Bull.Br.arachnol.Soc. (1990) 8 (5), 147-160

Spiders of the family Zodariidae from Sulawesi, Indonesia (Arachnida: Araneae: Zodariidae)

Robert Bosmans
Laboratorium voor Ecologie,
Ledeganckstraat 35,
B-9000 Gent, Belgium

and

Paul Hillyard
Department of Zoology,
British Museum (Natural History),
Cromwell Road, London SW7 5BD

Summary

In this paper the authors describe nine new species of *Langbiana* and one new species of *Asceua* (Araneae: Zodariidae), collected during the Alfred Russel Wallace Commemorative Expedition to Sulawesi Utara (Indonesia) in 1985. In addition, specimens from Sulawesi, originally identified as *Storena zebra* Thorell by Merian (1911), are here described as two further new species of *Langbiana*. Presented also is a key to the identification of the species of *Langbiana* from Sulawesi.

Introduction

"Project Wallace", a major expedition to North Sulawesi (Celebes, Indonesia), was organised by the Royal Entomological Society of London* to commemorate its 150th anniversary and the centenary of its Royal Charter. Alfred Russel Wallace was a former fellow of the Royal Entomological Society and his famous work in the Indo-Australasian Region is immortalised in the use of the name "Wallacea" for the faunal transition zone between Australasia and Asia. The forests of this region are extremely rich in species and those of Sulawesi are of particular interest because of the high levels of endemicity for which the island is famous.

The expedition occupied the whole of 1985; both authors participated during October and November. The expedition's base camp was situated in the Dumoga-Bone National Park just west of Kotamobagu. This is a large region of unspoilt rain forest ranging in altitude from 200 to 1800 m. Collections were also made by the authors on an excursion to the Tangkoko Batuangis National Park near the extreme north-east point of Sulawesi. Material collected in the Dumoga-Bone N.P. by C. L. & P. R. Deeleman in July 1982 is also included here.

Among the rich spider fauna in the forest, species of the family Zodariidae were common in the litter layer, though their abundance was less than in African rain forests. The species found in Sulawesi belong to two genera: *Asceua* Thorell and *Langbiana* Hogg.

Langbiana Hogg, 1922 is a senior synonym of *Suffucioides* Jézéquel, 1964, as established in a revision of the afrotropical species of *Langbiana* (Bosmans & Van Hove, 1986a). *Suffucioides* was formerly considered to be a subgenus of *Storena* Walckenaer, 1805, but was given generic rank by Van Hove & Bosmans (1984). As a result of these revisions, many species were transferred from *Storena* to *Langbiana*. *Langbiana* appears to have a palaeo-tropical distribution. Its afrotropical representatives were revised by Bosmans & Van Hove (1986a) but the Oriental ones remain poorly known. About 35 species have been described but, except for some species recently described or redescribed by Ono (1983) and Kritscher (1957), all are impossible to identify from the literature because of the lack of figures and descriptions of sexual organs. The types of the majority of these species have been studied by the first author but the results are not yet published.

It appeared from studies in Cameroon (Van Hove & Bosmans, 1984; Bosmans & Van Hove, 1986b) that *Langbiana* species have relatively small distribution ranges and show strong tendencies towards endemism. Most probably this is also the case in the Oriental Region. None of the twelve species described in this paper is known from other parts of the Oriental Region. *Langbiana zebra* (Thorell) is known from Papua New Guinea (type locality), but the specimens recorded from Sumatera (Thorell, 1890) and Sulawesi (Merian, 1911) as *Storena zebra* were misidentified and are, in fact, new species. Merian's material from Sulawesi concerns two species; both are described in this paper.

The second genus present in our material is *Asceua* Thorell, 1887. This genus also has a complicated history. Simon (1893) considered *Asceua* to be a junior synonym of *Storena*, but the genus was revalidated by Bosmans & Van Hove (1986a). Hitherto, the only published illustrations of genital organs are those of Jocqué (1986) in the description of a new species from the Comoros. The known Oriental species of *Asceua* have been studied by the first author (unpubl. data), and they are different from the species collected by us in Sulawesi.

Methods

The species descriptions in this paper are reduced to a minimum as in Van Hove & Bosmans (1984). The genital organs are always described in detail and particular attention has been paid to the shape of the suprategular apophysis and the embolus, both being of great diagnostic importance. By clearing the epigynes of the females which are closely related, additional characters to distinguish the species were found.

Holotypes are deposited in the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, or in the British Museum (Natural History), London. Paratypes are deposited in the same institutes and also in the personal collections of C. L. Deeleman and the first author.

Abbreviations: STA = suprategular apophysis. Fe, Pa, Ti, Mt, Ta = femur, patella, tibia, metatarsus, tarsus. In describing the spination, the position of the spines is indicated as follows: d (dorsal), pl (prolateral), pv (proventral), rl (retrolateral), rv (retroventral); spines disposed in groups are between brackets. The

*in collaboration with LIPI (Indonesian Institute of Sciences).

diameters of all eyes are expressed as multiples of that of the anterior median eyes (AM). AL = anterior lateral; PM = posterior median; PL = posterior lateral eyes. The distances separating the anterior eyes are also expressed as multiples of the diameter of the AM; the distances separating the posterior eyes are expressed as multiples of the diameter of the PM; a = distance between AM; b = distance between AM and AL; c = distance between PM; d = distance between PM and PL. Measurements are in mm. BM = British Museum (Natural History), KBIN = Koninklijk Belgisch Instituut voor Natuurwetenschappen, NMB = Naturhistorisches Museum Basel, BC = Bosmans Collection, DC = Deeleman Collection.

***Langbiana ponikii* sp. n.** (Figs. 1-3)

Type material

Holotype male: Sulawesi Utara, Summit of Gunung Poniki, 1817m, in pitfall in *Quercus* forest, 3 November 1985 (KBIN). Paratypes: 2 ♂, 1 subadult ♂, same data (KBIN); Poniki Trail, 1600m, 1 ♂, in pitfall in forest, 3 November 1985 (BC).

Male holotype

Measurements: Total length 6.24; carapace 3.19 long, 2.28 wide; sternum 1.39 long, 1.25 wide; chelicerae 1.30 long. *Colour:* Carapace dark mahogany-brown. Chelicerae brown, basolaterally and terminally orange-brown. Sternum yellowish brown. Trochanters of legs whitish; femora with basal part pale yellowish, distal part brown; patellae and tibiae yellowish grey; metatarsi and tarsi yellowish brown. Abdomen dorsally dark greyish brown, anteriorly slightly darkened and with 6 pairs of small pale grey spots; ventrally with some longitudinal, interconnected purplish brown stripes with whitish spots between them. *Carapace:* Reticulated. *Eyes:* All equal; a = ⅓; b = 1, c = ¾, d = 2. *Legs:* Spination leg I: Fe: dddpl; Pa: -; Ti: (pvrv)(plrlpvrv)(pvrv)(pvrvpl)(pvrv); Mt: v(pvrv)(plpvrv)(pvrv); Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.40	0.86	2.18	2.09	1.51
IV	2.52	0.91	2.28	2.98	1.73

Palp (Figs. 1-3): Tibial apophysis stout, gradually narrowing, in ventral view with distinct lateral concavity. Cymbial ridge nearly reaching middle of segment. STA (Fig. 3) slender, with basal tooth, gradually narrowing, terminally bifid, the mesal tooth longest. Conductor curved in ventral direction, in lateral view terminally with parallel margins and with rounded tip. Embolar base directed posteriorly, with lateral concavity; embolus linear, terminally slightly twisted.

Female

Unknown.

Etymology

The name refers to the type locality on Gunung Poniki.

Diagnosis

Langbiana ponikii sp. n. can be distinguished from other species by the shape of the STA with terminal bifid apophysis, and by the shape of the linear embolus.

***Langbiana kelvini* sp. n.** (Figs. 4-10)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, Poniki Trail, 1570m, in malaise trap near "Ice Station Zebra", 4 November 1985 (KBIN). Paratype: 1 ♀, same data (KBIN).

