CHAPTER 18

CRYPTOMYS NATALENSIS (ROBERTS) 1913

The so-called Natal mole-rat Cryptomys natalensis, was first described as a species by Roberts (1913, 94) based on a series of 11 skins. The type specimen was collected at Wakkerstroom (near the Transvaal-Natal border) in December 1912.

On the average this species is slightly darker in colour than C. holosericeus, while there is little difference in average size. In contrast, however, it differs from C. holosericeus as far as the number of mammae are concerned: in C. holosericeus the inguinal mammae are present, while in C. natalensis the inguinal mammae are constantly absent.

C. natalensis occurs in the vicinity of the Rand and Pretoria (as far north as Nylstroom, and as far west as Rustenburg), ranging eastwards to Wakkerstroom (the type locality) and further south-eastwards into the uplands of Natal eventually reaching the coastal areas to the north and south of Durban.

Roberts (1951, 394) has split the species natalensis into eight subspecies, but the present author fails to see the necessity of this procedure, as will be indicated below. As far as the present work is concerned, this species is regarded as monotypic.

Apart from the nominate race, C. natalensis natalensis, the following described forms are treated as subspecies by Roberts: C. n. langi, C.n. aberrans, C.n. junodi, C.n. streeteri, C.n. jamesoni, C.n. arenarius and C.n. mahali. In addition to these

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subspecies which are regarded as synonyms in the present work, - with the exception of C.n. streeteri (which I interpret as a form of Cryptomys komatiensis)- it is proposed to include the species C. anomalus and C. montanus as well as the subspecies C. komatiensis zuluensis as synonyms under C.natalensis as well.

Cryptomys natalensis (Roberts)

Georychus natalensis Roberts, Ann. Transv. Mus., 4: 94, 1913. Type locality: Wakkerstroom, Transvaal.

Georychus jamesoni Roberts, Ann. Transv. Mus., 4: 95, 1913. Type locality: Houghton, Johannesburg, Transvaal.

Georychus arenarius Roberts, Ann. Transv. Mus., 4: 96, 1913. Type locality: Rietondale, Pretoria, Transvaal.

Georychus anomalus Roberts, Ann. Transv. Mus., 4: 96, 1913. Type locality: Skinner's Court Valley, Pretoria, Transvaal.

Georychus aberrans Roberts, Ann. Transv. Mus., 4: 97, 1913. Type locality: Port St. Johns, Cape Province.

Georychus mahali Roberts, Ann. Transv. Mus., 4: 108, 1913. Type locality: Rosslyn, Pretoria, Transvaal.

Cryptomys montanus Roberts, Ann. Transv. Mus., 11: 260, 1926. Type locality: Klapperkop, Pretoria, Transvaal.

Cryptomys junodi Roberts, Ann. Transv. Mus., 11: 260 1926. Type locality: Masiyeni, north of the mouth of the Limpopo river, Mocambique.

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Cryptomys langi Roberts, Ann. Transv. Mus., 13: 119, 1929. Type locality: Karkloof, Howick district, Natal.

Cryptomys komatiensis zuluensis Roberts, in 'The Mammals of South Africa', p. 396, 1951. Type locality: Lake St. Lucia, Natal.

Type specimen:

Housed in the Transvaal Museum, Pretoria, old ♀, collected 10.12.1912 at Wakkerstroom, Transvaal.

Type locality:

Wakkerstroom, Transvaal.

Distribution: (Fig. 18.1).

C. natalensis is found in western Transvaal (e.g. at Potchefstroom, Koster and Rustenburg), ranging eastwards to Johannesburg and northwards to Pretoria. To the north of Pretoria it occurs at Nylstroom, while eastwards from Pretoria it occurs at Bronkhorstspruit, Witbank and intervening districts eventually reaching the escarpment at Wakkerstroom. From here it spreads northwards to a point south of Carolina and eastwards to Swaziland as well as southwards into Natal including the north and south coast areas. Its southernmost point of distribution along the coast of the Indian ocean is Port St. Johns in the Cape Province, while its known northernmost limit along the coast seems to be in the vicinity of Masiyeni, a little to the north of the mouth of the Limpopo river.

Diagnostic characters:

A large species, H.B. M = 143 mm., C.B. M = 34.8 mm., (♂♂) i.e. about the size of C. holosericeus, but differing in colour (i.e. being darker and not as buffy as C. holosericeus). Furthermore, it differs

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from holosericeus in the absence of the inguinal mammae.

Colour:

The colour can be described as a dirtyish dark slaty grey which tends to be richer in colour on the dorsal aspect compared to the ventral surface. The colour in the two sexes appear to be alike, although Roberts (1951, 394) found the ♀♀ to be darker than the ♂♂ in C. natalensis aberrans (Port St. Johns) and C.n. langi (Karkloof, Howick district).

As in all other species of Cryptomys, the young specimens are darker than the adults.

On the whole, the colour is relatively uniform in all specimens of this species. With certain exceptions, there is little evidence of a marked degree of geographical variation in colour. As an example, specimens collected at different localities in the Swaziland areas are decidedly darker than specimens from Wakkerstroom, while specimens from Masiyeni have a definite warmer and lighter colour.

As a rule, a white frontal or occipital patch is absent in all individuals of this species.

