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GEOLOGY AND PALAEOBIOLOGY OF THE NORTHERN SPERRGEBIET, NAMIBIA

by

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Early Miocene Rodentia from the Northern Sperrgebiet, Namibia

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Rodentia are abundant at Early Miocene fossil sites in the Northern Sperrgebiet. The richest concentrations of fossils appear to be due to the activities of carnivores about the size of the extant black backed jackal. Coprolites rich in fossils are found in small patches (up to half a metre diameter) usually within a single stratigraphic layer, suggesting latrine-like behaviour that typifies some extant carnivores which mark their territories by defecating at specific points. Where scats within such concentrations have disintegrated, bones and teeth are more scattered. A particularly rich and taxonomically diverse concentration of micromammal skeletons at Elisabethfeld appears to have accumulated in a burrow, perhaps due to the actions of a small carnivore. Four separate partial skeletons of *Bathyergoides* possibly represent individuals that died within their burrows.

Stromer's pioneering studies of rodents from the Sperrgebiet led to the identification of 8 species. A few additional taxa were described by Hopwood and later by Lavocat. The much augmented collections made by the Namibia Palaeontology Expedition (over 2100 cheek teeth, many of which are in mandibles and maxillae) includes 15 species of which three are new species belonging to new genera. The fauna is remarkable for the presence of three genera of pedetids, four of bathyergids and two of diamantomyids and for the low diversity of Myomorpha.

Several of the rodent taxa described from the Northern Sperrgebiet have been identified in Early Miocene deposits of Kenya and Uganda, indicating widespread distribution of certain lineages at the time, and providing evidence of a biochronological nature which suggests that the Namibian deposits are between 21 and 19 million years old. There are indications that Elisabethfeld is the earliest of the Northern Sperrgebiet deposits, followed closely in age by Grillental, and then Langental. All these deposits are earlier in age than the Orange River Valley deposits at Arrisdrift, but Langental is about the same age as Auchas. The rodent faunas from the sites also indicate that the palaeoclimate changed during the Early Miocene with coastal Namibia becoming more arid and its vegetation more open and grassy with the passage of time from Elisabethfeld to Grillental to Langental. The tree cover diminished in phase with the increase in grass cover.

Introduction

Since 1992, the Namibia Palaeontology Expedition has collected many dozens of rodent mandibles and maxillae containing more than two thousand teeth from various sites in the Northern Sperrgebiet, particularly rich assemblages being known from Elisabethfeld, Grillental and Langetal, with rarer occurrences at Glastal and Fiskus.

Stromer (1926) described 8 species of rodents from the Northern Sperrgebiet, one of which was indeterminate.

Parapedetes namaquensis
Bathyergoides neotertiarius
Neosciuromys africanus
Phiomyoides humilis
Cfr *Phiomys andrewsi*
Diamantomys luederitzi
Pomonomys dubius
Rodentia indet.

Hopwood (1929) described two additional species based on specimens collected « South of Lüderitz » by H. Lang and stored at the American Museum of Natural History. These fossils most likely came from Langental.

Phthinylla fracta
Apodecter stromeri

Lavocat (1973) erected the genus and species *Paracryptomys mackennae*, on the basis of a specimen in the American Museum of Natural History, but it is a synonym of *Bathyergoides neotertiarius*.

Taphonomy: Stromer (1926) thought it possible that the micromammals that he studied represented the remains of pellets deposited by birds of prey. However, many of the rodents collected by the NPE occur in medium-sized carnivore coprolites, or in concentrations consisting of a mixture of broken down and well preserved scats along single bedding planes, indicating that the carnivorous mammals responsible defecated in the same place over periods of months or even years. Extant mongooses and jackals often mark their territories by defecating regularly in strategic points, with the result that quite astonishing concentrations of microvertebrate remains can occur in small patches of ground (Pickford, 1999, Pl. 1, 3). Examination of fossilised long bones and skulls in the scats reveals the presence of tooth puncture marks, and in one case at Grillental 6, the teeth of large rodents such as *Neosciuromys africanus* were fractured by being chewed (Pickford, 1999).

At Elisabethfeld there was an extraordinary concentration of articulated skeletons of rodents, macroscelidids and other small mammals. These remains were not in scats but were concentrated in a 50 cm diameter burrow-like construction traversing a thickness of about 50 cm of sediment, and it is presumed that the concentration was made by a small carnivore that carried complete cadavres into its den, but did not consume them. The outcome is that the interplay between the behaviour of these carnivores and the sedimentary processes active during the Early Miocene has led to the preservation of a rich and diversified micro-vertebrate fauna of great value to palaeontology.

Four partial skeletons of *Bathyergoides* were recovered by the NPE, two at Langental and two at Grillental, one of which is almost complete, with its long tail intact. These individuals evidently died in their burrows and were not greatly disturbed post-mortem. Their pro-odont snout morphology is compatible with the suggestion that the genus was fossorial.

The species *Microfossor biradiculatus* was extremely poorly represented in the fossil record (only 2 isolated teeth) until 2005, when a small patch of fossil scats was found at Elisabethfeld, which yielded a rich microfauna including 19 specimens of this species, of which two are partial mandibles.

Dental nomenclature: We use odontological terms defined by Mein and Freudenthal, 1971, for the Myomorpha, and by Stirton, 1935, for rodents with hypsodont cheek teeth adorned with striae and striids.

Abbreviations: Many fossils are marked with abbreviations. These are AD = Arrisdrift, AM = American Museum of Natural History, EF = Elisabethfeld, GT = Grillental, KNM = Kenya National Museum; LG = Legetet, Kenya; LT = Langental, NPE = Namibia Palaeontology Expedition; PQN = Palaeontology Quaternary Neogene (in South African Museum) SO = Songhor, Kenya, TH = Tugen Hills, Kenya.

Systematic descriptions

Order Rodentia Bowdich, 1821
Suborder Sciuromorpha Brandt, 1955
Family Sciuridae Fischer de Waldheim, 1817
Tribe Xerini Murray, 1866
Genus *Vulcanisciurus* Lavocat, 1973

Type species: *Vulcanisciurus africanus* Lavocat, 1973

Species *Vulcanisciurus africanus* Lavocat, 1973

Referred material: EF 185’01, left mandible with p/4-m/1; LT 85’97, broken right dM4/; GT 26’00, right M3/; EF 35’98, right m/1.

Distribution in Namibia: Elisabethfeld, Grillental, Langental

Measurements of the teeth (in mm) (length x breadth).
EF 185’01, p/4, 1.79 x 1.88; m/1, 1.95 x 2.14.
GT 26’00, right M3/, 2.4 x --.
LT 85’97, dM4/, 1.82 x --.
EF 35’98, m/1, 1.92 x 1.90.

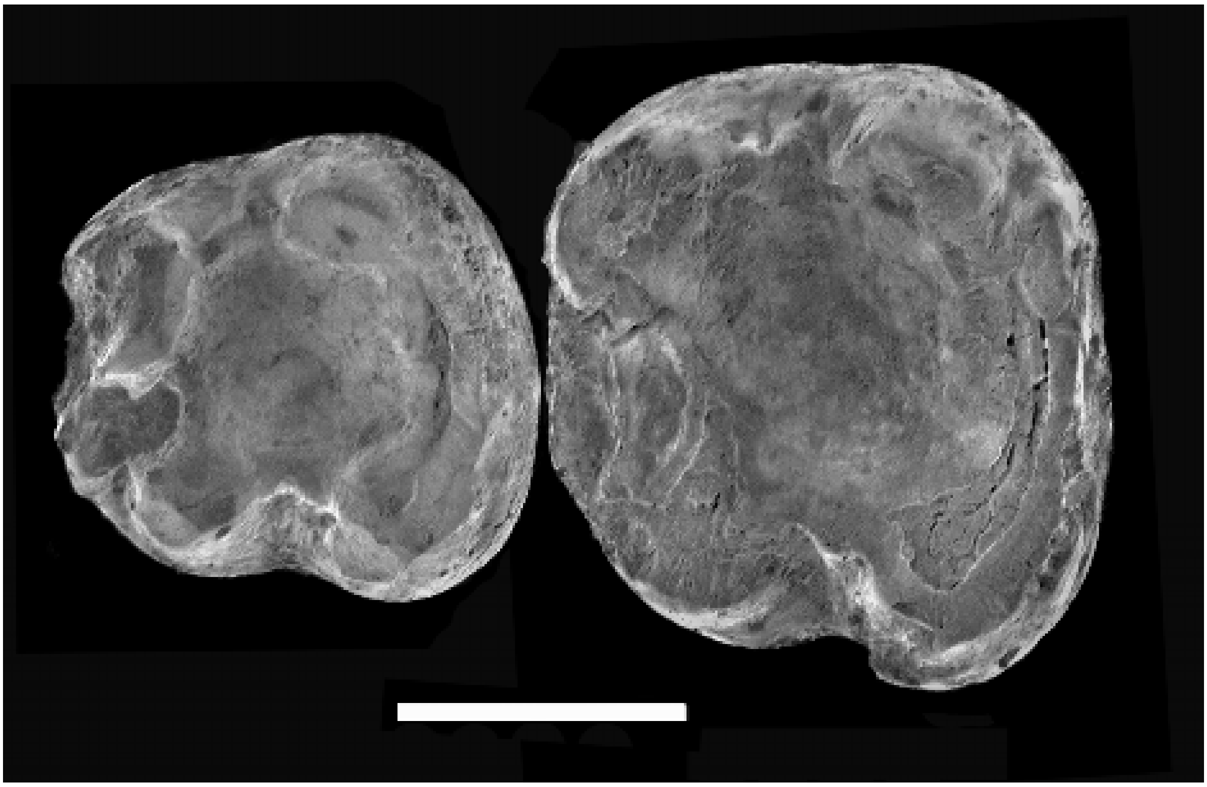

Figure 1. *Vulcanisciurus africanus* Lavocat, 1973, from the Northern Sperrgebiet, Namibia.
EF 185’01, left p/4-m/1 from Elisabethfeld, occlusal view (scale : 1 mm).

Description: From Elisabethfeld there is a left mandible with p/4-m/1 (EF 185'01, Fig. 1). The dimensions of the fossil are similar to those of the East African material attributed to the species *Vulcanisciurus africanus*, but the p/4 seems to be proportionally slightly larger relative to the m/1. The anteroconid in the p/4 is large. There is a liaison between the protoconid and the metaconid. The talonid basin is wide but shallow. The ectolophid is straight with no sign of cuspids. The trigonid basin is shallow and its surface area is reduced. There are two roots.

The occlusal outline of m/1 is not very oblique. There is a relatively long anterolophid which extends about half the breadth of the crown. It is separated from the liaison between the protoconid and metaconid by a shallow valley. The metaconid is higher than the protoconid. There is no antero-buccal valley nor an antero-buccal cingulum. The ectolophid is devoid of a mesoconid. On the lingual side there is a low but large entoconid which has a shallow postero-lingual indentation. There is no trace of an entolophid.

From Langental there is a broken dM4/ (the buccal half) which shows a damaged parastyle, the protoloph is cut between the paracone and the protocone, the metaloph is well preserved and shows a metaconule.

The upper third molar from Grillental has a rounded anteroloph, followed by a straight protoloph which joins the paracone to the protocone. Behind this, on the buccal side there is posteroloph which has no sign of a metacone. The postero-lingual corner is broken off. The talon basin is wide and shallow, with a smooth bottom.

Discussion: It is not possible to make comparisons with the upper dentition of the Kenyan material of *Vulcanisciurus africanus* because its dM4/ and M3/ have not been described (Lavocat, 1973). The morphology of the Langental tooth resembles a specimen described by Winkler (1992) from Muruyur, Kenya, but the Namibian specimen is much larger (1.41 x 1.64+ for the Kenyan fossil (KNM TH 22387) 1.82 x – for the Langental specimen). Winkler did not attribute the Muruyur specimen to a genus or species.

The best preserved specimen from Elisabethfeld is however, close enough metrically and morphologically to *Vulcanisciurus africanus* be attributed with some degree of confidence to this species.

The specimens from the Northern Sperrgebiet differ from squirrel specimens from Arrisdrift mainly by the presence in the latter of a well developed hypolophid and a wider valley between the metalophid and anterolophid. The Arrisdrift species is smaller (m/1 1.76 x 1.94 mm) than the Elisabethfeld specimen (m/1 1.95 x 2.14 mm). There can be little doubt that the Arrisdrift species is different from the Elisabethfeld one, even at the generic level. At Harasib 3a, Namibia, a basal Late Miocene deposit, there is a third genus of squirrel (Mein *et al.*, 2002).

Suborder Myomorpha Brandt, 1855
Family Cricetidae Fischer de Waldheim, 1817
Subfamily Democricetodontinae Lindsay, 1987
Genus *Protarsomys* Lavocat, 1973

Type species: *Protarsomys macinnesi* Lavocat, 1973

Species *Protarsomys macinnesi* Lavocat, 1973

Referred material: See list of measurements (Appendix 1).

Distribution in Namibia: Elisabethfeld, Grillental, Langental, E-Bay.

Description: The incisive foramen is long and extends as far back as the M1/.

M1/ has an occlusal outline like that of *Democricetodon*, with a straight buccal margin and with a narrow prelobe making a deep anterior narrowing in the outline (Fig. 2A). There is no sign of the doubled liaison between the protocone and paracone, which is frequent in *Democricetodon*. The anterocone is single, sometimes crest-like with an occasionally bifid apex. The prelobe is surrounded buccally and lingually by a cingulum which is better developed buccally. The protolophule is transversely oriented and inserts onto the longitudinal crest posteriorly to the protocone. A few specimens show a short transverse crest in front of the protocone which is either a remnant of a protolophule or a labial spur (nomenclature from Mein and Freudenthal, 1971). The mesoloph is low and variable in length, either long and ending in a small mesostyle or short and stopping before the buccal margin. The anterolophule descends towards the antercone as well as distally. The metalophule is transversely oriented and joins the hypocone, but in a few specimens it is located slightly further backwards and in a few it ends short of the hypocone. The posteroloph descends towards the buccal margin of the crown. The medio-lingual sinus has a low longitudinal crest at its lingual margin, the entostylar crest. This crest can reach the base of the hypocone. One specimen shows a continuous lingual cingulum from the base of the hypocone to the front of the anterocone. There are three roots, an elongated lingual one, and two cylindrical buccal ones.

M2/ has a small anterocone which joins a well developed anterior cingulum which extends lingually and a variable buccal cingulum. As in the M1/ there is no sign of the doubled liaison between the protocone and paracone. The protolophule inserts anterior to the front of the protocone. The mesoloph is of variable length, but is usually better developed than in the M1/. The metalophule is transversely oriented or slightly twisted anteriorly, and joins the front part of the hypocone. Behind the protocone the longitudinal crest is lower. The median sinus is often blocked by a low entostylar crest. There are three roots.

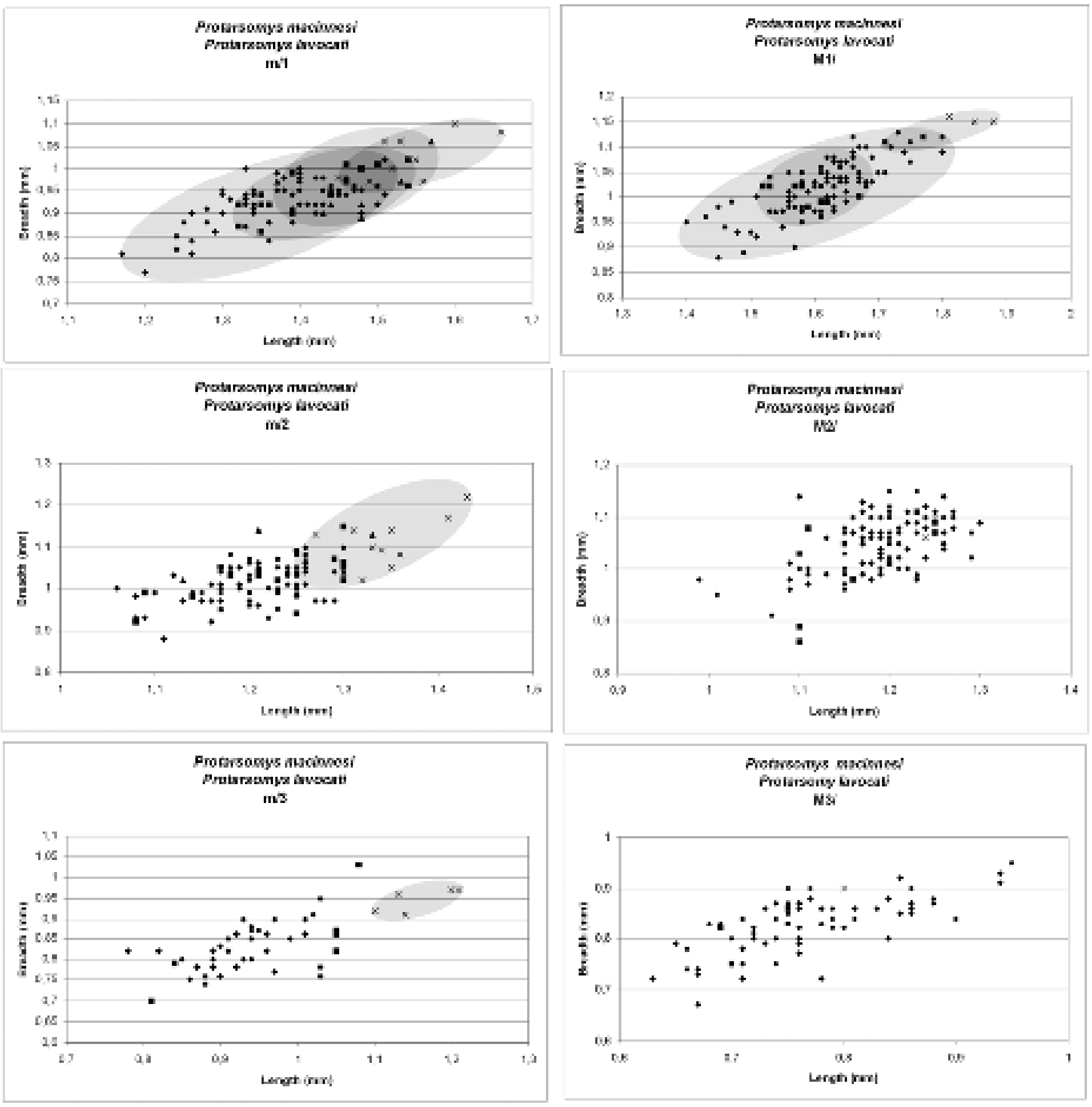

Figure 2. Bivariate plots of the teeth of *Protarsomys macinnesi* from the Northern Sperrgebiet, and *Protarsomys lavocati* from Arrisdrift, Namibia (x = Arrisdrift; diamond = Elisabethfeld; triangle = Langental; square = Grillental).

M3/ is reduced with a rounded triangular outline. The basic structure of the anterior loph is similar to that of the M2/ but the rear loph is reduced. The anterior cingulum is reduced. The oblique protolophule reaches the anterocone. The mesoloph is usually absent, but when present it is short. The metacone and hypocone cannot be distinguished from the posterior cingulum, although in a few teeth there is a slight swelling where a hypocone would occur in front of which is a small sinus which occasionally sports a low cingulum along the lingual margin. There are three roots.

The m/1 is triangular narrowing slightly anteriorly (Fig. 3B). The anteroconid is almost in the centre line of the tooth and is antero-posteriorly compressed. It has well developed anterior cingula, especially the buccal one which reaches the base of the protoconid. The metaconid is joined by a metalophulid which is oblique anteriorly and which joins the longitudinal crest midway between the protoconid and anteroconid. Some specimens also have a second metalophulid which is oblique posteriorly and reaches the longitudinal crest behind the protoconid.

The transversely oriented mesolophid is low and variable in length, ranging from long to short. In a few specimens there is a low cingular crest descending from the metaconid blocking the end of the valley that contains the mesolophid. The entoconid is joined to the longitudinal crest by a narrow hypolophulid in front of the hypoconid. There is a posterolophid which descends and ends at the posterior base of the entoconid. The tooth is widest at the posterolophid.

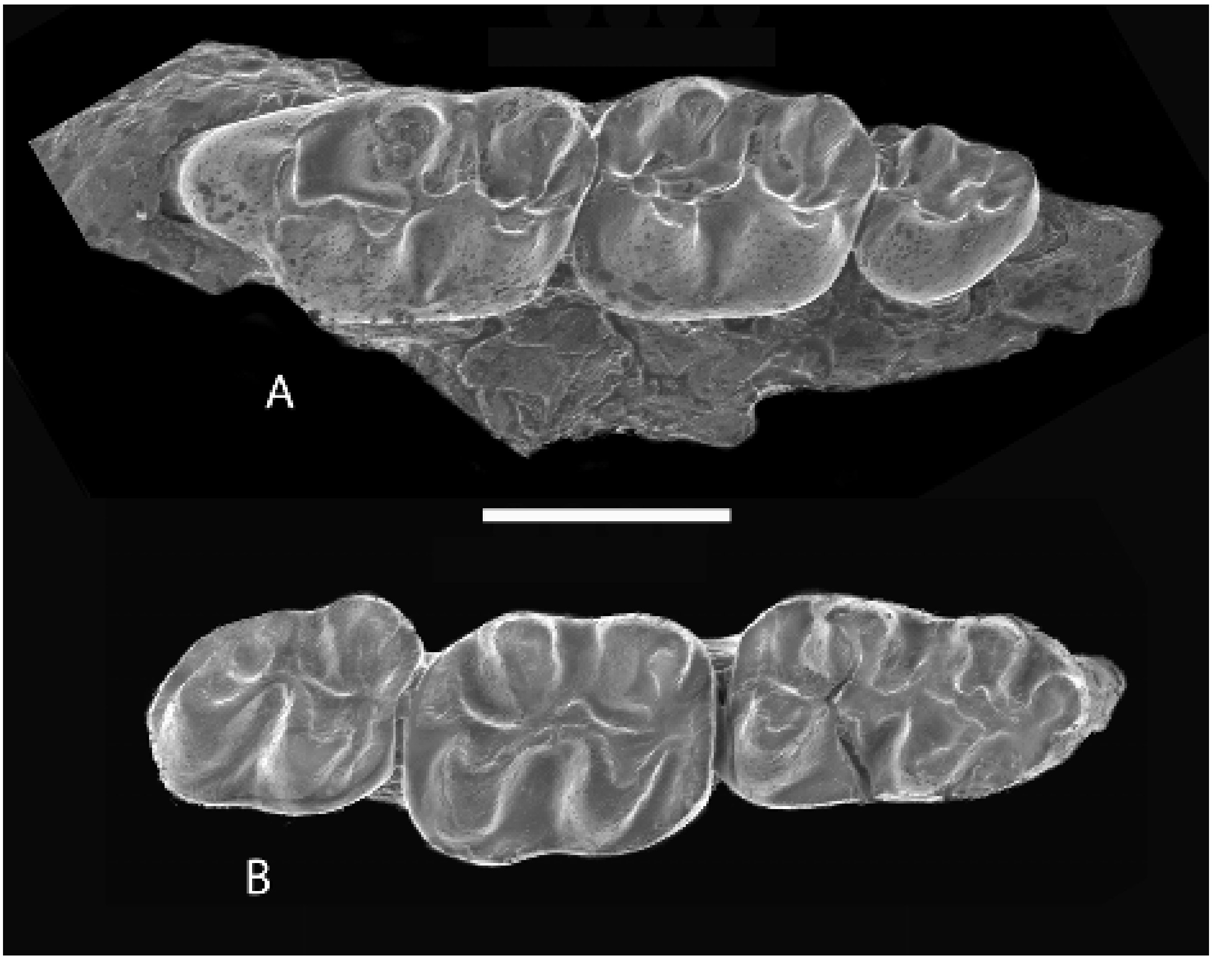

Figure 3. *Protarsomys macinnesi* Lavocat, 1973, from the Northern Sperrgebiet, Namibia.
A) EF 202'01, maxilla with M1-M3 from Elisabethfeld, B) GT 5'97, mandible with m/1-m/3 from Grillental, occlusal views (scale : 1 mm).

The sinusid is transversely oriented and in a few teeth there is a small fine descending crest within the sinusid, the ectomesolophid. There are two roots.

The m/2s are rectangular in occlusal outline. The anteroconid is very small but distinct, and has a large anterobuccal cingulum and a smaller lingual one. A narrow valley persists between the anterolingual cingulum and the anterior flank of the metaconid. The anterolophulid and metalophulid insert directly into the anteroconid. The mesolophid is medium to short and is transversely oriented. The hypolophulid is transversal and joins the longitudinal crest anterior to the hypoconid. The posterolophid forms a descending crest at the rear of the tooth. In a few specimens there is a lingual offshoot of the posterolophid. The widest part of the tooth is at the level of either the rear lophid, or the anterior lophid. The sinusid is transversely oriented. Its opening may have a low longitudinal buccal crest and in a few cases this crest may continue towards the rear where it fuses with the posterlophid, in which case the posterolophid forms a small posteroconid. There are two roots.

The m/3s are triangular, reduced posteriorly. There are three cuspids, metaconid, protoconid and hypoconid. The anterolophid is fused to the anterior cingulum. The mesolophid reaches the lingual margin of the tooth, where it joins the posterolophid. The sinusid is either transverse or obliquely oriented towards the rear.

Discussion: This is the smallest of the rodents found by the NPE in the Northern Sperrgebiet, it is very common at Elisabethfeld.

The *Protarsomys* material from the Northern Sperrgebiet is morphologically similar to fossils from Arrisdrift described by Mein and Pickford, 2004, but it is smaller. Scatter diagrams of dental measurements reveal overlap in distributions from the various sites but the means of some of the teeth, in particular the p/4 tend to be separated from each other. It is not possible to make metric comparisons with the Kenyan material as no dimensions have been published. However, our own measurements of a cast of a mandible from Legetet fall not far from the mean of measurements of the Sperrgebiet fossils, but it plots out below the range of variation of the Arrisdrift fossils attributed to *Protarsomys lavocati*. However, until a revision of the Kenyan fossils is done, particularly those from Rusinga, some doubt will remain concerning the identification of the Namibian fossils.

Some of the teeth of Namibian *Protarsomys* show a trend of gradual increase in dimensions from Elisabethfeld to Grillental to Langental and Arrisdrift which is compatible with previous suggestions that the sites decrease in age from Elisabethfeld to Arrisdrift. This lineage is therefore potentially useful for biochronology, but on condition that sufficiently great samples are available.

Protarsomys is the only myomorph rodent recognised in the Sperrgebiet.

Suborder Anomaluromorpha Bugge, 1974
Family Pedetidae Gray, 1825
Subfamily Parapedetinae McKenna and Bell, 1997
Genus *Parapedetes* Stromer, 1926

Type species: *Parapedetes namaquensis* Stromer, 1926

Species *Parapedetes namaquensis* Stromer, 1926

Material: see list of measurements (Appendix 2).

Distribution: Elisabethfeld.

Description: The dM4/ has two lophs, each of which

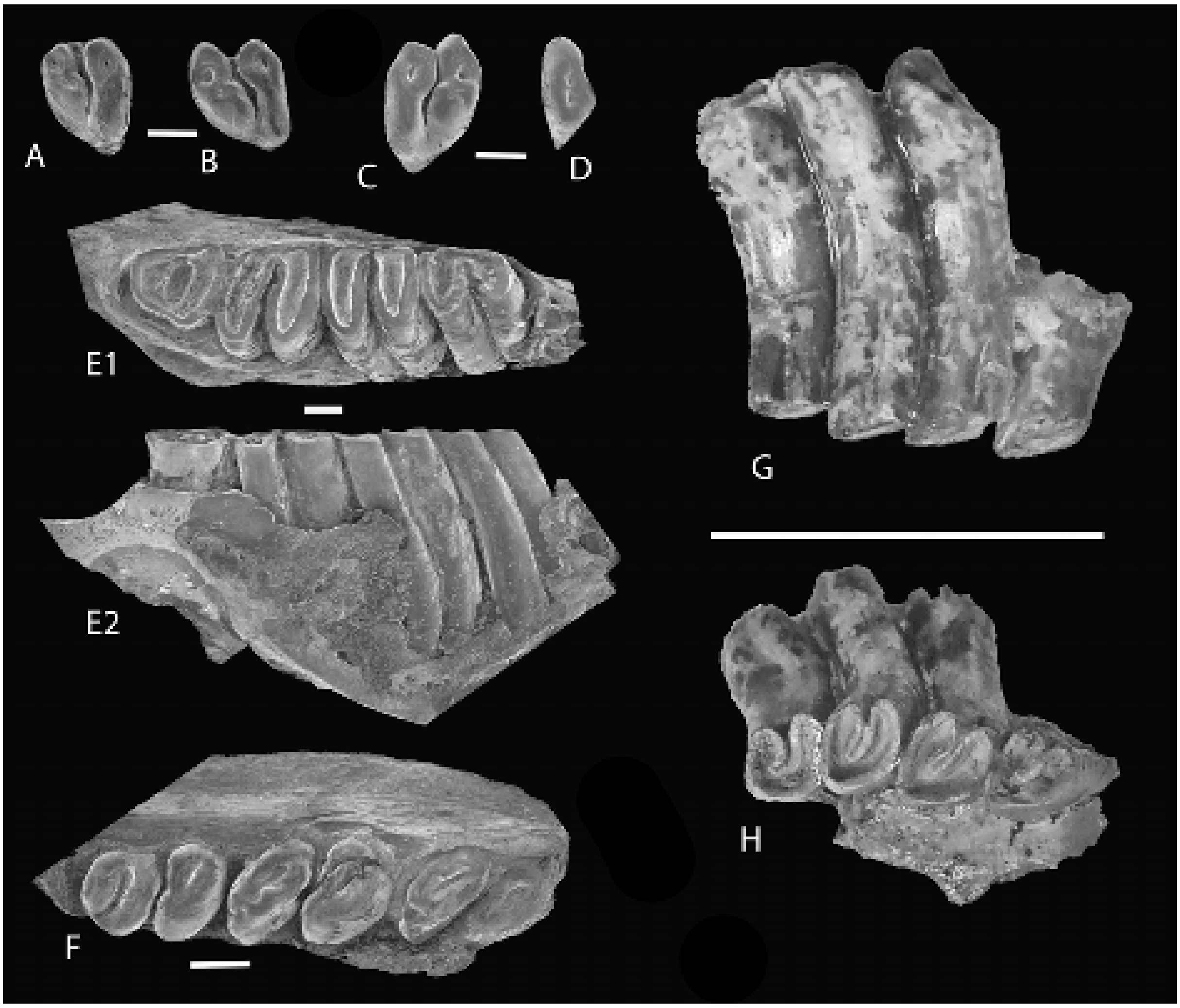

Figure 4. *Parapedetes namaquensis* Stromer, 1926, from the Northern Sperrgebiet, Namibia.
A) EF 21'04, left D4/ occlusal view; B) EF 21'04, left M1/ occlusal view; C) EF 21'04, right M1/, occlusal view; D) EF 21'04, anterior loph of juvenile right M2/, occlusal view; E) EF 225'01, left mandible with p/4-m/3, occlusal and buccal views; F) EF 2'00, extremely juvenile left mandible with p/4-m/2, occlusal view (each tooth appears as two lobes); G) EF 199'01, left maxilla with P4/-M3/, buccal view; H) EF 199'01, left maxilla, occlusal view; all from Elisabethfeld (scale : 1 mm except G-H : 1 cm).

is comprised of two transverse crests which are joined buccally and lingually to the protocone, paracone, metacone and hypocone (Fig. 4A). The anterior loph has a protolophule directed posteriorly and the posterior loph has a metalophule close to the metacone. The two lophs are separated by a deep transverse valley, the striae, which join in the centre of the tooth. With wear the superficial occlusal structures disappear leaving two transverse lophs and in slightly greater wear stages, the lingual stria disappears, leaving only the buccal one in evidence. A similar schema occurs in the lower deciduous molars (Fig. 4F).

