New distribution records for four mammal species, with notes on their taxonomy and ecology

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New distribution records for four small mammal species (*Georychus capensis*, *Galerella pulverulenta*, *Rhinolophus swinnyi* and *Amblysomus julianae*) are presented, along with relevant notes on the taxonomy, karyology and ecology of these species.

Keywords: distribution, taxonomy, Bathyergidae, Viverridae, Rhinolophidae, Chrysochloridae.

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Introduction

During the past two years, fieldwork undertaken by Transvaal Museum staff to augment cytotaxonomic research on small mammals resulted in the capture of four species at localities not previously documented in the literature. These new distribution records are noteworthy in that they either extend the known range(s) of the species considerably, or provide intermediate distributional links between known geographical isolates.

Details of the new distribution records, with attendant notes on the taxonomy and ecology of the species concerned, are presented below.

Methods

Terrestrial small mammals were captured with: "National Trap Co." squirrel traps (viverrids); Macabee mole-traps (bathyergids); and scissor (="S.J. Mole-traps") and guillotine traps (chrysochlorids). Bats were netted using standard micro-mistnets erected at appropriate sites where flight paths were suspected.

Chromosome analyses were performed using an *in vitro* bone marrow method modified from Green, Keogh, Gordon, Pinto & Hartwig (1980). Animals sacrificed were prepared as standard museum specimens, and accessioned into the Transvaal Museum (TM) mammal research collection.

Cranial measurements were taken with Tesa Digit-Cal II callipers. All statistical analyses were performed using either the NT-SYS (Rohlf 1986) or BIOSTAT (Pimentel & Smith 1986) software packages, on an Olivetti M24 microcomputer.

Unless otherwise stated, keys in Meester, Rautenbach, Dippenaar & Baker (1986) were used for identifying specimens.

Results and Discussion

(i) ***Georychus capensis*** (Pallas, 1778) — Cape mole-rat

This fossorial species is widespread in the southern Cape (Fig. 1a), with two geographically isolated populations in southwestern Natal and the Belfast-Ermelo districts of the southeastern Transvaal (De Graaff 1981). Roberts (1951) commented that *G. capensis* probably occurs throughout the moist, eastern Transvaal Highveld; however, no specimens have been collected in over 35 years, and all attempts to trace the original Transvaal population have proved unsuccessful.

In March 1988, a new population of *G. capensis* intermediate to the known Transvaal and Natal populations was discovered at Kastrol Nek (= farm Tafelkop; 27° 17′S; 30° 16′E), 13 km north-east of Wakkerstroom in the southeastern Transvaal (Fig. 1a). Four specimens