Male holotype

Measurements: Total length 7.24; carapace 3.34 long, 2.26 wide; sternum 1.30 long, 1.30 wide; chelicerae 1.10 long. *Colour:* Carapace reddish brown, locally mottled with grey. Chelicerae and sternum yellowish brown. Trochanters and basal part of femora yellowish white, distal part of femora and other leg segments yellowish brown. Abdomen dark purplish brown, with anteromedian dorsal brown stripe; two pairs of rounded spots, a transverse bar and a terminal spot pale greyish; venter with some longitudinal pale grey spots. *Carapace:* Moderately reticulated. *Eyes:* AM=1, AL=PM=PL=⅔; a=b=½, c=⅘, d=2.5. *Legs:* Spination leg I: Fe: d(drl)(dpl)(pldrl); Pa: pl; Ti: (pvrv)(plpvrl)(dpvplrl)(pvrv); Mt: rv(pvrv)(plrlpvrv)(pvrv); Ta: (pvrv)(pvrv). Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.59	0.89	2.30	2.59	1.70
IV	2.76	0.89	2.59	3.60	1.75

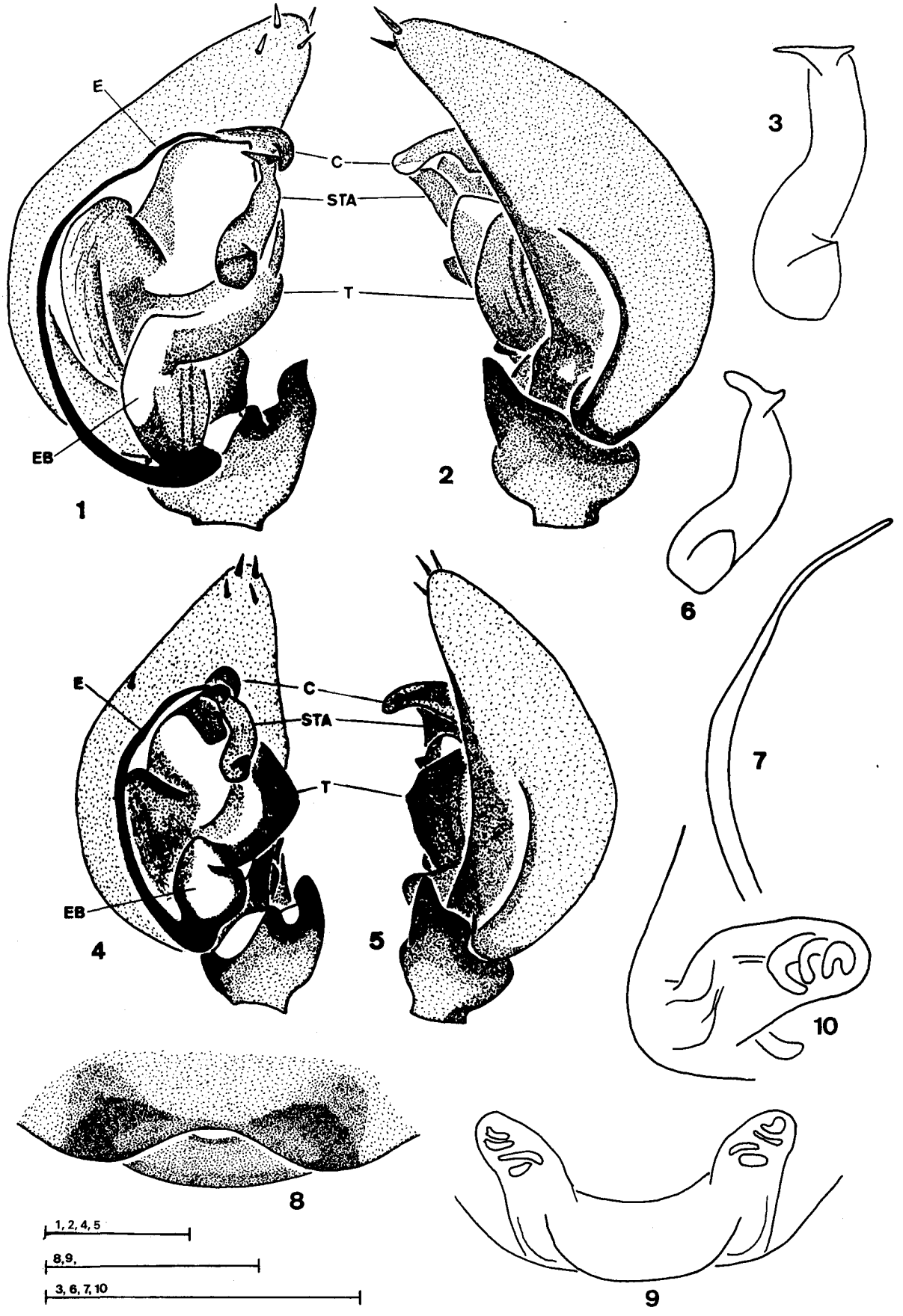
Palp (Figs. 4-7): Tibial apophysis with broad base, abruptly narrowed on its dorsal surface, terminally bluntly pointed. Cymbial ridge nearly half length of segment. Tegulum with small lateral prominence; STA (Fig. 6) slender, basally with parallel margins and with a tooth; distal part gradually narrowing into a bifid apophysis. Conductor curved in ventral direction, in lateral view with parallel margins and rounded tip. Embolar base directed posteriorly, with small lateral concavity; embolus linear, at ⅔ of its length slightly widened before becoming thread-like (Fig. 7).

Female paratype

Measurements: Total length 7.54; carapace 3.66 long, 2.30 wide; sternum 1.42 long, 1.30 wide; chelicerae 1.46 long. General appearance and colour as in male. *Legs:* Spination leg I: Fe: d(drl)d(pld); Pa: -; Ti: (pvrv)plpvrvpvpl(pvrv); Ta: (pvrv)(pvrv). Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.37	0.94	2.02	2.11	1.44
IV	2.52	0.91	2.33	2.93	1.49

Epigyne (Fig. 8): Median plate lenticular; no distinct lateral lobes. *Vulva* (Figs. 9-10): Spermathecae moderately long; in lateral view with parallel margins; in posteroventral view curved outwards.



Figs. 1-3: *Langbiana ponikii* sp. n. **1** Male palp, ventral view; **2** Idem, lateral view; **3** Suprategular apophysis, ventral view.

Figs. 4-10: *Langbiana kelvini* sp. n. **4** Male palp, ventral view; **5** Idem, lateral view; **6** Suprategular apophysis, ventral view; **7** Tip of embolus, ventral view; **8** Epigyne, ventral view; **9** Vulva, anteroventral view; **10** Vulva, lateral view.
Scale lines = 0.5mm. C = conductor, E = embolus, EB = embolar base, STA = suprategular apophysis, T = tegulum.

Etymology

The species is dedicated to Lt. Kelvin Murray of the British Royal Air Force in recognition of his accompanying the authors during their field work in Sulawesi, especially on the trip to Gunung Poniki.

Diagnosis

Langbiana kelvini sp. n. is closely related to *L. ponikii* sp. n. The two species can be distinguished by the lateral prominence on the tegulum, and by the shape of the palpal tibia and embolus.

***Langbiana dumogabonensis* sp. n.** (Figs. 11-16)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, Lake Mooat, 1100m, pitfall in forest behind P.P.R. bungalow, 18 November 1985 (KBIN). Paratypes: 1♂, 1♀, same data (KBIN); 1♂, 1♀ by sieving litter, same locality, 29 October 1985 (KBIN); 6♂ in pitfall in neglected coffee plantation, 18 November 1985 (BC); top of Gunung Poniki, 1817m, 6♂ in pitfalls in *Quercus* forest, 3 November 1985 (BC); "Camp 1440" trail, 400m, 3♂, 3♀ in pitfall in forest, 24 October 1985 (BC); watershed protection near Doloduo road, 1♀ in dry leaf litter, 27-30 July 1982 (C. L. & P. R. Deeleman leg., DC).

Male holotype

Measurements: Total length 3.77; carapace 1.49 long, 1.37 wide; sternum 0.91 long, 0.82 wide; chelicerae 0.60 long. *Colour:* Carapace dark brown. Chelicerae brown, base and apex yellowish brown. Sternum yellowish brown with darker margin. Trochanters of legs yellowish white; femora olive brown; patellae and tibiae slightly paler; tarsi and metatarsi yellowish brown. Abdomen dorsally dark purplish brown, with anteromedian brown spot; a pair of rectangular spots, 2 pairs of rounded spots, a transverse bar and tip all whitish. In some paratypes, the legs are paler; in others, the abdominal spots are almost absent. *Carapace:* Reticulated. *Eyes:* AM=0.91, AL=PL=1, PM=1.1; a=2, b=2.5, c=2, d=6. *Legs:* Spination leg I: Fe: ddpl; Pa: -; Ti: rvpvrvpv; Mt: (pvrv)(pvrv); Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	1.34	0.48	1.01	1.06	0.95
IV	1.46	0.50	1.32	1.68	1.13

Palp (Figs. 11-13): Tibia with relatively short, compact apophysis, bluntly pointed in anteroventral direction. Cymbial ridge not very pronounced, ⅓ length of segment. STA (Fig. 13) broad and rounded, without obvious teeth or folds; with a short basal fold and a terminal tooth pointed in ventral direction. Conductor terminally sharply pointed in ventral direction. Embolar base broad, directed mesally; embolus short and linear, not modified.

