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A NEW SPECIES OF *LYCHAS* C. L. KOCH, 1845 FROM KO TAO ISLAND, THAILAND (SCORPIONES: BUTHIDAE)

Wilson R. Lourenço

Muséum national d'Histoire naturelle, Sorbonne Universités, Institut de Systématique, Evolution, Biodiversité (ISYEB), UMR7205-CNRS, MNHN, UPMC, EPHE, CP 53, 57 rue Cuvier, 75005 Paris, France. wilson.lourenco@mnhn.fr

Abstract: A new species, *Lychas kotao* **sp. n.**, is described from the island of Ko Tao in Thailand, on the basis of a single female. It was found in a small cavity at approximately 260 metres of altitude, in an area of dense bush vegetation in the north-eastern portion of the island. The new species is characterised by a moderate to small size with respect to the genus, with a total length of 41.7 mm. The general coloration ranges from yellow to pale yellow and is marked by faded pigmentation over the body and appendages; the chelicerae show a peculiar pale reticular pigmentation. Pectines are short and small, with 19-20 teeth.
Key words: Scorpiones, Buthidae, *Lychas*, new species, Ko Tao Island, Thailand.

Una especie nueva de *Lychas* C.L. Koch, 1845 de la isla de Ko Tao, Tailandia (Scorpiones: Buthidae)
Resumen: Se describe una especie nueva, *Lychas kotao* **sp. n.**, de la isla de Ko Tao, en Tailandia, a partir de una única hembra. Se encontró en una pequeña cavidad a unos 260 metros de altitud, en una zona de matorral denso del noreste de la isla. La especie nueva se caracteriza por un tamaño entre mediano y pequeño, comparado con el habitual del género, con una longitud total de 41'7 mm. La coloración general oscila entre amarillo y amarillo pálido, y lleva pigmentación poco nítida en el cuerpo y apéndices; los quelíceros tienen una peculiar pigmentación pálida, reticular. Las pectinas son cortas y pequeñas, y cuentan con 19-20 dientes.
Palabras clave: Scorpiones, Buthidae, *Lychas*, especie nueva, isla de Ko Tao, Tailandia.

Taxonomy / Taxonomía: *Lychas kotao* **sp. n.**

Introduction

As already outlined in several previous publications, the scorpion fauna of Asia and in particular of Southeast Asia can yet be considered as poorly known (e.g., Lourenço, 2014, Lourenço, 2017a,b; Pham *et al*., 2017). This situation is still more significant concerning the faunas of small islands of this region.

Lychas can be considered as a basal element among buthids (Lourenço, 2011), what is also attested by fossil records from early Cenozoic (Lourenço & Weitschat, 1996). The standard characters defining this genus are precise and clear; consequently, the recent division of *Lychas* in several new genera by Kovařík (2019) is considered as unjustified, corresponding rather to an artefact to create artificial new taxa. This kind of action is a typical practice of Vandal's taxonomists (Kaiser, 2013; Measey, 2013). This decision is therefore ignored at present. For more detailed historical aspects about the genus *Lychas*, readers can refer to Lourenço (2017b).

Methods

Illustrations and measurements were produced using a Wild M5 stereomicroscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations are those of Vachon (1974) and morphological terminology mostly follows Hjelle (1990) and Vachon (1952).

Taxonomic treatment

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

Genus ***Lychas*** C. L. Koch, 1845

***Lychas kotao* sp. n.**
Fig. 1-11.
FEMALE HOLOTYPE, Thailand, Ko Tao Island, 23/I/1999 (P. Studer coll. – leg. D. Huber). Scorpion found in a small cavity in a zone of dense bush vegetation, at approximately 260 m of altitude. Holotype will be deposited in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN-RS-9151).

ETYMOLOGY: The specific name is placed in apposition to the generic name and refers to the Ko Tao Island where the new species was found.