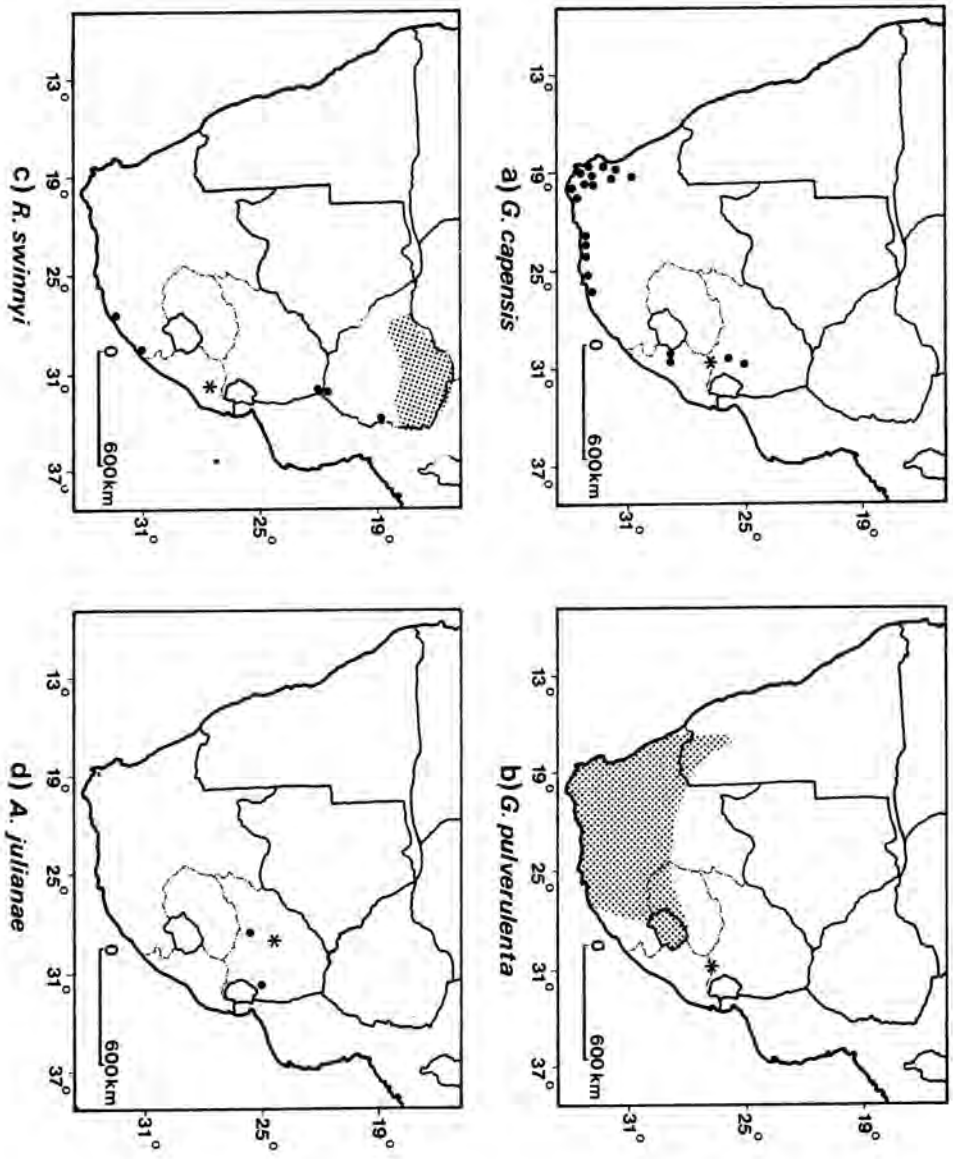

Fig. 1. Maps showing the distribution of (a) *Georychus capensis*, (b) *Galerella pulverulenta*, (c) *Rhinolophus swinnyi*, and (d) *Amblysomus julianae* in southern Africa. New distribution records are indicated by stars.

were subsequently collected in red clay and black "turf" soils amidst montane grassland ("Highland Sourveld" of Acocks (1975)) on the edge of a small vlei: two non-breeding females (TM41599 and TM41605); and two breeding males (TM39874 and TM39875), which apparently were the sole occupants of a common burrow system.

Identification of the specimens from Wakkerstroom was based not only on size, colouration and cranial morphology, but also on standard karyotypes (2N=54; NF=104) which agree with those reported for *G. capensis* by Nevo, Capanna, Corti, Jarvis & Hickman (1986). No marked morphological differences are evident between the Transvaal specimens (which Roberts (1913) assigned to the subspecies *G. c. yatesi*) and topotypical *G. capensis*, suggesting that subspecific distinction between these forms is unwarranted (De Graaff 1981). Preliminary cytogenetic analyses, however, have indicated that *G. capensis* from Nottingham Road in Natal and from the Cape are divergent allozymically with a Nei's distance of 0,47 (Nevo, Ben-Shlomo, Beiles, Jarvis & Hickman 1987) — a value found by Thorpe (1982) to usually indicate specific distinctness. Honeycutt, Edwards, Nelson & Nevo (1987) have further shown that Natal and Cape *Georychus* differ in mtDNA sequence by an average of 12 %, which approximates the divergence found between the genera *Heliophobius* and *Georychus*. These results suggest that taxonomic distinction, probably at the species level, between Cape and Natal/Transvaal *Georychus* may indeed be justified. However, larger sample sizes and investigation of intermediate populations is needed before the possibility of there being more than one species of *Georychus* in South Africa can be resolved (Honeycutt *et al.* 1987). Tissues collected from the Wakkerstroom *G. capensis* are currently being used in electrophoretic and mtDNA sequence studies addressing this question in greater detail (R. Honeycutt, *in litt.*)

