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THE TRUE STATUS OF THE SPECIMEN BELONGING TO THE GENUS *ORTHOCHIRUS* KARSCH, 1891 (SCORPIONES: BUTHIDAE) FROM AGUELHOK (AGUEL'HOC), MALI

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Abstract: The enigmatic specimen of *Orthochirus* Karsch, 1891 reported almost 70 years ago by Vachon from Aguelhok (Aguel'hoc), in the *former 'Afrique occidentale française'* (now in Mali), has been studied, and its taxonomic status can now be clarified. It actually belongs to a new species, here described, and is the basis for the first confirmed record of this genus from Mali.
Key words: Scorpiones, Buthidae, new species, Sahara, Mali.

El verdadero estatus del espécimen perteneciente al género *Orthochirus* Karsch, 1891 (Scorpiones: Buthidae) de Aguelhok (Aguel'hoc), Mali
Resumen: El estudio del enigmático espécimen de *Orthochirus* Karsch, 1891 procedente de Aguelhok (Aguel'hoc), en la antigua 'África Occidental Francesa' (ahora perteneciente a Mali), que citó Vachon hace casi 70 años ha permitido esclarecer su estatus taxonómico. En realidad, representa una especie nueva, que aquí se describe, constituyendo el primer registro confirmado del género para Mali.
Palabras clave: Scorpiones, Buthidae, especie nueva, Sahara, Mali.

Taxonomy/taxonomía: *Ortochirus milloti* **sp. n.**

Introduction

During the last decade, attempts were done to clarify the taxonomic position of most African populations of the scorpion genus *Orthochirus* Karsch, 1891 (Lourenço & Leguin, 2011a,b; Lourenço *et al*., 2012). In particular, the status of two classical species, *Orthochirus aristidis* (Simon, 1882) and *Orthochirus innesi* Simon, 1910 were clarified. These studies equally also conducted to the description of several new species from the Western and Central portion of North Africa, namely from Algeria, Morocco, Mauritania and Chad (Lourenço & Leguin, 2011a,b; Lourenço *et al*., 2012). More recently, new studies lead to the clarification of some Algerian populations (Lourenço & Sadine, in press), and also allow to reconsider the status of some Eastern North-African populations. A particular new species was also described from Somalia (Lourenço & Ythier, 2021).

In the present note I try to focus on a poorly studied specimen of *Orthochirus*, previously cited by Vachon (1952) and to some extent associated with *Orthochirus innesi*. According to Vachon (1952) this juvenile specimen was collected by the late Professor Jacques Millot in 1937 in the region of Aguelock (Adrar des Iforas) in the ancient 'Afrique occidentale française' (AOF), region today located in Mali (Fig. 1 map). According to unpublished notes of M. Vachon, he first associated this specimen to *O. innesi*, but subsequently even suggested a new genus to accommodate it. After some research on the collections of the Muséum in Paris, I was able to locate the specimen registered under the number (RS-4761). The specimen is clearly poorly preserved, as already cited by Vachon (1952), but most important characters to a diagnosis are still available. A precise analysis of several characters and in particular those related to the trichobothriotaxy, confirm that the specimen does belongs to the genus *Orthochirus* but clearly represents à distinct species from *O. innesi*. A new species is described here, based on morpho-

