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NOTES ON THE OCCURRENCE OF RODENTS IN SOUTH AFRICAN NATIONAL PARKS

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Abstract – The object of a national park is mentioned and it is emphasized that considerable ecological data are available for the larger mammals. The important role that smaller mammals (especially rodents) play in such areas is of importance for conservation and management policies. The physical features of existing national parks are tabulated, followed by a resumé of genera and species which occur. Of the 35 genera and 63 species occurring in South Africa and South West Africa, some 17 genera (48,5 per cent) and 24 species (38,0 per cent) do not occur in any national park. A brief outline is given of technical data which have to be amassed in order to assess the importance of rodents in ecosystems of national parks.

Introduction

In the Republic of South Africa, the law relating to national parks and matters incidental thereto was promulgated in Act No. 42 of 1962. The object of a park " . . . is the preservation and study therein of wild animal and plant life and of objects of geological, archaeological, historical, ethnological and other scientific interest and the benefit and enjoyment of visitors to the park".

In national parks attention tends to have been focussed on the large mammals and birds, although the smaller mammals (including the bats, insectivores, rodents and lagomorphs) are obviously important in the energy flow of any ecosystem. Neglect of them results partly from the fact that they are often inconspicuous and much information is still required before conservation management policies for parks can be made complete.

The European exploration of South Africa marked the beginning of systematic recording of its fauna and flora, resulting in the descriptions of the vast array of genera and species. This process also occurred elsewhere in Africa and resulted in a situation by the mid-1950's when frequently little more was known of the fauna of a particular area than the names of

the more obvious species that lived within it (Delany 1972). However, since 1950, the rodents of South Africa have been studied in a more ecological sense, especially those species with relevance to agriculture and health (see *inter alia* Davis 1953a, 1953b, 1964). This approach resulted in more detailed information on the taxonomy (Davis 1962, 1965), ecology (Pienaar 1964) and behaviour (Brooks 1972; Davis 1972) of different rodent species.

Material and Methods

The data presented in this paper were amassed from:

(i) a literature survey (Coetzee 1963; Pienaar 1964; Meester, Davis and Coetzee 1964; de Graaff and Nel 1965, 1970; Nel and Nolte 1965; Nel and Pretorius 1971; Rautenbach 1971);
(ii) distribution records in the Transvaal Museum, Pretoria; and
(iii) based on trapping records and field work in certain national parks.

National Parks of South Africa

Relevant information concerning national parks in South Africa is given in Table 1. The provinces of Transvaal and the Orange Free State have one national park respectively while all the other areas under control of the National Parks Board of Trustees lie within the confines of the Cape Province. There are no national parks *sensu strictu* in Natal or in South West Africa. The abbreviations used in the text are given in Table 1.

Results

In the Republic of South Africa and South West Africa the rodent fauna (inclusive of all rodents) shows a total of 35 genera and 63 species which may be encountered. A survey of the taxonomical diversity and distribution of rodents has been obtained by listing the number of genera and species recorded to date from the four provinces and South West Africa. As elsewhere, rodent populations are also subjected to a diversity of vegetation, climate and altitude. This diversity is exemplified by the situation in the Transvaal, the Cape Province and South West Africa in contrast to the more homogeneous conditions encountered in the Orange Free State. Thirty-five genera occur in the Republic and South West Africa. The Transvaal, the Cape Province and South West Africa each harbours 82,8 per cent, the Orange Free State 54,2 per cent and Natal, 65,7 per cent. Similarly, on species level, the Transvaal has some 61,9 per cent, Orange Free State 39,6 per cent, Natal 47,6 per cent, the Cape Province 71,4 per cent and South West Africa some 60,3 per cent of the known species.

