



A new species of *Babycurus* Karsch, 1886 from dry Savannahs in Central African Republic (Scorpiones: Buthidae)

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Abstract. A new species, *Babycurus brignolii* sp. n., is described from North Savannah formations in Central African Republic. This is the second record of a *Babycurus* species from Central African Republic. The new species is characterized by a small total body size, with respect to other species within the genus, and a general yellow to yellow-testaceous coloration with some diffuse fuscosity. This species, a possible endemic element from the savannah formations of Northern Central African Republic, provides further evidence regarding the unsuspected scorpion richness of this region.

Riassunto. Una nuova specie di *Babycurus* Karsch, 1886 dalle savane aride della Repubblica Centrafricana (Scorpiones: Buthidae). Una nuova specie, *Babycurus brignolii* sp. n., viene descritta dalle savane settentrionali della Repubblica Centrafricana. Questa è la seconda segnalazione di una specie di *Babycurus* dalla Repubblica Centrafricana. La nuova specie è caratterizzata da una piccola taglia, rispetto alle altre specie del genere, e da una colorazione generale gialla o giallo testacea con alcune zone più scure. Questa specie, un possibile elemento endemico delle savane della parte settentrionale della Repubblica Centrafricana, fornisce ulteriore prova riguardo alla inaspettata ricchezza di questa regione.

Résumé. Une nouvelle espèce de *Babycurus* Karsch, 1886 des savanes arides de la République Centrafricaine (Scorpiones: Buthidae). Une nouvelle espèce, *Babycurus brignolii* sp. n., est décrite des formations savaniques situées dans le nord de la République Centrafricaine. La nouvelle espèce de *Babycurus* est la première citée pour ce pays. La nouvelle espèce est caractérisée par une taille plutôt petite, par rapport à d'autres espèces du genre, et une coloration globalement jaunâtre avec quelques taches brunâtres diffuses. La nouvelle espèce est très probablement un élément endémique des savanes situées dans le nord de la République Centrafricaine et contribue à renforcer la richesse scorpionique de cette région.

Key words. Scorpion, *Babycurus*, new species, sub-Saharan, Savannah formations, Africa, Central African Republic.

Introduction

As already outlined in a recent publication (LOURENÇO, 2013), among the scorpion groups distributed in the sub-Saharan region of Africa, the genus *Babycurus* Karsch, 1886 appears to be one of the most complex and the identity of several species remained dubious for long periods of time. For instance, LOURENÇO (1986) studied large collections from the LAMTO Ecological Station in Côte d'Ivoire and concluded that the *Babycurus* population locally present could be assimilated to *B. kirki* (Pocock, 1890), and rejected the synonymy of this species with *Babycurus buettneri* Karsch, 1886, proposed by KRAEPELIN (1899). This decision was not, however, taken in consideration in the Catalog of the scorpions of the world (FET & LOWE, 2000).

In a revision of the genus *Babycurus*, KOVAŘÍK (2000) maintained the validity of both *B. buettneri* and *B. kirki*, but suggested the synonymy of *B. johnstonii* with *B. buettneri* and confirmed the synonymy of *Babycurus neglectus* Kraepelin, 1896 with *B. kirki*. Shortly after, PRENDINI (2004) in a rather complete study about the scorpions of Gabon and neighboring countries, confirmed the synonymy of *B. kirki* with *B. buettneri*, but restored both *B. johnstonii* and *B. neglectus* as valid species. In a subsequent ecological study about the scorpions of the LAMTO Ecological Station, LOURENÇO *et al.* (2005) confirmed the taxonomic status of the local *Babycurus* population as distinct and described a new subspecies as *Babycurus buettneri savanicola* Lourenço, Ramos & Cloudsley-Thompson, 2005.

The scorpion fauna of Central African Republic remains yet poorly studied. ROSSI (2014) described *Pandinus ulderigo* Rossi, 2014, a peculiar species of the genus *Pandinus* Thorell, 1876, from the rainforest around the area of Bangui. In a recent publication LOURENÇO (2016) described a new *Buthus* species from dry forests-savannahs formations located mainly in the northern range of the country. In the present contribution, a new species belonging to the genus *Babycurus* is described from these Savannah/Sahel formations from northern Central African Republic. The discovery of this new species attests to the understudied scorpion richness of this area.

