The occurrence and conservation status of *Ceratogyrus bechuanicus* and *C. brachycephalus* in the Transvaal, South Africa.

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In South Africa, *Ceratogyrus* is presently protected by the Transvaal Provincial Nature Conservation Ordinance. Owing to the demand for these spiders as pets they are classified as Commercially Threatened in terms of the IUCN system. It was found, however, that the two known species in the Transvaal are well represented in protected areas which include nature reserves and national parks. *Ceratogyrus bechuanicus* is well represented in the Kruger National Park, Messina, D'nyala and Atherstone provincial nature reserves, as well as in the Klaserie and Sabi Sand private nature reserves in the Transvaal. The only conservation area in which *C. brachycephalus* has been located is the Messina Provincial Nature Reserve. With its much smaller distribution, *C. brachycephalus* has a higher conservation priority than *C. bechuanicus.* Applied ecological work needs to be done so that comprehensive species conservation plans for both species can be compiled.

Key words: *Ceratogyrus*, conservation status, distribution, Araneae, Theraphosidae.

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Introduction

A project to investigate the conservation status of the endangered invertebrates in the Transvaal was initiated in 1985 by the Transvaal Chief Directorate of Nature and Environmental Conservation. Representations from several prominent local and overseas arachnologists who were concerned about the escalating trade in baboon spiders (family Theraphosidae) as pets, notably in the Pretoria, Vereeniging, Johannesburg area, led to an investigation into the extent of trade in these spiders.

It is on record that between 150 and 200 spiders were sold for R20,00 each at the 1985 Rand Show in Johannesburg. These spiders probably originated from the Okavango areas of Botswana and Namibia. It is also known that a major dealer in Johannesburg sold as many as 400 spiders each summer over a period of about six years (*The Sunday Star*, 9 Nov. 1986).

According to Mr Rick West (*pers. comm.*), export of South African spiders to the United States of America and Canada took place in minimum consignments valued at 500,00 US dollars at a time. These spiders were in turn sold for up to 50,00 US dollars each. Apparently even larger numbers of baboon spiders reached America, hidden amongst consignments of legally imported reptiles. Unfortunately most of these spiders were dead on arrival. It is suspected that the demand for South African theraphosid spiders increased considerably when the Mexican red kneed tarantula (*Euathlus smithii*) was placed on Appendix Two of the Convention on International Trade in Endangered Species (CITES) in 1985. Spiders of the genus *Ceratogyrus* are particularly popular in America where they are known as horned baboon spiders because they have a unique round, horn-shaped foveal tubercle (Figs. 1&2).

Considering the secrecy surrounding the trade in baboon spiders, it was very difficult to obtain concrete evidence on the extent of this trade. It appeared, however, that the major suppliers of these spiders were two farmers in the Soutpansberg district in the Transvaal. These farmers employed teams of

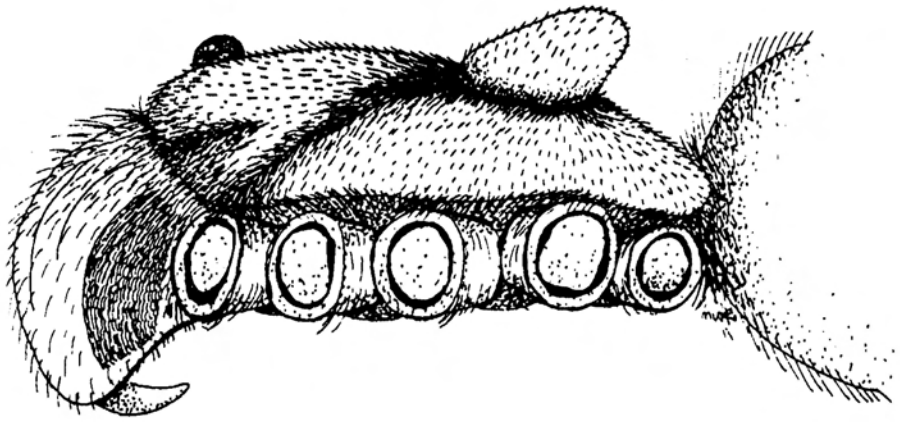

Fig. 1. Carapace of *Ceratogyrus bechuanicus*, showing foveal tubercle.

labourers to collect the spiders for delivery to traders, who sold them to the public for between R18,00 and R20,00 each.