DIAGNOSIS. *Lychas* species of moderate to small size, measuring 41.7 mm in total length for female. General coloration ranging from yellow to pale yellow, marked by a faded pigmentation over the body and appendages; chelicerae with a pale reticular pigmentation (diagnostic). Carinae and granulations moderately marked. Carapace weakly emarginated. Pectines small and short; pectinal tooth count 19-20 (diagnostic). Pedipalps not elongated; dentate margins of fixed and movable fingers with 6-6 almost linear rows of granules. Internal face of pedipalp patella with 8-9 spinoid granules. Telson moderately elongated; subaculear tubercle strongly developed and more to spinoid; several ventral granules present.

RELATIONSHIPS: From its general morphology *Lychas kotao* sp. n. shows several characters which clearly associate it to *Lychas mucronatus* (Fig. 12-17), a species known from several localities in Southeast Asia – other localities, however, such as India may require yet confirmation. The new species can, however, be distinguished from *L. mucronatus* by a number of features: (i) paler general coloration pattern, and in special a quite distinct distribution of the variegated spots on the chelicerae; this character is successful used in the identification of the species of the genus *Ananteris* (Lourenço, 1982), and both genera belong to the same "*Ananteris* group" (Lourenço, 2011), (ii) pectines smaller and shorter in size with a slightly lower number of teeth, (iii) some distinct morphometric values (see Table I). Moreover, the new species was found in an island, in a reasonable distance from the continent.



Fig. 1-2. *Lychas kotao* **sp. n.**, female holotype. Habitus, dorsal and ventral aspects.

Table I. Morphometric values (in mm) of *Lychas kotao* sp. n. and *Lychas mucronatus* from Laos (RS-9153). * Including telson length.

Characters	*L. kotao* sp. n.	*L. mucronatus*	
	♀Holotype	♀	♂
Total Length*	41.7	49.6	47.1
Carapace length	4.7	6.0	5.5
- anterior width	3.2	3.9	3.6
- posterior width	4.8	5.6	5.7
Mesosoma length	12.6	13.4	15.2
Metasomal segment I			
- length	2.7	3.4	3.1
- width	2.7	3.6	3.2
Metasomal segment II			
- length	3.3	4.1	3.6
- width	2.5	3.6	2.9
Metasomal segment III			
- length	3.5	4.4	3.8
- width	2.4	3.5	2.9
Metasomal segment IV			
- length	4.3	5.4	4.5
- width	2.3	3.4	2.8
Metasomal segment V			
- length	5.7	7.1	6.2
- width	2.2	3.4	2.7
- depth	2.1	2.8	2.5
Telson length	4.9	5.8	5.2
- width	1.7	2.4	1.9
- depth	1.6	2.3	1.8
Pedipalp:			
- Femur length	4.3	5.7	4.9
- Femur width	1.4	1.9	1.5
- Patella length	4.9	6.2	5.5
- Patella width	1.9	2.3	2.0
- Chela length	7.7	10.5	8.6
- Chela width	1.6	3.3	1.7
- Chela depth	1.5	2.8	1.6
- Movable finger, length	5.4	6.3	5.9

DESCRIPTION OF THE NEW SPECIES

Coloration ranging from yellow to pale yellow with a fade marbled pigmentation over the body and appendages. Prosoma: Carapace yellow with some faded reddish-brown spots; anterior spots forming a rough triangle running from the median eyes to the anterior margin; eyes surrounded by black pigment. Mesosoma: Tergites yellow with confluent faded reddish stripes, less marked on VI-VII. Metasomal segments yellow to reddish-yellow; segment V and telson more to reddish with weakly marked pigments. Vesicle reddish; aculeus reddish-yellow at base and reddish at tip. Venter pale yellow all over; only sternite VII shows some faded reddish pigments; genital operculum and pectines paler than sternites. Chelicerae yellow with pale reddish variegated spots which only partially cover the dorsal surface (diagnostic); fingers yellow, teeth redish. Pedipalps: Femur and patella yellow; chela pale yellow with reddish fingers; pigmentation quite diffused on femur, better marked on patella, almost absent on chela; rows of granules on dentate margins of fingers reddish. Legs pale yellow with faded infuscations.