Material and methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope equipped 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).

Abbreviations

MNHN = Muséum national d'Histoire naturelle, Paris, France; CIRAD = INRA/IRD/Cirad/Montpellier SupAgro, France; ZMUM = Zoological Museum, State University of Moscow, Russia.

The new species was compared with the type materials of the most closely related species, *Babycurus prudenti* Lourenço, 2013: holotype: male (MNHN), Cameroon, Garoua, region of Sanguéré-Djoï (9°13'52.4" N, 13°30'3.2" W); paratypes: 1 female, 2 males, 1 juv. male, (MNHN); 1 female, 1 juv. male, (CIRAD); 1 female (ZMUM), Sanguéré-Djoï, Gaschiga (9°28'5.5" N, 13°19'52.5" W), Guilder (10°00'34.1" N, 13°54'58.2" W), Kismatari-Tajetes and Tcholliré (8°27'24.5" N, 14°15'44.9" W), August/October 2012, leg. P. Prudent. Scorpions collected with Barber traps.

On the contrary, it was not possible to examine the type of *Babycurus ugartei* Kovařík, 2000 because it is kept in a not accessible private collection.

Taxonomic treatment

Family Buthidae C.L. Koch, 1837

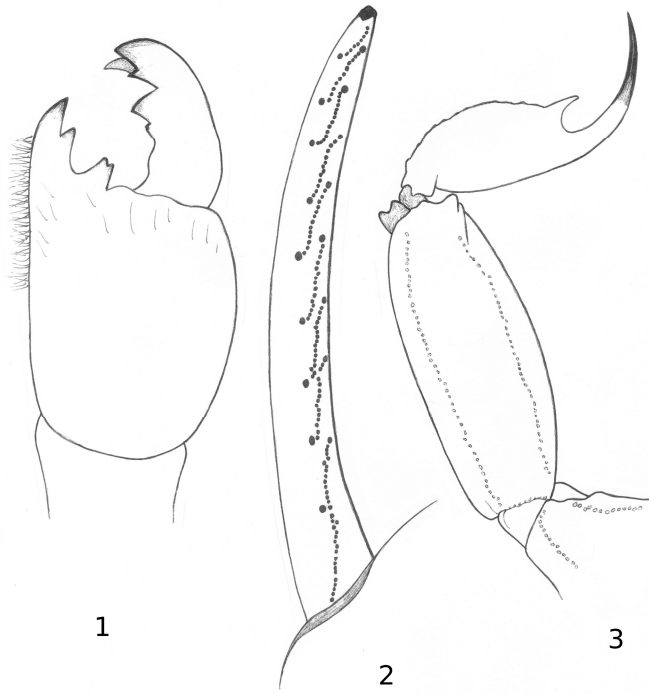
Genus *Babycurus* Karsch, 1886

Babycurus brignolii sp. n. (Figs 1-10)

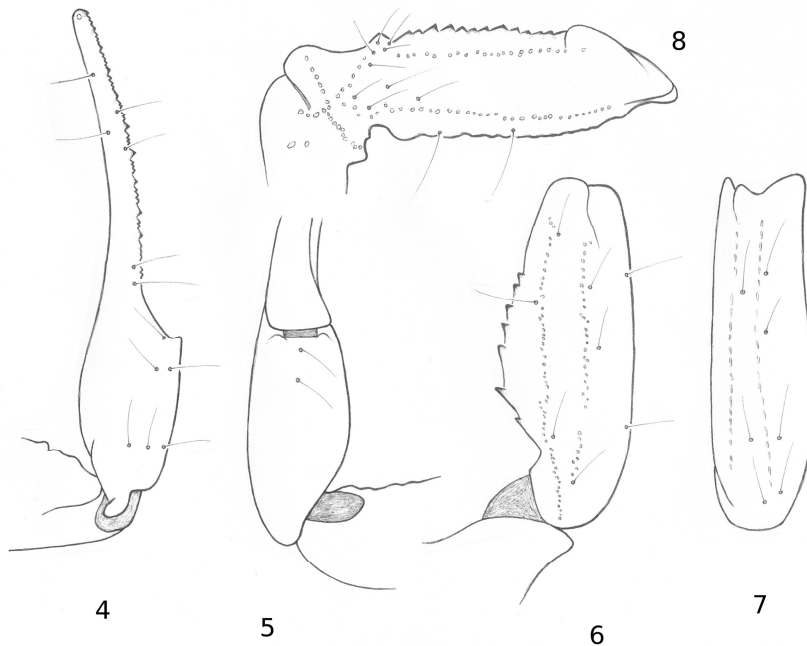
Type material. Holotype ♂, Central African Republic, Province Bamingui-Bangoran, National Park of Bamingui-Bangoran, 40-45 km N of Fort Crampel, in dry forest - woodland savannah formation, P. M. Brignoli leg., 23/I/1973, MNHN.