Size: Adult ♂♂:

H.B. 125-177 mm., M = 143 mm.
T. 17-29 mm., M = 21 mm., (14.6% of H.B.)
H.F. 20-32 mm., M = 25 mm., (17% of H.B.)
C.B. 30.4-38.1 mm., M = 34.8 mm.
B.C. 13.2-17.0 mm., M = 15.0 mm., (43.1% of C.B.)
I.W. 6.8-8.1 mm., M = 7.4 mm., (21.2% of C.B.)
Z.W. 21.5-28.5 mm., M = 24.7 mm., (70.9% of C.B.)
M.W. 6.1-8.3 mm., M = 6.9 mm., (19.8% of C.B.)
U.T.R. 5.1-7.0 mm., M = 5.7 mm., (16.3% of C.B.)
L.J. 20.4-26.1 mm., M = 23.1 mm., (66.3% of C.B.)
L.T.R. 5.0-7.1 mm., M = 5.9 mm., (16.9% of C.B.)

Adult /...

Adults ♀♀:

H.B. 125-174 mm., M = 141 mm.

T. 17-29 mm., M = 21 mm., (14.8% of H.B.)

H.F. 20-30 mm., M = 24 mm., (17.0% of H.B.)

C.B. 30.1-39.0 mm., M = 33.6 mm.

B.C. 13.2-18.8 mm., M = 15.0 mm., (44.6% of C.B.)

I.W. 6.4-8.0 mm., M = 7.3 mm., (21.7% of C.B.)

Z.W. 21.5-28.6 mm., M = 24.0 mm., (71.4% of C.B.)

M.W. 5.9-8.5 mm., M = 6.4 mm., (19.0% of C.B.)

U.T.R. 5.1-7.1 mm., M = 5.6 mm., (16.6% of C.B.)

L.J. 20.3-26.3 mm., M = 22.2 mm., (66.0% of C.B.)

L.T.R. 5.0-7.1 mm., M = 5.8 mm., (17.2% of C.B.)

Although not phenotypically evident directly, sexual dimorphism is apparent when subjecting the figures given above to statistical manipulation. As an example, the C.B. lengths may be quoted: when the ♂♂ (M= 34.8 $\pm$ 1.700 mm.) are compared to the ♀♀ (M = 33.6 $\pm$ 1.526 mm.), the ♂♂ are very significantly larger than the ♀♀ at the 0.1% level (t = 8.5, 219 degrees of freedom, P= 0.001).

Skull and dentition:

The skull is large and robust, while the incisors tend to curve more sharply downwards than in C. holosericeus or C. hottentotus. In some cases, the zygomata tend to bow downwards to a level below the level of the palatines, anterior to the molars. As far as the structure of the nasals are concerned, a great deal of morphological variation is seen, indicating that the nasals can not be used as a diagnostic criterium.

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Apart from the incisors which tend to bow downwards more sharply, very little diagnostic features are offered by the structure and arrangement of the teeth.

Discussion:

The systematics of C. natalensis presents an extremely confusing picture when the available literature is consulted. As was indicated in the synonymy list, the following forms were all originally described as species by Roberts: 'Georychus' natalensis, 'Georychus' aberrans, 'Georychus' jamesoni, 'Georychus' arenarius, 'Georychus' mahali, 'Georychus' anomalus, Cryptomys montanus, C. junodi and C. langi, while a subspecies of C. natalensis was described as C.n.streeteri. In 1951, Roberts (pp. 394, 395) demoted the specific status of langi, aberrans, junodi, jamesoni, arenarius and mahali to subspecific rank under the nominate race of C. natalensis. This resulted in the C. natalensis group being regarded as polytypic with eight subspecies (i.e. C.n.natalensis, C.n.langi, C.n.aberrans, C.n.junodi, C.n.streeteri, C.n.jamesoni, C.n. arenarius and C.n.mahali with Wakkerstroom, Karkloof, Port St. Johns, Masiyeni, Hektorspruit, Houghton Estate, Rietondale and Rosslyn as the respective type localities).

The specimens were originally described as separate species, based mainly on difference in the colour of the pelage as well as craniological differences (e.g. the structure of the nasals, mandible and the curvature of the incisors.)

On the other hand, one has the opinion of Ellerman et.al. (1953, 234, 235) concerning C. natalensis to consider as well. These authors

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placed the originally described species (i.e. natalensis, aberrans, anomalus, mahali, junodi and langi) as subspecies of Cryptomys holosericeus, while the originally described species of jamesoni, arenarius and montanus were placed as synonyms under Cryptomys hottentotus jamesoni of their Cryptomys hottentotus group. It must be pointed out however, that montanus was placed in synonymy tentatively (Ellerman et.al. 1953, 233).

Roberts' procedure, in demoting the specimens from specific rank (as originally interpreted by him) to subspecific rank, was significant indicating that Roberts eventually (in 1951) doubted the validity of the specific status originally accorded to the specimens.