Female paratype

Measurements: Total length 4.3; carapace 2.09 long, 1.35 wide; sternum 0.94 long, 0.89 wide; chelicerae 0.96 long. General appearance and colour as in male. *Legs:*

	Fe	Pa	Ti	Mt	Ta
I	1.32	0.50	1.14	1.01	0.86
IV	1.46	0.58	1.32	1.34	1.04

Epigyne (Fig. 14): Median plate represented by a small lenticular plate at posteromedian side of epigyne; lateral lobes not expressed. *Vulva* (Figs. 15-16): Spermathecae compact, basally widened, with 5 coils.

Etymology

Langbiana dumogabonensis n. sp. was the commonest species of the genus in the Dumoga-Bone National Park, and is therefore named after it.

Diagnosis

This species is diagnosed by its small size, the short tibial apophysis, the broad, simple STA and the small lenticular median plate in the epigyne.

***Langbiana hamata* sp. n.** (Figs. 17-23)

Type material

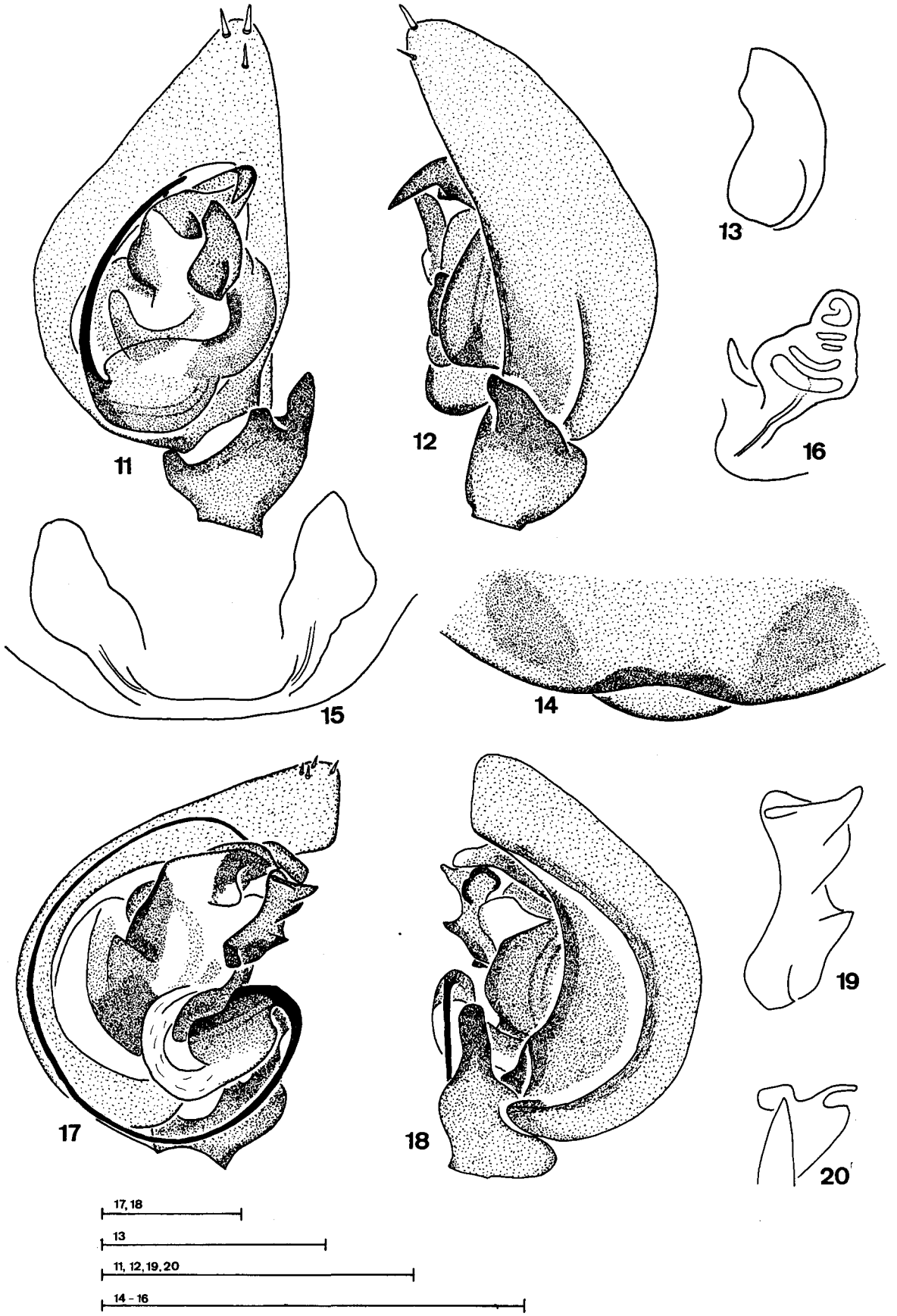
Holotype male: Sulawesi Utara, Dumoga-Bone National Park, 1440 trail, 400m, pitfall in forest, 24 October 1985 (KBIN). Paratypes: 5♂, 1♀, same data (BC); idem, 1♂, 5 November 1985 (BC); 300m, 1♂, 1♀, 2 subadult ♀ in pitfall in forest, 24 October 1985 (KBIN); 650m, 3♂ in pitfall in forest, 24 October 1985 (BC).

Male holotype

Measurements: Total length 4.99; carapace 2.71 long, 1.92 wide; sternum 1.03 long, 1.01 wide. *Colour:* Carapace chestnut brown. Chelicerae yellowish brown with frontal darker spot. Sternum yellowish brown, margin darker. Trochanters and basal part of femora whitish, distal part of femora brown; other leg segments yellowish brown. Abdomen purplish brown with a dorsal pattern of 3 paired spots, a transverse bar and a terminal spot; venter paler, with two parallel stripes and darkened area anterior to spinnerets. *Carapace:* Reticulated. *Eyes:* Large and closely set; AM=1, AL=PM=PL=⅔; a=⅓, b=½, c=⅓, d=¾. *Legs:* Spination leg I: Fe: ddpld; Pa: -; Ti: (pvrv)(plpvrvrl)(plvrl)v; Mt: (pvrv)(plpvrvrl)(pvrv); Ta:-. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	1.94	0.70	1.94	1.99	1.78
IV	2.18	0.67	2.16	2.88	1.75

Palp (Figs. 17-20): Tibial apophysis relatively long, with parallel margins and terminally rounded. Cymbial ridge ⅔ length of segment. STA slender, provided with a basomesal tooth and a median ridge, terminally widened and with two diverging teeth, the mesal one hook-like. Conductor bluntly pointed, its tip situated between the bifurcated tip of the STA. Embolar base directed laterally, with indistinct mesal concavity; embolus long and linear.



Figs. 11-16: *Langbiana dumogabonensis* sp. n. **11** Male palp, ventral view; **12** Idem, lateral view; **13** Suprategular apophysis, ventral view; **14** Epigyne, ventral view; **15** Vulva, anteroventral view; **16** Vulva, lateral view.

Figs. 17-20: *Langbiana hamata* sp. n. **17** Male palp, ventral view; **18** Idem, lateral view; **19** Suprategular apophysis, ventral view; **20** Tip of conductor and suprategular apophysis, anterior view.
Scale lines = 0.2 mm (13), 0.5 mm (11-12, 14-20).

Female paratype

Measurements: Total length 5.28; carapace 2.76 long, 1.92 wide; sternum 1.13 long, 1.10 wide. Colour and general appearance as in male. *Legs:*

	Fe	Pa	Ti	Mt	Ta
I	1.97	0.74	1.73	1.61	1.32
IV	2.16	0.72	1.97	2.47	1.54

Epigyne (Fig. 21): Median plate oval; lateral lobes well developed, nearly rectangular. *Vulva* (Figs. 22-23): Spermathecae very long, with 8 coils and 7 subcoils.

Etymology

The name refers to the hook-like structure at the tip of the STA.

Diagnosis

Langbiana hamata sp. n. can be recognised by the relatively long tibial apophysis, by the terminal hook on the STA, by the oval median plate in the epigyne, and by the long spermathecae.

***Langbiana nigra* sp. n.** (Figs. 24-27)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, 200m, pitfall in forest clearing near river Tumpah, 24 October 1985 (KBIN). Paratype: idem, 1♂ in malaise trap in forest (Rentice II), 24 November 1985 (BC).