Morphology. Prosoma: Anterior margin of carapace weakly emarginated. Carapace carinae moderately marked; anterior median and posterior median carinae weakly developed; central lateral carinae weak. Intercarinal spaces weakly to moderately granular. Median ocular tubercle anterior to the centre of the carapace; median eyes separated by approximately one ocular diameter. Three pairs of lateral eyes. Mesosoma: Tergites I-VI with a median carina; weak on I, weak to moderate on II-VI. Tergite VII pentacarinate, with lateral pairs of carinae moderate to strong; median carinae present in proximal half, moderately developed. Intercarinal spaces moderately to strongly granular. Sternites III to VI smooth; VII with a weakly marked granulation; spiracles long; sternite VII with four vestigial carinae. Pectines small and short; pectinal teeth count 19-20. Metasomal segments I and II with 10 carinae, crenulate; intermediate carinae incomplete on II; III-IV with 8 carinae, crenulate. Segment V with five carinae; presence of one posterior spinoid granule on dorsal and subdorsal carinae of segments I-III. Dorsal furrows of all

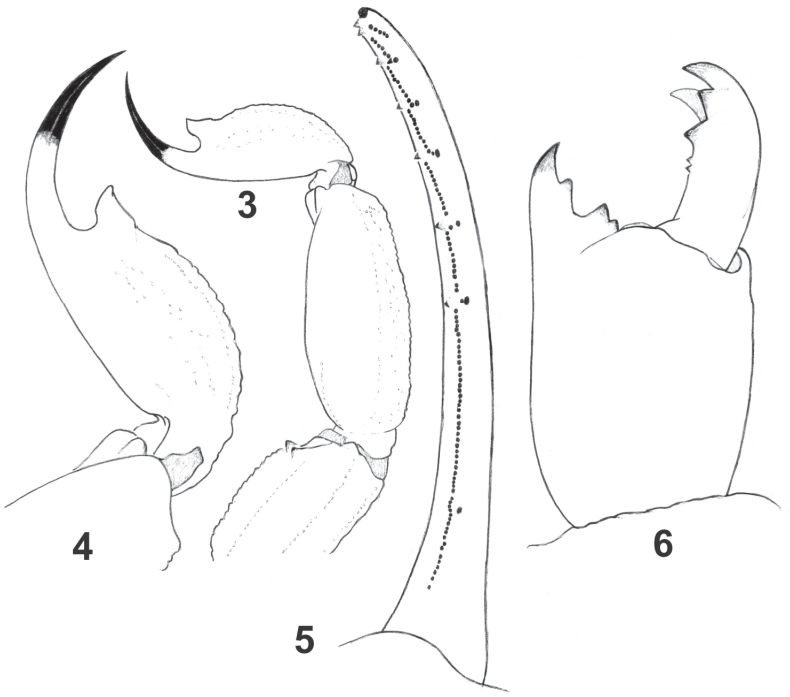


Fig. 3-6. *Lychas kotao* **sp. n.**, female holotype. **3**. Metasomal segments IV –V and telson, lateral aspect. **4**. Telson in detail. **5**. Cutting edge of chela movable finger showing series of granulations. **6**. Chelicera, dorsal aspect.

