

Two new genera of Zodariidae (Araneae) from Southeast Asia

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Two new genera of Zodariidae (Araneae) from Southeast Asia. - Two new genera of Zodariidae, belonging to the Zodariinae and strongly related to *Mallinella* Strand, are reported from evergreen forests in Thailand and Malaysia. *Euryeidon* gen. n. is represented by six species, all of which are new: *E. monticola* sp. n. (the type species; ♂ ♀), *E. musicum* sp. n. (♂ ♀), *E. anthonyi* sp. n. (♂ ♀), *E. sonthichaiiae* sp. n. (♂), *E. consideratum* sp. n. (♀) and *E. schwendingeri* sp. n. (♀). The genus is characterized by its strongly reticulate carapace and widely spaced eyes. *Heradion* gen. n. is represented by five new species, all known from both sexes, which can be clustered in two species groups on the base of somatic characters. The first group, found in Thailand, consists of *Heradion naiadis* sp. n. (the type species) and *H. peteri* sp. n. The second group is restricted to Malaysia and consists of three smaller, long-legged species: *H. pernix* sp. n., *H. damrongi* sp. n. and *H. luctator* sp. n. *Heradion* is characterized by: carapace smooth, domed; chilum drawn out into a point, pointing forward; sternum with anterior concavity accommodating labium; sclerotized field in front of the spinnerets with rows of hairs; femora inflated dorsally near proximal dorsal spine; coxae I and IV elongated. Keys to the genera of Zodariinae in Southeast Asia and to the species of *Euryeidon* and *Heradion* are provided.

Keywords: *Euryeidon* - *Heradion* - new genera - new species - taxonomy - zoogeography - Thailand - Malaysia.

INTRODUCTION

Zodariidae Thorell is a medium-sized family represented by 60 genera and 608 species (Platnick, 2004), which has its main distribution centers in Africa and Australia. Nonetheless, there are significant taxonomic inventory data gaps in our knowledge of the Zodariidae in Southeast Asia as a whole. This region appears to be very poor in zodariids as compared to the tropical areas in Africa and Australia, and only four genera have been listed (Jocqué, 1991; Murphy & Murphy, 2000): *Asceua*

Thorell, *Mallinella* Strand, *Storenomorpha* Simon and *Zodarion* Walckenaer, with the latter represented by a doubtful record from the Philippines. This information obviously represents only a small proportion of zodariid genera likely to occur in the region. The data for Thailand and Malaysia in particular are even more scant. Only one species, *Storenomorpha reinholdae* Jocqué & Bosmans, has been recorded from Thailand (Jocqué & Bosmans, 1989) and two species of *Storena* Walckenaer, *S. cinc-tipes* Simon 1893 and *S. obnubila* Simon 1901, were reported from Malaysia (Platnick, 2004). The latter two do certainly not belong in *Storena*, which is a purely Australian genus (Jocqué & Baehr, 1992), and they will probably turn out to belong either to *Asceua* or *Mallinella*. Both new genera described here are represented by species with clear preference for humid tropical forests, as it is also the case in *Mallinella* species to which they appear to be closely related. These findings once more indicate that the forest floor fauna of Southeast Asia is still very superficially known and recent field work in the area (unpublished data) has yielded more undescribed supraspecific taxa.

MATERIAL AND METHODS

All specimens were collected in the leaf litter layer of evergreen tropical forests.

The illustrations were made with an Olympus SZX-9 stereomicroscope equipped with a drawing tube. Measurements of leg segments were taken from the dorsal side. Epigynes were drawn in natural and cleared state (immersing in lactic acid for 10-20 minutes). Male palps were drawn in lateral and ventral view. Structures examined with the scanning electron microscope (JEOL LV-5400) were critical point dried, stud-mounted and sputter coated for observation and photography. Characters given in the generic diagnoses are for the most part not repeated in the species descriptions. All measurements are in millimetres.

The material examined is deposited in the collections of the Muséum d'histoire naturelle, Genève (MHNG) and the Entomology Department of the Koninklijk Belgisch Instituut voor Natuurwetenschappen (KBIN), except for the specimens marked with PDC (Pakawin Dankittipakul Collection, Auckland, New Zealand), which will later be deposited in the MHNG.

Abbreviations used in the text and in the figures: ALE, anterior lateral eyes; ALS, anterior lateral spinnerets; AME, anterior median eyes; CP: central plate of epigyne; DA: distal tegular apophysis; DTA: dorsolateral tibial apophysis; LE, lateral eyes; MA: median apophysis; MAP, major ampulatte spigots; ME, median eyes; MOQ, median ocular quadrangle; PA: patellar apophysis; PE, prolateral extension of cymbium; PER, posterior eyes row; PLE, posterior lateral eyes; PME, posterior median eyes; RTA: retrolateral tibial apophysis. Spination: d, dorsal; disp, dispersed, not in obvious rows; pl, prolateral; rl, retrolateral; v, ventral. Arrangement refers to number of spines from proximal to distal part.

TAXONOMY

KEY TO THE GENERA OF SOUTHEAST ASIAN ZODARIINAE

- 1 Small spiders (<4.5 mm) without ventral abdominal spines in front of spinnerets; cymbium of male palp laterally compressed, with large retrolateral fold; epigynal ducts long and strongly tortuous *Asceua* Thorell

- Usually larger spiders, with one or more transverse rows of ventral abdominal spines in front of spinnerets; cymbium without large retro-lateral fold 2
- 2 Single row of spines in front of spinnerets *Mallinella* Strand
- More than one row of spines in front of spinnerets 3
- 3 Cephalothorax strongly reticulate; LE far from ME; anterior margin of sternum straight *Euryeidon* gen. n.
- Cephalothorax smooth, LE close to ME; anterior margin of sternum with concavity accommodating labium *Heradion* gen. n.

***Euryeidon* gen. n.**

Type species. Euryeidon monticola sp. n.

Diagnosis. *Euryeidon* species are characterized by a strongly domed and coarsely granular carapace (Fig. 1), by a wide eye field in which the LE are situated far apart from the ME (Fig. 20), and by the presence of a ventral abdominal plate in front of the spinnerets (Fig. 2) which carries a field of short spines decreasing in length towards the front (Fig. 3). The palp (Figs 7, 8) is characterized by a cymbium with a prolateral extension (Fig. 13, PE), the embolic base is clearly separated from the tegulum (as in the palp of *Forsterella* Jocqué) and the median apophysis is very simple. Females have a simple epigyne with a median plate of variable shape (Figs 15, 26, 33, 41), and long, coiled, strongly sclerotized spermathecae connected by a transverse band (Figs 16, 17).

Etymology. *Euryeidon* is a combination of εὐρύς (Greek prefix: wide) and εἶδον (Greek: to look), and refers to the position of the median and lateral eyes which are situated far apart from each other. The gender is neuter.

Description. Medium-sized (5-9 mm) spiders. Carapace (Figs 18, 19) lengthways oval, in profile strongly domed with its highest point just in front of fovea (Fig. 1), more strongly raised in larger specimens. Cervical groove absent. Tegument densely granular (Fig. 1), provided with a marked but shallow median groove running from between PME to the short, longitudinal fovea.

Coloration: carapace usually reddish brown to dark chestnut-brown, in some species orange or pale brown. Chelicerae brown. Sternum orange-brown. Legs pale yellow to brown; femora usually dark brown, remaining leg articles mostly paler than femora. Abdomen (Figs 18, 19) dark sepia with a typical pattern of pale spots and stripes, rarely pale or without dorsal pattern (Fig. 37).

Eight eyes arranged in two rows, both rows strongly procurved (Fig. 20). All eyes subequal in size, circular, pale except for dark AME. AME less than their diameter apart, separated from ALE by almost twice their diameter. PME more than their diameter apart, about 3 times that distance away from PLE. MOQ slightly longer than wide and usually wider behind than in front. Clypeus rather high, 3 to 6 times the diameter of ALE, bulging, covered with setae.

Chilum a single sclerite, drawn out into a point, projecting forward (Fig. 20). Chelicerae (Fig. 20) tapering, sparsely hirsute but with a distinct distomesal group of hairs; condyle well-developed; promargin with 2 small teeth; fangs short and thick. Maxillae (Fig. 21) with anteromesal fringe of hairs. Labium triangular, with constrict-

ted base. Sternum roughly triangular, elevated; margins with short extensions fitting into coxal concavities, posterior part of the sternum protruding between coxae IV (Fig. 21). Small pleurites present.

Leg formula 4123. Spination: few spines on legs I and II, more on legs III and IV. Femora with 1-3 dorsal spines, inflated near proximal dorsal spine. Stridulating ridges present on femora I (Fig. 5), absent on other legs (Fig. 6). Patellae with single, short prolateral spine on posterior legs. Anterior legs with few spines on tibiae and metatarsi, posterior legs with numerous spines. Ventral tuft of metatarsal preening brush with modified chisel-shaped hairs (Fig. 10). Tarsal organ capsulate (Fig. 11). Bothria simple, with a long crescent-shaped ridge (Fig. 12). No claw tufts and no hinged hairs present.

Abdomen oval, covered with numerous fine hairs; prolateral sigilla strongly developed; pedicel sclerotized (Fig. 18). Males with a pale brown dorsal scutum. Six spinnerets (Figs 2, 4); anterior pair long, conical, biarticulate; posterior and median pairs much smaller and shorter. Ventral abdominal plate (Figs 2, 3) slightly sclerotized, situated in front of spinnerets. Colulus represented by few hairs.

