

## New species of Malaysian *Agorius* and *Sobasina* (Araneae: Salticidae)

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### Summary

Two new species of Salticidae are described from Malaysia, *Agorius borneensis* n. sp. from Sabah, Borneo, and *Sobasina sylvatica* n. sp. from the Genting Highlands in the Malayan Peninsula. The generic placement of these species and the geographical distribution of the two genera are discussed.

### Introduction

During the course of research on ant-like Salticidae and their ant associates carried out by one of the authors (ME) in Malaysia in 1989, several unusual species were found. Two of them are described here: they appear to be hitherto unknown species belonging to the genera *Agorius* and *Sobasina*.

### Remarks on the genus *Agorius* Thorell, 1877

The studied specimens present a curious mixture of characters of the genera *Agorius* Thorell, 1877 and *Synagelides* Strand, in Bösenberg & Strand, 1906. The shape of the body with slender abdomen narrowed in the middle, the proportions of the legs with long first patella, followed by short metatarsus and tarsus, and spines on first tibia limited to distal half only, are all typical for *Agorius*. At the same time the enormous swelling of the pedipalpal patella, which is broader and longer than the femur, and corresponding modifications of the tibia and cymbium, are typical for *Synagelides*. The structure of the bulbus, the embolus and the tibial apophysis are diagnostic for the new species: drawings of male pedipalps of *Agorius* in the literature indicate a slender tibia and patella, similar to those of most other salticids. It is possible that *Agorius* and *Synagelides* are related and, from the above mentioned characters, the present species appears to be morphologically intermediate between them. It is also possible, although less likely, that the pedipalpal structures of the species described below developed in parallel with those of *Synagelides*. The genus *Agorius* was known hitherto from 5 species described from Indonesian Islands (Java, Lombok, Sumatra, Celebes) and from Malacca, Singapore and the Philippines; no species have so far been described from Borneo. The type species, *Agorius gracilipes*, was described by Thorell in 1877 and redescribed by Prószyński (1968).

The genus *Synagelides*, type species *S. agoriformis* from Japan, was described by Strand (in Bösenberg & Strand, 1906). More extensive descriptions of further species were published by Prószyński (1979), Bohdanowicz (1978, 1979, 1987), Bohdanowicz & Prószyński (1987), Żabka (1985) and Peng *et al.* (1993). The genus *Synagelides* is known from continental Asia: Nepal, Bhutan, India, Vietnam, China, Korea, Japan, and the Russian Far East (Maritime Province).

### *Agorius borneensis* n. sp. (Figs. 1–8)

*Type material*: Holotype ♂ and one paratype ♂: MALAYSIA: Sabah: Sepilok Reserve, on forest floor, 3 March 1989. Deposited in Natural History Museum, London, accession number BMNH(E)2000–184.

*Etymology*: The species is named after its geographical location on the island of Borneo.

*Diagnosis*: *Agorius borneensis* can be distinguished from other currently known species in the genus by its greatly enlarged palpal patellae and the robust prongs of the tibial apophysis.

*Description*: *Male*: Carapace parallel-sided, red-brown with black around eyes, anterior eyes fringed with white hairs, outer ones higher than inner (recurved); sternum broad, square in front, orange-brown; abdomen very long and slender, narrower than cephalothorax, narrowest in middle third which also has diagonal rows of white hairs laterally, dark red-brown, dark brown posteriorly; spinnerets long, brown. Pedipalps brown merging to dark brown and even black distally. Pedipalp structure characteristic, with huge patella; reduced femur; tibia massive, with enormous two-pronged apophysis, almost fused with massive, triangular cymbium; bulbus relatively simple, distally with narrow embolus making a simple coil; sclerotised anterior apophysis on bulbus, resembling that in *Synagelides*, but less complicated. Legs characterised by unusual dimensions of leg I, with patella as long as tibia and with very short metatarsus and tarsus; legs brownish yellow apart from orange-brown femora I and IV, brown patella, tibia and metatarsus I and tibia and metatarsus IV, and dark brown stripe anteriorly on coxa and trochanter I; five pairs of spines in distal half of tibia I and two single spines on metatarsus I, no spines on leg II. In the living animal the cephalothorax is black in front merging to bright orange behind; the abdomen is glossy orange brown anteriorly, bright red-orange in the middle and glossy black posteriorly.

