# *Gerbilliscus paeba* – Hairy-footed Gerbil


Tim Jackson

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|---|---|
| **Regional Red List status (2016)** | **Least Concern*** |
| National Red List status (2004) | Least Concern |
| Reasons for change | No change |
| Global Red List status (2016) | Least Concern |
| TOPS listing (NEMBA) (2007) | None |
| CITES listing | None |
| Endemic | No |

*Watch-list Data

*Gerbilliscus paeba* will exploit any opportunity for burrowing in consolidated soils, for example, a study found that of 134 soil patches solidified by Gemsbok (*Oryx gazella*) urine, 79% of them were utilised as burrow entrances for gerbils (Seely 1977).

## Taxonomy

*Gerbilliscus paeba* (A. Smith 1836)

ANIMALIA - CHORDATA - MAMMALIA - RODENTIA - MURIDAE - *Gerbilliscus* - *paeba*

**Synonyms:** *Gerbillurus paeba* (A. Smith 1936)

**Common names:** Hairy-footed Gerbil, Pygmy Gerbil, Pygmy Hairy-footed Gerbil (English), Haarpootnagmuis (Afrikaans)

**Taxonomic status:** Species

**Taxonomic notes:** This species was previously described under the genus *Gerbillurus*, which included three other species, of which only *Gerbilliscus vallinus* (previously *Gerbillurus vallinus*) occurs within the assessment region. Until recently *Gerbillurus* and *Gerbilliscus* were treated as separate genera (Musser & Carleton 2005). However, chromosomal, mitochondrial and nuclear molecular data suggest that they should be combined into one genus (see Monadjem et al. 2015). *Gerbilliscus* was also previously included in *Tatera*, but evidence suggests that the genus *Tatera* is restricted to a single Asian species and that all African species formerly grouped in *Tatera* form a distinct clade that corresponds with *Gerbilliscus* (see Monadjem et al. 2015).

This is one of four species from the "*Gerbillurus*" group that can be distinguished from other *Gerbilliscus* species by the hairy soles of their hindfeet, their relatively long tails, and their small body size (Monadjem et al. 2015). When compared to *G. vallinus*, *G. paeba* can be recognised by its lighter pelage colouration, which is generally light reddish-brown/-grey, shorter hindfeet (< 30 mm), and the lack of red/black hairs on the end of its tail. Taxonomic revision of the peripherally distributed subspecies from the assessment region, including *G. p. mulleri* (Western Cape Province), *G. p. exilis* (Eastern Cape Province), *G. p. coombsi* (Limpopo Province) and the nominate *G. p. paeba* is urgently required (Qumsiyeh et al. 1991).

## Assessment Rationale

Listed as Least Concern in view of its wide distribution within the assessment region, presumed large population, and because there are no major threats that could cause population decline. It occurs in a number of protected areas as well as in agricultural landscapes. However, each of the peripheral subspecies, *G. p. mulleri* in extreme southwestern South Africa, *G. p. exilis* along the Indian Ocean coast and *G. p. coombsi* in extreme northeastern South Africa, is morphologically distinct from the centrally occurring nominate subspecies as well as other subspecies in adjacent parts of the species' geographic range. An isolated population of *G. p. exilis*, which occurs in the dunefields of the northern shores of Algoa Bay, between the Swartkops River and Woody Cape, may especially warrant separate assessment. Although most of this subpopulation's habitat is included in the Addo Elephant National Park, it may be threatened by property development in other parts of its range. Although not differing in terms of chromosome structure, this subpopulation may represent a new species pending molecular research. Once the taxonomy is resolved, this form may warrant separate assessment.

**Regional population effects**: There is possible dispersal between Namibia, South Africa and Botswana. However, each of the three peripheral subspecies occurring in South Africa are isolated in unique habitats with no evidence of dispersal from the nominate subspecies in South Africa or those in neighbouring Zimbabwe, Botswana or Namibia. Populations of *G. p. coombsi* in northeastern South Africa seem to be isolated from each other and those in neighbouring Zimbabwe and Mozambique.