Male palp: tibia (Fig. 14) usually with dark retrolateral apophyses; sometimes with additional dorsolateral apophysis. Cymbium provided with long prolateral extension (Fig. 13, PE); few spines on apex; dorsolateral surface of cymbium clothed with thick patch of chemoreceptive hairs (Figs 8, 9); cymbial fold situated proximally on retrolateral side. Subtegulum well-developed. Tegulum with two apophyses: terminal or distal apophysis blunt, projecting outward; median apophysis simple, rising from membranous base. Posterior part of bulbus covered by embolic base, the latter clearly separated from rest of tegulum. Embolus variable in shape, from broad and massive to slender and whip-like, originating from posterior part of embolic base, forming half a loop.

Epigyne simple, provided with a median plate of variable shape (Figs 15, 26, 33, 41); copulatory ducts strongly sclerotized, long and coiled, leading to widely separated posterior spermathecae interconnected by wide, sometimes sclerotized band (Figs 16, 29, 34, 40, 42).

Species included. *Euryeidon anthonyi* sp. n., *E. consideratum* sp. n., *E. monticola* sp. n., *E. musicum* sp. n., *E. schwendingeri* sp. n. and *E. sonthichaiiae* sp. n.

Distribution. Evergreen hill forests of northern Thailand.

Key to the species of *Euryeidon* gen. n.

- | | | |
|---|--|-------------------------|
| 1 | ♂♂ | 2 |
| - | ♀♀ | 5 |
| 2 | Palpal patella with dorsal apophysis; RTA short, pointed, triangular in lateral view (Fig. 31) | <i>E. anthonyi</i> |
| - | Palpal patella without dorsal apophysis; RTA bifid or elongate | 3 |
| 3 | Palpal tibia with dorsal apophysis; RTA long and tapered (Fig. 14) | <i>E. monticola</i> |
| - | Palpal tibia without dorsal apophysis; RTA bifid | 4 |
| 4 | Dorsal prong of RTA much longer than ventral one (Fig. 36) | <i>E. sonthichaiiae</i> |

- Prongs of RTA of similar length or dorsal one slightly shorter than ventral one (Fig. 23) *E. musicum*
- 5 Abdomen with a pair of pale patches following by rows of transverse bands (Fig. 19) 6
- Abdomen with three pairs of pale spots following by rows of transverse bands (Fig. 38) *E. consideratum*
- 6 Epigyne plate almost twice as long as wide 7
- Epigyne plate not more than 1.5 times longer than wide 8
- 7 Epigyne plate tapered with posterior margin rounded (Fig. 15) . . *E. monticola*
- Epigyne plate roughly triangular, posterior margin with short central extension (Fig. 33) *E. anthonyi*
- 8 Epigyne plate as long as wide, slightly broader in front than behind (Fig. 41) *E. schwendingeri*
- Epigyne slightly longer than wide, posterior end rounded (Fig. 26) *E. musicum*

***Euryeidon monticola* sp. n.**

Figs 1-21

Type material. HOLOTYPE: ♂, THAILAND: Chiang Mai Province, Chomthong District, Doi Inthanon National Park, Doi Inthanon, 1000 m, pitfall trap, 25.I.-26.II.2000, leg. S. Sonthichai & P. Dankittipakul (MHNG).

PARATYPES: THAILAND: Chiang Mai Province, Doi Suthep-Pui National Park, Doi Suthep, 1400 m: 1 ♀, leaf litter sample, 13.II.1986, KBIN, leg. P. J. Schwendinger. Doi Suthep, 1180 m: 1 ♀, pitfall trap, 2.I.-1.III.1987 (MHNG); 2 ♂, pitfall trap, 4.XII.1986-2.I.1987 (MHNG); 2 ♂, pitfall trap, 2.VII.-2.VIII.1987 (MHNG); 1 ♂, pitfall trap, 18.III.-22.IV.1986 (MHNG); 1 ♂, 19.II.-18.III.1986 (MHNG); 1 ♂, pitfall trap, 18.I.-19.II.1986 (MHNG); 1 ♂, pitfall trap, 30.III.-28.IV.1987 (MHNG); 1 ♂, pitfall trap, 3.XI.-4.XII.1986 (MHNG); 1 ♂, pitfall trap, 28.IV.-30.V.1987 (MHNG); 1 ♂, pitfall trap, 1.III.-30.III.1987 (MHNG); 2 ♂, pitfall trap, 30.XI.-14.XII.1996 (KBIN); 1 ♂, pitfall trap, 14.XII.1996-10.I.1997 (KBIN); 1 ♂, 3.XII.1987-3.I.1988 (KBIN). All latter specimens leg. P. J. Schwendinger. Doi Suthep, 1150 m: 5 ♂, pitfall trap, 10.I.-11.II.1997 (KBIN), leg. P. J. Schwendinger. Doi Suthep, 960 m: 1 ♂, pitfall trap, 2.I.-5.III.1987 (PDC ZD0015); 1 ♂, pitfall trap, 5.III.-4.IV.1987 (PDC ZD0016). All leg. P. J. Schwendinger. Chiang Mai Province, Chiang Dao District, Doi Chiang Dao, Huay Mae Kok, 1500 m: 1 ♀, leaf litter sample, 27.I.1996, leg. P. J. Schwendinger (PDC ZD0017). Doi Inthanon, 1000 m: 6 ♂, 1 ♀, same data as for holotype (PDC ZD0018-0023); 2 ♂, pitfall trap, 25.XII.1999-25.I.2000 (PDC ZD0024-0025); 1 ♂, leaf litter sample, 15.II.2000 (PDC ZD0026). All latter specimens leg. S. Sonthichai & P. Dankittipakul.

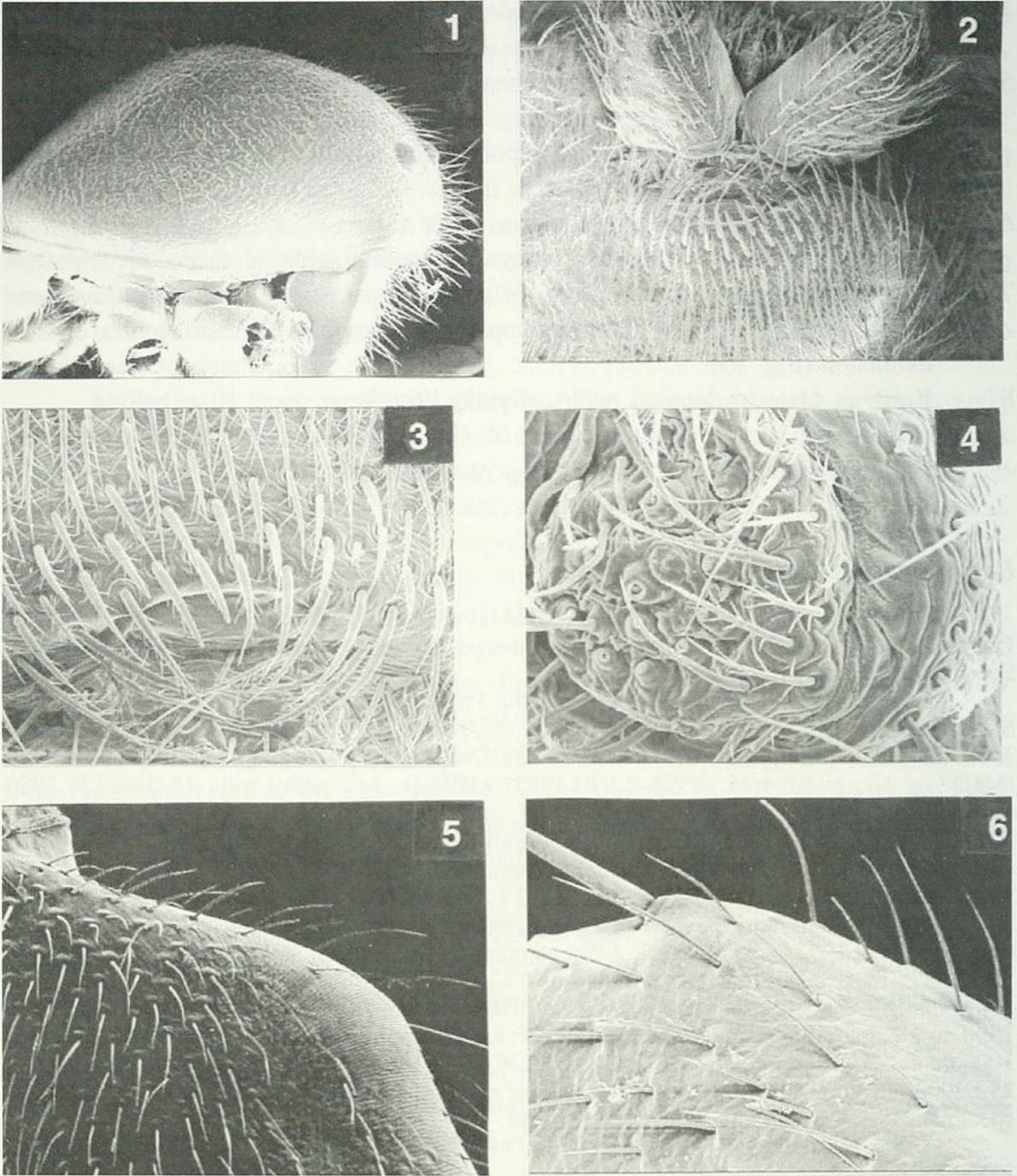
Other material. Doi Suthep, 1180 m, 1 ♀, 2.I.-1.III.1987, leg. P. Dankittipakul (PDC ZD00-ex-1).

