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Simpsonictis, a New Genus of Viverravine Miacid (Mammalia, Carnivora)

BY GILES T. MAC INTYRE¹

The family Miacidae is generally recognized as the ancestral group from which the modern Carnivora arose. The earliest miacids to appear in the fossil record are members of the subfamily Viverravinae. These are obviously not the most primitive miacids, however, because the third molars had been eliminated from both upper and lower dentitions, and the second lower molar had elongated posteriorly—a specialization that had not developed in the subfamily Miacinae when they appeared later. Clearly, the Viverravinae were an early offshoot of the family, while the Miacinae were closer to the ancestral stock.

Three genera of viverravine miacids have hitherto been recognized: *Viverravus* Marsh, 1872 (note: not "Cope, 1872"); *Didymictis* Cope, 1875; and *Ictidopappus* Simpson, 1935.

The first two genera are well represented in collections. The genus *Viverravus* is known from the late Paleocene and continues through the late Eocene. Typically small to medium-sized miacids, the members of this genus show increasing specialization toward a hypercarnivorous² condition of the teeth, with sharp cusps and crests, trenchant talonids on the lower molars, and progressive carnassial systems on M_1 and P^4 . The earlier species converge toward the Paleocene species of *Didymictis*. The

¹ Department of Zoology, Columbia University, New York, New York.

² Term from Crusafont-Pairó and Truyols-Santonja (1956), denoting a member of the order Carnivora with teeth relatively well specialized for shearing. "Hypocarnivorous" is an antonym indicating less shearing and more grinding specialization.

collections were made at the Gidley Quarry by the American Museum of Natural History. Among other specimens, four more partial lower jaws of *D. tenuis* were found which confirmed Simpson's assessment of the distinctive character of that species. These were marked "new genus" and stored away, as the press of other business kept him from resuming work on this collection. Many years later, at his suggestion, I began a comprehensive study of the family Miacidae. A systematic search of collections uncovered these specimens in the American Museum, and other specimens were found in the Bison Basin by McGrew and Patterson.

Thanks are due to Drs. E. H. Colbert and M. C. McKenna for the use of facilities and collections at the American Museum and to Prof. P. O. McGrew and B. Patterson for the loan of specimens from the Wyoming and Harvard University collections. Drs. G. L. Jepsen and C. L. Gazin granted access to relevant specimens in the Princeton Museum and United States National Museum, respectively. The manuscript was read critically by Drs. G. G. Simpson and M. C. McKenna; but such reading does not imply agreement on all points. I am indebted to these gentlemen and to Prof. Th. Dobzhansky of Columbia University for encouragement and support.

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The following abbreviations are used:

- A.M.N.H., the American Museum of Natural History
- U.S.N.M., United States National Museum, Smithsonian Institution
- U.W., University of Wyoming

CLASS MAMMALIA

ORDER CARNIVORA BOWDICH, 1821

FAMILY MIACIDAE COPE, 1880

SIMPSONICTIS,¹ NEW GENUS

TYPE: *Didymictis tenuis* Simpson (1935, p. 238).

KNOWN DISTRIBUTION: Middle (and ?late) Paleocene of North America.

DIAGNOSIS: This genus differs from *Ictidopappus* in the relatively higher and sharper trigonid of M_1 , in the relatively narrower and higher P_{3-4} , which have comparatively well-developed, anterior, basal cuspules distinct from the main cusp, and in the higher talonid cuspules of M_2 .

¹ After Dr. G. G. Simpson, plus *iktis* (weasel or small carnivore), by analogy with *Didymictis*.

typical representatives of the genus *Didymictis* are found in the early Eocene rocks as increasingly larger, more robust forms; they show a trend toward the hypocarnivorous type of dentition, having stout, blunt cusps on all the cheek teeth and basined talonids on the molars. The carnassial system does not show progressive specialization, but the upper molars and the corresponding parts of the lowers (the M_1 talonid and the whole crown of M_2) show a distinct adaptation to crushing or grinding. The Paleocene species of *Didymictis* are smaller and more sharp-toothed than these but not so specialized as any *Viverravus* species.

