

On a new cave-dwelling *Liphistius* from Thailand (Araneae: Liphistiidae)

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Summary

A new species, *Liphistius tham*, is described from female and male specimens collected in a limestone cave in central Thailand and reared in captivity. Notes are given on the natural history of the species.

Introduction

Among the twenty species of *Liphistius* described so far, four occur inside or in the close vicinity of caves in peninsular Malaysia. The deeper they occur in caves, the more they adapt to life in darkness. *L. panching* Platnick & Sedgwick builds burrows in and around the entrance of Panching Cave; coloration of its integument is still dark. *L. langkawi* Platnick & Sedgwick, from a cave on Langkawi Island, and *L. tioman* Platnick & Sedgwick of Sinah Cave and Panah Cave on Tioman Island, build burrows in the soil and sac-like retreats on rock surfaces. Both species construct extraordinarily long signal threads to enlarge their prey sensing area in a habitat of reduced food availability; body coloration light. The most pronounced adaptation to cave life appears in *L. batuensis* Abraham, which lives in burrows on the ground and in sac-like retreats attached to the cave walls in the dark parts of the Batu and Anak Takun Caves. Apart from a general paleness of the cuticle, its anterior median eyes are more or less reduced (Platnick & Sedgwick, 1984). The species described in this paper is the first record of a cave-dwelling *Liphistius* from Thailand. As in the foregoing species, it constructs sac-like retreats and elongated signal threads, shows weak pigmentation and a reduction of the anterior median eyes, and thus is one of the few examples of Asian tropical cave spiders with visible adaptations to an underground environment (cf. Deeleman-Reinhold, 1986).

Abbreviations: AME, ALE, PME, PLE = anterior (posterior) median (lateral) eyes; MOQ = median ocular quadrangle. AMNH = American Museum of Natural History, New York; MCZ = Museum of Comparative Zoology, Cambridge, Mass.; MHNG = Muséum d'Histoire naturelle, Genève; NHMW = Naturhistorisches Museum, Wien; WCS = Walter Sedgwick Collection, San Francisco. All measurements, if not otherwise indicated, are in mm.

Liphistius tham n. sp. (Figs. 1-8)

Material examined

Thailand, Tham Suan Hin: ♀ holotype, 12 Aug. 1986, Schwendinger leg., AMNH; paratypes: 2♀, 4 Nov. 1985 (one moulted on 19 July 1987, the other on 8 Jan. 1988), Sedgwick leg., MCZ, WCS; 1♂, 3 May 1987 (matured on 25 Sept. 1987) and 3♀, 12 Aug. 1986 (one moulted on 14 Aug. 1986, another on 5 Apr. 1987), Schwendinger leg., AMNH, MHNG, NHMW; others: 2 juv.♀, 4 Nov. 1985, Sedgwick leg., WCS; 2 juv.♂, 10 Feb. 1987 (one moulted on 5 Aug. 1987, one on 4 Dec. 1987), Schwendinger leg., AMNH.

Etymology

Thai: *tham* = cave, noun in apposition. The specific epithet refers to the habitat of the species.

Diagnosis

The female resembles that of *L. bristowei* Platnick & Sedgwick in genital characters, but is distinguished by a single digitiform receptacle and lateral indentations on the ventral side of the poreplate (Fig. 6). The male resembles that of *Liphistius trang* Platnick & Sedgwick in the shape of the palp, but can be distinguished by the tibial apophysis, which is stouter and more produced, by longer and stouter setae irregularly arranged on the low cumulus, and by the shorter sclerotised part of the embolus (Figs. 1-4). In its bipartite embolus, *L. tham* n. sp. resembles the species of northern Malaysia (*L. desultor* Schiödte, *L. murphyorum* Platnick & Sedgwick, *L. langkawi*) and southern Thailand (*L. trang*), whereas in other species the embolus is largely fused. AME in both sexes more or less reduced.