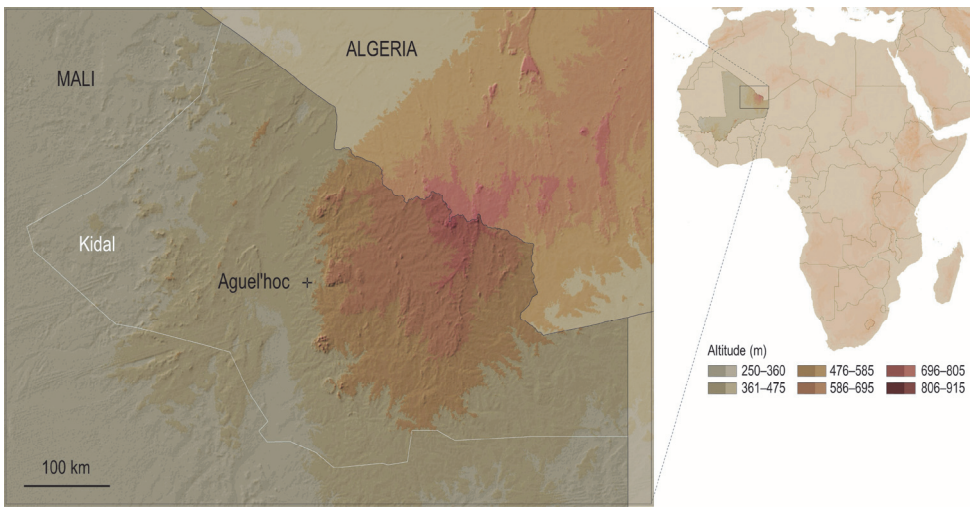
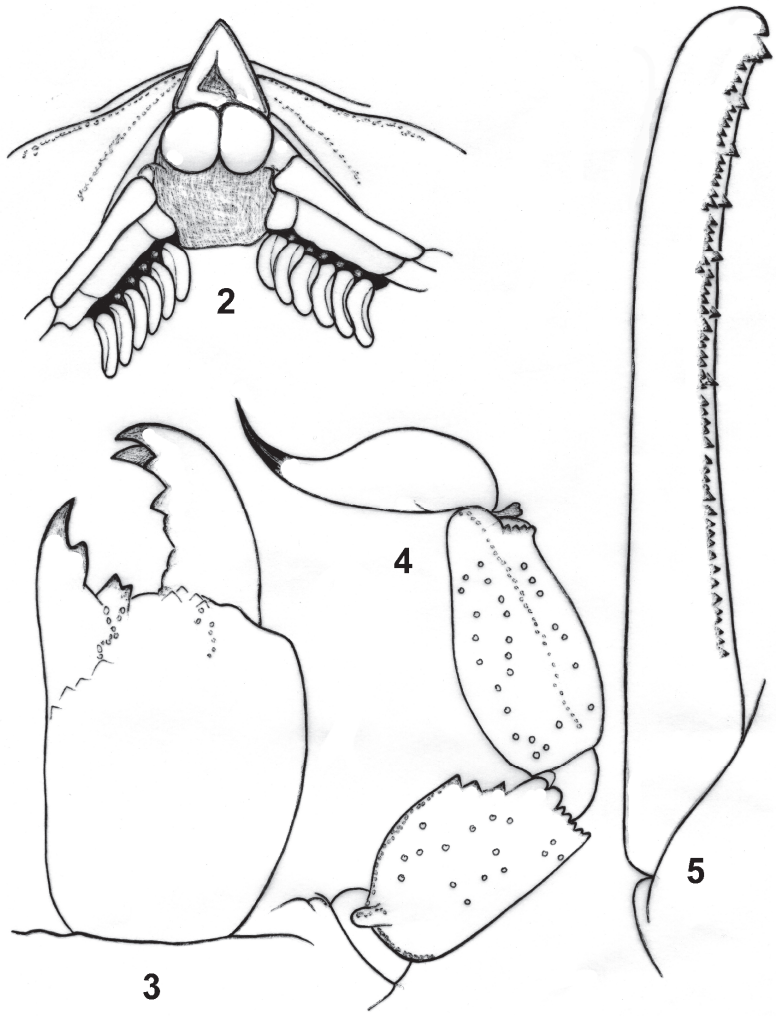


Fig. 1. Map of Mali, showing the general relief of the region and the emplacement of Aguel'hoc.



Figs. 2-5. *Orthochirus milloti* **sp. n.** Juvenile male holotype. **2**. Sternum, genital operculum and proximal zone of pectines. **3**. Chelicera, dorsal aspect. **4**. Metasomal segments IV, V and telson, lateral aspect. **5**. Cutting edge of movable finger with rows of granules.

logical characters but also on some ecological characteristics, as described by J. Millot on some personal notes (see ecological comments). This study seems totally justified since the region of collection of this new species is presently inaccessible due to local political problems.

Since the only aim of this study is to clarify the status of this Malian *Orthochirus* specimen, no further discussions are provided on other historical or polemic aspects surrounding the genus *Orthochirus*; most available data can be found in other publications (Lourenço & Leguin, 2011a,b; Lourenço *et al*., 2012; Lourenço & Ythier, 2021; Lourenço & Sadine, 2021-in press).

Methods

Illustrations and measurements were obtained using a Wild M5 stereo-microscope with a drawing tube and ocular micrometre. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Results

Family **Buthidae** C. L. Koch, 1837

Genus ***Orthochirus*** Karsch, 1891

***Orthochirus milloti* sp. n.** (Figs. 2-11)

Orthochirus innesi?: Vachon, 1952: 228-229, fig. 312 (misidentification, specimen from "Aguelok").