Male holotype

Measurements: Total length 6.41; carapace 3.41 long, 2.26 wide; sternum 1.49 long, 1.39 wide; chelicerae 1.22 long. *Colour:* Carapace black. Sternum and chelicerae dark reddish brown. Trochanters and femora blackish brown, other leg segments yellowish brown. Abdomen purplish brown, with small anterodorsal brown stripe; also with 2 pairs of small spots and 5 transverse bars, the posterior two laterally widened and whitish. *Carapace:* Cephalic part reticulated, thoracic part rugose. *Eyes:* AM=1, AL=PM=PL=0.6; a=b=⅓, c=⅞, d=2. *Legs:* Spination leg I: Fe: ddpld; Pa: -; Ti: (pvrvpl)(pvrvpl)(pvrv); Mt: rvpvrv(pvrv); Ta: vv. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.76	0.84	2.54	2.66	1.90
IV	2.71	0.96	2.52	3.48	1.82

Palp (Figs. 24-27): Tibial apophysis with very broad base, then suddenly narrowed; rounded terminally. Cymbial ridge short, only slightly longer than ⅓ length of segment. Bulbus with a median, membranous pointed process (Fig. 24, MP). STA (Fig. 26) voluminous and typical, with large basomedian tooth, median transverse ridge and subterminal ridge; terminally bifid, with a short and rounded posteromesally directed tooth, and a larger and sharper anterolaterally directed tooth. Conductor terminally sharply pointed and curved in anterolateral direction. Embolar base directed posteromesally; embolus relatively short, subterminally twisted in a spiral of 360° (Fig. 27).

Female

Unknown.

Etymology

The name refers to the black colour of the carapace.

Diagnosis

Langbiana nigra sp. n. is diagnosed by its dark colour, and by the median membranous process on the bulbus, which is unique in the genus.

***Langbiana lobata* sp. n.** (Figs. 28-32)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, 1600m, pitfall in forest along Poniki trail, 18 October 1985 (KBIN).

Male holotype

Measurements: Carapace 2.59 long, 1.92 wide; sternum 1.08 long, 1.08 wide; chelicerae 0.91 long (the abdomen is damaged, and therefore the total length is not given). *Colour:* Carapace dark reddish brown, clypeus somewhat paler. Chelicerae and sternum orange-brown. Legs yellowish white (possibly somewhat discoloured), dorsal surface of femora more brownish. *Carapace:* Reticulated. *Eyes:* AM=1, AL=PM=PL=⅘; a=½, b=⅗ , c=1, d=⅔. *Legs:* Spination leg I: Fe: ddpl; Pa: -; Ti: rvpvplrv(plpvrvrl); Mt: (pvrv); Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.02	0.67	1.73	1.68	1.22
IV	2.28	0.67	—	—	—

Palp (Figs. 28-32): Tibial apophysis with broad base, suddenly narrowed at its dorsal margin and bent in anteroventral direction; bluntly pointed. Cymbial ridge reaching nearly ¾ length of segment. Tegulum with pronounced lateral prominence. STA (Fig. 30) with rectangular base, subterminal ridge and terminal, bifurcate, anteroventrally directed apophysis. Conductor pointing in ventral direction. Embolar base directed laterally, with anterolateral concavity; embolus relatively broad proximally, suddenly widened into a posteromesal lobe, then linear.

Female

Unknown.

Etymology

The name refers to the two lobe-like prominences on the male palp: one on the lateral surface of the tegulum, the other on the embolus.

Diagnosis

Langbiana lobata sp. n. is easily recognised by the lobe-like widening of the embolus.

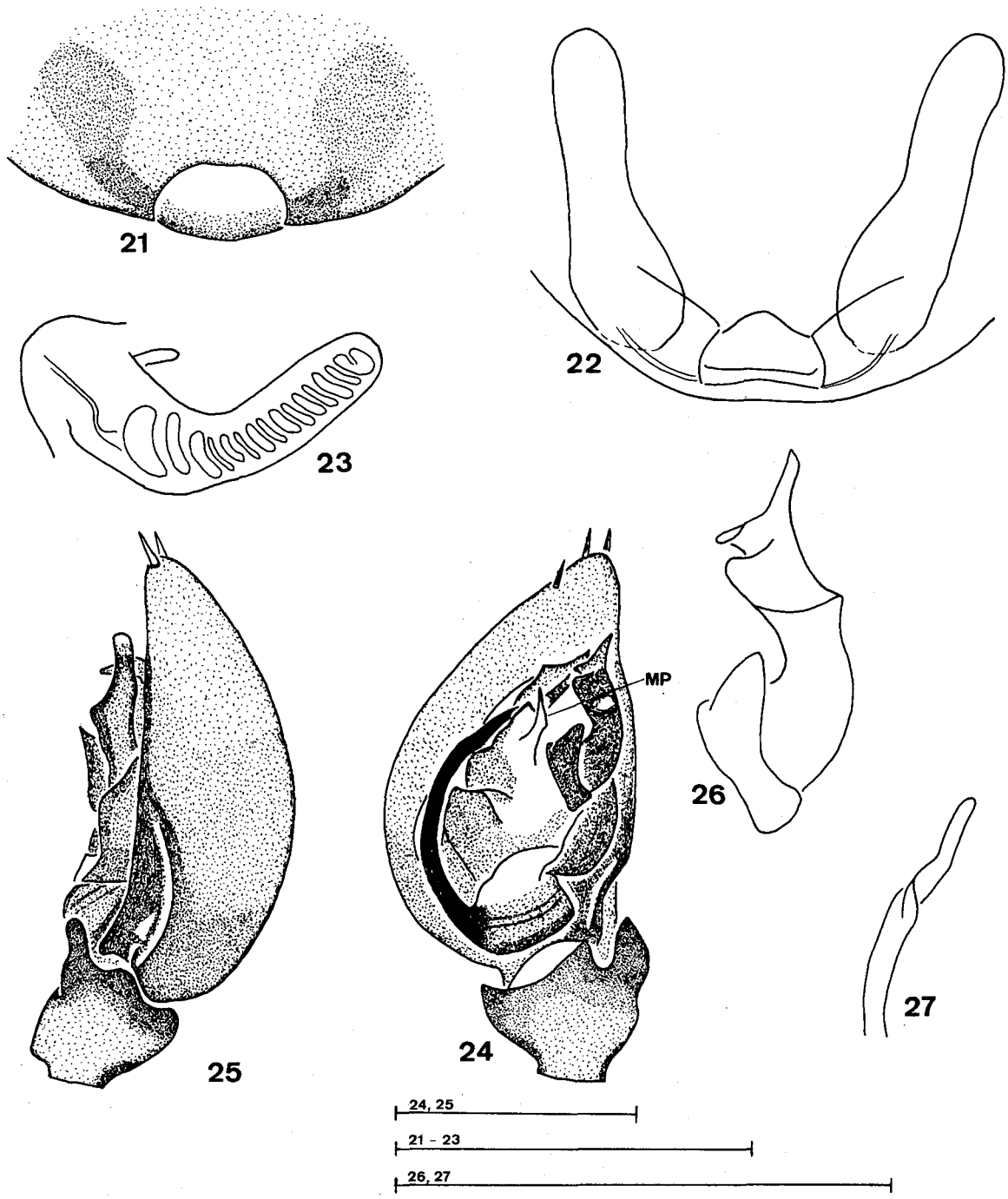
***Langbiana pulchra* sp. n.** (Figs. 33-35)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, Poniki Trail, 800m, in leaf litter, 14 October 1985 (KBIN).

Male holotype

Measurements: Total length 5.57; carapace 2.81 long, 2.23 wide; sternum 1.27 long, 1.25 wide; chelicerae 1.01 long. *Colour:* Carapace dark maroon-brown, anterior margin orange-brown. Chelicerae reddish brown, inner margin orange-brown. Sternum brown. Trochanters of legs yellowish white; femora brown, anterodorsal and ventral surface yellowish brown; basal half of metatarsi yellowish white; other leg segments yellowish brown. Abdomen dorsally dark



Figs. 21-23: *Langbiana hamata* sp. n. **21** Epigyne, ventral view; **22** Vulva, anteroventral view; **23** Vulva, lateral view.

Figs. 24-27: *Langbiana nigra* sp. n. **24** Male palp, ventral view (MP = membranous process); **25** Idem, lateral view; **26** Suprategular apophysis, ventral view; **27** Tip of embolus, mesoventral view.
Scale lines = 0.5mm.

purplish brown; with a pair of longitudinal rectangular bars, 2 pairs of rounded spots, a large transverse bar, a small transverse bar and a terminal spot all clear white; venter dark purplish brown with some clear white spots, anterior to epigastric fold and anterior to spinnerets yellowish. *Carapace:* Reticulated, more pronounced on thoracic part. *Eyes:* AM=1, AL=PM=PL=⅔; a=⅓, b=1, c=¾, d=3. *Legs:* Spination leg I: Fe: dd(pldrl); Pa: pl; Ti: 2 d, 6 pl, 5 rv, 8 rl, more or less in rows. Mt: pv(pvrv)pl(plpvrvrl)(pvrv); Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.23	0.70	2.16	2.23	1.73
IV	2.40	0.74	2.35	3.06	1.82

Palp (Figs. 33-35): Tibial apophysis tapering, bluntly pointed; in ventral view slightly bent. Cymbial ridge half as long as cymbium. STA (Fig. 35) basally with large tooth, gradually narrowing, terminally bifid. Conductor curved in ventral direction, rounded terminally. Embolar base directed posteriorly, with lateral concavity; embolus linear.