When Roberts' 1951 treatment of the C. natalensis species is compared to that proposed by Ellerman et.al. in 1953, it becomes evident that Roberts may be nearer to the correct interpretation of the facts. This statement rests on the following considerations:

1. To my mind, the genus Cryptomys has been grossly overlumped by Ellerman et.al., resulting in too simple a picture of the genus in Southern Africa. I fail to see why only two species (i.e. C. hottentotus and C. holosericeus) are worthy of specific recognition, especially if such well marked species as C. damarensis and C. darlingi occur. These, and other species, are all placed as races under either hottentotus or holosericeus by Ellerman et.al. Roberts has accepted the occurrence of a greater number of species, which seems to be a truer representation

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of the facts.

2. C. natalensis, C. aberrans, C. anomalus, C. mahali, C. junodi and C. langi constantly possess two pairs of mammae (i.e. 2 pairs of pectoral), while C. holosericeus constantly shows 3 pairs of mammae (2 pairs pectoral, 1 pair inguinal). If these forms are now placed as races under C. holosericeus (as was proposed by Ellerman et.al.) one encounters the situation that some races have four mammae while others have six. The constant absence of inguinal mammae in natalensis (in contrast to the constant presence of inguinal mammae in holosericeus) has prompted me to retain C. natalensis as a separate species of holosericeus. In this case, Robert's treatment of C. natalensis (i.e. retaining it as a species) seems preferable and I have followed this interpretation.

3. Similarly, the species C. jamesoni, arenarius and montanus do not have the inguinal mammae. If they are placed as synonyms under C. hottentotus (as has been proposed by Ellerman et.al.), then once again one has the situation that the species hottentotus constantly shows the inguinal mammae, but that suddenly, within its range of distribution, certain populations from certain localities possess no inguinal mammae. In view of the fact that the inguinal mammae are absent in jamesoni, arenarius and montanus, it is more acceptable to group them under natalensis where this pair of mammae is also constantly absent. This has been done by Roberts (1951, 395) and I am inclined to adhere to this interpretation.

In the present work, it is proposed to go one step further in the direction indicated by Roberts

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(1951, 394, 395) with regard to the subspecific status. As far as I am concerned, it is felt that there seems to be little reason for accepting Roberts' subspecific rankings, that they are not to be accepted as valid, and that C. natalensis should be interpreted as a variable, monotypic species (See fig. 18.2). Furthermore, the species known as C. anomalus from Skinner's Court Valley, Pretoria, and C. montanus from Klapperkop, Pretoria, are also considered as representatives of C. natalensis in the present work. The way Ellerman et.al. have interpreted the latter two species has already been indicated above, while Roberts (1951, 395, 397) has retained them as separate species. In order to justify the proposed procedure followed in the present work, a more detailed discussion of the facts will be given below.

Cryptomys natalensis was described as a separate species by Roberts (1913, 94) from material collected at Wakkerstroom in December 1912. It differed from C. holosericeus mainly in its slightly darker colouration, in the absence of inguinal mammae as well as having the incisors more sharply curved downwards (Roberts, 1951, 394). In the original description, the nasals were described as "... pointed at the back, widest at about two-thirds of the length from the front and with the foremost third produced straight forward to the tip or with a very slight broadening at the tip."

It must be emphasised however, that even in the series from which the type specimen was selected, a degree of variation in the structure of the nasals can be demonstrated - the nasals being

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either straight forward at the tip, or they can also show a slight broadening at the tip. This again demonstrates my contention that little diagnostic value can be attached to the nasals in view of the great amount of individual variation which is encountered.

Following the description of 'Georychus' natalensis, Roberts (1913, 95) described 'Georychus' jamesoni on three specimens taken at Houghton Estate, Johannesburg in July 1907. It was described as being very similar to natalensis, although being somewhat smaller in size while the mammae also consisted of two pectoral pairs only. Roberts pointed to some differences pertaining to the nasals however, and described them as being ".... intermediate in shape between natalensis and arenarius". In the latter, the nasals were described as narrow, being only slightly broadened at about the middle of their length ".... and posteriorly squared or at any rate not pointed ...." (Roberts, 1913, 96).

Since 1907, no other specimens from this type locality have been collected and the grand total still stands at the three original specimens. When these specimens are compared with specimens from Wakkerstroom, it becomes evident that one finds the identical nasal configuration, described for jamesoni, in specimens of natalensis from Wakkerstroom. In view of the fact that natalensis and jamesoni are virtually identical in colour and size (see Table 18.1, below), the present author has seen fit to synonymize the latter with the former. It is unfortunate that the samples available for comparison are too small for further statistical investigation.

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The distribution of jamesoni was given as the high-veld about Johannesburg and northwards to the hills above Pretoria (Roberts, 1951, 395) and all known specimens from Johannesburg were considered as representatives of jamesoni for comparative purposes in the Table below.