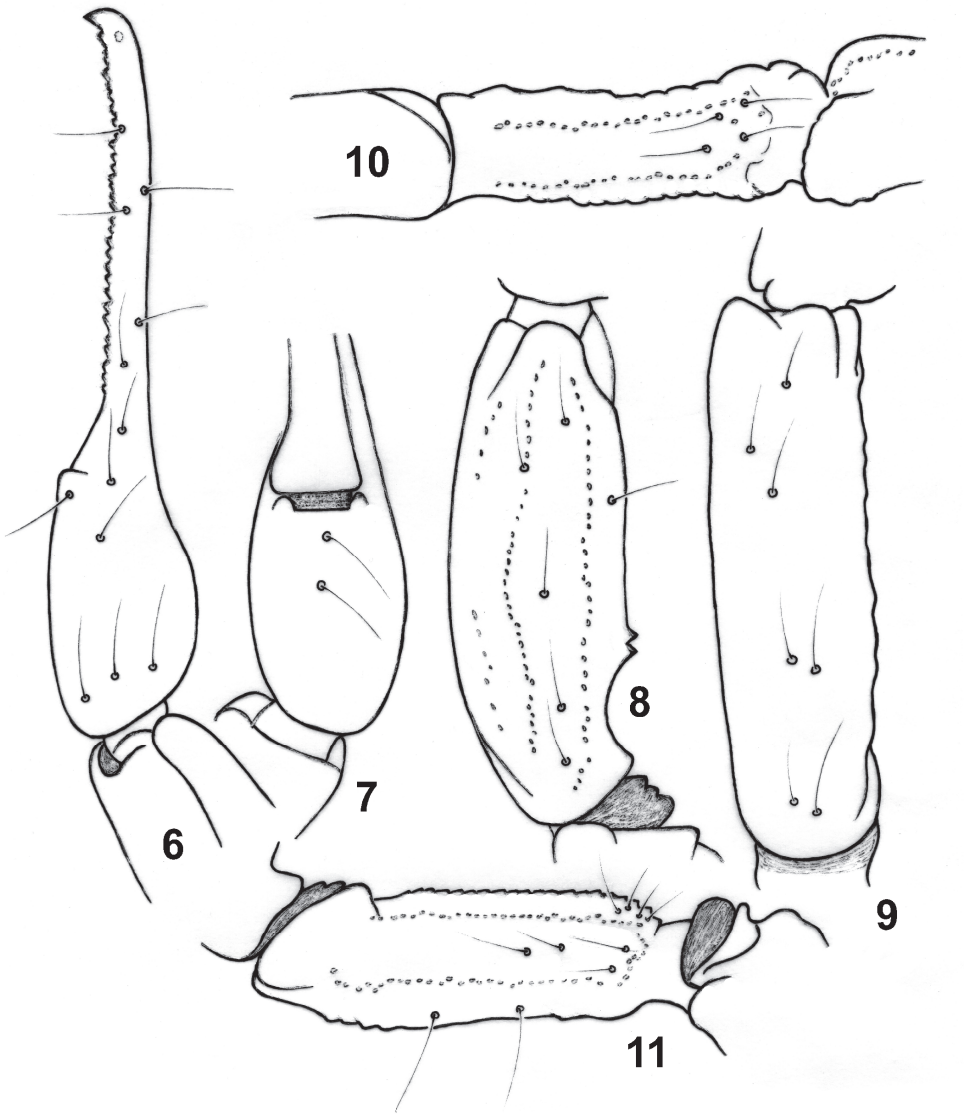
HOLOTYPE: Juvenile male, Aguelhok (Aguel'hoc), AOF [now Mali], 1937 (J. Millot). Holotype is deposited in the Muséum national d'Histoire naturelle, Paris (RS-4761). Since the specimen is globally disarticulated a photo of the habitus does not appears as useful at this stage.

ETYMOLOGY: Specific name honours the late Professor Jacques Millot, the collector of the new species and eminent arachnologist.