Diagnosis. Males of *E. monticola* sp. n. can be recognized by the broad and massive embolus with swollen embolic tip (Figs 7, 13), the large dorsolateral tibial apophysis with sharp and pointed apex (Fig. 14). Females can be distinguished by the relatively long, tongue-shaped central plate (Fig. 15) of epigyne. *Euryeidon monticola* is the largest of the species so far included in the genus.

Etymology. Latin, *monticola* is a noun in apposition for mountain dweller and refers to the habitat in which the spiders were found.

Description. ♂ (holotype). Total length 6.67. Carapace 3.31 long, 2.36 wide. Abdomen 3.36 long, 2.38 wide.

Coloration and pattern: carapace coarsely granular. Carapace and chelicerae dark reddish brown, short pubescent on cephalic part, none on thoracic part. Sternum

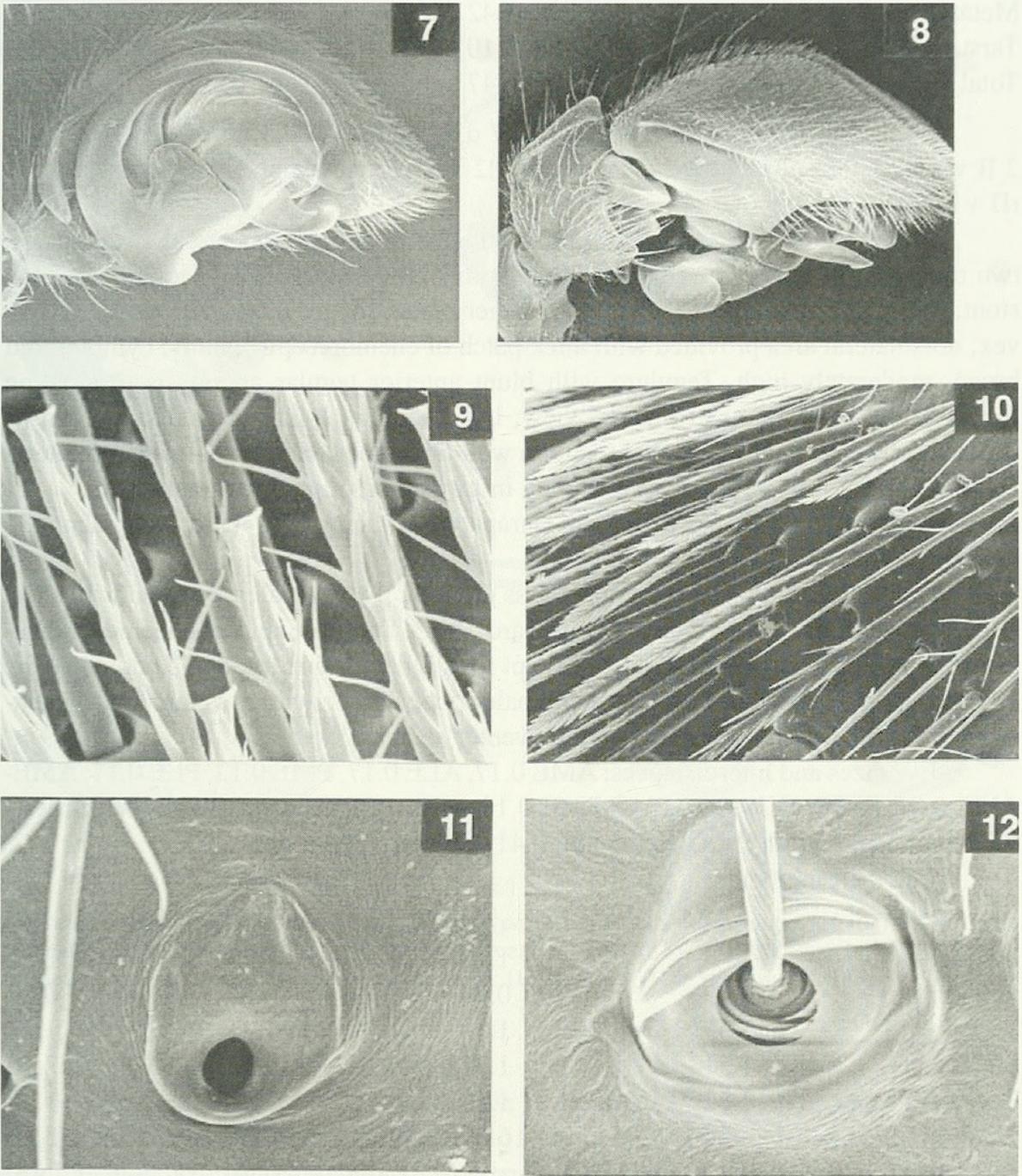


FIGS 1-6

Euryeidon monticola gen. n., sp. n. Carapace, lateral view (1). Ventral abdominal plate in front of spinnerets (2). Ditto, detail (3). ALS (4). Stridulating ridges on dorsal side of femur I (5). Dorsolateral side of femur II without stridulating ridge (6).

reddish brown. Legs segments brown except for orange-brown coxae. Abdomen dark sepia, almost black, covered with fine white hairs; dorsum (Fig. 18) with two pairs of pale round spots, followed by a series of chevrons; venter sepia, with 2 pale spots, relatively large; sides with 3 oblique bands. Dorsal scutum brown.

Eye sizes and interdistances: AME 0.20, ALE 0.17, PME 0.15, PLE 0.17; AME-AME 0.07, AME-ALE 0.33, PME-PME 0.15, PME-PLP 0.51, ALE-PLP 0.05; MOQ 0.46 long, front width 0.46, back width 0.43. Clypeus 0.51 high.



FIGS 7-12

Euryeidon monticola gen. n., sp. n. Male palp, ventral view (7). Ditto, prolateral view (8). Chemoreceptive hairs (9). Modified hairs of preening bush (10). Tarsal organ (11) on leg I. Trichobothrium (12) on tarsus IV.

Dorsal scutum covering half of abdomen length.

Leg measurements:

	I	II	III	IV
Femur	1.94	1.73	1.73	2.21
Patella	0.78	0.78	0.78	0.84
Tibia	1.68	1.42	1.21	1.68

Metatarsus	1.47	1.42	1.47	2.10
Tarsus	1.31	1.10	0.89	1.31
Total	7.21	6.47	6.10	8.15

Spination: femora I d2 II d2 III d3 IV d3; patellae III pl3 IV pl3; tibiae I v2-2-2 II v2-1-2 III d3 pl2 rl3 v2-2-2 IV d3 pl3 rl2 v2-2-2; metatarsi I v1-2 II v1-2 III pl1 rl1 v1-2 IV pl3 rl1 v1-1.

Male palp (Figs 7, 8, 13, 14): palpal tibia with strong retrolateral swelling and two tibial apophyses: dark retrolateral one with slightly indented tip; dorsolateral one stout, sharp, strongly tapered. Cymbium rather broad, longer than wide, dorsally convex; dorsolateral area provided with thick patch of chemoreceptive hairs; cymbial fold broad, moderately high. Tegulum with blunt anterior tegular apophysis originating from distal part, truncated in lateral view; large, simple, J-shaped median apophysis situated on membranous base. Subtegulum well-developed, clearly visible in prolateral view. Embolus broad and massive, ending in a swollen, partly membranous tip.

♀ (paratype). Total length 7.88. Carapace 3.57 long, 2.36 wide. Abdomen 4.31 long, 3.42 wide.

Coloration and pattern: carapace less granular than in males, covered with short fine setae running from clypeal rim toward PER. Carapace and chelicerae orange-brown. Sternum orange. Legs yellow except for slightly darker femora. Abdomen (Fig. 19) dark sepia, mottled with small, round pale spots; dorsum with two large pale patches followed by a series of pale chevrons; venter as in males.

Eye sizes and interdistances: AME 0.17, ALE 0.17, PME 0.12, PLE 0.17; AME-AME 0.07, AME-ALE 0.56, PME-PME 0.15, PME-PLE 0.76, ALE-PLE 0.10; MOQ 0.23 long, front width 0.38, back width 0.41. Clypeus 0.64 high.