Ictidopappus is known only from the type lower jaw, which has a partial dentition, and from a referred but not definitely associated upper dentition. Both specimens are from the Gidley Quarry, middle Paleocene of Montana. There is no doubt that this genus is sharply distinct from all other miacids, but the preserved teeth are well worn and do not provide very satisfying clues to its exact affinities or to its ecological adaptations. It was small in size but not so minute as the smallest miacids. The carnassial pair (M_1 and P^4) seem to have had well-developed shearing blades, and the talonids of the lower molars are basined, not trenchant. It appears to have been an early hypercarnivore, resembling *Viverravus* to some extent but not necessarily related to that genus.

The new genus named here includes the smallest known miacids. The tall, needle-like cusps on the diminutive teeth and the comparatively weak jaws are clear signs that point to the distinctive ecological niche which these dainty predators filled. They are here separated as a genus because they obviously represent a line of evolution very different from the lines followed by *Didymictis* and *Viverravus*.

The relationships of *Ictidopappus* are not clear cut, but that genus is so distinctive that there is no doubt that it also represents quite a different line.

There is, of course, much more to be said about the animals the characteristics of which are briefly sketched above, and a more detailed exposition of the relationships of the family as a whole is now under way. Before that fuller report is completed, it seems desirable to record the new genus.

The history of this new taxon is rather peculiar. The type species, *Didymictis tenuis*, was first described by Simpson in 1935, and additional comments were made in his 1937 study of the Crazy Mountain Field. In the latter paper, Simpson remarked that this species may well be separable as a different genus, but that the evidence from the type (then the only known specimen) was insufficient to justify such a step.

However, subsequent to the research on the United States National Museum collection, which resulted in the 1935 and 1937 papers, further

(The trigonid cusps of M_2 are unknown in *Ictidopappus*.)

Simpsonictis differs from *Viverravus* in the more broadly basined talonids of M_{1-2} , in the relatively higher trigonid of M_2 , and in the reduction of the posterior accessory cusp on P_4 .

It differs from all known species of *Didymictis* in the relatively higher trigonid of M_2 , bearing relatively higher and sharper protoconid and metaconid cusps, in the higher talonid cuspules of M_2 , particularly the hypoconulid, and in the reduced posterior accessory cusp of P_4 .

In common with the above genera, *Simpsonictis* differs from the Miacinae in the absence of M_3 and in the elongated talonid of M_2 .

DISCUSSION: *Simpsonictis* can be generally characterized as including the smallest known miacids and as having a dentition apparently adapted to



FIG. 1. *Simpsonictis tenuis*, left dentary, labial side. Reconstructed from A.M.N.H. Nos. 35348 and 35350. Dashed outlines are restored from related forms. $\times 4$.

piercing rather than to shearing or grinding. It represents an insectivore-like line of evolution among the Viverravinae. Although there are clear-cut differences, there is a general resemblance to the earlier and smaller species of *Viverravus*. There is also a certain general similarity to the smaller species of *Didymictis* but little resemblance to *Ictidopappus*. These general statements will be fully supported by the more complete study to be published later, but comparison of the figures in Simpson (1937) and Matthew (1915) with the figures in the present paper will aid the reader in forming an independent judgment.

Simpsonictis tenuis (Simpson, 1935), new combination

Figures 1-3

HOLOTYPE: U.S.N.M. No. 9297, fragment of left dentary with M_1 and part of P_4 .