The section of the upper incisors has a flat labial surface. There is a low longitudinal crest bordered by a very shallow, fine groove which is close to the mesial side of the tooth.

The lower incisor has a longitudinal labial crest located close to the distal part of the crown, the buccal enamel surface is more curved than that of the upper incisors and the tooth is more mesio-distally compressed than the uppers.

The P4/s are the largest of the cheek teeth. When held with the barrel of the tooth vertical, the occlusal surface dips from back to front, as was shown by Stromer (1926, Pl. 42, Fig. 5a) but when in the mandible, the occlusal surface is in line with that of the rest of the cheek teeth, the P4/ being inclined in the maxilla. It is distinguished from the p/4 by its lack of an inflection in the lingual side, a structure that is well developed in the lower teeth. The buccal ends of the lophs of the upper teeth end in line with each other, whereas in the lower teeth the posterior lophid is displaced lingually, which gives rise to the inflection in the lingual profile of the tooth.

In *Parapedetes* it is relatively easy to determine whether the teeth are upper or lowers and to which side they belong (Fig. 4F-4H). M1/ and M2/ are recognisable by their narrow lingual side and the wider posterior part. M1/ differs from M2/ by the angle between the anterior margin and lingual margin which is widely obtuse in M1/ and almost a right angle in the M2/. Furthermore the column of the tooth is straight in M1/ and slightly concave towards the rear and buccally in the M2/.

The M3/s have a more rounded trapezoidal occlusal outline with the anterior loph broader than the posterior one, in contrast to the occusal outline of the other cheek teeth which have a more triangular outline. It differs from the m/3 by its flexus which curves transversely and distally whereas in m/3 the flexus is straighter, and by the absence of the lingual inflection, which is present but shallow in the m/3.

The cheek teeth are hypsodont (Fig. 4E1, E2) but small roots appear in advanced wear stages, in which the striae and striids are almost eliminated. In associated mandibles and maxillae, the mesostriae are less deep than the hypostriids. The striids thus persist longer in lower teeth than in uppers. A particularity of *Parapedetes* is that the p/4 and m/3 are almost straight, and diverge only slightly from the vertical, in strong contrast to *Propedetes* (see below). We did not observe any cementum in the cheek teeth of *Parapedetes*.

Discussion: *Parapedetes namaquensis* was described in detail by Stromer, 1926, who had at his disposal an almost complete skeleton from Elisabethfeld. The species is thus well known, but has only ever been found at the type locality. The NPE recovered abun-

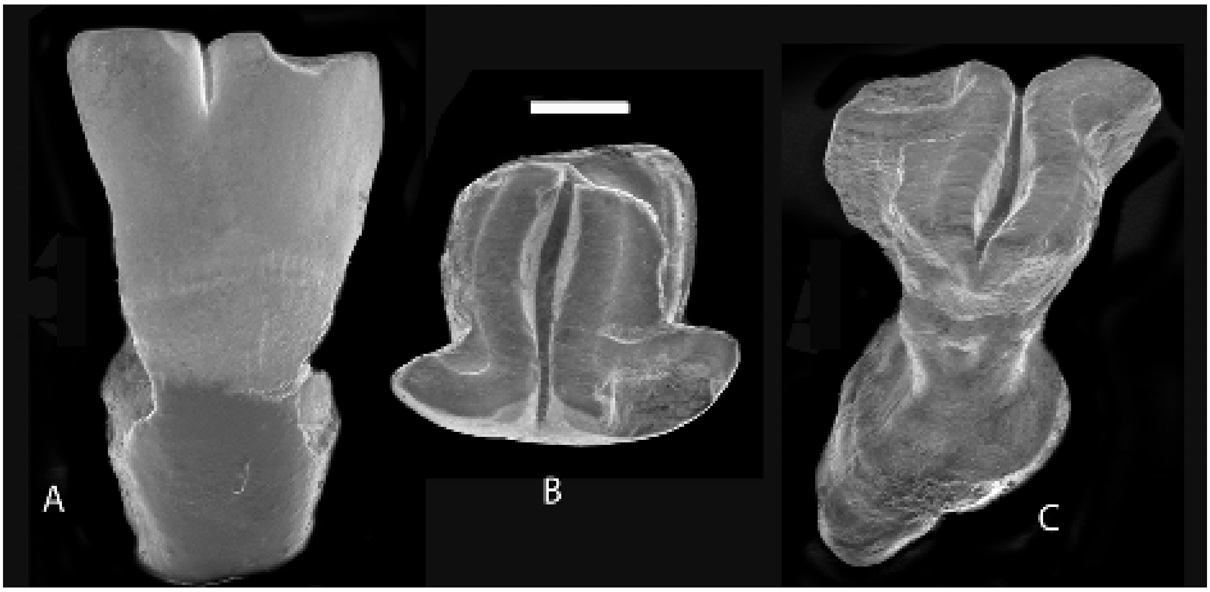

Figure 5. *Megapedetes* cf *gariepensis*, Mein and Senut, 2003, from the Northern Sperrgebiet, Namibia. LT 157'96, fragment of right M1/ or M2/ from Langental, lateral, occlusal and oblique occlusal views (scale : 1 mm).

dant additional material at this site, but none at Grillental and Langental despite the rich micromammalian faunas that occur there.

McKenna and Bell, 1997, considered that *Parapedetes* did not belong to Pedetidae but to a distinct family, on account of the fact that the stria is buccal in the upper teeth and the striid is lingual in the lower cheek teeth. In *Pedetes* the striae are on the same side in the upper molars, but on the opposite side in the lowers. In reality, in all Pedetidae, including *Parapedetes*, there are two striae and striids on each cheek tooth, one of which is usually deeper than the other, except in *Megapedetes* where they have the same depth. With increasing wear, the shallower striae and striids disappear and in advanced wear both striae and striids disappear. Thus, in *Parapedetes*, it is only the depth of the striids that differs from *Pedetes*, the rest of the skull and skeleton being typical of the family Pedetidae. We accept the subfamily Parapedetinae for this genus, which is extinct and which has only ever been found in Namibia. It differs from other pedetids by the retention of deciduous dentition as was noted by Stromer (1926). The deciduous teeth are morphologically similar to unworn permanent teeth, the dm/4 and dM4/ being similar to unworn p/4s and P4/s respectively. Once the permanent teeth are fully formed they cannot be confused with deciduous teeth, being much higher crowned. The unworn occlusal morphology of the cheek teeth observed in very juvenile individuals of *Parapedetes* is similar to that of extant infant *Pedetes*.

A significant difference from other pedetids is the mesio-distally narrow lower incisor with a more curved labial surface.

Subfamily Megapedetinae MacInnes, 1957
Genus *Megapedetes* MacInnes, 1957

Type species: *Megapedetes pentadactylus* MacInnes, 1957

Species *Megapedetes* cf *gariepensis* Mein and Senut, 2003

Material: LT 157'96, right M1/ or M2/ fragment.

Dimensions: Length greater than 3.20 mm, breadth greater than 3.07 mm, height 3.45 mm, S = 0.30 mm, s = 0.8 mm.

Description: The fragmentary upper molar (Fig. 5) is deeply worn and has thick enamel, is brachyodont, more so than the Arrisdrift specimens (Mein and Senut, 2003) and the distance between cervix and striae is short and there is a strong root. The bases of the two striae are almost at the same level. All these features occur in the genus *Megapedetes*.

Discussion: This tooth, even though fragmentary, is important in being the earliest known specimen of its genus in Namibia. On account of its size and morphology we provisionally attribute it to the species from Arrisdrift.

Subfamily Pedetinae Gray, 1825
Genus *Propedetes* nov.

Type species: *Propedetes efeldensis* sp. nov.

Other species: *Propedetes laetoliensis* (Davis, 1987); *Propedetes* nov. sp. Rooilepel, Namibia, *Diamantornis laini* level; *Propedetes* sp. from Zebra Hill, Namibia.

Generic diagnosis: Pedetid with hypsodont cheek teeth with prolonged growth but with roots developed in old individuals (one root in upper teeth, two in lower teeth). Moderately worn teeth show two lophs clearly separated from each other by a median valley. On the lateral surfaces this valley is revealed as deep grooves (striae and striids in the nomenclature of Stirton, 1935 for *Castor*). These grooves are very unequal in depth from occlusal surface towards cervix, the mesostria (mesostriids) are deeper than the hypostria (hypostriids). Because of the great degree of hypsodonty, the cheek teeth show torsion. Lower p/4 with distinct indentation on posterior surface of anterior loph. No cementum in cheek teeth. Doubled mental foramen positioned low down on mandible.

Differential diagnosis: *Propedetes* differs from *Pedetes* by its lesser hypsodonty, the presence of roots in the cheek teeth of old individuals (2 in lower teeth, one in upper teeth) in contrast with *Pedetes* which has arhyzic cheek teeth endowed with cementum, which is lacking in *Propedetes*. *Propedetes* differs from *Parapedetes* by its greater dimensions, its lesser hypsodonty and by the difference in depth of the lateral striae and striids. *Propedetes* differs from *Megapedetes* by its lesser dimensions, its greater hypsodonty which causes a torsion to develop in the cheek teeth, in contrast with the straight cheek teeth of *Megapedetes* and by the different depths of the striae and striids, which are almost the same depth in *Megapedetes*.

Derivatio nominis: The prefix '*pro*' indicates the lineage predates and could have given rise to the genus *Pedetes*.

Species *Propedetes efeldensis* sp. nov.

Species diagnosis: Large species of the genus. Length p/4 to m/3 ca 13,75 mm.

Holotype: EF 14'01, left mandible with incisor, p/4-m/3 slightly worn (Fig. 6A).

Paratypes: LT 134'99, left P4/; LT 135'99, left M1/; LT 446'96, broken left m/2?; PQN 117, left m/2; EF 198'01, left m/2 (Appendix 3).

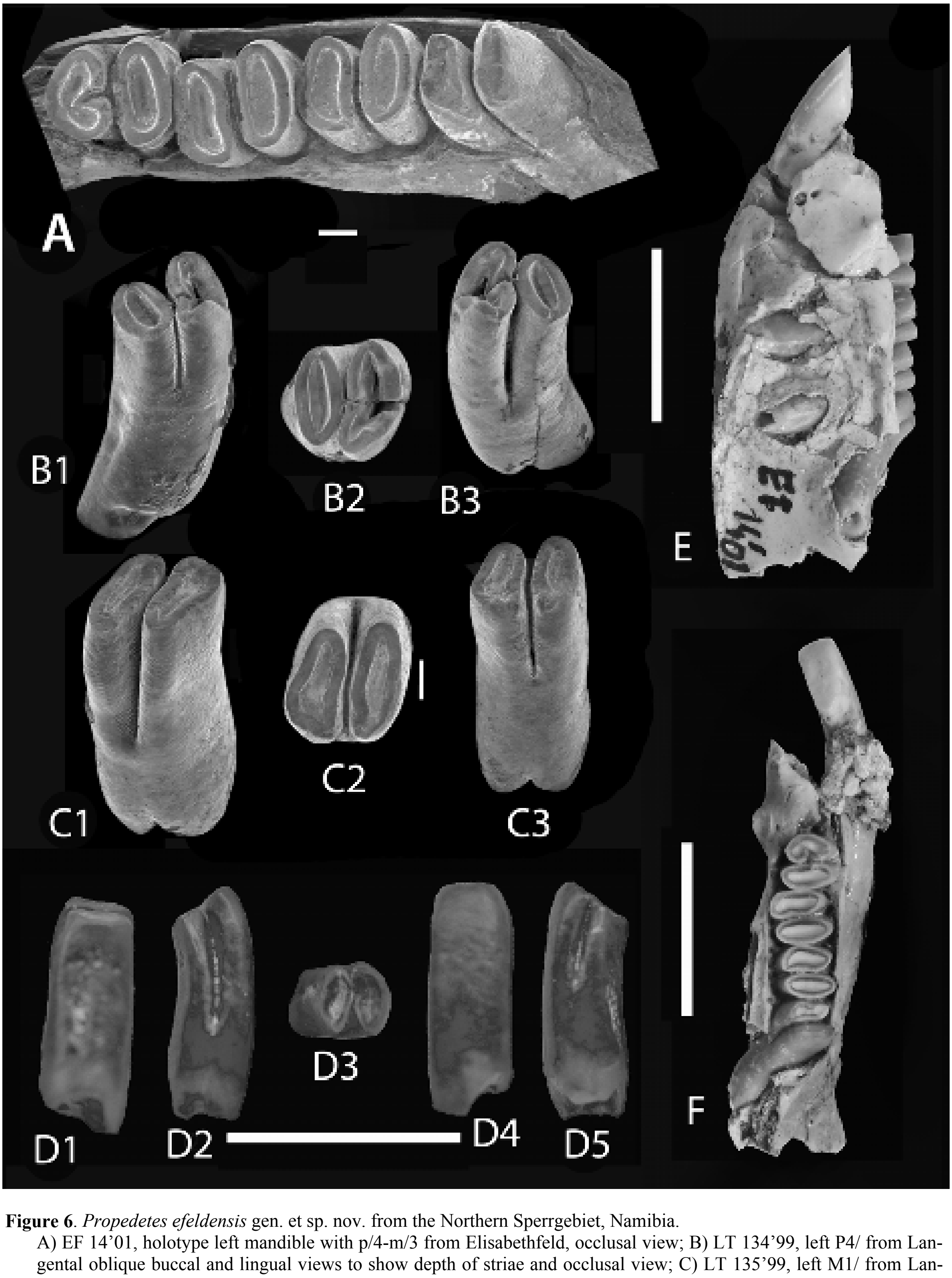

Figure 6. *Propedetes efeldensis* gen. et sp. nov. from the Northern Sperrgebiet, Namibia.
A) EF 14'01, holotype left mandible with p/4-m/3 from Elisabethfeld, occlusal view; B) LT 134'99, left P4/ from Langental oblique buccal and lingual views to show depth of striae and occlusal view; C) LT 135'99, left M1/ from Langental, oblique lingual and buccal views and occlusal view; D) PQN 117, left m/2 from Langental, digital image, distal, lingual, occlusal, anterior and buccal views; E) EF 199'01, right P4/-M3/, buccal view; F) EF 199'01, right P4/-M1/, occlusal view (scales A-C : 1 mm, D-F : 10 mm).

Derivatio nominis: "E-feld" is the colloquial abbreviation of Elisabethfeld. As part of a species name it drops the hyphen.

Distribution: Elisabethfeld, Langental.

Description: The holotype mandible contains the incisor and four cheek teeth in medium wear (Fig. 6A, 6E-6F). There are two mental foramina close to the base of the mandible. The m/3 is markedly concave to the rear, and the p/4 concave towards the anterior side.

The lower incisor has a flattened labial surface and measures 2.7 mm antero-posteriorly by 2.5 mm mesio-distally.

The p/4 is not molarised, having an anterior lophid with a distinct indentation on its posterior surface differing from the posterior lophid which is oval in outline. It is appreciably less hypsodont than the molars and strongly concave towards the front.

The m/1 and m/2 are relatively straight, the m/1 lightly curved anteriorly, the m/2 lightly curved distally. They have two ovoid lophids with a weak distal inflection in the anterior lophid. When isolated these teeth are difficult to distinguish from one another.

The m/3 has the distal lophid lower and narrower than the anterior one, and the crown is strongly concave distally, the root being located near the base of the ascending ramus.

An isolated m/2 from Elisabethfeld, has the striids well preserved, the short striid having a depth of 2.7 mm, and the tall striid, a depth of 3.7 mm.

PQN 117, a left m/2 from Langental preserved in the Iziko South African Museum, Cape Town (Fig. 6D) has the short striid 3.75 mm and the tall one 5.7 mm. The apex of the crown is more strongly curved than in the Elisabethfeld holotype most probably due to the greater wear stage of the latter specimen.

Another fragment of lower molar from Langental, LT 446'96 has a short striid 3.7 mm deep and the tall one 4.6 mm. The tooth shows a peculiar subdivision of the posterior lophid into two cuspids.

The upper P4/, LT 134'99 (Fig. 6B) is concave anteriorly, with the small stria 2.45 mm and the large one 4.0 mm. The crown is 7.6 mm high and shows the beginning of the formation of roots.

The left M1/, LT 135'99 (Fig. 6C) is straight and has the small stria 2.96 mm deep and the large one 3.87 mm; while the crown height is 10.3 mm. The roots are just beginning to form. There is no sign of cementum.

Discussion: This new species is rare in the Northern Sperrgebiet, but is extremely abundant at Rooilepel and other sites in the aeolianites of the Namib Desert where it and allied species occur at many levels throughout the Neogene. There is a clear trend towards an increase in hypsodonty through the Rooilepel succession, the youngest specimens being quite similar to the most hypsodont species, from the Middle Pliocene of Laetoli, Tanzania (Davis, 1987).

The morphology of the teeth and jaws of *Propedetes* are such that this genus could be ancestral to the extant genus *Pedetes*. The main differences between these genera are the absence of roots in the cheek teeth of *Pedetes*, and the complete molarisation of the lower p/4 and the development of cementum in the extant genus.

Discussion on Pedetidae of the Northern Sperrgebiet: It is surprising to find three subfamilies of Pedetidae in the Early Miocene of Namibia, which indicates to us that the family had a long prior history. The three subfamilies have quite divergent dental adaptations (hypsodonty in particular) indicating different diets. The abundance of brachyodont *Megapedetes* in the more humid Early Miocene sites in East Africa and its relative rarity in Southern Africa at the same time suggests that it was adapted to more closed vegetation types and a less abrasive diet than the hypsodont genera *Parapedetes* and *Propedetes* which, in contrast, are common in Namibia but unknown in East Africa until the Middle Pliocene, where *Propedetes laetoliensis* has been reported. The latter two genera probably included important quantities of grass in their diet.

Pedetids seem to have developed in Subsaharan Africa, the only genus to have dispersed northwards being *Megapedetes* which reached the Mediterranean region by the beginning of the Middle Miocene (Chios, Greece) (Tobien, 1968) Turkey (Sen, 1977) and Israel (Wood and Goldsmith, 1968). It has also been found in younger deposits at Beni Mellal, Morocco (Lavocat, 1961) and Tunisia (Batik and Fejfar, 1990).

Suborder Hystricognatha Woods, 1976
Family Diamantomyidae Schaub, 1958
Genus *Diamantomys* Stromer, 1922

Type species: *Diamantomys luederitzi* Stromer, 1922

Species *Diamantomys luederitzi* Stromer, 1922

Material: see list of measurements (Appendix 4).

Distribution: Elisabethfeld, Grillental, Langental, Glastal.

Description: The palatines invaginate as far forwards as the rear of M1/ and the palatine foramen is opposite the M1/. The posterior nares are v-shaped and their anterior extremity is opposite the rear of the M3/.

The P3/ (or dM3/) is a small uniradiculate tooth located in the centre line of the tooth row, but the crown has not been discovered in Namibia, although many specimens from East Africa possess it (Lavocat, 1973).

The P4/ (or dM4/) is a molarised tooth with a

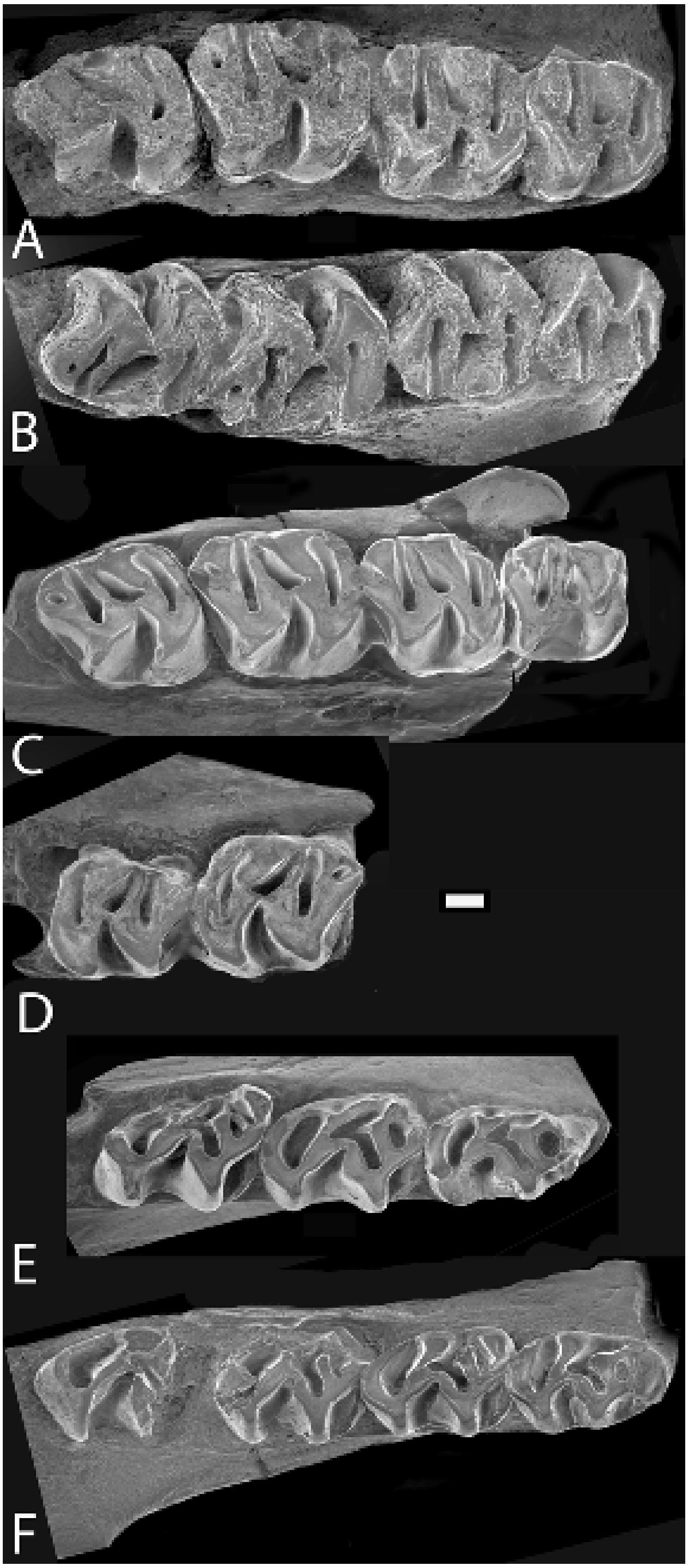

Figure 7. *Diamantomys luederitzi* Stromer, 1922, from the Northern Sperrgebiet, Namibia. A and B) EF 36'93, maxilla with left and right P4-M3 from Elisabethfeld, occlusal views, C and D) GT 9'00, maxilla with right P4/-M3/ and left M1/-M2/, from Grillental, occlusal views, D) E) GT 43'04, right mandible with p/4-m/2 from Grillental, occlusal view, F) GT 195'96, right mandible with p/4-m/3 from Grillental, occlusal view (scale : 1 mm).

strongly w-shaped endoloph with a deep hypoflexus separating the protocone from the hypocone. The endoloph is considerably more hypsodont than the buccal side of the tooth. There are four buccal flexi, from front to back the parafexus I bordered by the protoloph and the paracone, the paraflexus II bordered by the paracone and the mesoloph, the mesoflexus bordered by the mesoloph and the metacone and a small metaflexus distally bordered by the metacone and the posteroloph. With wear, the metaflexus becomes a fossette.

The M1/, M2/ and M3/ are constructed on the same plan as the P4/, but they are slightly larger, increasing in dimensions distally. The M3/ has a wide concavity in the posterior wall of the posteroloph as in the M1/ and M2/. A remarkable aspect of the cheek teeth of *Diamantomys* is that the tooth row shows a subdued wear gradient, the wear patterns of the various teeth usually being similar to each other. In GT 9'00 (Fig. 7C, D) and EF 36'93 (Fig. 7A, B) the anterior tooth is slightly more deeply worn than the molars, suggesting that it is more likely to be a dM4/ than a P4/.

There are two mental foramina in mandibles of *D. luederitzi*, one beneath the p/4 which is sometimes doubled, the other low down in the middle of the diastema. Although Stromer (1926, Pl. 41, Fig. 32a) illustrated only one mental foramen in the holotype mandible, there are in fact two. The mandible is slender and does not possess a masseteric boss, but in its place there is a shallow depression beneath the m/2 or m/3.

The p/4 is molariform but narrower and longer than the molars (Fig. 7E, F). It is usually slightly more worn than the molars suggesting that it is a retained deciduous tooth. None of the specimens of p/4 from the Sperrgebiet show the accessory spurs that occur in material from Moroto, Uganda (Mein and Pickford, 2006). The lower molars have three flexids lingually, from anterior to posterior called the paraflexid, mesoflexid and metaflexid. The paraflexid becomes a fossettid in medium wear. The w-shaped ectolophid has a deep hypoflexid. The ectolophid is extremely hypsodont, whereas the lingual side of the tooth is brachyodont.

The lower molars are constructed along the same lines as the p/4, but are broader. The m/3 does not appear to have any spur into the paraflexid. The rear lophid of the m/3 narrows distally, giving the tooth a triangular occlusal outline and there is no fossettid in the posterolophid. None of the teeth of *Diamantomys luederitzi* possess cementum.

Discussion: *Diamantomys* is emblematic of the Sperrgebiet on account of its name, yet previously available samples were extremely restricted. Stromer (1922, 1926) described a single right mandible with three molars collected at Langental. Abundant material of the species was subsequently reported from many localities in Kenya and Uganda (Lavocat, 1973) but more recently, Mein and Pickford (2006) have shown that there are at least three species in East Africa on the basis of odontological and metric variation. The NPE has collected more specimens from Elisabethfeld, Grillental and Langental, including palates and mandibles, but the species is relatively uncommon, in contrast to its abundance in East Africa, where it is often the dominant rodent species.

In Southern Africa, the species occurs up to the level of Auchas (ca 19 Ma) but it is unknown in younger deposits, including notably rich sites such as Arrisdrift (Mein and Pickford, 2003). It seems to have gone extinct locally by about 18 Ma, whereas in East Africa it persisted well into the Middle Miocene, having been found at Kipsaraman (ca 14.5 Ma) (Winkler, 1992).

Genus *Pomonomys* Stromer, 1922

Type species: *Pomonomys dubius* Stromer, 1922

Species *Pomonomys dubius* Stromer, 1922

Material: see list of measurements (Appendix 5).

Distribution: Grillental, Langental.

Description: The maxilla is poorly represented in the collections, but one specimen with three molars and the roots of P4/ shows that it has a robust zygomatic root endowed with a boss on its ventral surface. The zygomatic is antero-posteriorly broad in LT 31'06 (Fig. 8B) and more slender in LT 49'06 (Fig. 8A). The P4/ is molarised. The crown morphology superficially resembles that of *Diamantomys* but the flexa are endowed with cementum. In addition there is a spur across the mesoflexus so that in advanced wear there are two fossettes in place of the flexus. The metaflexus has a buccal wall that, with wear, closes off the flexus to form a distal fossette. When the teeth become very worn, the breadth-length ratio changes so that the teeth appear to be shorter than broad with a curved occlusal outline (convex mesially, concave distally). In anterior view the cheek teeth are buccally concave, with an extremely hypsodont lingual side and a brachyodont buccal side. As a result the occlusal surfaces of the cheek teeth dip laterally at a high angle, the angle between the two tooth rows being about 100°.

The upper molars are similar morphologically to the P4/ and are almost the same size as it.

The mandible has an enormous horizontal masseteric boss beneath the m/2-m/3 (Fig. 9F). The sometimes doubled mental foramen is at mid-height beneath the middle of the diastema.

The lower incisors of *Pomonomys* are small considering the size of the mandible (1,7 mm mesiodistal x 2.8 mm antero-posterior in juvenile mandible LT 30'06 (Fig. 8C, D) and 2.9 x 4.3 in adult jaw LT 41'04 (Fig. 8E)). The outer surface is curved mesio-

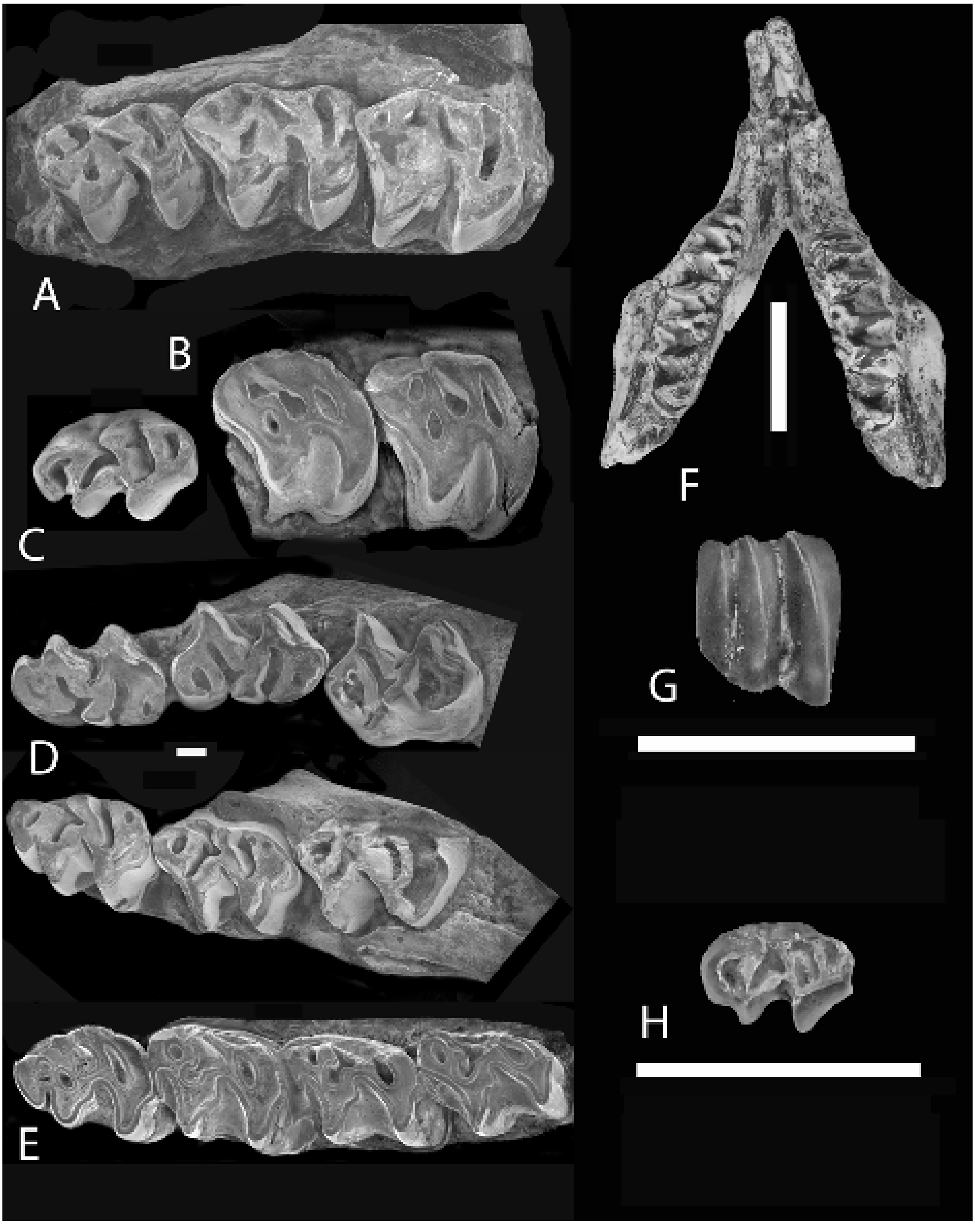

Figure 8. *Pomonomys dubius* Stromer, 1922, from the Northern Sperrgebiet, Namibia.
A) LT 49'06, right maxilla with P4/-M2/, B) LT 31'06, right maxilla with M1/-M3/ (M1/ not illustrated) C) LT 184'06, left p/4, D) and E) LT 30'06 right and left mandibles with p/4-m/2, E) LT 41'04, left mandible with p/4-m/3; F) LT 30'06 complete mandible; G) LT 184'06, left p/4, buccal view; H) LT 184'06, occlusal view; all specimens from Langental (scale : 1 mm except F-H : 1 cm).