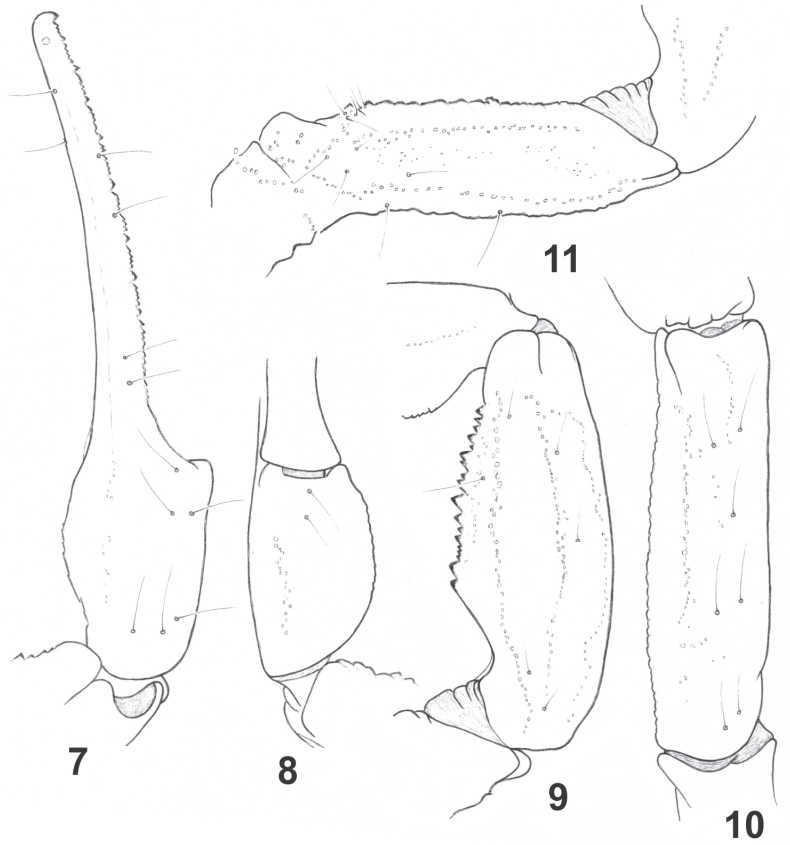


Fig. 7-11. *Lychas kotao* **sp. n.**, female holotype. Trichobothrial pattern. **7-8**. Chela, dorso-external and ventral aspects. **9-10**. Patella, dorsal and external aspects. **11**. Femur, dorsal aspect.

segments weakly developed with minute granulations; intercarinal spaces weakly granular. Telson moderately to weakly elongated and slightly globular; weakly granulated with three vestigial ventral carina; subaculear tubercle strongly marked and more to spinoid. Chelicerae with dentition characteristic of buthids (Vachon, 1963); two reduced basal teeth on movable finger but not fused. Pedipalps: Femur pentacarinate; all carinae crenulate. Patella with seven carinae, crenulate; dorsointernal carinae with 8-9 spinoid granules. Chela with weakly marked carinae; internal face with a few granules. Intercarinal spaces weakly granular. Dentate margins on fixed and movable fingers composed of 6-6 almost linear rows of granules. Trichobothrial pattern type A, orthobothriotaxic (Vachon, 1974); dorsal trichobothria of femur in β (beta) configuration (Vachon, 1975). Legs: ventral aspect of tarsi with a brush-like group of setae. Tibial spurs present on legs III and IV but quite reduced on III; pedal spurs present and moderately developed on all legs (Measurements on Table I)

DISTRIBUTION. Only known from the type locality.