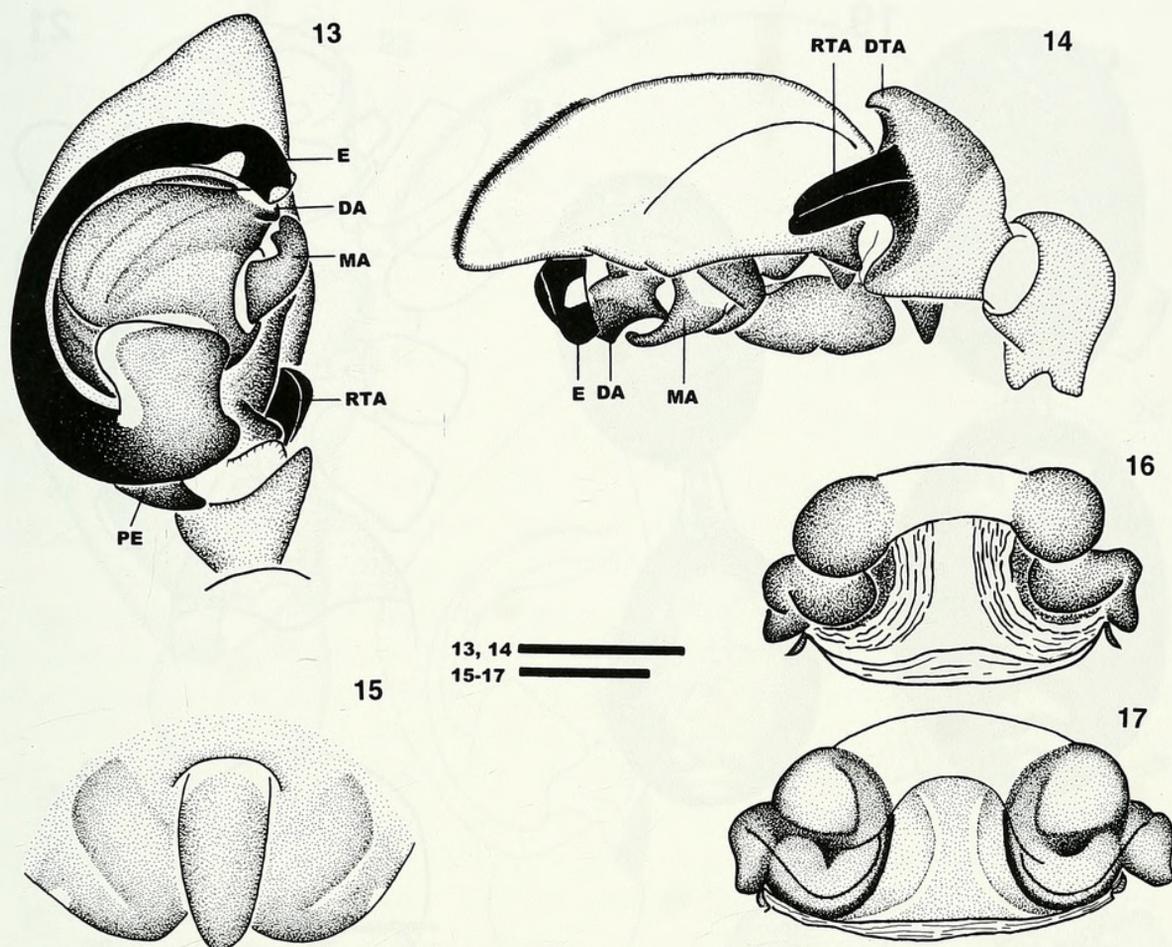
Leg measurements:

	I	II	III	IV
Femur	1.84	1.73	1.73	2.51
Patella	0.89	0.84	0.84	0.89
Tibia	1.57	1.31	1.21	1.73
Metatarsus	1.31	1.31	1.52	2.10
Tarsus	1.31	1.15	1.05	1.36
Total	6.94	6.36	6.36	8.26

Spination: femora I d2 II d2 III d2 IV d3; patellae III pl1 IV pl1; tibiae I v2-2-2 II v2-2-2 III d3 pl2 rl3 v2-2-2 IV d3 pl2 rl3 v2-2-2; metatarsi I v2-2-2 II v2-2-2 III d7 disp. v4 disp. IV d7 disp. v3 disp.

Epigyne (Fig. 15): central plate tongue-shaped (Fig. 15) Copulatory ducts broad, leading to large, elongate, coiled spermathecae (Figs 16, 17). Tongue-shaped central plate broken and only its proximal part remaining in most females examined.

Variation. The color of the carapace varies from dark brown, dark chestnut-brown, reddish brown to orange; the color of the abdomen ranges from black, dark sepia to pale brown; the color of legs ranges from brown, yellowish brown to yellow. The tip of the dorsolateral tibial apophysis varies from blunt to sharp, pointing upward or slightly curved downward. The connection between left and right spermathecae is of variable consistence, from membranous to strongly sclerotized.



FIGS 13-17

Euryeidon monticola gen. n., sp. n., ♂ holotype (13, 14) and ♀ paratype (15-17). Male palpus, ventral (13) and lateral (14) view. Epigyne, ventral view (15). Internal structure of epigyne, normal (16) and cleared (17) state. Scale lines: 0.5 mm (13, 14); 1.0 mm (15-17).

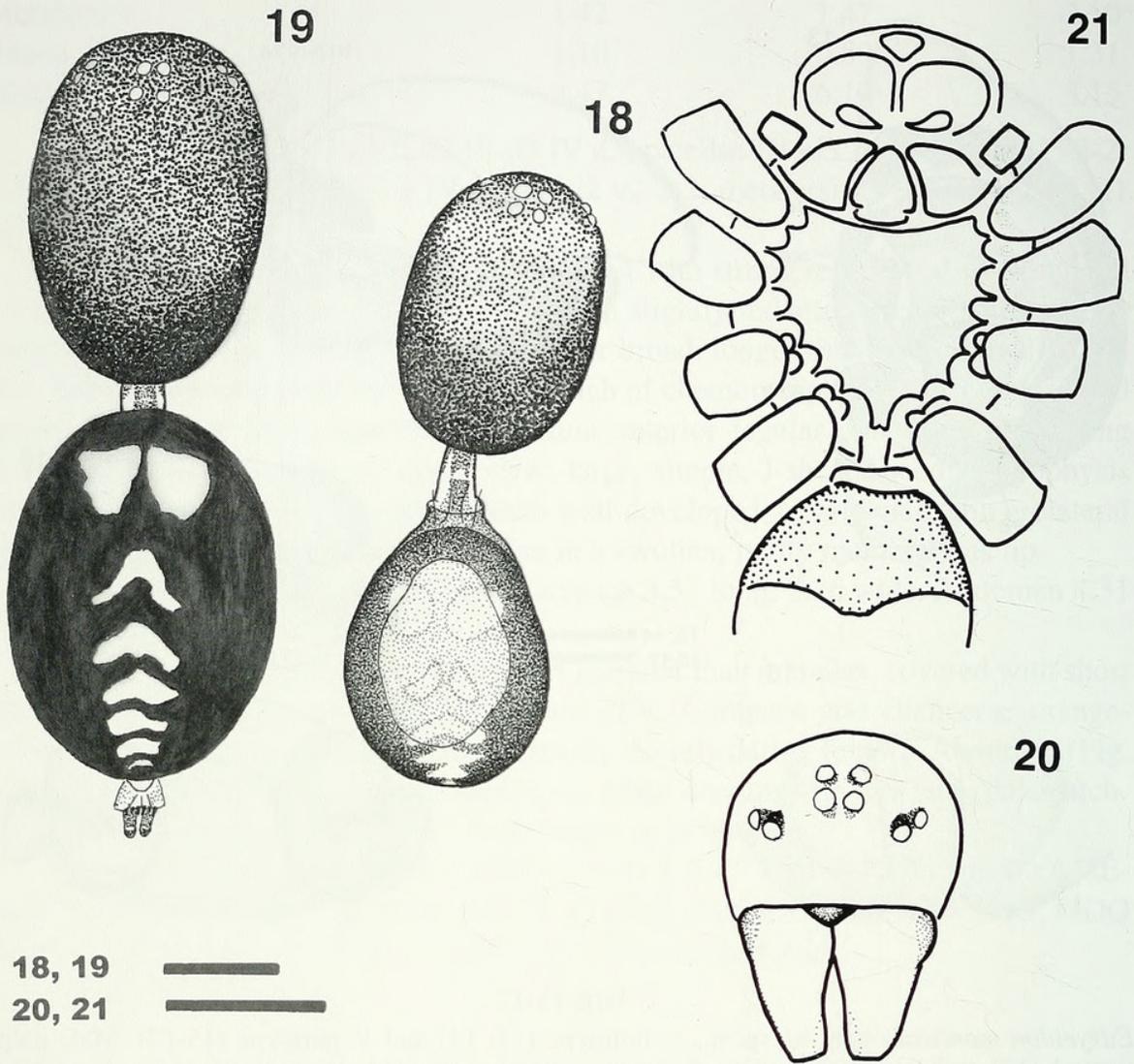
Distribution and habitat. *Euryeidon monticola* sp. n. inhabits damp evergreen hill forests at altitudes between 960 and 1610 m in the Doi Suthep-Pui National Park, Doi Inthanon National Park and Doi Chiang Dao Wildlife Sanctuary, all in Chiang Mai Province, northern Thailand. Several spiders were found walking on the forest floor.

Euryeidon musicum sp. n.

Figs 22-29

Type material. HOLOTYPE: ♂, THAILAND: Chiang Mai Province, Chiang Dao District, Chiang Dao Wildlife Sanctuary, Pha Tang, evergreen riverine forest, 510 m, pitfall trap, 23.XI.-22.XII.1990, leg. P. J. Schwendinger (MHNG).

PARATYPES: THAILAND: Chiang Mai Province, Chiang Dao District: 2 ♀, Doi Chiang Dao Wildlife Research Station, 510 m, leaf litter sample, 12-15.VII.2002, leg. S. Sonthichai & P. Dankittipakul (MHNG); 1 ♀, Tham Klaeb, evergreen riverine forest near cave entrance, 570 m, 14.XII.2002, leg. P. J. Schwendinger & P. Dankittipakul (KBIN). Fang District: 1 ♀, evergreen forest at 750 m, road to Doi Ang Khang, 30.IX.1987, leg. P. J. Schwendinger (MHNG); 2 ♂, data as for holotype (MHNG); 1 ♂, 1 ♀, data as for holotype, 22.IX.-25.X.1990 (KBIN).



