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About the enigmatic presence of the genus Scorpio Linnaeus, 1758 in Congo with the description of a new species from Niger (Scorpiones, Scorpionidae)

Wilson R. Lourenço [1] & John L. Cloudsley-Thompson [2]
[1] Muséum national d'Histoire naturelle, Département Systématique et Evolution, UMR7205, CP 053, 57 rue Cuvier, 75005 Paris, France. E-mail: arachne@mnhn.fr
[2] 44 Alconbury Road, Hackney, London E5 8RH, United Kingdom

Abstract

For almost a century, Scorpio maurus L., 1758 (Scorpiones, Scorpionidae) has been considered to be no more than a widespread and presumably highly polymorphic species. Recent investigation of the ancient classifications by Birula (1910) and Vachon (1952) have led to the consideration of several African populations at the rank of species. Two new species have also been described from Cameroon (Lourenço, 2009) and Sudan Lourenço & Cloudsley-Thompson, 2009), countries not previously recorded as containing members of the genus Scorpio. In the present paper, the enigmatic presence of the genus Scorpio in Congo has been tentatively clarified, and this record is attributed to mislabelling. A new species is also described from Niger. It is the first confirmed record of a species of Scorpio from that country.

Keywords: Scorpion, Scorpio, Scorpionidae, Congo, new species, Niger.

Introduction

In a recent publication, Lourenço (2009) reinvestigated the taxonomic position of several species of the genus Scorpio. Analysis of a number of characters, already defined by Vachon (1952), confirmed that these are valid for the precise definition of true species. Using this approach, eight forms or subspecies were raised to the rank of species, although subsequent adjustments may prove to be necessary yet. In this same publication, a new species, S. savanicola Lourenço, 2009, was described from Cameroon. This was the second Scorpio species, together with S. occidentalis Werner, 1936 from Senegal, to be reported from beyond the Saharan region. Shortly afterwards, another new species, Scorpio sudanensis Lourenço & Cloudsley-Thompson, 2009, was described from Sudan (Lourenço & Cloudsley-Thompson, 2009). In both cases, these records from Cameroon and Sudan proved to be the first to be confirmed for these countries.

Another interesting point concerning the genus Scorpio was its supposed presence in Congo. Vachon (1952) refers to a paper by Pallary (1938) in which this last author indicated a Scorpio (Heterometrus maurus L.) in the 'Moyen Congo'. The possible presence of a Scorpio in Congo was rejected by Vachon (1952), who consider it to be doubtful. In the Catalog of the Scorpions of the World (Fet, 2000), the genus Scorpio is recorded for Congo, but with an interrogation. Although, the initial position by Vachon (1952) was to reject any possible presence of Scorpio in Congo, one specimen was located in the collections of the Muséum national d'Histoire naturelle in Paris, labelled by himself as from the 'Moyen Congo'. Naturally, this specimen drew attention to, and invited further investigation. The conclusions are as follows: 1. The indication of 'Moyen Congo' in a label written by Vachon himself is most certainly the result of some mislabelling. Another label, even older, found in the same jar indicates 'Bassin du Moyen Niger', region of Gono (in Niger). This specimen was in fact collected in Niger, somewhere in the region of Gono. 2. The initial opinion of Vachon (1952), about the absence of any Scorpio species from Congo seems to be correct. The specimen cited by Pallary (1938) may, in our opinion, be a juvenile specimen of Pandinus Thorell. Although Pallary (1938) actually described a number of new species, he was not very precise in the assignment of the species to their correct genera. 3. After a careful study of the Scorpio specimen from Niger, we concluded that it belongs to a new species, described here. This is the third Scorpio species to be reported from beyond the Saharan region of Africa (Sahel), and is the first record of the genus Scorpio in Niger.

Methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Taxonomic treatment

Family Scorpionidae Latreille, 1802
Genus Scorpio Linnaeus, 1758

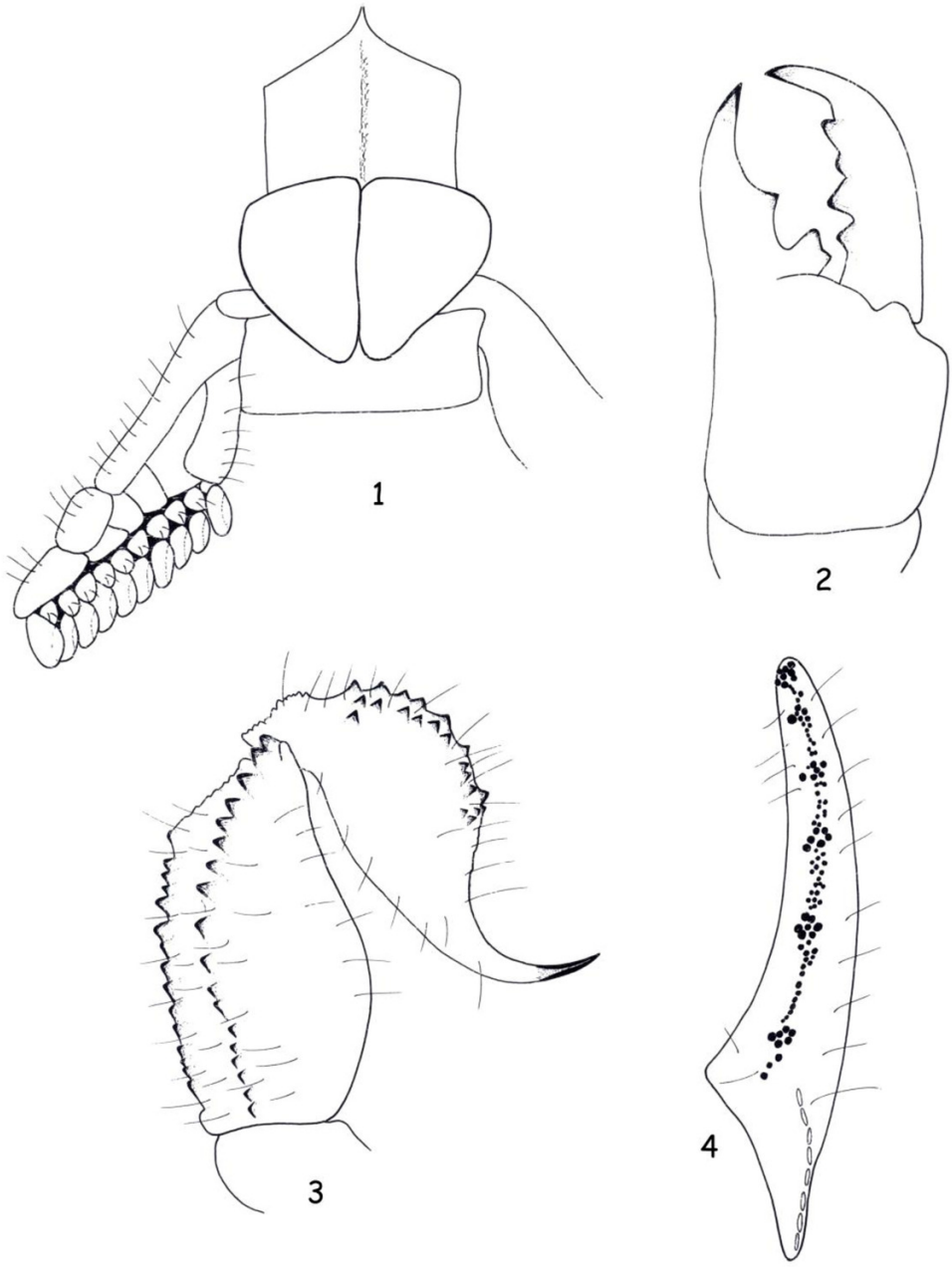
Scorpio niger sp. n. (Figs. 1-11)

Type material: 1 female holotype Niger, Bassin du Moyen Niger, region of Gono, 6/VI/1909 (R. Chudeau). Deposited in the Muséum national d'Histoire naturelle, Paris, RS-7045 (S-11).

Etymology: The specific name is placed in apposition to the generic name and refers to the country in which the new species was found.

The indication 'Moyen Congo' is definitely the result of mislabelling.

Diagnosis: Scorpion of moderate size with respect to the genus. Female reaching 40.9 (45.6) mm in total length. Coloration, basically light yellow to reddish-yellow, without any dusty markings. Pedipalps, especially the chela, almost acarinate; dorsal and dorso-external carinae vestigial. Chela manus with weakly marked granules on dorso-external aspect. Telson globular and strongly granulated, with spinoid granules ventrally. Pectines moderately narrowed with 10-10 teeth. Trichobothriotaxy of type C, orthobothriotaxic. Genital operculum with semi-triangular plates.