Etymology. The name is in honour of the late Prof. Paolo Marcello Brignoli (1942-1986), a well known Italian arachnologist, who collected the holotype.

Diagnosis. Scorpion of small size, in relation to other species within the genus, reaching a total length of 28.6 mm for male. General coloration yellow to yellow-testaceous; pedipalp femur and patella brownish. Carinae and granulations weak to moderate. Fixed and movable fingers with 9-10 rows of granules. Pectines with 21-21 teeth. Basal teeth on chelicerae movable finger fused and vestigial.



Figs 1-3. *Babycurus brignolii* sp. n., male holotype. 1. Chelicera, dorsal aspect. 2. Fixed finger of pedipalp chela with rows of granules. 3. Metasomal segment V and telson lateral aspect.



Figs 4-8. *Babycurus brignolii* sp. n., male holotype. Trichobothrial pattern. 4-5. Chela, dorso-external and ventral aspects. 6-7. Patella, dorsal and external aspects. 8. Femur, dorsal aspect.



Fig. 9. *Babycurus brignolii* sp. n., male holotype. Dorsal and ventral view.

Relationships. By its general morphology, *Babycurus brignolii* sp. n. shows some affinities with *Babycurus prudenti* Lourenço, 2013 and *Babycurus ugartei* Kovařík, 2000, species described respectively from Cameroon and Nigeria. It can, however, be distinguished from *Babycurus prudenti*, the most closely related species both in morphology and distribution, by a number of characters: (i) a different pattern of body coloration more to brownish-yellow, (ii) 21-21 teeth on pectines, (iii) 9-10 rows of granules on fixed and movable fingers of pedipalps, (iv) basal teeth on chelicerae movable finger fused and vestigial. Moreover, although the three species can be considered geographically related, they inhabit at distinct habitats (see ecological notes).

Description. Based on male holotype. Morphometric measurements are listed after the description.

Coloration. Body coloration globally yellow to brownish-yellow. Prosoma: carapace yellow with brownish spots on central zone; eyes surrounded by black pigment. Mesosoma: yellow with dark confluent bands. Metasomal segments yellow with brownish spots ventrally; vesicle yellow; aculeus yellow with a reddish tip. Venter pale yellow. Chelicerae yellow with an intense variegated pigmentation; fingers brownish-yellow with teeth reddish. Pedipalps yellow; femur and patella with marked brownish spots; chela yellow with brownish fingers; rows of granules on fingers reddish. Legs pale yellow with intense brownish spots.

Morphology. Carapace moderately to weakly granular; anterior margin with a very weak concavity, almost straight; carinae weak to obsolete; furrows weak. Median ocular tubercle anterior to the centre of carapace; median eyes separated by almost one and half ocular diameters. Three pairs of lateral eyes. Sternum triangular. Mesosoma: tergites with weak granulation. Median carina weak to moderate in all tergites. Tergite VII pentacarinata, but all carinae moderately marked. Venter: genital operculum divided longitudinally, forming two semi-oval plates. Pectines: pectinal tooth count 21-21 on male holotype; basal middle lamellae of each pecten not dilated. Sternites smooth with weakly elongate spiracles; VII with vestigial carinae. Metasomal segment I with ten carinae; segments II to IV with eight carinae; segment V with five carinae; all carinae moderately marked. Tegument weakly granular. Telson with rough granules ventrally; other surfaces smooth; presence of a moderate setation; aculeus