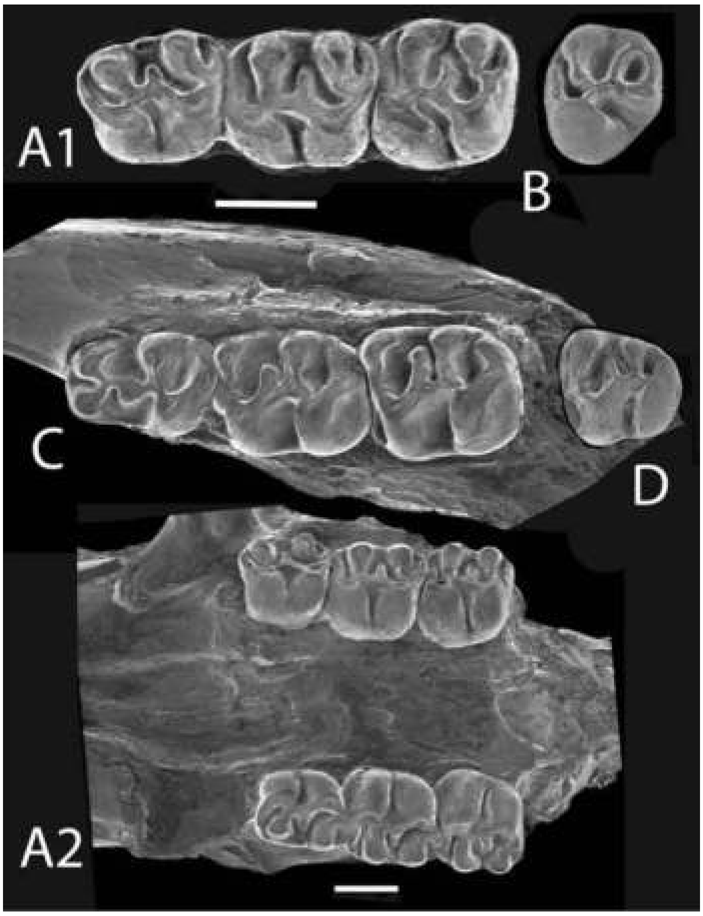

Figure 9. *Phiomyoides humilis* Stromer, 1926, from the Northern Sperrgebiet, Namibia.
A) EF 102'94, palate with left and right P4-M2, B) EF 106'05, isolated left M3/, C) EF 102'94, left mandible with p/4 -m/2 and isolated m/3, all specimens from Elisabethfeld, occlusal views (scale : 1 mm).

distally, as in *Diamantomys* and the enamel is shagreened.

The cheek teeth are considerably more hypsodont than in *Diamantomys* and the column of the teeth is concave lingually. The flexids are filled with cementum. The lower molars show a tall lingual stylid behind the metaconid which is well below occlusal level in unworn teeth (particularly clearly expressed in the juvenile mandible LT 30'06). This metastylid broadens the base of the teeth, making the lower cheek teeth wider than those of *Diamantomys*. There is a low antero-buccal cingulum in the molars, but it is difficult to discern in some specimens because it is covered in cement. Roots are formed late and are shorter than the height of the crown.

In the lower teeth there is a spur emanating from the protolophid (Fig. 8C) which can reach the distal wall of the paraflexid, thereby subdividing the anterior fossettid into two, especially visible in worn teeth such as the p/4 in LT 135'96 and LT 41'04 (Fig. 8E). The buccal side of the p/4 is taller than the tooth is long (LT 184'06, Fig. 8G, 8H).

Discussion: Stromer (1926) mentioned three mandible fragments of *Pomonomys dubius* all from Langental. The NPE found abundant additional specimens at this site including maxillae with upper teeth, but only one specimen at Grillental, and none at Elisabethfeld.

In contrast, *Diamantomys luederitzi* is common at Elisabethfeld and Grillental and is rare at Langental. Given that *Pomonomys* is more hypsodont than *Diamantomys* and in addition, its cheek teeth are abundantly covered in cementum whereas those of *Diamantomys* are not, suggests to us that grass was a more important element of the vegetation at Langental than at Elisabethfeld or Grillental. Given also the biochronology of the three sites, which occur in the order Elisabethfeld, Grillental, Langental, this could be taken as evidence for changes in vegetation over time, with an increase in grass cover at the expense of trees. This in turn would indicate the probability of climatic change, with increasing aridity in coastal Namibia during the Early Miocene.

Family Thryonomyidae Pocock, 1922
Genus *Phiomyoides* Stromer, 1926

Type species: *Phiomyoides humilis* Stromer, 1926

Species *Phiomyoides humilis* Stromer, 1926

Holotype: left mandible with p/4-m/2 figured by Stromer (1926, Pl. 42, Fig. 25a, b). The specimen has been reported lost (Lavocat, 1973).

Neotype: EF 102'94, skull and mandibles of a single individual.

Material: see list of measurement (Appendix 6).

Emended diagnosis: Mandible with four cheek teeth. The p/4 with anterior lophid formed of two cusps (metaconid and protoconid) separated by a central valley but which join in the centre line of the tooth behind these cusps. Molars with antero-buccal cingulum decreasing in size from m/1 to m/3. Lower molars with metalophulid 2 (= mesolophid of some authors). Molars relatively high and narrow. Lower cheek tooth row ranging from 5.4 to 6.3 mm. Molariform P4/ (dM4/). First and second upper molars subequal in size, M3/ reduced distally. Upper premolar and molars with five lophs. In all unworn cheek teeth the cusps are pointed and extend above the lophs (ids).

Differential diagnosis: *Phiomyoides* differs from *Apodecter* by the absence in the latter of the metalophulid 2, by its smaller dimensions and by its better developed metaloph in the upper molars. *Phiomyoides* differs from *Elmerimys* by its narrower lower molars, its higher crowned cheek teeth and by the posterolophid extending onto the entoconid, closing off a fossettid in slightly worn teeth. *Phiomyoides* differs from *Epiphiomys* by its smaller dimensions, its shorter metalophulid 2, and shorter mesoloph in upper molars.

Distribution: Elisabethfeld, Bohrloch (Betrieb IV) Grillental, Langental, E-Bay.

Description: The mandible has a mental foramen low down beneath the p/4 below the anterior end of the masseteric crest. The diastema is not deeply recurved ventrally.

The lower incisor is slender and terminates under the m/3. It has a groove on its mesial surface between the enamel and the dentine. The mesial and anterior surfaces are flat, whereas the distal surface is slightly convex. The enamel extends over about half the lateral surface of the incisor.

The p/4 with anterior lophid formed of two cusps (metaconid and protoconid) separated by a central valley but which join in the centre line of the tooth behind these cusps (Fig. 9C). There is a tiny anteroconid at the mesial end of tooth. The metaconid usually has a posterior crest on its lingual border which reaches the entoconid low down. The longitudinal crest has a mesoconid behind the protoconid, but it

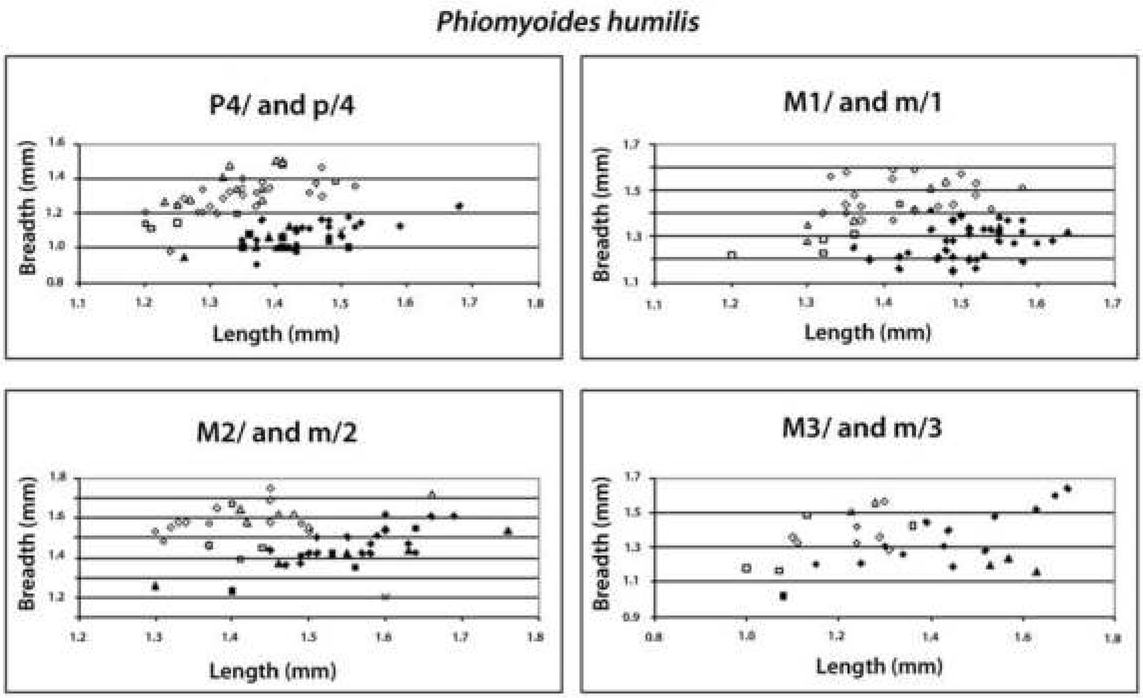

Figure 10. Bivariate plots of the teeth of *Phiomyoides humilis* from the Northern Sperrgebiet, Namibia (diamond = Elisabethfeld; triangle = Langental; square = Grillental; X = holotype).

has no sign of the metalophulid 2. It has two roots.

The first and second molars have a medium sized metalophulid 2, the sinusid curves obliquely towards the rear on its way towards the centre of the crown. There is a low antero-buccal cingulum which decreases in height buccally. This cingulum decreases in importance in the distal molars, and is seldom as high as the occlusal surface. The molars have three roots, two in front and a single one distally. The first and second molars are subequal in size, and m/3 is reduced distally and is narrower than the anterior molars.

The ventral surface of the zygomatic arch possesses a well developed and saliant masseteric tubercle behind the medial end of which is a small depression. The palatines invade the palate as far as the M1/, and the two palatine foramina are opposite the front of M1/ (Fig. 9A). The posterior choanae are opposite the rear of the M2/.

The upper incisor is almost semicircular in lateral view, the internal end terminating in the premaxilla, the enamel band is weakly developed mesially, more developed on the lateral side with a groove between the enamel and the dentine. The internal surface is flat, the lateral one weakly inflated and the anterior side flat with a slight curve towards its distal part.

The P4/ (or dM4/) resembles the molars but is slightly smaller and more trapezoidal in occlusal outline. Save for the M3/ (Fig. 9B) the upper cheek teeth have five lophs, but the mesoloph usually stops short of the buccal margin. The sinus is curved anteriorly towards the centre of the tooth. In the upper molars the transverse protolophule inserts onto the longitudinal crest just behind the protocone. In some individuals it subdivides into two crests at its approach to the longitudinal crest. The metalophule is transversely oriented at its buccal end but curves distally to join the posteroloph in its buccal half. In a few cases the metalophule can bifurcate in which case the anterior branch joins the longitudinal crest in front of the hypocone, but never onto the metalophule. M2/s are wider and shorter than the M1/s. The M3/ is reduced distally with a deep oblique sinus and is devoid of a mesoloph.

Discussion: The loss of the holotype described by Stromer (1926) during the 2nd World War has caused a certain amount of uncertainty in subsequent interpretations of small African thryonomyids (Lavocat, 1973). The NPE collected abundant additional fossils, including maxillae and mandibles which permits a thorough revision of the group. For this reason, we nominate a neotype consisting of a skull and left mandible of a single individual preserving all four incisors.

Phiomyoides humilis is the smallest of the Thryonomyidae known in Namibia. It is close in dimensions to the East African species *Elmerimys woodi* (Lavocat, 1973). The new collections are abundant (288 teeth) and allow us to remove the doubt that Lavocat (1973) expressed concerning the relationships between the two genera. *Elmerimys woodi* has broader lower cheek teeth which are less hypsodont than those of *Phiomyoides humilis*. We consider this to mean that the two species belong to different genera.

The samples from Elisabethfeld, Grillental and Langental show no metric differences from each other.

Genus *Apodecter* Hopwood, 1929

Type species: *Apodecter stromeri* Hopwood 1929

Species *Apodecter stromeri* Hopwood 1929

Original diagnosis: Simplicidentate rodents with quadricuspidate lower molars. Teeth brachyodont, one outer and two inner valleys; a slight antero-external cingulum on m/1 and m/2, external valley directed backward, internal valleys directed forward. Hinder half of m/3 reduced.

Emended diagnosis: To the original diagnosis we add the following features. Lower molars devoid of metalophulid 2; p/4 with retired protoconid and advanced metaconid which forms the anterior end of the tooth which is thus not bicuspid, anteroconid of p/4 pointed and high; m/2 larger than the m/1; antero-buccal cingulum in lower molars projects beyond border of crown.

Upper cheek teeth with five lophs of which the mesoloph is reduced in length, and absent in M3/; upper incisors orthodont.

Material: see list of measurements (Appendix 7).

Distribution: Elisabethfeld, Grillental, Langental, E-Bay.

Description: The mental foramen is located anterior to the p/4 in the upper third of the jaw beneath the diastema. Beneath the p/4 and m/1 there is a horizontal masseteric crest analogous to, but not as massively developed as, that of *Pomonomys*.

In the lower p/4 (Fig. 11C, D) there is a lingual cingulum behind the anteroconid which in some individuals can be reduced to a stylid, and a low cingular stylid antero-buccally. In unworn teeth the anteroconid is almost isolated from the protoconid but with wear these cusps join each other. The first molar is broadest at the level of the entoconid (second lophid) whereas the second molar is broadest at the first lophid. There are three roots, a large postero-buccal one, in front of which there is a small postero-lingual one, and a moderate anterior one.

The root of the zygomatic arch has a ventral masseteric tubercle behind which is a pit. The tubercle emits a crest that extends laterally and curves distally following the curvature of the zygomatic bone. The

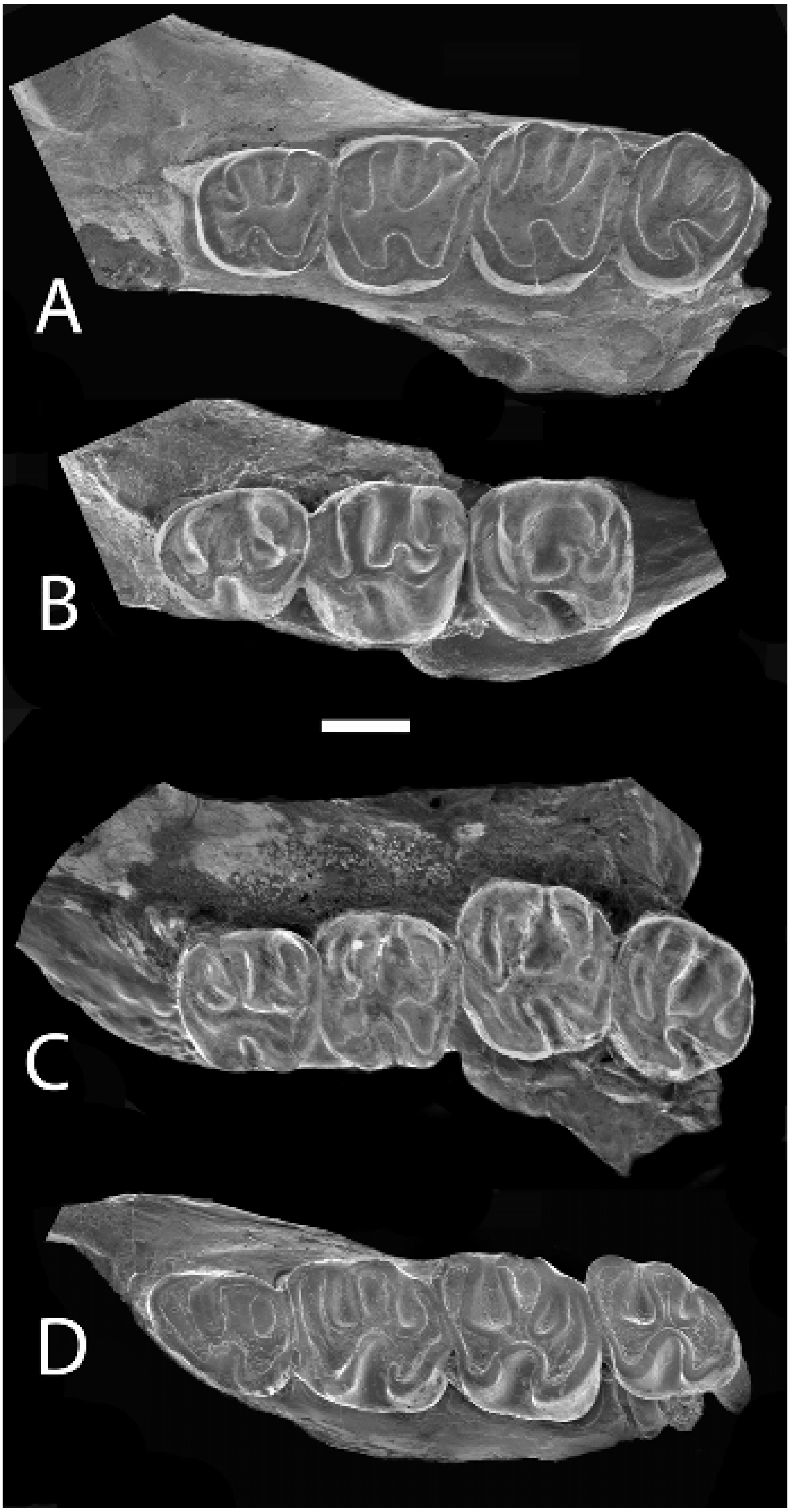

Figure 11. *Apodecter stromeri* Hopwood, 1929, from the Northern Sperrgebiet, Namibia.
A) EF 246'01, left maxilla with P4/-M3/, B) EF 156'01, left maxilla with P4/-M2/, C) EF 228'01, left maxilla with P4/-M3/, D) EF 73'96, left mandible with p/4-m/3, all specimens from Elisabethfeld, occlusal views (scale : 1 mm).

incisive foramen extends back as far as the front of M1/. The palatines extend forwards to the middle of M1/ which means that the intermaxillary suture is extremely short. The palatine foramina open opposite the M2/. The posterior choanae open opposite the rear of M3/ making the palatines elongated.

The P4/ (Fig. 11A, B) is molariform and slightly smaller than the molars. The sinus is oriented obliquely towards the front. The metaflexus is shallow and narrow and disappears with wear. The first and second molars generally show the metalophule inserting onto the posteroloph, but in some specimens it is interrupted and is connected by fine crests to the posteroloph and the mesoloph, in which case it closes off a shallow fossette in front of the hypocone. In a few individuals the metaloph is short and lacks connections to neighbouring structures. The M3/ is reduced distally and does not possess a mesoloph. The sinus of the M3/ is very oblique bending anteriorly to end opposite the protocone.

Discussion: Measurements of the holotype from Langental provided by Hopwood (1929) are appreciably smaller than the illustration published by Flynn *et al.*, (1983) would imply, and are smaller than measurements taken by us from a cast. Hopwood's measurements fall into the range of variation of *Phiomyoides humilis*, whereas ours fall within the range of variation of *Apodecter stromeri* for the m/1, but below this species for the m/2 and m/3. Despite these metric differences, we consider that the new samples belong to this species, especially since our own sample from Langental (possibly the type locality) consists of only a few teeth.

Apodecter has been found in many localities in Southern and Eastern Africa (Mein and Pickford, 2003). The p/4 resembles that of *Paraphiomys simonsi* from the Fayum, Egypt (Wood, 1968, Fig. 5) but the m/3 in the Egyptian species is not reduced.

Isolated cheek teeth of *Apodecter* can be confused with those of *Phiomyoides*, save for their superior dimensions and their shorter mesoloph.

Genus *Neosciuromys* Stromer, 1922

Type species: *Neosciuromys africanus* Stromer, 1922

Synonymy: *Phthinylla* Hopwood, 1929

Species *Neosciuromys africanus* Stromer, 1922

Partial synonymy: *Neosciuromys africanus* Stromer, 1922.
Neosciuromys africanus Stromer, 1924, p. 263.
Neosciuromys africanus Stromer, 1926, pp. 135-136, Pl. 42, Fig. 28-29.

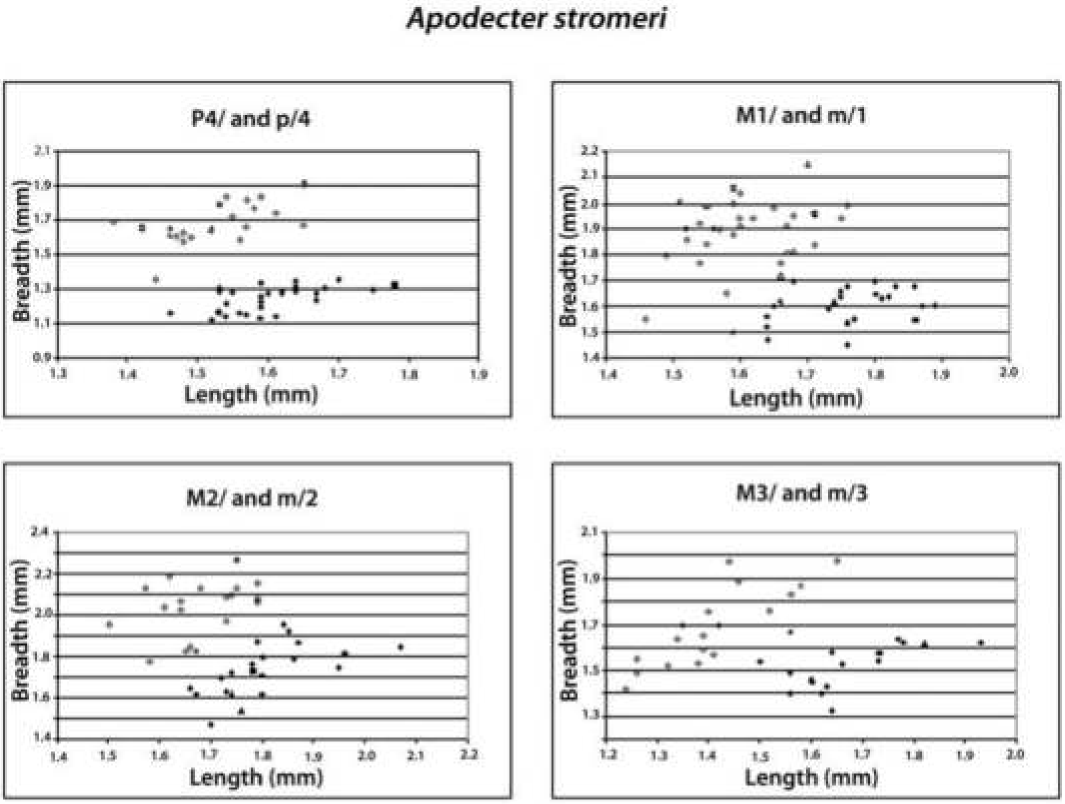

Figure 12. Bivariate plots of the teeth of *Apodecter stromeri* from the Northern Sperrgebiet, Namibia (diamond = Elisabethfeld; triangle = Langental; square = Grillental).

cfr. *Phiomys andrewsi* Schlosser. Stromer, 1926, Pl. 42, Fig. 24.

Non - *Neosciuromys africanus* Stromer, 1926, Pl. 42, Fig. 27a, 27b = *Bathyergoides neotertiarius*.

Original diagnosis: „Etwas grösser als das gemeine Eichhörnchen. Unterkeifer niedrig mit Masseterleiste; Backenzähne niedrig, etwas länger als breit, nach hinten zu grösser werderend, gleichartig W förmig; innen zwei tiefe V förmige Querfalten, aussen eine mittlere tiefe und eine vordere ganz kleine.“

Emended diagnosis: To the original diagnosis we add the following features. The p/4 has three roots (one anterior, two distal) and the anteroconid is bucco -lingually broad and low. Antero-buccal cingulum on lower molars small and not projecting beyond border of crown. Upper molars hypsodont with lingual side considerably higher crowned than the buccal side. Five lophs in upper molars, mesoloph always short, metaflexus short. M2/ clearly larger than other cheek teeth.

Material: see list of measurements (Appendix 8).

Distribution: Elisabethfeld, Fiskus, Langental, Bohrloch Betrieb IV, Grillental, Glastal.

Precision about measurements of teeth of *Neosciuromys*: The cheek teeth of *Neosciuromys* are brachyodont on one side and hypsodont on the other. In addition they are mesio-distally shorter at the cervix than at the occlusal surface. Thus the length-breadth proportions change with wear, from long/ narrow to short/broad. This is evident in bivariate

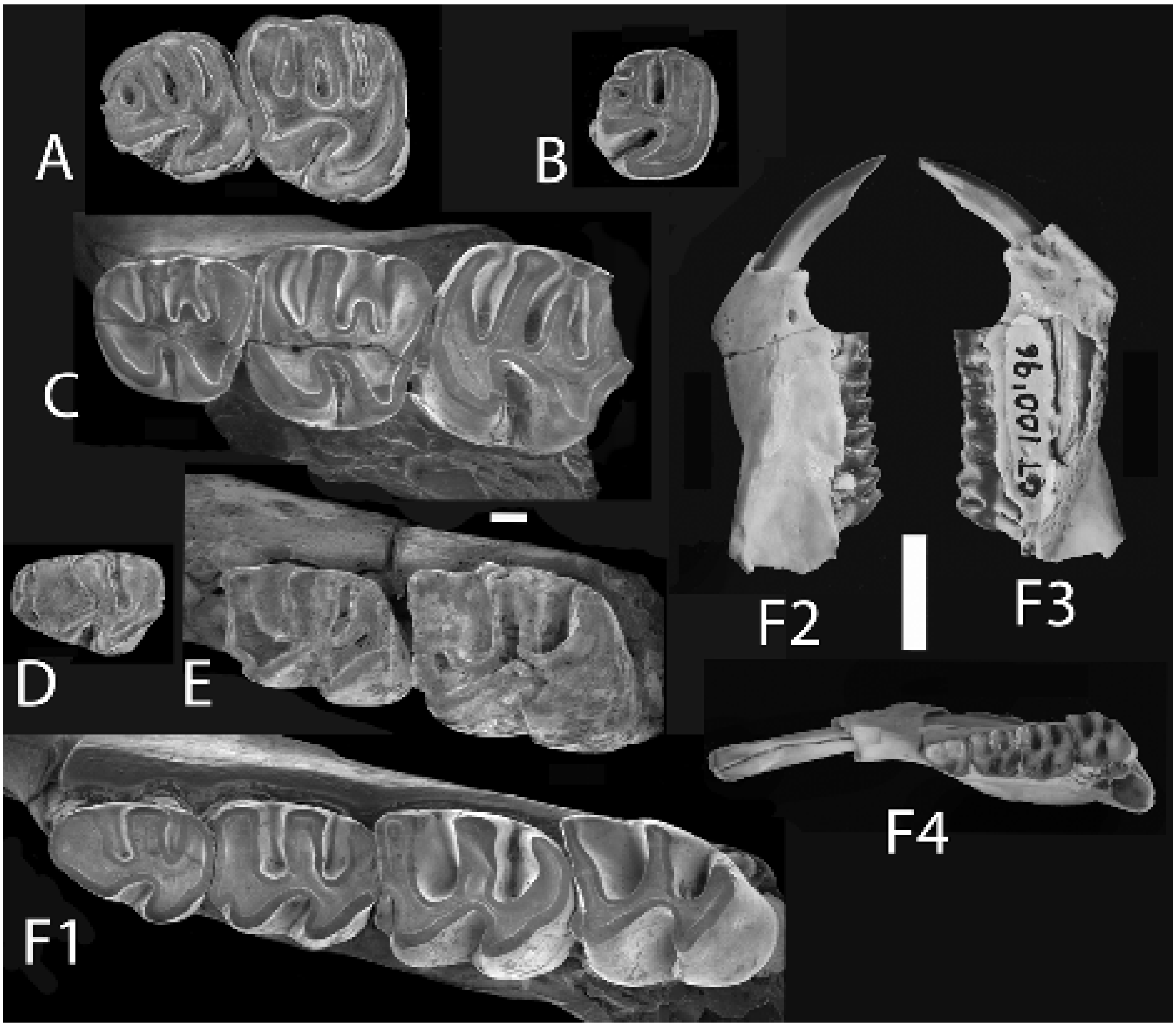

Figure 13. *Neosciuromys africanus* Stromer, 1922, from the Northern Sperrgebiet, Namibia.
A) EF 101’05, right maxilla with P4/-M1/ from Elisabethfeld, B) GT 152’04, right M3/ from Grillental; C) GT 117’04, left maxilla with P4/-M2/ from Grillental; D) GT 154’04, left p/4 from Grillental; E) EF 56’93, left mandible with m/1-m/2 from Elisabethfeld; F) GT 100’96, left mandible from Grillental, F1) and F4) occlusal views, F2) buccal, F3) lingual views (scale : 1 mm except F2-F4 : 1 cm).

scatter plots of the teeth. It is thus difficult to be certain that every tooth has been correctly attributed to its species.

Description: The ventral surface of the zygomatic arch sports an elongated masseteric boss, but there is no sign of a depression or pit behind it.

The upper M3/ (Fig. 13B) is not reduced distally, although it is shorter and narrower than the M2/ but distinctly larger than the P4/ (Fig. 13A, B).

Mandibles LT 40’04 and LT 131’03 have a mental foramen high just in front of the root of p/4 and the diastema is not deeply descending. The lower masseteric crest is prominent. The anterior surface of the lower incisor is flat and it terminates internally just behind the m/3.

The anteroconid of p/4 (Fig. 13D, 13F) is transversely broad and in some specimens has a lingual cingulum which itself reaches the entoconid, thereby closing off a large anterior basin. In others this basin is open lingually, or is only partly closed by the cingulum. It is linked to the longitudinal crest, even in unworn teeth. It has three roots and three lophids, two lingual flexids, and a single sinusid buccally.

The second lower molar is the biggest of the cheek teeth (Fig. 13E, 13F). The lower molars have an antero-buccal cingulum which diminishes in size from m/1 to m/3. There are three lophids which are constant in width. The m/3 is not reduced distally, and in some individuals is longer although narrower than the m/2.

From Glastal there is a sand blasted mandible (Glastal 5’05) with parts of the p/4-m/2 preserved. The p/4-m/2 measures 12.3 mm and what remains of the teeth is compatible with *Neosciuromys africanus*.

Discussion: López-Antoñanzas *et al.*, (2004) recently re-analysed the status of *Neosciuromys*, and declared the species *P. fracta* to be a synonym of *N. africanus*. These authors also pointed out that one of the specimens attributed to this species by Stromer (1926, Pl. 42, Fig. 27a, b) is not a maxilla of *Neosciuromys*, but a mandible of *Bathyergoides neotertiarius*. Furthermore, a tooth attributed to cfr. *Phiomys andrewsi* by Stromer (1929, Pl. 42, Fig. 24) is in fact a tooth of *Neosciuromys*. According to Stromer’s (1926) measurements, this tooth is longer than broad (3.2 x 2.5 mm) which is unlike other upper cheek teeth of *Neosciuromys*. The length-breadth proportions of the illustration (Stromer, 1926, Pl. 42, Fig. 24b) are different from the proportions given in the text (3.2 x 2.8 mm). The roots (Stromer, 1926, Pl. 42, Fig. 24a) suggest that it is a dM4/ rather than a permanent tooth, which could explain its narrow appearance.