Measurements of an adult male are given in Table 1. Abdomen widest at about two-thirds of its length (0.95 mm), almost as wide in basal third (0.85 mm), but much narrower in middle (0.55 mm). Lengths of leg segments (in sequence coxa, trochanter, femur, patella, tibia, metatarsus, tarsus): I: 0.55, 0.75, 2.4, 1.8, 1.7, 0.35, 0.35; II: 0.3, 0.25, 1.4, 0.55, 1.3, 0.75, 0.5; III: 0.45, 0.25, 1.55, 0.6, 1.5, 1.2, 0.5; IV: 0.7, 0.85, 2.05, 0.8, 1.8, 2.0, 0.8.

*Female*: Unknown.

*Material examined*: In addition to the type material listed above, a third ♂ was collected at the same time but

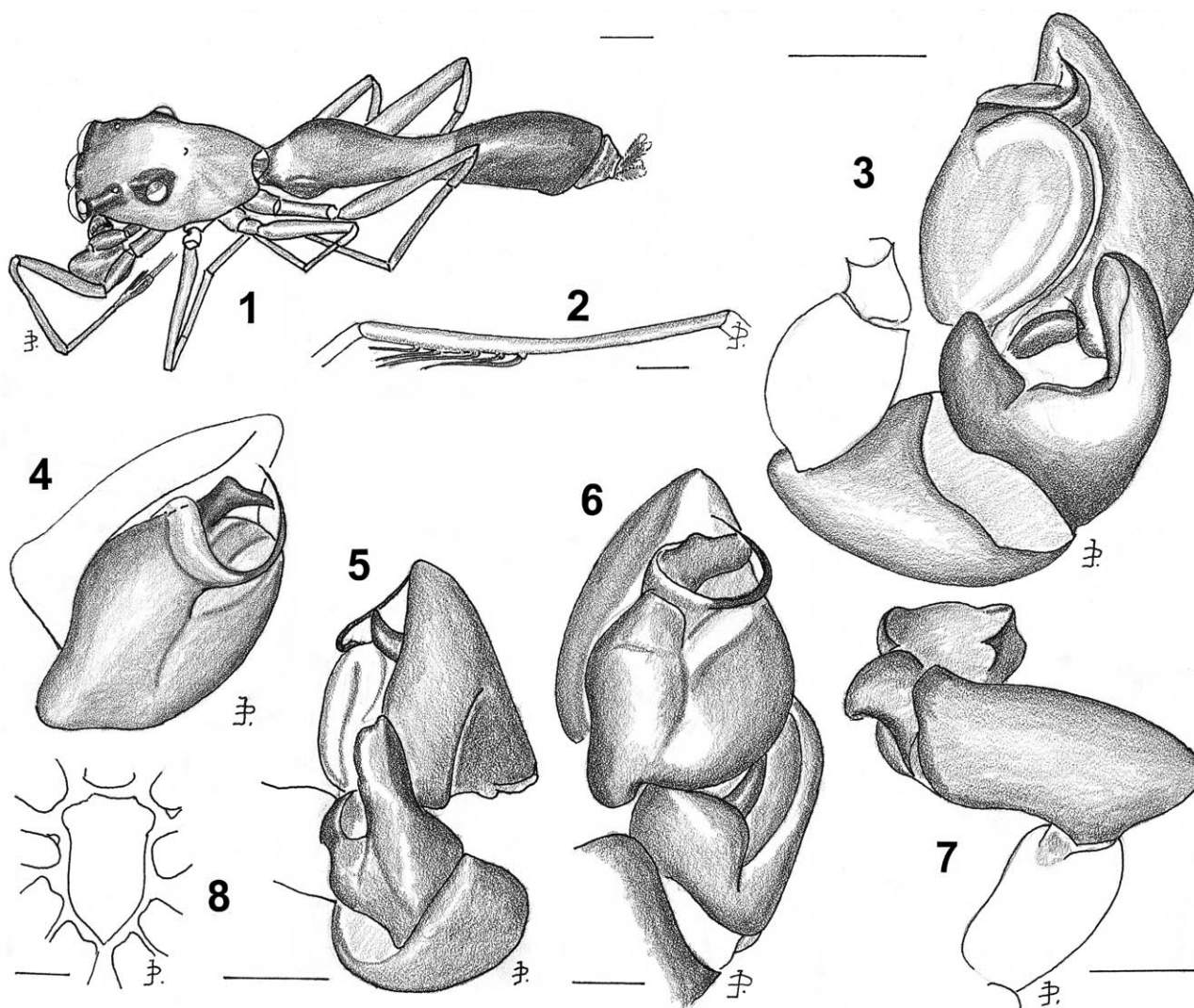
was subsequently lost in the post. Also 1♂ of presumably the same species labelled: "Agorius sp. 13, BORNEO/E. Sabah: Danum Valley Field Centre, 6-16. V. 91. Leg. C.L. Deeleman." Personal collection of C.L. Deeleman-Reinhold.