## Distribution

The Hairy-footed Gerbil is located across western and central southern Africa, from western and northern South Africa northwards throughout Namibia, marginally into southwestern Angola, through most of Botswana (absent

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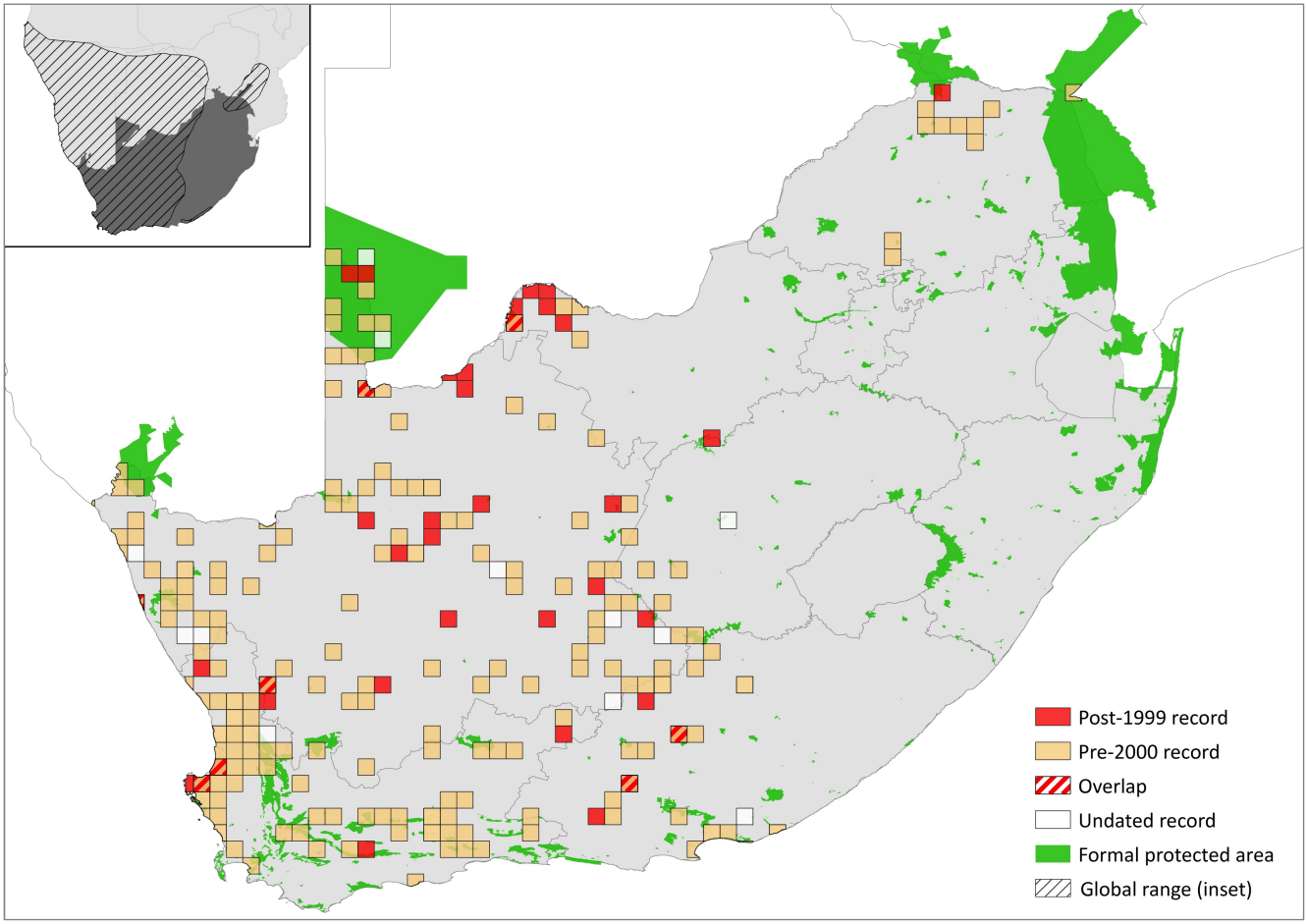


**Figure 1. Distribution records for Hairy-footed Gerbil (*Gerbilliscus paeba*) within the assessment region**

**Table 1. Countries of occurrence within southern Africa**

| Country | Presence | Origin |
|---|---|---|
| Botswana | Extant | Native |
| Lesotho | Absent | - |
| Mozambique | Extant | Native |
| Namibia | Extant | Native |
| South Africa | Extant | Native |
| Swaziland | Absent | - |
| Zimbabwe | Extant | Native |

from the extreme north), partially into western and south-eastern Zimbabwe and into the southwestern parts of Mozambique (Skinner & Chimimba 2005). Substrate and vegetation cover are important factors determining distribution (Perrin & Dempster 2013).

Although widespread in South Africa, three allopatric subspecies are distributed peripherally to the nominate subspecies. In the southwestern coastal region, *Gerbilliscus paeba mulleri* occurs from the vicinity of Eendekuil and Langebaan to Mitchell's Plain on the Cape flats; *G. p. exilis* occurs along the south Indian Ocean coast from east of Witsand to the vicinity of Port Shepstone in suitable solidified coastal white sand dunes; while *G. p. coombsi* is found in sandveld habitat in the extreme northeast of South Africa. Additionally, a disjunct population, recognised as *G. p. exilis*, occurs in the coastal dunefields on the northern shores of Algoa Bay in the Eastern Cape. This population is isolated from those in the hinterland by the thicket vegetation of the lower Sundays River valley.