For the complete, rather complicated history of this genus and species, we make reference to the analysis of López-Antoñanzas *et al.*, (2004). For a while, the genus was considered to be a synonym of *Paraphiomys*, but there are sufficient differences in hypsodonty and crown morphology to reveal that it is

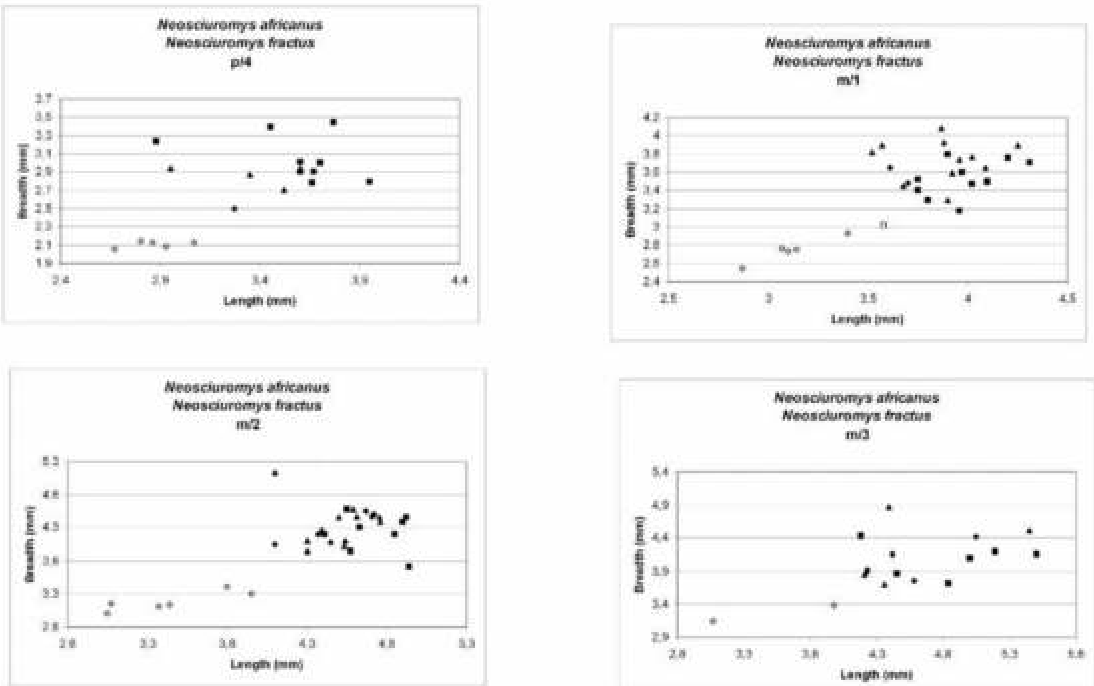

Figure 14. Bivariate plots of the teeth of *Neosciuromys africanus* (solid symbols) and *Neosciuromys fractus* (open symbols) from the Northern Sperrgebiet, Namibia (diamond = Elisabethfeld; triangle = Langental; square = Grillental; + = holotype).

a distinct genus. The augmented samples made by the NPE, including abundant material from Grillental, show that it is not particularly similar to *Paraphiomys*.

The species *Phthinylla fracta* is based on a maxilla with P4/-M1/ (AM 22539) which is smaller than newly collected specimens of *Neosciuromys africanus*. The NPE collected additional material of *Neosciuromys* at Elisabethfeld, Grillental and Langental, and it is clear that there are two size groups which are morphologically similar, the larger encompassing the type specimen of *N. africanus*, and the smaller being compatible with *P. fracta*. We therefore accept Hopwood's (1929) species *fracta*, but not his genus *Phthinylla* which we consider to be a synonym of *Neosciuromys*.

The lower p/4 of *Neosciuromys* has three lophids and three roots as in *Apodecter* but it differs from the latter by its superior size, the different shape of the anteroconid and the absence of the antero-buccal cingulum. In the lower molars the lophids of *Neosciuromys* are constant in breadth, but in *Apodecter* they are swollen towards their lingual ends.

Species *Neosciuromys fractus* (Hopwood, 1929)

Holotype: AM 22539, left maxilla with P4/-M1/ from "South of Lüderitz", Namibia.

Referred material: see list of measurements (Appendix 9).

Description: The P4/ in EF 57'01 is almost the same size as the holotype, and smaller than material attributed to *N. africanus*. The upper molars of *Neosciuromys fractus* (Fig. 15A-F) are morphologically similar to those of *N. africanus*.

The lower incisor of *N. fractus* is appreciably smaller than that of *N. africanus* but its morphology is similar.

The p/4 (Fig. 15H, I) of *N. fractus* has a pointed anteroconid and a well developed buccal cingulum. In the three available specimens the lingual cingulum in the p/4 is well formed and almost closes off the anterior basin.

The lower molars are morphologically similar to those of *N. africanus* (Fig. 15G - I).

Discussion: Specimens of *Neosciuromys* from Elisabethfeld, although in most respects morphologically similar to *N. africanus*, are smaller, in particular the premolars. The size difference is the same order of magnitude as that between *N. africanus* and the holotype of *Phthinylla fracta*, and we consider it plausible that the smaller fossils belong to a single species, which should be called *Neosciuromys fractus*. The pointed anteroconid of the p/4 is a significant difference from *N. africanus*, which has a broader anteroconid, but considering that Elisabethfeld is older than Grillental and Langental, it is possible that the morphology in *fractus* is plesiomorphic, and that of *africanus* is derived from it.

The species *N. fractus* is commonest at Elisabethfeld, where *N. africanus* is rare, and it is rare at Grillental and possibly absent at Langental where *N. africanus* is the dominant species. As for *Diamantomys* and *Pomonomys* this could reflect a combination of geological age and palaeoecology.

Family Bathyergidae Waterhouse, 1841

A word on dental nomenclature in Bathyergidae

In general, when unworn or lightly worn, bathyergid upper molars possess one lingual flexus (the hypoflexus) and two buccal ones (the mesoflexus between first and second lophs and the metaflexus between the second and third lophs). Lower molars possess one buccal flexid (hypoflexid) and two lingual ones (mesoflexid between the metaconid and entoconid; metaflexid between the entoconid and hypoconulid). Denys (1988) illustrated the right m/1 of *Georhychus capensis* showing a single buccal flexid and two lingual ones, which would make the genus markedly different from other bathyergids. We interpret these teeth to be from the left side, in which case the lower molars of *Georhychus* have the same grundplan as other bathyergids.

Genus *Bathyergoides* Stromer, 1923

Type species: *Bathyergoides tertiarius* Stromer, 1923.

Species *Bathyergoides neotertiarius* Stromer, 1923

Synonymy: *Neosciuromys africanus* Stromer, 1926 partim (Pl. 42, Fig. 27a, 27b).
Paracryptomys mackennae Lavocat, 1973 (p. 147 Pl. 21, Fig. 10-13).

Material: see list of measurements (Appendix 10).

Distribution: Elisabethfeld, Fiskus, Grillental, Langental.

Description: The cranium of *Bathyergoides neotertiarius* is now represented by reasonably complete specimens. The snout is extremely pro-odont. The premaxillae curve dorsally from the incisive foramina towards the front and do not redescend ventrally or if they do it is very slightly (Fig. 23B, C). The fossa for the anterior part of the masseter is narrow and flat. The anterior incisive foramina are narrow and long and on a level with the anterior root of the zygomatic arch. The anterior jugum of the P4/ has a vertical groove. The infra-orbital foramen is small, low, and oval with the long axis horizontal almost as in *Bathyergus*. The occlusal surfaces of the two cheek tooth rows are inclined slightly laterally, the occlusal surfaces making a dihedral angle of about 130°

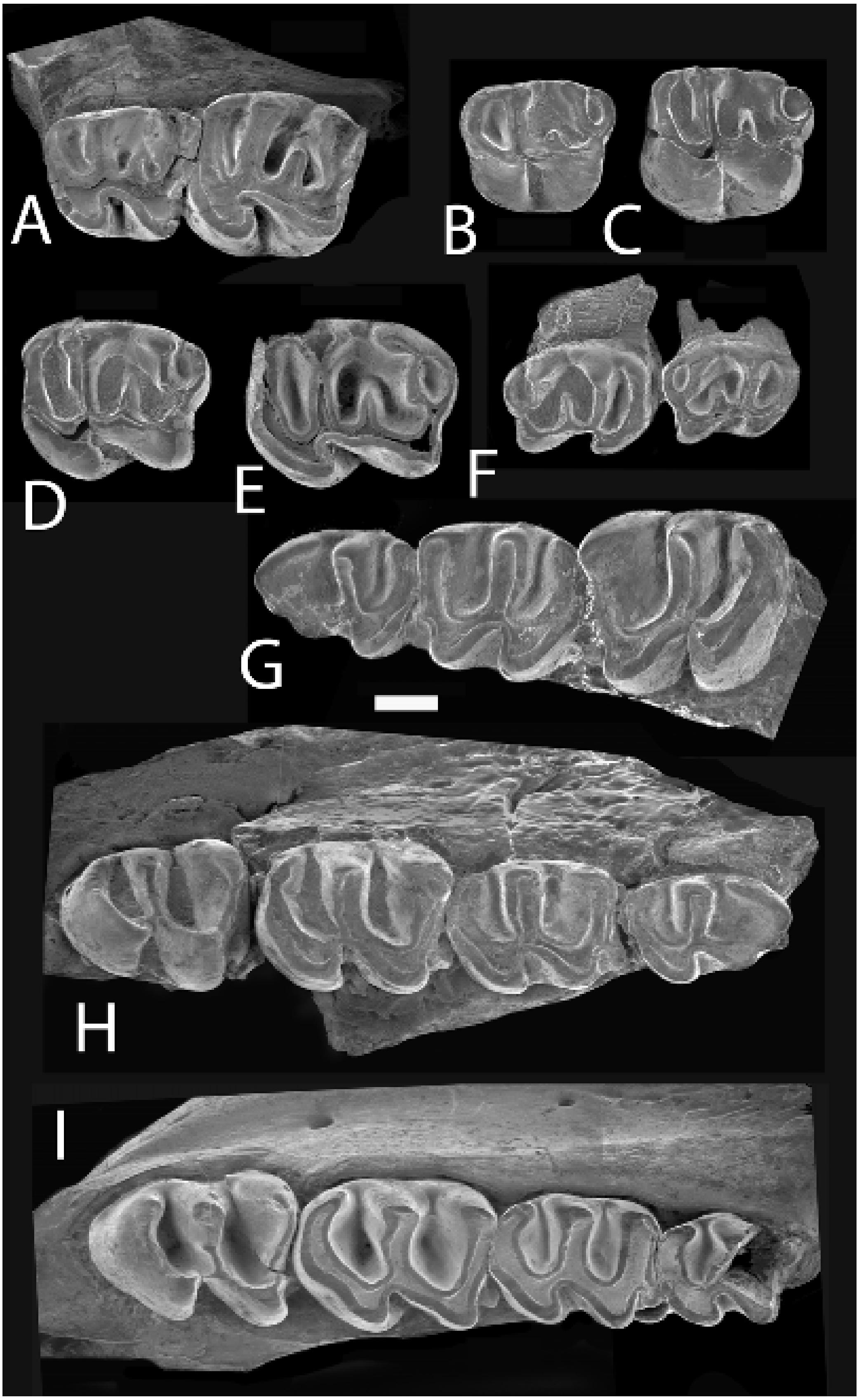

Figure 15. *Neosciuromys fractus* (Hopwood, 1929) from the Northern Sperrgebiet, Namibia.
A) EF 132'05, left maxilla with P4/-M1/, B-F) EF 52'93, isolated upper teeth, G) EF 143'01 left mandible with p/4-m/2, H) EF 142'01, right mandible with p/4-m/3, I) right mandible with p/4-m/3, all specimens from Elisabethfeld, occlusal views (scale : 1 mm).

(Fig. 24C2).

The mandible is typically bathyergid in overall morphology, with a large descending plate at the angle. The coronoid process of the ascending ramus is narrow and higher than the mandibular condyle. The condyle is rounded distally and has an anterior apophysis making it longer antero-posteriorly than medio-laterally. The mental foramen is small and in a distal position beneath the rear of m/1 and just in front of the root of the ascending ramus. The mandibular condyle is located close to the long axis of the tooth row, being slightly lateral to it. The margin of the diastema is sharp.

The lower incisors are broad mesio-distally without grooves or longitudinal crests. They are extremely hypsodont, the internal apex terminating just beneath the mandibular condyle well above the occlusal surface of the cheek teeth.

In complete tooth rows, it is noticeable that there is a marked wear gradient, the p/4 and P4/ losing all details of crown morphology whereas m/3 and M3/ can be almost unworn (Fig. 16A, E). The lower molars have an ectolophid with an oblique sinusid and lingually there are three transverse lophids. In tooth germs, the ectolophid can be interrupted behind the protoconid and the anterolophid interrupted between the protoconid and metaconid. No mandibles in the collection possess more than four teeth.

The teeth increase in size distally, but m/3 is sometimes slightly smaller than m/2 (Fig. 16C). The p/4 is molarised and in unworn specimens the buccal side is more hypsodont than the lingual side (Fig. 16B-D). There is no antero-buccal cingulum.

The upper incisors are mesio-distally broad without grooves or crests. They are extremely hypsodont, the internal end terminating just above the roots of the second molar. In anterior view the two cutting edges of the upper incisors forms an open v-shape, the mesial part wearing faster than the distal part.

Upper cheek teeth have an endoloph with a weak sinus, and buccally there are two transverse lophs (Fig. 16A). The anterior loph is comprised of the anteroloph and protoloph, and the rear loph is comprised of the metaloph and posteroloph. In unworn teeth the metaloph is almost isolated, but with slight wear it joins the posteroloph. It does not reach the endoloph. Between the lophs there is a mesosinus which is narrow and shallow buccally and widens towards the centre of the tooth and turns towards the rear. In more worn teeth, this valley becomes a central fossette. In very worn teeth there remains only a ring of enamel. The buccal sides of the upper teeth are appreciably more brachyodont than the lingual sides.

Discussion: Several partial skeletons of *Bathyergoides neotertiarius* have been found, and it is likely that these individuals died within their burrows and were not damaged by predator activity post-mortem. This scenario accords with the morphology of the head and anterior dentition, which suggests that they were fossorial animals.

The cheek teeth of *Bathyergoides neotertiarius* can be confused with teeth of other species, worn specimens being superficially similar to worn lower teeth of *Neosciuromys africanus* and worn upper teeth of *Myohyrax*. In one of his figures, Stromer, (1926, Pl. 42, Fig 27a, 27b) attributed a mandible with two lower teeth to *Neosciuromys*, but the specimen belongs to *Bathyergoides* (López-Antoñanzas *et al.*, 2004). There are however significant differences, lower teeth of *Neosciuromys* possess an antero-buccal cingulum, which does not exist in *Bathyergoides*, and it has four roots in the lower teeth, as opposed to three roots in *Bathyergoides*. The enamel also appears to be thicker in *Bathyergoides* than in *Neosciuromys* and the valleys in the cheek teeth are narrow in comparison with the size of the cuspids, being much narrower than those of *Neosciuromys*. The incisors are also very different, those of *Bathyergoides* being huge in comparison with those of *Neosciuromys*.

Stromer (1923, 1926) described only the mandible of *Bathyergoides neotertiarius*. Lavocat (1973) erected the genus and species *Paracryptomys mackennae* on the basis of a specimen from the Lang collection housed in the American Museum of Natural History, which is probably from Langental. The holotype is part of a muzzle without cheek teeth. It is clear from his text that Lavocat considered the East African fossils that he attributed to *Bathyergoides neotertiarius* to be typical of the species, and that the Lang muzzle was different from the Kenyan specimens. This prompted him to create the new genus and species. However, material collected by the Namibia Palaeontology Expedition, including several specimens with associated skulls and mandibles, reveals that the holotype of *Paracryptomys mackennae* is identical to the rest of the Namibian material attributed to *Bathyergoides neotertiarius*, but divergent from the East African material attributed to the species by Lavocat (1973). *Paracryptomys mackennae* is thus a junior synonym of *Bathyergoides neotertiarius*. This leaves the East African species without a name (see Annex I).

Hamilton and Van Couvering (1977) listed *Paracryptomys mackennae* at Arrisdrift, a mention that was followed by Denys and Jaeger (1992) who attributed a specimen from Arrisdrift to *Paracryptomys mackennae*, but the material is considerably smaller than the holotype of this species described by Lavocat (1973). It was re-identified as *Geofossor corvinusae* by Mein and Pickford (2003).

Genus *Efeldomys* nov.

Type species: *Efeldomys loliae* nov.

Generic diagnosis: Small bathyergid with opisthodont upper incisors, with two clear longitudinal

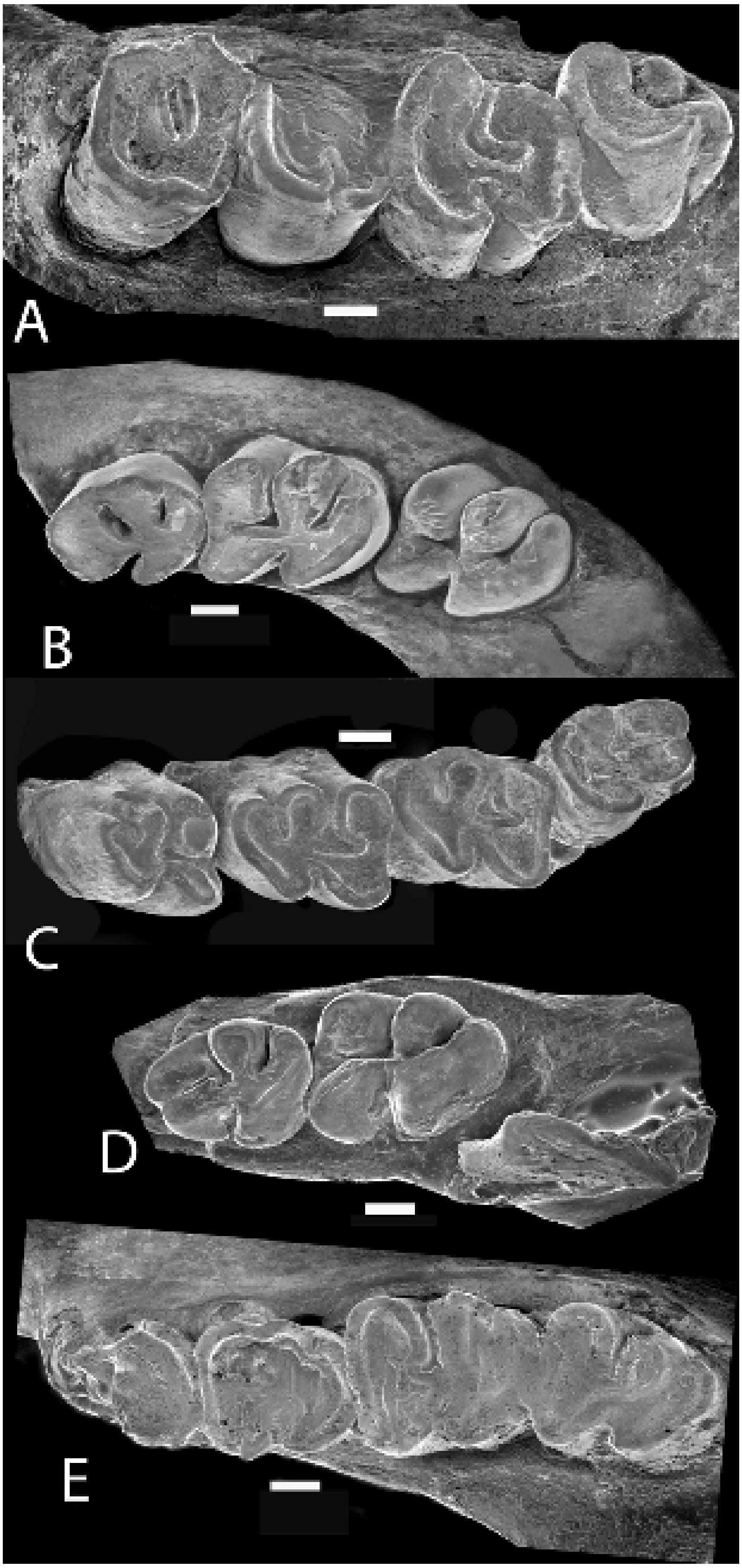

Figure 16. *Bathyergoides neotertiarius* Stromer, 1923, from the Northern Sperrgebiet, Namibia.
A) LT 245'03, left upper cheek tooth row, from Langental, B) LT 56'03, left mandible with p/3-m/2, from Langental, C) GT 126'04, right mandible with p/4-m/3 from Grillental, D) LT 449'96, left mandible with p/4-m/1 from Langental, E) left mandible with p/4-m/3 from Langental, occlusal views (scale : 1 mm).

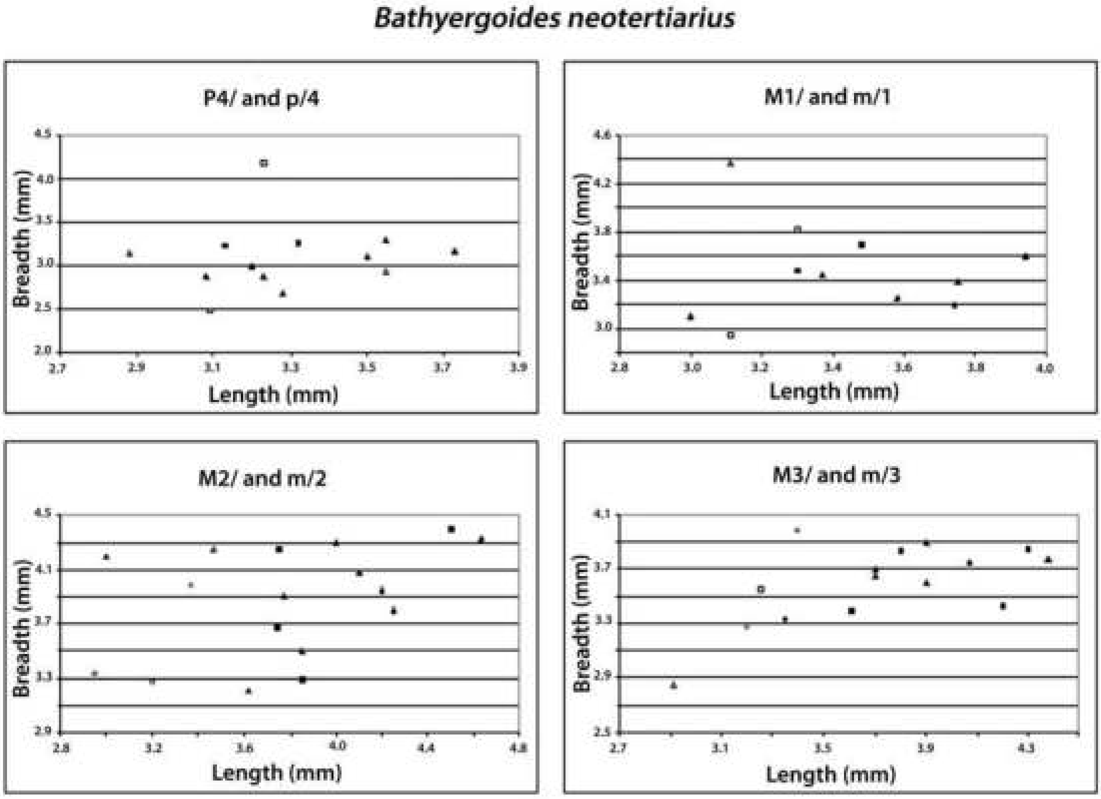

Figure 17. Bivariate plots of the teeth of *Bathyergoides neotertiarius* from the Northern Sperrgebiet, Namibia (diamond = Elisabethfeld; triangle = Langental; square = Grillental).

grooves. Exposed part of lower incisors short and almost vertical with the cutting edge in the same plane as the occlusal surface of the cheek teeth (from this morphology we infer that when the mouth was closed the incisors were probably not exposed). Cheek teeth semi-hypsodont with reduced roots and retention of sinuses and flexa in the upper teeth and sinusids and flexids in the lowers. M2/ and m/2 largest of the cheek teeth. Upper tooth row with large molarised dM4/ replaced by a smaller P4/. Lower dm/4 two rooted and larger than p/4. Mental foramen beneath the diastema in advance of the p/4.

Differential diagnosis: Differs from *Bathyergoides* by its smaller dimensions, and its opisthodont upper incisors with two grooves. Differs from *Geofossor* by the grooved upper incisors.

Derivatio nominis: The genus name is derived from the colloquial abbreviation of Elisabethfeld.

Species *Efeldomys loliae* nov.

Species diagnosis: Large and elongated incisive foramina. Upper tooth row ca 6.88 mm long, lower cheek tooth row ca 7.43 mm long.

Derivatio nominis: The species name honous the late Dr Dolores (Loli) Soria, who participated in many expeditions to Namibia.

Holotype: EF 79'98, snout with both incisors and all eight cheek teeth and EF 73'98 associated right mandible with incisor and four cheek teeth (Fig. 18A, I).

Paratypes: see list of measurements (Appendix 11).

Description: The infraorbital foramen is partly preserved in EF 169'01 and appears to have been large, confirmed in another specimen (EF 181'01) which shows the base of a large infra-orbital foramen. There is a masseteric tubercle anterior to, and lateral to, the P4/. The palate is hollowed between the tooth rows.

The upper incisors are opisthodont and the outer surface is scored by two prominent grooves with rounded crests between them (Fig. 18E, 18F, 18J). The internal extremities of the upper incisors end above the roots of P4/ making the radius of curvature extremely tight within a bathyergid context.

The dM4/ in maxilla EF 169'01 (Fig. 18D, 18J) which contains the channeled incisor characteristic of this species, is molarised and is larger than the P4/. It has a high lingual side (1.86 mm) and is brachyodont laterally. The endoloph is sinuous and the sinus is oblique towards the rear and does not extend as far as the cervix. The endoloph is attached to three lophs, of

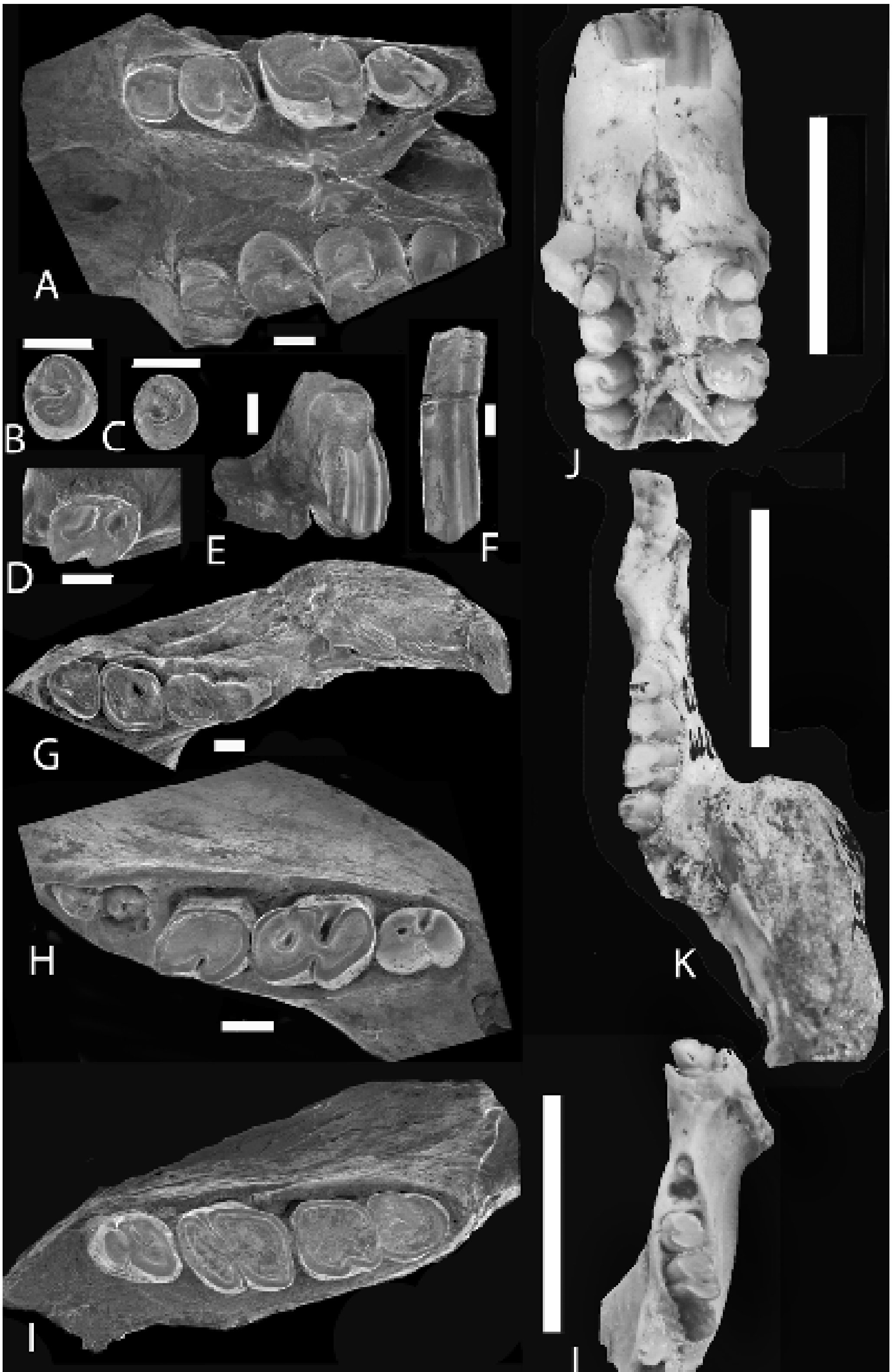

Figure 18. *Efeldomys loliae* gen. et sp. nov. from the Northern Sperrgebiet, Namibia.
A) EF 73'98, holotype snout with both cheek tooth rows, occlusal view, B and C) EF 111'05, P4/s, occlusal views, D) EF 169'01, right P4/ in maxilla, occlusal view, E) EF 169'01, right upper incisor in premaxilla, anterior view, F) EF 181'01, right upper incisor in premaxilla, anterior view, G) right mandible with p/4-m/3, occlusal view, H) EF 12'04, left mandible with m/1-m/3 and roots p/4, occlusal view, I) EF 79'98, holotype right mandible with p/4-m/3, occlusal view; J) EF 73'98, holotype snout, occlusal view; K) EF 73'98, holotype mandible, occlusal view; L) EF 12'04, mandible, occlusal view; all specimens from Elisabethfeld (scale : 1 mm except J-L : 1 cm).

which the anteroloph narrows and descends towards the base of the paracone. The protoloph is transversely oriented and aligned with the protocone. Between the anteroloph and the protoloph there is an anterosinus which is almost closed to form a fossette. The metaloph is almost fused to the posteroloph except at its postero-buccal side. Between the protoloph and metaloph there is a mesosinus oblique to the rear. The occlusal surface is flat except for the fossettes and sinus. Behind the tooth we observe the alveolus of the M1/.

The P4/ in the holotype is deeply worn (Fig. 18A). It has three roots. Other specimens, including four teeth numbered EF 111'05 (Fig. 18B, C) are less worn and show the typical horse-shoe shaped occlusal surface.

The M1/ is well used, but preserves the medium sized sinus oriented obliquely towards the front. M1/ is clearly larger than the P4/.

The M2/ is the largest of the cheek teeth and shows the lingual sinus of medium length, very oblique towards the front, and a short transverse buccal mesosinus. The right dental series shows a vestige of a small fossette in the posterior loph of the M2/.

