

*The presence of Taeniodonta (Mammalia) in the  
Early Eocene of Europe*

Carmen ESTRAVIS\*  
Donald E. RUSSELL\*\*

\* Centro de Estratigrafia e Paleobiologia da UNL, Faculdade de Ciências e Tecnologia,  
Quinta da Torre, P-2825 Monte de Caparica, Portugal.

\*\* Institut de Paléontologie (URA 12, CNRS), 8 rue Buffon,  
75005 Paris, France.

Ciências da Terra (UNL)	Lisboa	Nº 11	pp. 191-201 1 pl.	1992
-------------------------	--------	-------	----------------------	------



---

## RESUMO

*Palavras-chave:* *Eurodon* — *Taeniodonta* — Eocénico — *Silveirinha* — Portugal.

*Eurodon silveirinhensis* nov. gén., nov. sp., do Eocénico inferior de Silveirinha (Portugal) é considerado o primeiro representante, na Europa, da extinta ordem de mamíferos Taeniodonta. O enigmático género *Lessnessina* Hooker, 1979, de Abbey Wood (Inglaterra), sensivelmente contemporâneo de *Eurodon*, é também atribuído aos taeniodontes.

---

## RÉSUMÉ

*Mots-clés:* *Eurodon* — *Taeniodonta* — Eocène — *Silveirinha* — Portugal.

*Eurodon silveirinhensis* nov. gen., nov. sp., de l'Eocène inférieur de Silveirinha (Portugal) est interprétée comme la première représentante en Europe des Taeniodonta (ordre éteint de mammifères). L'énigmatique genre *Lessnessina* Hooker, 1979, de Abbey Wood (Angleterre), à peu près contemporain de *Eurodon*, est rapporté également aux Taeniodonta.

---

## ABSTRACT

*Key-words:* *Eurodon* — *Taeniodonta* — Eocene — *Silveirinha* — Portugal.

The first representative of the extinct mammalian order Taeniodonta in Europe is described, *Eurodon silveirinhensis* n. gen., n. sp., from the early Eocene locality of Silveirinha, Portugal. A formerly enigmatic form, *Lessnessina* Hooker, 1979, from Abbey Wood, England, and approximately contemporary, is also referred to the Taeniodonta.



## INTRODUCTION

Study of the early Eocene mammalian fauna from Silveirinha, Portugal (ANTUNES, 1981; ANTUNES & RUSSELL, 1981), is the subject of a doctoral dissertation for one of us (C. E.). One specimen, SV2-15, a small lower last molar, has long defied identification. The bulbousness of its cusps initially lead to the supposition that it represented some sort of condylarth. We here present a new interpretation, that of affinity to Taeniodonta.

Specimens of the order Taeniodonta are rarely found. Until now, the few taxa constituting this group were known only from North America, ranging in time from early Paleocene to middle Eocene. The rarity of taeniodonts was discussed by GINGERICH (1989) and attributed to ecological conditions, wherein their habitat was inland and upland and far from the low floodplain and basin environments that furnish most fossil collections. SCHOCH (1986) deduced that their alimentary source consisted primarily of underground roots and tubers. The early generalized form, *Onychodectes*, in addition to being a noncursorial, plantigrade mammal, is presumed to have been fairly adept at climbing. It was also the smallest of the Taeniodonta.

## SYSTEMATIC PALEONTOLOGY

- Order Taeniodonta COPE, 1876
- Family Conoryctidae WORTMAN, 1896
- Subfamily Onychodectinae WINGE, 1917
  - Onychodectes* COPE, 1888
- Subfamily Conoryctinae WORTMAN, 1896
  - Conoryctella* GAZIN, 1939
  - Conoryctes* COPE, 1881
  - Huerfanodon* SCHOCH & LUCAS, 1981
- Subfamily Eurodontinae, new subf.
  - Eurodon*, new gen.
  - Lessnessina* HOOKER, 1979
  - Eurodon*, new genus

Type species — *Eurodon silveirinhensis*, new species.

Diagnosis — Small mammal, smaller than any described taeniodont. M<sub>3</sub> with large hypoconulid, apparently subequal hypoconid and slightly smaller, conical entoconid; protoconid and metaconid inflated and subequal; paraconid very small, situated on anterior side of metaconid.

Differs from all conoryctids by lesser hypsodonty and by a larger M<sub>3</sub> hypoconulid.

Age and distribution — early Eocene of Europe.

Etymology — euro — pertaining to Europe; —odon (Gr. tooth).

### *Eurodon silveirinhensis*, new species

Type specimen — SV2-15, isolated, right M<sub>3</sub>.