Based on mound characteristics, *G. capensis* is relatively uncommon in the Wakkerstroom district, whereas the common mole-rat *Cryptomys hottentotus* (Lesson, 1826) and the Hottentot golden mole *Amblysomus hottentotus* (A. Smith, 1829) are exceptionally abundant. The dense nature of the grassland, coupled with the ubiquity of mounds made by the latter species, makes detection of *G. capensis* tunnel systems a difficult task, which perhaps explains why so few specimens have been collected in the eastern Highveld in the past.

This new distribution record for *G. capensis* lends support to Roberts's (1951) prediction that this species probably occurs throughout "most of the eastern Highveld and even the uplands of Natal", but at the same time suggest that it is relatively uncommon in the region, occurring only at low population densities.

(ii) ***Galerella pulverulenta*** (Wagner, 1839) — Small grey mongoose.

The small grey mongoose is widely distributed in the Cape and Orange Free State, with a marginal extension into north-western Natal (Giants Castle and Royal Natal National Park districts) via Lesotho (Pringle 1977; Rowe-Rowe 1978). No previous records of occurrence in the Transvaal exist.

An adult female *G. pulverulenta* in non-breeding condition (TM40611) was captured in *Leucosidea sericea* ("Ouhout"; South African National Tree List No. 145) scrub at Kastrol Nek (see above) near Wakkerstroom (Fig. 1b) in January 1990. Based on colour (which is paler than in topotypical specimens), size, cranial characteristics and distribution, the specimen was assigned to the taxon *G. p. basutica* Roberts, 1936.

This new distribution record extends the known range of *G. pulverulenta* in eastern South Africa from Lesotho and north-western

Natal to the south-eastern Transvaal, a distance of ca. 200 km northwards. Farmers and local populace questioned were aware of the existence of the small grey mongoose "further south, in Natal", but had never seen this species in the Wakkerstroom district, suggesting that it is rare and seldom encountered. As Roberts (1951) collected extensively in the vicinity of Wakkerstroom but never recorded this species, it is tempting to speculate that the actual range of *G. pulverulenta* is expanding, with the arrival of the first specimens in the Wakkerstroom district during the past few decades. It also seems likely that *G. pulverulenta* occurs throughout the Highland Sourveld along the escarpment between the known Transvaal and Lesotho-Natal populations, albeit at low population densities. Obviously, more data are necessary to confirm these predictions.

(iii) ***Rhinolophus swinnyi*** Gough, 1908 —Swinny's horseshoe bat.

This small rhinolophid species is known from only scattered localities in central and southern Africa. In South Africa, it has been recorded from only Port St. Johns and King William's Town in the eastern Cape, and Pafuri in the northern Kruger National Park (Rautenbach & Espie 1982; Smithers 1983).

In March 1988, a male *R. swinnyi* (TM39848) was captured in a micro-mistnet above a stream in Afro-montane *Podocarpus* mist forest at Ngome Forest Reserve (27° 50′S; 31° 24′E), 70 km north-east of Vryheid in Natal (Fig. 1c). Identification of the specimen was based primarily on cranial and noseleaf features, and on a standard karyotype (2N=58) which agrees with that reported for *R. swinnyi* by Rautenbach (1986). The fur of this specimen, however, was "lightish" basally as in *R. denti* Thomas, 1904, instead of unicoloured as in *R. swinnyi*. This discrepancy reflects the poor state of current taxonomic knowledge regarding these two species, which are so similar in size, external and cranial morphology, and echolocation characteristics (Rautenbach 1986) that only subspecific distinction between them may be warranted. An electrophoretic study addressing the systematics of southern African Rhinolophidae, and the specific status of *R. denti* and *R. swinnyi* in particular, is currently being undertaken by I. L. Rautenbach at the Transvaal Museum.