The M3/ is almost unworn distally but worn anteriorly. The lingual sinus is inclined forwards and in the transverse mesosinus there is a small fossette in the middle of the crown opposite the metacone. There is a buccal metasinus which is succeeded by an external cusp and the posterior margin of the tooth is indented. The hypocone is almost unworn. There is thus evidence of four lophs in this tooth. As for the M2/, the left M3/ is more worn than the right one, and shows that the hypocone is distally located. The height of the crown of M3/ is 2.65 mm, and with the root the total height of the tooth is 3.42 mm. The sinus is only 1.2 mm deep. The M3/ has a large buccal root and two tiny lingual ones. The height of the unworn crown of M3/ is much greater than its length and breadth (H = 2.65 mm, L = 1.54 mm, B = 1.55 mm).

The diastema of the mandible descends in front of the cheek teeth (Fig. 18K, 18L) and the mental foramen is located beneath the middle of the diastema. The masseteric crest is weak to absent, and the buccal side of the mandible is not inflated beneath the tooth row. In the palate the palatines invaginate as far anteriorly as the M2/ the posterior nares forming a sharp v-shaped angle. The ascending ramus ascends at the level of the m/3 at an angle of about 45°. The coronoid process is damaged but is higher than the mandibular condyle. It is wider medio-laterally than its antero-posterior length. The mandibular foramen is at the level of the cheek teeth, and has a spine of bone on its antero-lingual aspect.

The lower incisors are broad and flat mesiodistally. Their internal apex terminates at the level of the cheek teeth and slightly buccally to the m/3.

The p/4 and m/1 (Fig. 18G, I) are deeply worn but the m/1 preserves a small part of the buccal sinusid. The m/2 is the largest tooth in the lower row and preserves the distally oblique buccal sinusid and a metasinusid oblique towards the front and almost in the same line as the buccal sinusid. The anterior lobe shows the vestige of a fossettid.

The m/3 is lightly worn, and shows the buccal side is higher crowned than the lingual side. The lingual side has a sinusid oriented gently to the rear and the buccal side has three lophids, of which the anterior one is the largest. The second one, the mesolophid, is small and almost transverse and is opposite the sinusid.

In EF 12'04 (Fig. 18H) has three molars and roots in two alveoli for the dm/4. The anterior root is divergent anteriorly and almost circular in section, whereas the distal root is vertical and compressed antero-posteriorly. The diastema descends less than in the holotype, but this could be due to the more juvenile status of EF 12'04.

The m/2 in this individual shows a well developed fossettid in which there is no sign of cementum. The m/3 is incompletely erupted, just showing its surface at gingival level.

An isolated p/4 from Langental, LT 117'00, could belong to this species. It has two roots, a circular anterior one, and a compressed oval distal one.

Discussion: Three specimens of *Efeldomys loliae* preserve the area near the infraorbital foramen, but the foramen itself is not preserved. Judging from the morphology of the neighbouring bone, it must have been larger than in any of the extant bathyergids, and larger than in *Bathyergoides* which is a much bigger animal. Likewise the incisive foramina of *Efeldomys* are larger than those of *Bathyergoides*.

The mandible of *Efeldomys loliae* is slender beneath the molar row, differing from *Proheliophobius*, in which the jaw is inflated buccally beneath the cheek teeth. This divergence in morphology appears to be related to the strength of the masseteric crest, which is weak in *Efeldomys* and strong in *Proheliophobius*. The mental foramen is located in an anterior position beneath the diastema. In *Efeldomys* the coronoid process of the mandible is lower than or close to the level of the mandibular condyle, whereas in *Cryptomys* and *Heterocephalus* the coronoid process is considerably higher than the articular condyle.

The upper incisors of *Efeldomys loliae* mimic those of *Thryonomys* in having two longitudinal grooves but they are considerably smaller than those of the cane rat. No other known bathyergid shows upper incisors with two grooves, making *Efeldomys* unique in the family. The exposed part of the lower incisors is short and the cutting edge is in the same plane as the occlusal surface of the cheek teeth. From this we infer that when the mouth was closed the incisors were not exposed, unlike *Cryptomys* and *Heterocephalus* in which they are.

In the unworn m/3 of EF 113'05 the crown height (2.10 mm) is greater than the length (1.85 mm) and the occlusal part shows a vestige of a mesolophid. There are thus three flexids in this tooth. Another m/3 is shorter than the preceding specimen (length 1.34 mm) and its occlusal outline is thus almost triangular. The m/3s of this species are thus highly variable in morphology and size.

Two specimens retain the channelled upper incisor and an anterior cheek tooth. The one with the smaller incisor possesses an anterior cheek tooth that is larger and of different morphology from the larger specimen. There are two possibilities. Either there are two taxa which differ in size and cheek tooth morphology, or if we interpret the tooth in the smaller specimen as a deciduous tooth then the small specimen could represent the juvenile of the larger one. If the latter hypothesis is correct, then this would be the first evidence of tooth replacement in a bathyergid.

Genus *Geofossor* Mein and Pickford, 2003
Species *Geofossor moralesi* nov. sp.

Holotype: EF 115'05A, right mandible with m/1, m/2 and alveoli of p/4 and m/3, (p/4-m/3 = 5.0 mm).

Material: see list of measurements (Appendix 12).

Diagnosis: Species of *Geofossor* smaller than *G. corvinusae*, (p/4-m/3 = 5.0-5.30 mm in *G. moralesi* vs 6.64 mm in *G. corvinusae*) presence of two mental foramina located between the p/4 and m/1, posterolingual crest of the metaconid of p/4 truncated; lower incisor more gracile than in *G. corvinusae*. Two flexids in lower molars separated by prominent entoconid.

Derivatio nominis: The species name is in honour of Jorge Morales, long term member of the Namibia Palaeontology Expedition.

Description: There are several teeth and mandibles of a very small bathyergid at Elisabethfeld (Fig. 19A-C). The morphology of the cheek tooth crowns recalls the teeth of *Geofossor corvinusae* from Arrisdrift.

One well preserved specimen from Elisabethfeld has typical morphology of this genus, but is considerably smaller than the remainder of the hypodigm. EF 130'05 (Fig. 19B) a lightly worn left lower p/4 has two roots, a small cylindrical anterior one, and a wider compressed distal one. The anterior half of the tooth has separate protoconid and metaconid, the metaconid being located mesially to the protoconid. There is a lophid between the entoconid and hypoconid behind which is a short posterolophid. The ectolophid is interrupted between the protoconid and the hypoconid. The crown is brachyodont both buccally and lingually. This is one of the few Neogene bathyergid teeth to preserve the crown structure.

Discussion: The specimens from the Northern Sperrgebiet attributed to *Geofossor* are smaller than those of the type species *G. corvinusae* from Arrisdrift, Namibia. The four cheek teeth are all more or less the same dimensions, unlike other bathyergids which usually have one tooth that is noticeably larger than the others. In terms of size the Sperrgebiet species fits with *Proheliophobius*, but its dental morphology differs from this genus, notably in the width of the sinusids, which are narrower in the Elisabethfeld specimens than in *Proheliophobius*. In the overall crown morphology these teeth resemble those of *G. corvinusae*, and for this reason they are attributed to a new species *Geofossor moralesi*.

Genus *Microfossor* nov.

Type species: *Microfossor biradiculatus* nov. sp.

Generic diagnosis: Minute bathyergid, cheek teeth moderate crown height, lower incisor section rounded with smooth enamel, single mental foramen located beneath the anterior cheek tooth, only three cheek teeth (p/4-m/2) the p/4 is the longest cheek tooth, the m/1 the broadest and the m/2 the smallest, two roots on each lower cheek tooth which are fused for some distance below cervix.

Differential diagnosis: Apart from its minuscule size and its three cheek teeth instead of the four usually found in bathyergids, it differs from *Geofossor* by having teeth of different sizes, and the rounded occlusal outline of the teeth. It differs from *Richardus* by its smaller dimensions and its more gracile incisors. It differs from *Heterocephalus* by the root apices being separate and by the presence of two roots on each lower cheek tooth. The upper teeth are more elliptical than those of *Heterocephalus* with the long axis of the oval transversely oriented. It differs from *Proheliophobius* by its smaller size and by having three cheek teeth instead of four. In addition, the m/2 is the smallest tooth whereas in *Proheliophobius* it is the largest of the cheek teeth.

Derivatio nominis: The genus name combines the Greek words for small and digger.

Species *Microfossor biradiculatus* nov.

Holotype: EF 122'05, left mandible with m/2.

Material: See list of measurements (appendix 13).

Species diagnosis: as for the genus.

Derivatio nominis: The species name refers to the fact that the lower cheek teeth possess only two roots.

Description: Apart from the m/2 in the holotype mandible (Fig. 20O, 20P) the available lower molars are all deeply worn so that only an oval ring of

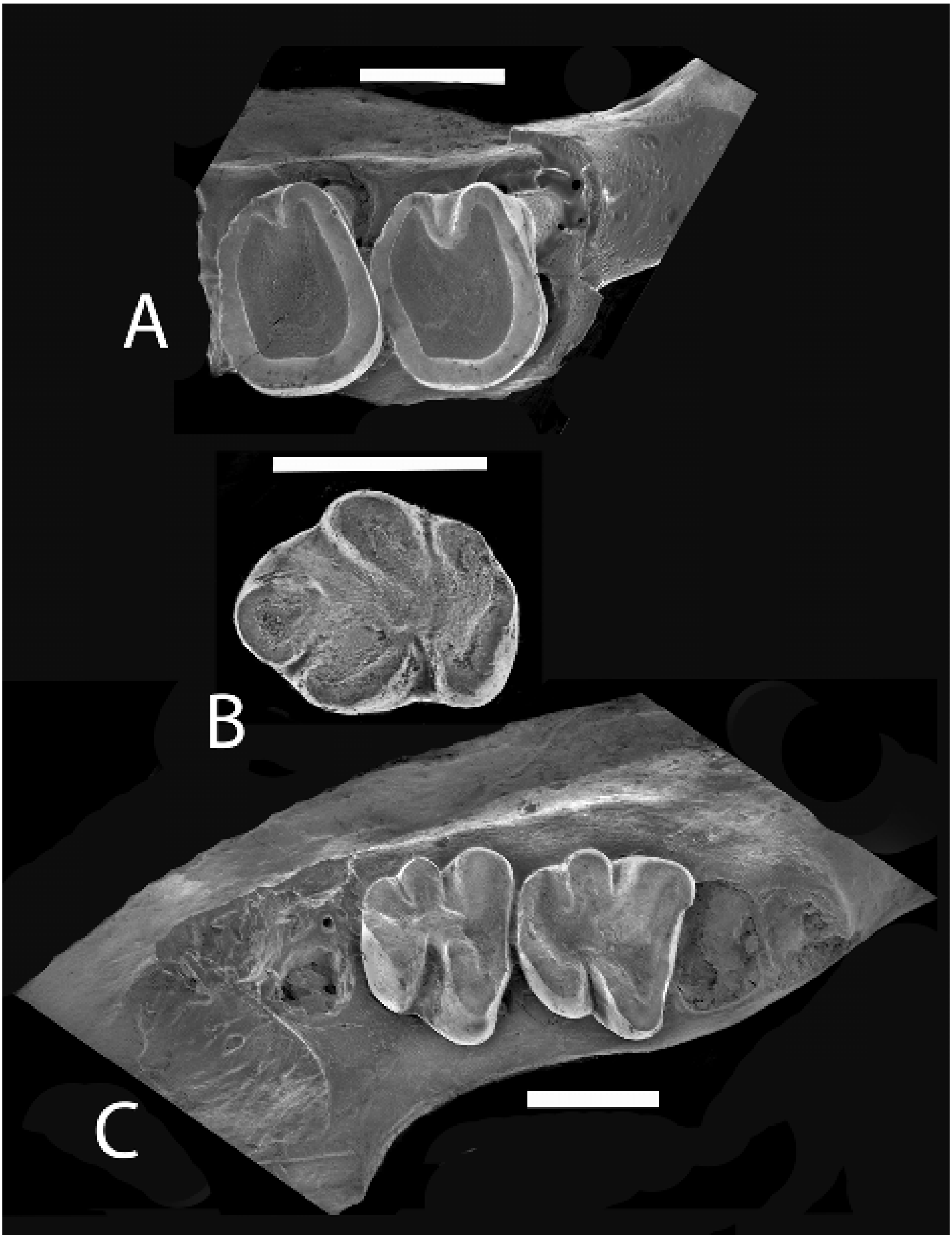

Figure 19. *Geofossor moralesi* sp. nov. from the Northern Sperrgebiet, Namibia.
A) EF 114'05, right maxilla with P4/-M1/, B) EF 130'05, left p/4, C) EF 115'05, holotype right mandible with m/1-m/2 and alveoli of p/4 and m/3, all specimens from Elisabethfeld, occlusal views (scale : 1 mm).

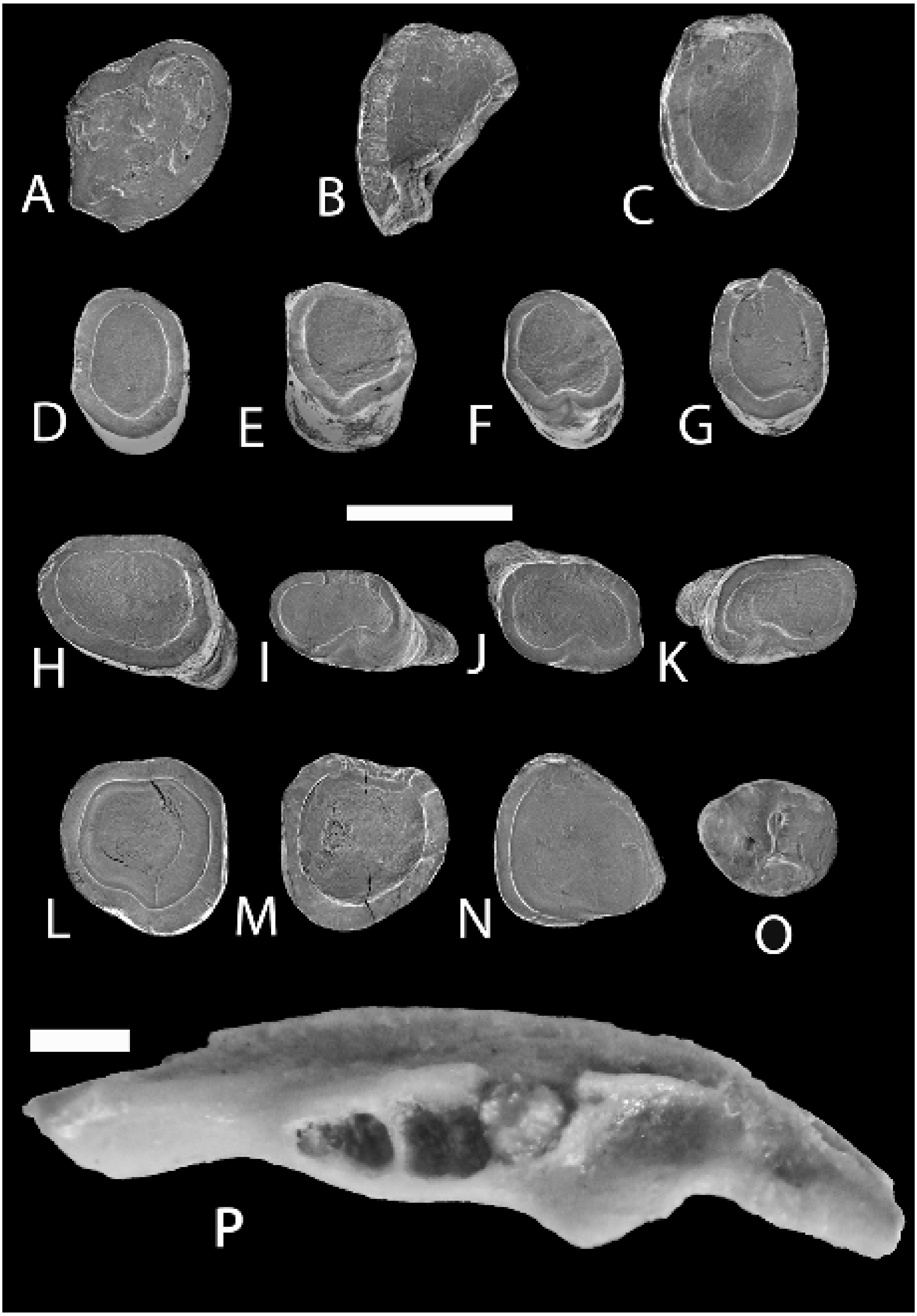

Figure 20. *Microfossor biradiculatus* gen. et sp. nov. from the Northern Sperrgebiet, Namibia.
A) EF 72'96, isolated P4/, B and C) EF 19'00, isolated M2/s, D-G) EF 131'05, isolated M1/s, H-K) EF 127'01, isolated p/4s, L-N) EF 128'05, isolated m/1s, O) EF 122'05, left m/2 of the holotype mandible, P) EF 122'05, holotype mandible; all specimens from Elisabethfeld, occlusal views; (scale : 1 mm).

enamel with a sinusid or flexid is left encircling the dentine (Fig. 20A-N). The roots are fused beneath the cervix, only their apices separating from each other. The m/2 is represented by two specimens which have a shallow basin with raised rims, higher on the buccal side and leaning slightly anteriorly (Fig. 20O, 20P).

In the upper cheek teeth the P4/ (Fig. 20A) is horse-shoe shaped as in *Heterocephalus* with a moderately deep mesoflexus and a shallow hypoflexus which disappears with wear. The enamel is thicker anteriorly than posteriorly. The large lingual root is arched and follows the lingual convexity of the crown. Buccally there are two smaller, shorter roots which are closer together in the P4/ than in the M2/. The breadth is always greater than the length. There is only one shallow flexus on each side of the tooth, even in lightly worn teeth.

Discussion: Among the recent bathyergids, *Microfossor* is closest morphologically to *Heterocephalus glaber*, but is smaller than it (the lower cheek tooth row is 2.63-2.64 mm long versus 3.80 mm in *Heterocephalus*). Indeed it is the smallest bathyergid described. There are some differences from *Heterocephalus*, including the lesser height of its molar crowns and the incompletely fused roots, of which there are two in *Microfossor*, but three in *Heterocephalus*. It resembles *Heterocephalus* in the inter-tooth proportions.

Several authors have compared their fossil bathyergids with *Heterocephalus* but they are all larger than the Namibian species. *Heterocephalus atikoi* from Omo, Ethiopia, (Wesselman, 1984) is considerably more hypsodont than *Microfossor*. *H. quenstedti* from Laetoli, Tanzania, (Denys, 1987) and *H. jaegeri* from Olduvai (Denys, 1989) are larger than *M. biradiculatus*. Winkler (1997) mentioned the existence of *Heterocephalus* sp. at Ngorora, Kenya, but no figures or dimensions are available. All these forms appear to be more derived than the extant species *H. glaber*. Given that *Microfossor* shows derived morphology shared with *Heterocephalus* including the presence of only three cheek teeth and fused roots, it is likely that it belongs to this group of bathyergids, rather than to any others. Relationships of *Microfossor* to the Maboko bathyergids is difficult to assess, as Winkler (1997) reports the presence of four lower cheek teeth, whereas Lavocat (1988, 1989) reports only three. *Microfossor* is smaller than *Richardus* which in addition differs from *Microfossor* in possessing a disproportionately large second cheek tooth.

General discussion and conclusions

There are 15 species of rodents in the Early Miocene deposits of the Northern Sperrgebiet, belonging to 6 families (Table 1). Three of the families, Pedetidae, Diamantomyidae and Bathyergidae are more diverse in Namibia than in tropical Africa, but the other families, in particular the Cricetidae, are less diverse. These differences are most probably due to differences in palaeoecology and latitude. The Namibian sites formed under more arid and more open conditions than the contemporaneous deposits in East Africa. Within Namibia, there is a trend towards increasing aridity with the passage of geological time, with Elisabethfeld more humid than Grillental, which was more humid than Langental, although all three sites were more arid than any of the East African ones.

The thryonomyids are appreciably more diverse

Table 1. Rodent fauna from Early Miocene deposits of the Northern Sperrgebiet (total 2132 teeth, not counting numerous incisors. Many of the teeth are in mandibles and maxillae) (EF = Elisabethfeld; GT = Grillental; LT = Langental. Teeth from E-Bay, Fiskus, Glastal and Bohrloch are included only in the overall total).

Family	Species	Quantity of Teeth	EF	GT	LT
Sciuridae	*Vulcanisciurus africanus* Lavocat, 1973	5	3	1	1
Cricetidae	*Protarsomys macinnesi* Lavocat, 1973	1017	879	74	61
Pedetidae	*Parapedetes namaquensis* Stromer, 1926	68	69	0	0
	Megapedetes cf *gariepensis* Mein & Senut, 2003	1	0	0	1
	Propedetes efeldensis nov. gen. nov. sp.	10	6	0	4
Diamantomyidae	*Diamantomys luederitzi* Stromer, 1922	43	15	24	3
	Pomonomys dubius Stromer, 1922	71	0	1	70
Thryonomyidae	*Phiomyoides humilis* Stromer, 1926	317	208	52	45
	Apodecter stromeri Hopwood, 1929	258	237	10	10
	Neosciuromys africanus Stromer, 1922	133	53	64	52
	Neosciuromys fractus (Hopwood, 1929)	44	33	3	10
Bathyergidae	*Bathyergoides neotertiarius* Stromer, 1923	73	2	20	47
	Efeldomys loliae nov. gen. nov. sp.	39	37	0	2
	Geofossor moralesi nov. sp.	91	85	2	6
	Microfossor biradiculatus nov. gen. nov. sp.	21	21	0	0

Table 2. Dental morphotypes and possible diets and ecology of Early Miocene rodents from the Northern Sperrgebiet, Namibia (the hypso-brachyodont category is so named because one side of the cheek teeth is hypsodont while the opposite side is brachyodont).

Species	Tooth morphotype	Possible diet	Ecology
Vulcanisciurus africanus	Brachyodont	Omnivorous	Above ground
Protarsomys macinnesi	Brachyodont	Granivore?	Above ground
Parapedetes namaquensis	Hypsodont	Grass	Springing
Megapedetes cf *gariepensis*	Brachyodont	Soft leaves	Springing
Propedetes efeldensis	Hypsodont	Grass	Springing
Diamantomys luederitzi	Hypso-brachyodont	Grass (mixed feeder?)	Above ground
Pomonomys dubius	Hypsodont with cementum	Grass	Above ground
Phiomyoides humilis	Brachyodont	Granivore?	Above ground
Apodecter stromeri	Brachyodont	Granivore?	Above ground
Neosciuromys africanus	Hypso-brachyodont	Mixed	Above ground
Neosciuromys fractus	Hypso-brachyodont	Mixed	Above ground
Bathyergoides neotertiarius	Hypso-brachyodont	Tubers	Fossorial
Efeldomys loliae	Brachyodont	Tubers	Fossorial
Geofossor moralesi	Brachyodont	Tubers	Fossorial
Microfossor biradiculatus	Brachyodont with fused roots	Tubers	Fossorial

and geographically more widespread than previously thought (López Antoñanzas *et al.*, 2004). The southern African fauna differs from that of tropical Africa by its lesser diversity, and by its different generic and specific composition.

Southern Africa as a centre of endemism

The diversity of pedetids in the Northern Sperrgebiet is astonishing, the presence of three genera in three subfamilies indicating that the family must have had a considerable prior history which up to now is completely unknown (Fig. 21). In contemporaneous deposits in East Africa there is only one genus, with perhaps two species (Lavocat, 1973) which suggests that the centre of radiation of the family was in Southern Africa. The fact that two of the Namibian genera have extremely hypsodont cheek teeth, provides good evidence that the region of coastal Namibia was probably endowed with important grass cover during the Early Miocene. The springing adaptations of all three genera were well established by the Early Miocene (MacInnes, 1957; Senut, 1997; Stromer, 1926) indicating that the countryside was relatively open at the time.

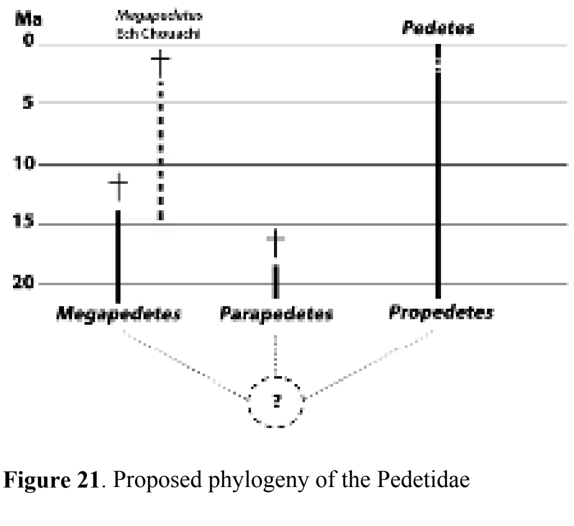

Figure 21. Proposed phylogeny of the Pedetidae

The Namibian Early Miocene bathyergids are also quite diverse, and one lineage, *Efeldomys*, shows the earliest known evidence of grooving in the upper incisors, a feature unknown in East African Miocene members of the family.

Palaeoecology

The high diversity of bathyergids in Namibia (four morphologically and metrically divergent genera) indicates not only that the family must have had a long prior history, but also that Southern Africa was probably near its centre of radiation.

Phylogeny of the Bathyergidae

Studies by Nevo *et al.*, (1987) using chromosomal and electrophoretic data led to the proposal of two hypotheses of relationship between the three extant genera of South African bathyergids, *Georhychus*, *Cryptomys* and *Bathyergus*. Hypothesis A linked *Cryptomys* and *Georhychus* as closest relatives with a divergence between them aged about 5 Ma and a divergence of these two genera from *Bathyergus* at about 11 Ma. Hypothesis B linked *Georhychus* and *Bathyergus* as closest relatives with a divergence date of ca 8 Ma, and a divergence between them and *Cryptomys* at about 11 Ma. Denys (1998) discussed these hypotheses taking into account the rich fossil record from the Early Pliocene of Langebaanweg, South Africa, where both *Cryptomys* and *Bathyergus* occur. She concluded that the differences between *Cryptomys broomi* and *Georhychus capensis* were so great that they tended to support hypotheses B of Nevo *et al.*, (1987). This suggestion accorded with the results of Honeycutt *et al.*, (1987) based on mitochondrial DNA data.

Our own data from the Northern Sperrgebiet is relevant to the debate. We consider it possible that *Geofossor* ultimately gave rise to *Cryptomys* and

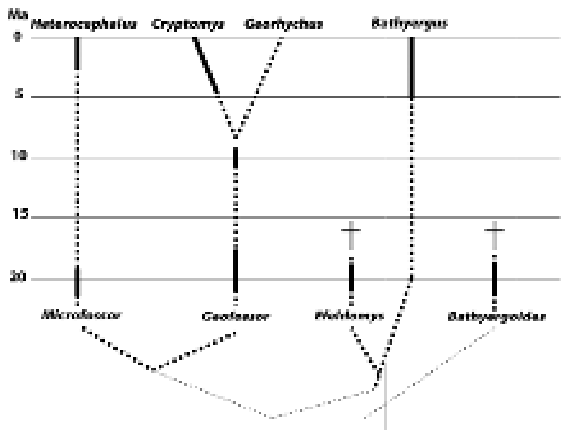

Figure 22. Proposed phylogeny of Bathyergidae.

Georhychus, and that because of its possession of a channelled upper incisor, *Efeldomys* is allied to *Bathyergus*, but is positioned later than the dichotomy between it and *Bathyergus*. This would place the split between the *Bathyergus* lineage and the *Cryptomys*+*Georhychus* one older than ca 21 Ma. The Sperrgebiet fossils thus support the sequence in hypothesis A of Nevo *et al.*, (1987) but would locate the dichotomies considerably earlier in time than the 11 Ma estimate of these authors (Fig. 22).

As far as *Microfossor* is concerned, we consider that it is possibly the ancestral group from which *Heterocephalus* evolved. The *Bathyergoides* lineage seems to have gone extinct without issue. This interpretation suggests that the Bathyergidae probably had a considerably longer history than previously considered possible, with an origin deep within the Oligocene or even the Eocene.

Implications of the new collections for African rodent palaeontology

As is often the case in palaeontology, the collection of additional material of known taxa leads to revision of the taxonomy of related taxa from other sites. In the case of *Bathyergoides*, the much expanded sample made by the NPE has led to the realisation that not only is *Paracryptomys* a synonym of *Bathyergoides*, but also that all the East African fossils previously attributed to *Bathyergoides* differ from it at the generic level. The name *Renefossor* is erected for the East African form, the name honouring René Lavocat, a pioneer of African rodent palaeontology. The type species is *Renefossor songhorensis* sp. nov. (see Annex I).

Strangely, although the NPE collected an order of magnitude more fossils than was available to previous researchers, it has added only seven species to the fauna initially described by Stromer (1922, 1923, 1926) and Hopwood (1929). These are a squirrel *Vulcanisciurus africanus*, the very small cricetid *Protarsomys macinnesi*, the two relatively rare pedetid species *Megapedetes* cf *gariepensis* and *Propedetes efeldensis*, and the bathyergids *Efeldomys loliae*, *Geofossor moralesi* and *Microfossor biradiculatus*.

The much expanded samples have led to the reattribution of some of Stromer's and Hopwood's material. *Phiomys* cfr *andrewsi* mentioned by Stromer (1926) is based on a tooth of *Neosciuromys africanus*, and a specimen thought by Stromer (1926) to be a maxilla of *Neosciuromys* is in fact a mandible of *Bathyergoides*. Hopwood's (1929) genus *Phthinylla* is a synonym of *Neosciuromys* but the type species is smaller than *N. africanus* and is thus valid.

There remain a few residual doubts about the identification of some of the Namibian rodents, *Protarsomys macinnesi*, for example, is considered to be the same species as the East African one, but without better illustrations and measurements of the Rusinga holotype and other East African material it is not certain that we are dealing with the same species. Only a re-analysis of the Kenyan material will resolve the issue.

Two rodents from the Sperrgebiet remain inadequately sampled, the squirrel *Vulcanisciurus africanus* and the pedetid *Megapedetes* cf. *gariepensis*. Both are represented in the Sperrgebiet by a few isolated teeth, and until mandibles and maxillae are found there will remain doubt about the identifications.

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Annex I

The realisation that the East African rodent species hitherto identified as *Bathyergoides neotertiarius* differs radically from the Namibian species which is now much better represented (four partial skeletons and numerous mandibles, maxillae and isolated teeth) than it was to Stromer (1926) and Lavocat (1973) necessitates a revision of large Early Miocene bathyergoids. Although it is similar in dimensions to *Bathyergoides neotertiarius* the East African species is so divergent from it in cranial, mandibular and even dental features, that it is concluded that it belongs to a different family of burrowing rodents.

Family Renefossoridae nov.

Lavocat (1973) erected the family Bathyergoididae, but the basis for this decision was the morphology of the Kenyan material, which is here attributed to a separate genus. Because the Namibian genus *Bathyergoides* is easily accommodated in Bathyergidae the name Bathyergoididae is thus, in our opinion, superfluous. East African *Renefossor* does belong to a separate family Renefossoridae.

Genus *Renefossor* nov.

Type species: *Renefossor songhorensis* nov.