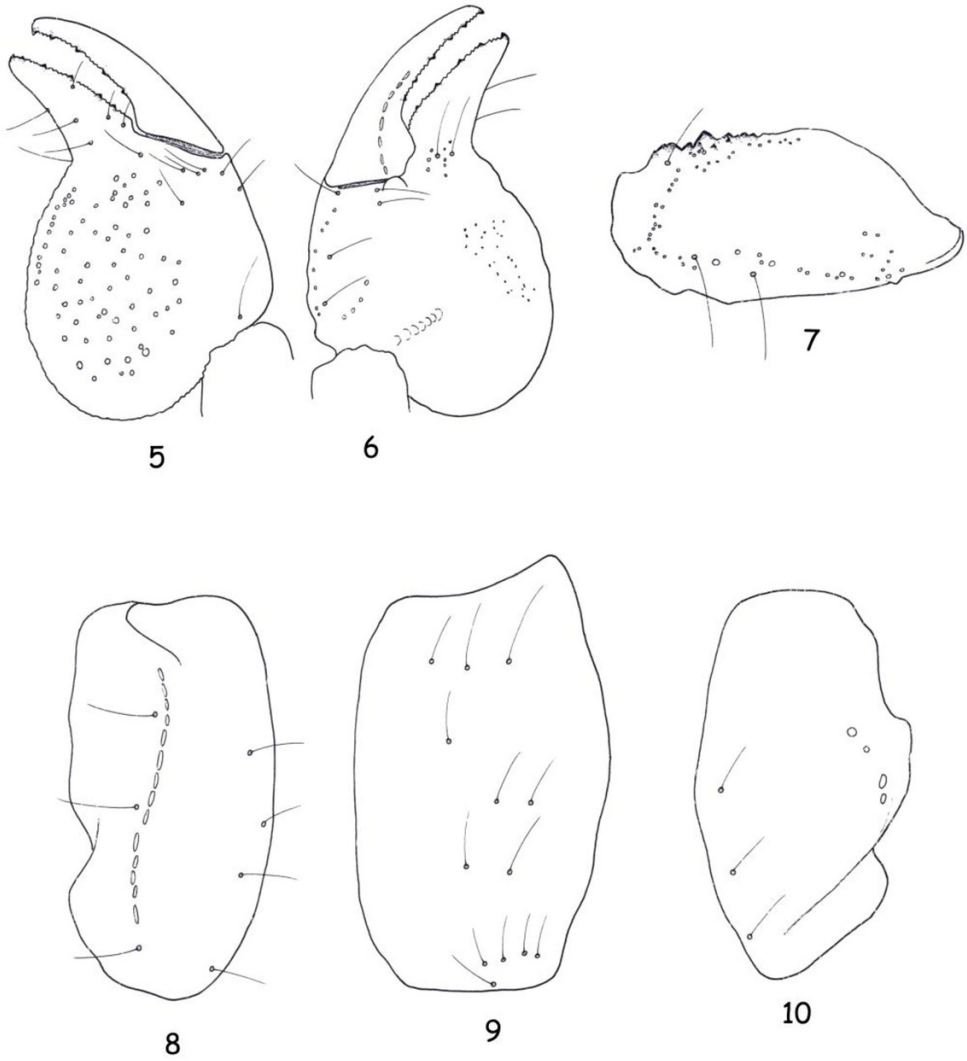
Figs. 1-4. Scorpio niger sp. n. Female holotype. 1. Ventral aspect, showing sternum, genital operculum and pecten. 2. Chelicera, dorsal aspect. 3. Metasomal segment V and telson, lateral aspect. 4. Dentate margin of movable finger with rows of granules.

Relationships: Scorpio niger sp. n., can be distinguished from other Scorpio species, and in particular from S. occidentalis Werner, 1936 and Scorpio savanicola Lourenço, 2009, the two species most closely related geographically (Lourenço, 2009) by the following features: (i) pedipalps almost acarinated; dorsal and dorso-external carinae vestigial; chela manus with weakly marked granules, (ii) telson globular, with strong spinoid granules ventrally, (iii) genital operculum with semi-triangular and elongated plates (iv) distinct morphometric values – see Table (1).

Description: Based on female holotype. Measurements in Table (1).

Coloration. Body basically light yellow to reddish-yellow. Prosoma: carapace reddish-yellow with some blackness near the eyes. Mesosoma: tergites reddish-yellow, as

the carapace; sternites yellow to pale yellow. Coxapophysis, sternum, genital operculum and pectines pale yellow. Metasoma: all segments yellowish, with carinae slightly reddish. Telson yellowish; aculeus yellow at the base and dark reddish at the extremity. Chelicerae yellowish with variegated pale reddish spots; fingers yellowish with reddish teeth. Pedipalps: femur and patella yellowish; chela reddish-yellow; dentate margins of fingers dark. Legs yellowish.