TABLE 18.1: A comparison of certain skull measurements in C.natalensis and C.n.jamesoni

	♂♂					♀♀				
	C.B.	I.W.	Z.W.	U.T.R.	L.J.	C.B.	I.W.	Z.W.	U.T.R.	L.J.
Wakkerstroom (C.natalensis)	M=36.4 mm. N = 4 (35.2 - 37.4 mm.)	M=7.8 mm. N = 4 (7.7 - 8.0 mm.)	M=26.2 mm. N = 4 (25.6 - 26.6 mm.)	M=5.7 mm. N = 2 (5.4 - 6.0 mm.)	M=24.1 mm. N = 4 (22.9 - 25.1 mm.)	M=36.3 mm. N = 2 (36.2 - 36.5 mm.)	M=7.7 mm. N = 3 (7.3 - 8.1 mm.)	M=25.9 mm. N = 3 (23.0 - 28.3 mm.)	M=5.7 mm. N = 3 (5.5 - 6.0 mm.)	M=23.0 mm. N = 3 (20.6 - 24.7 mm.)
Johannesburg (C.n.jamesoni)	M=34.9 mm. N = 4 (32.0 - 38.0 mm.)	M=7.8 mm. N = 5 (7.2 - 817 mm.) S.D. = 0.5523	M=24.2 mm. N = 4 (21.6 - 28.5 mm.)	M=6.2 mm. N = 3 (6.2)	M=23.2 mm. N = 5 (20.5 - 25.8 mm.) S.D. = 2.004	M=32.3 mm. N = 2 (29.9 - 34.8 mm.)	M=7.6 mm. N = 2 (7.1 - 8.1 mm.)	M=23.7 mm. N = 2 (20.5 - 26.9 mm.)	M=5.2 mm. N = 2 (5.0 - 6.0 mm.)	M=22.2 mm. N = 2 (20.1 - 24.4 mm.)

On comparing the mean values given above, it becomes clear that there is little difference in size between C. natalensis and C. jamesoni and I am convinced of the fact that the differences which exist (or come to the surface in Table 18.1) will be further diminished if more specimens become available for study. It is therefore felt that there is no justification for the retention of jamesoni, either as a species of subspecies.

In the same year, Roberts (1913, 96) also described a new species of mole-rat from Rietondale (East), Pretoria, which was named 'Georychus' arenarius. It was described as differing from 'G'. jamesoni in having narrow nasals, which were only slightly broadened at the middle of their length while "..... posteriorly they are squared or at any rate not pointed". The premaxilla is ".... produced straight back considerably beyond the back of the nasals in all specimens examined".

The type specimen was an old ♀, taken in March 1913, having a H.B. length of 145 mm., T = 20 mm. and H.F. = 25 mm., while it also showed the absence of the inguinal mammae. The corresponding measurements for the type of C. jamesoni were 135 mm., 15 mm. and 24 mm. respectively.

Some specimens of the type series were taken in white sandy soil and were rather lighter coloured than is the rule. Other specimens taken in red soil not far off, had the fur stained by the soil. To what extent the soil has staining capabilities on the fur of mole-rats is however not clear. One would rather be inclined to think that this was not so much

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a question of the fur being stained by the soil, rather than interpreting it as an example of adaptation of the animals to their environment.

In 1951, Roberts (p. 395) referred to 'G.' arenarius as the subspecies Cryptomys natalensis arenarius (Roberts) and described the specimens as typically rather paler in shade of colour than C.n.jamesoni. The nasals are straight-sided and that arenarius was on the average larger in size. It was stated furthermore, that arenarius was almost indistinguishable from jamesoni, ".... so that this name may have to be dropped". The present author is in full agreement with this verdict, and has therefore synonymized arenarius with jamesoni which in turn does not warrant either specific or subspecific separation from Cryptomys natalensis.

In the same paper in which 'G.' natalensis, 'G'. jamesoni and 'G'.arenarius were described as new species, yet another new species named 'G'.aberrans was described by Roberts, based on specimens collected at Port St. Johns, Pondoland. This form was described as being quite different from all the preceding species, in having the nasals pointed at the back "..... swelling out broadly forwards, then tapering down to a very narrow neck, and finally swelling out again at the tip: the nasals measure 4.2 at the broadest part, 1.4 at the neck, and 2.6 at the tip." (Roberts, 1913, 97, 98). According to Roberts, this peculiarity is very pronounced and is quite distinct in a young adult and even in a very young specimen with only three visible molars.

The type specimen is a very old ♂, ex the collection of H.H. Swinny, and the type was taken in

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October, 1911. The H.B., T. and H.F. measurements are given as 159, 14 and 22 mm., respectively.

I am not entirely convinced that the pitcher-shaped nasals are to be found only in C.natalensis aberrans from Port St. Johns. On closer inspection, a similar nasal structure (to a greater or lesser extent, in any case), can be shown to be present in specimens from Arnhemburg, Carolina district (C. komatiensis), Wakkerstroom (type locality of C.natalensis), and Vryburg (C.holosericeus). It is thus felt that the pitcher-shaped nasals is not of important diagnostic value and certainly not of enough importance for the erection of a new species.

As far as colour is concerned, it is stated that C.n.aberrans corresponds in colour to C.n.langi (see below), which in turn is very similar in general appearance to C.n.natalensis (Roberts, 1951, 394). When the Port St. Johns specimens are compared with those collected at Wakkerstroom, it becomes evident that there is a great degree of phenotypic correspondence. At both localities, white frontal or occipital patches are usually absent, while all specimens from these two localities have no inguinal mammae. Furthermore, in both natalensis from Wakkerstroom and aberrans from Port St. Johns, the zygomata bow downwards more, so that they lie below the level of the palate in front of the molars. A further cranial factor pointing to the actual similarity between natalensis and aberrans is found in the projection of the upper incisors, the index angle of which is not more than 105 in both natalensis and aberrans (Roberts, 1951, 394). Finally, it may be

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pointed out that Roberts found the ♂♂ of aberrans (as in C.n.langi) to be lighter coloured compared to the darker coloured ♀♀.