Table 1

National Parks of South Africa

Park	Province and locus	Date of proclamation	Area km^2	Vegetation Type (according to Acocks 1953)	Range of annual rainfall (mm)	Altitude (m)
Kruger National Park (KNP)	Transvaal (22°25′ – 25°31′S, 30°50′ – 32°02′E)	31.5.26	19 084	(a) Lowveld and arid lowveld in the south. (b) mopani veld in the north	508–762 254–508	0–600
Kalahari Gemsbok National Park (KGNP)	Cape (24°25′, 26°29′S, 20°00′, 21°00′E)	17.6.31	9 490	Kalahari Thornveld and Shrub Bushveld	127–381	0–600
Addo Elephant National Park (AENP)	Cape (33°30′S, 25°45′E)	17.6.31	75	Karroo & Karroid Bushveld	508–762	0–600
Bontebok National Park (BNP)	Cape (34°02′, 20°25′E)	17.6.31	28	Coastal Rhenosterbushveld	254–508	0–600
Mountain Zebra National Park (MZNP)	Cape (32°15′S, 25°40′E)	2.7.37	66	(a) *Danthonia* – Mountain veld replaced by (b) Karroo and Karroid *Danthonia* Mountain veld.	508–762	600–1200
Golden Gate Highlands National Park (GGHNP)	O.F.S. (28°25′S, 28°45′E)	13.9.63	43	(a) Highveld, and (b) *Themeda-Festuca* Alpine veld.	1016–1524	1800–2400
Tsitsikama Coastal and Forest National Parks (TC&FNP)	Cape (30°45′S, 22°21′E)	4.12.64	8	Knysna Forest	1016–1524	0–600
Augrabies Falls National Park (AFNP)	Cape (28°35′S, 20°25′E)	5.8.66	37	Orange River broken-veld	127–381	0–600

Table 2

Genera and species of rodents in South Africa

Region	No. of genera	No. of species	Area km2
Transvaal	29	39	287 170
Orange Free State	19	25	129 652
Natal	23	30	87 302
Cape Province	29	45	724 009
South West Africa	29	38	826 506
		Total	2 054 639

The following resumé takes into consideration all the South African genera and species of rodents indicating their presence or absence from particular national parks. This information is summarized in Table 3.

Table 3

The distribution of South African rodents in the existing National Parks

GENUS & SPECIES	NATIONAL PARKS							
	KGNP	AFNP	BNP	TC & FNP	AENP	MZNP	GGHNP	KNP
Order Rodentia								
Suborder Hystricomorpha								
Family Hystricidae								
Hystrix africae-australis Cape Porcupine	x	x	x	x	x	x	x	x
Family Thryonomidae								
Thryonomys swinderianus Cane Rat	–	–	–	–	–	–	–	x
Family Petromyidae								
Petromus typicus Dassie rat	–	x	–	–	–	–	–	–
Suborder Hystricomorpha *inc. sedis*								
Family Bathyergidae								
Bathyergus suillus Cape Dune Mole-rat	–	–	–	x	–	–	–	–
B. janetta Namaqua Dune Mole-rat	–	–	–	–	–	–	–	–
Georychus capensis Blesmol	–	–	–	x	–	–	–	–

Cryptomys hottentotus Common Mole-rat	x – x x x x x x
Suborder Sciuromorpha	
Family Sciuridae	
Paraxerus cepapi Bush Squirrel	– – – – – – – x
P. palliatus S.A. Red Squirrel	– – – – – – – –
Funisciurus congicus Western Striped Squirrel	– – – – – – – – –
Xerus inauris Cape Ground Squirrel	x x – – – x – –
X. princeps Kaokoveld Ground Squirrel	– – – – – – – –
Suborder Sciuromorpha *inc.sedis*	
Family Pedetidae	
Pedetes capensis Spring Hare	x x – – x x – x
Suborder Myomorpha	
Superfamily Muroidea	
Family Cricetinae	
Mystromys albicaudatus White-tailed Rat	– – – – – – – –
Subfamily Gerbillinae	
Gerbillurus vallinus Brush-tailed Gerbille	– – – – – – – –
G. paeba Lesser Gerbille	x – – x x – – –
G. tytonis Gerbille	– – – – – – – –
G. sp. aff.*paeba* Gerbille	– – – – – – – –
Tatera leucogaster Peters, Gerbille	x – – – – – – x
T. afra Cape Gerbille	– – – – – – – –
T. brantsi Brant's Gerbille	x x – – – – – –
Desmodillus auricularis Namaqua Gerbille	x x – – – x – –
Subfamily Cricetomyinae	
Saccostomys campestris Cape Pouched Mouse	x x x – x x – x
Cricetomys gambianus Giant Rat	– – – – – – – –
Subfamily Dendromurinae	
Dendromus mystacalis Lesser Climbing Mouse	x – – ? ? – – x
D. melanotis Grey Pygmy Tree Mouse	X – – ? ? – – X