Female (holotype)

The format of this description follows that of Platnick & Sedgwick (1984). Total length, not including chelicerae, 13.3. Carapace 6.8 long, 6.0 wide, light orange with dark seam on posterior margin; anterior half of pars cephalica slightly darkened, with indistinct W-shaped pattern behind ocular tubercle. Ocular tubercle 0.78 long, 1.11 wide, AME completely reduced. Eye sizes and interdistances: ALE 0.58, PME 0.31, PLE 0.44; PME-PME 0.08, PME-PLE 0.06, ALE-PLE 0.05. Sternum 3.5 long, 1.4 wide, light yellow, with gently sloping margins. Labium 0.9 long, 1.9 wide, light orange. Endites 2.5 long, 1.7 wide. Chelicerae pale yellow proximally, light brown distally; promargin with 10/11 teeth. Legs light olive-brown, ventrally pale; indistinct annulations dorsally on tibiae, metatarsi and tarsi. Tibio-metatarsal proprioceptors (*sensu* Platnick & Goloboff, 1985) on legs I-III present. Superior tarsal claws with 2 or 3 teeth; inferiors with 1-4 tiny denticles. Palpal claw with 2 or 3 teeth. Measurements:

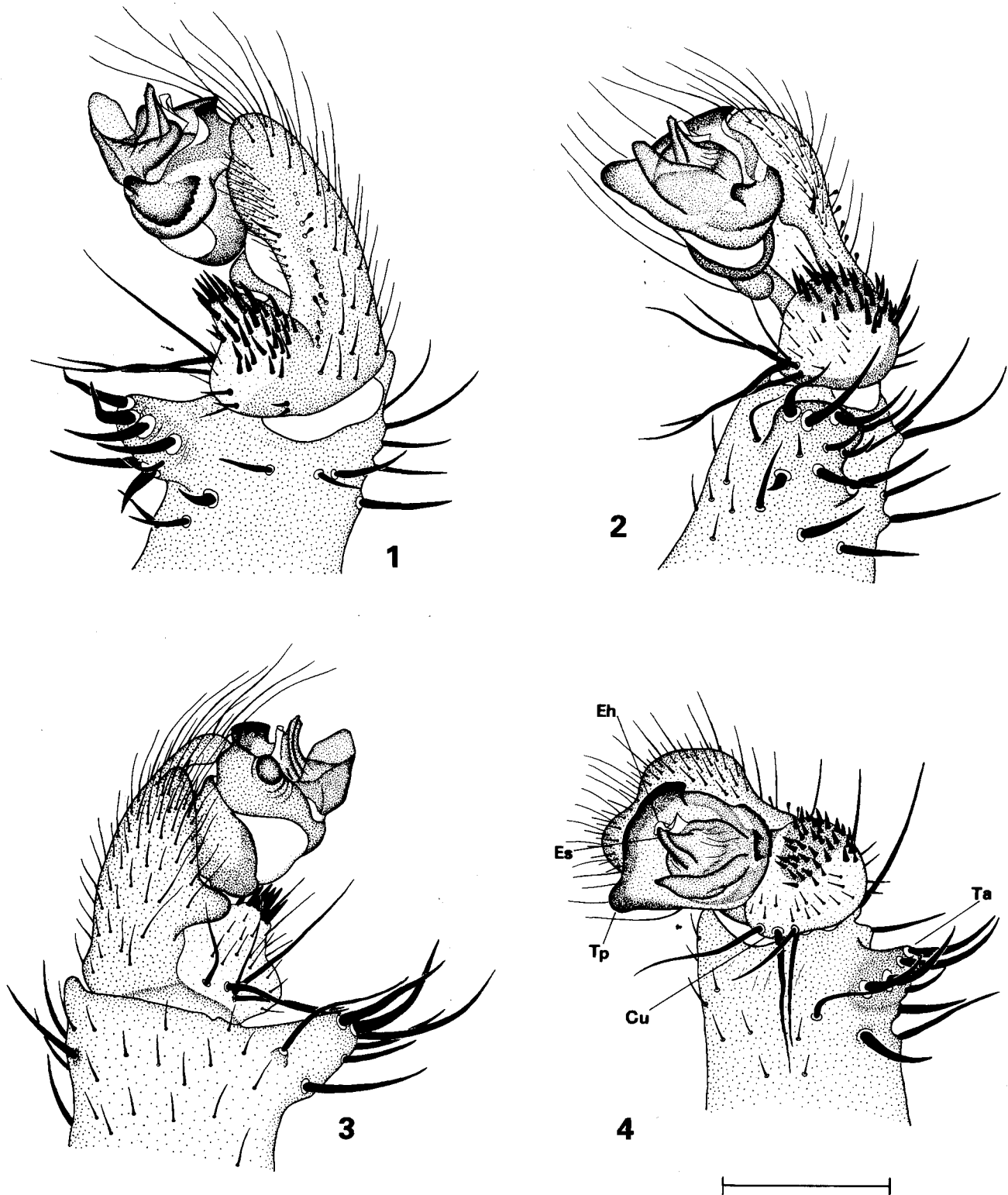
	I	II	III	IV	Palp
Femur	4.9	5.2	5.3	6.7	4.2
Patella	2.7	2.8	2.8	3.0	2.4
Tibia	3.3	3.5	3.7	5.0	3.1
Metatarsus	3.2	3.5	4.4	6.7	—
Tarsus	1.9	1.9	2.3	3.2	3.1
Total	16.0	16.9	18.5	24.6	12.8