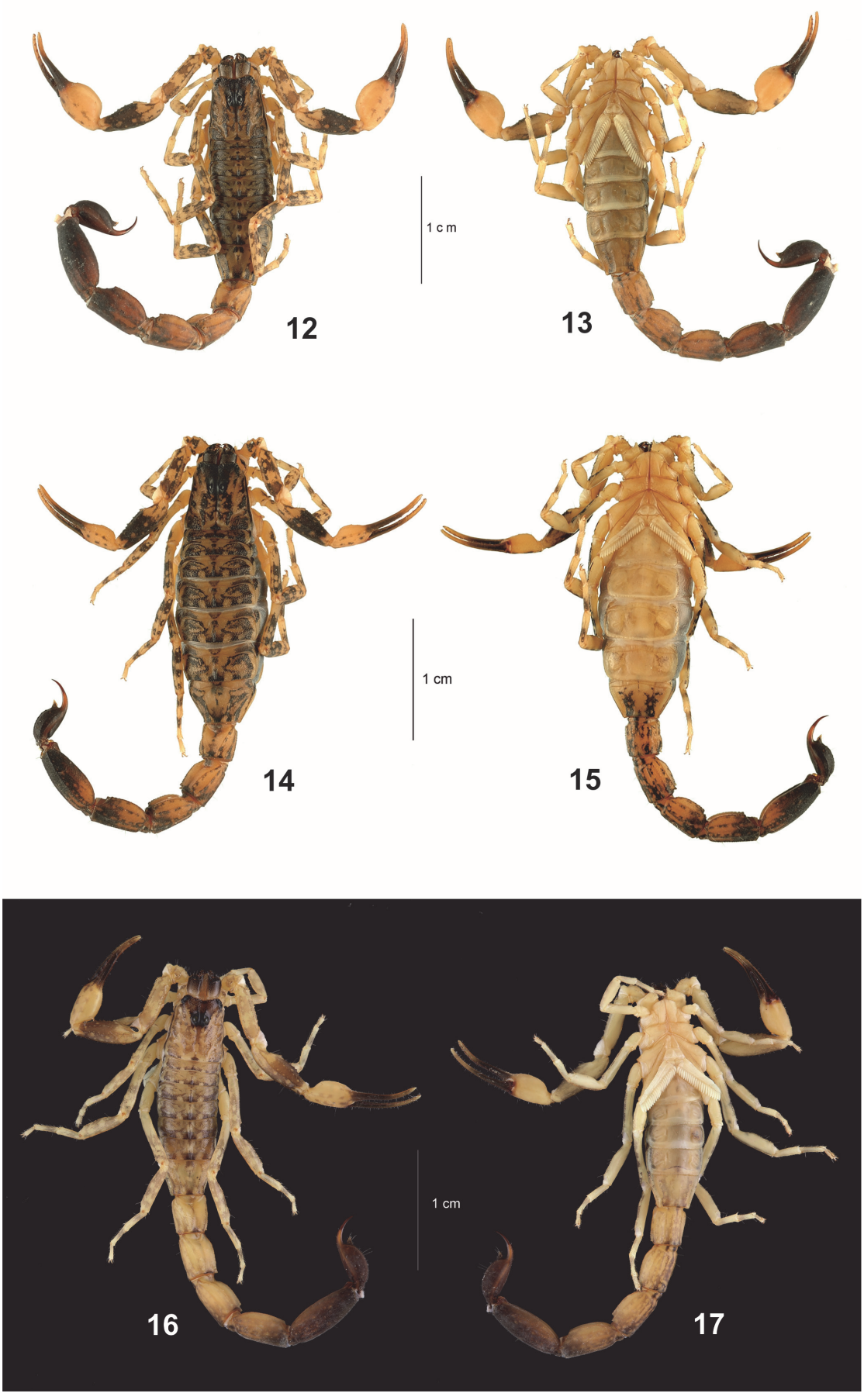


Fig. 12-15. *Lychas mucronatus* from the canopy in Laos's rainforest. **12-13**, male. **14-15**, female. Habitus, Dorsal and ventral aspects (RS-9153). **Fig. 16-17**. *Lychas mucronatus* male from South Vietnam. To notice the much paler coloration of the body in relation to the specimens from Laos. The chelicerae pigmentation, however, is constant (RS-9152).



Fig. 18. Map of Thailand showing Ko Tao Island (see arrow); type locality of the new species.

Ecological aspects of Ko Tao Island (Fig. 18)

Ko Tao, together with Ko Nang Yuan, forms a small archipelago with a total area of 19.2 square kilometres. Ko Tao is approximately 7.6 km long and 3.4 large. Coordinates: 10°5'24" N - 99°50'17" E. The coastline is predominantly steep, rocky shoreline. A large percentage of Ko Tao is mountainous with only about 30% of flat land. The mountains of Ko Tao stretch from north to south and the highest point in the island reaches 374 metres above sea level.

The local climate is tropical and wet with monsoon normally arriving between the second half of November and beginning of December. Heavy rain and strong winds are frequent during this period (Scott & Phillips, 2011).