As is so often the case, the number of available specimens from a certain locality is too small for statistical analysis. This also concerns the number of specimens from Port St. Johns. Although I can thus offer no statistical parameters to strengthen my arguments, it seems fairly certain that C.natalensis aberrans (Roberts) is not specifically or even subspecifically distinct from C.natalensis (Roberts) when external features (e.g. size, colour) and craniological characters (e.g. size, shape of nasals, structure of zygomata etc.) are taken into consideration.

The species, 'G'. mahali was also first named and described by Roberts in 1913 (1913 a, 108), from Rosslyn, some five miles north-west of Pretoria North. According to Roberts (op.cit.) the species was first discovered at Bleskop, a small native village seven miles east of Rustenburg. Four specimens were taken, of which two were kept alive but escaped one week later. Roberts stated this species to be very locally distributed, and that it was only observed at one other place along the railway line, namely at Rosslyn. At Rosslyn it was found to be very abundant, where five specimens were taken (two very young ones were kept alive, but also escaped subsequently.) The type specimen is an adult ♀ selected from the remaining three Rosslyn specimens.

This species was described as being similar to ".... the small reddish coloured species...." found to the east of the Drakensberg, but differed therefrom

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in being larger in size (Roberts, 1913, 108). The nasals were described as being so distinctly different from those of another larger species found at Rosslyn, that there was no doubt, according to Roberts, of their being a different species. This other large species referred to above, is evidently Cryptomys anomalus (to be discussed below).

The species taken at Rosslyn, appear to be referable to C. anomalus in all respects, but for the greater breadth of the nasals in one old ♀ (Roberts, 1913 a, 108).

As has been done so often in the present work, it must be emphasized again that there is a great degree of morphological variability present in the extent and size of craniological features found in different individuals, even coming from the same tunnel system. Roberts states that in C. anomalus the premaxilla does not extend beyond the back of the nasals in some cases: in the case of the old ♀, serving as an example of 'G'. mahali, the back of the nasals are squared and the premaxilla does not extend backwards either. In the two younger specimens, this is not the case i.e. the premaxillae extend slightly beyond the back of the nasals, and whether later development would have produced a similar configuration to that found in the old ♀, is, according to Roberts, open to question.

To the mind of the present author, it is clear that there seems to be no valid reason for accepting 'G'. mahali as a separate species or subspecies based on the broader nasals found in one single specimen only. The inguinal mammae are also

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lacking, as in all forms of natalensis and the subspecies C. natalensis mahali (as interpreted by Roberts, 1951, 395) is synonymized with the species Cryptomys natalensis in this work.

With the description of Cryptomys anomalus by Roberts (1913, 96) greater confusion concerning the taxonomy of Cryptomys in the vicinity of Pretoria was created. This form, originally described as a new subspecies (Roberts, 1913, 96), was described as a large form, with long and narrow nasals, about the same breadth throughout their length.

In 1951, Roberts (p. 395) described the colouration and size of anomalus as being "..... much as in the forms of C.natalensis, though tending to be greyer in adults, but much larger in size than jamesoni and arenarius occurring in the same neighbourhood, and larger also than mahali; the inguinal mammae absent; the nasals long and straight-sided as in arenarius". It is interesting to note that in the original description of the type specimen (a fairly old ♀, collected at Skinner's Court Valley, Pretoria on 23rd of February 1913) three pairs of mammae were noted - 1 in front, 2 at side = 6. The presence of a second lateral pair is probably abnormal. The measurements pertaining to the type were given as 140 mm., 21 mm. and 26 mm. for the H.B., T. and H.F. respectively.

In the same paper, Roberts (1913, 99) also described 'G'. pretoriae as a separate species, based on one single specimen, an adult (not old ♂) also collected at Skinner's Court Valley, Pretoria on the 19th of January, 1913. The H.B., T. and H.F.

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dimensions were given as 140 mm., 20 mm. and 24 mm. respectively. On comparison of these measurements with those given for anomalus (see above), it becomes evident that there is absolutely no valid reasons for accepting the species status of pretoriae. Roberts (1913, 99) stated that pretoriae was very similar to 'G'. talpoides (originally described as a subspecies of C. hottentotus by Thomas and Schwann from Knysna) but that it was much larger in size, with a stronger suffusion of sandy buff on the under surface, sides and cheeks. The fact that a talpoides-like form was found side-by-side with a grey coloured species would seem to show that it is distinct and not only a subspecies of C. hottentotus.

Roberts continues (1913, 99) to state that the fact that the darker coloured pretoriae species occurs in the open veld at Pretoria "... explodes the fallacy that the dark colouration is due to residence of the species in forested regions".

Although the original description of pretoriae referred to an adult, but not old ♂, this specimen was called an immature ♂ by Roberts in 1951 (p. 395). I have seen the type specimen and am satisfied that the specimen is in fact immature, which would possibly explain the darker colouration (which reminded Roberts of talpoides). In 1951, Roberts demoted the specific rank of pretoriae as a synonym under C. anomalus. This procedure is understandable and acceptable, for it is not clear why two species should occur in the identical habitat at Skinner's Court Valley in Pretoria.