Abdomen 6.1 long, 4.8 wide, greyish brown, tergites light brown, lung patches and spinnerets light orange.

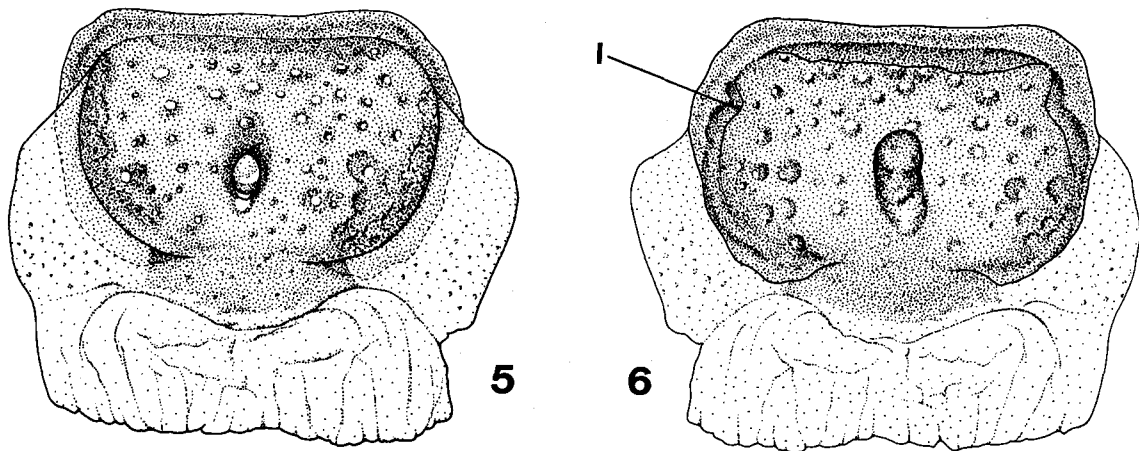
Vulva with wide poreplate and short, wide posterior stalk (Fig. 5). Poreplate ventrally with strongly thickened margins, showing two lateral indentations, and with single digitiform median receptacle, instead of receptacular cluster (Fig. 6).

Male

Total length, not including chelicerae, 11.8. Coloration as in female but slightly more greyish. Carapace 5.7 long, 5.4 wide, posterior margin with dark seam. Ocular tubercle 0.70 long, 1.01 wide. Eye sizes and interdistances: AME indistinct, 0.05, ALE 0.56, PME 0.26, PLE 0.39; AME-AME 0.05, AME-ALE 0.06,



Figs. 1-4: *Liphistius tham* n. sp., reflection of right male palp. **1** Retrolateral view; **2** Retroventral view; **3** Ventral view; **4** Distal view. Abbreviations: Cu = cumulus, Eh = hyaline part of embolus, Es = sclerotised part of embolus, Ta = tibial apophysis, Tp = tegular process. Scale line = 1 mm. Illustrations by Schwendinger.



