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Scorpions from the rainforest canopy of New Guinea and description of a new subspecies of *Lychas* C.L. KOCH, 1845 (Scorpiones: Buthidae)

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Abstract

A new subspecies, *Lychas variatus canopensis* ssp. n., is described from the canopy of the rainforest in New Guinea. The new subspecies is characterized by small to moderate size with respect to the genus. It measures from 27 to 29 mm in total length in both males and females. General coloration pale yellow to reddish-yellow with intense variegated pigmentation throughout body and appendages. Pectines with 12 to 14 teeth in males and 11 to 13 teeth in females; fulcra present. Telson elongated in males but more globular and rounded in females; aculeus short and curved; subaculear tooth strongly rhomboid, with two granules on the ventral surface. Tibial spurs present. Pedipalp fixed and movable fingers with 6-7 rows of granules.

Key words: Scorpion, Buthidae, *Lychas*, new subspecies, New Guinea, Canopy.

Introduction

Scorpions from the tropical rainforest canopy are little known, and very few examples have been documented. Some examples are given by LOURENÇO (1997) mainly relating to species of the genus *Tityus* C.L. KOCH, 1836 (Buthidae) from the tropical rainforest of South America. Other species of *Tityus* were subsequently reported from the canopy of the Amazon forest by LOURENÇO & PÉZIER (2002) and a new species living exclusively in the canopy was described: *Tityus canopensis* LOURENÇO & PÉZIER.

Some recent inventory work in New Guinea included the collection of several scorpion specimens from the canopy by means of fogging. The study of this important sample of scorpions, revealed a single species belonging to the genus *Lychas* C.L. KOCH, 1845. The only species of *Lychas* previously reported from New Guinea is *Lychas variatus papuanus* (THORELL, 1888) (see FET & LOWE, 2000). After examination of the type specimen of this, we concluded that the canopy population was very similar, but distinct both in its considerably smaller size and also by its habitat. *L. variatus papuanus* has been found only in the soil. For these reasons we describe this canopy population as a new subspecies.

Material and methods

Illustrations and measurements were produce using a Wild M5 stereo-microscope with a drawing tube 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). The type specimen of *Lychas variatus papuanus* (THORELL, 1888) was also studied.