Genus diagnosis: Incisors markedly pro-odont and narrow, upper incisor jugum reaching the middle of M3/; in anterior view the upper incisor cutting edges form a straight line; premaxilla rising dorsally from the incisive foramina anteriorly and then curving sharply ventrally beneath the anterior nares. Fossa for the anterior masseter insertion much enlarged; infraorbital foramen huge; incisive jugum markedly divergent towards the rear; mandibular condyle lies

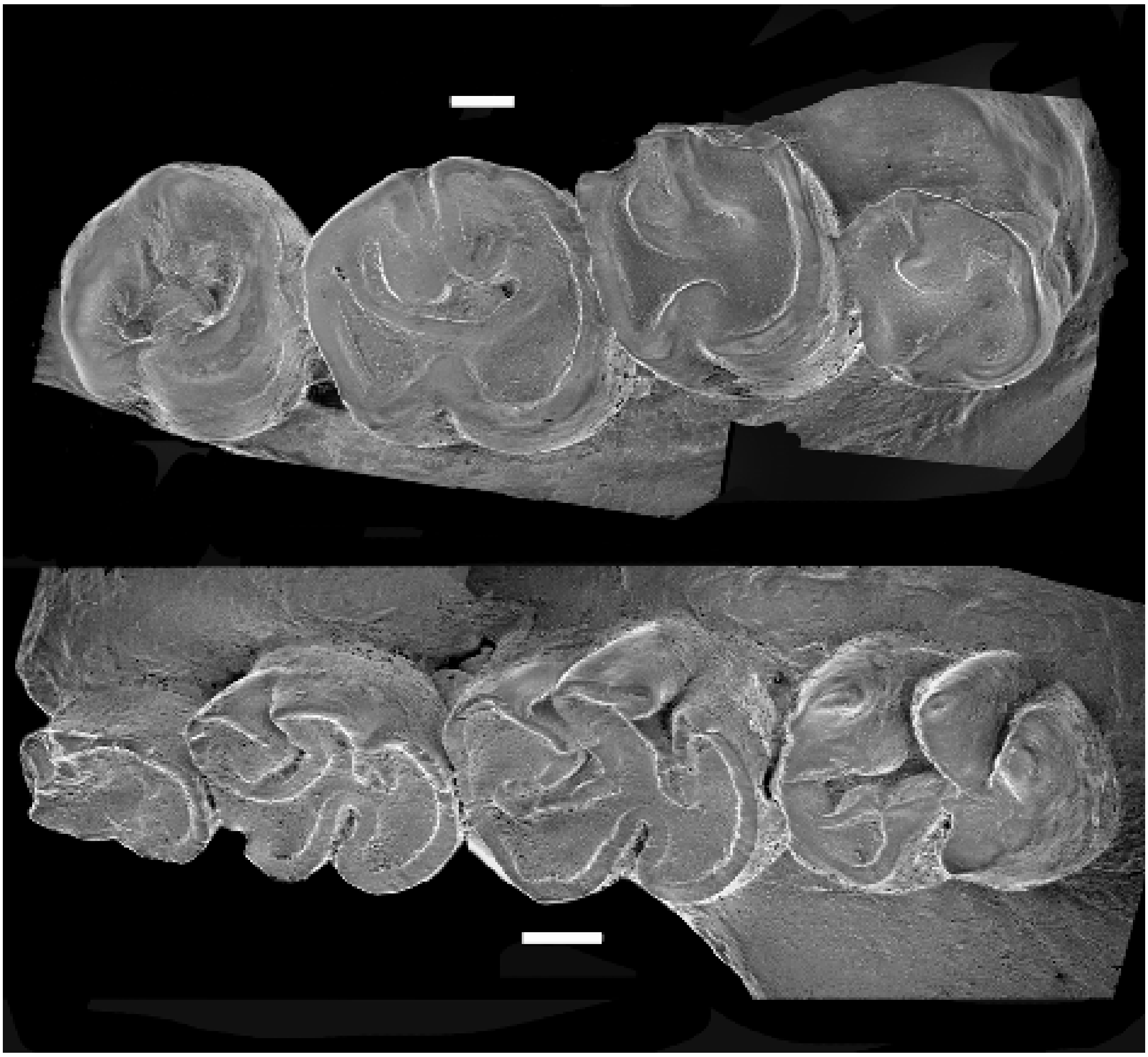

Figure 23. *Renefossor songhorensis* gen. et sp. nov. KNM SO 710 from Songhor, Kenya, tooth rows of the holotype skull and mandible (scale : 1 mm).

far lateral to the tooth row. The mental foramen located beneath the anterior margin of p/4; margin of the diastema swollen and rounded.

Species *Renefossor songhorensis* nov.

Holotype: KNM SO 710, skull and skeleton (Fig. 23, 24A).

Species diagnosis: as for the genus.

Differential diagnosis: The main features separating *Renefossor songhorensis* from *Bathyergoides neotertiarius* are the markedly more pro-odont and narrower incisors of the Namibian species, with the upper incisor jugum reaching the level of M1/-M2/, whereas in *R. songhorensis* it reaches the middle of M3/ (Fig. 24). In anterior view the upper incisor cutting edges form a straight line, unlike the re-entrant v-shaped wear facets produced in *Bathyergoides*. The premaxilla of *Renefossor* rises dorsally from the incisive foramina anteriorly and then curves sharply ventrally beneath the anterior nares. Another significant difference between these species is the much enlarged fossa for the anterior masseter insertion in the Kenyan form, compared with the diminutive fossa in *B. neotertiarius*. The infraorbital foramen is huge in the Kenyan species, but is small in *B. neotertiarius*, being similar in size and position to extant *Bathyergus*. The lower molars of *B. neotertiarius* are appreciably narrower than those of *R. songhorensis*. Allied with these dental differences are modifications of the mandibular condyle which has an anterior apophysis in *B. neotertiarius*, and none in *R. songhorensis*. The occlusal surface of the cheek teeth is almost flat in *Bathyergoides*, but is antero-posteriorly concave in *Renefossor*. The occlusal surfaces of the upper cheek tooth rows form a high dihedral angle (ca 100°) in *Renefossor* the occlusal surfaces facing almost laterally, whereas in *Bathyergoides* the angle is less marked (ca 130°) the surfaces facing more ventrally. In the Kenyan species M2/ and m/2 are clearly larger than the other cheek teeth, whereas in the Namibian species, these teeth are sub-equal in size to the neighbouring teeth.

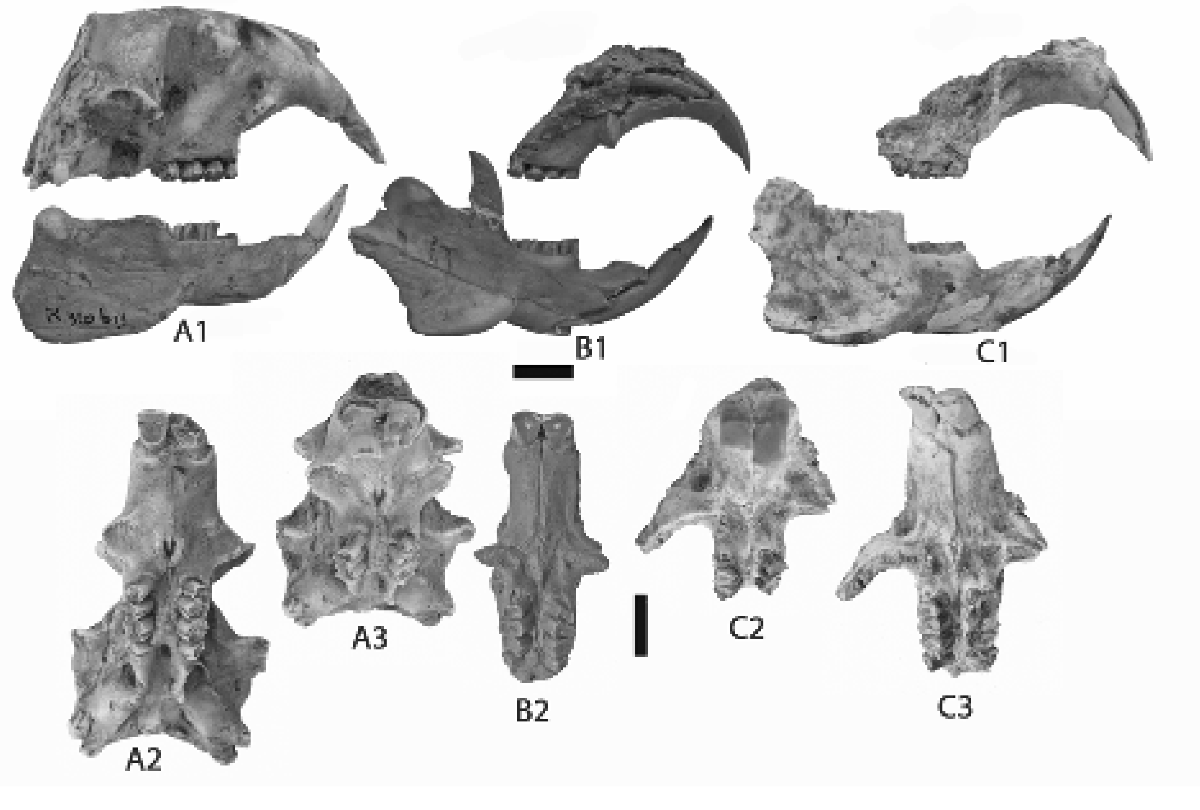

Figure 24. Comparison between the crania of large East African and Namibian Bathyergidae.
A) KNM SO 710, holotype skull and mandible of *Renefossor songhorensis* gen. et sp. nov., B and C) LT 200'98 and LT 245'03, snouts and mandibles of *Bathyergoides neotertiarius*. 1) lateral views to illustrate different degrees of pro-odonty (more marked in *Renefossor* than in *Bathyergoides*) and the position of the ascending ridge bordering the anterior part of the masseteric fossa (beneath m/1 in *Renefossor* and beneath m/2 in *Bathyergoides*); 2) oblique anterior views of palate to illustrate major differences in the region immediately anterior to the cheek teeth (extent of the fossa in the zygomatic process of the maxilla which is antero-posteriorly extensive in *Renefossor*, and antero-posteriorly narrow in *Bathyergoides*); 3) anterior views to show major differences in dimensions of the infra-orbital foramina (very large in *Renefossor* and tiny in *Bathyergoides*) (scales : 10 mm).

Type locality: Songhor, Kenya.

Age: Early Miocene ca 20-19 Ma.

Description: see Lavocat, 1973 pp. 109-139.

Discussion:
We propose the name *Renefossor songhorensis* for the East African species previously attributed to *Bathyergoides neotertiarius*, the main distinguishing features being the markedly more pro-odont and narrower incisors of the Namibian species, with the upper incisor jugum reaching the level of M1/-M2/, whereas in *R. songhorensis* it reaches the middle of M3/. In anterior view the upper incisor cutting edges form a straight line, unlike the re-entrant v-shaped wear facets produced in *Bathyergoides*. The premaxilla of *Renefossor* rises dorsally from the incisive foramina anteriorly and then curves sharply ventrally beneath the anterior nares. Another significant difference between these species is the much enlarged fossa for the anterior masseter insertion in the Kenyan form, compared with the diminutive fossa in *B. neotertiarius*. The infraorbital foramen is huge in the Kenyan species, but is small in *B. neotertiarius*, being similar in size and position to extant *Bathyergus*.

The type locality of *Renefossor songhorensis* is Songhor, Kenya. The species is also known from Napak, Uganda and Koru, Legetet, Chamtwara, Mfwangano and Rusinga, Kenya.

In the mandible, the incisor jugum is rectilinear in *B. neotertiarius*, in ventral view diverging only slightly towards the rear. In *R. songhorensis* in contrast the incisive jugum is markedly divergent towards the rear. Parallelling these differences is the position of the mandibular condyle relative to the tooth row. In the Namibian species the condyle lies only slightly lateral to the long axis of the tooth row, whereas in the Kenyan form it is located far lateral to the tooth row. The mental foramen is beneath the rear of m/1 in *Bathyergoides* and is much further forwards in *Renefossor*, being located beneath the anterior of p/4. The margin of the diastema is sharp in *Bathyergoides* and swollen and rounded in *Renefossor*. The latter genus has a deep genial re-entrant in the symphysis which is much reduced in *Bathyergoides*.

The lower molars of *B. neotertiarius* are appreciably narrower than those of *R. songhorensis*. Allied with these dental differences are modifications of the mandibular condyle which has an anterior apophysis in *B. neotertiarius*, and none in *R. songhorensis*. The difference in condylar and dental morphology suggests that the species chewed differently, with the Namibian one enhancing antero-posterior movements, whereas in the Kenyan one medio-lateral movements were important. This is confirmed by the aspect of the occlusal surface of the cheek teeth which is almost flat in *Bathyergoides*, but antero-posteriorly concave in *Renefossor*. Furthermore the occlusal surfaces of the upper cheek tooth rows form a high dihedral angle (ca 100°) in *Renefossor* the occlusal surfaces facing almost laterally, whereas in *Bathyergoides* the angle is less marked (ca 130°) the surfaces facing more ventrally. In the Kenyan species M2/ and m/2 are clearly larger than the other cheek teeth, whereas in the Namibian species, these teeth are sub-equal in size to the neighbouring teeth. The holotype of the new species is the partial skeleton with skull and mandibles, KNM SO 710 (Lavocat, 1973, Text Fig. 9a-e; Pl. 7, 19, 20, 21, 23) (Fig. 23, 24A). Other specimens of the species are illustrated in Lavocat (1973, Pl. 26, 29, 30, 34).

Appendix I. Measurements (in mm) of the teeth of *Protarsomys macinnesi* from the Northern Sperrgebiet, Namibia (EF = Elisabethfeld, GT = Grillental, LT = Langental) and Legetet, Kenya (LG).

Catalogue N°	Tooth	Length	Breadth
EF 102'94	m/1	1.40	0.99
EF 102'94	m/1	1.40	1.00
EF 102'94	m/1	1.44	0.95
EF 102'94	m/1	1.45	0.95
EF 1998	m/1	1.37	0.99
EF 1998	m/1	1.30	0.95
EF 1998	m/1	1.26	0.90
EF 1998	m/1	1.51	1.02
EF 1998	m/1	1.40	0.99
EF 1998	m/1	1.20	0.77
EF 1998	m/1	1.17	0.81
EF 1998	m/1	1.34	0.91
EF 1998	m/1	1.29	0.86
EF 1998	m/1	1.40	0.95
EF 1998'94	m/1	1.46	1.01
EF 1998'94	m/1	1.43	0.95
EF 2000	m/1	1.48	0.90
EF 2000	m/1	1.37	0.95
EF 2000	m/1	1.29	0.86
EF 2000	m/1	--	0.91
EF 2000	m/1	1.28	0.91
EF 2000	m/1	1.38	0.95
EF 2001	m/1	1.34	0.91
EF 2001	m/1	1.47	0.95
EF 75'96	m/1	1.41	0.92
EF 75'96	m/1	1.34	0.90
EF 75'96	m/1	1.51	0.94
EF 75'96	m/1	1.40	0.98
EF 94	m/1	1.33	0.87
EF 94	m/1	1.33	1.00
EF 94	m/1	1.30	0.90
EF 94	m/1	1.40	0.97
EF 94	m/1	1.30	0.94
EF 94	m/1	1.33	0.94
EF 94	m/1	1.36	0.84
EF 94	m/1	1.43	0.98
EF 94	m/1	1.42	0.90
EF 94	m/1	1.36	0.88
EF 94	m/1	--	0.90
EF 94	m/1	1.28	0.88
EF 94	m/1	1.33	0.92
EF 94	m/1	1.26	0.84
EF 94	m/1	1.39	0.91
EF 94	m/1	1.34	0.90
EF 94	m/1	1.43	0.92
EF 94	m/1	1.45	0.94
EF 94	m/1	1.35	0.92
EF 94	m/1	1.39	0.94
EF 94	m/1	1.40	0.92
EF 94	m/1	1.50	0.96
EF 94	m/1	1.35	0.92
EF 94	m/1	1.44	0.96
EF 94	m/1	1.47	0.96
EF 94	m/1	1.48	0.95
EF 94	m/1	1.43	0.95
EF 94	m/1	1.34	0.94
EF 94	m/1	1.26	0.81
EF 94	m/1	1.24	0.85
EF 94	m/1	1.39	0.88
EF 94	m/1	1.31	0.93
EF 94	m/1	1.42	0.98
EF 94	m/1	1.40	0.99
EF 94	m/1	1.38	0.98
EF 94	m/1	1.25	0.88
EF 94	m/1	1.34	0.92
EF 94	m/1	1.34	0.95
EF 94	m/1	1.46	0.98
EF 94	m/1	1.33	0.93
EF 94	m/1	1.50	0.92
EF 94	m/1	1.40	0.95
EF 94	m/1	1.42	0.92
EF 94	m/1	1.46	0.94
EF 94	m/1	1.24	0.82
GT 110'96	m/1	1.50	1.01
GT 110'96	m/1	1.54	1.02
GT 110'96	m/1	1.50	1.01
GT 110'96	m/1	1.54	1.02
GT 19'94	m/1	1.46	1.01
GT 2'00	m/1	1.48	1.00
GT 2'00	m/1	1.39	0.90
GT 2'00	m/1	1.32	0.87
GT 2'00	m/1	1.35	0.92
GT 202'96	m/1	1.39	0.99
GT 202'96	m/1	1.39	0.99
GT 206'96	m/1	1.36	0.92
GT 206'96	m/1	1.46	1.01
GT 4'97	m/1	1.54	0.96
GT 4'97	m/1	1.35	0.86
GT 4'97	m/1	1.46	0.97
GT 4'97	m/1	1.35	0.94
GT 4'97	m/1	1.46	0.97
GT 6'97	m/1	1.44	0.94
GT 7'00	m/1	1.32	0.92
LG	m/1	1.43	1.03
LT 168'03	m/1	1.37	0.97
LT 1998	m/1	1.44	0.92
LT 536'96	m/1	1.53	0.97
LT 86'97	m/1	--	0.98
LT 86'97	m/1	1.57	1.06
LT 86'97	m/1	1.43	0.90
LT 86'97	m/1	1.48	0.92
LT 86'97	m/1	1.48	0.89
LT 86'97	m/1	1.36	0.92
E-Bay	m/2	1.36	1.11
E-Bay	m/2	1.19	1.02
EF 102'94	m/2	1.22	1.00
EF 102'94	m/2	1.23	1.07
EF 102'94	m/2	1.20	0.99
EF 1998	m/2	1.25	1.08
EF 1998	m/2	1.14	0.99
EF 1998	m/2	1.19	1.01
EF 1998	m/2	1.20	1.02
EF 1998	m/2	1.23	1.05

EF 1998	m/2	1.17	1.04
EF 1998	m/2	1.15	0.99
EF 1998	m/2	1.16	0.92
EF 1998	m/2	1.17	0.97
EF 1998	m/2	1.08	0.98
EF 1998	m/2	1.26	1.04
EF 1998	m/2	1.10	0.99
EF 1998'94	m/2	1.26	1.01
EF 2000	m/2	1.29	0.97
EF 2000	m/2	1.25	1.04
EF 2000	m/2	1.25	1.01
EF 2000	m/2	1.25	1.05
EF 2000	m/2	1.16	0.97
EF 2000	m/2	1.11	0.88
EF 2001	m/2	1.12	1.03
EF 2001	m/2	1.20	1.03
EF 75'96	m/2	1.28	0.97
EF 75'96	m/2	1.29	1.04
EF 75'96	m/2	1.23	0.95
EF 75'96	m/2	1.23	1.07
EF 94	m/2	1.19	1.05
EF 94	m/2	1.20	1.06
EF 94	m/2	1.23	1.02
EF 94	m/2	1.26	1.05
EF 94	m/2	1.25	1.03
EF 94	m/2	1.24	1.01
EF 94	m/2	1.26	1.08
EF 94	m/2	1.20	1.03
EF 94	m/2	1.26	1.06
EF 94	m/2	1.17	1.01
EF 94	m/2	1.17	0.99
EF 94	m/2	1.23	1.02
EF 94	m/2	1.25	0.98
EF 94	m/2	1.17	1.00
EF 94	m/2	1.06	1.00
EF 94	m/2	1.22	0.93
EF 94	m/2	1.09	0.93
EF 94	m/2	1.20	0.99
EF 94	m/2	1.24	1.05
EF 94	m/2	1.19	1.00
EF 94	m/2	1.21	1.06
EF 94	m/2	1.20	1.07
EF 94	m/2	1.14	0.99
EF 94	m/2	1.30	1.10
EF 94	m/2	1.16	1.01
EF 94	m/2	1.26	1.05
EF 94	m/2	1.21	1.05
EF 94	m/2	1.15	0.97
EF 94	m/2	1.27	0.97
EF 94	m/2	1.18	1.05
EF 94	m/2	1.26	1.10
EF 94	m/2	1.20	1.07
EF 94	m/2	1.24	1.03
EF 94	m/2	1.21	0.96
EF 94	m/2	1.13	0.97
EF 94	m/2	1.18	1.05
EF 94	m/2	1.24	1.04
EF 94	m/2	1.18	1.08
EF 94	m/2	1.15	0.97
EF 94	m/2	1.23	0.99
EF 94	m/2	1.17	0.95
EF 94	m/2	1.25	1.00

EF 94	m/2	1.20	0.97
EF 94	m/2	1.15	0.99
EF 94	m/2	1.20	0.96
EF 94	m/2	1.18	1.04
EF 94	m/2	1.08	0.93
GT 110'96	m/2	1.14	0.98
GT 110'96	m/2	1.21	1.04
GT 110'96	m/2	1.21	1.03
GT 202'96	m/2	1.30	1.05
GT 202'96	m/2	1.18	1.03
GT 202'96	m/2	1.29	1.07
GT 202'96	m/2	1.30	1.06
GT 202'96	m/2	1.18	1.03
GT 206'96	m/2	1.09	0.99
GT 206'96	m/2	1.25	1.09
GT 208'96	m/2	1.14	0.98
GT 4'97	m/2	1.17	1.05
GT 4'97	m/2	1.30	1.02
GT 4'97	m/2	1.08	0.92
GT 4'97	m/2	1.23	1.02
GT 4'97	m/2	1.30	1.15
GT 6'97	m/2	1.25	0.94
LT 168'03	m/2	1.13	1.02
LT 536'96	m/2	1.25	0.99
LT 86'97	m/2	1.23	1.00
LT 86'97	m/2	1.21	1.14
LT 86'97	m/2	1.30	1.04
LT 86'97	m/2	1.33	1.13
LT 86'97	m/2	1.17	0.95
EF 102'94	m/3	1.03	0.95
EF 1998	m/3	0.94	0.85
EF 1998	m/3	0.94	0.80
EF 1998	m/3	0.88	0.74
EF 1998	m/3	0.89	0.78
EF 1998	m/3	0.97	0.77
EF 1998	m/3	0.82	0.82
EF 2000	m/3	0.97	--
EF 2000	m/3	0.93	0.90
EF 2000	m/3	0.92	0.78
EF 2001	m/3	0.95	0.87
EF 2001	m/3	1.01	0.90
EF 75'96	m/3	1.02	0.91
EF 75'96	m/3	0.78	0.82
EF 75'96	m/3	0.94	0.87
EF 94	m/3	0.96	0.86
EF 94	m/3	1.03	0.76
EF 94	m/3	1.01	0.86
EF 94	m/3	0.90	0.83
EF 94	m/3	0.90	0.76
EF 94	m/3	1.03	0.78
EF 94	m/3	0.91	0.85
EF 94	m/3	0.92	0.86
EF 94	m/3	0.97	0.90
EF 94	m/3	0.91	0.82
EF 94	m/3	0.85	0.80
EF 94	m/3	0.99	0.85
EF 94	m/3	0.86	0.75
EF 94	m/3	0.94	0.88
EF 94	m/3	0.94	0.88
EF 94	m/3	0.96	0.82
EF 94	m/3	0.87	0.78
EF 94	m/3	0.88	0.76

EF 94	m/3	0.93	0.80
EF 94	m/3	0.89	0.82
EF 94	m/3	0.89	0.80
EF 94	m/3	0.89	0.78
GT 110'96	m/3	1.05	0.87
GT 110'96	m/3	1.05	0.86
GT 110'96	m/3	1.05	0.82
GT 110'96	m/3	1.05	0.86
GT 206'96	m/3	0.84	0.79
GT 4'97	m/3	0.81	0.70
GT 4'97	m/3	--	0.86
GT 6'97	m/3	1.08	1.03
GT 7'00	m/3	0.84	0.79
E-Bay	M1/	1.64	1.10
EF 102'94	M1/	1.68	1.10
EF 102'94	M1/	1.63	1.08
EF 1998	M1/	1.56	1.05
EF 1998	M1/	1.67	1.03
EF 1998'94	M1/	1.67	1.03
EF 1998'94	M1/	1.80	1.12
EF 2000	M1/	1.80	1.09
EF 2000	M1/	1.69	1.08
EF 2000	M1/	1.58	0.95
EF 2000	M1/	1.58	0.97
EF 2000	M1/	1.63	0.97
EF 2001	M1/	1.63	1.02
EF 2001	M1/	1.63	1.00
EF 332'94	M1/	1.51	0.92
EF 332'94	M1/	1.67	1.05
EF 332'94	M1/	1.55	0.94
EF 332'94	M1/	1.77	1.12
EF 332'94	M1/	1.61	0.97
EF 332'94	M1/	1.64	1.06
EF 332'94	M1/	1.61	0.96
EF 332'94	M1/	1.59	1.01
EF 332'94	M1/	1.63	1.00
EF 332'94	M1/	1.61	1.02
EF 332'94	M1/	1.56	1.01
EF 332'94	M1/	1.53	0.97
EF 332'94	M1/	1.56	1.05
EF 332'94	M1/	1.68	1.02
EF 332'94	M1/	1.65	1.07
EF 332'94	M1/	1.67	1.05
EF 332'94	M1/	1.58	1.02
EF 332'94	M1/	1.65	1.01
EF 332'94	M1/	1.60	1.02
EF 332'94	M1/	1.62	1.00
EF 332'94	M1/	1.65	1.01
EF 332'94	M1/	1.65	1.03
EF 332'94	M1/	1.56	1.00
EF 332'94	M1/	1.40	0.95
EF 332'94	M1/	1.49	0.89
EF 332'94	M1/	1.62	0.99
EF 332'94	M1/	1.67	1.04
EF 332'94	M1/	1.48	0.93
EF 332'94	M1/	1.57	0.90
EF 332'94	M1/	1.66	1.08
EF 332'94	M1/	1.63	1.07
EF 332'94	M1/	1.47	0.99
EF 332'94	M1/	1.43	0.96
EF 332'94	M1/	1.65	1.01
EF 340'94	M1/	1.57	0.98

EF 340'94	M1/	1.45	0.98
EF 340'94	M1/	1.62	1.03
EF 75'96	M1/	1.64	1.04
EF 75'96	M1/	1.61	1.02
EF 75'96	M1/	1.67	1.00
EF 75'96	M1/	1.73	1.13
EF 94	M1/	1.53	1.02
EF 94	M1/	1.70	1.05
EF 94	M1/	1.63	0.98
EF 94	M1/	1.69	1.03
EF 94	M1/	1.65	1.04
EF 94	M1/	1.62	1.05
EF 94	M1/	1.75	1.11
EF 94	M1/	1.61	1.06
EF 94	M1/	1.61	0.99
EF 94	M1/	1.71	1.11
EF 94	M1/	1.64	1.04
EF 94	M1/	1.56	1.01
EF 94	M1/	1.66	1.06
EF 94	M1/	1.58	1.05
EF 94	M1/	1.61	1.05
EF 94	M1/	1.60	0.97
EF 94	M1/	1.74	1.09
EF 94	M1/	1.62	1.04
EF 94	M1/	1.50	0.93
EF 94	M1/	1.55	0.97
EF 94	M1/	1.56	0.99
EF 94	M1/	1.51	1.00
EF 94	M1/	1.46	0.94
EF 94	M1/	1.57	1.00
EF 94	M1/	1.69	1.08
EF 94	M1/	1.47	0.99
EF 94	M1/	1.62	0.99
EF 94	M1/	1.45	0.88
EF 94	M1/	1.66	1.09
EF 94	M1/	1.64	1.07
EF 94	M1/	1.67	1.10
EF 94	M1/	1.60	1.03
EF 94	M1/	1.71	1.05
EF 94	M1/	1.53	0.97
EF 94	M1/	1.58	0.98
EF 94	M1/	1.58	1.03
EF 94	M1/	1.66	1.12
EF 94	M1/	1.60	1.02
EF 94	M1/	1.65	1.03
EF 94	M1/	1.56	0.98
EF 94	M1/	1.62	1.08
EF 94	M1/	1.64	1.03
EF 94	M1/	1.60	1.02
EF 94	M1/	1.75	1.07
EF 94	M1/	1.65	0.99
EF 94	M1/	1.72	1.10
EF 94	M1/	1.60	1.02
EF 94	M1/	1.68	1.03
EF 94	M1/	1.63	1.04
EF 94	M1/	1.56	0.98
GT 208'96	M1/	1.61	0.99
GT 208'96	M1/	1.62	0.99
GT 4'97	M1/	1.58	1.02
GT 4'97	M1/	1.59	0.98
GT 4'97	M1/	1.52	1.02
GT 4'97	M1/	1.57	1.02

GT 4'97	M1/	1.67	1.00
GT 4'97	M1/	1..53	1.04
GT 4'97	M1/	1.53	1.02
LT 86'97	M1/	1.54	0.97
EF 102'94	M2/	1.15	1.03
EF 102'94	M2/	1.19	1.10
EF 102'94	M2/	1.26	1.14
EF 1998	M2/	1.13	1.06
EF 1998	M2/	0.99	0.98
EF 1998	M2/	1.20	1.07
EF 1998'94	M2/	1.19	1.00
EF 1998'94	M2/	1.22	1.11
EF 1998'94	M2/	1.21	1.05
EF 1998'94	M2/	1.20	1.12
EF 2000	M2/	1.18	1.12
EF 2000	M2/	1.27	1.10
EF 2001	M2/	1.15	1.08
EF 2001	M2/	1.20	1.06
EF 2001	M2/	1.24	1.12
EF 332'94	M2/	1.01	0.95
EF 332'94	M2/	1.18	1.06
EF 332'94	M2/	1.21	1.00
EF 332'94	M2/	1.19	0.99
EF 332'94	M2/	1.19	1.07
EF 332'94	M2/	1.15	0.96
EF 332'94	M2/	1.18	1.07
EF 332'94	M2/	1.18	0.98
EF 332'94	M2/	1.27	1.11
EF 332'94	M2/	1.17	1.08
EF 332'94	M2/	1.19	1.07
EF 332'94	M2/	1.19	1.00
EF 332'94	M2/	1.20	1.10
EF 332'94	M2/	1.17	1.01
EF 332'94	M2/	1.20	1.02
EF 332'94	M2/	1.25	1.11
EF 332'94	M2/	1.15	--
EF 332'94	M2/	1.20	1.15
EF 332'94	M2/	1.20	1.12
EF 332'94	M2/	1.23	1.07
EF 332'94	M2/	1.10	1.03
EF 332'94	M2/	1.20	1.11
EF 332'94	M2/	1.11	0.97
EF 332'94	M2/	--	0.97
EF 340'94	M2/	1.21	1.02
EF 340'94	M2/	1.19	1.02
EF 340'94	M2/	1.29	1.07
EF 340'94	M2/	1.15	1.05
EF 75'96	M2/	1.17	1.11
EF 75'96	M2/	1.23	1.09
EF 75'96	M2/	1.10	1.00
EF 75'96	M2/	1.19	1.03
EF 75'96	M2/	1.30	1.09
EF 94	M2/	1.17	1.13
EF 94	M2/	1.26	1.10
EF 94	M2/	1.19	1.00
EF 94	M2/	1.16	1.10
EF 94	M2/	1.13	0.99
EF 94	M2/	1.19	1.06
EF 94	M2/	1.24	1.02
EF 94	M2/	1.26	1.04
EF 94	M2/	1.15	0.99
EF 94	M2/	1.18	1.01