#### Remarks on the genus *Sobasina* Simon, 1898

The genus *Sobasina* comprises 13 species described from Pacific Islands: Solomons, Bismarck Archipelago (Simon, 1898; Wanless, 1978) Carolines, Fiji and Tonga (Berry, Beatty & Prószyński, 1998); the geographical range of each species is small, with most restricted to a single island. The genus has never been recorded from the Malayan Peninsula or from the Asiatic mainland.

The appearance of the genus is rather uniform: the spiders are small, somewhat myrmecomorph in appearance, although as yet no biological observations have been made to confirm that they are ant-mimics. This

ant-like appearance results from the body shape with a long pedicel, and often an abdominal constriction in females, sometimes with white spots on each side of the constriction. In males the abdomen is usually not constricted, and is sometimes covered with a hardened tegument (scutum), which usually reflects light. The cephalothorax usually has some constrictions or grooves with eyes 3 often raised above the surface on small tubercles; the surface is covered either with minute protuberances or minute pits, in some species both (see SEM photographs in Wanless, 1978: pl. 1 a-e). However, cephalothorax and abdomen shape are quite variable. A very unusual body form was observed in *S. paradoxa* Berry, Beatty & Prószyński, 1998 from higher elevations on Viti Levu. The legs are thin, in males leg I is the longest, in females leg IV. Legs I usually have long spines on the tibia (4-5 pairs ventrally) and metatarsus I, however these numbers may vary, and one species is devoid of spines; another species from Fiji (*S. platypoda*



Figs. 1-8: *Agorius borneensis* n. sp., male. **1** Dorsolateral view of whole animal; **2** Tibia I; **3** Left pedipalp, retrolateral view (note proportions of segments and huge tibial apophysis with two swollen rami); **4** Left palpal organ, mesal view (note shape of embolus); **5** Left palpal organ, retrodorsal view (note shape of dorsal ramus of apophysis and posterior depression of cymbium, only part of ventral ramus of apophysis and patella visible); **6** Left palpal organ, ventral view (note thin embolus, coiled around apical apophysis of bulbus); **7** Left pedipalp, lateral view of patella, with dark flap of dorsal tibial apophysis and posterior concavity of dorsal cymbium (in this position delimited by sharp edges and two sharp triangular processes, femur not shaded); **8** Sternum. Scale lines=0.66 mm (1), 0.4 mm (8), 0.25 mm (3-5, 7), 0.125 mm (6).

Berry, Beatty & Prószyński, 1998) has an unusually modified tibia I, with broadened dorsal surface and swollen ventral edge.

The minute size of the genital organs makes interpretation very difficult. The palpal organ in males is uniform and simple, with oval bulbus and reduced, short, apical embolus. The main specific differences are the proportions of tibia to cymbium and the tibial apophysis. The species described below differs from all other known species by having a broad, bifurcate tibial apophysis, articulating with a small cymbial protuberance, and this is accompanied more dorsally by a spine-like, long and thin process parallel to the apophysis; otherwise it does not differ from typical species in the genus.

The female epigynum is so small that details of its external structure are difficult to see; its internal structures are more useful diagnostically, but visible only in preparations stained with chlorazol black E and examined under high power of a compound microscope. Copulatory openings are usually located laterally, often near the end of a shallow transverse groove. The internal structures are very unusual, and may be interpreted in various ways. The copulatory channel is very short, in some species reduced to nil, in which case the spermatheca begins almost directly from the copulatory opening. The spermatheca may be oval, sometimes of a more complicated shape, which then passes into a long and twisted channel-like structure, whose posterior part consists of a chain of numerous small rounded chambers resembling a string of coral beads, finally ending in the usual, soft fertilisation channel. These structures are twisted and entangled at various depths, and reconstruction of their course under a high power microscope requires long and patient study; they are not visible with lower magnification. Accessory glands are poorly visible, in some specimens minute pores are visible in the

wall of the end of the spermatheca, near the origin of the fertilisation channel, and scent gland openings could be seen in *M. yapensis* and *M. platypoda* (see Berry *et al.*, 1998: figs. 70, 79). Another interpretation of the internal structure of the epigynum—that of a complicated channel ending with a minute spermatheca—seems less probable in view of the studies of Berry *et al.* (1998).

The genus *Sobasina* shows some resemblance to the genera *Efate* Berland, 1938, and *Rarahu* Berland, 1929, both from the Pacific Islands. They may be related, but diagnostic differences confirm their separate generic status.

