On the Systematic Position of *Chaetomys subspinosus* (Rodentia: Caviomorpha) Based on Evidence from the Incisor Enamel Microstructure

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We have studied the incisor enamel microstructure of *Chaetomys subspinosus* and other possibly closely related caviomorph rodents. *Chaetomys subspinosus* lacks the important synapomorphy of the Octodontoidea, rectangular plate-like interprismatic matrix (IPM) in the portio interna (PI) of the incisor Schmelzmuster. Therefore its transfer from the Erethizontidae to the Echimyidae, as proposed by Patterson and Wood (Bull. Mus. Comp. Zool. 149, 371–543, 1982) based on retention of dP4, is contested. The parallel to acute angular IPM in the PI of *Chaetomys* and the Erethizontidae is a symplesiomorphy and does not indicate close relationship. Contrary to previous claims, a posterior carotid foramen is also retained in *Chaetomys*. *Chaetomys* is characterized by an unusual thin enamel which is considered primitive after outgroup comparison. Therefore, it is proposed to leave *Chaetomys* in the monospecific erethizontid subfamily Chaetomyinae, until additional information on the species is available.

**KEY WORDS:** enamel microstructure; evolution; *Chaetomys*; incisors, Caviomorpha.

**INTRODUCTION**

The systematic position of the peculiar monospecific Brazil rodent genus *Chaetomys* is not clear. Superficially, *Chaetomys subspinosus* resembles the New World porcupines because of its spiny fur, and for a long time it has been regarded as a member of the Erethizontidae because of similarities in the feet, which are adapted for arboreal life (Wied, 1826; Ellermann, 1940). *Chaetomys* was first described by Olfers (1818) as *Hystrix subspinosus*, and skulls and skins of the holotype and paratype are housed at the ZMB (Berlin).

There has been some confusion about the distribution of *Chaetomys*, because its type locality was assigned erroneously to Cametá in the northern Amazon region of Brazil (Avila-Pires, 1967). According to the recent field study of Oliver and Santos (1991), *Chaetomys* is restricted to the east Brazil Atlantic forest region from south Sergipe through eastern Bahia, northeast Minas Gerais and Espírito Santo to the extreme north of Rio de Janeiro State. It has the status of an endangered species (Emmons and

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Feer, 1990), but it is more common in suitable habitats and has a wider geographical
distribution in the Brazil Atlantic forest region than previously believed (Oliver and
Santos, 1991). Little is known about its life habits, but it is reported that Chaetomys
feeds on cocoa nuts and is a good climber (Nowak and Paradiso, 1983). Chaetomys
differs from other erethizontids in having more wavy bristles rather than stiff spines on
the back. Its tail is 255 to 280 mm long and the naked tip is described as prehensile by
some authors (Grassé, 1955; Emmons and Feer, 1990), but this is contested by others
(Nowak and Paradiso, 1983; Eisenberg, 1989). With a head–body length (HBL) of 430–
457 mm, Chaetomys is smaller than Erethizon (HBL, 645–860 mm) and comparable to
Coendu (HBL, 300–600 mm).

The skull morphology and cheek tooth structure of Chaetomys are very different
from those of the Erethizontidae (Fig. 1). The skull is characterized by a very strong
zygomatic arch with orbital ring and lacks the inflated nasal region that is characteristic
for Erethizontidae. Due to superficial resemblances in cheek tooth structure, Stehlin and
Schaub (1951, p. 369) transferred Chaetomys from the Erethizontidae to the octodontoid
family Echimyidae. This had already been proposed by Miller and Gidley (1918), who
presented no reasons for it, however. This familial assignment was further supported by
Patterson and Wood (1982) based on two craniodental characters. They stated that, like
all other caviomorph rodents except the Erethizontidae, Chaetomys lacks a posterior
carotid foramen and therefore an internal carotid artery. Among extant caviomorphs,
retention of the internal carotid artery is characteristic for the Erethizontidae (Bugge,
1974a,b); a rudimentary probable posterior carotid foramen was reported for the Desea-
dan (Oligocene) dasyproctid Incamys bolivianus (Patterson and Wood, 1982). The pre-
sumed absence of the posterior carotid foramen in Chaetomys would contradict an
affiliation with the Erethizontidae, but it would not tell anything about its relationship
with the Echimyidae. The second character used by Patterson and Wood (1982) for
uniting Chaetomys with the Echimyidae is the presumed retention of dP4/4 throughout
life, which is present in all post-Deseadan Echimyidae but absent in other caviomorphs.
On the Chaetomys skull from the Museu de Zoologia da Universidade de Sao Paulo,
Patterson and Wood (1982) observed a lower crown height and stronger wear on the
crests of the anterior cheek teeth than on the molars. Based on the presumed retention
of dP4 and the resemblance in cheek tooth pattern, Patterson and Wood (1982) reconfir-
mred removal of Chaetomys from the Erethizontidae and placed the monospecific
subfamily Chaetomyinae within the Echimyidae. This placement was also adopted for
general systematic works (Woods, 1993).

Because skulls of Chaetomys are extremely rare in museum collections and, with
the exception of Patterson and Wood (1982), have not been carefully studied or figured
since Gray (1843) and Ellerman (1940), any additional morphological data on this ani-
mal are desirable. Since the groundbreaking investigations by Tomes (1850) and Kor-
venkontio (1934), incisor enamel microstructure has proved to be a reliable tool for
phylogenetic analyses in the Rodentia (Wahlert, 1968; Wahlert and Koenigswald, 1985;
Sahni, 1980, 1985; Martin 1992, 1993, 1994). Consequently it was decided to test
whether the placement of Chaetomys within the Echimyidae is corroborated by enamel
microstructure analysis or if other relationships might be indicated.