Because of the above mentioned factors, it became quite clear that, if not prevented, the indiscriminate collection of Baboon spiders in South Africa could pose a serious threat to the very existence of one or more of its species. The following factors are also associated with the injudicious exploitation of the theraphosid spiders and might further contribute towards their possible extinction:

- Eggs are usually laid only once a year and if present in a burrow when a female is excavated, they do not survive.

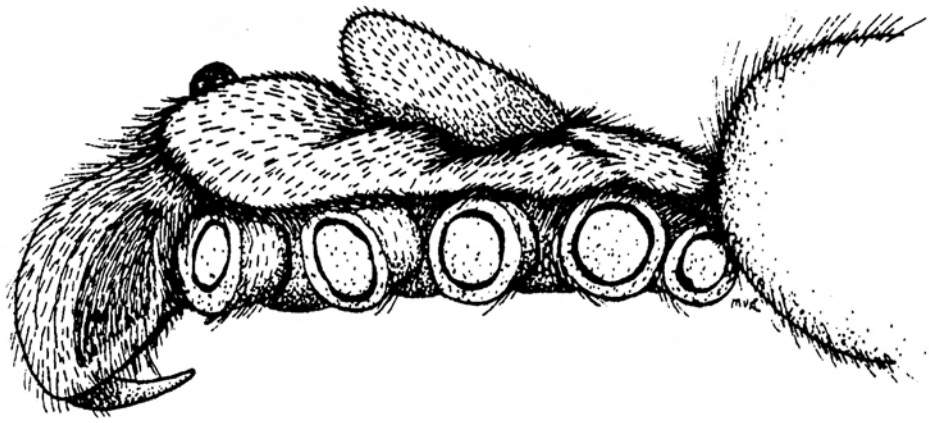

Fig. 2. Carapace of *Ceratogyrus brachycephalus*, showing foveal tubercle.

- If spiderlings are present when a female is removed, they die because they are still dependent on the female for food and care.
- Excavated immature spiders, which might be released because of their inferior size, cannot easily re-establish new burrows so they also stand a good chance of perishing.
- Theraphosids live approximately for 25 years and can take up to 10 years to mature (Seymour 1979; Baerg & Peck 1970). Thus young spiders could be removed from populations before they have had an opportunity to reproduce.
- Their dispersal in nature is very slow and no new colonies are founded if young spiders are prematurely destroyed or removed.

In February 1987 three genera of the baboon spider family Theraphosidae, namely *Ceratogyrus*, *Harpactira* and *Pterinochilus* were added to Schedule Seven of the Transvaal Provincial Nature Conservation Ordinance of 1983 as Protected Invertebrate Animals.

Although legislation is regarded as important, it is not sufficient to prevent the extinction of an animal. The most significant factor in its survival is the availability of a suitable breeding habitat (Cain *et al.* 1970). Unfortunately the progress of man has had a severely detrimental effect on the natural habitats of animals.

Meaningful conservation cannot take place if it is not known how many species are actually involved, where each species occurs, and whether each species displays a stable population growth. Without this information, a conservation strategy can be based only on vague and general conservation measures. If one or more of these species has a restricted distribution and if it occurs only in small numbers, it may well be exterminated without the conservation authorities even knowing about its existence. In the case of the Theraphosidae, there is very little recorded data about the three genera already mentioned, other than their original descriptions. Therefore, to be able to apply specific and effective conservation measures, more detailed bio-systematic studies are urgently needed.