#### *Sobasina sylvatica* n. sp. (Figs. 9–14)

*Type material*: Holotype ♂: MALAYSIA: Genting Highlands, on low vegetation in forest clearing near roundabout, 5–19 February 1989. Deposited in Natural History Museum, London, accession number BMNH(E)2000-184.

*Etymology*: The species is named after its occurrence in secondary forest or woodland, from *sylva*, a wood.

*Diagnosis*: Specimens of both sexes display the typical *Sobasina* appearance. The male is unique within the genus in having the tibial apophysis broader with a concave tip, accompanied by a spine-like process. The female has the epigynum larger than in typical *Sobasina*, with channels of the spermatheca much broader.

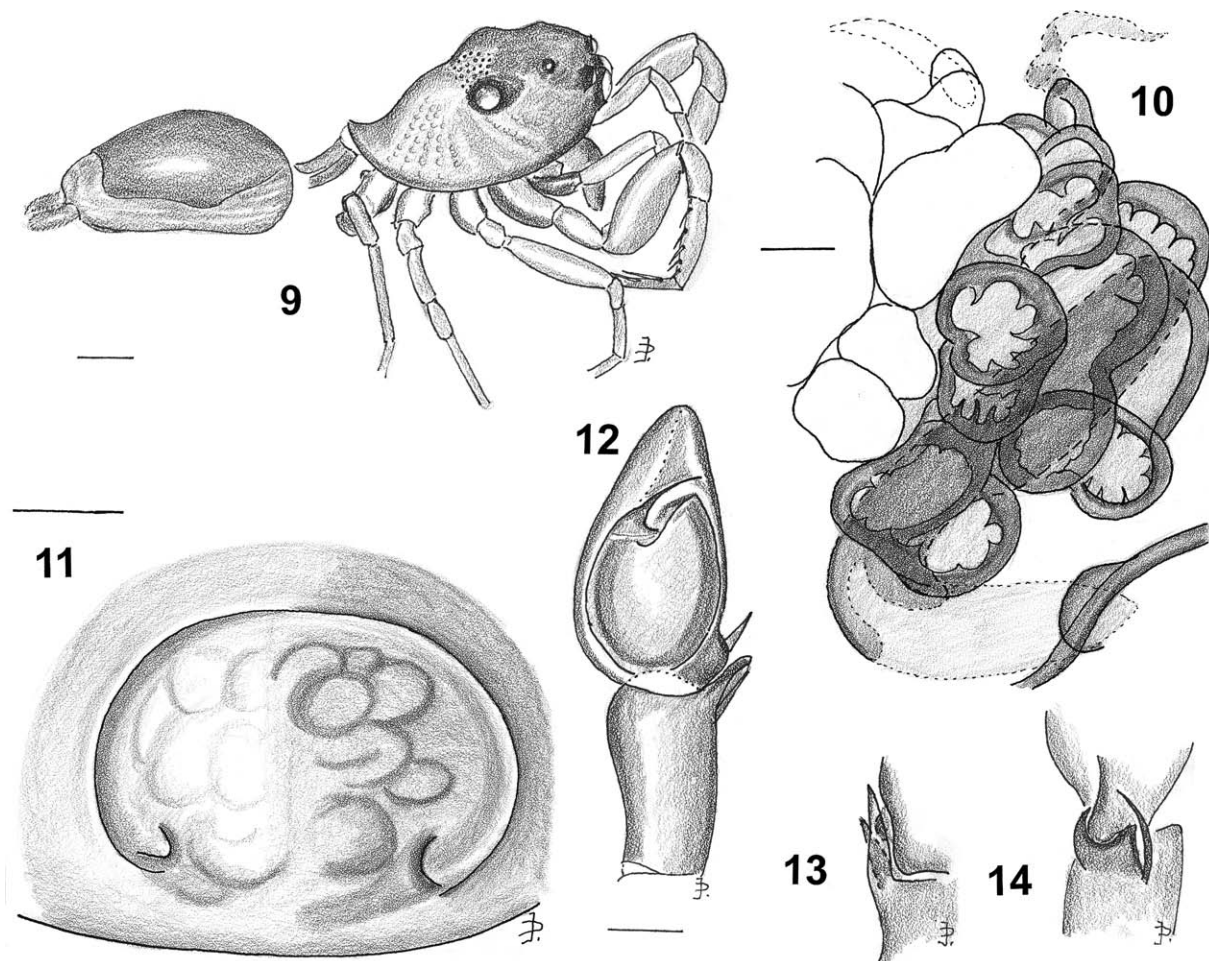
*Description*: *Male*: Carapace broad, 1.5 times longer than wide, rounded at rear, sloping down at about 45° from posterior eyes towards pedicel; dark red-brown and finely rugose, but blackish red-brown dorsally between eyes and black around eyes. Eyes 3 on small tubercles. Sternum broad, slightly concave anteriorly, dark red-brown. Pedicel comprising a single segment, slender, brown. Abdomen oval, dark grey. Chelicerae dark red-brown. Pedipalp orange, dark brown distally. Legs mostly pale brownish yellow in adults, cream in juveniles; leg I mainly orange (red in life) with coxa browner, femur greatly swollen, tibia also broader than other legs, with 5 spines in outer row and 4 in inner row, metatarsus with three pairs of spines; leg II coxa tinged brown, with one spine at mid point on posterior side of tibia and two short spines posteriorly on metatarsus; leg III with faint brown stripe anteriorly from femur to tibia and posteriorly from tibia to metatarsus; leg IV with black anterior stripe from coxa to tibia and posterior stripe on tibia and metatarsus, petering out on tarsus. In the living animal the cephalothorax is black in front merging to dark brown or red-brown behind; the abdomen is glossy black, sometimes with buff inverted Vs medially.