In 1917, Roberts (1917, 5) described yet another species, 'G'. palki, based on a type specimen

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and a series of five younger specimens. The type was an old ♂, taken at Viljoenskroon on the banks of the Vaal river in the Potchefstroom district on March 24th, 1917, with H.B., T. and H.F. lengths of 150 mm., 22 mm. and 29 mm. respectively. Roberts described this species as being most closely allied to 'G'. anomalus in having long and narrow nasals with the same buffyish colouration. It differed from this species and other members of the group in having a distinct semi-circular notch in the upper anterior angle of the ocular area of the skull, which affected a thinning of the arch of the maxilla above the infraorbital foramen and opposite the infraorbital process. Furthermore, in two adult specimens the hindmost molar is very large, equal in dimension to the foremost tooth. In the type series, the only ♀ trapped was immature and the number of mammae could not be ascertained.

Roberts continues to state that besides these specimens two other animals were captured in another colony (probably in close vicinity where the type series was collected) which consisted of an adult ♀ and a young adult ♂, showing all the characteristics of 'G'. natalensis mihi (Roberts, 1917, 5) including the number of mammae (i.e. 2 pectoral pairs, without the inguinal pair). On closer inspection, it is clear, that we are dealing here with C. natalensis and in 1951 Roberts (395) synonymized 'G'. palki with C. anomalus.

It thus becomes evident that even on the specific level, C. anomalus was grossly oversplit in the past. In the present work, it is suggested that

C. anomalus should in turn be synonymized with C. natalensis.

When five ♂♂ from Skinner's Court Valley (anomalus) are compared to five ♂♂ from Rosslyn (mahali) in respect of C.B. length, no significant difference can be found ($t = 1.17$, $P = 0.3-0.2$, 8 degrees of freedom) at the 30-20% level ($M = 33.6 \pm 4.055$ mm. and $M = 35.3$ mm. ± 2.229 mm. for anomalus and mahali respectively). Similar comparisons pertaining to other skull measurements do not indicate any significant differences statistically speaking. This has led to the conclusion that C. anomalus is morphologically identical to C. mahali and C.arenarius and in view of the fact that the latter can not be distinguished from jamesoni which is virtually identical to C. natalensis, it follows that C. anomalus is to be regarded as a synonym of C. natalensis.

In all instances, a C.D. value far below 1.28 is attained, indicating not even a subspecific difference, let alone specific differences.

In 1926, Roberts (1926, 260) described yet another species from the vicinity of Pretoria. This was named Cryptomys montanus, the type specimen, an adult ♀, having been collected at Klapperkop, Pretoria. It was described as a small species, similar to C. transvaalensis (interpreted as a synonym of C. hottentotus in the present work) in colour and size, but differing therefrom in having no inguinal mammae "....in which respect it approaches C. arenarius ...., from which it differs again in its smaller dimensions." (Roberts, 1926, 260). It was stated to occur in the same ground as C. anomalus on the hills, amongst stones

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on the hillsides, or in the valleys, but does apparently not so frequently find its way amongst the yellow shale in which C. anomalus is reported to have been plentiful, while C. arenarius occurs more in a sand-belt running east and west between the Magaliesberg and Daspoort ranges.

On closer inspection, however, there seems to be little evidence pointing to the retention of C. montanus as a separate species. In 1951, Roberts (p. 397) described it as a dull coloured species, resembling C. natalensis jamesoni, which also occurs in the neighbourhood, while the mammae also lack the inguinal pair. Again it was stated to be consistently smaller in size. In the latter publication, the distribution was given as occurring in ".... stony ground, in the Fountains Valley, Pretoria", which incidentally is adjacent to the type locality viz. Klapperkop.

As far as size is concerned, eight ♂♂ from Fountains Valley have shown a mean C.B. length of 35.7 mm. (S.D. = 2.083 mm., min. - max. variation 33.6 - 39.2 mm.) which compares very favourably with 35.3 mm. (M) of five ♂♂ from Rosslyn (S.D. = 2.299 mm., min.-max. variation 32.7-37.5 mm.) In the material available to me for study, the ♂♂ therefore do not show a consistently smaller size. In a sample of five ♀♀ from Groenkloof (immediately below Klapperkop), the mean C.B. length obtained was 30.8 mm. (S.D. = 1.031 mm., min.-max. variation 29.7-32.5 mm.) and this compares favourably with a mean value of 33.2 mm. obtained from eight ♀♀ from Rietondale (S.D. = 1.224 mm., min.-max. variation 31.9-35.0 mm.).

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These figures, give a C.D. value of 1.06 which lies between 85-86% J.N.O. i.e. below the conventional level of 90% for subspecific difference. In view of these facts, I have seen fit to synonymize C. montanus under C. natalensis, especially when factors other than size, (e.g. general overall colouration and the number of mammae) are also taken into consideration.