Female

Unknown.

Etymology

The name is an allusion to the beautiful colour of the species.

Diagnosis

Langbiana pulchra sp. n. is diagnosed by its colour, by the long and heavily spined legs and by the sexual organs.

***Langbiana ponikioides* sp. n.** (Figs. 36-38)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, summit of Gunung Poniki, 1817m, in litter of *Quercus* forest, 3 November 1985 (BM 1989.6.5.1).

Male holotype

Measurements: Total length 4.72; carapace 2.20 long, 1.52 wide; sternum 1.14 long, 1.10 wide; chelicerae 0.72 long. *Colour:* Carapace mahogany-brown. Chelicerae orange-brown. Sternum yellowish brown. Femora olive-brown, other leg segments yellowish brown. Abdomen purplish brown, with 4 pairs of whitish spots (first pair elongated, pairs 2-3 rounded, and pair 4 oval), followed by an unpaired and a terminal spot. *Carapace:* Reticulated. *Eyes:* AM=1, AL=PM=PL=¾; a=½, b=¾, c=½, d=⅘. *Legs:* Spination leg I: Fe: dd(dpl); Pa: -; Ti: (pvrvrl)(plpvrvrl)(pvrv); Mt: (pvrv)(pvrv)(pvrv). Measurements:

	Fe	Pa	Ti	Mt	Ta
I	1.62	0.59	1.38	1.34	1.16
IV	1.78	0.56	1.62	1.98	1.34

Palp (Figs. 36-38): Tibial apophysis bluntly pointed. Cymbial ridge nearly half as long as segment. STA (Fig. 38) gently curved, with broad base and basolateral tooth, terminally rounded. Conductor long, curved in ventral direction, bluntly pointed. Embolar base directed posteriorly; embolus linear, terminally slightly twisted.

Female

Unknown.

Etymology

The name refers to the close relationship with *Langbiana ponikii* sp. n.

Diagnosis

Langbiana ponikioides sp. n. is closely related to *L. ponikii* sp. n. It differs by its smaller size, by the absence of the lateral concavity on the tibial apophysis of the male palp and by the form of the STA.

***Langbiana albomaculata* sp. n.** (Figs. 39-43)

Type material

Holotype male: Sulawesi Utara, Tangkoko Batuangis National Park, coastal forest litter, November 1985 (BM 1989.6.5.2). Paratype: 1♀, same data (BM 1989.6.5.3).

Male holotype:

Measurements: Total length 6.64; carapace 3.40 long, 2.52 wide; sternum 1.28 long, 1.52 wide; chelicerae 1.02 long. *Colour:* Carapace dark brown. Sternum and chelicerae reddish brown. Trochanters and basal third of femora white, distal ⅔ of femora dark brown; patellae yellowish brown; tibiae I-II brown, III-IV dark brown; metatarsi and tarsi brown. Abdomen dark purplish brown, dorsally with 4 pairs, 3 unpaired and one terminal cream-white spots; laterally with 2 rounded and one large, U-shaped cream-white spots; ventrally with some small cream-white spots. *Carapace:* Strongly reticulated, with indistinct median ridge. *Eyes:* AM=1, AL=PM=PL=⅗; a=⅖, b=⅘, c=1, d=1⅕. *Legs:* Heavily and irregularly spined; leg I: Fe: dd(dpl); Pa: -; Ti: 1 d, 5 pl, 4 pv, 7 pv, 7 rl; Mt: 2 pl, 4 pv, 7 rv, 2 rl; Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.36	0.88	2.16	2.32	1.94
IV	2.56	0.88	2.40	1.68	1.70

Palp (Figs. 39-42): Tibial apophysis bluntly pointed, laterally depressed. Cymbial ridge nearly half as long as segment. STA (Fig. 41) large, in oblique position, with a basal tooth and a mediolateral ridge, terminally pointed and bent in posteromesal direction. Conductor a broad, rounded lobe, surrounding the tips of the embolus and the STA. Embolar base directed posteromesally, with small posterolateral concavity; embolus with bifurcation at half its length (Fig. 42).

Paratype female

Measurements: Total length 6.4; carapace 3.28 long, 2.36 wide; sternum 1.32 long, 1.32 wide; chelicerae 1.16 long. Colour as in male. *Eyes:* AM smaller than in male: AM=1, AL=PM=PL=⅘; a=½, b=⅗, c=d=1. *Legs:* Spination strongly different from male; leg I: Fe: d(drl)d(dpl); Pa: pl; Ti: (plpvrv)rv(pvrv); Mt: (pvrv)(pvrv)(pvrv). Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.06	0.82	1.78	1.82	1.44
IV	2.24	0.80	2.18	1.34	1.50

Epigyne (Fig. 43): Lateral lobes strongly developed, their inner margins forming a semi-circular ridge converging into the middle of the median plate.

Etymology

The name refers to the cream-white spots on the abdomen.

Diagnosis

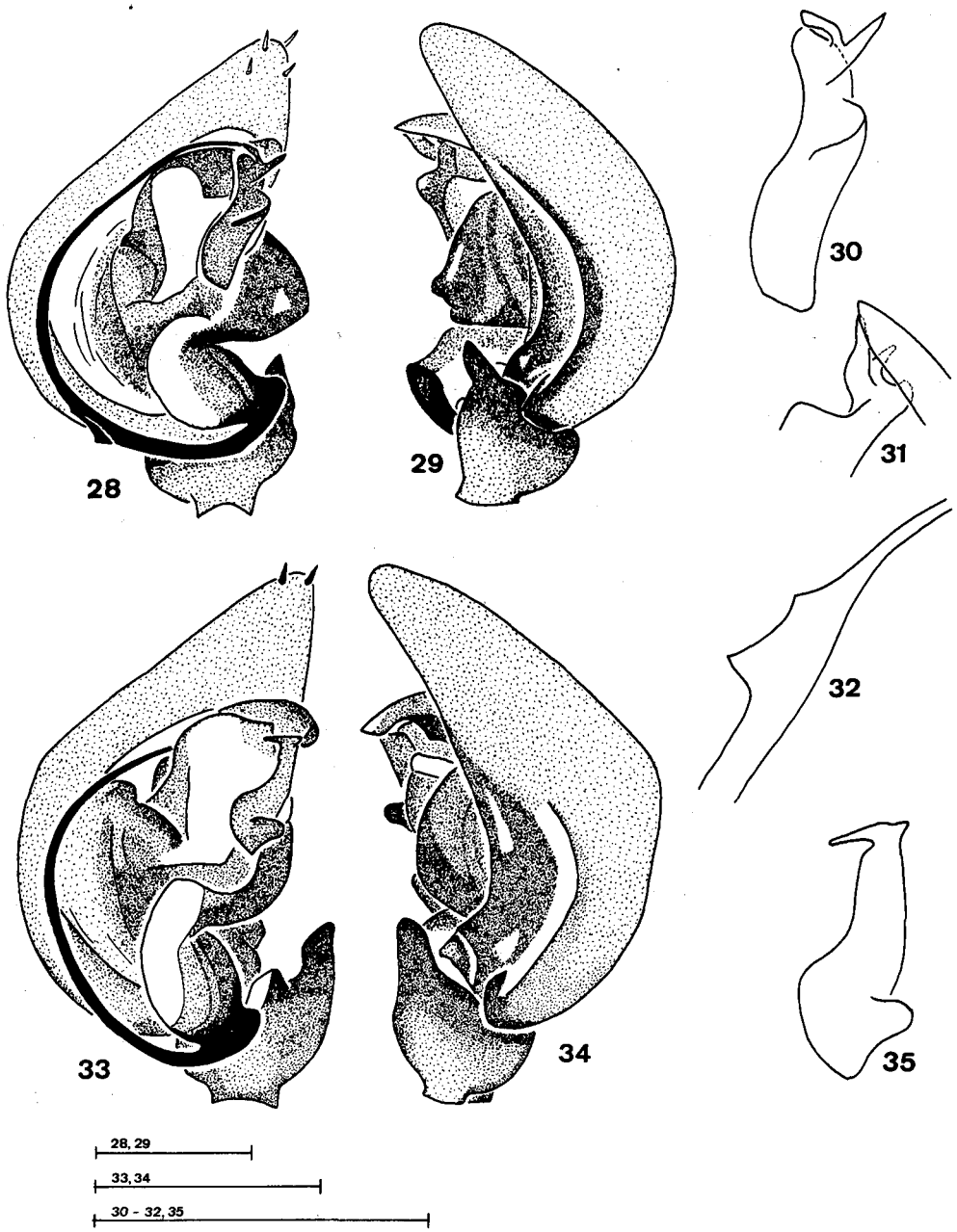
Langbiana albomaculata sp. n. is easily recognised by the cream-white spots on the abdomen, by the bifurcated embolus of the male palp, and by the ridged median plate of the epigyne.