Referred material — SV3-234, right M<sub>3</sub>, and, more questionably, SV3-208, left M<sup>1</sup> or M<sup>2</sup>; both specimens lack most of their enamel.

Diagnosis — Same as for genus.

Locality and age — Silveirinha (Baixo Mondego region of west central Portugal); Dormaalian mammal age.

Etymology — named after the locality in Portugal from which it was collected.

## DESCRIPTION

The trigonid of M<sub>3</sub> is moderately high, as were apparently the three strong talonid cusps (hypoconid, hypoconulid and entoconid; now truncated by wear). Although wear has reduced the height of the protoconid (more than that of the metaconid) it seems to have been subequal in size to the metaconid; both are large, bulbous cusps. A paracristid, also worn, extends from the antero-median side of the protoconid to the very small paraconid situated at the anterior base of the metaconid. The rather weak cristid obliqua

links the hypoconid and the base of the posterior wall of the trigonid, contacting the latter far below the protoconid-metaconid notch. Forming a veritable third lobe, the hypoconulid is bulbous, prominent, and sharply separated from the hypoconid and entoconid. The entoconid is large and conical and has at its anterior base a small accessory cusp, the entoconulid. The talonid basin is open lingually. Despite considerable wear on the posterior side of the metaconid, a postmetacristid of some sort is indicated, or a linguo-vertically placed ridge. Enamel is smooth and there is no indication of hypsodonty. Length, 3.7 mm; width, 2.3 mm.

Two other teeth are perhaps referable to *Eurodon silveirinhensis*. One of these, SV3-234, a right M3 like the type specimen, is quite probably of this taxon. Identification is hampered by the effects of chemical erosion which removed most of the enamel; only a small amount remains on the anterior and lingual sides. This specimen provides little information, beyond the presence of a more strongly developed anterior cingulum.

The upper molar, SV3-208, also lacks most of its enamel, and the labial border of the tooth, exterior to the paracone and metacone, is missing as well. Nevertheless, the specimen is of a size that concords well with that of the type specimen. The protocone is large and bulbous and situated rather far from the lingual base of the tooth. Both conules are present, the metaconule being the larger. The preparaconule crest is high and strongly developed, as is the premetaconule crest; the latter contacts the lingual side of the metacone high, near its summit, while the preparaconule crest extends to the region of the parastyle. Apparently the postparaconule crest was weak, although the paracone possessed a lingual, vertical crest that could be regarded as the continuation of this crest. The postmetaconule crest is obscured by wear and erosion, but it extended to the metastyle. Anterior and posterior cingula are strongly developed with the latter being the broader. It appears to have supported a small, lingually placed hypocone.

It is, of course, uncertain whether or not this specimen is referable to *Eurodon silveirinhensis*. But by its size and morphology, it seems possible.

## DISCUSSION

Attribution of the M3, SV2-15, to the Taeniodonta was inspired by the inflated aspect of the protoconid and metaconid, the small size of the paraconid, and the large, conical shape of the entoconid.

Consultation of the most recent revision of taeniodonts (SCHOCH, 1986) revealed that some of the morphologic features that typify *Eurodon* correspond to traits that are rather marginal within the known taxa. In his list of derived character-states for

the order, Schoch cited the lack of cingulids in lower molars, which indeed agrees with the condition in *Eurodon* (exception made of an anterior cingulum in *Onychodectes* and *Eurodon*). He also stated that the trigonids and talonids of all molars were subequal in length and width, but exceptions can be seen in the figurations of conoryctids in his monograph, where the talonid of M3 can be either shorter than the trigonid or appreciably longer, as in *Eurodon*. The hypoconulid is typically not expanded on conoryctid M3 talonids, but this feature is shown to be very variable in (at least) *Huerfanodon torrejonius* (SCHOCH, 1986, P1. 16, Fig. 5 and 7); the specimen illustrated in his Fig. 7 is similar to the Silveirinha M3, with an elongate talonid and a prominent hypoconulid. Taeniodonts are well known for their tendency for the cheek teeth to develop hypsodonty, but in the earliest forms this is not always perceptible or is only slightly manifested. Its absence in *Eurodon* can be interpreted as a retention of the atavistic state.

Despite the distinctiveness of the Silveirinha specimen, similarities in its morphology to various conoryctids are preponderant. The inflated cusps, the large conical entoconid and the presence of an entoconulid at its anterior base, are all features found in *Onychodectes* and *Conoryctella*. A very small paraconid anterior on the metaconid of M3 is also shared with *Conoryctella* and *Conoryctes*. It is concluded that a sufficient number of elements characteristic of recognized taeniodonts are also found in the M3 of *Eurodon* to render its attribution to this order and to the family Conoryctidae quite likely.