EF 94	M2/	1.17	1.06
EF 94	M2/	1.09	0.96
EF 94	M2/	1.20	1.07
EF 94	M2/	1.10	1.14
EF 94	M2/	1.11	1.00
EF 94	M2/	1.17	1.08
EF 94	M2/	1.24	1.10
EF 94	M2/	1.19	1.00
EF 94	M2/	1.17	1.05
EF 94	M2/	1.07	0.91
EF 94	M2/	1.17	0.99
EF 94	M2/	1.15	0.97
EF 94	M2/	1.15	1.07
EF 94	M2/	1.22	1.09
EF 94	M2/	1.15	1.05
EF 94	M2/	1.15	1.00
EF 94	M2/	1.27	1.08
EF 94	M2/	1.26	1.07
EF 94	M2/	1.18	1.10
EF 94	M2/	1.29	1.02
EF 94	M2/	1.19	1.04
EF 94	M2/	1.18	1.06
EF 94	M2/	1.21	1.08
EF 94	M2/	1.25	1.07
EF 94	M2/	1.26	1.05
EF 94	M2/	1.23	1.15
EF 94	M2/	1.23	0.98
EF 94	M2/	1.24	1.08
EF 94	M2/	1.26	1.05
EF 94	M2/	1.09	0.98
EF 94	M2/	1.20	1.05
EF 94	M2/	1.21	1.07
EF 94	M2/	1.21	1.00
EF 94	M2/	1.11	0.99
EF 94	M2/	1.16	1.07
EF 94	M2/	1.09	1.01
EF 94	M2/	1.22	1.00
EF 94	M2/	1.21	1.02
EF 94	M2/	1.18	1.07
EF 94	M2/	1.22	1.04
GT 110'96	M2/	1.40	--
GT 110'96	M2/	1.16	0.98
GT 19'94	M2/	1.20	1.01
GT 19'94	M2/	1.10	0.89
GT 19'94	M2/	1.25	1.09
GT 202'96	M2/	1.25	1.07
GT 202'96	M2/	1.25	1.07
GT 202'96	M2/	1.10	0.86
GT 206'96	M2/	1.10	0.89
GT 206'96	M2/	1.20	1.01
GT 4'97	M2/	1.23	1.11
GT 4'97	M2/	1.11	1.08
GT 4'97	M2/	1.10	1.03
GT 5'97	M2/	1.15	1.05
LT 86'97	M2/	1.23	0.99
EF 1998	M3/	0.70	0.80
EF 1998	M3/	0.76	0.86
EF 2000	M3/	0.84	0.88
EF 2000	M3/	0.74	0.87
EF 2000	M3/	0.85	0.92
EF 2001	M3/	0.74	0.80
EF 2001	M3/	0.73	0.79

EF 332'94	M3/	0.72	0.82
EF 332'94	M3/	0.77	0.90
EF 332'94	M3/	0.79	0.86
EF 332'94	M3/	0.88	0.87
EF 332'94	M3/	0.86	0.85
EF 332'94	M3/	0.86	0.90
EF 332'94	M3/	0.86	0.87
EF 332'94	M3/	0.86	0.86
EF 332'94	M3/	0.75	0.85
EF 332'94	M3/	0.76	0.80
EF 332'94	M3/	0.67	0.67
EF 332'94	M3/	0.63	0.72
EF 332'94	M3/	0.70	0.80
EF 332'94	M3/	0.78	0.83
EF 340'94	M3/	0.75	0.90
EF 75'96	M3/	0.69	0.83
EF 75'96	M3/	0.78	0.72
EF 75'96	M3/	0.68	0.83
EF 75'96	M3/	0.75	0.87
EF 94	M3/	0.76	0.82
EF 94	M3/	0.71	0.78
EF 94	M3/	0.80	0.82
EF 94	M3/	0.73	0.86
EF 94	M3/	0.74	0.84
EF 94	M3/	0.77	0.88
EF 94	M3/	0.66	0.78
EF 94	M3/	0.76	0.77
EF 94	M3/	0.88	0.88
EF 94	M3/	0.94	0.93
EF 94	M3/	0.67	0.73
EF 94	M3/	0.90	0.84

EF 94	M3/	0.71	0.84
EF 94	M3/	0.66	0.74
EF 94	M3/	0.72	0.81
EF 94	M3/	0.79	0.82
EF 94	M3/	0.81	0.86
EF 94	M3/	0.76	0.82
EF 94	M3/	0.65	0.79
EF 94	M3/	0.84	0.80
EF 94	M3/	0.94	0.93
EF 94	M3/	0.78	0.83
EF 94	M3/	0.76	0.87
EF 94	M3/	0.79	0.84
EF 94	M3/	0.83	0.86
EF 94	M3/	0.85	0.85
EF 94	M3/	0.71	0.75
EF 94	M3/	0.72	0.81
EF 94	M3/	0.94	0.91
EF 94	M3/	0.71	0.72
EF 94	M3/	0.78	0.86
EF 94	M3/	0.95	0.95
EF 94	M3/	0.72	0.80
EF 94	M3/	0.74	0.75
EF 94	M3/	0.76	0.79
EF 94	M3/	0.81	0.84
EF 94	M3/	0.67	0.74
GT 19'94	M3/	0.75	0.83
GT 19'94	M3/	0.69	0.82
GT 206'96	M3/	0.75	0.83
GT 206'96	M3/	0.69	0.82
GT 4'97	M3/	0.75	0.86
GT 5'97	M3/	0.70	0.75

Appendix 2. Measurements (in mm) of the teeth of *Parapedetes namaquensis* from Elisabethfeld, Namibia.

Specimen	**Tooth**	**Length**	**Breadth anterior**	**Breadth posterior**	**Height**	**Tall stria(id)**	**Short stria (id)**
EF 74'96	dP4/	2.24	2.10	2.46	4.00	4.00	1.04
EF 74'96	dP4/	2.35	1.80	2.18	5.10	2.42	0.08
EF 74'96	dP4/	2.09	1.75	2.20	5.15	2.45	0.25
Stromer cast	dP4/	2.30	1.77	2.33	5.40	0.80	--
Stromer N°12	dP4/	1.90	--	2.50	--	--	--
Stromer fig.5	dP4/	2.30	1.70	2.30	6.00	0.83	--
EF 74'96	P4/	2.50	2.54	2.73	6.60	0.18	--
EF 97'94	P4/	2.67	--	--	8.02	0.72	--
EF 74'96	M1/ juvenile	2.23	--	1.85	4.25	4.25	0.65
EF 74'96	M1/ juvenile	2.30	--	2.23	5.22	3.45	0.60
Stromer skull	M1/	2.22	2.13	2.42	9.30	1.18	--
EF 84'94	M1/	2.12	2.56	2.75	5.23	--	--
Stromer fig.2	M1/	2.00	2.50	2.75	2.12	--	--
EF 97'94	M1/	2.16	--	3.08	4.20	--	--
EF 74'96	M1/	1.85	--	2.58	6.15	--	--
EF 103'05	M1/	2.26	2.29	2.11	10.03	4.17	--
Stromer skull	M2/	2.17	2.06	2.23	9.10	0.90	--
EF 84'94	M2/	2.03	2.49	2.69	5.75	0.60	--
EF 97'94	M2/	2.29	--	2.87	7.70	0.60	--
EF 97'94	M2/	2.24	--	2.95	6.60	1.80	--
EF 97'94	M2/	2.31	--	--	7.40	1.10	--
EF 103'05	M2/	2.14	2.27	2.04	10.80	4.25	--
Stromer skull	M3/	2.11	2.07	1.73	8.90	0.65	--
EF 84'94	M3/	2.18	2.30	1.93	6.60	0.72	--

Appendix 2. (Continued)

Specimen	Tooth	Length	Breadth anterior	Breadth posterior	Height	Tall stria(id)	Short stria (id)
EF 97'94	M3/	2.47	2.64	2.10	6.42	--	--
EF 74'96	M3/	2.05	2.40	2.40	5.80	--	--
EF 74'96	M3/	2.08	2.45	--	6.15	--	--
EF 56'96	dp/4 or p/4 juv.	2.40	2.05	2.27	3.23	3.23	0.58
EF 74'96	dp/4 or p/4 juv.	2.40	2.06	2.46	2.80	1.75	0.58
EF 74'96	dp/4 or p/4 juv.	2.50	1.97	2.40	4.50	2.00	0.44
EF 74'96	dp/4 or p/4 juv.	2.50	1.90	2.30	4.85	1.80	0.45
Stromer N°5	dp/4 or p/4 juv.	2.50	2.30	2.30	2.30	1.50	--
Stromer N°8	dp/4 or p/4 juv.	2.50	2.20	--	--	--	--
EF 84'94	p/4	2.70	2.10	3.00	--	0.64	--
EF 84'94	p/4	2.77	2.08	2.98	6.82	0.36	--
EF 74'96	p/4	2.70	1.97	3.00	6.22	1.75	--
EF 96'94	p/4	2.58	2.10	2.90	9.00	2.76	--
EF 97'94	p/4	2.55	2.03	2.80	9.48	2.50	--
Stromer 7a	p/4	2.50	2.90	--	--	--	--
Stromer 7b	p/4	2.50	2.90	--	--	--	--
Stromer 10	p/4	2.50	3.00	--	--	--	--
EF 56'96	m/1 juvenile	2.35	2.44	2.49	3.23	3.23	0.64
EF 74'96	m/1 juvenile	2.40	2.31	2.21	5.20	3.98	0.45
EF 74'96	m/1 juvenile	2.51	2.23	2.33	5.80	5.44	0.57
EF 84'94	m/1	2.56	2.60	2.79	--	1.36	--
EF 84'94	m/1	2.53	2.63	2.78	5.70	1.45	--
EF 96'94	m/1	2.78	2.77	3.00	8.25	1.80	--
EF 97'94	m/1	2.64	2.77	2.78	9.75	3.28	--
EF 97'94	m/1	2.60	2.75	2.90	8.43	2.23	--
EF 97'94	m/1	2.78	2.93	2.90	9.82	3.38	--
EF 84'94	m/2	2.56	2.60	2.79	6.35	2.50	--
EF 84'94	m/2	2.45	2.80	2.70	6.07	2.30	--
EF 97'94	m/2	2.50	2.91	2.90	5.50	5.15	--
EF 74'96	m/2	2.40	2.75	2.86	6.95	1.26	--
EF 103'05	m/2	2.52	2.59	2.51	10.75	8.65	0.93
EF 84'94	m/3	2.44	2.38	2.01	6.80	2.03	--
EF 97'94	m/3	2.46	2.52	2.10	8.02	3.87	--
EF 74'96	m/3	2.67	2.61	1.78	6.08	2.03	--
EF 74'96	m/3	2.54	2.60	1.85	6.70	2.10	--
EF 97'94	m/3	2.76	--	2.07	6.30	3.70	--
EF 103'05	m/3	2.92	2.60	2.25	10.56	8.87	0.65
EF 84'94	I1/	1.60	3.00	--	--	--	--
EF 84'94	I1/	1.52	2.71	--	--	--	--
EF 97'94	I1/	1.52	2.71	--	--	--	--
EF 97'94	I1/	1.65	2.70	--	--	--	--
EF 97'94	I1/	1.46	2.80	--	--	--	--
EF 97'94	I1/	1.53	3.14	--	--	--	--
EF 97'94	i/1	0.79	2.92	--	--	--	--
EF 225'01	p/4	2.51	2.61				
EF 225'01	m/1	2.77	3.14				
EF 225'01	m/2	3.05	2.95				
EF 225'01	m/3	3.02	2.18				
EF 199'01	P4/	2.12	2.49				
EF 199'01	M1/	2.36	2.70				
EF 199'01	M2/	2.35	2.63				
EF 199'01	M3/	2.25	2.40				

Appendix 3. Measurements (in mm) of the teeth of *Propedetes efeldensis* from the Northern Sperrgebiet, Namibia.

Specimen	Tooth	Length	Anterior breadth	Posterior breadth	Height	Short stria (id)	Tall stria(id)
LT 134'99	P4/	3.09	2.85	3.05	7.60	2.45	4.00
LT 135'99	M1/	2.73	2.70	3.02	10.30	2.96	3.87
LT 446'96	m/2?	--	--	--	9.50	3.70	4.60
LT PQN 117	p/4 or m/2	3.18	3.40	3.00	10.00	--	--
EF 14'01	p/4	3.08	2.55	2.87	6.55	2.60	3.65
EF 14'01	m/1	3.02	2.90	2.94	9.72	--	2.82
EF 14'01	m/2	2.96	2.77	2.68	9.00	--	2.07
EF 14'01	m/3	2.65	2.28	2.43	9.15	--	2.14
EF 14'01	i/1	2.50	2.70	--	--	--	--
EF 198'01	m/2	3.20	3.50	3.30	9.30	2.70	3.70

Appendix 4. Measurements (in mm) of the teeth of *Diamantomys luederitzi* from the Northern Sperrgebiet, Namibia.

Specimen	Tooth	Length	Breadth
EF 22'1926	i/1	3.60	2.30
EF 53'93	I1/	2.30	3.70
EF 22'1926	m/1	4.34	3.60
EF 22'1926	m/2	4.80	4.00
EF 22'1926	m/3	5.20	4.30
EF 17'00	M1/	4.40	4.70
EF 36'93	M1/	4.30	4.75
EF 37'06	M1/	3.90	4.11
EF 170'04	M2/	4.44	4.67
EF 36'93	M2/	5.05	5.10
EF 37'06	M2/	5.07	5.72
EF 170'04	M3/	5.30	4.75
EF 36'93	M3/	4.85	4.90
EF 17'00	P4/	4.10	4.30
EF 36'93	P4/	4.00	4.40
GT 156'04	m/1	4.00	3.05
GT 195'96	m/1	4.21	3.53
GT 43'04	m/1	4.27	3.45
GT 45'04	m/1	4.70	3.68
GT 195'96	m/2	4.60	3.90
GT 43'04	m/2	4.53	3.80

GT 45'04	m/2	4.42	3.62
GT 195'96	m/3	5.10	4.10
GT 43'04	m/3	3.85	3.42
GT 156'04	M1/	4.63	4.14
GT 207'96	M1/	4.42	3.86
GT 9'00	M1/	3.60	4.20
GT 9'00	M1/	3.52	3.94
GT 202'96	M2/	3.75	4.25
GT 9'00	M2/	4.09	4.59
GT 9'00	M2/	3.80	4.67
GT 9'00	M3/	3.88	4.45
GT 156'04	p/4	4.15	2.65
GT 195'96	p/4	4.47	3.17
GT 45'04	p/4	4.43	3.05
GT 156'04	P4/	3.20	3.84
GT 2'94	P4/	3.93	4.13
GT 2'94	P4/	3.94	4.00
GT 9'00	P4/	3.38	3.80
LT 99'03	m/1	4.40	4.10
LT 158'96	m/3	4.70	3.80
LT 124'99	M3/	4.16	4.12
Glastal 4'05	M2/	3.51	4.25

Appendix 5. Measurements (in mm) of the teeth of *Pomonomys dubius* from the Northern Sperrgebiet, Namibia.

Specimen	Tooth	Length	Breadth
LT 30'06	i/1	1.70	2.80
LT 41'04	i/1	2.90	4.30
GT 42'04	m/1	5.10	4.15
LT 117'99	m/1	4.67	4.20
LT 119'99	m/1	5.60	4.30
LT 135'96	m/1	5.38	4.22
LT 28'04	m/1	5.75	4.28
LT 29'06	m/1	5.40	4.99
LT 30'06	m/1	5.23	4.11
LT 41'01	m/1	5.00	4.30
LT 42'04	m/1	5.60	4.88
LT 43'04	m/1	5.35	4.77
LT 41'04	m/1	5.46	4.65
LT 67'01	m/1	5.50	3.70
LT 1926 X23	m/1	5.10	4.30
LT 1926 X506	m/1	5.00	4.00
LT 1926c	m/1	5.00	4.10
LT 117'99	m/2	4.66	4.25
LT 119'99	m/2	5.40	4.20
LT 123'99	m/2	4.60	5.10
LT 135'96	m/2	5.28	4.32
LT 166'03	m/2	5.31	4.14
LT 172'98	m/2	5.70	4.30
LT 28'04	m/2	5.25	4.35
LT 29'06	m/2	5.15	4.45
LT 30'06	m/2	5.80	3.90
LT 42'04	m/2	5.75	5.00
LT 43'01	m/2	4.80	4.20
LT 43'04	m/2	5.20	4.60
LT 41'04	m/2	5.15	4.14
LT 1926 X23	m/2	5.10	4.10
LT 1926 X506	m/2	4.90	3.50
LT 1926c	m/2	5.00	4.00
LT 117'99	m/3	5.11	3.74
LT 135'96	m/3	5.28	3.77
LT 151'00	m/3	4.70	3.90
LT 166'03	m/3	4.65	3.67
LT 172'98	m/3	5.60	4.20
LT 29'06	m/3	5.03	4.28
LT 41'01	m/3	4.80	3.90
LT 42'04	m/3	5.10	4.15
LT 43'04	m/3	5.90	4.45
LT 41'04	m/3	5.80	4.13
LT 123'99	M1/	4.70	4.80
LT 166'03	M1/	4.40	3.92
LT 255'03	M1/	3.43	3.73
LT 28'06	M1/	4.06	4.50
LT 49'06	M1/	5.33	4.58
LT 514'96	M1/	5.05	4.30
LT 166'03	M2/	4.60	4.74
LT 28'06	M2/	5.15	4.58
LT 49'06	M2/	4.75	4.10
LT 166'03	M3/	4.53	4.61
LT 109'03	p/4	5.44	3.60
LT 117'99	p/4	4.98	4.35
LT 135'96	p/4	5.18	3.90
LT 166'03	p/4	4.30	4.02
LT 28'04	p/4	5.57	4.03
LT 29'06	p/4	5.12	4.35
LT 30'06	p/4	5.23	3.85
LT 42'04	p/4	5.60	4.15
LT 43'04	p/4	5.15	4.67
LT 41'04	p/4	5.00	4.97
LT 58'03	p/4	5.55	4.16
LT 67'01	p/4	6.07	3.45
LT 184'06	p/4	5.20	3.90
LT 1926 X23	p/4	5.40	4.00
LT 166'03	P4/	4.00	3.75
LT 255'03	P4/	3.62	4.38
LT 49'06	P4/	5.03	4.80
LT 514'96	P4/	4.42	3.10+
LT 69'06	P4/	5.08	3.80

Appendix 6. Measurements (in mm) of the teeth of *Phiomyoides humilis* from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
E-Bay	m/1	1.53	1.32
EF 107'05	m/1	1.50	1.28
EF 107'05	m/1	1.49	1.25
EF 107'05	m/1	1.48	1.30
EF 107'05	m/1	1.49	1.25
EF 107'05	m/1	1.55	1.33
EF 107'05	m/1	1.44	1.38
EF 107'94	m/1	1.60	1.27
EF 107'94	m/1	1.49	1.37
EF 107'94	m/1	1.58	1.37
EF 107'94	m/1	1.55	1.31
EF 107'94	m/1	1.54	1.33
EF 107'94	m/1	1.57	1.27
EF 107'94	m/1	1.42	1.16
EF 107'94	m/1	1.42	1.21
EF 288'98	m/1	1.43	1.23
EF 36'98	m/1	1.62	1.28
EF 39'98	m/1	1.54	1.33
EF 41'98	m/1	1.46	1.33
EF 42'98	m/1	1.46	1.41
EF 43'98	m/1	1.48	1.24
EF 544'97	m/1	1.48	1.28
EF 546'97	m/1	1.49	1.28
EF 565'94	m/1	1.55	1.28
EF 61'93	m/1	1.51	1.31
EF 62'93	m/1	1.51	1.33
EF 62'93	m/1	1.53	1.33
EF 93'94	m/1	1.51	1.34
EF 94'94	m/1	1.52	1.16
EF 98'94	m/1	1.58	1.19
EF 98'94	m/1	1.58	1.32
EF 9'94	m/1	1.49	1.21
GT 203'96	m/1	1.47	1.20
GT 203'96	m/1	1.47	1.21
GT 203'96	m/1	1.36	1.25
GT 3'00	m/1	1.50	1.39
GT 3'00	m/1	1.56	1.37
GT 8'97	m/1	1.52	1.20
GT 8'97	m/1	1.38	1.20
GT 8'97	m/1	1.49	1.15
GT 8'97	m/1	1.51	1.20
LT 116'00	m/1	1.64	1.32
LT 116'00	m/1	1.55	1.34
LT 116'00	m/1	1.53	1.22
LT 239'98	m/1	1.55	1.39
Stromer	m/1	1.50	--
E-Bay	m/2	1.66	1.30
E-Bay	m/2	1.63	1.30
EF 107'05	m/2	1.51	1.49
EF 107'05	m/2	1.47	1.51
EF 107'05	m/2	1.49	1.38
EF 107'05	m/2	1.51	1.47
EF 107'05	m/2	1.57	1.50
EF 107'05	m/2	1.49	1.49
EF 107'94	m/2	1.63	1.47
EF 107'94	m/2	1.57	1.42
EF 107'94	m/2	1.51	1.42
EF 107'94	m/2	1.60	1.54
EF 36'98	m/2	1.47	1.36
EF 39'98	m/2	1.55	1.50
EF 41'98	m/2	1.45	1.44
EF 42'98	m/2	1.60	1.62
EF 44'98	m/2	1.59	1.51
EF 544'97	m/2	1.58	1.47
EF 546'97	m/2	1.51	1.50
EF 565'94	m/2	1.50	1.42
EF 61'93	m/2	1.49	1.37
EF 62'93	m/2	1.49	1.37
EF 93'94	m/2	1.66	1.61
EF 94'94	m/2	1.69	1.61
EF 98'94	m/2	1.64	1.42
EF 9'94	m/2	1.58	1.42
GT 18'94	m/2	1.47	--
GT 203'96	m/2	1.56	1.35
GT 203'96	m/2	1.49	1.41
GT 203'96	m/2	1.53	1.42
GT 3'00	m/2	1.64	1.55
GT 8'97	m/2	1.56	--
GT 8'97	m/2	1.65	--
GT 8'97	m/2	1.40	1.23
GT 8'97	m/2	1.44	--
LT 116'00	m/2	1.76	1.54
LT 534'96	m/2	1.55	1.42
LT 87'97	m/2	1.63	1.43
LT 87'97	m/2	1.30	1.26
LT 87'97	m/2	1.46	1.37
Stromer	m/2	1.60	1.20
E-Bay	m/3	1.33	1.18
EF 107'05	m/3	1.09	1.10
EF 107'05	m/3	1.49	1.37
EF 107'05	m/3	1.26	1.30
EF 107'05	m/3	1.06	1.13
EF 107'05	m/3	1.51	1.42
EF 107'05	m/3	1.40	1.36
EF 107'05	m/3	1.60	1.53
EF 107'05	m/3	1.47	1.47
EF 107'94	m/3	1.43	1.31
EF 107'94	m/3	1.52	1.28
EF 107'94	m/3	1.54	1.48
EF 107'94	m/3	1.63	1.52
EF 36'98	m/3	1.39	1.45
EF 44'98	m/3	1.44	1.40
EF 544'97	m/3	1.25	1.21
EF 546'97	m/3	1.15	1.20
EF 565'94	m/3	1.45	1.19
EF 93'94	m/3	1.67	1.60
EF 94'94	m/3	1.70	1.64
EF 9'94	m/3	1.34	1.26
EF 9'94	m/3	1.30	1.31
GT 3'00	m/3	1.25	--
GT 8'97	m/3	1.08	1.02
GT 8'97	m/3	1.16	--
LT 87'97	m/3	1.63	1.16

Appendix 6. (Continued)

LT 87'97	m/3	1.53	1.20
LT 87'97	m/3	1.57	1.24
Stromer	m/3	--	1.30
EF 102'94	M1/	1.37	1.43
EF 106'05	M1/	1.40	1.38
EF 106'05	M1/	1.42	1.22
EF 106'05	M1/	1.35	1.23
EF 106'05	M1/	1.28	1.19
EF 106'05	M1/	1.46	1.46
EF 106'05	M1/	1.45	1.37
EF 106'94	M1/	1.52	1.53
EF 106'94	M1/	1.50	1.57
EF 107'94	M1/	1.36	1.48
EF 107'94	M1/	1.32	1.40
EF 107'94	M1/	1.44	1.41
EF 107'94	M1/	1.41	1.55
EF 107'94	M1/	1.41	1.37
EF 107'94	M1/	1.37	1.37
EF 107'94	M1/	1.47	1.43
EF 281'01	M1/	1.33	1.56
EF 288'98	M1/	1.33	1.56
EF 288'98	M1/	1.41	1.59
EF 36'98	M1/	1.35	1.40
EF 37'98	M1/	1.44	1.59
EF 38'98	M1/	1.35	1.58
EF 565'94	M1/	1.44	1.42
EF 62'93	M1/	1.58	1.51
EF 62'93	M1/	1.49	1.44
EF 62'93	M1/	1.54	1.42
EF 62'93	M1/	1.52	1.48
EF 9'94	M1/	1.35	1.44
GT 18'94	M1/	1.36	1.31
GT 18'94	M1/	1.32	1.29
GT 18'94	M1/	1.42	1.44
GT 8'97	M1/	1.20	1.22
GT 8'97	M1/	1.32	1.23
LT 534'96	M1/	1.30	1.28
LT 534'96	M1/	1.46	1.51
LT 534'96	M1/	1.48	1.54
LT 87'97	M1/	1.30	1.35
LT 87'97	M1/	1.48	--
LT 87'97	M1/	1.36	1.37
E-Bay	M1/ or M2/	1.34	1.59
E-Bay	M1/ or M2/	1.37	1.49
EF 102'94	M2/	1.31	1.48
EF 106'05	M2/	1.38	1.60
EF 106'05	M2/	1.43	1.73
EF 106'05	M2/	1.56	1.72
EF 106'05	M2/	1.41	1.73
EF 106'05	M2/	1.30	1.46
EF 106'05	M2/	1.37	1.50
EF 106'05	M2/	1.42	1.63
EF 106'05	M2/	1.49	1.69
EF 107'94	M2/	1.33	1.58
EF 107'94	M2/	1.30	1.53
EF 107'94	M2/	1.49	1.57
EF 107'94	M2/	1.37	1.46
EF 107'94	M2/	1.32	1.55
EF 107'94	M2/	1.37	1.57
EF 107'94	M2/	1.50	1.55
EF 36'98	M2/	1.38	1.65
EF 36'98	M2/	1.45	1.69

EF 38'98	M2/	1.45	1.75
EF 565'94	M2/	1.34	1.58
EF 9'94	M2/	1.50	1.53
EF 9'94	M2/	1.45	1.58
GT 3'00	M2/	1.41	1.39
GT 3'00	M2/	1.37	1.46
GT 8'97	M2/	1.40	1.67
GT 8'97	M2/	1.44	1.45
GT 8'97	M2/	1.46	--
LT 87'97	M2/	1.66	1.72
LT 87'97	M2/	1.46	1.62
LT 87'97	M2/	1.41	1.64
LT 87'97	M2/	1.48	1.62
LT 87'97	M2/	1.42	1.58
EF 106'05	M3/	1.06	1.32
EF 106'05	M3/	1.13	1.30
EF 106'05	M3/	1.23	1.46
EF 106'05	M3/	1.30	1.47
EF 106'05	M3/	1.18	1.55
EF 106'05	M3/	1.20	1.39
EF 106'05	M3/	1.20	1.48
EF 107'94	M3/	1.30	1.57
EF 107'94	M3/	1.24	1.33
EF 107'94	M3/	1.24	1.42
EF 107'94	M3/	1.31	1.29
EF 36'98	M3/	1.28	--
EF 36'98	M3/	1.11	1.33
EF 36'98	M3/	1.13	--
EF 37'98	M3/	1.10	1.36
EF 9'94	M3/	1.29	1.36
EF 9'94	M3/	1.26	--
GT 18'94	M3/	1.00	1.18
GT 3'00	M3/	1.13	1.49
GT 8'97	M3/	1.07	1.17
GT 8'97	M3/	1.36	1.43
LT 534'96	M3/	1.18	--
LT 87'97	M3/	1.28	1.56
LT 87'97	M3/	1.23	1.51
LT 87'97	M3/	1.06	--
E-Bay	p/4	1.56	1.12
EF 107'05	p/4	1.48	1.03
EF 107'05	p/4	1.40	0.96
EF 107'05	p/4	1.30	0.95
EF 107'05	p/4	1.41	1.00
EF 107'05	p/4	1.30	1.07
EF 107'05	p/4	1.48	1.10
EF 107'05	p/4	1.37	1.00
EF 107'05	p/4	1.50	0.94
EF 107'94	p/4	1.38	1.16
EF 107'94	p/4	1.48	1.07
EF 107'94	p/4	1.44	1.12
EF 288'98	p/4	1.48	1.16
EF 36'98	p/4	1.47	1.17
EF 36'98	p/4	1.59	1.13
EF 36'98	p/4	1.37	0.91
EF 39'98	p/4	1.48	1.12
EF 41'98	p/4	1.53	1.15
EF 42'98	p/4	--	1.11
EF 544'97	p/4	1.43	1.02
EF 546'97	p/4	1.35	1.02
EF 565'94	p/4	1.43	1.09
EF 61'93	p/4	1.41	1.07

Appendix 6. (Continued)

EF 62'93	p/4	1.51	1.18
EF 62'93	p/4	1.68	1.24
EF 93'94	p/4	1.45	1.11
EF 94'94	p/4	1.43	1.11
EF 98'94	p/4	1.50	1.07
EF 98'94	p/4	1.50	1.07
EF 9'94	p/4	1.35	1.05
EF 9'94	p/4	1.52	1.12
EF 9'94	p/4	1.37	1.05
GT 203'96	p/4	1.41	1.06
GT 8'97	p/4	1.36	1.08
GT 8'97	p/4	1.41	1.01
GT 8'97	p/4	1.35	1.00
GT 8'97	p/4	1.43	0.99
GT 8'97	p/4	1.41	1.01
GT 8'97	p/4	1.51	1.01
GT 8'97	p/4	1.48	1.04
GT 8'97	p/4	--	1.04
LT 534'96	p/4	1.26	0.95
LT 534'96	p/4	1.40	1.00
LT 87'97	p/4	1.37	1.01
LT 87'97	p/4	1.42	1.01
LT 87'97	p/4	1.42	1.13
LT 87'97	p/4	1.39	1.06
LT 87'97	p/4	1.39	1.07
Stromer	p/4	1.50	1.10
E-Bay	P4/	1.13	1.30
EF 102'94	P4/	1.35	1.34
EF 106'05	P4/	1.30	1.39
EF 106'05	P4/	1.41	1.24
EF 106'05	P4/	1.34	1.37
EF 106'05	P4/	1.33	1.36
EF 106'05	P4/	1.30	1.48
EF 106'05	P4/	1.38	1.33
EF 106'05	P4/	1.38	1.36
EF 106'05	P4/	1.32	1.22
EF 106'94	P4/	1.39	1.35
EF 106'94	P4/	1.46	1.37
EF 107'94	P4/	1.32	1.29
EF 107'94	P4/	1.31	1.20

EF 107'94	P4/	1.28	1.21
EF 107'94	P4/	1.29	1.21
EF 107'94	P4/	1.29	1.34
EF 107'94	P4/	1.20	1.21
EF 107'94	P4/	1.30	1.24
EF 107'94	P4/	1.37	1.32
EF 107'94	P4/	1.38	1.38
EF 107'94	P4/	1.25	1.25
EF 281'01	P4/	1.26	1.29
EF 288'98	P4/	1.26	1.29
EF 288'98	P4/	1.35	1.31
EF 288'98	P4/	1.47	1.47
EF 36'98	P4/	1.24	0.98
EF 36'98	P4/	1.35	1.34
EF 36'98	P4/	--	1.41
EF 37'98	P4/	1.33	1.33
EF 38'98	P4/	1.35	1.40
EF 565'94	P4/	1.37	1.24
EF 62'93	P4/	1.47	1.30
EF 62'93	P4/	1.52	1.36
EF 9'94	P4/	1.45	1.32
GT 18'94	P4/	1.20	1.14
GT 18'94	P4/	1.49	1.39
GT 18'94	P4/	1.34	1.20
GT 203'96	P4/	1.41	1.49
GT 203'96	P4/	1.26	--
GT 3'00	P4/	1.21	1.11
GT 8'97	P4/	1.25	1.15
GT 8'97	P4/	1.49	--
LT 241'98	P4/	1.38	1.28
LT 241'98	P4/	1.34	1.34
LT 534'96	P4/	1.41	1.50
LT 534'96	P4/	1.32	1.41
LT 534'96	P4/	1.33	1.48
LT 534'96	P4/	1.40	1.51
LT 87'97	P4/	1.27	1.28
LT 87'97	P4/	1.38	1.34
LT 87'97	P4/	1.44	--
LT 87'97	P4/	1.23	1.27
LT 87'97	P4/	1.25	1.25