***Langbiana v-insignita* sp. n.** (Figs. 44-47)

Storena zebra; Merian, 1911: 173 (misidentification).

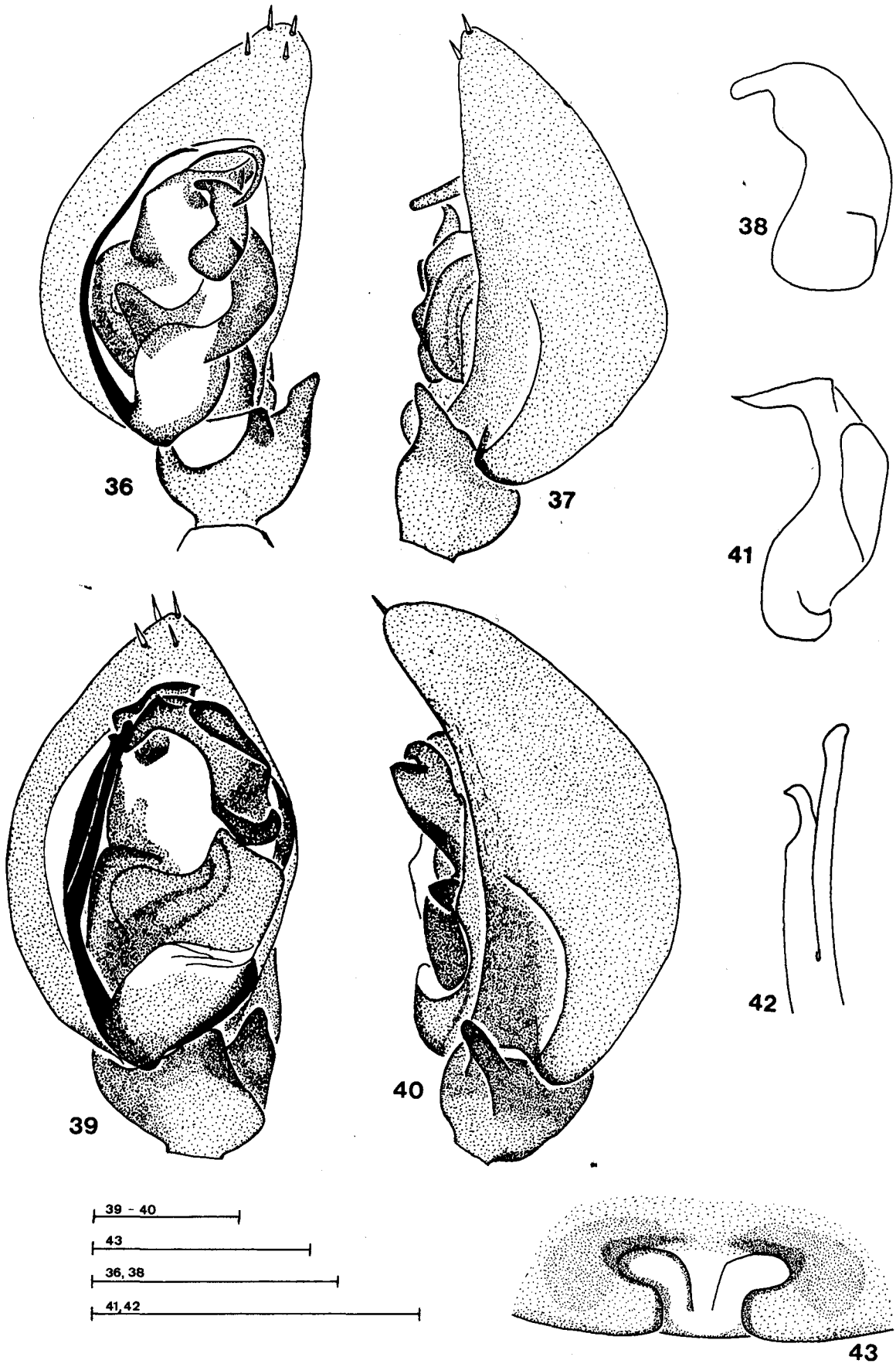
Type material

Holotype male: Sulawesi, Masarang (NMB 854d).



Figs. 28-32: *Langbiana lobata* sp. n. **28** Male palp, ventral view; **29** Idem, lateral view; **30** Suprategular apophysis, ventral view; **31** Tips of suprategular apophysis and embolus, anterior view; **32** Part of embolus, posteroventral view.

Figs. 33-35: *Langbiana pulchra* sp. n. **33** Male palp, ventral view; **34** Idem, lateral view; **35** Suprategular apophysis, ventral view. Scale lines = 0.5mm.



Figs. 36-38: *Langbiana ponikioides* sp. n. **36** Male palp, ventral view; **37** Idem, lateral view; **38** Suprategular apophysis, ventral view.

Figs. 39-43: *Langbiana albomaculata* sp. n. **39** Male palp, ventral view; **40** Idem, lateral view; **41** Suprategular apophysis, ventral view; **42** Tip of embolus, mesoventral view; **43** Epigyne, ventral view.
Scale lines = 0.2mm (38), 0.5mm (36-37, 39-43).

Male holotype

Measurements: Total length 4.71; carapace 2.67 long, 1.92 wide; sternum 1.13 long, 1.06 wide; chelicerae 0.91 long. *Colour:* Carapace, chelicerae and sternum dark reddish brown. Legs yellowish brown, except brownish femora. Abdomen shrivelled, but dorsal pattern of paired spots followed by transverse bars still recognisable. *Carapace:* Distinctly rugose; with a V-shaped dorsal pattern of whitish hairs, base of V on fovea; clypeus with similar whitish hairs. *Eyes:* Rather small and widely spaced; AM=1, AL=PM=PL=0.9; a=3, b=4.5, c=5, d=11. *Legs:* Long; tibiae and metatarsi with many long spines, tarsi with short spines, as in other *Langbiana* species. Spination leg I: Fe: ddpl; Pa: -; Ti: 6 d, 10 pl, 8 pv, 8 rv, 7 rl, more or less in rows; Mt: (pvrvpl)(pvrvpl)(pvrv); Ta: v. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.04	0.65	1.92	1.92	1.54
IV	2.14	0.67	2.09	2.81	1.61