D. nyikae Nyika Climbing Mouse	– – – – – – – – –
D. mesomelas Chestnut Climbing Mouse	– – – ? ? – x –
Malacothrix typica Large-eared Mouse	) x – – – – x –
Steatomys pratensis Fat Mouse	– – – – – – – – x
S. minutus Small Fat Mouse	– – – – – – – – –
S. krebsii Krebs's Fat Mouse	– – – – – – – – –
Subfamily Petromyscinae	
Petromyscus monticularis Berseba Rock Mouse	– – – – – – – – –
P. collinus Pygmy Rock Mouse	– – – – – – – – –
Subfamily Otomyinae	
Otomys laminatus Laminate Vlei Rat	– – – – – – – – –
O. saundersiae Saunders's Vlei Rat	– – – – – – – – –
O. irroratus Vlei Rat	– – ? x x – x x
O. angoniensis Angoni Vlei Rat	– – ? x x – x x
O. unisulcatus Bush Karoo Rat	– – – – x x – –
Parotomys brantsi Brant's Karoo Rat	x – – – – – – –
P. littledalei Littledale's Karoo Rat	– – – – – – – –
Family Muridae	
Subfamily Murinae	
Zelotomys woosnami Woosnam's Desert Rat	x – – – – – – –
Thamnomys (Grammomys) cometus Forest Mouse	– – – – – – – – –
T. (G.) dolichurus Forest Mouse	– – – ? ? – – x
Dasymys incomtus African Water Rat	– – – – – – – – x
Pelomys fallax Creek Rat	– – – – – – – – –
Aethomys (Michaëlamys) granti Grant's Rat	– – – – – – x – –
A. (M.) namaquensis Namaque Rock Mouse	– – – ? x x x x
A. (A.) chrysophilus Red Veld Rat	– – – – – – – – x
Thallomys paedulcus Tree Rat	x – – – – – – – x
Lemniscomys griselda Single Striped Grass Rat	– – – – – – – – –
Rhabdomys pumilio Striped Mouse	x x x x x x x –
Praomys (Mastomys) natalensis Multimammate Rat	– – – – x x x x
P. (M.) shortridgei Shortridge's Mouse	– – – – – – – –
P. (Myomyscus) verreauxi Verreaux's Rat	– – – – – – – –

Rattus norvegicus Brown Rat	– – – x – – – –
R. rattus Black Rat	– – – x x x x x
Mus musculus House Mouse	x x x – x – x x
Leggada minutoides Pygmy Mouse	x x – x x – x x
Acomys spinosissimus Common Spiny Mouse	– – – – – – – x
A. subspinosus Cape Spiny Mouse	– – – – – – – –
Superfamily Gliroidea	
Family Muscardinidae	
Graphiurus (G.) ocularis Black White Dormouse	– – ? – ? x – –
G. (Claviglis) platyops Rock Dormouse	– – – – – – – –
G. (C.) murinus Forest Dormouse	– – – – x x x x

Order Rodentia
Suborder Hystricomorpha
Family Hystricidae

The porcupine *Hystrix africae-australis* is ubiquitous in occurrence in South Africa and is consequently found in all national parks.

Family Thryonomyidae

The cane rat *Thryonomys swinderianus,* occurs mainly in the eastern parts of South Africa and is consequently found only in the KNP.

Family Petromyidae

The dassie rat *Petromus typicus,* is a species adapted to the drier and the more arid zones of the northwest Cape and South West Africa, but ranges inland along the Orange River, occurring in the AFNP only.

Suborder Hystricomorpha *inc. sedis*
Family Bathyergidae

In contrast to the families mentioned above, which are monotypic, four species of mole-rats are found in South Africa viz. the Cape dune mole-rat *Bathyergus suillus,* the Namaqua mole-rat *B. janetta,* the blesmol *Georychus capensis* and the common mole-rat *Cryptomys hottentotus.* Of these, the latter occurs in all parks, except at the AFNP. *Bathyergus suillus* and *Georychus capensis* are found only in TC & FNP and on account of their natural geographical distribution will not be encountered elsewhere. *Bathyergus janetta* is not found in any national park.

Suborder Sciuromorpha
Family Sciuridae

The squirrels have few representatives in the national parks. The bush squirrel *Paraxerus cepapi* occurs only in the KNP, while the Cape ground squirrel *Xerus inauris* occurs in the KGNP, AFNP and the MZNP. The remaining species, the South African red squirrel *Paraxerus palliatus,* western striped squirrel *Funisciurus congicus* and the Kaokoveld ground squirrel *X. princeps* all occur in areas where national parks have not been proclaimed.

Suborder Myomorpha
Superfamily Muroidea
Family Cricetidae
Subfamily Cricetinae

The white-tailed rat *Mystromys albicaudatus,* is an interesting species and is the only representative of this subfamily in South Africa. The species occurs in no national park, although it could possibly be expected to occur in the AENP and the GGHNP but surveys hitherto have failed to indicate their presence.

Subfamily Gerbillinae

The gerbils are represented by three genera and eight species in South Africa. Of these, four species (*Gerbillurus vallinus, G. tytonis, G.* sp. aff. *paeba* and *Tatera afra*) do not occur in any national park while the KGNP and the AFNP have four and three (possibly four) species respectively. *Tatera leucogaster* is encountered in the KNP as well as the KGNP.