Figs. 5, 6: *Liphistius tham* n. sp., female, poreplate. **5** Dorsal view; **6** Ventral view. Abbreviation: I = indentation. Illustrations by Tenorio.

PME-PME 0.05, PME-PLE 0.06, ALE-PLE 0.05. MOQ 0.39 long, front width 0.17, back width 0.50. Sternum 3.1 long, 1.1 wide. Labium 0.6 long, 1.3 wide. Endites 1.9 long, 1.2 wide. Promargin of chelicerae with 9/10 teeth. Legs without annulations, tibio-metatarsal proprioceptors absent. Superior tarsal claws with 2/3 teeth on anterior/posterior legs; inferiors mostly with 2 tiny denticles, one small tooth on leg III. Measurements:

	I	II	III	IV	Palp
Femur	5.6	5.7	5.7	6.4	3.5
Patella	2.6	2.7	2.7	2.7	2.0
Tibia	4.3	4.5	4.8	5.8	3.6
Metatarsus	5.0	5.5	6.4	8.2	—
Tarsus	2.2	2.4	2.7	3.2	1.8
Total	19.7	20.8	22.3	26.3	10.9

Palp characterised by divided embolus (*sensu* Kraus, 1978), by presence of tegular process, and by absence of subtegular process and elevated cumulus (Figs. 1-4). It closely resembles that of *L. trang* (cf. Schwendinger, 1987: fig. 1). Abdomen 5.7 long, 3.6 wide.

Variation

The largest female measures: total length 15.5, carapace 7.4 long, 6.4 wide. Various stages of reduction occur in the AME: in the male present but indistinct, in two females missing on one side and in all other specimens completely reduced. Immature males can be distinguished by their enlarged palpal tarsi at least three instars before maturity.

Distribution

Known only from Tham Suan Hin (Stone Garden Cave; 200 m), a limestone cave in Saraburi Province, central Thailand.

Natural history

Burrows of *Liphistius tham* n. sp. occur only in the remote, dark part of the cave, 300-400m from the entrance, near roosting sites of bats. The temperature, about 26°C, remains quite stable all year (F. Stone,

pers. comm.). During the rainy season the cave is flooded, the water rises up to 1.5 m, disappearing towards the end of the dry season. The spiders mostly build burrows, closed by a trap-door level with the surface, into holes and crevices in the upper cave wall (Fig. 7). A few sac-like retreats (Fig. 8), as described for *L. batuensis* (Abraham, 1923; Bristowe, 1952; Klingel, 1967; Platnick & Sedgwick, 1984), were found on dry, smooth rock surfaces. Such webs are up to 5.5cm long and well camouflaged with interwoven mineral particles on the outside, whereas at the bottom they are open or separated from the rock by just a very thin web. Only the front part of the retreat is surrounded by a compact ring of silk. The trap-door is up to 3cm wide, with 6-8 remarkably long (maximum 35cm) signal threads radiating from the entrance. Back entrance with a smaller escape door (maximum width 1.7 cm) and occasionally with a single short silken thread (1.5 cm long) attached to its rim. In most retreats and burrows inspected, the spider was found behind the front door waiting to ambush its prey. Some were



Fig. 7: *Liphistius tham* n. sp. Burrow built in a crevice. Photograph by Schwendinger.



Fig. 8: *Liphistius tham* n. sp. Sac-like retreat on the cave wall. Photograph by Schwendinger.

observed capturing cave grasshoppers (Rhopidophoridae), which were numerous on the cave walls. All specimens, reared in Chiang Mai and San Francisco, were kept in darkness, so that data on moulting and

maturation may accord with natural conditions.

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