FIGS 18-21

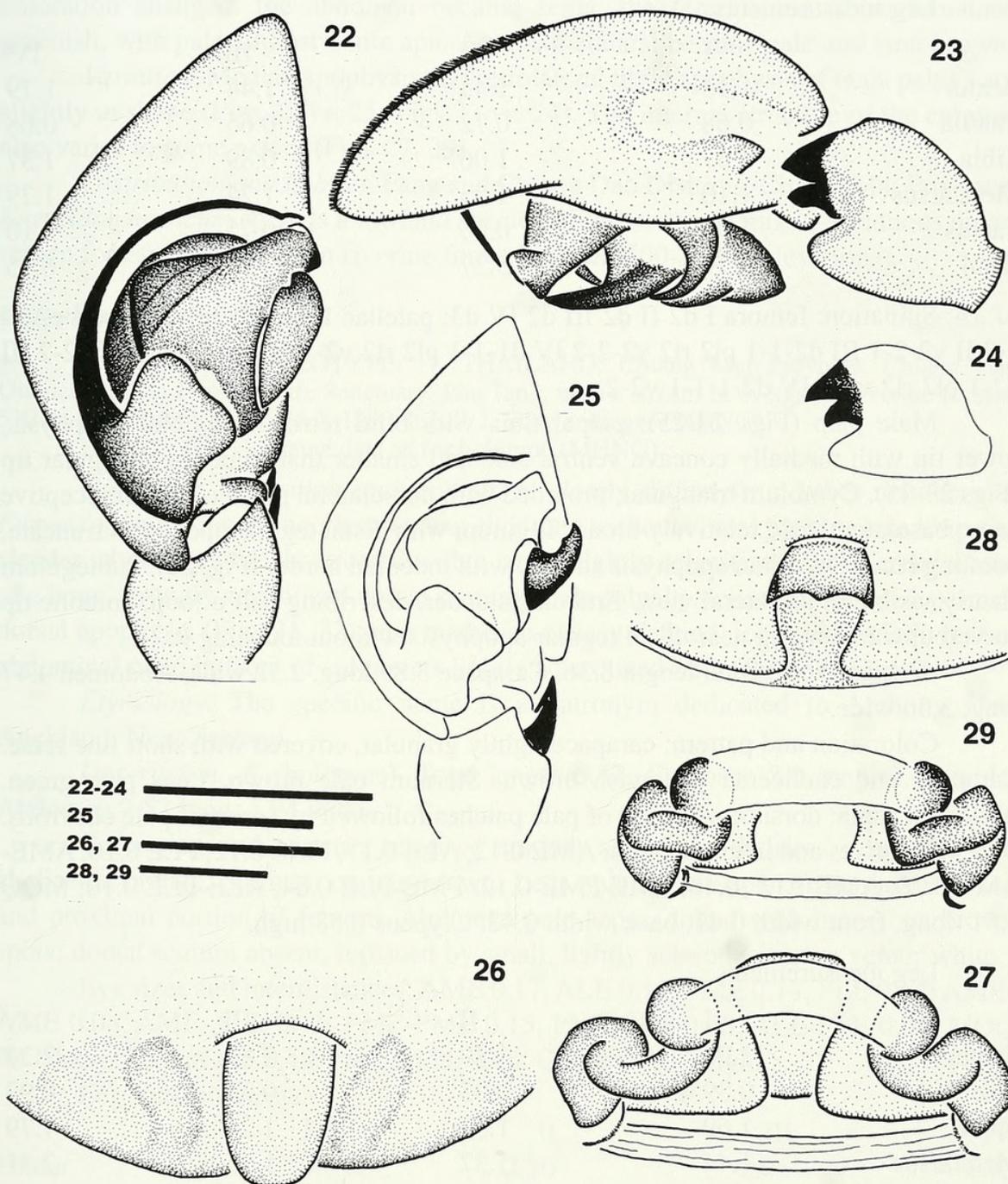
Euryeidon monticola gen. n., sp. n., ♂ holotype (18, 20, 21) and ♀ paratype (19). Body of male, dorsal view (18). Body of female, dorsal view (19). Carapace of male, frontal view (20). Sternum, labium and maxillae (21). Scale lines: 1.0 mm (18-21).

Diagnosis. Males of *E. musicum* sp. n. can be recognized by the bifid retro-lateral tibial apophysis (Figs 23, 24), by the absence of a dorsolateral tibial apophysis, by the triangular shape of the cymbium and by the slightly upturned embolic tip (Fig. 22). Females have a typical more or less quadrangular central plate on the epigyne (Fig. 26).

Etymology. Latin, *musicus* means 'musical' and refers to the stridulating organ of this species which is rare in Zodariidae; a femoral stridulating organ was unknown in spiders until recently (Jocqué, in press).

Description. ♂ (holotype). Total length 5.36. Carapace 2.84 long, 1.84 wide. Abdomen 2.52 long, 1.84 wide.

Coloration and pattern: carapace coarsely granular, covered with short fine hairs in cephalic area. Carapace and chelicerae brown. Sternum orange-brown. Legs



FIGS 22-29

Euryeidon musicum gen. n., sp. n., ♂ holotype (22, 23), ♂ paratype (24, 25) and ♀ paratype (26-29). Male palp, ventral (22, 25) and lateral (23) view. Palpal tibia (24). Epigyne, ventral view (26, 28). Internal structure of epigyne (27, 29). Scale lines: 1.0 mm.

yellowish brown. Abdomen dark sepia, with yellowish brown dorsal scutum overlaying a pair of small, pale patches, followed by a series of chevrons; venter with 2 white patches.

Eye sizes and interdistances: AME 0.17, ALE 0.13, PME 0.12, PLE 0.12; AME-AME 0.06, AME-ALE 0.25, PME-PME 0.07, PME-PLP 0.43, ALE-PLP 0.05; MOQ 0.43 long, front width 0.44, back width 0.35. Clypeus 0.35 high.

Leg measurements:

	I	II	III	IV
Femur	1.58	1.48	1.44	1.79
Patella	0.68	0.72	0.65	0.68
Tibia	1.37	1.06	0.89	1.37
Metatarsus	1.10	1.03	1.24	1.79
Tarsus	1.03	0.96	0.75	1.10
Total	5.79	5.27	5.00	6.75

Spination: femora I d2 II d2 III d2 IV d3; patellae III pl1 IV pl1; tibiae I v2-1-1-2 II v2-2-1 III d2-1-1 pl2 rl2 v2-2-2 IV d1-1-1 pl2 rl2 v2-1-1-2; metatarsi II v2-2 III d2-1 pl2 rl2 v1-2 IV d2-1-1-1 v2-2.

Male palp (Figs 22-25): palpal tibia with bifid retrolateral tibial apophysis, lower tip with medially concave ventral side and smaller than superior triangular tip (Figs 23-25). Cymbium triangular, provided with dorsolateral patch of chemoreceptive hairs; basolateral fold relatively broad. Tegulum with distal tegular apophysis truncate, pointing laterad; median apophysis simple, with indented border (Fig. 22). Subtegulum clearly visible in prolateral view. Embolus slender, describing half a loop; embolic tip curved upward ending near distal tegular apophysis without touching it.

♀ (paratype). Total length 8.36. Carapace 3.89 long, 2.52 wide. Abdomen 4.47 long, 3.36 wide.

Coloration and pattern: carapace lightly granular, covered with short fine setae. Carapace and chelicerae yellowish brown. Sternum pale brown. Legs pale green. Abdomen sepia; dorsum with pair of pale patches followed by series of pale chevrons.

Eye sizes and interdistances: AME 0.12, ALE 0.17, PME 0.12, PLE 0.16; AME-AME 0.10, AME-ALE 0.48, PME-PME 0.12, PME-PLE 0.64, ALE-PLE 0.10; MOQ 0.51 long, front width 0.41, back width 0.43. Clypeus 0.58 high.

Leg measurements:

	I	II	III	IV
Femur	1.96	1.89	1.86	2.34
Patella	0.89	0.93	0.93	0.93
Tibia	1.69	1.31	1.24	1.79
Metatarsus	1.44	1.37	1.55	2.31
Tarsus	1.37	1.31	1.06	1.51
Total	7.37	6.82	6.65	8.89

Spination: femora I d2 II d2 III d2 IV d3; patellae III pl1 IV pl1; tibiae I v2-1-1-2 II v2-1-1-2 III d2-1-1-1 pl2 rl2 v2-1-1-2 IV d3 pl2 rl2 v2-1-1-1-2; metatarsi I v3-1-1-1 II v3-1-1-2 III d2 v1 IV d2 pl2 v3-2-1.

Epigyne (Figs 26, 28): central plate quadrangular. Internal structure as in Figs 27 and 29.

Remarks. In most female paratypes the tongue-shaped central plate is broken off and only its proximal part remains (Fig. 28). A living female specimen collected by Schwendinger & Dankittipakul had a dark sepia carapace, a blackish sepia abdomen and dark greenish legs (possibly newly moulted). After preservation in alcohol the

coloration changed: the abdomen became sepia, the femora and tibiae remained greenish, with pale, almost white apical parts, metatarsi became pale and tarsi brown.

Variation. Median apophysis and retrolateral tibial apophysis of male palps vary slightly in shape (Figs 22 vs. 25; Figs 23 vs. 24). The internal structure of the epigyne also varies to some extent (Figs 27, 29).

Distribution and habitat. Fang and Chiang Dao Districts, Chiang Mai Province. *Euryeidon musicum* sp. n. is a lowland species which occurs in mixed deciduous dipterocarp forests and evergreen riverine forest between 500-750 m elevation.