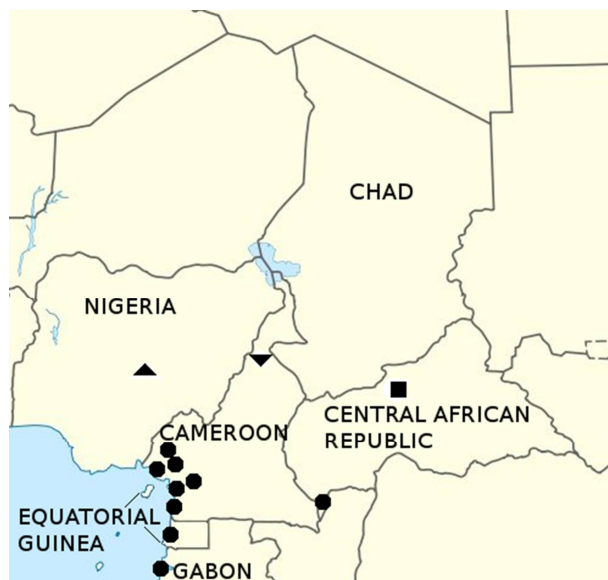


Fig. 10. Map of Central African Republic and neighboring countries, showing the collection localities of *Babycurus brignolii* sp. n. (square), *Babycurus prudenti* Lourenço, 2013 (inverted triangle), *Babycurus ugartei* Kovařík, 2000 (triangle) and *Babycurus buettneri* Karsch, 1886 (circle). Data are from PRENDINI (2004) and LOURENÇO (2013).

almost as long as vesicle, and strongly curved; subaculear tooth strong and spinoid. Cheliceral dentition characteristic of the family Buthidae (VACHON, 1963); basal teeth on movable finger vestigial and fused; ventral aspect of both finger and manus with long dense setae. Pedipalps: femur pentacarinata, crenulate; patella with 6-7 carinae, crenulated; internal face of patella with 5-6 spinoid granules; chela with some vestigial carinae; all faces smooth. Fixed and movable fingers with 9-10 rows of granules; internal and external accessory granules present. Trichobothriotaxy A- β (beta), orthobothriotaxy (VACHON, 1974, 1975). Legs: tarsi with numerous fine setae ventrally. Tibial spurs reduced and only present on leg IV; pedal spurs present on all legs but reduced.

Morphometric values (in mm) of male holotype. Total length (including telson) 28.6. Carapace: length 3.4; anterior width 2.2; posterior width 3.2. Mesosoma length 9.1. Metasomal segment I: length 1.8, width 1.9; II: length 2.2, width 1.7; III: length 2.4, width 1.6; IV: length 2.8, width 1.5; V: length 3.7, width 1.4, depth 1.3. Telson length 3.2. Vesicle: width 1.0, depth 0.9. Pedipalp: femur length 2.7, width 0.9; patella length 3.5, width 1.2; chela length 5.6, width 0.9, depth 0.9; movable finger length 3.8.

Ecological notes. The area in which *Babycurus brignolii* sp. n. was collected is mostly covered by Savannah and Woodland Savannah formations which represent a transitional zone between the Sahel and more humid forests in Central African Republic (Fig. 10). However, important amounts of these natural formations are gradually replaced since some years by agriculture activities (MAYAUX *et al.*, 1999). The formations within the National Park, are, however better preserved than those found outside its limits.

It is quite possible that with increasing anthropic action on the environment, several scorpion species will experience a significant regression of their population in numbers and range of distribution.

In contrast, the area in which *Babycurus prudenti* was collected is the transitional zone between the Sahel and savannah formations. Most of these natural formations have been replaced in recent years by agriculture. The new species was collected in cotton fields with ‘Barber Traps’ used to test the efficacy of treatment on seeds. In present days, most of the area of the Senguéré-Djoï is used for

agriculture, however some of the parcels may also consist of bushes.