HORIZON AND LOCALITY: Middle Paleocene, Fort Union Formation, Upper Lebo Beds, Crazy Mountain Field Locality No. 4, Gidley Quarry,

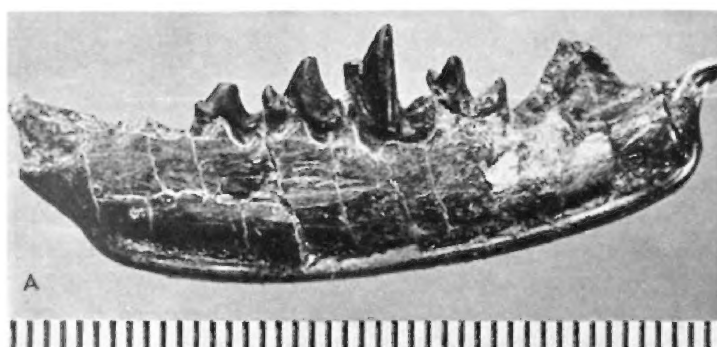


FIG. 2. *Simpsonictis tenuis*, A.M.N.H. No. 35348, most of left dentary with P_3 - M_2 and alveoli of P_{1-2} ; Gidley Quarry, middle Paleocene of North America. Unretouched photographs. A. Labial view of entire specimen. B. Occlusal view of dentition. Scale with 0.5-mm. divisions placed at plane of focus. About $\times 4$.

NW. $\frac{1}{4}$ of NE. $\frac{1}{4}$, sect. 25, T.5 N., R.15 E., Sweetgrass County, Montana.

HYPODIGM: U.S.N.M. No. 9297, A.M.N.H. Nos. 35347-35350.

DIAGNOSIS (REVISED): Characters of the genus, with P_4 having the

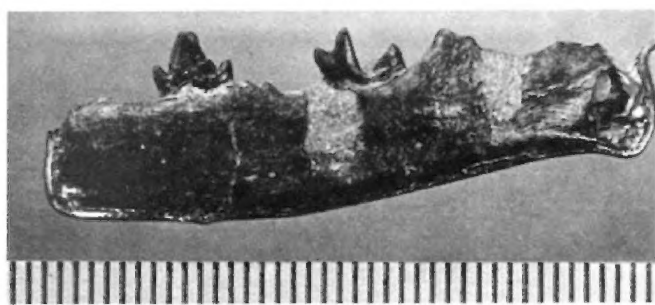


FIG. 3. *Simpsonictis tenuis*, A.M.N.H. No. 35350, posterior part of right dentary with P_4 and M_2 ; Gidley Quarry, middle Paleocene of North America. Unretouched photograph of lingual side. Scale with 0.5-mm. divisions at plane of focus. $\times 4$.

posterior cuspule reduced to a trace on the posterior edge of the main cusp¹ or absent entirely. The molar talonids are basined, not trenchant, with the "hypoconid and entoconid about equally high and distinct" (Simpson, 1935); these two cuspules are larger on M_1 than on M_2 .

DISCUSSION: This is the only species of the genus so far described. Specimens from other localities exist which may represent taxonomically separable populations (see below). The five specimens now known from the type locality allow a more complete picture of the lower jaw and dentition than was formerly possible (see fig. 1). Full descriptions of the individual specimens involved will be presented elsewhere.

NOTE ON *SIMPSONICTIS* FROM THE BISON BASIN

Two lower jaw fragments have been collected at or near the Saddle Locality, south rim of the Bison Basin, E. $\frac{1}{2}$, sect. 28, T. 27 N., R. 95 W., Fremont County, Wyoming.

The first of these (U.W. No. 1063) was reported by Gazin (1956) as "*Didymictis* near *D. tenuis*." A second specimen, collected by McGrew and Patterson in 1961, has not yet been catalogued; indeed, the sorting of the large number of small specimens collected on that expedition is still in progress. In view of the possibility that more specimens of this form will soon become available, it seems best now to defer description. However, at present it is possible to state that this form unquestionably belongs to the genus *Simpsonictis* and that it may not be more than subspecifically distinct from the type species.

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¹ This cusp is sometimes called the protoconid; in the absence of any definite evidence, I prefer not to identify a cusp on the premolars with any single cusp on the molars.

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