The broad hiatus between the distributions of the nominate subspecies, *G. p. paeba*, and the northeastern subspecies, *G. p. coombsi*, is valid. The region has been extensively sampled over the years and no records have been taken. The relationship between the distributions of the other two coastal subspecies and the nominate subspecies is unclear. Both of the former subspecies seem to be more of a habitat specific while the nominate subspecies is more habitat generalist. Interestingly, samples from nearly sympatric localities show no integration of morphological characters (D. Schlitter unpubl. data).

# Population

A common and abundant species exhibiting population fluctuations, often dominating small mammal communities numerically. For example, they are the most common rodent in the Kalahari Desert, constituting 90% of the rodent community in sand dune habitats and 54% in river-bed habitats (see Perrin & Dempster 2013). However, only the nominate subspecies is common in suitable habitats, especially during years of population explosions. The three peripheral subspecies seem to occur in low numbers in South Africa, Zimbabwe and Mozambique.

Population densities vary considerably: 5–32 individuals / ha were recorded at one site in the semiarid Karoo (Kerley 1992a), 1–9 individuals / ha for six sites across the southern Karoo (Kerley & Erasmus 1992), and 0.7–3.3

individuals / ha in the Alexandria Dunefield (Ascaray et al. 1991). One population collapsed during an El Niño-related drought in the Karoo (Kerley & Erasmus 1992), suggesting a vulnerability to predicted climate extremes under global change.

**Current population trend:** Stable

**Continuing decline in mature individuals:** Unknown

**Number of mature individuals in population:** Unknown

**Number of mature individuals in largest subpopulation:** Unknown

**Number of subpopulations:** Unknown

**Severely fragmented:** No, population is contiguous in the arid and semi-arid western southern Africa, with the exception of the Algoa dunefield population.

# Habitats and Ecology

The Hairy-footed Gerbil is a nocturnal species that occurs extensively throughout the Nama Karoo and Succulent Karoo biomes, generally within sandy soils, or sandy alluvium associated with grass, scrub or thin woodland cover (Nowak 1999; Perrin & Dempster 2013). Their occurrence extends into savannah, desert and dunefield habitats. For example, they are common in the Kalahari Desert in lightly vegetated dune slopes, calcrete river banks and pans (Perrin & Dempster 2013). The population in the dunefields of Algoa Bay favours the dune swales habitat, avoiding dense vegetation and dune crests. In Rolfontein Nature Reserve, Northern Cape Province, a single specimen was caught in the *Rhus ciliata* community (Jooste & Palmer 1982). Within the North West Province, the species is common on Kalahari sands and found in all the western Kalahari vegetation types and may occur in the Mafikeng Bushveld, but so far no evidence has been found (Power 2014). The populations of *G. p. exilis* in the coastal white sand dunes seem to be found most commonly on the interface between the grass vegetation and the open sand dunes but not on the bare sand dunes themselves. Such grass cover may be critical to their survival and, if so, must be a part of any conservation effort to protect tracts of white dunes along the coastal region.

Abundance is negatively correlated with plant cover (Kerley & Erasmus 1992), and it is thus an open habitat specialist (Kerley et al. 1990). This is a solitary species, which dwells in simple burrows with a single entrance hidden by vegetation, and a tunnel extending to about 220 mm underground (Downs & Perrin 1989; De Graaf & Nel 1992; Skinner & Chimimba 2005). As omnivorous rodents (Kerley & Erasmus 1992), *G. paeba* consume arthropods, seeds and plant material (Downs & Perrin 1989; Griffin 1990; Kerley et al. 1990; Kerley 1992b; Perrin et al. 1992). Plant material was found to constitute the majority of their diet in the Karoo, while seeds and insects made up a lesser proportion (Skinner & Chimimba 2005). Contrastingly, in the Kalahari, seeds made up a much larger proportion of their diet (Nel et al. 1984). Although insect consumption did not vary seasonally in the Karoo, consumption of plant material was highest in late summer (February/March), while seeds were eaten far more commonly in winter (June/July) (Kerley 1992b).

It appears able to breed opportunistically throughout the year, although, in the Karoo, pregnancies were only recorded from October to May (White et al. 1997), and in the Kgalagadi Transfrontier Park, reproductive potential increases in summer. The gestation period is 21 days (Ascaray 1986), and litter size has been recorded as 3.7 in Botswana (Smithers 1971), 3.0 in the Karoo (White et al. 1997), 4.1 in the Kgalagadi Transfrontier Park (Nel et al. 1984), and 4.6 in captivity (Dempster & Perrin 1989).