The natural environment of *Babycurus ugartei* seems quite different from those of the other two *Babycurus* species discussed here. According to KOVAŘÍK (2000), *B. ugartei* was collected in Plateau Lafia in Nigeria. Lafia is a Nigerian town located in the Nassarawa state which is in the frontier of the Plateau state. In this central area of Nigeria many plateaus are present and climatic conditions are more mesic and vegetation is much denser than what is currently present in both northern Cameroon or Central African Republic (AKOSIM *et al.*, 2007).

References

- AKOSIM C., KWAGA B.T., ALI A. & MAMMAN G.S., 2007. Flora resources and structure in Pandam Wildlife Park, Pandam, Plateau State, Nigeria. *Agriculture Journal*, 2: 740-747.
- FET V. & LOWE G., 2000. Family Buthidae C.L. Koch, 1837 (pp. 54-286). In: FET V., SISSOM W.D., LOWE G. & BRAUNWALDER M.E. (ed.). Catalog of the Scorpions of the world (1758-1998). *The New York Entomological Society*, New York, 690 pp.
- HJELLE J.T., 1990. Anatomy and morphology (pp. 9-63). In: POLIS G.A. (ed.). The Biology of Scorpions. *Stanford University Press*, Stanford, CA, 587 pp.
- KOVAŘÍK F., 2000. Revision of *Babycurus* with descriptions of three new species (Scorpiones: Buthidae). *Acta Societatis Zoologicae Bohemoslovenicae*, 64: 235-265.
- KRAEPELIN K.M.F.M., 1899. Scorpiones und Pedipalpi. Das Tierreich. 8. Lieferung. *Verlag von R. Friedländer und Sohn*, Berlin, 265 pp.
- LOURENÇO W.R., 1986. Les scorpions de la Station Ecologique de LAMTO (Cote d'Ivoire). *Bulletin du Muséum national d'Histoire naturelle*, Paris. 4^e sér., 8: 199-208.
- LOURENÇO W.R., 2013. A new species of *Babycurus* Karsch, 1886 from northern Cameroon (Scorpiones: Buthidae). *Arthropoda Selecta*, 22 (4): 343-348.
- LOURENÇO W.R., 2016. A new species of the genus *Buthus* Leach, 1815 (Scorpiones: Buthidae) from dry forest formations in Central African Republic. *Serket*, 15 (2): 71-79.
- LOURENÇO W.R., BRUEHMUELLER RAMOS E.C. & CLOUDSLEY-THOMPSON J.L., 2005. Further notes on the scorpion inhabiting the savannas of the Lamto Ecological Station in Côte d'Ivoire. *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg*, 14: 253-263.
- MAYAUX P., RICHARDS T. & JANODET E., 1999. A vegetation map of Central Africa derived from satellite imagery. *Journal of Biogeography*, 25: 353-366.
- PRENDINI L., 2004. On the scorpions of Gabon and neighboring countries, with a reassessment of the synonyms attributed to *Babycurus buettneri* Karsch and a redescription of *Babycurus melanicus* Kovařík. *California Academy of Sciences Memoir*, 28: 235-267.
- ROSSI A., 2014. Notes on the distribution of *Pandinus (Pandinus)* Thorell, 1876 and *Pandinus (Pandinurus)* Fet, 1997 with the descriptions of two new species from Central African Republic. *Onychium*, 10: 10-31.
- STAHNKE H.L., 1970. Scorpion nomenclature and mensuration. *Entomological News*, 81: 297-316.
- VACHON M., 1952. Études sur les scorpions. *Institut Pasteur d'Algérie*, Alger, 482 pp.
- VACHON M., 1963. De l'utilité, en systématique, d'une nomenclature des dents des chélicères chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, Paris. 2^e sér., 35: 161-166.
- VACHON M., 1974. Étude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriax et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, Paris, 3^e sér., 140: 857-958.
- VACHON M., 1975. Sur l'utilisation de la trichobothriotaxie du bras des pédipalpes des Scorpions (Arachnides) dans le classement des genres de la famille des Buthidae Simon. *Comptes Rendus de l'Académie des Sciences*, Paris, sér. D, 281: 1597-1599.

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