The vegetation types found in the island can be classified in four main types:

a. Dry evergreen forest. This is the most common type of vegetation found in Ko Tao and it globally covers the mountain tops. This is the type of vegetation of the area in which the scorpion was found (Fig. 19).

b. Mixed deciduous forest. This type of vegetation is mostly found on the foothills in the northeast portion of Ko Tao and is mainly composed of scrub and small trees which shed their leaves during the dry season.



Fig. 19. Photo showing the Ko Tao summits with the typical vegetation (modified from TripAdvisor).

c. Dry evergreen forest. Composed mainly by the 'Koi Naam' tree. This type of vegetation is found on the hills in the southeast portion of the island.

d. Coastal forest. Most of the trees are salt-tolerant plants (Halophytes) and resistant to drought and dehydration. They normally have bent trunks and short branches with thick and hard leaves (Scott & Phillips, 2011).

The holotype (only examined material) was found in a small cavity, approximately 260 meters of altitude, in an area of dense bush vegetation.

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Bibliography

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

KAISER, H. 2013. The taxon filter, a novel mechanism designed to facilitate the relationship between taxonomy and nomenclature, vis-à-vis the utility of the Code's Article 81 (the Commission's plenary power). *The Bulletin of Zoological Nomenclature*, **70**: 293–302. https://doi.org/10.21805/bzn.v70i4.a17

KOVAŘÍK, F. 2019. Taxonomic reassessment of the genera *Lychas*, *Mesobuthus* and *Olivierus* with descriptions of four new genera (Scorpiones: Buthidae). *Euscorpius*, **288**: 1-27.

LOURENÇO, W. R. 1982. Révision du genre *Ananteris* Thorell, 1891 (Scorpiones, Buthidae) et description de six espèces nouvelles. *Bulletin du Muséum national d'Histoire naturelle*, Paris, 4e série, **4** (A1-2): 119-151.

LOURENÇO, W. R. 2011. The "*Ananteris* group" (Scorpiones: Buthidae); suggested composition and possible links with other buthids. *Boletin de la Sociedad Entomologica Aragonesa*, **48**: 105-113. Available at www.sea-entomologia.org

LOURENÇO, W. R. 2014. Biogeography of Southeast Asia (and wallacea) scorpions, a review. Pp. 27-46. In: Telnov D. (ed.), Biodiversity, Biogeography and Nature Conservation in Wallacea and New Guinea, Volume II. *The Entomological Society of Latvia*, Riga.

LOURENÇO, W. R. 2017a. A new genus and species of scorpion from Burma (Myanmar) (Scorpiones: Scorpiopidae); implications for the taxonomy of the family. *Comptes Rendus Biologies*, **340**: 349-357.

LOURENÇO, W. R. 2017b. Comments on the genus *Lychas* C. L. Koch, 1845; proposition of a neotype for *Lychas scutilus* Koch, 1845 and description of a new species from caves in north Myanmar (Scorpiones: Buthidae). *Arachnida – Rivista Aracnologica Italiana*, **14**: 36-51.

LOURENÇO, W. R. & W.WEITSCHAT 1996. More than 120 years after its description the enigmatic status of the genus of the Baltic amber scorpion '*Tityus eogenus*' Menge, 1869 can finally be clarified. *Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg*, **79**: 183-193.

MEASEY, J. 2013. Taxonomic publishing, vandalism and best practice: African Journal of Herpetology makes changes that will safeguard authors. *African Herp News*, **60**: 2-4.

PHAM D.-S., T.-H. TRAN & W. R. LOURENÇO 2017. Diversity and endemicity in the scorpion fauna of Vietnam. A preliminary synopsis. *Comptes Rendus Biologies*, **340**: 132-137.

SCOTT, C. M. & W. N. PHILLIPS 2011. A sustainable model for resource management and protection achievable through empowering local communities and businesses. *Ramkhamhaeng University International Research Conference*, 2010: 25-28.

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

VACHON, M. 1952. Etudes sur les Scorpions. Institut Pasteur d'Algérie: 482pp. 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, **35**: 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, **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.