In the same paper in which C. montanus was described, the species Cryptomys junodi was also described by Roberts (1926, 260). The type specimen was collected at Masiyeni, a little to the north of the mouth of the Limpopo river in Portuguese East Africa. It was described as a buffy coloured species, in that respect not distinguishable from C. aberrans of Pondoland, but being distinguishable in aspects relating to the skull. Compared to the Port St. Johns form, the nasals are less or not so pinched-in markedly near the apex while the overall impression created by the skull is that it is broader and more massive, the muzzle being longer as well. The nasals are broadest near the back, opposite the infraorbital foramina, narrowing thence forward to the tip (sometimes narrower subapically), while the back portion narrows rapidly to a blunt point. The posterior processes of the maxilla project about a millimetre behind the nasals but they do not converge and meet. The incisor teeth are larger and form a wider arch than in either aberrans or natalensis and the bullae are larger so that the mastoid width is greater.

The type specimen, an adult ♂, was trapped by van Dam on August 20th, 1924, with a series of about a dozen specimens showing uniformity.

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In 1951, Roberts (p. 395) described the distribution of the species as follows: "The coastal tract, from just north of the Limpopo River southwards, at least to Maputa, just south of the border of Portuguese South-East Africa".

If the type specimen is compared to specimens representing C. natalensis, it becomes obvious that there is no justification for the retention of junodi as either a separate species or even as a subspecies under C. natalensis. This becomes evident even when looking at the measurements given by Roberts comparing the type of aberrans with the type of junodi, as the following size measurements will indicate: H.B. aberrans, 150 mm., junodi 157 mm., Z.W. 28.0 mm., 30.2 mm., B.C. 14.7 mm., 14.5 mm., I.W. 7.6 mm., 6.9 mm., M.W. 8.7 mm., 8.7 mm., length of palate, 22.5 mm., 23.0 mm., U.T.R. 5.5 mm., 5.8 mm.

Cryptomys langi was described by Roberts from Karkloof, Howick district, Natal in 1929. This species was described as being very similar in general appearance to C. natalensis from Wakkerstroom, with the nasals having the same shape but differing from C. natalensis in having the upper incisors more forwardly projecting while the ♂♂ were lighter in colour and darker in the ♀♀. The overall colour for the ♂♂ was described as a general greyish-buffy, the underfur being pale slate grey with buffy tips, the head, top of feet and tail more buffy, while the underparts are more whitish. The ♀♀ are darker, the underfur slate grey with very little external buffy colouring, the top of the nose whitish, but the face

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much the same as the underparts of the body. The feet and tail were paler than in the ♂.

The young specimens are said to be darker than the adults while the young ♂♂ are lighter than adult ♀♀.

The skull resembles C. junodi to a great extent especially in respect of the projection of the incisors, the angle index of which is about 115-120 as against not more than 105 in natalensis and aberrans. The skull however is less massive in construction, the nasals more pointed posteriorly, the infraorbital foramina more perpendicular while the posterior border of the mandibular angle is more rounded than squared. In langi, as well as junodi the zygomata do not bow downwards to such a degree as in natalensis and aberrans i.e. they lie above the level of the palate in front of the molars. In junodi the palatine foramina lie further forward, their anterior ends in advance of a line drawn across the front of the zygomata, whereas in natalensis and langi they lie behind that line.

The distribution of langi was given as the middle districts of Natal about the Karkloof and Dargle areas.

When the C.B. length of a number of ♀♀ is considered (including specimens from the type locality, as well as surrounding districts, e.g. Dargle, Estcourt), M = 33.6 mm. which is exactly the value attained for the corresponding mean value in the case of C. anomalus from Skinner's Court, Pretoria. Similarly, ♂♂ from Pietermaritzburg give a mean value of 33.4 mm. which is exactly the mean

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derived for C. arenarius from Rietondale. These factors all therefore seem to point to the equivalence of C. langi with C. natalensis, and langi is therefore synonymised with natalensis in the present work.

Finally, the status of Cryptomys komatiensis zuluensis remains to be considered. It may have been Roberts' intention to publish a description of this subspecies before the publication of 'The Mammals of South Africa' in 1951. This was never done and the description as given in Roberts (1951) stands as being the original one (Editor's Footnote, Roberts, 1951, 396).

This mole-rat was interpreted as a subspecies of C. komatiensis, in colour like the typical form from the Carolina district, ".... but the muzzle and incisors are much broader and the molar teeth slightly larger, the nasal longer and broader" (Roberts, 1951, 396). The type is an adult ♀ from Lake St. Lucia with two pairs of pectoral and no inguinal mammae. Another specimen had been collected in the Mkuzi Game Reserve.

I feel however, that this mole-rat should rather be interpreted as a representative of C. natalensis. The various measurements given by Roberts (1951, 612) all point to the larger nature of the Zululand specimens, which indicate closer affinity to natalensis than to the smaller komatiensis (See Chapter 19). Furthermore, if these specimens are interpreted as being representatives of C. natalensis, they fit logically into the geographical distribution pattern of natalensis. Their resemblance to C. junodi (i.e. C. natalensis, occurring/...

occurring in the coastal tract from the Limpopo river southwards to Maputa, just south of the border of Mocambique) is great. As I see the picture, C. komatiensis does not occur to the east of the Lebombo mountain range. It is therefore tentatively proposed in this work, that C.k.zuluensis should be synonymised with C. natalensis.