Material and methods

In order to obtain an adequate number of specimens of *Ceratogyrus bechuanicus* and *C. brachycephalus* from as many localities in Transvaal as possible, requests were made to all institutes known to house material of this genus. Additional collecting was also undertaken in the Transvaal. Specimens, adults and juveniles, housed in the following institutions were studied and a taxonomic revision was done to determine which species occur in the Transvaal:

BMNH - British Museum of Natural History, London, UK.

CAS - California Academy of Sciences, San Francisco, California, USA.

MNB - Museum für Naturkunde der Humboldt Universität Berlin, Germany.

MNHG - Museum d'Histoire naturelle, Gènève, Switzerland.

MRAC - Musée Royal de l'Afrique Centrale, Tervuren, Belgium.

NCA - Biosystematic division: National Collection of Arachnida, Plant Protection Research Institute, Pretoria, South Africa.

NM - Natal Museum, Pietermaritzburg, South Africa.

NMB - Natural History Museum of Zimbabwe, Bulawayo, Zimbabwe.

SAM - South African Museum, Cape Town, South Africa.

SMN - State Museum, Windhoek, Namibia.

TM - Transvaal Museum, Pretoria, South Africa.

Ceratogyrus material in museum collections is scarce, because these animals are difficult to collect, as they are nocturnal and because the females live in burrows in the soil. Entrances to the burrows are difficult to locate and some expertise is needed to excavate the spiders. Males are even more difficult to locate as they wander freely above ground at night, remaining hidden under any suitable cover by day.

Collecting trips were therefore undertaken to:

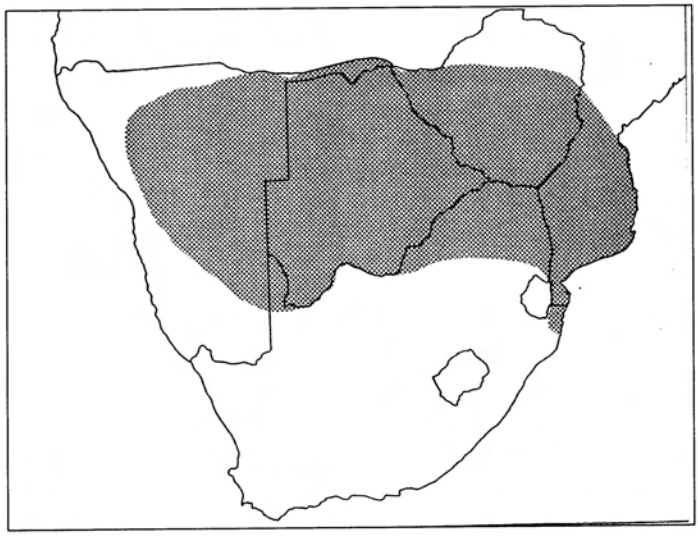

Fig. 3. Known geographical distribution of the genus *Ceratogyrus* Pocock in Southern Africa.