**Ecosystem and cultural services:** Rodents are both predators and dispersers of plant seeds in the environment. Since these gerbils are hoarders, they may serve in a limited capacity as seed dispersers. Seeds taken into the burrows are likely to be consumed, but some of the seeds scatter-hoarded in caches or buried are often forgotten or abandoned, and if these escape other seed predators, they may germinate and establish seedlings. Additionally, this species is a valuable food source for small carnivores (Perrin & Dempster 2013).

# Use and Trade

This species is not traded or utilised in any form and has not entered the international pet trade, nor is it utilised in traditional medicine.

# Threats

No major threats have been identified for this species. However, an observed local collapse of the population under an El Niño-related drought (Kerley & Erasmus 1992) suggests a vulnerability to predicted climate extremes under global change.

The nominate subspecies seems to have no threats over its wide geographic range. However, the three peripheral subspecies are under a number of local threats: *G. p. coombsi* is threatened by habitat change mostly due to agricultural development and the need for both housing and small agricultural plots for the expanding local populations; *G. p. exilis* is confined to a narrow band of suitable coastal white sand dune habitat that is undergoing increasing housing and industrial developments all along the Indian Ocean coast; and *G. p. mulleri* is losing suitable habitat to expanding housing developments, especially informal housing in the Cape Town region, and agricultural and industrial development in the northern parts of its distribution, including irrigated monocultures.

**Current habitat trend:** Stable

# Conservation

No direct interventions are necessary as this species can exist in agricultural landscapes and urban areas. Additionally, this species is present in many protected areas within the assessment region, including the Karoo, Tankwa Karoo, Namaqua, Richtersveld, Camdeboo, Augrabies Falls and Addo Elephant National Parks. The isolated population in the coastal dunefields of the Eastern Cape is well protected in the Addo Elephant National Park Woody Cape section, which comprises over 60% of the known range of this form and is thus critical for the conservation of the *G. p. exilis* subspecies. *Gerbilliscus p. coombsi* is present within both Kruger and Mapungubwe National Parks, and based on its distribution, it is possible that *G. p. mulleri* occurs within the West Coast National Park. However, continued taxonomic investigations are required to confirm the conservation status of these peripheral subspecies. These two subspecies are under threat from habitat loss due primarily to expanding

**Table 2. Threats to the Hairy-footed Gerbil (*Gerbilliscus paeba*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)**

| Rank | Threat description | Evidence in the scientific literature | Data quality | Scale of study | Current trend |
|---|---|---|---|---|---|
| 1 | *1.1 Housing & Urban Areas* and *1.2 Commercial & Industrial Areas*: property development in the Eastern Cape (localised threat to *G. p. exilis*). Current stress *1.1 Ecosystem conversion*. | - | Anecdotal | - | Increasing |
| 2 | *1.1 Housing & Urban Areas*: informal housing development in the Western Cape (localised threat to *G. p. mulleri*). Current stress *1.1 Ecosystem conversion*. | - | Anecdotal | - | Increasing |
| 3 | *2.1 Annual & Perennial Non-Timber Crops* and *1.2 Commercial & Industrial Areas*: localised agricultural and industrial development, specifically affecting *G. p. coombsi* in the Limpopo Province and *G. p. mulleri* in the Western Cape. Current stress *1.1 Ecosystem conversion.* | - | Anecdotal | - | Increasing |
| 4 | *11.2 Droughts*: population crashes related to increasing frequency of droughts. | Kerley & Erasmus 1992 | Inferred | Local | Increasing |

agriculture and informal housing, especially in the Cape Town region. Protected area expansion and stewardship may be necessary for the subspecies once taxonomic and distributional limits are more clearly established.

**Recommendations for land managers and practitioners:** No specific management plan is currently necessary.

**Research priorities:**

- An extensive study of the distributions and local conditions of each of the three subspecies, so that the exact ranges and preferred habitats of each can be delineated.
- A study of the population ecology, numbers and reproduction of each subspecies so that a better understanding of the status of each subspecies is known and a better management strategy can be done after the amount of available and suitable habitat is known.
- Continued taxonomic research is necessary to discern whether the Eastern Cape subpopulation may represent a new species/subspecies.

**Encouraged citizen actions:**

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.

## Data Sources and Quality

**Table 3. Information and interpretation qualifiers for the Hairy-footed Gerbil (*Gerbilliscus paeba*) assessment**

| | |
|---|---|
| Data sources | Field study (unpublished), indirect information (literature, expert knowledge), museum records |
| Data quality (max) | Inferred |
| Data quality (min) | Inferred |
| Uncertainty resolution | Best estimate |
| Risk tolerance | Evidentiary |

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Details of the methods used to make this assessment can be found in *Mammal Red List 2016: Introduction and Methodology.*