## The problem of *Lessnessina* HOOKER, 1979

Schoch, in his monograph, argued against the presence of any members of the Taeniodonta outside of North America. None of the specimens from Asia or Europe that had been proposed as attributable to this order can be unequivocally accepted. However, no one has as yet proposed this relationship for the enigmatic genus *Lessnessina* from the early Eocene locality of Abbey Wood, England. The principal specimen is a maxilla with P<sup>3</sup>-M<sup>3</sup>. HOOKER (1979) was convinced that its dental morphology indicated affinity to the anisonchine Periptychidae; he was particularly impressed with an apparent similarity to *Oxyacodon*.

ARCHIBALD *et al.* (1983), in a revision of this genus, denied the existence of any relationship between *Oxyacodon* and *Lessnessina*, excluded the latter from the Anisonchinae and doubted it was a condylarth. Without making a definitive assessment of its ordinal affinities, they noted some resemblances to pseudictopids or other anagalidans (*sensu* SZALAY & MCKENNA, 1971).

hypsodonty, a widely separate, round paracone and metacone (with a mesostyle present) and a similar occlusal contour in the upper teeth of *Lessnessina* and those of the Mixodontia (revised by DASHZEVEG & RUSSELL, 1988), the resemblance does not seem to be significant. The presence of the Asiatic Mixodontia in Europe seems unlikely in view of the lack of communication between Asia and Europe at the time and the absence of mixodonts in North America, the only migrational path available. Recognition of a diminutive taeniodont, *Eurodon*, in Europe, approximately contemporaneous with *Lessnessina*, encouraged an analysis of the latter's characters from the viewpoint of possible taeniodont relationships.

Dental similarities to the earliest taeniodonts, *Onychodectes*, *Conoryctella*, and *Huerfanodon*, are evident in the upper dentition ( $P^3$ - $M^3$ ) that is all that is known of *Lessnessina*. Particularly striking in both is the lingual height of the protocone and the absence of a strong hypocone giving the upper cheek teeth a triangular aspect in occlusal view.  $P^4$  morphology in the most primitive form, *Onychodectes tisonensis*, with the paracone and protocone prominent and the metacone absent, is shared by *Lessnessina*. The mesostyle that occurs in the molars of the latter is also found in *Conoryctella*, *Conoryctes* and *Huerfanodon*, along with the conical character of the principal cusps.

Differences in the upper molars of *Lessnessina* principally concern the acquired existence of anterior and posterior cingula, terminating lingually in a small protostyle and an even smaller hypocone. In view of the considerable lapse of time that separates the earliest taeniodont species (which *Lessnessina* most closely resembles) and the British form, it is not surprising that some morphological evolution has occurred. It is perhaps more surprising that *Lessnessina* apparently changed so little in other respects from a Puercan early Paleocene pattern.

If it is postulated that *Lessnessina* and *Eurodon* are related, the eventuality of their being conspecific should be considered. Comparative upper and lower tooth dimensions in early conoryctids reveals that the lower  $M_3$  is about as long as, or shorter than the transverse width of the upper  $M^3$ . Given this relationship, *Eurodon silveirinhensis* would be 25 to

33% larger than *Lessnessina packmani*, making allowances for the variability of last molars. They are not referable, therefore, to the same species. Generic identity would be extremely difficult to demonstrate, with only the available material.

HOOKE (1979), speculating on the possible nature of the unknown lower dentition of *Lessnessina*, remarked that  $M_3$  would have been relatively smaller than  $M_1$ - $M_2$  and been characterized by a reduced hypoconulid. Further on, he emphasized the similarity in dental morphology to *Lessnessina* of *Oxyacodon*. If the shape of the last molars in the latter is regarded, it can be seen that the upper  $M^3$  is narrower (antero-posteriorly) and more transversely elongate than this tooth in *Lessnessina* and that the lower  $M_3$  possesses a hypoconulid even more prominent than that in *Eurodon*. We feel, therefore, that the morphology of the upper  $M^3$  in *Lessnessina* is compatible with that of the lower  $M_3$  of *Eurodon*.

## CONCLUSION

Sparse remains from Portugal and England furnish evidence suggesting that the order Taeniodonta was not restricted to North America. But in order to include *Eurodon* and *Lessnessina* in the Taeniodonta one must hypothesize that a branch, whose known members represented a primitive stage similar to that of the Puercan *Onychodectes*, existed in Europe. That this possibility is not totally unrealistic is supported by the facts that taeniodonts are known to be always rare in any fauna and that the Paleocene mammals of Europe are very incompletely sampled. It may be postulated that increased data from more representative collections will substantiate the reality of this European taeniodont lineage.