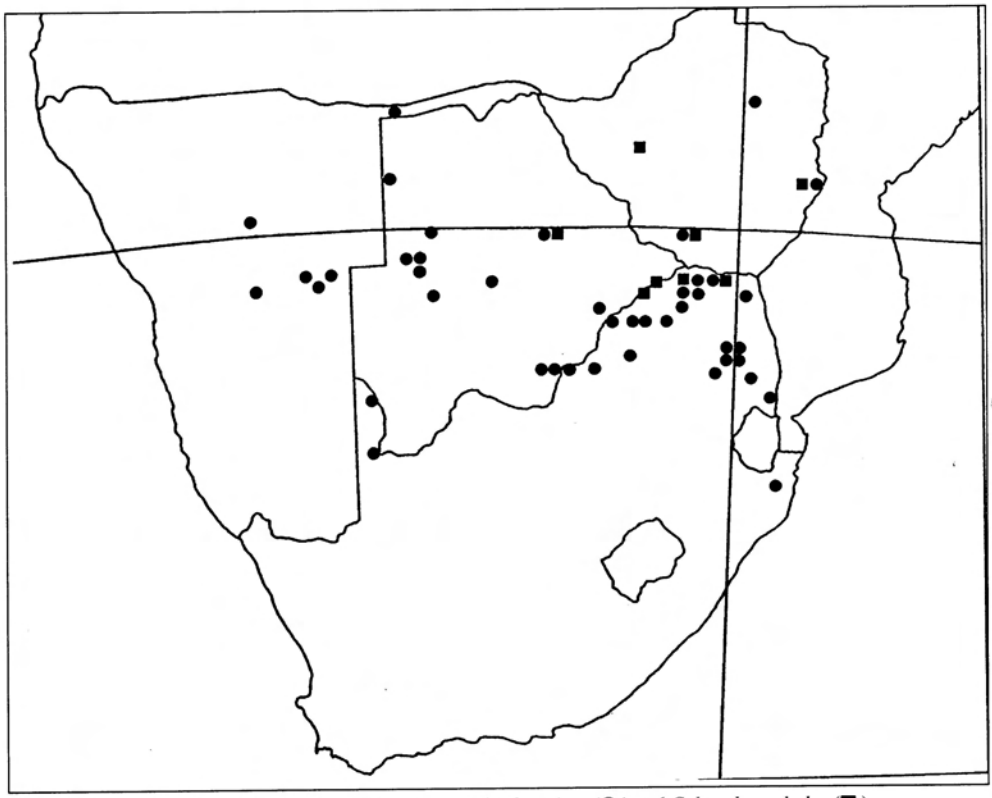

Fig. 4. Known geographical distribution of *Ceratogyrus bechuanicus* (●) and *C. brachycephalus* (■).

* Complement distribution records of *C. bechuanicus* and *C. brachycephalus* for the Transvaal.

* Assess their conservation status in the Transvaal

Fourty-one game farms (1000 hectares) in the Transvaal were visited to collect specimens of *Ceratogyrus*. These farms were selected by latitudinal and longitudinal degree squares in which no previous collection of the genus has yet been recorded. A minimum of one farm per degree square was visited for a week. During that week, large areas of the selected farm and, if time permitted, of neighbouring farms, were thoroughly searched for colonies of *Ceratogyrus*. If a colony was located, two female spiders per colony were taken to confirm the species' distribution. Only females and juveniles of *C. bechuanicus* and *C. brachycephalus* were found during the collecting period. In an attempt to locate males, areas immediately surrounding colonies were thoroughly searched. Pitfall traps were found to be unsuccessful, as the males of *Ceratogyrus* are not easily captured in this manner. This finding was confirmed by Dr A.S. Dippenaar-Schoeman (*pers. comm.*) who indicated that an average of only eight theraphosid males was collected in pitfall traps per 1000 other spiders over a collecting period of five years in the Northern Transvaal.

Distribution

The genus *Ceratogyrus* is indigenous to Southern Africa and according to distribution records listed in the cataloques of Roewer (1942) and Bonnet (1945-1959), this genus is restricted between 16° and 28° latitude south of the southern region of Africa (Fig. 3).

Ceratogyrus bechuanicus has the widest distribution (Fig. 4) of all the species, and is found in central Namibia, Botswana, Zimbabwe, Moçambique, as well as the north-western Cape, northern and eastern Transvaal and northern Natal. *Ceratogyrus brachycephalus* is found (Fig. 4) in central Botswana, southern Zimbabwe and northern Transvaal. None of the other species, *C. darlingii*, *C. dolichocephalus*, *C. marshalli*, *C. cornuatus* and *C. sanderi* are found in the Transvaal.

Conservation Status

To achieve its goals, one of the tasks of the Chief Directorate: Nature and Environmental Conservation in the Transvaal, is preparing an inventory of all indigenous species, their natural ecosystems or habitats, and natural features. This also involves determining the conservation status of each of the different elements of this inventory together with collecting more detailed information about the more seriously endangered species and habitats. Following this, detailed conservation plans must be compiled for each of the elements in the inventory.