Measurements of an adult male are given in Table 1. Lengths of leg segments (in sequence coxa, trochanter, femur, patella+tibia, metatarsus, tarsus): I: 0.45, 0.45, 1.05, 0.9, 0.6, 0.35; II: 0.25, 0.23, 0.8, 0.7, 0.4, 0.25; III: 0.23, 0.18, 0.75, 0.9, 0.6, 0.3; IV: 0.25, 0.25, 0.95, 1.05, 0.75, 0.35.

*Female*: The only specimen was unfortunately lost in the post before detailed notes on its appearance had been prepared. However, we retained drawings of the

	<i>A. borneensis</i>	<i>S. sylvatica</i>
Total length	7.25	3.9
Cephalothorax length	2.5	1.9
Cephalothorax width	1.5	1.25
Cephalothorax height	0.9	0.8
Eye field length	1.4	1.0
Eye field width at eyes 1	1.55	0.9
Eye field width at eyes 3	1.5	1.25
Chelicera length	*	0.45
Pedicel length	*	0.3
Abdomen length	4.75	1.8
Abdomen width	0.95	1.0
Sternum length	1.05	0.65
Sternum width	0.6	0.5
Leg I total length	7.9	3.8
Leg II total length	5.05	2.63
Leg III total length	6.05	2.96
Leg IV total length	9.0	3.6
Leg II as % leg I	64	69
Leg III as % leg I	77	78
Leg IV as % leg I	114	95

Table 1: Measurements (mm) of adult male *Agorius borneensis* n. sp. and adult male *Sobasina sylvatica* n. sp. (leg lengths include coxa and trochanter). \*Chelicera and pedicel short and impossible to measure without damaging specimen.



Figs. 9–14: *Sobasina sylvatica* n. sp. **9** Dorsolateral view of whole male animal; **10** Internal structure of female epigynum, showing complicated coils of right spermatheca and channel; **11** Epigynum; **12** Left male palpal organ and tibia, ventral view; **13** Left tibial apophyses, dorsal view; **14** Left tibial apophyses, retrolateral view (note flap-like protuberance on cymbium). Scale lines=0.4 mm (9), 0.125 mm (12–14), 0.08 mm (11), 0.025 mm (10).

epigynum, which is more distinct than in other species of the genus. The submarginal groove is semilunar (horseshoe-shaped) with distinct copulatory openings at its ends, located ventrally, and thick coils of the translucent internal structures are visible through the tegument. Internal structures are channel-like and entangled in a very complicated way, with channels of left and right sides partially overlapping; they fill the whole internal space of the epigynum. Copulatory openings are distinct, followed by an indistinct, straight and relatively broad copulatory channel running horizontally. This passes into a number of convoluted and relatively narrow sclerotised chambers, whose exact course and connections could not be reconstructed because of the thickness and opacity of their walls. The small end chamber and fertilisation channel are distinctly visible. The appearance of these structures is unique within the genus, but fits the general pattern found in *Sobasina*.

**Material examined:** In addition to holotype ♂, same data: 2♂ 1♀ 2 immatures. One ♂ and the ♀ were studied, but subsequently lost in the post.

**Distribution:** Malayan Peninsula, genus new to Asiatic mainland; remaining species of the genus known from various Pacific islands.

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