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**GEOLOGY AND PALAEOBIOLOGY OF THE CENTRAL AND  
SOUTHERN NAMIB**

**VOLUME 2:  
PALAEOONTOLOGY OF THE ORANGE RIVER VALLEY,  
NAMIBIA**

by

**Martin Pickford and Brigitte Senut**



*Orangemeryx hendeyi*

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Dr Martin Pickford<sup>(1)</sup> & Dr Brigitte Senut<sup>(2)</sup>

<sup>(1)</sup>Chaire de Paléanthropologie et de Préhistoire, Collège de France, and Laboratoire de Paléontologie,  
UMR 8569 du CNRS. 8, rue Buffon, F-75005 Paris, France

<sup>(2)</sup>Département Histoire de la Terre du Muséum national d'Histoire naturelle et UMR 8569 CNRS,  
8, rue Buffon 75005, Paris.

Typesetting and layout : Estelle Grobler and David Richards

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## Fossil Bat (Microchiroptera, Mammalia) from Arrisdrift, Namibia

<sup>1</sup>Pierre Mein and <sup>2</sup>Martin Pickford

<sup>1</sup>Département des Sciences de la Terre, Université Claude Bernard I, 27-43 Boulevard du 11 Novembre, 1918, 69621 Villeurbanne, Cedex.  
e-mail:- pierre.mein@univ-lyon1.fr

<sup>2</sup>Département Histoire de la Terre, UMR 8569 du CNRS, 8, rue Buffon, 75005, Paris, France and Collège de France,  
11, Place Marcellin Berthelot, 75005, Paris, France. e-mail:- pickford@mnhn.fr

Bats are extremely rare in the Orange River deposits, mainly on account of the fluvial nature of the deposits. Nevertheless the order is represented at Arrisdrift by a new species of rhinolophid which is peculiar in having the vestigial premolar offset to the lingual side, opposite to the usual position in other rhinolophids.

### Résumé français

Une seule chauve-souris fossile a été découverte dans les dépôts fluviaux d'Arrisdrift, gisement de la base du Miocène moyen situé sur le flanc nord du fleuve Orange, à 35 kms d'Oranjemund à l'intérieur des terres (Namibie). La formule dentaire et la morphologie des dents antérieures suggèrent qu'il s'agit d'un rhinolophidé. Ce dernier diffère des espèces connues de *Rhinolophus* par la position linguale de la p/3 contrastant avec la position classiquement plus labiale où alignée avec les prémolaires. Les comparaisons avec les autres espèces du genre montre que le spécimen présente des caractères morphologiques nouveaux comme le contour occlusal de la p/4. Pour ces raisons, une nouvelle espèce est érigée, *Rhinolophus contrarius*.

### Introduction

Among the many thousands of vertebrate remains from Arrisdrift, there is but a single microchiropteran fossil. The fluvial deposits at Arrisdrift contain, for the most part, medium to large mammals, while, apart from the macroselidean *Myohyrax*, small mammals are uniformly rare. The bat fossil from the site belongs to a widespread genus *Rhinolophus*, but it is sufficiently different from known extinct and extant species that a new species is created for it.

### Systematic description

Order Chiroptera Blumenbach, 1779  
Suborder Microchiroptera Dobson, 1875  
Family Rhinolophidae Bell, 1836  
Genus *Rhinolophus* Lacépède, 1799

**Type species:** *Vespertilio ferrum-equinum* Schreber, 1774

**Species** *Rhinolophus contrarius* sp.nov.

**Diagnosis:** *Rhinolophus* with lingually positioned p/3; p/4 occlusal outline square with rounded corners except where the cingula meet to form points anteriorly and posteriorly.

**Derivatio nominis:** The specific name *contrarius* highlights the unique position of the p/3 on the lingual side of the jaw, in contrast to its labial or axial position in all other species of the genus.

**Material:** Holotype.- AD 272'97, anterior fragment of left mandible with symphysis, alveoli of incisors and canine, and complete p/2-p/4 (Fig. 1).

**Description:** The mandible shows an antero-posteriorly elongated oval mental foramen located about half the height of the jaw and below the root of p/2, above which are several accessory foramina. The mandibular symphysis is relatively elongated (3.04 x 1.01 mm) and extends back to the level of the rear of p/2.

The p/2 is single rooted and possesses a relatively low conical crown with a cingulum which is relatively straight on the lingual side but chevron shaped on the labial surface with the point of the V pointing ventrally. In occlusal view the tip of the cusp is located close to the lingual side and it has marked labial flare, to such an extent that the breadth is greater than the length. The base of the crown is ovoid with small salient points anteriorly and posteriorly where the labial and lingual cingula meet.

The p/3 is a vestigial, button-like tooth encircled by a prominent cingulum. The crown has greater flare labially than lingually. The most surprising feature of this tooth is that it is positioned in a very lingual location, whereas in most rhinolophids the tooth is either in the same line as the other premolars or is located labially. Its lingual position means that the p/2 and the p/4 are almost in contact.

The p/4 is a two rooted tooth completely surrounded by a strong cingulum which form small low points anteriorly and posteriorly. The crown is almost twice as high as the p/2 and the occlusal outline is a square with rounded corners except where the anterior and posterior points interrupt the outline. The canine alveolus suggests that it was relatively small.

**Discussion:** The Arrisdrift bat jaw belongs to *Rhinolophus*

**Table 1:** Measurements of the teeth and mandible (in mm) of *Rhinolophus contrarius* nov. sp. from Arrisdrift, Namibia.