***Euryeidon anthonyi* sp. n.**

Figs 30-34

Type material. HOLOTYPE: ♂, THAILAND: Chiang Mai Province, Chiang Dao District, Chiang Dao Wildlife Sanctuary, Pha Tang, near a stream in evergreen riverine forests, 510 m, pitfall trap, 22.IX.-25.X.1990, leg. P. J. Schwendinger (MHNG).

PARATYPES: ♀, same data as for holotype (MHNG).

Diagnosis. *Euryeidon anthonyi* sp. n. clearly differs from other members of *Euryeidon* in having a smooth carapace; abdomen without dorsal pattern; legs long and slender; abdomen of male covered with a small, lightly sclerotized dorsal area instead of a large, strongly sclerotized dorsal scutum; male palpal patellae possessing a pointed dorsal apophysis (Figs 31, 32); spermathecae clearly defined, long and coiled; ventral abdominal plate in front of spinnerets lightly sclerotized but clearly visible.

Etymology. The specific name is a patronym dedicated to Anthony Osa, Auckland, New Zealand.

Description. ♂ (holotype). Total length 5.57. Carapace 3.0 long, 2.05 wide. Abdomen 2.57 long, 1.94 wide.

Coloration and pattern: carapace smooth and shiny, hairless. Carapace and chelicerae orange. Sternum orange-brown. Legs pale yellow apart from darker coxae and proximal portion of femora. Abdomen pale sepia, dotted with numerous brown spots; dorsal scutum absent, replaced by small, lightly sclerotized area; venter white.

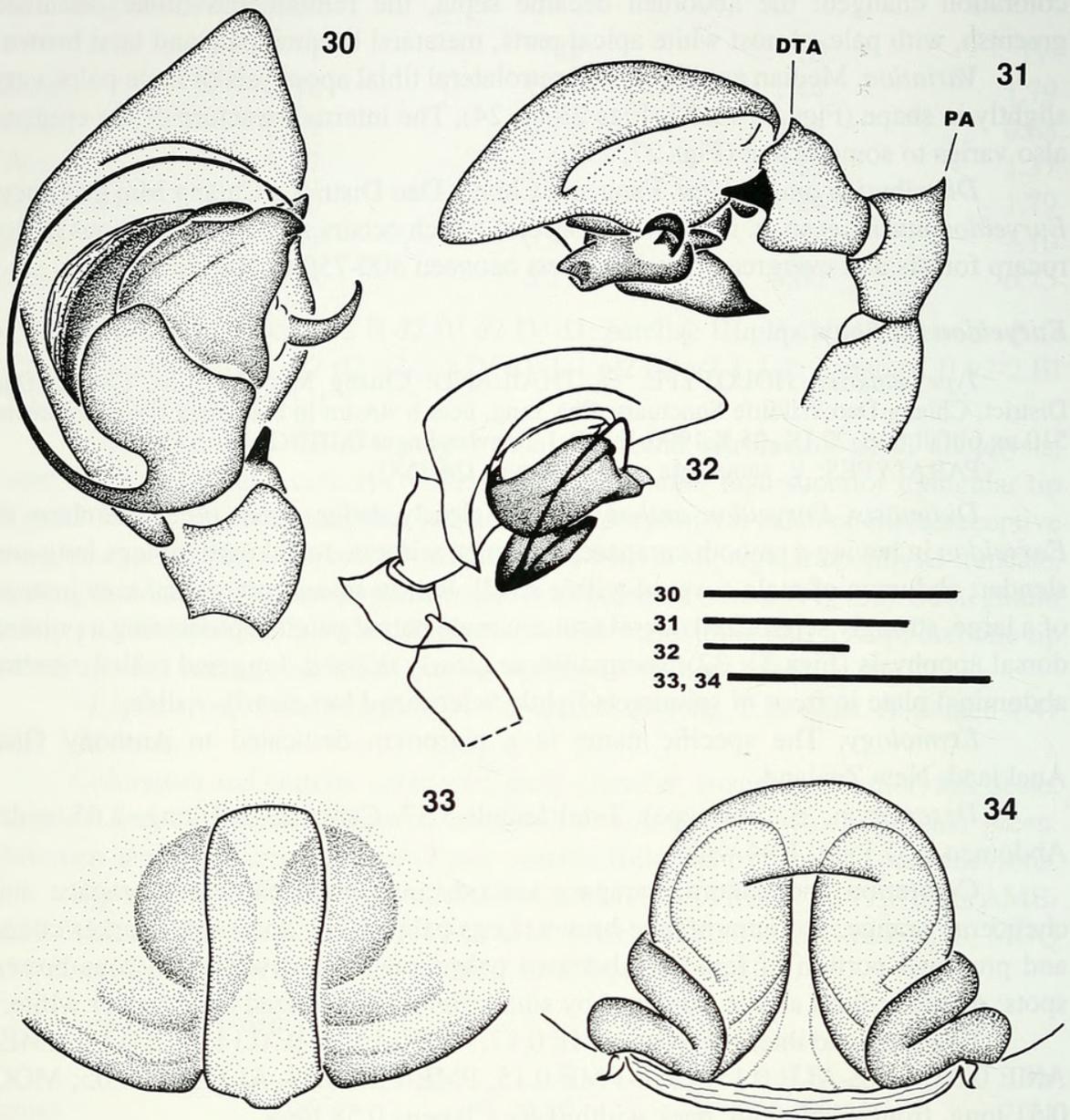
Eye sizes and interdistances: AME 0.17, ALE 0.15, PME 0.14, PLE 0.14; AME-AME 0.08, AME-ALE 0.15, PME-PME 0.15, PME-PLP 0.28, ALE-PLP 0.05; MOQ 0.51 long, front width 0.48, back width 0.46. Clypeus 0.58 high.

Leg measurements:

	I	II	III	IV
Femur	2.58	2.20	2.06	2.75
Patella	0.86	0.86	0.82	0.79
Tibia	2.41	1.82	1.20	2.51
Metatarsus	1.96	1.72	1.82	2.96
Tarsus	1.62	1.27	1.06	1.65
Total	9.44	7.89	7.41	10.68

Spinination: femora I d1 II d1 III d2 IV d1-1-2; patellae III pl1 IV pl1; tibiae I v5 disp. II pl1 v4 disp. III d2 pl3 rl2 v2-1-1 IV d26 disp. v2-1-1; metatarsi I v2-2-1 II v3-2-2 III d2-2-2 v3-2-2 IV d3-2-2 pl2 rl2 v2-1-2.

Male palp (Figs 31, 32): palpal patella with small, acutely pointed dorsal apophysis pointing outward. Palpal tibia provided with short, pointed retrolateral apophysis and small dorsal apophysis. Cymbium with broad retrolateral fold; dorso-



FIGS 30-34

Euryeidon anthonyi gen. n., sp. n., ♂ holotype (30-32), ♀ paratype (33, 34). Male palp, ventral (30) and lateral (31, 32) view. Epigyne, ventral view (33). Internal structure of epigyne (34). Scale lines: 1.0 mm (Figs 30-32); 0.5 mm (Figs 33, 34).

lateral area with patch of chemoreceptive hairs. Distal tegular apophysis with lateral flange (Fig. 32) supporting tip of long, slender embolus; median apophysis canoe-shaped. Subtegulum clearly visible.

♀ (paratype). Total length 6.10. Carapace 3.10 long, 2.10 wide. Abdomen 3.0 long, 2.26 wide.

Coloration and pattern: carapace smooth and shiny, hairless. Carapace and chelicerae reddish brown. Sternum orange-brown. Legs yellow with slightly darker coxae. Abdomen as in males except for the absence of a dorsal scutum, venter pale sepia.

Eye sizes and interdistances: AME 0.17, ALE 0.15, PME 0.14, PLE 0.15; AME-AME 0.07, AME-ALE 0.23, PME-PME 0.15, PME-PLE 0.37, ALE-PLE 0.02; MOQ 0.51 long, front width 0.41, back width 0.42. Clypeus 0.58 high.

Leg measurements:

	I	II	III	IV
Femur	2.34	1.96	1.82	2.41
Patella	0.82	0.82	0.79	0.79
Tibia	2.82	2.03	1.89	3.17
Metatarsus	2.24	1.86	2.34	3.68
Tarsus	2.03	1.65	1.41	2.13
Total	10.27	8.34	8.27	12.24

Spination: femora I d1 II d1 III d3 IV d3; patellae III pl1 IV pl1; tibiae I pl2 v1-1 II pl1 v2 disp. III d2 pl2 r12 v6 disp. IV d4 pl4 r11; metatarsi I v2-2-2 II v6 disp. III d7 disp. v6 disp. IV d7 disp. v7 disp.

Epigyne (Fig. 33): central plate long and rectangular, both lateral margins slightly concave in the middle, posterior border with short, widely rounded projection. Internal structure as in Fig. 34.

Remarks. The somatic characters (smooth carapace, abdominal color pattern and absence of dorsal scutum in male) of *E. anthonyi* sp. n. are untypical for *Euryeidon*, but both male and female genitalia correspond well with those of other species in this genus.

Distribution and habitat. Known only from the type locality in an evergreen forest at the foot of Doi Chiang Dao, a limestone mountain in Chiang Mai Province, northern Thailand.

Euryeidon sonthichaiiae sp. n.