Subfamily Cricetomyinae

The Cape pouched mouse *Saccostomys campestris,* has been collected in all national parks except at the TC & FNP and the GGHNP. The other member of the subfamily, the giant rat *Cricetomys gambianus,* is not encountered in any park.

Subfamily Dendromurinae

As in the case of the gerbil, some eight species of climbing, large-eared and fat mice occur in South Africa, of which three are absent from all parks (*Dendromus nyikae, Steatomys minutus* and *S. krebsii*). *D. mystacalis, D. melanotis* and *D. mesomelas* may yet be collected at the TC & FNP and at the AENP, and this also applies to *S. krebsii* at the BNP.

Subfamily Petromyscinae

The rock mice *Petromyscus monticularis* and *P. collinus,* are not encountered in any national park.

Subfamily Otomyinae

The vlei rats (a vernacular misnomer) are represented in South Africa by two genera viz. *Otomys* and *Parotomys*, the former having six species and the latter two species. Of the *Otomys* species, only *O. irroratus* (TC & FNP, AENP, GGHNP and KNP), *O. angoniensis* (KNP) and *O. unisulcatus* (AENP and MZNP) occur in national parks, while *O. laminatus, O. sloggetti* and *O. saundersiae* have not been recorded hitherto. As far as *Parotomys* is concerned, *P. brantsi* is known from the KGNP only while *P. littledalei* does not occur in any park.

Family Muridae
Subfamily Murinae

This large assemblage of rodents consists of 14 genera and 20 species in South Africa (including the introduced *Rattus* and *Mus*). Of these, four genera and five species (*Thamnomys (Grammomys) cometus, Pelomys fallax, Praomys (Mastomys) shortridgei, P. (M) verreauxi* and *Acomys subspinosus*) are not encountered in any national park.

Superfamily Gliroidea
Family Muscardinidae

The dormice are represented by one genus and three species in South Africa of which one species *Graphiurus (Claviglis) platyops* is not represented in the existing parks.

The resumé presented above, is of neccessity brief and more detail concerning the presence or absence of genera and species in the different national parks is given in Table 3.

Discussion

An interesting facet which emerges from the analysis presented above, is that 17 genera and 24 species (48,5 per cent and 38,0 per cent respectively) of the total number of genera and species resident in South Africa are not afforded protection on national level. These figures are fairly high and they should be borne in mind whenever new areas are investigated with an eye on eventual proclamation as new national parks in the future. These animals form as much part and parcel of the ecosystem as the larger mammals and birds.

Technical data on the rodents are meagre, but rodent populations encountered in our existing parks offer unique possibilities for basic and applied research. As is the case in many fields of enquiry, however, the number of interested scientists are limited and scattered throughout South Africa. It may be the nature of the material (repulsive to many persons, absence of an overall impact which this type of research has in comparison to, say, the larger and more conspicuous herbivores) has resulted in relatively superficial investigations hitherto.

The situation, however, is improving. Quite a number of projects, especially under the auspices of the Mammal Research Unit at the University of Pretoria, in conjunction with the National Parks Board are in progress, especially in the KGNP, the AENP, the MZNP and the GGHNP, where basic surveys and the population ecology of various species are investigated in finer detail. For instance, in the KGNP, this applies especially to the ground squirrel, the different species of gerbils and to *Parotomys*. These projects are long-term programmes covering the study of distribution, behaviour and reproduction.

Range conditions vary from park to park and season to season. It is to be stressed that hoofed animals are not the only animals utilizing an area for food consumption – the overall spectrum also includes insects, lagomorphs, rodents and birds, all competing for food. Therefor the role of rodents should also be considered when the carrying capacity of an area in evaluated.

The importance of rodents (in terms of density and biomass) in protected areas such as national parks has not yet been assessed in southern Africa. A good summary of information pertaining to the rest of Africa (especially tropical Africa) can be found in Delany (1972). In order to obtain such information, the following aspects have to be unravelled: studies of aggregations and home ranges, knowledge of the population structure which varies at different times of the year, food-requirements of the various species and habitat studies, data on predator-prey relationships and finally information of the reproductive biology of particular species. Reproductive biology is usually correlated with the condition of the urogenital tract (indicating periods of fecundity of males, the frequency and size of placental scars in females), correlation to climate and vegetation – in short, correlation to prevailing ecological conditions. This, in turn, implies a knowledge of the reproductive potential of the species, as well as the study of adaptation of the organism to its environment.

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