## ACKNOWLEDGEMENTS

We wish to express our gratitude to Professor M. T. Antunes for his support. We are indebted to "Instituto Nacional de Investigação Científica (INIC, Portugal)" for a fellowship granted to one of us (C.E.). We acknowledge with gratitude the talents of Madame C. Weber for the electron scanning microphotographs.

## BIBLIOGRAPHY

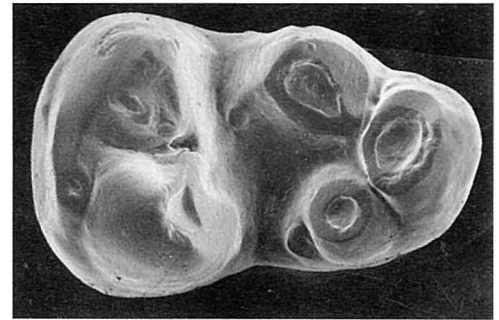
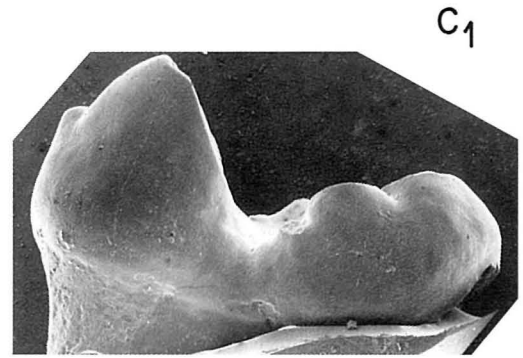
- ANTUNES, M. T. (1981) — *As areias e argilas de Silveirinha: II Aspectos paleontológicos*. Memórias e Notícias, Mus. Lab. Mineral. Geol., Univ. Coimbra, 91-92: pp. 253-267.
- ANTUNES, M. T. & RUSSELL, D. E. (1981) — *Le gisement de Silveirinha (Bas Mondego, Portugal): la plus ancienne faune de vertébrés éocènes connue en Europe*. C. R. Acad. Sc., Paris, (II) 293: pp. 1099-1102.
- ARCHIBALD, J. D.; RIGBY, J. K. JR. & ROBISON, S. F. (1983) — *Systematic revision of Oxyacodon (Condylarth, Periptychidae) and a description of O. ferronensis n. sp.* Jour. Palcont., 57 (1): pp. 53-72.
- DASHZEVEG, D. & RUSSELL, D. E. (1988) — *Palaeocene and Eocene Mixodontia (Mammalia, Glires) of Mongolia and China*. Palaeontology, 31 (1): pp. 129-164.
- GINGERICH, P. D. (1989) — *New earliest Wasatchian mammalian fauna from the Eocene of northwestern Wyoming: composition and diversity in a rarely sampled high-floodplain assemblage*. Univ. Michigan Papers on Paleontology, n° 28: pp. 1-97.
- HOOKE, J. J. (1979) — *Two new condylarths (Mammalia) from the early Eocene of southern England*. Bull. Brit. Mus. Nat. Hist. (Geol.), 32 (1): pp. 43-56.
- SCHOCH, R. M. (1986) — *Systematics, functional morphology and macroevolution of the extinct mammalian order Taeniodonta*. Peabody Mus. Nat. Hist. Bull., 42: pp. 1-307.
- SZALAY, F. S. & MCKENNA, M. C. (1971) — *Beginning of the age of mammals in Asia: the late Paleocene Gashato Fauna, Mongolia*. Bull. Amer. Mus. Nat. Hist., 144 (4): pp. 269-318.



**DOCUMENTAÇÃO  
FOTOGRAFICA**

PLATE 1

A and B — *Lessnessina packmani* HOOKER, 1979; A - M29632, holotype, left P<sup>3</sup>-M<sup>3</sup>, bar=1 mm; B - MC 17, right M<sup>1</sup>, bar=1 mm. Collections of the British Museum (N.H.). C - *Eurodon silveirinhensis* n. gen., n. sp., SV2-15, holotype right M<sub>3</sub>. C<sub>1</sub>, lingual view; C<sub>2</sub>, occlusal view; C<sub>3</sub> labial view, bar=1 mm. Collections of the Centro de Estratigrafia e Paleobiologia da Universidade Nova de Lisboa.



1mm