Appendix 7. Measurements (in mm) of the teeth of *Apodecter stromeri* from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
AM 22538	m/1	1.66	1.61
EF 05	m/1	1.80	1.00
EF 05	m/1	1.59	1.50
EF 05	m/1	1.77	1.55
EF 05	m/1	1.64	1.52
EF 05	m/1	1.80	1.65
EF 05	m/1	1.68	1.70
EF 05	m/1	1.69	1.37
EF 05	m/1	1.75	1.66
EF 05	m/1	1.86	1.68
EF 05	m/1	1.68	--
EF 108'05	m/1	1.80	1.00
EF 108'05	m/1	1.59	1.50
EF 108'05	m/1	1.72	1.55
EF 108'05	m/1	1.64	1.52
EF 108'05	m/1	1.80	1.65
EF 108'05	m/1	1.68	1.70
EF 108'05	m/1	1.69	1.37
EF 108'05	m/1	1.75	1.66
EF 108'05	m/1	1.86	1.68
EF 108'05	m/1	1.66	--
EF 108'94	m/1	1.76	1.45
EF 11'04	m/1	1.73	1.59
EF 156'01	m/1	1.82	1.64
EF 156'01	m/1	1.89	1.60
EF 156'01	m/1	1.81	1.63
EF 158'01	m/1	1.87	1.60
EF 158'01	m/1	1.80	1.70
EF 227'01	m/1	1.83	1.68
EF 227'01	m/1	1.76	1.68
EF 73'96	m/1	1.75	1.64
EF 74'98	m/1	1.64	1.47
EF 87'01	m/1	1.65	1.60
EF 87'01	m/1	1.64	1.56
EF 87'01	m/1	1.66	1.62
GT 7'97	m/1	1.86	1.55
LT 116'00	m/1	1.76	1.54
LT 88'97	m/1	1.74	1.62
AM 22538	m/2	1.55	1.52
EF 05	m/2	1.78	1.76
EF 05	m/2	1.70	1.47
EF 05	m/2	1.66	1.65
EF 05	m/2	1.96	1.82
EF 05	m/2	1.73	1.63
EF 05	m/2	1.96	1.81
EF 05	m/2	1.80	1.62
EF 108'05	m/2	1.78	1.76
EF 108'05	m/2	1.70	1.47
EF 108'05	m/2	1.66	1.64
EF 108'05	m/2	1.96	1.82
EF 108'05	m/2	1.73	1.63
EF 108'05	m/2	1.96	1.81
EF 108'05	m/2	1.80	1.62
EF 108'94	m/2	1.72	1.70
EF 156'01	m/2	1.79	1.87
EF 156'01	m/2	1.87	1.87
EF 158'01	m/2	1.95	1.75
EF 158'01	m/2	1.85	1.92
EF 227'01	m/2	1.86	1.79
EF 227'01	m/2	1.80	1.71
EF 73'96	m/2	1.80	1.80
EF 87'01	m/2	2.07	1.85
EF 87'01	m/2	1.67	1.62
EF 87'01	m/2	1.74	1.72
EF 87'01	m/2	1.84	1.96
GT 9'97	m/2	1.78	1.73
LT 88'97	m/2	1.89	1.87
AM 22538	m/3	1.36	1.42
EF 05	m/3	1.78	1.62
EF 05	m/3	1.56	1.49
EF 05	m/3	1.56	1.67
EF 05	m/3	1.60	1.46
EF 05	m/3	1.64	1.58
EF 05	m/3	1.73	1.54
EF 05	m/3	1.62	1.40
EF 05	m/3	1.60	1.45
EF 05	m/3	1.56	1.40
EF 108'05	m/3	1.78	1.62
EF 108'05	m/3	1.56	1.44
EF 108'05	m/3	1.56	1.67
EF 108'05	m/3	1.60	1.46
EF 108'05	m/3	1.64	1.58
EF 108'05	m/3	1.73	1.54
EF 108'05	m/3	1.62	1.40
EF 108'05	m/3	1.60	1.45
EF 108'05	m/3	1.56	1.40
EF 108'94	m/3	1.64	1.33
EF 108'94	m/3	--	1.72
EF 158'01	m/3	1.63	1.43
EF 158'01	m/3	1.77	1.64
EF 73'96	m/3	1.66	1.53
EF 87'01	m/3	1.93	1.62
EF 87'01	m/3	1.50	1.54
GT 9'97	m/3	1.73	1.58
LT 240'98	m/3	1.82	1.62
EF 05	M1/	1.46	1.55
EF 05	M1/	1.56	1.90
EF 05	M1/	1.65	1.98
EF 05	M1/	1.54	1.92
EF 05	M1/	1.51	2.01
EF 05	M1/	1.52	1.86
EF 05	M1/	1.49	1.80
EF 05	M1/	1.57	1.90
EF 05	M1/	1.52	1.90
EF 05	M1/	1.59	1.88
EF 1'05	M1/	1.62	1.94
EF 1'05	M1/	1.60	1.91
EF 108'94	M1/	1.58	1.65
EF 108'94	M1/	1.68	1.81
EF 108'94	M1/	1.55	1.84
EF 109'05	M1/	1.46	1.55
EF 109'05	M1/	1.56	1.90
EF 109'05	M1/	1.65	1.98

Appendix 7. (Continued)

EF 109'05	M1/	1.54	1.92
EF 109'05	M1/	1.51	2.01
EF 109'05	M1/	1.52	1.86
EF 109'05	M1/	1.49	1.80
EF 109'05	M1/	1.57	1.90
EF 156'01	M1/	1.71	1.96
EF 158'01	M1/	1.71	1.84
EF 158'01	M1/	1.75	1.94
EF 158'01	M1/	1.67	1.81
EF 158'01	M1/	1.66	1.77
EF 158'01	M1/	1.76	1.99
EF 18'00	M1/	1.54	1.77
EF 227'01	M1/	1.59	2.00
EF 228'01	M1/	1.60	2.04
EF 246'01	M1/	1.60	1.94
EF 74'98	M1/	1.67	1.91
EF 74'98	M1/	1.68	1.95
GT 140'04	M1/	1.55	1.99
GT 155'04	M1/	1.59	2.06
GT 4'00	M1/	1.71	1.96
LT 242'98	M1/	1.70	2.15
LT 87'97	M1/	1.66	1.72
EF 05	M2/	1.35	1.63
EF 05	M2/	1.50	1.96
EF 05	M2/	1.64	2.07
EF 05	M2/	1.68	2.13
EF 1'05	M2/	1.66	1.85
EF 1'05	M2/	1.58	1.78
EF 108'94	M2/	1.67	1.83
EF 108'94	M2/	1.65	1.83
EF 108'94	M2/	1.73	1.97
EF 109'05	M2/	1.35	1.63
EF 109'05	M2/	1.50	1.96
EF 109'05	M2/	1.64	2.07
EF 109'05	M2/	1.68	2.13
EF 156'01	M2/	1.75	2.13
EF 158'01	M2/	1.61	2.04
EF 158'01	M2/	1.73	2.09
EF 158'01	M2/	1.79	2.08
EF 158'01	M2/	1.64	2.03
EF 158'01	M2/	1.57	2.13
EF 158'01	M2/	1.79	2.07
EF 158'01	M2/	1.79	2.16
EF 228'01	M2/	1.74	2.10
EF 246'01	M2/	1.62	2.19
GT 9'97	M2/	1.75	2.27
E-Bay	M2/?	1.68	--
EF 05	M3/	1.26	1.55
EF 05	M3/	1.39	1.59
EF 05	M3/	1.46	1.89
EF 05	M3/	1.24	1.42
EF 05	M3/	1.40	1.76
EF 05	M3/	1.56	1.83
EF 05	M3/	1.26	1.49
EF 05	M3/	1.26	1.49
EF 05	M3/	1.32	1.52
EF 05	M3/	1.41	1.57
EF 05	M3/	1.38	1.53
EF 05	M3/	1.42	1.70
EF 108'94	M3/	1.52	1.76
EF 109'05	M3/	1.26	1.55
EF 109'05	M3/	1.39	1.59

EF 109'05	M3/	1.46	1.89
EF 109'05	M3/	1.24	1.42
EF 109'05	M3/	1.40	1.76
EF 109'05	M3/	1.56	1.83
EF 109'05	M3/	1.26	1.49
EF 109'05	M3/	1.32	1.52
EF 109'05	M3/	1.41	1.57
EF 109'05	M3/	1.38	1.53
EF 109'05	M3/	1.42	1.70
EF 109'05	M3/	1.40	1.52
EF 158'01	M3/	1.39	1.65
EF 158'01	M3/	1.58	1.87
EF 18'00	M3/	1.35	1.70
EF 228'01	M3/	1.65	1.98
EF 246'01	M3/	1.44	1.97
EF 74'98	M3/	1.34	1.64
EF 05	p/4	1.55	1.28
EF 05	p/4	1.57	1.15
EF 05	p/4	1.59	1.26
EF 05	p/4	1.75	1.30
EF 05	p/4	1.46	1.16
EF 05	p/4	1.54	1.22
EF 05	p/4	1.53	1.16
EF 05	p/4	1.56	1.16
EF 05	p/4	1.59	1.20
EF 108'05	p/4	1.55	1.28
EF 108'05	p/4	1.57	1.15
EF 108'05	p/4	1.59	1.26
EF 108'05	p/4	1.75	1.30
EF 108'05	p/4	1.46	1.16
EF 108'05	p/4	1.54	1.22
EF 108'05	p/4	1.53	1.16
EF 108'05	p/4	1.56	1.16
EF 108'05	p/4	1.59	1.20
EF 11'04	p/4	1.53	1.17
EF 156'01	p/4	1.52	1.12
EF 156'01	p/4	1.61	1.14
EF 156'01	p/4	1.64	1.29
EF 158'01	p/4	1.62	1.29
EF 158'01	p/4	1.64	1.35
EF 158'01	p/4	1.54	1.14
EF 158'01	p/4	1.59	1.23
EF 158'01	p/4	1.64	1.32
EF 158'01	p/4	1.60	1.28
EF 158'01	p/4	1.70	1.36
EF 158'01	p/4	1.67	1.24
EF 18'00	p/4	1.59	1.13
EF 227'01	p/4	1.59	1.34
EF 227'01	p/4	1.53	1.29
EF 73'96	p/4	1.62	1.28
EF 87'01	p/4	1.68	1.31
EF 87'01	p/4	1.67	1.28
EF 87'01	p/4	1.53	1.31
GT 7'97	p/4	1.78	1.33
EF 05	P4/	1.44	1.36
EF 05	P4/	1.48	1.58
EF 05	P4/	1.38	1.69
EF 05	P4/	1.48	1.63
EF 05	P4/	1.57	1.66
EF 1'05	P4/	1.57	1.82
EF 1'05	P4/	1.46	1.61
EF 109'05	P4/	1.44	1.36

Appendix 7. (Continued)

EF 109'05	P4/	1.48	1.58
EF 109'05	P4/	1.38	1.69
EF 109'05	P4/	1.48	1.63
EF 109'05	P4/	1.57	1.66
EF 109'05	P4/	1.52	1.90
EF 109'05	P4/	1.59	1.88
EF 156'01	P4/	1.65	1.67
EF 158'01	P4/	1.49	1.60
EF 158'01	P4/	1.61	1.74
EF 158'01	P4/	1.54	1.84
EF 158'01	P4/	1.58	1.77
EF 18'00	P4/	1.56	1.59
EF 227'01	P4/	1.59	1.84
EF 227'01	P4/	1.65	1.92
EF 228'01	P4/	1.65	1.91
EF 246'01	P4/	1.46	1.65
EF 74'98	P4/	1.47	1.61
EF 74'98	P4/	1.55	1.72
GT 140'04	P4/	1.53	1.80
GT 9'97	P4/	1.42	1.66
LT 241'98	P4/	1.52	1.65

Appendix 8. Measurements (in mm) of the teeth of *Neosciuromys africanus* from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
Borhloch	dM4/	3.20	2.50
EF 56'93	i/1	3.50	2.20
GT 100'96	i/1	2.50	3.10
GT 31'06	i/1	2.60	2.70
LT 1'05	i/1	2.20	3.10
LT 131'03	i/1	2.30	3.00
LT 57'03	i/1	2.24	3.00
EF 166'01	m/1	3.68	3.44
EF 56'93	m/1	3.61	3.65
EF 56'93	m/1	3.70	3.48
GT 100'96	m/1	3.90	3.8
GT 141'04b	m/1	4.20	3.76
GT 153'04	m/1	4.02	3.47
GT 154'04b	m/1	3.75	3.52
GT 154'04c	m/1	4.31	3.71
GT 154'04d	m/1	3.96	3.18
GT 17'00	m/1	4.10	3.50
GT 18'00	m/1	3.80	3.30
GT 26'05	m/1	3.75	3.40
GT 31'06	m/1	4.10	3.49
GT 95'96	m/1	3.97	3.60
LT 1'05	m/1	4.02	3.77
LT 11'00	m/1	3.90	3.30
LT 11'00	m/1	4.10	3.50
LT 131'03	m/1	4.25	3.90
LT 1926.19	m/1	3.96	3.74
LT 1926.504	m/1	3.92	3.59
LT 259'03	m/1	4.09	3.65
LT 38'06 left	m/1	3.96	--
LT 38'06 right	m/1	3.88	3.92
LT 40'04	m/1	3.52	3.82
LT 90'97	m/1	3.87	4.08
LT PQN 26	m/1	3.57	3.90
EF 166'01	m/2	4.10	4.05
EF 56'93	m/2	4.45	4.07
EF 56'93	m/2	4.37	4.19
EF 56'93	m/2	4.71	4.46
EF 56'93	m/2	4.67	4.55
FS 25'93	m/2	4.72	4.50
FS 25'93	m/2	4.72	4.50
GT 100'96	m/2	4.63	4.30
GT 141'04b	m/2	4.55	4.57
GT 154'04a	m/2	4.90	4.39
GT 154'04b	m/2	4.92	4.45
GT 154'04c	m/2	4.94	3.71
GT 154'04d	m/2	4.57	3.95
GT 17'00	m/2	4.85	4.20
GT 31'06	m/2	4.41	4.19
LT 1'05	m/2	4.54	4.10
LT 131'03	m/2	4.50	4.45
LT 169'04	m/2	4.75	4.45
LT 1926.19	m/2	4.61	4.47
LT 1926.504	m/2	4.39	4.26
LT 236'98	m/2	4.30	3.95
LT 38'06 right	m/2	4.76	4.38
LT 39'06	m/2	4.53	4.02
LT 40'04	m/2	4.10	5.14
LT 57'03	m/2	4.30	4.10
LT PQN 26	m/2	4.59	4.58
EF 166'01	m/3	4.58	3.76
EF 56'93	m/3	4.23	3.92
EF 56'93	m/3	4.42	4.16
EF 56'93	m/3	5.05	4.42
GT 100'96	m/3	5.50	4.15
GT 141'04b	m/3	4.18	4.43
GT 154'04a	m/3	5.00	4.10
GT 154'04b	m/3	5.19	4.20
GT 154'04c	m/3	--	4.29
GT 15'97	m/3	4.45	3.87
GT 31'06	m/3	4.84	3.72
LT 131'03	m/3	4.21	3.85
LT 38'06 right	m/3	4.22	3.91
LT 39'06	m/3	4.39	4.87
LT 57'03	m/3	4.36	3.70
LT PQN 26	m/3	5.45	4.51
EF 101'05	M1/	3.00	4.19
EF 104'05	M1/	2.8	3.83
EF 56'93	M1/	3.64	3.50
GT 117'04	M1/	3.58	4.57
GT 121'04	M1/	3.60	--
GT 141'04a	M1/	3.33	4.48
GT 151'04	M1/	3.71	3.92
GT 152'04	M1/	3.27	4.18
GT 152'04	M1/	4.35	4.03
GT 49'06	M1/	3.75	3.77

Appendix 8. (Continued)

GT 57'96	M1/	3.60	4.40
LT 139'96	M1/	3.53	4.85
LT 254'03	M1/	3.40	4.35
LT 38'06 left	M1/	4.15	4.85
LT 452'96	M1/	3.70	4.80
LT PQN 35	M1/	3.48	3.59
EF 56'93	M2/	3.90	5.20
GT 117'04	M2/	4.26	5.10
GT 141'04a	M2/	3.73	5.55
GT 152'04	M2/	3.78	4.86
GT 152'04	M2/	4.29	5.71
GT 152'04	M2/	4.34	4.70
GT 152'04	M2/	4.37	4.67
GT 23'94	M2/	4.25	4.06
GT 49'06	M2/	4.48	4.73
LT 139'96	M2/	4.04	5.53
LT 254'03	M2/	4.60	5.05
LT 452'96	M2/	4.10	5.10
LT PQN 35	M2/	4.15	4.56
EF 56'93	M3/	3.57	4.25
GT 141'04a	M3/	3.50	4.80
GT 152'04	M3/	4.29	4.22
GT 152'04	M3/	3.90	4.25
GT 61'96	M3/	4.26	5.37
LT 139'96	M3/	4.04	5.10
LT 452'96	M3/	4.20	4.80
EF 15'04	p/4	3.27	2.50
GT 100'96	p/4	3.70	3.00
GT 10'97	p/4	3.67	2.90
GT 141'04b	p/4	3.45	3.40
GT 153'04	p/4	3.66	2.79
GT 154'04a	p/4	3.60	3.01
GT 154'04b	p/4	2.88	3.24
GT 154'04c	p/4	3.77	3.44
GT 17'00	p/4	3.95	2.80
GT 95'96	p/4	3.60	2.90
LT 1'05	p/4	3.60	2.94
LT 1926.19	p/4	3.35	2.87
LT 1926.504	p/4	3.52	2.71
LT PQN 26	p/4	2.95	2.94
EF 101'05	P4/	2.83	3.46
EF 56'93	P4/	3.80	--
GT 117'04	P4/	3.17	3.58
GT 141'04a	P4/	2.78	3.6
GT 151'04	P4/	3.27	3.55
GT 152'04	P4/	2.94	3.59
LT 254'03	P4/	3.04	3.65
LT 260'03	P4/	3.00	3.40

Appendix 9. Measurements (in mm) of the teeth of *Neosciuromys fractus* from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
EF 142'01	i/1	1.40	1.92
EF 143'01	i/1	1.50	2.00
EF 3'97	i/1	1.90	--
EF 142'01	m/1	3.07	2.76
EF 143'01	m/1	3.14	2.75
EF 15'00	m/1	2.87	2.55
EF 15'04	m/1	3.40	2.93
EF 3'97	m/1	3.10	2.73
GT 154'04a	m/1	3.58	3.02
LT 38'06	m/1	3.88	3.92
EF 104'05	m/2	3.37	3.11
EF 142'01	m/2	3.07	3.15
EF 143'01	m/2	3.44	3.14
EF 15'00	m/2	3.05	3.01
EF 15'04	m/2	3.80	3.42
EF 3'97	m/2	3.95	3.30
LT 38'06	m/2	4.76	4.38
LT 38'06	m/2	4.53	4.02
EF 142'01	m/3	3.07	3.15
EF 15'04	m/3	3.98	3.39
LT 38'06	m/3	4.22	3.91
LT 38'06	m/3	4.39	4.87
AM 22539	M1/	3.05	3.34
EF 52'93	M1/	3.14	3.25
EF 52'93	M1/	3.25	3.43
EF 57'01	M1/	3.20	3.47
LT 38'06	M1/	4.15	4.85
EF 132'05	M2/	3.70	4.20
EF 57'01	M2/	3.60	4.14
EF 104'05	M3/	3.06	3.33
EF 132'05	M3/	3.22	3.38
GT 152'04	M3/	3.00	4.00
EF 142'01	p/4	3.07	2.13
EF 143'01	p/4	2.86	2.13
EF 143'01	p/4	2.93	2.09
EF 15'00	p/4	2.67	2.06
EF 3'97	p/4	2.80	2.15
AM 22539	P4/	2.77	2.71
EF 52'93	P4/	3.11	3.00
EF 52'93	P4/	3.21	3.14
EF 57'01	P4/	3.15	3.12
GT 49'06	P4/	3.36	3.21
LT 38'06 left	P4/	3.55	3.02
LT PQN 35	P4/	3.02	3.05

Appendix 10. Measurements (in mm) of the teeth of *Bathyergoides neotertiarius* from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
GT 126'04 right	i/1	4.20	4.80
GT 34'03	i/1	3.70	--
LT 10'00	i/1	5.40	4.55
LT 143'96	i/1	4.50	4.30
LT 200'98	i/1	4.50	3.90
LT 234'98	i/1	3.20	3.00
LT 237'98	i/1	3.50	3.20
LT 449'96	i/1	2.29	2.15
LT 56'03	i/1	2.62	2.45
GT 190'04	I1/	4.10	3.65
LT 200'98	I1/	4.40	4.00
LT 237'98	I1/	3.60	4.00
LT 39'04	I1/	4.50	5.10
LT 258'03a	M	5.08	4.00
LT 258'03b	m	3.85	3.70
GT 126'04 left	m/1	3.30	3.48
GT 126'04 right	m/1	3.48	3.70
LT 10'00	m/1	3.90	--
LT 106'03	m/1	3.00	3.10
LT 200'98	m/1	3.37	3.44
LT 44'01	m/1	3.58	3.25
LT 448'96	m/1	3.75	3.39
LT 46'01	m/1	3.94	3.60
LT 56'03	m/1	3.74	3.20
GT 126'04 left	m/2	3.85	3.29
GT 126'04 right	m/2	3.75	4.25
GT 157'04	m/2	3.74	3.67
GT 24'01	m/2	4.50	4.40
LT 10'00	m/2	4.20	3.95
LT 177'03	m/2	3.85	3.50
LT 200'98	m/2	4.10	4.08
LT 44'01	m/2	4.63	4.33
LT 46'01	m/2	4.25	3.80
LT 56'03	m/2	3.62	3.21
LT 90'97	m/2	4.00	4.30
GT 126'04 left	m/3	4.20	3.43
GT 126'04 right	m/3	3.80	3.83
GT 157'04	m/3	3.61	3.40
GT 24'01	m/3	4.30	3.85
LT 150'00	m/3	3.90	3.60
LT 156'96	m/3	4.38	3.77
LT 200'98	m/3	3.70	3.65
LT 235'98	m/3	3.70	3.70
LT 90'97	m/3	3.90	3.89
LT 91'97	m/3	4.07	3.75
GT 157'04	M1/	3.11	2.95
GT 190'04	M1/	3.30	3.82
LT 200'98	M1/	2.79	3.79
LT 35'06	M1/	3.11	4.38
EF 54'93	M2/	2.95	3.33
FS 30'93	M2/	3.37	3.98
FS 7'94	M2/	3.20	3.27
LT 181'96	M2/	3.00	4.20
LT 200'98	M2/	3.77	3.91
LT 35'06	M2/	3.47	4.25
EF 54'93	M3/	3.35	3.33
FS 25'93	M3/	3.40	3.98
FS 30'93a	M3/	3.20	3.27
GT 157'04	M3/	3.25	3.55
LT 200'98	M3/	2.91	2.85
GT 126'04 right	p/4	3.13	3.24
GT 157'04	p/4	3.32	3.27
LT 149'00	p/4	3.50	3.10
LT 200'98	p/4	3.08	2.88
LT 234'98	p/4	3.20	3.00
LT 448'96	p/4	3.23	2.87
LT 46'01	p/4	3.55	3.30
LT 56'03	p/4	3.28	2.68
LT 89'97	p/4	3.73	3.18
GT 157'04	P4/	3.09	2.48
GT 190'04	P4/	3.23	4.20
LT 200'98	P4/	2.88	3.15
LT 35'06	P4/	3.55	2.93

Appendix 11. Measurements (in mm) of the teeth of *Efeldomys loliae* gen. et sp. nov. from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
EF 169'01	dM4/	1.91	2.00
EF 272'01	i/1	2.10	2.20
EF 169'01	I1/	1.40	1.33
EF 181'01	I1/	2.20	2.30
EF 79'98	I1/	1.94	1.89
EF 12'04	m/1	1.77	1.96
EF 16'00	m/1	1.83	1.82
EF 79'98	m/1	1.64	1.83
EF 12'04	m/2	2.25	2.20
EF 16'00	m/2	2.17	2.30
EF 79'98	m/2	2.15	2.20
EF 113'05	m/3	1.84	1.54
EF 113'05	m/3	1.34	1.59
EF 12'04	m/3	1.64	1.52
EF 16'00	m/3	1.74	2.03
EF 79'98	m/3	1.93	1.68
EF 91'00	m/3	1.90	1.52
EF 79'98	M1/	1.55	1.85
EF 79'98	M1/	1.69	1.57
EF 229’01	M1/	1.58	1.88
EF 79'98	M2/	2.28	2.14
EF 79'98	M2/	2.17	1.87
EF 229’01	M2/	2.00	2.23
EF 112'05	M3/	1.47	1.63
EF 112'05	M3/	1.32	1.59
EF 112'05	M3/	1.25	1.56
EF 112'05	M3/	1.41	1.54
EF 79'98	M3/	1.54	1.55
EF 79'98	M3/	1.34	1.40
EF 229’01	M3/	1.69	1.90
EF 16'00	p/4	1.68	1.40
EF 79'98	p/4	1.61	1.55
LT 117'00	p/4	1.75	1.58
LT 91'97	p/4	1.60	1.49
EF 111'05	P4/	0.99	1.25
EF 111'05	P4/	1.11	1.36
EF 79'98	P4/	1.37	1.56
EF 79'98	P4/	1.49	1.43
EF 229’01	P4/	1.10	1.80

Appendix 12. Measurements (in mm) of the teeth of *Geofossor moralesi* sp. nov. from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
EF 120'05	m/1	1.32	1.51
EF 120'05	m/1	1.30	1.42
EF 120'05	m/1	1.34	1.65
EF 120'05	m/1	1.67	1.65
EF 120'05	m/1	1.52	1.28
EF 120'05	m/1	1.47	1.39
EF 120'05	m/1	1.50	1.63
EF 120'05	m/1	1.60	1.66
EF 120'05	m/1	1.53	1.33
EF 120'05	m/1	1.31	1.50
EF 120'05	m/1	1.67	1.59
EF 120'05	m/1	1.29	1.42
EF 120'05	m/1	1.49	1.40
EF 120'05	m/1	1.38	1.66
EF 120'05	m/1	1.45	1.55
EF 120'05	m/1	1.35	1.53
EF 120'05	m/1	1.34	1.54
EF 120'05	m/1	1.44	1.55
EF 120'05	m/1	1.12	1.32
EF 120'05	m/1	1.36	1.24
EF 120'05	m/1	1.23	1.22
EF 120'05	m/1	1 .00	1.20
EF 120'05	m/1	1.39	1.35
EF 120'05	m/1	1.17	1.34
EF 72'96	m/1	1.20	1.55
LT 91'97	m/1 or m/2	1.26	1.42
LT 91'97	m/1 or m/2	1.27	1.64
EF 120'05	m/2	1.27	1.53
EF 120'05	m/2	1.20	1.57
EF 226'01	m/2	1.44	1.47
EF 121'05	m/3	1.14	1.21
EF 121'05	m/3	1.18	1.26
EF 121'05	m/3	1.18	1.28
EF 121'05	m/3	1.08	1.28
EF 121'05	m/3	1.00	1.20
EF 121'05	m/3	1.46	1.60
EF 121'05	m/3	1.34	1.56
EF 121'05	m/3	1.18	1.34
EF 121'05	m/3	1.34	1.49
EF 121'05	m/3	1.09	1.28
EF 121'05	m/3	1.07	1.21
EF 121'05	m/3	1.12	1.32
EF 226'01	m/3	1.09	1.25
EF 226'01	m/3	1.34	1.53
GT 11'97	m/3	1.36	1.48
EF 226'01	M1/	1.31	1.52
LT 238'98	M1/ or M2/	1.29	1.65
LT 91'97	M1/ or M2/	1.38	1.80
EF 117'05	M1+2/	1.08	1.48
EF 117'05	M1+2/	1.14	1.63
EF 117'05	M1+2/	1.28	1.69
EF 117'05	M1+2/	1.28	1.61
EF 117'05	M1+2/	1.31	1.66
EF 117'05	M1+2/	1.25	1.48
EF 117'05	M1+2/	1.22	1.64
EF 117'05	M1+2/	1.21	1.70
EF 117'05	M1+2/	1.10	1.45
EF 117'05	M1+2/	1.05	1.40
EF 117'05	M1+2/	1.16	1.58
EF 117'05	M1+2/	1.34	1.62
EF 117'05	M1+2/	1.16	1.45
EF 117'05	M1+2/	1.20	1.42
EF 117'05	M1+2/	1.20	1.46
EF 117'05	M1+2/	1.15	1.44
EF 117'05	M1+2/	1.10	1.63
EF 117'05	M1+2/	1.02	1.42
EF 117'05	M1+2/	1.10	1.53
EF 118'05	M3/	1.25	1.21
EF 118'05	M3/	1.02	1.38
EF 118'05	M3/	1.17	1.67
EF 118'05	M3/	1.20	1.64
EF 118'05	M3/	1.19	1.70
EF 118'05	M3/	1.08	1.47
EF 119'05	p/4	1.44	1.43
EF 119'05	p/4	1.46	1.40
EF 119'05	p/4	1.45	1.35
EF 119'05	p/4	1.47	1.47
EF 119'05	p/4	1.55	1.44
EF 119'05	p/4	1.46	1.33
EF 119'05	p/4	1.50	1.37
EF 119'05	p/4	1.60	1.50
EF 119'05	p/4	1.57	1.4
EF 130'05	p/4	1.38	1.16
GT 11'97	p/4	1.46	1.56
LT 117'00	p/4	1.75	1.58
LT 91'97	p/4	1.47	1.50
EF 116'05	P4/	1.04	1.43
EF 116'05	P4/	1.25	1.68
EF 116'05	P4/	1.10	1.53
EF 116'05	P4/	1.00	1.49
EF 19'00	P4/	0.89	1.25
EF 72'96	P4/	1.22	1.05

Appendix 13. Measurements (in mm) of the teeth of *Microfossor biradiculatus* gen. nov. sp. nov. from the Northern Sperrgebiet, Namibia.

Catalogue N°	Tooth	Length	Breadth
EF 128'05	m/1	1.25	1.14
EF 128'05	m/1	1.16	1.12
EF 128'05	m/1	1.24	1.14
EF 129'05	m/2	0.90	1.07
EF 129'05	m/2	0.82	1.07
EF 129'05	m/2	0.93	1.09
EF 122'05	m/2	0.88	0.81
EF 123'05	m/2	0.80	0.74
EF 131'05	M1/	0.82	1.03
EF 131'05	M1/	0.80	1.12
EF 131'05	M1/	0.76	1.15
EF 131'05	M1/	0.83	1.07
EF 19'00	M2/	0.89	1.25
EF 126'05	M2/	0.82	1.05
EF 127'05	p/4	0.93	0.68
EF 127'05	p/4	0.98	0.80
EF 127'05	p/4	0.94	0.81
EF 127'05	p/4	1.12	0.92
EF 72'96	P4/	1.22	1.05
EF 125'05	P4/	0.78	0.94
EF 125'05	P4/	0.81	1.10