Biological:

Aspects relating to the biology of C. natalensis are few and meagre. However, a number of tentative interpretations can be put forward.

The species occurs in widely diverging vegetational veldtypes. This is illustrated by the fact that they occur in a pure grassveld type near the escarpment at Wakkerstroom as well as in temperate and transitional forest and scrub types found in the uplands of Natal. The veld types in Swaziland, where C. natalensis has been collected can be described as a mountain sourveld while at Port St. Johns and Maputa they occur in coastal tropical forest types (= coastal forest thornveld). The highveld area, which includes false grassveld types also supports populations of this species, while north of the Magalies mountains (e.g. at Nylstroom) they are encountered in tropical bush and savannah veld types, often referred to as sour bushveld. In the western portions of Transvaal (e.g. at Potchefstroom), they occur in pure grassveld types (Cymbopogon-Themeda veld).

It is clear that there seems to be no definite correlation between the distribution of this species and the vegetation.

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As far as soil types are concerned, there is a greater degree of correlation evident. It seems as if they occur predominantly in undifferentiated fersialitic soils. Topographically, they range from sea level to areas 7,000' above sea level (e.g. near Wakkerstroom).

This species probably avoids drier and more arid areas. They occur plentifully in the Johannesburg-Pretoria district with an average rainfall figure of 24-32" per annum while Swaziland and Natal varies between 40-50" of rain per annum. The area near Port St. Johns receives as much as 60-70" per year, and yet this species is encountered. In a number of instances, additional information as to where specimens were trapped, can be derived from the labels attached to the specimens and often it is stated that they were collected near marshes or vlei's.

Information in connection with reproduction is also scattered. A gravid ♀ has been trapped in Pretoria during November, while pregnant ♀♀ were also trapped near Brooklyn (Pretoria) and Muckleneuk Hill (Pretoria) during February and April respectively, each containing one embryo only. Similarly a gravid ♀ was collected at Uitkomst near Krugersdorp during February. It would thus seem that pregnant ♀♀ are to be expected more frequently during the summer months indicating a certain periodicity during the year in terms of reproduction.

An adult ♀, trapped in Pretoria, weighed 121 gms.

Virtually nothing is known about the predators or parasites, or food preferences.

Phylogenetic/...

Phylogenetic:

Relationships of C. natalensis are not clear. Genetically speaking it may be reasonable to assume a greater affinity with C. komatiensis which also has two pairs of pectoral mammae only. This is in contrast to C. hottentotus or C. holosericeus where the inguinal mammae are also present. Its wide geographical distribution may also point to a certain degree of plasticity in its genotype, enhancing adaptive abilities for a greater spectrum of divergent ecological conditions.

List of localities:

Balgowan, 1 (NM), Benoni, 1 (TM), Bleskop, Rustenburg, 2 (TM), Blokspruit, Pretoria, 1 (TM), Boksburg, 4 (TM), Breyten, 1 (TM), Bronkhorstspruit, 7 (TM), Brooklyn, Pretoria, 31 (TM), Bulwer, 1 (NM), Dargle, 4 (TM), Dullstroom, 1 (TM), Durban, 2 (DM, NM), Elandsfontein, Pretoria, 2 (TM), Empangeni, 4 (NM), Esparanza, South Coast, 1 (NM), Estcourt, 2 (SA, NM), Fairfield, Rustenburg, 2 (TM), Forbes Reef, 7 (TM), Fountains, Pretoria, 6 (TM), Garstfontein, Pretoria, 2 (TM), Geelhoutkop, Nylstroom, 5 (TM), Groenkloof, Pretoria, 8 (TM), Hillcrest, 2 (AM), Hilton Road, 1 (TM), Hogsback, 3 (TM), Howick, 1 (SA), Ingwavuma, 4 (TM), Irene, 5 (TM), Johannesburg, 8 (SA, TM), Karkloof, 2 (TM), Kendal, 1 (SA), Knoppieslaagte, 1 (TM), Koedoespoort, Pretoria, 3 (TM), Koster, 3 (TM), Krugersdorp, 2 (TM), Malvern, 2 (TM), Manderston, 1 (NM), Maputa, 2 (TM), Masiyeni, 5 (TM), Mooivlei, Rustenburg, 4 (TM), Mountain View, Pretoria, 1 (TM), Mseleni, 3 (NM), Mungazi, 2 (TM, NM), Ngoya forest, 1 (TM), Nylstroom, 22 (TM), Pietermaritzburg, 40

(NM)/...

(NM), Port St. Johns, 2 (TM), Potchefstroom, 1 (TM), Randfontein, 2 (TM), Rietondale, Pretoria, 14 (TM), Rietspruit, Nylstroom, 1 (TM), Roodeplaat, Pretoria, 1 (TM), Rooi Krans, Rustenburg, 4 (TM), Rosslyn, Pretoria, 19 (TM), Skinner's Court, Pretoria, 15 (TM), Steynsdorp, 7 (TM), Ubombo, 1 (TM), Uitkomst, 1 (TM), Umhlati River, 2 (TM), Venterskroon, 7 (TM), Waterkloof, Pretoria, 5 (TM), Wakkerstroom, 7 (TM), Welgegund, Rustenburg, 1 (TM), Zwartkops, Pretoria, 9 (TM).