Figs. 5-10. Scorpio niger sp. n. Female holotype. Trichobothrial pattern. 5-6. Chela, dorso-external and ventro-internal aspects. 7. Femur, dorsal aspect. 8-10. Patella, dorsal, ventral and external aspects.

Morphology. Carapace acarinate with some vestigial granulations on median zone; anterior margin with a moderately pronounced concavity; posterior furrows moderately pronounced; median ocular tubercle distinct in the centre of the carapace; three pairs of lateral eyes; the first two of equal size, the third slightly reduced. Mesosoma: tergites acarinate and smooth (lustrous) with sparse granulation only on VII. Sternum pentagonal, wider than high. Venter: genital operculum formed by two semi-triangular elongated plates. Pectines moderately narrowed; pectinal tooth count 10-10; fulcra strongly developed. Sternites smooth and shiny, with two longitudinal parallel furrows on III to VI; VII with four moderately marked carinae; spiracles linear and

conspicuous. Metasoma with strongly marked carinae on segments I to IV; granulation becomes spiniform on segment V; ventral and latero-ventral carinae intensely spinoid on V; all intercarinal surfaces weakly granular. Telson globular and strongly granular with four ventral carinae formed by strong spinoid granules; aculeus shorter than vesicle and moderately curved. Cheliceral dentition characteristic of the Scorpionidae (Vachon, 1963); movable finger with one subdistal tooth, and conspicuous basal teeth. Pedipalps with weak granulations; femur with four incomplete carinae; patella with dorsal carina almost complete; chela with weakly marked ventral carinae; other carinae inconspicuous or absent; dorso-external aspect of the manus weakly granular. Dentate margin on fixed and movable fingers with a series of granules divided by 4 or 5 strong accessory granules. Trichobothriotaxy of type C; orthobothriotaxic (Vachon, 1974); femur with 3 trichobothria, patella with 19, and chela with 26. Legs: tarsi of legs I to IV with 7/6: 6-7/5-6: 6-7/5-6: 6/4 internal and external spines arranged in series.

Table 1. Morphometric values (in mm) of the ♂ neotype of Scorpio occidentalis, the ♂ holotype and ♀ paratype of Scorpio savanicola and the ♀ holotype of Scorpio niger sp. n.

	Scorpio occidentalis	Scorpio savanicola		Scorpio niger sp. n.
	♂ Neotype	♂ Holotype	♀ Paratype	♀ Holotype
Total length	47.1(52.9*)	42.4(47.2*)	51.1(56.5*)	40.9(45.6*)
Carapace:				
- length	8.7	7.5	8.7	7.9
- anterior width	5.7	5.2	6.0	5.4
- posterior width	9.0	8.0	9.2	8.4
Mesosoma length	15.1	15.0	21.7	14.6
Metasomal segment I:				
- length	3.3	2.8	2.9	2.6
- width	5.0	4.5	4.7	4.2
Metasomal segment V:				
- length	6.4	5.5	5.8	4.9
- width	3.3	2.9	3.0	2.9
- depth	2.7	2.4	2.8	2.6
Telson:				
- length	5.8	4.8	5.4	4.7
- width	2.3	2.5	2.7	2.4
- depth	2.2	2.3	2.3	2.0
Pedipalp:				
- Femur length	4.9	4.4	4.8	4.5
- Femur width	2.8	2.6	2.9	2.3
- Patella length	6.3	5.8	5.9	5.5
- Patella width	3.3	2.7	3.0	2.7
- Chela length	12.8	10.7	12.4	11.2
- Chela width	4.4	3.9	4.6	4.4
- Chela depth	8.0	7.2	7.6	6.8
Movable finger: length	6.3	5.6	7.0	6.0

* including telson length.

Taxonomic comments

Scorpio tunetanus Birula, 1910 (now Scorpio punicus Fet, 2000 was the first species of the genus to be characterized as having a pale coloration, varying from light yellow to reddish-yellow. Subsequently, other species having a similar pattern of coloration were described: Scorpio occidentalis Werner, Scorpio savanicola Lourenço and now Scorpio niger sp. n. All these species are probably members of a single group, which originated from a common ancestor, but today occupy distinct regions of

distribution. The range of distribution of S. punicus seems to be limited to the high plateaus of Tunisia and North of Algeria (Vachon, 1952, 1958), whereas the other three species are distributed much further to the South, in the Sahel region (Fig. 11). Vachon (1958) referred to Scorpio maurus from the mountains of the Tassili N'Ajjer in the South of Algeria without reaching a final determination. We were not able to locate the specimen studied by Vachon (1958), or other specimens collected in the same region. However, the future study of Scorpio specimens from the mountain range in the South of Algeria should reveal yet another distinct species of this group.

