



## Biodiversity/Biodiversité

## More about the geographical distribution of the Malagasy genus *Neogrosphus* Lourenço, 1995 (Scorpiones: Buthidae) and description of a vicariant new species



### *Nouvelles données sur la distribution géographique du genre malgache Neogrosphus Lourenço, 1995 (Scorpiones : Buthidae) et description d'une nouvelle espèce vicariante*

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## ABSTRACT

The distributional patterns of Malagasy scorpions belonging to the endemic genus *Neogrosphus* Lourenço, 1995 are revised. Up to now only two species were known for this genus: *Neogrosphus griveaudi* (Vachon, 1969), restricted to the dry forests formations in the southern and western portions of Madagascar, and *Neogrosphus blanci* Lourenço, 1996 only known from the Massifs of the Central region. Diagnoses are proposed for the genus and known species and a new vicariant species is described from the Ankarana Massif. The actual range of distribution of the members of this genus is currently patchy and fragmented over a large area extending from subarid to subhumid bioclimates. Based on the eco-biogeographical analyses of the genus *Neogrosphus*, we formulate a global rule to explain species diversity and vicariance.

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## R É S U M É

Les modèles de distribution des scorpions malgaches appartenant au genre endémique *Neogrosphus* Lourenço, 1995 sont révisés. Seules deux espèces étaient connues jusqu'à présent pour ce genre : *Neogrosphus griveaudi* (Vachon, 1969), dont la distribution est limitée aux formations forestières sèches du Sud et de l'Ouest de Madagascar, et *Neogrosphus blanci* Lourenço, 1996 qui n'est connu que des massifs montagneux de la région centrale. Des diagnoses sont proposées pour le genre, les deux espèces connues et une nouvelle espèce vicariante décrite du massif de l'Ankarana. L'aire de distribution globale des membres du genre est fragmentée sur une superficie étendue allant des bioclimats subarides à subhumides. À partir des analyses éco-biogéographiques du genre *Neogrosphus*, nous formulons une règle globale pour expliquer la diversité spécifique et la vicariance.

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## 1. Introduction

As outlined in previous papers [1–3], the large majority of the scorpion genera represented in Madagascar are endemic and in most cases representing very ancient lineages. The genus *Neogrosphus* Lourenço, 1995 was created for the species *Grosphus griveaudi* Vachon, 1969 (Fig. 1) [4], which was described based on five males and two females collected in dry southwestern vegetation formations at two sites in the ex-Province de Toliara: Tanandava in the Mikea Forest, east of Lake Ihotry and north of Toliara and Evazy, S of Toliara (Fig. 2, map, right). According to Vachon [5], the specimens from Tanandava were found in a baobab (*Adansonia*) forest on red sands, and those from Evazy in the spiny bush biome composed of Didiereaceae and Euphorbiaceae.

The creation of the new genus *Neogrosphus* [4] was decided to accommodate the species *G. griveaudi* that showed a range of morphological characters falling outside of typical members of the genus *Grosphus*. In the original description of *G. griveaudi* [5], it was already obvious that the generic position of this species was questioned, and Vachon [5] stated as follows on page 481: “La détermination des spécimens qui ont permis la création de cette espèce nouvelle nous a posé maints problèmes... Il est donc fort possible que l'espèce *griveaudi* appartienne à un sous-genre nouveau ou à un genre nouveau.”

One year after the description of the genus *Neogrosphus* [4], a second species, *Neogrosphus blanci* Lourenço,

1996 was described based on one male specimen held in the collections of the Muséum in Paris. This new species was *a priori* considered as collected from an imprecise locality in Central Madagascar [1,6]. However, more recent data brings further details about its possible type locality (see the section on *N. blanci*).

In a paper by Lourenço et al. [6], a preliminary synthesis was proposed for the known elements of the genus *Neogrosphus*. This was based on extensive samples of new material of this group collected during considerable biological exploration performed for more than a decade. For details on this material, refer to Lourenço et al. [6].

The present study of one new specimen of *Neogrosphus* has resulted in the discovery of one new species. The type material has been collected from the Ankarana Massif in extreme North of Madagascar, and is partially related to *N. griveaudi*, which has a range of distribution limited to the south and southwestern regions of Madagascar. This represents yet a new case of disrupted distribution, which illustrates one more example of micro-endemism and vicariance among the populations of Malagasy scorpions.

## 2. Methods

Illustrations and measurements were made with the aid of a Wild M5 stereomicroscope, equipped with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke [7] and are given in mm. Trichobothrial notations follow Vachon [8], while morphological terminology mostly follows Vachon [9] and Hjelle [10].

## 3. Taxonomic treatment

Family BUTHIDAE C.L. Koch, 1837  
Genus *Neogrosphus* Lourenço, 1995

Diagnosis for the genus *Neogrosphus*

Scorpions of average size when compared with most species of Malagasy buthids. Males much smaller than females measuring from 24 to 30 mm in total length, whereas females may reach up to 45 mm [6]. General coloration pale yellow to reddish-yellow with or without dark spots over the body and appendages. Disposition of granulations on the dentate margins of the pedipalp chela fingers, arranged in 8 to 9 rows of granules. Subaculear tooth absent both in adults and juvenile forms. Trichobothriotaxie type A with A- $\alpha$  (alpha) disposition for the dorsal trichobothria of femur [8,11].

The known species of *Neogrosphus*  
*Neogrosphus griveaudi* (Vachon, 1969) (Fig. 1)

Same diagnosis as for the genus. General pattern of pigmentation yellowish, with dark spots over the body and appendages. Carapace yellowish with an inverted dark triangle extending from the anterior edge to the zone behind the median eyes. Tergites with confluent dark

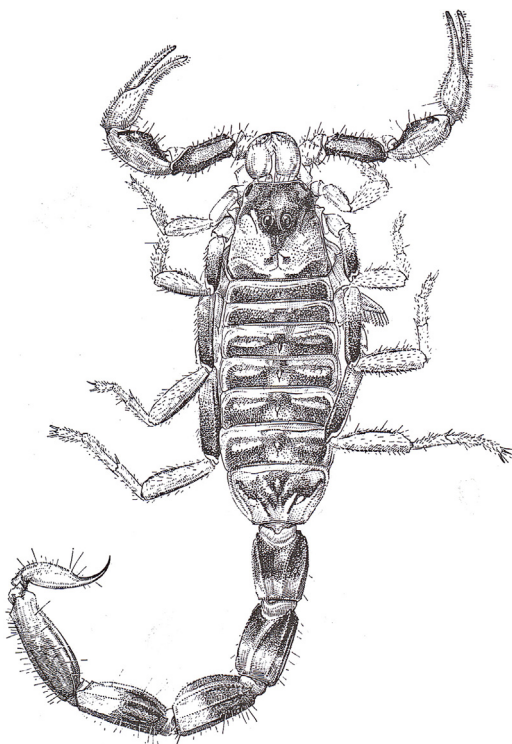


Fig. 1. *Neogrosphus griveaudi*, female paratype from Tanandava. Habitus. After Vachon, 1969.

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