DIAGNOSIS. Scorpions probably of small to moderate size in relation to other African species of the genus; the juvenile male has a total length of 19.01 mm. General coloration reddish-yellow to yellow-brown. Anterior margin of carapace slightly concave. Metasomal segments moderately enlarged posteriorly. Ventral aspect of metasomal segment V without granulations posteriorly. General granulation moderately to weakly marked. Dorsal furrows of metasomal segments not granulated. Fixed and movable fingers of pedipalps with 7-8 rows of denticles; accessory denticles present. Pectines with 17-17 teeth in male. Trichobothriotaxy*:* A-β (Beta) minor-neobothriotaxy; absence of $\mathbf{d_2}$. Trichobothria **et** and **est** of fixed finger in a marked distal position (Figs. 6-11).

DESCRIPTION of the juvenile male holotype. (Measurements in table I)

Coloration. Basically reddish-yellow to yellow-brown. Prosoma: carapace light brown; median and lateral eyes surrounded by black pigment. Mesosoma brownish, slightly darker than carapace. Metasomal segments yellow-brown;



Figs. 6-11. *Orthochirus milloti* **sp. n.** Juvenile male holotype. Trichobothrial pattern. **6-7**. Chela, dorso-external and ventral aspects. **8-9**. Patella, dorsal and external aspects. **10-11**. Femur, internal and dorsal aspects.

telson with the same coloration as segment V; aculeus reddish-yellow with a darker tip. Metasomal carinae slightly darker than the cuticle. Venter yellow; genital operculum and pectines pale yellow. Chelicerae yellow without spots; fingers reddish. Pedipalps, femur, patella and chela yellow. Legs yellow without spots.

Morphology. Carapace weakly granular; anterior margin slightly concave. Carinae and furrows weak. Median ocular tubercle slightly anterior to the centre of the carapace; median eyes separated by more than one ocular diameter. Three pairs of lateral eyes. Sternum subtriangular to subpentagonal, wider than long at the base. Mesosoma: tergites with weakly marked granulations; median carina moderate to weak in all tergites. Tergite VII pentacarinate with moderately marked carinae. Venter: genital operculum not elongated, divided longitudinally into two sub-oval plates. Pectines: pectinal tooth count 17-17; basal middle lamellae of each pecten not dilated. Sternites with very thin granulations and small slit-like spiracles; VII with four weak carinae. Metasomal segments rounded, with carinae moderately to weakly marked; granulations moderately to weakly marked; segments I and II with ten carinae; segment III with eight carinae; segments IV and V with punctuations; ventral aspect of segment V without granulations in the distal region. Dorsal furrows without granulations. Telson smooth without punctuations; aculeus with about the same length as vesicle and moderately curved; subaculear tooth absent. Cheliceral dentition characteristic of the family Buthidae (Vachon, 1963); movable finger with basal teeth reduced and almost fused; ventral aspect of both finger and manus with thin setae. Pedipalps: femur with five carinae; patella with 6-7 weakly marked carinae; chela without carinae, smooth. Fixed and movable fingers with 7-8 rows of granules. Trichobothriotaxy: A-β (beta); minor-neobothriotaxy with absence of $\mathbf{d_2}$ (Vachon, 1974, 1975); trichobothria **et** and **est** of fixed finger in a marked distal position; all bothria of small size. Legs: tarsus with two rows of setae ventrally. Tibial and pedal spurs weakly marked.

RELATIONSHIPS: Originally the new species, *Orthochirus milloti* sp. n. was associated by Vachon (1952) to *Orthochirus innesi* Simon, but both species can be distinguished by a number of characters: (i) a paler coloration pattern in the new species; body more to light brown, pedipalps and legs yellow, as already described by Vachon (1952), (ii) a possible smaller overall size*, (iii) anterior margin of carapace slightly concave, (iv) granulations and carinae globally weakly marked; differences between adults and pre-adults being minor, (v) trichobothria **et** and **est** of fixed finger in a marked distal position (Figs. 6-11).

*Note: taking in account the average total length (21 to 30 mm) of moderate-size *Orthochirus* species and applying the theoretical morphometric growth factor for arthropods defined by Dyar (1890) and Przibram & Megusar (1912), it is

possible to suggest that the described specimen is a third or fourth instar juvenile. This is excluding the pro-juvenile instar and counting only juvenile instar from I to IV for *Orthochirus* species which normally reach adulthood with 4 to 5 molts (Lourenço, 2007).

ECOLOGICAL COMMENTS. According to some personal notes of J. Millot, the *Orthochirus* specimen was collected in a zone less arid than that of the site of Aguel'hoc, corresponding more to the Tilemsi Valley where a number of trees could be observed. The scorpion was found under a tree bark. The region of Aguel'hoc corresponds to an arid environment, located at the North of the Tilemsi Valley. In fact, the global territory of this village comprises quite different ecological habitats including some mountain zones on its oriental portion, namely the Tigharghar Massif which contains most water reserves of the entire region.