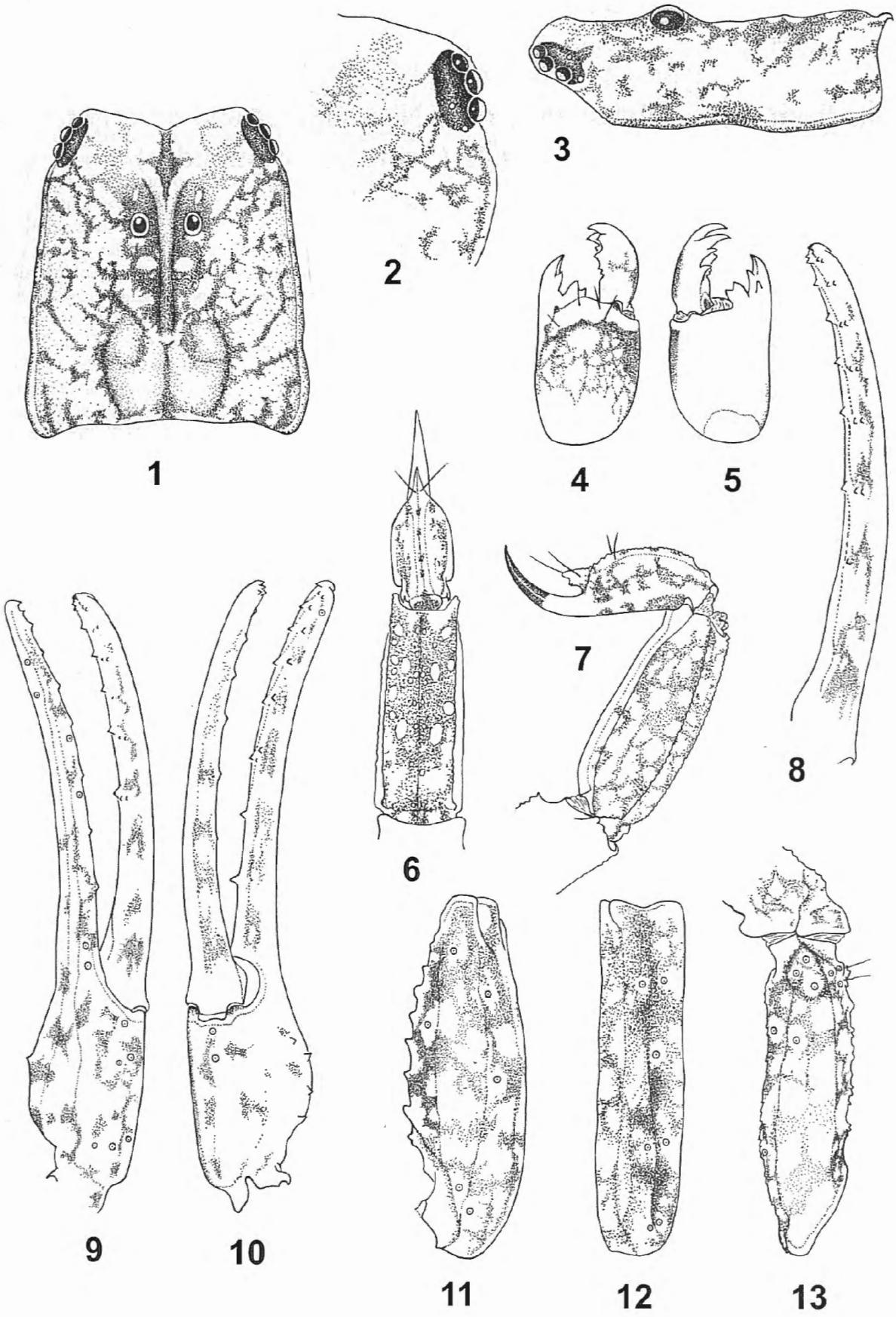
Taxonomic treatment

Description of the new subspecies

Buthidae C. L. KOCH, 1837
Lychas C.L. KOCH, 1845
Lychas variatus canopensis ssp. n.
(Figs 1-13)

TYPE MATERIAL: Papua New Guinea, Madang Province, Baiteta Forest (5°01'S, 145°45'E) (lowland mixed tropical rainforest), fogging samples obtained in 4 consecutive years (1993-1996) (Domir De Bakker leg.).

Male holotype (M5-5-19), **[MR]**. Paratypes. 2 males, 5 juveniles (M4), 1 juvenile (M6), 1 female, 1 juvenile (M9), 1 female (M1), 1 female, 3 juveniles (AR-25-14), 2 males, 10 juveniles (AR-1), 1 male, 1 juvenile (AR-



Figs 1-13 — *Lychas variatus canopensis* ssp. n., Male holotype. 1-3. Carapace. 1 dorsal aspect. 2. Lateral eyes in detail. 3. Lateral aspect. 4-5. Chelicera, dorsal and ventral aspects. 6-7. Metasomal segment V and telson, ventral and lateral aspects. 8. Dentate margin of movable finger, showing rows of granules. 9-13. Trichobothrial pattern. 9-10. Chela dorso-external and ventral aspects. 11-12. Patella, dorsal and external aspects. 13. Femur, dorsal aspect

16), 1 female, 5 juveniles (AR-12), 1 female (AR-13), 2 females, 1 juvenile (AR-32), 1 female (AR-20), 1 male (AR14), 12 juveniles (AR-8), 2 juveniles (AR-27), 1 female (AR-17), 1 male, 1 female (AR-22), 1 juvenile (AR-65), 1 juvenile (AR-38), 1 juvenile (AR-55), 1 juvenile (AR-68), 5 juveniles (AR-9), 1 juvenile (AR-62), 3 juveniles (AR-2), 1 juvenile (AR-31), 1 juvenile (AR-14), 1 juvenile (AR-57), 1 juvenile (AR-54), 1 juvenile (AR-64), 2 juveniles (AR-3), 1 male (AR-63-5), 1 female (AR-69), 1 male (AR-61), 1 female (AR-50), 1 male, 1 juvenile (PR-18), 3 juveniles (T2), 5 juveniles (T9), 1 male, 6 juveniles (T7), 1 juvenile (T4), 2 juveniles (TM), 3 juveniles (T12), 3 juveniles (T2), 3 juveniles (T1), 2 juveniles (T7), 1 juvenile (XB), 1 juvenile (XC), 2 juveniles (XC), 3 juveniles (XM), 1 juvenile (XN) **[MR]**, 1 male, 1 female (XC), 1 male, 1 female, 4 juveniles (X6), 1 female (M5) **[MNHN]**

DEPOSITORIES: MR = Musée Royale, Brussels, Belgium. MNHN = Muséum national d'Histoire Naturelle, Paris.

ETYMOLOGY: the subspecific name makes reference to the ecological niche in which the new subspecies lives.