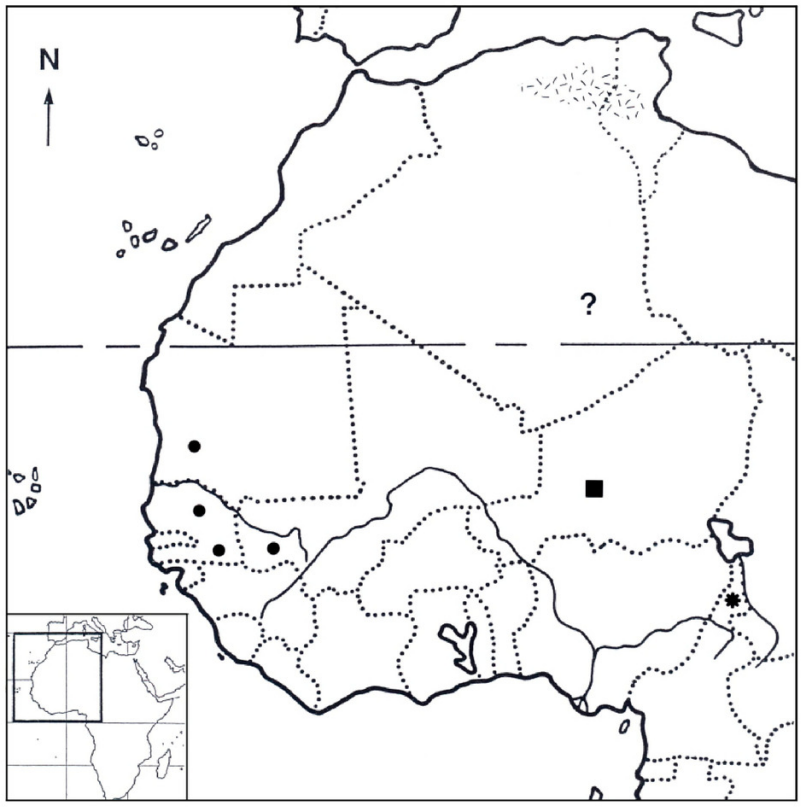


Fig. 11. Map of Western Africa with the known distribution of Scorpio punicus (=Scorpio tunetanus) (hatched zone); Scorpio occidentalis (black circles); Scorpio savanicola (black star); Scorpio niger sp. n. (black square). Scorpio sp. from Tassili N'Ajjer indicated by an interrogation mark.

Ecological and Biogeographic comments

Present vegetation zones in Niger can be described as follows: The Sahara covers the whole northern part of the country. The transition between the Northern and Southern Sahel covers a strip about 200 km in the south (between 14 to 15°N). The Northern Sudanian Zone is restricted to the south-west and small areas of southern Niger.

In general, the physiognomy of the vegetation zones changes from contracted vegetation in the Sahara to tree, shrub or grass savannas in the Sahel with Mimosaceae and Combretaceae tree and shrub species sparsely distributed. In the Northern Sahel, grass savannas are mostly found in depressions, sometimes on plateaus, whereas (thorn) shrub savannas predominate on sandy soils. This zone is a pastoral zone, where persistent rain fed agriculture is not possible because precipitation (200-400 mm) is too low. Combretum thickets on laterite plateaus and grass or (thorn) shrub savannas on sandy terraces, dry valley floors or fixed dunes are characteristic for the Southern Sahel (400-600 mm precipitation). Ancient river valleys, so-called Dallols are a peculiarity. In these

valleys a tree savanna with Faidherbia albida and Hyphaene thebaica has its northernmost occurrence. Gallery forests occur along rivers, if water supply is sufficient during at least few months of the year (Aubréville, 1949; AETFAT, 1959; Schnell, 1976; White, 1983).

The new species of Scorpio is undoubtedly an element of the Sahel zone in Niger. By the time the specimen was collected, the expansion of the Sahara was less important than it is today. The borders between Sahara and Sahel were further north (AETFAT, 1959; Schnell, 1976).

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