The field expedition of J. Millot performed on the AOF territory during the late 1930s lead to the collection of other scorpion specimens, and in particular those which served for the description of *Butheloides milloti* Vachon, 1948, collected more to the South at Sangha, region of Mopti, Bandiagara. Specimens equally collected under tree bark.

Table I. Comparative morphometric values (in mm) of the *Orthochirus innesi*, female topotype and *Orthochirus milloti* **sp. n**. juvenile male holotype. Total length includes telson.

	O. innesi	*O. milloti* **sp. n.**
Total length	32.00	19.01
Carapace:		
Length	3.80	2.00
Anterior width	2.50	1.54
Posterior width	4.80	3.00
Mesosoma length	8.80	4.70
Metasomal segment I:		
Length	2.10	1.47
Width	3.20	1.60
Metasomal segment II:		
Length	2.80	1.60
Width	3.30	1.67
Metasomal segment III:		
Length	3.10	1.75
Width	3.50	1.75
Metasomal segment IV:		
Length	3.80	2.14
Width	3.60	1.87
Metasomal segment V:		
Length	4.00	2.74
Width	3.50	1.94
Depth	2.50	1.41
Telson length	3.60	2.61
Width	1.40	0.94
Depth	1.20	0.87
Femur:		
Length	2.70	1.67
Width	0.80	0.61
Patella:		
Length	3.30	2.14
Width	1.30	0.81
Chela:		
Length	4.70	3.11
Width	0.90	0.67
Septh	1.00	0.74
Movable finger:		
Length	3.30	2.21

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Bibliography

DYAR, H. 1890. The number of molts in Lepidopterous larvae. *Psyche*, **5**: 420-422.

HJELLE, J. T. 1990. Anatomy and morphology. Pp. 9-63, *In*: Polis, G. A. (ed.). *The Biology of Scorpions*. Stanford Univ. Press, Stanford: 587 pp.

LOURENÇO, W. R. 2007. Litter size in micro-buthoid scorpions (Chelicerata, Scorpiones). *Boletin de la Sociedad Entomológica Aragonesa*, **40**: 473-477. Available at www.sea-entomologiaorg

LOURENÇO W. R. & E.-A. LEGUIN 2011a. Further considerations on the species of the genus *Orthochirus* Karsch, 1891 from Africa, with description of three new species (Scorpiones: Buthidae). *Euscorpius*, **123**: 1-19.

LOURENÇO W. R. & E.-A. LEGUIN 2011b. One more new species of the genus *Orthochirus* Karsch, 1891 from Africa (Scorpiones: Buthidae). *Euscorpius*, **135**: 1-6.

LOURENÇO, W. R. & S. E. SADINE 2021(in-press). A new contribution to the knowledge of the Algerian scorpion fauna with description of a new species of the genus *Orthochirus* Karsch, 1891 (Scorpiones: Buthidae). *Bulletin de la Société Entomologique de France*, **126** (2).

LOURENÇO, W. R. & E. YTHIER 2021. A particular new species of *Orthochirus* Karsch, 1891 from Somalia (Scorpiones: Buthidae). *Serket*, **17**(4): 335-349.

LOURENÇO, W. R., B. DUHEM & J. L. CLOUDSLEY-THOMPSON 2012. Scorpions from Ennedi, Kapka and Tibesti the mountains of Chad, with descriptions of nine new species (Scorpiones: Buthidae, Scorpionidae). *Arthropoda Selecta*, **21**(4): 307-338.

PRZIBRAM, H. & F. MEGUSAR 1912. Wachstummessungen an *Sphodromantis bioculata* Burm. 1. Länge und Masse. *Archiv für Entwickungsmechanik der Organismen*, **34**: 680-741.

STAHNKE, H. L. 1970. Scorpion nomenclature and mensuration. *Entomological News*, **81**: 297-316.

VACHON, M. 1952. *Etudes sur les scorpions*. Publications de l'Institut Pasteur d'Algérie, 482 pp. Alger.

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 2è sér., **35**(2): 161-166.

VACHON, M. 1974. Etude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, Paris, 3è sér., n° 140, Zool., **104**: 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 des séances de l'Académie des Sciences*, Paris, sér. D, **281**: 1597-1599.