DIAGNOSIS: Scorpions of small to moderate size, with respect to the genus, measuring from 27 to 29 mm for both males and females. General coloration pale yellow with intense dark variegated pigmentation over the body and appendages. Carinae and granulations strong to moderate. Pectines small; pectinal tooth count 12 to 14 for males and 11-13 for females. Dentate margins of fixed and movable fingers of pedipalp chela with 6-7 almost linear rows of granules. Subaculear tubercle strong and very rhomboid, with two ventral granules.

RELATIONSHIPS: From its general morphology, *Lychas variatus canopensis* ssp. n. appears to be most closely related to *Lychas variatus* (THORELL, 1876), and in particular to *Lychas variatus papuanus* (THORELL, 1888), described from Yule Island in New Guinea. It can be distinguished from this last subspecies by the following characters:
(i) a much more intense variegated pigmentation on body and appendages, (ii) much smaller size overall; see Table I, (iii) both populations inhabit quite different habitats.

DESCRIPTION: based on the male holotype and on one female paratype. (Morphometric measurements in Table I).

Coloration. Generally pale yellow with intense dark brown variegated pigmentation. Prosoma: carapace yellowish with several pigmented zones particularly on the posterior margin; eyes surrounded by black pigment. Mesosoma: tergites yellowish with several dark spots forming three approximately longitudinal strips. Venter pale yellow, with diffused spots on coxapophysis, sternum and pectines. Metasoma: all segments yellowish intensely marked with variegated spots. Ventral aspect of segments IV and V blackish. Vesicle yellowish; aculeus yellow at the base and reddish at its extremity. Chelicerae yellowish with brownish variegated spots on their posterior half; teeth reddish. Pedipalps: yellowish throughout, intensely marked with dark variegated spots; rows of granules on dentate margins of the fingers reddish. Legs yellowish, intensely marked with variegated spots.

Morphology. Prosoma: Anterior margin of carapace moderately to strongly emarginate. Carapace carinae moderate; anterior median and posterior median carinae moderately developed. Intercarinal spaces moderately granular. Median ocular tubercle anterior to the centre of the carapace; median eyes separated by a little more than one ocular diameter. Three pairs of lateral eyes. Mesosoma: tergites I-VI with a median carina; obsolete on I, 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 with thin but intense granulation; more intense than that of carapace. Sternites with sparse granulation; spiracles long; sternite VII with four carinae. Pectines small to moderately long; pectinal teeth count 13-13 in both male and female. Metasoma: Segment I and II with 10 carinae, crenulate; III and IV with 8 carinae, crenulate. Segment V with five carinae; one posterior spinoid granule on the dorsal carinae of segments I-IV. Dorsal furrows of all segments weakly developed, smooth; intercarinal spaces weakly granular. Telson moderately to strongly granular, with one ventral and three lateral carinae; subaculear tubercle strong and rhomboid, with two granules on the ventral surface. Chelicerae with dentition characteristic of buthids (VACHON, 1963); two small but clearly distinct basal teeth on movable finger. Pedipalps: Femur pentacarinate; all carinae moderately crenulate. Patella with seven carinae, moderately crenulate; dorsointernal carinae with nine spinoid granules. Chela with vestigial carinae weakly crenulated, and three internal spinoid granules. Intercarinal spaces weakly granular. Dentate margins on movable and fixed fingers composed of 6-7 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

Table 1 — Morphometric values (in mm) of male holotype and female paratype of *Lychas variatus canopensus* ssp. n. and of the female lectotype of *Lychas variatus papuanus* (THORELL).

	Lychas variatus canopensis ssp. n.		*Lychas variatus papuanus*
	Holotype	Paratype	Lectotype
Total length	27.3	28.6	44.0
Carapace			
- length	3.9	4.1	5.2
- anterior width	2.8	3.2	3.8
- posterior width	3.6	4.5	5.5
Metasomal segment I:			
- length	2.1	2.6	2.8
- width	2.2	2.5	3.0
Metasomal segment V:			
- length	4.7	5.2	6.2
- width	1.7	2.1	2.5
- depth	1.7	2.1	2.4
Vesicle:			
- width	1.2	1.4	2.0
- depth	1.4	1.5	1.9
Pedipalp:			
- Femur length	3.8	4.3	4.8
- Femur width	1.1	1.2	1.4
- Patella length	4.3	5.1	5.6
- Patella width	1.4	1.6	2.1
- Chela length	6.1	6.9	8.4
- Chela width	1.0	1.1	1.7
- Chela depth	1.0	1.1	1.6
Movable finger:			
- length	4.2	4.9	5.9

setae. Tibial spurs present on legs III-IV, moderately developed; pedal spurs present on all legs; reduced on legs I and II.

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