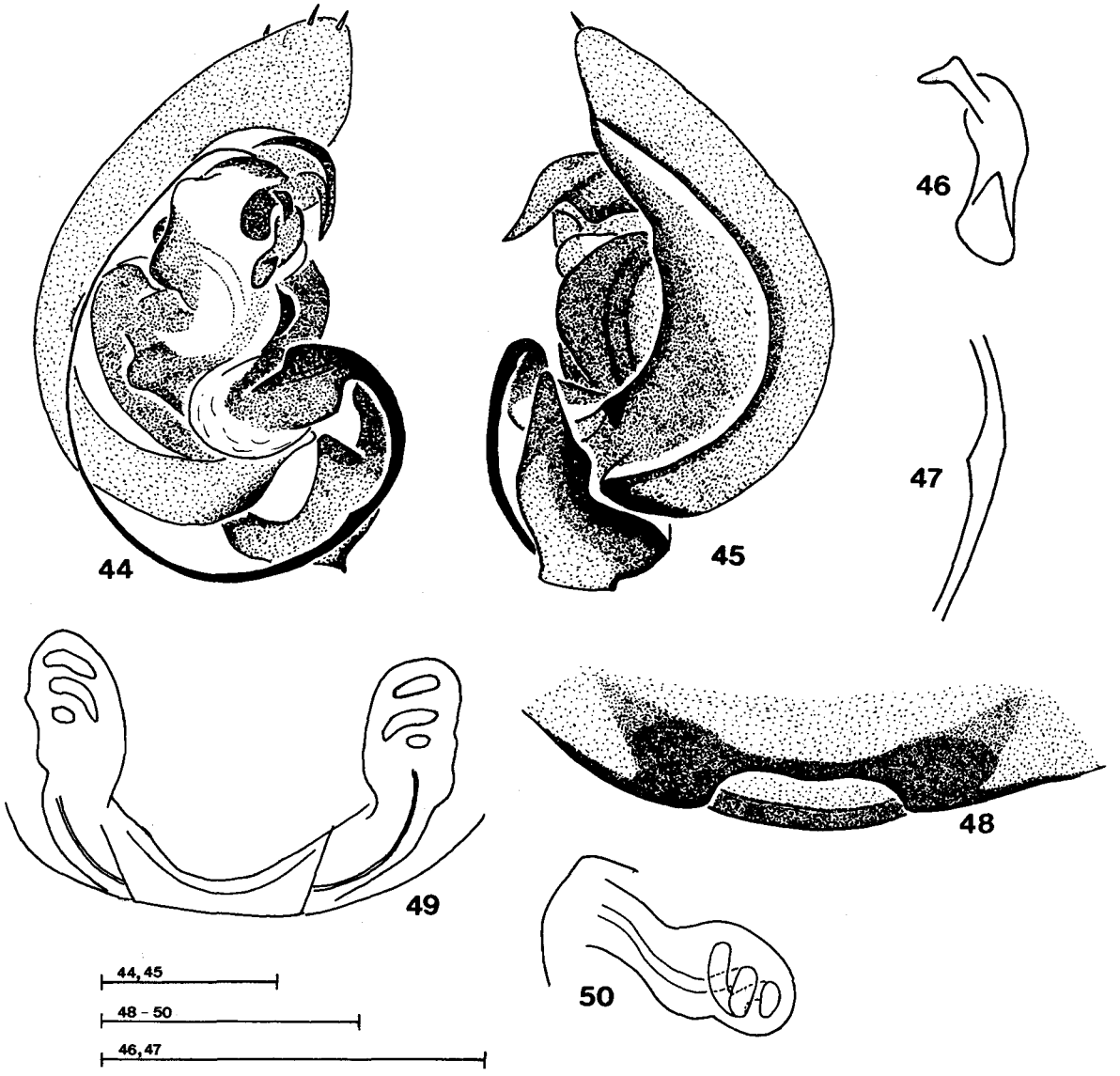
Palp (Figs. 44-47): Tibial apophysis straight, terminally bluntly pointed; lateral margin distinctly concave, at first with parallel margin, then tapering. Cymbium with deep lateral cleft; ridge 4/5 length of segment. STA (Fig. 46) very small, with basomedian ridge-like tooth; terminally pointed and curved in mesal direction; mediodorsally accompanied by a small membrane. Conductor a long and sharp, posteroventrally directed tooth. Embolar base directed laterally, with small anteromedian concavity; embolus long, linear except for a small widening near its base (Fig. 47).

Female

Unknown.

Etymology

The name refers to the shape of the whitish pubescence on the carapace.



Figs. 44-47: *Langbiana v-insignita* sp. n. **44** Male palp, ventral view; **45** Idem, lateral view; **46** Suprategular apophysis, ventral view; **47** Part of embolus, ventral view.

Figs. 48-50: *Langbiana meriani* sp. n. **48** Epigyne, ventral view; **49** Vulva, anteroventral view; **50** Vulva, lateral view. Scale lines = 0.5mm.

Diagnosis

The species is easily distinguished from other *Langbiana* species by the V-shaped pubescence on the carapace. The long and heavily spined legs and the genital organs provide other diagnostic characters.

***Langbiana meriani* sp. n.** (Figs. 48-50)

Storena zebra; Merian, 1911: 173 (misidentification).

Type material

Holotype female: Sulawesi Selatan, Pic Bantaeng, 2000m, October 1895 (NMB 854c). Paratype: 1♀, same data (NMB 854a).

Female holotype

Measurements: Total length 8.51; carapace 3.98 long, 2.62 wide; sternum 1.54 long, 1.46 wide; chelicerae 1.44 long. *Colour:* Carapace reddish brown, anterior margin orange. Chelicerae reddish brown, anteromedian margin yellowish. Sternum orange-brown. Legs yellowish orange, trochanters and basal part of femora somewhat paler. Abdomen dark purplish grey, with 5 pairs of spots, 3 small transverse bars and tip all pale grey; venter similar, with some scattered pale grey spots. *Carapace:* Rather rectangular, thoracic part only slightly wider than cephalic part (ratio 1.12); reticulated. *Eyes:* All equal; a=1, b=⅔, c=⅘, d=3.5. *Legs:* Spination leg I: Fe: ddpl; Pa: -; Ti: (pvrv)pvplrvpv(pvrv); Mt: (pvrv)(pvrv)(pvrv); Ta: -. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	2.33	0.98	1.90	1.80	1.37
IV	2.64	1.10	2.21	2.76	1.51

Epigyne (Fig. 48): Median plate small, consisting of only a small ridged sclerite; lateral lobes obtuse, marked by a rounded dark spot. *Vulva* (Figs. 49-50): Receptacula of moderate length, oval, with three coils.

Male

Unknown.

Etymology

The German arachnologist Prof. Merian recorded this species from Sulawesi as *Storena zebra* Thorell. It appears however to be a new species and it is named after this author.

Diagnosis

Langbiana meriani sp. n. can be recognised by the very small median plate in the epigyne.

***Asceua wallacei* sp. n.** (Figs. 51-55)

Type material

Holotype male: Sulawesi Utara, Dumoga-Bone National Park, 1600m, pitfall in forest along Poniki Trail, 16 October 1985 (KBIN). Paratypes: 3♂, 1♀, same data; 300m, forest near "Barney's camp", 2♂, 1♀ in pitfalls, 24 October 1985 (KBIN); 400m, 1440 trail, 1♂ in pitfall, 24 October 1985, and 1♀ by sieving litter, 10 October 1985 (BC); 660m, "Hogg's Back", 2♂ in pitfall, 24 October 1985, and 1♀ by sieving litter, 10 October 1985 (BC); Poniki Trail, 810m, 1♂ by sieving litter, 18 October 1985 (BC); Poniki Trail, "Ice Station Zebra", 1570m, 1♀ by sieving litter, 17 October 1985 (BC); 1817m, top of Gunung Poniki, 2♂ in pitfall, 17 October 1985 (BC). Danau Mooat, 1100m, forest behind P.P.R. bungalow, 3♂, 1♀ in pitfalls, 18 November 1985 (KBIN); border primary forest near Doloduo road, 3♀, 27-30 July 1982 (C. L. & P. R. Deeleman leg., DC); pass Gunung Ambon, 40km east of Kotamobagu, 1000m, litter in secondary forest near stream, 1♀, 26 August 1982 (C. L. & P. R. Deeleman leg., DC).

Male holotype

Measurements: Total length 2.69; carapace 1.30 long, 0.98 wide; sternum 0.65 long, 0.62 wide; clypeus 0.46 high; chelicerae 0.53 long. *Colour:* Carapace orange-brown, foveal region, lateral margin and median part of clypeus greyish brown. Chelicerae and sternum yellowish brown, the latter with grey margin. Legs yellowish orange; femora ventrally with two greyish brown spots; tibiae ventrally streaked with greyish brown. Abdomen dorsally dark purplish brown; with two pairs of elongate longitudinal spots, a pair of U-shaped spots, a small transverse spot, a very large transverse spot and tip of abdomen all pale grey; venter pale grey. *Carapace:* Very high, with large clypeus; reticulated, with rather wide meshes. *Eyes:* Anterior row recurved, posterior row procurved; AM=1, AL=⅜, PM=⅞, PL=1; a=b=½, c=d=1. *Legs:* All femora with two dorsal spines. Ti I-II spineless, Ti II-IV with a posteroventral terminal spine. Mt I-II with a pair of terminal ventral spines; Mt III with 6 terminal ventral and lateral spines; Mt IV with 2 ventral and 2 lateral spines. Except for lateral spines on Mt IV, all other spines shorter than diameter of corresponding segment. Measurements:

	Fe	Pa	Ti	Mt	Ta
I	1.20	0.29	1.15	1.18	0.58
IV	1.20	0.36	1.01	1.27	0.58

Palp (Figs. 51-53): Tibia with slender dorsal apophysis, and broad lateral apophysis; with a large concavity between them, in which fits a posterior projection of the cymbium. Cymbium modified, in dorsal view with a median semi-circular projection, which in lateral view appears to be strongly excavated below. Tegulum with small anterior chitinised tooth, and small, pointed posterior hook. Conductor large and semi-circular, not very chitinised, with anterior and posterior pointed processes, the posterior one situated near posterior hook of tegulum and near tip of embolus. Embolar base triangular, situated at posterior end of bulbus; embolus very long and thread-like, at first following dorsal curvature of cymbium on mesal side of palp, then turning to lateral side of palp and following dorsal margin of conductor; in many paratypes, the thread-like embolus has a different disposition, but the normal position seems to be as in the holotype.

Female paratype (from same locality as holotype)

Measurements: Total length 2.45; carapace 1.20 long, 0.94 wide; sternum 0.58 long, 0.57 wide; clypeus 0.38 high; chelicerae 0.43 long. Colour and general appearance as in male. *Legs:* Spination as in male, but spines always shorter than corresponding segment.

