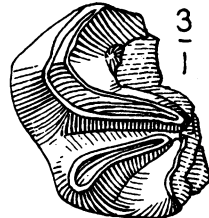


Fig. 3. *Sphenopsalis nobilis* Matthew, Granger, and Simpson, new genus and species. Type, left M^2 , A. M. No. 21736. Internal and crown views, three times natural size.



A.M. 21715

Fig. 4. *Sphenopsalis nobilis* Matthew, Granger, and Simpson. Anterior end of M_1 , A. M. No. 21715. Crown view, three times natural size.



A.M. 21713

Fig. 5. *Sphenopsalis nobilis* Matthew, Granger, and Simpson. Anterior end of left M_2 , A. M. No. 21713. Crown view, three times natural size.

running posterointernally, those of the internal row posteroexternally. Anterior to one of the rows (probably the external, if analogies are not misleading) is a small thorn-like accessory cusp. From its small size it is not certain that this tooth belongs in this species—it is slightly narrower relative to M^2 than is M_1 of *Tæniolabis*—but the structure is harmonious, and the size difference not unduly great.

Among other fragments is the anterior end of a left M_2 which, from its character and perfect occlusion with the type, surely belongs to this species. The anterointernal cusp is large, high, very strongly and perfectly crescentic, the wings of the crescents pointing backwards. The outer row is only about half as wide as this cusp. The anteroexternal cusp and part of that following are preserved. The former, at least, was like the cusps of the M_1 described above, with an external

apex and a sharp crest running posterointernally. The total width anteriorly is 10.6 mm.—exactly the same as in some specimens of *Tæniolabis taöensis*.

The dentition, so far as revealed, is certainly multituberculate but of an adaptive type very different from that of any other known genus. The high, narrow, sharp crests of the cusps are little fitted for heavy crushing or grinding but form a cutting device of remarkable perfection, probably an adaptation to some specific type of vegetable food.

AFFINITIES OF *PRIONESSUS* AND *SPHENOPSALIS*

Matthew and Granger (Op. cit., 1925, p. 6–7) compared *Prionessus* with *Catopsalis*, *Meniscoëssus*, and *Tæniolabis* rather than with the *Ptilodus* group, which it more resembles in size, and suggested that it might be “an ancestral type of the catopsaline subfamily.” The present more complete data are still inadequate for final decision, but they tend to support this view. The large, stout lower incisor¹ (not strongly compressed as in *Eucosmodon*), the absence of P₃ and the greatly reduced P₄, the simple cusps and their number (close to *Catopsalis* in at least the lower jaw), the probably short broad muzzle, and the absence of palatal vacuities (which we believe also to have been absent in *Tæniolabis*) all suggest relationship to this group rather than to the true *Ptilodontidæ*. The difference in size is striking but, as regards family relationships, unimportant.

Sphenopsalis is as yet morphologically unique and this, with the inadequacy of the known material, makes its relationships still more doubtful. It also, however, may tentatively be considered as related to *Catopsalis* and *Tæniolabis* more closely than to other previously known genera. The adaptive type is very different from that of *Tæniolabis*, with its broad crushing teeth², but *Catopsalis* is somewhat intermediate in adaptation. The molars of *Tæniolabis* have many points in common with those of *Sphenopsalis* so far as the latter are known. In the American form the cusps have apparently become heavier and more quadrate, in the Mongolian more compressed and crested, but it is a tenable hypothesis that these represent divergent adaptations from a more or less intermediate ancestral type, perhaps more nearly preserved in the Mongolian *Prionessus* and, probably to less extent, in the American *Catopsalis*.

¹Known only from its alveolus.

²Less different, however, than would be supposed from the literature, for the unworn molar cusps of *Tæniolabis* are high, crested, and rather slender.