Figs 35-37

Type material. HOLOTYPE: ♂, THAILAND: Chiang Mai Province, Chiang Dao District, Doi Chiang Dao Wildlife Sanctuary, Pha Tang, evergreen riverine forest, 510 m, pitfall trap, 22.VIII.-22.IX.1990, leg. P. J. Schwendinger (MHNG).

Diagnosis. *Euryeidon sonthichaiiae* sp. n. is recognizable by the deeply divided retrolateral tibial apophysis with a smaller, sharply pointed, and a larger elongate prong (Fig. 36), and by the simple, long and slender embolus and simple embolic base; the abdomen is uniformly pale cream, without a dorsal pattern; the dorsal scutum of male is lightly sclerotized (Fig. 37).

Etymology. The specific name is a patronym dedicated to Professor Saowapa Sonthichai (Chiang Mai University).

Description. ♂ (holotype). Total length 5.60. Carapace 2.94 long, 1.94 wide. Abdomen 2.78 long, 1.73 wide.

Coloration and pattern: carapace slightly granular; clypeus covered with fine white setae extending to PME. Carapace and chelicerae orange-brown. Sternum pale brown. Legs yellow. Abdomen (Fig. 37) creamy white, without dorsal pattern, decorated only by pale brown spots; venter white; dorsal scutum oval, pale yellow.

Eye sizes and interdistances: AME 0.12, ALE 0.11, PME 0.10, PLE 0.12; AME-AME 0.06, AME-ALE 0.25, PME-PME 0.12, PME-PLE 0.38, ALE-PLE 0.05; MOQ 0.35 long, front width 0.30, back width 0.33. Clypeus 0.41 high.

Leg measurements:

	I	II	III	IV
Femur	2.0	1.86	1.72	2.20
Patella	0.79	0.79	0.79	0.82
Tibia	1.79	1.44	1.24	1.86
Metatarsus	1.44	1.37	1.37	2.24
Tarsus	1.34	1.37	1.83	1.44
Total	7.37	6.62	6.17	8.58

Spination: femora I d2 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v2-1-1-2 II d1 pl2 v2-2-2 III d3 pl2 r13 v2-1-1-2 IV d3 pl3 r13 v2-1-1-2; metatarsi I v2-2-3 II v3-1-1-1-1 III d2 pl2 r12 v1-1-1-1-4 IV d2 pl2 r12 v2-1-1-3.

Male palp (Figs 35, 36): palpal tibia with a single, deeply divided retrolateral tibial apophysis: the upper tip long and blunt; the lower one smaller, sharply pointed. Dorsolateral area of cymbium provided with thick patch of chemoreceptive hairs; cymbial fold broad. Distal tegular apophysis blunt, roughly axe-shaped, with small groove supporting embolic tip. Median apophysis slightly curved, upper side provided with small denticle. Subtegulum well-developed, clearly visible. Embolus long and slender.

Female unknown.

Distribution and habitat. Known only from the type locality, an evergreen riverine forest at Doi Chiang Dao, which is also the type locality of *E. musicum* sp. n. and *E. anthonyi* sp. n.

***Euryeidon consideratum* sp. n.**

Figs 38-40

Type material: HOLOTYPE: ♀, THAILAND: Chiang Rai Province, Phan District, Doi Luang National Park, riverine forest along Phu Kang Waterfall, 700 m, 20.VII.2002, leg. S. Sonthichai & P. Dankittipakul (MHNG).

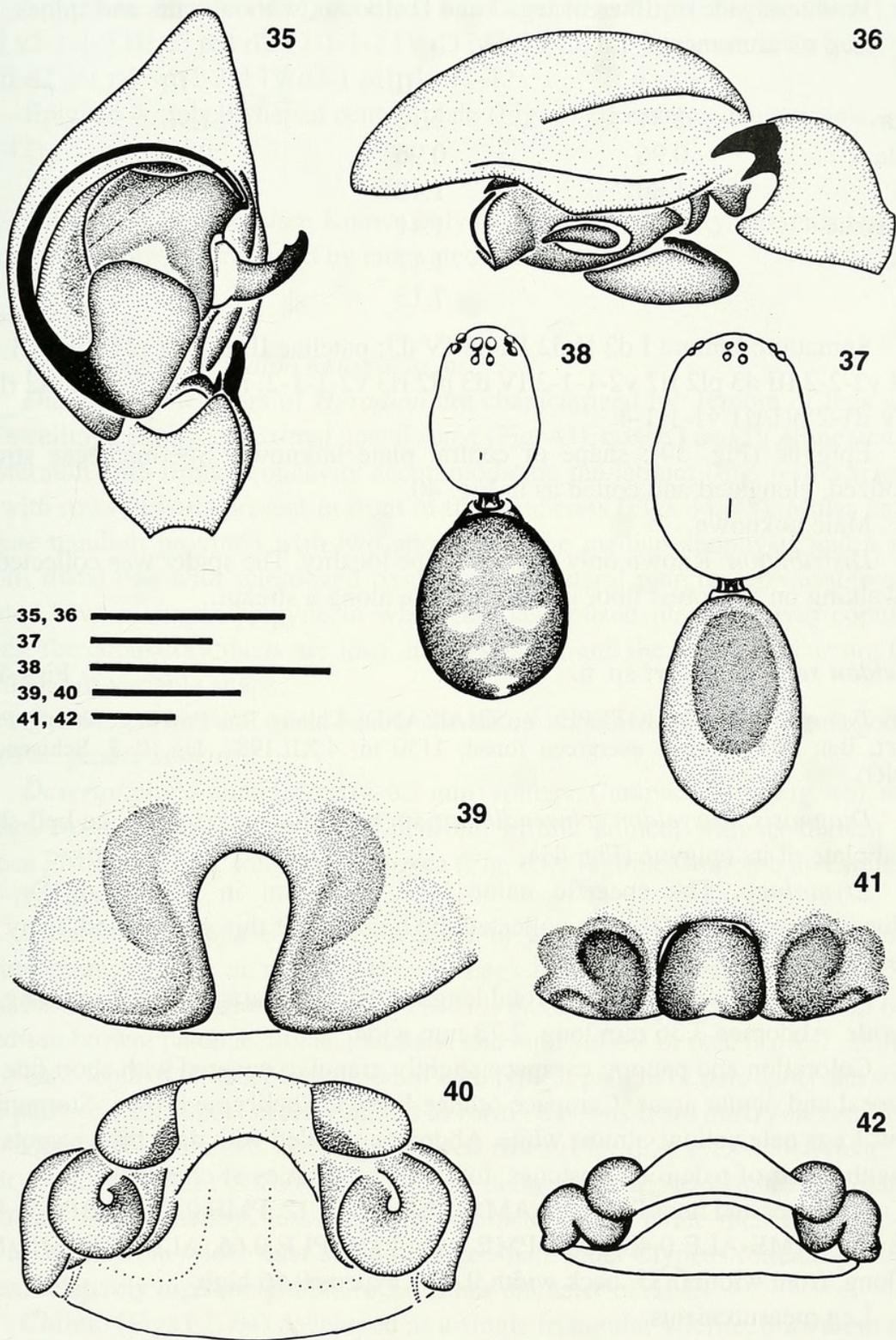
Diagnosis. The central epigynal plate of the type of *Euryeidon consideratum* sp. n. was broken off therefore comparing the epigyne of this new species with other *Euryeidon* females is impossible. However, the specific shape and orientation of the vulva clearly separate *E. consideratum* sp. n. from other members of the genus. Generally, the dorsum of *Euryeidon* female possess a pair of pale patches followed by a series of chevrons (Fig. 19) but in this species the pale patches are replaced by a pair of small pale spots, and there is an indistinct separation between the chevrons, which are followed by a connecting band (Fig. 38).

Etymology. Latin, *consideratum* means modest and refers to the simple abdominal pattern.

Description. ♀ (holotype). Total length 9.15. Carapace 4.0 long, 2.78 wide. Abdomen 4.84 long, 3.52 wide.

Coloration and pattern: carapace coarsely granular, covered with short, fine hairs in clypeal and ocular areas; a pair of small, shallow depression present in the middle of the carapace. Carapace and chelicerae dark reddish brown. Sternum orange-brown. Legs brown. Abdomen dark sepia.

Eye sizes and interdistances: AME 0.17, ALE 0.14, PME 0.12, PLE 0.15; AME-AME 0.07, AME-ALE 0.48, PME-PME 0.20, PME-PLP 0.71, ALE-PLP 0.12; MOQ 0.56 long, front width 0.43, back width 0.44. Clypeus 0.71 high.



FIGS 35-42

Euryeidon sonthichaiiae gen. n., sp. n. (35-37), ♂ holotype. Male palp, ventral (35) and retrolateral (36) view. Body of male, dorsal view (37). *Euryeidon consideratum* gen. n., sp. n. (38-40), ♀ holotype. Epigyne, ventral view (39). Internal structure of epigyne (40). Body of female, dorsal view (38). *Euryeidon schwendingeri* gen. n., sp. n. (41-42), ♀ holotype. Epigyne, ventral view (41). Internal structure of epigyne (42). Scale lines: 0.5 mm (39-42); 1.0 mm (35, 36); 2.0 mm (37); 5.0 mm (38).

Prolateral side of tibiae of legs I and II smooth, without hairs and spines.

Leg measurements:

	I	II	III	IV
Femur	2.34	2.10	1.96	2.51
Patella	0.96	0.96	0.89	0.93
Tibia	1.86	1.48	1.37	1.82
Metatarsus	1.58	1.41	1.62	2.10
Tarsus	1.20	1.17	1.03	1.20
Total	7.96	7.13	6.89	8.58

Spination: femora I d2 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v2-1-1-2 II v2-2-2 III d3 pl2 rl2 v2-1-1-2 IV d3 pl2 rl3 v2-1-1-2; metatarsi III d2 pl2 rl2 v2-2-4 IV d1-2 pl1 rl1 v1-1-1-4.