	Fe	Pa	Ti	Mt	Ta
I	0.98	0.33	0.82	0.86	0.42
IV	0.96	0.36	0.84	1.03	0.48

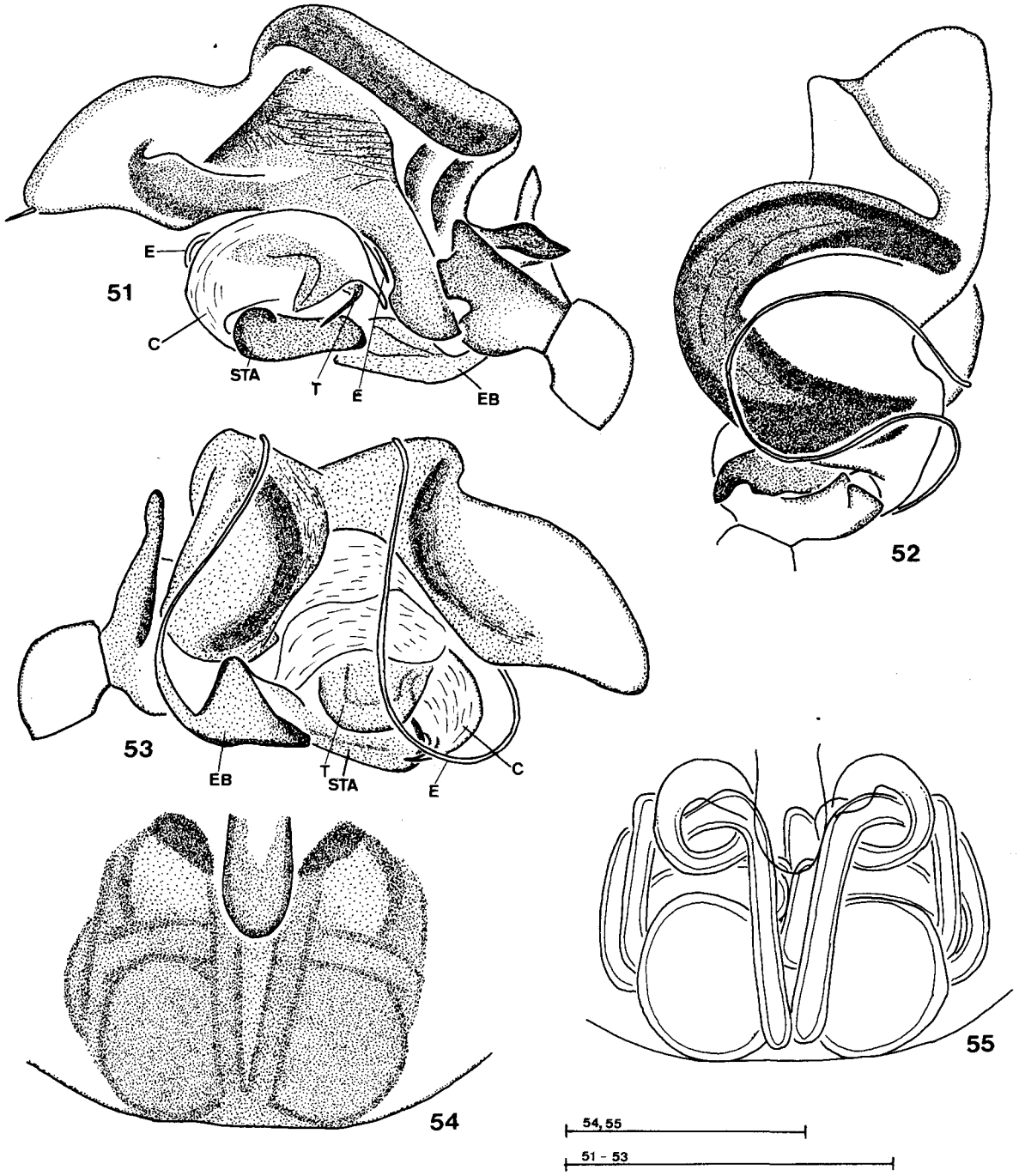
Epigyne (Fig. 54): With an anteromedian, elongate process, which has a cleft laterally. No other outer chitinous structures. Two large posterolateral receptacula can be seen through transparent integument, at their anterior and mesal margins encircled by ducts. *Vulva* (Fig. 55): Copulatory openings situated lateral to anteromedian process. Copulatory ducts for a short length membranous, then becoming chitinous; ducts very long and with many coils. One pair of very large recaptacula.

Etymology

The species is named after Alfred Russel Wallace, the well-known entomologist to whom the expedition to Sulawesi was dedicated.

Diagnosis

Asceua wallacei sp. n. is easily diagnosed by the very complicated sexual organs.



Figs. 51-55: *Asceua wallacei* sp. n. **51** Male palp, lateral view; **52** Idem, dorsal view; **53** Idem, mesal view; **54** Epigyne, ventral view; **55** Vulva, ventral view.
Scale lines = 0.5mm. C = conductor, E = embolus, EB = embolar base, STA = suprategular apophysis, T = tegulum.

Key to *Langbiana* species of Sulawesi

Males

1. Embolar base directed laterally; embolus very long (Figs. 17, 28, 44) 2
— Embolar base directed posteriorly; embolus of moderate length (Figs. 1, 4, 33, 36) 4
— Embolar base directed mesally; embolus relatively shorter and thicker (Figs. 11, 24, 39) 7

2. Embolus linear, without widening (Fig. 17); tibial apophysis long, with parallel margins (Fig. 18) ..... *hamata* sp. n.
— Embolus locally widened (Figs. 28, 32, 44, 47); tibial apophysis shorter and more tapering (Figs. 29, 45) 3

3. Widening of embolus very distinct, situated on its posterior margin (Figs. 28, 32); large lateral prominence on tegulum (Figs. 28, 29) ..... *lobata* sp. n.
— Widening of embolus inconspicuous, situated on its anterior margin (Figs. 44, 47); no lateral prominence on tegulum (Figs. 44, 45) ..... *v-insignita* sp. n.

4. Tibial apophysis with distinct anterodorsal concavity (Fig. 5); tegulum with large lateral prominence (Fig. 4) ..... *kelvini* sp. n.
— Tibial apophysis tapering (Figs. 2, 34, 37); tegulum without lateral prominence (Figs. 1, 33, 36) .. 5

5. Tibiae and metatarsi heavily spined; femora brown, anterodorsal and ventral surface yellowish brown ..... *pulchra* sp. n.
— Tibiae and metatarsi normally spined; femora with basal part yellowish, and distal part brown, or all olive-brown 6

6. Embolar base with lateral concavity (Fig. 1); STA terminally bifid (Fig. 3) ..... *ponikii* sp. n.
— Embolar base without lateral concavity (Fig. 36); STA terminally not bifid (Fig. 38) ..... *ponikioides* sp. n.

7. Embolus bifid for about half its length (Figs. 39, 42) ..... *albomaculata* sp. n.
— Embolus not bifid (Figs. 11, 24) 8

8. STA with distinct basal and terminal teeth (Fig. 26); tibial apophysis with distinct anterodorsal concavity (Fig. 25); size large ..... *nigra* sp. n.
— STA lacking distinct teeth (Fig. 13); tibial apophysis short and tapering (Fig. 12); size small ..... *dumogabonensis* sp. n.

Females

1. Lateral lobes of epigyne strongly protruding; median plate with two converging ridges (Fig. 43) ..... *albomaculata* sp. n.
— Lateral lobes of epigyne not strongly protruding; median plate without ridges (Figs. 8, 14, 21, 48) 2

2. Median plate oval or more or less rectangular; lateral lobes present (Figs. 21, 48) 3
— Median plate lenticular; lateral lobes not developed (Figs. 8, 14) 4

3. Median plate twice as wide as long, lateral lobes rectangular (Fig. 21); spermathecae long (Figs. 22-23) ..... *hamata* sp. n.
— Median plate three times as wide as long, lateral lobes obtuse (Fig. 48); spermathecae short (Figs. 49-50) ..... *meriani* sp. n.

4. Receptacula oval in lateral view (Fig. 10); in anteroventral view curved outwards (Fig. 9) ..... *kelvini* sp. n.
— Receptacula conical in lateral view (Fig. 16); not curved outwards in anteroventral view (Fig. 15) ..... *dumogabonensis* sp. n.

Acknowledgements

The first author acknowledges grants from the Leopold III Foundation and from the "Nationaal Fonds voor Wetenschappelijk Onderzoek". E. Sutter (NMB) and C. L. Deeleman are thanked for supplying specimens from their collections. The second author is grateful to the Director and Trustees of the British Museum (Natural History) for the opportunity to participate in Project Wallace.

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