Specimen	length	breadth
AD 272'97, p/2	0.78	1.07
AD 272'97, p/3	0.54	0.61
AD 272'97, p/4	1.00	1.15
AD 272'97, i/1 to p/4 length	3.78	
AD 272'97, p/2-p/4 length	2.27	
AD 272'97, mandible depth below m/1	2.27	

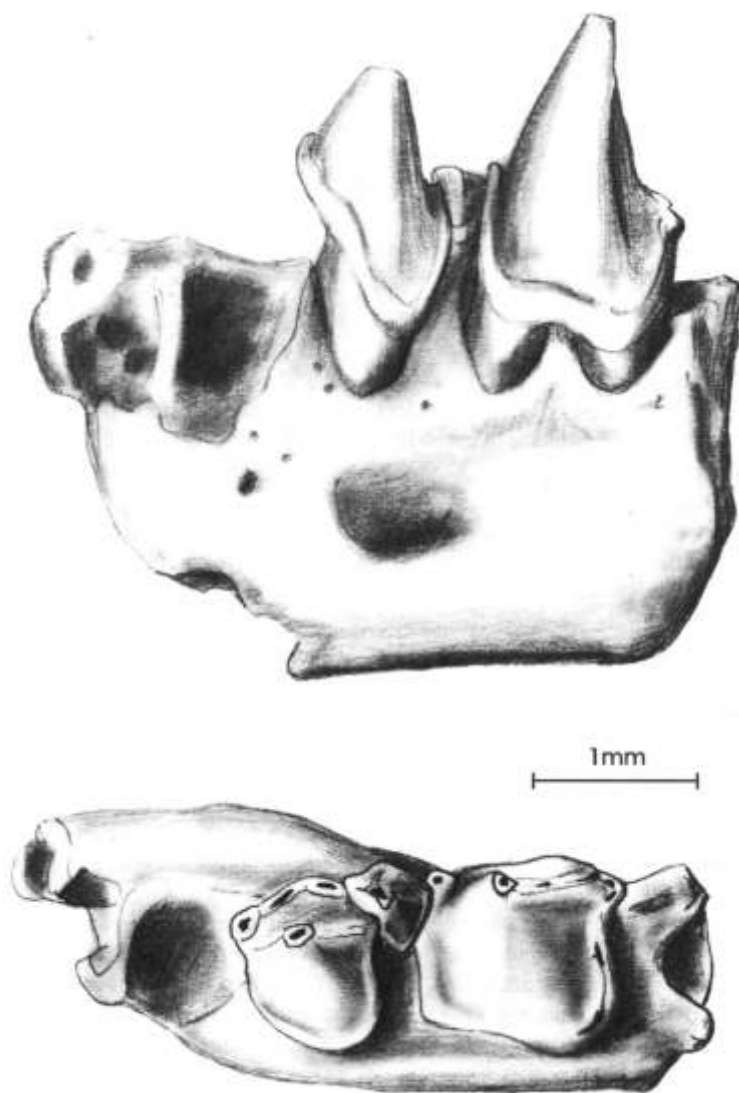


Figure 1: AD 272'96, *Rhinolophus contrarius* sp. nov., left mandible with p/2-p/4 and incisor and canine alveoli, a) buccal view; b) occlusal view.

because it possessed two incisors and three premolars of which the middle one is reduced in size. It falls into the middle of the size range of extant South African rhinolophids, being closest to *Rhinolophus clivosus* and *R. ferrumequinum*.

Lavocat (1961) described *Rhinolophus ferrumequinum mel-lali* from the upper Middle Miocene of Beni Mellal, Morocco, which differs from the Arrisdrift bat by its anteriorly pointed p/4 and labially positioned p/3. The Beni Mellal species is close in size to the Arrisdrift one. *Rhinolophus yongyuthi* from Li Mae Long, Thailand, (Mein & Ginsburg, 1997) is about the same age as Arrisdrift, but differs from *Rhinolophus contrarius* by its anteriorly pointed and narrower p/4. *Rhinolophus cf capensis* was described by de Graaf (1960) from Rodent Cave, a Pliocene site at Makapansgat, South Africa. This species is considerably smaller than *Rhinolophus contrarius*. He further described some younger remains from the Cave of Hearths (*Rhinolophus cf geoffroyi*) at Makapansgat.

*Rhinolophus darlingi* from Taung, South Africa (Cooke, 1990; Butler 1978) is smaller than the Arrisdrift species, and also differs from it by the narrower and more pointed p/4 and labially positioned p/3. The mental foramen in *R. darlingi* is in

the same position as it is in *R. contrarius* but it is smaller in diameter and is circular in outline as opposed to the oval outline in *R. contrarius*. *R. contrarius* is closest in size to *R. clivosus*, an extant South African form recorded as a fossil from Sterkfontein (Pocock, 1987) and it is smaller than *R. fumigatus* and *R. hildebrandti*.

### Conclusion

The Arrisdrift bat is clearly a rhinolophid based on the dental formula of the anterior half of the jaw. It falls outside the range of variation of known species of the genus, principally in morphological characters such as the occlusal outline of the p/4, and the location of its p/3 is on the lingual side of the jaw as opposed to other species in which the p/3 is either in line with the other premolars or is located labially of them. Despite the meagre remains, the differences from known species of *Rhinolophus* are sufficiently great to warrant the creation of a new species. The detailed relationships of this species within the genus cannot be determined because of the unique position of the p/3.

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