The Ngome locality provides an intermediate distributional link between the known eastern Cape and northern Transvaal/Zimbabwe populations of *R. swinnyi* (Fig. 1c). Rautenbach & Espie (1982) suggested that *R. swinnyi* is a permanent resident of the eastern Transvaal lowveld, and it seems likely that more extensive sampling at other forests and bushveld areas intermediate to the known localities will provide additional records linking these populations.

(iv) ***Amblysomus julianae*** Meester, 1972 — Juliana's golden mole.

(a) Distribution and ecology

Amblysomus julianae is an uncommon subterrestrial species endemic to the Transvaal, with only two populations recorded previously (Fig. 1d): one in The Willows and Shere districts of eastern Pretoria (25° 46′S; 28° 20′E); and the other in the Numbi Gate, Pretoriuskop and Matjulwana districts (25° 10′S; 30° 14′E) of the south-western Kruger National Park (Meester *et al.* 1986; Pienaar, Joubert, Hall-Martin, De Graaff & Rautenbach 1987). So little is known about this secretive species that its conservation status is listed as "Indeterminate" in the most recent IUCN Red Data Book on South African Terrestrial Mammals (Smithers 1986).

In 1974 a golden mole collected at Nylsvley Provincial Nature Reserve (24° 29′S; 28° 42′E; Fig. 1d) in the northern Transvaal was accessioned into the Transvaal Museum mammal collection with the identification

Amblysomus hottentotus (A. Smith, 1829)". This identification remained unquestioned until recently, when re-examination of the specimen (TM27407) suggested that the species concerned is not *A. hottentotus*, but *A. julianae* instead. This was subsequently confirmed when another *A. julianae* specimen (TM41422) was captured at Nylsvley PNR in December 1989. Identification of the Nylsvley specimens was based on size, pelage colour, karyology and the multivariate analysis of cranial features (see below). The Nylsvley *A. julianae* specimens resemble those from Pretoria more closely than those from Kruger National Park, in being cinnamon-buff in colour (instead of darkish brown) and not having a small third lower molar (which is present in Kruger National Park (KNP) specimens).

At Nylsvley PNR, *A. julianae* is uncommon, and appears to be confined to colluvial sands (Mossdale and Maputa series - see Frost, 1987) derived from Waterberg sandstones of Quaternary origin. While Jacobsen (1977) recorded the presence of golden moles in most of the drier *Burkea* savanna types at Nylsvley, during December 1989 sub-surface burrows of *A. julianae* were found only in a small area comprising *Tristachya rehmanni* — *Digitaria monodactyla* savanna and subclimax grassland (formerly agricultural