In the past, invertebrate animals were completely ignored in conservation endeavours and these animals were only conserved incidentally in existing reserves. With the formation of the Invertebrate Conservation Services section by the Transvaal Chief Directorate of Nature and Environmental Conservation in 1985, invertebrates were specifically provided for, for the first time.

As a result of the impact of the spider pet trade, both locally and internationally, on the genus *Ceratogyrus* amongst others, this genus is regarded as Commercially Threatened according to to the standards of the IUCN (Wells *et al.* 1983). It has also been declared protected in the Transvaal by the Transvaal Nature Conservation Ordinance. This was done to prevent the extinction of *Ceratogyrus* and to permit its sustainable utilization. Legislation seems to be effective in stopping trade in these spiders as pets, as no southern African species of the Harpactirinae appear on American or European markets any more (R. West and A. Smith, *pers. comm.*). To be able to apply legislation and to determine a species' conservation status one needs to be able to identify the species concerned correctly. For this reason the genus has been revised systematically.

Ceratogyrus bechuanicus is well represented in the Kruger National Park, Messina, D'nyala and Atherstone provincial nature reserves, as well as in the Klaserie and Sabi Sand private nature reserves. The only conservation area in which *C. brachycephalus* has been located to date is the Messina Provincial Nature Reserve. Its historical distribution also includes the Langjan Provincial Nature Reserve and although it has not been rediscovered there yet, it is highly likely that

it may well occur there. From its known distribution range it should probably also occur in the northern parts of the Kruger National Park. With its much smaller distribution, *C. brachycephalus* has a higher conservation priority than *C. bechuanicus*.

No specimens have yet been found in the southern Transvaal highveld.

Applied ecological work needs to be done so that comprehensive species conservation plans for both of the above species can be compiled. A large component of this work comprises research into veld management, since it is essential that the veld be managed to retain conditions suitable for the survival and growth of spider populations. Since known colonies of *Ceratogyrus* are found in areas sparsely covered with grass, a balanced utilization of habitat must be prescribed and, for management purposes, the complete ecosystem must thus be taken into account.

Specific projects to ensure the continued existence of all the species of *Ceratogyrus* must include the following:

- Long-term monitoring of the population stability of selected colonies.
- Determination of veld condition boundaries of habitats where randomly selected colonies of *Ceratogyrus* occur. This information can be used to compile veld condition indices. In this way the natural environment of *Ceratogyrus* can be managed so that condition values suitable for the survival of this genus can be retained.
- Establishment of suitable habitat conditions for *Ceratogyrus*, based on information about prevailing environmental conditions of existing selected colonies of *Ceratogyrus*, to ensure the continued existence of this genus.

Concluding remarks

Little published information exists on the conservation, distribution, ethology and population dynamics of terrestrial invertebrates, especially of the theraphosid spiders. Most of the work done on these aspects has usually been conducted on economically- and agriculturally-important species. Many groups of invertebrates are insufficiently known taxonomically to ensure effectuve decisions about their conservation status. This lack of knowledge is an important reason to do research in order to formulate specific conservation strategies. Incomplete collecting and a lack of distribution records often create a misconception about the conservation status of a species. Some bibliographies, such as Wood (1981), which cover the conservation of rare and endangered species, are available. No applied work in this field on any invertebrates from the Republic of South Africa has, however, been done so far, so that these bibliographies largely cover exotic species at present. Although the same conservation principles apply to South Africa, this country also has its own unique environmental conditions which merit investigation in order to find specific solutions to these problems.

The present investigation has enabled the author to establish more accurately the known distribution and relative abundance of *Ceratogyrus* in the Transvaal. The next step would be to monitor and to evaluate the specific microclimatic conditions most suitable for the natural population growth of species of this genus. This will entail studies on the ecology of the food items occurring within the natural environment of the different species. Attention must also be given to the effects of predation on these theraphosid spiders.

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