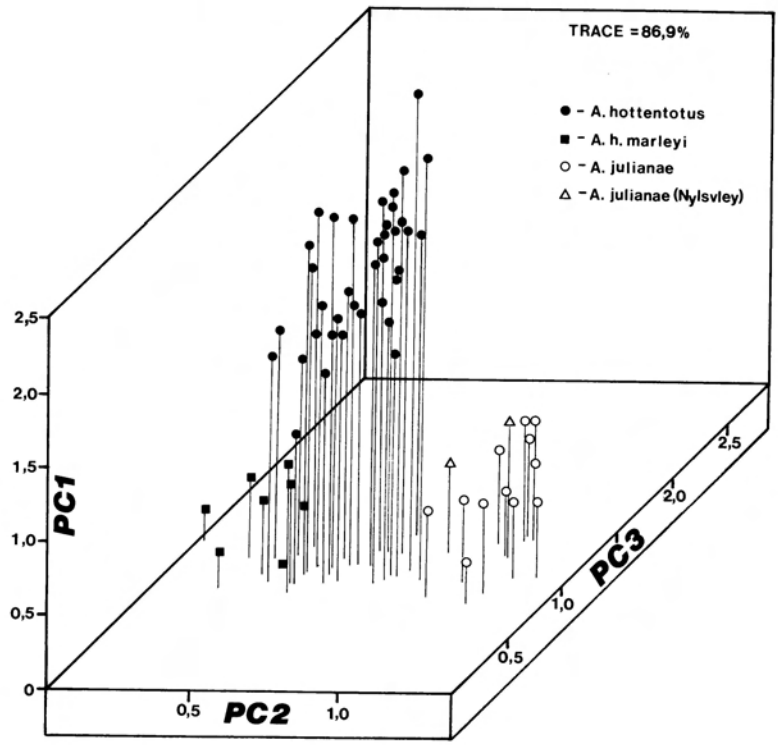

Fig. 2. Plot of the first three principal components derived from standardised cranial measurements for selected *Amblysomus julianae*, *A. hottentotus hottentotus* and *A. h. marleyi*. The cophenetic correlation is 0.974.

lands) along the eastern border of the floodplain. Penetration into adjoining *Eragrostis pallens — Setaria perennis* variation of *Burkea* savanna was only marginal (<100 m). Old, disused tunnels were also found in recently burned *T. rehmanni - D. monodactyla* savanna along the southern border of the floodplain, suggesting that *A. julianae* occurred more widely on the reserve in the past, and that this species is highly sensitive to habitat disturbance.

The population of *A. julianae* at Nylsvley PNR is only the third recorded to date, and extends the known range of this species by ca. 125 km northwards. The Nylsvley population occurs in vegetation categorised by Acocks (1975) as "Mixed Bushveld", whereas the Pretoria population subsists in a "Bankenveld - Bushveld" transition zone, and the KNP population has been recorded from only the "Lowveld Sour Bushveld of Pretoriuskop" landscape (see Gertenbach 1983). At all of these localities, the soils are loose sands or sandy loams. These observations indicate that *A. julianae* is a bushveld-savanna species restricted to sandy areas, and that it does not penetrate into more mesic grassland areas on clay soils (such as in the eastern Highveld) where *A. hottentotus* occurs. It seems likely that *A. julianae* occurs at many other localities in Transvaal bushveld, as predicted by Meester (1972).

(b) Taxonomy and karyology

The original description of *A. julianae* was based on univariate and bivariate statistical evaluation of only a few cranial characters, and the distinctness of this species from *A. hottentotus* — in particular *A. h. marleyi* Roberts, 1931 — has been questioned by some workers, including Meester (*pers. comm.*) himself. Preliminary multivariate analyses performed as part of a systematic revision of the Chrysochloridae currently under way (G. Bronner, *in prep.*), confirm the specific distinctness of *A. julianae*. A plot of the first three principal components derived from 31 standardised cranial measurements scored for 14 *A. julianae*, eight *A. h. marleyi*, and 50 *A. h. hottentotus* originating from the Transvaal shows a clear separation between *A. julianae* and *A. hottentotus* along both the first (size) and second (shape) principal components (Fig. 2), indicating fundamental morphological (and thus presumedly, genetic) divergence between these taxa.

Karyotypic differences between these species also exist: *A. julianae* from all three known localities have a karyotype characterised by 2N=30 (n=11), whereas all *A. h. hottentotus* from the Transvaal karyotyped (n=9) to date have either 2N=34 or 2N=36 (Bronner & Rautenbach, *in prep.*). While *A. julianae* is not karyotypically distinguishable from *A. h. marleyi* (2N=30, n=1), the *A. julianae* and *A. h. marleyi* clusters in Figure 2 are well separated along the second (shape) principal component, suggesting that these taxa are not as closely related as Meester (1972) postulated. The karyotypic variation recorded within *A. hottentotus* (2N=30;34;36) indicates either chromosomal polymorphism in this species, or that cryptic species are involved. Morphometric data support the latter possibility, but until more karyotypic and electrophoretic data have been included in analyses, this issue cannot be fully resolved.

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