Epigyne (Fig. 39): shape of central plate unknown. Spermathecae strongly sclerotized, elongated and coiled as in Fig. 40.

Male unknown.

Distribution. Known only from the type locality. The spider was collected as it was walking on the forest floor in a shady area along a stream.

***Euryeidon schwendingeri* sp. n.**

Figs 41, 42

Type material: HOLOTYPE: ♀, THAILAND: Chiang Rai Province, Wiang Pa Pao District, Ban Pong Thong, evergreen forest, 1130 m, 4.XII.1987, leg. P. J. Schwendinger (MHNG).

Diagnosis. *Euryeidon schwendingeri* sp. n. is characterized by the bell-shaped central plate of its epigyne (Fig. 41).

Etymology. The specific name is a patronym in honour of Dr Peter J. Schwendinger (MHNG), who collected the holotype of this species and many other interesting zodariids.

Description. ♀ (holotype). Total length 7.10 mm. Carapace 3.89 mm long, 2.63 mm wide. Abdomen 3.36 mm long, 2.73 mm wide.

Coloration and pattern: carapace slightly granular, covered with short fine hairs in clypeal and ocular areas. Carapace orange-brown. Chelicerae brown. Sternum pale yellow. Legs pale yellow, almost white. Abdomen mottled with dark brown spots; dorsum with a pair of pale round patches, followed by a series of chevrons.

Eye sizes and interdistances: AME 0.12, ALE 0.12, PME 0.12, PLE 0.15; AME-AME 0.07, AME-ALE 0.48, PME-PME 0.15, PME-PLE 0.66, ALE-PLE 0.10; MOQ 0.43 long, front width 0.35, back width 0.41. Clypeus 0.66 high.

Leg measurements:

	I	II	III	IV
Femur	2.10	1.96	1.82	2.41
Patella	0.93	0.93	0.93	0.93
Tibia	1.72	1.44	1.20	1.93
Metatarsus	1.34	1.34	1.58	2.41
Tarsus	1.37	1.17	1.03	1.44
Total	7.48	6.86	6.58	9.13

Spination: femora I d2 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v2-1-1-2 II v2-1-1-2 III d3 pl2 rl2 v2-1-1-2 IV d3 pl2 rl3 v2-1-1-2; metatarsi I v1-2 II v1-2-2-4 III d2 pl1 rl1 v1-1-2-4 IV d2-1 pl1 rl1 v1-4.

Epigyne with bell-shaped central plate (Fig. 41). Entrance ducts simple, coiled (Fig. 42).

Male unknown.

Distribution and habitat. Known only from the type locality, a remnant patch of evergreen hill forest surrounded by cultivated land.

Heradion gen. n.

Type species. *Heradion naiadis* sp. n.

Diagnosis. Members of *Heradion* are characterized by: femora of legs with a basal swelling bearing a proximal dorsal spine (Fig. 43); coxae I and IV elongated (Fig. 64); sternum with frontal concavity accommodating the labium (Fig. 64); a sclerified field with rows of hairs present in front of the spinnerets (Figs 44, 45). Males have an elongate tegulum provided with two apophyses: the median apophysis and a membranous distal one with sclerotized basal and retrolateral margins of variable shape. Females have a simple epigyne in which the sclerotized plate has two copulatory orifices, the copulatory ducts are long and S-shaped, and the spermathecae are thick-walled and of variable shape.

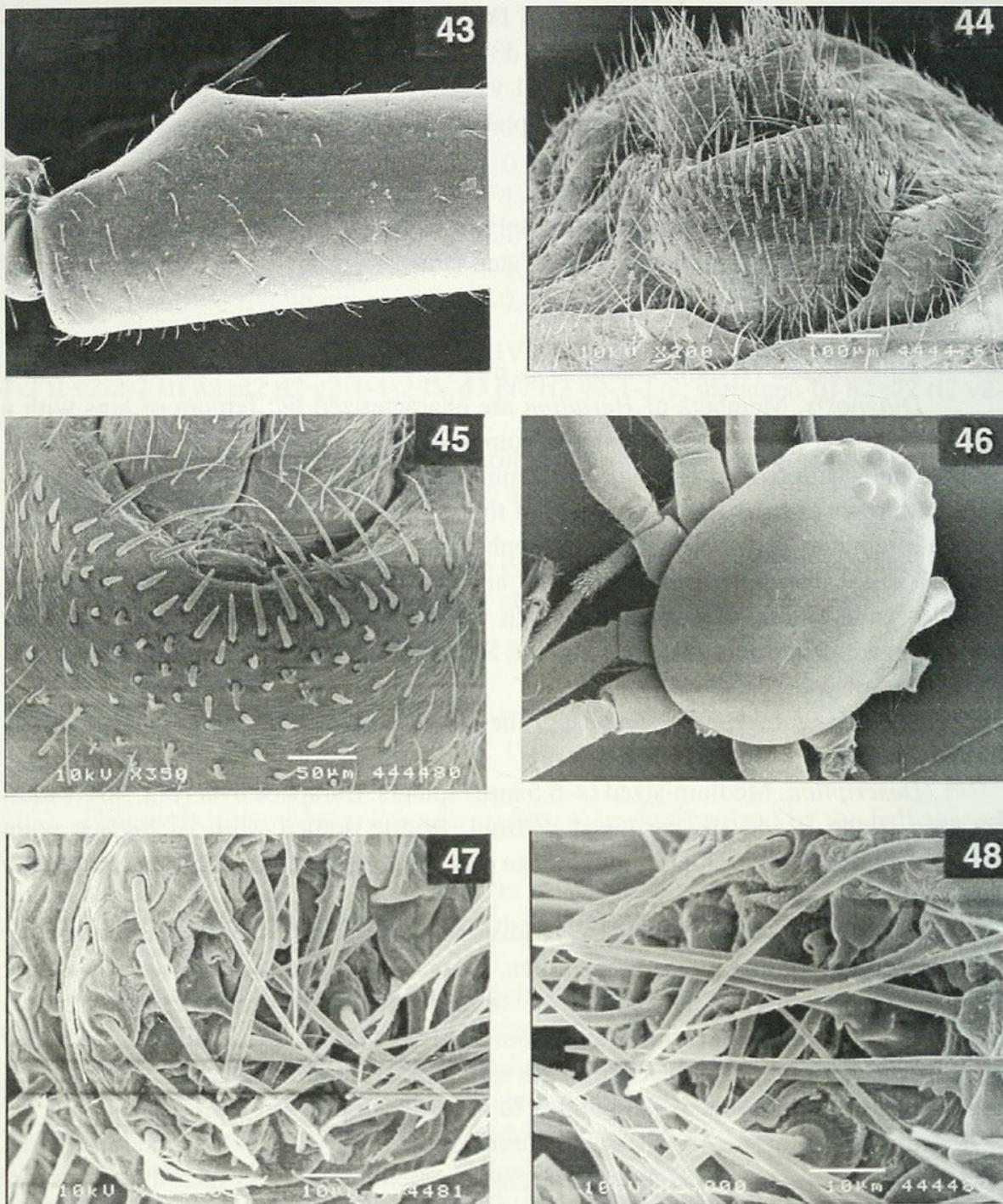
Etymology. In view of its beauty the taxon is named after the Greek goddess, Hera. The gender is neuter.

Description. Medium-sized (4-6.5 mm) spiders. Carapace oval (Fig. 46), widest between coxae II and III, narrowed in front. Profile domed, with its highest point between PME and short, longitudinal fovea (Fig. 63). Tegument smooth and shining to finely reticulated.

Coloration: carapace usually reddish to chestnut-brown. Chelicerae brown. Sternum orange-brown or medium brown. Legs brown, with femora usually darker brown basally or throughout. Males often with bicolored legs: femora reddish brown to medium brown; patellae, tibiae, metatarsi and tarsi yellow or pale brown. Abdomen pale to dark sepia or almost black, dorsum with typical pattern of pale spots and stripes, seven pairs of white spots usually united to form chevrons from third pair onward.

Eight eyes arranged in two procurved rows (Fig. 62); eyes subcircular; pale, except for dark AME. AME more than their diameter apart, less than their diameter from ALE. PME smallest, less than their diameter apart, twice their diameter from PLE. MOQ in front wider than behind, longer than wide. Clypeus retreating, slightly convex, relatively high (height 3.8 to 5.3 times diameter of ALE).

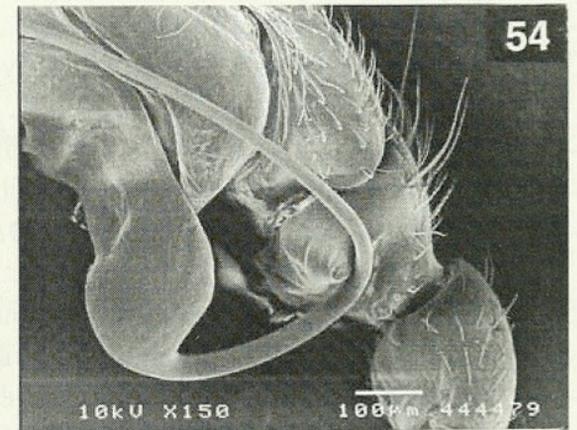
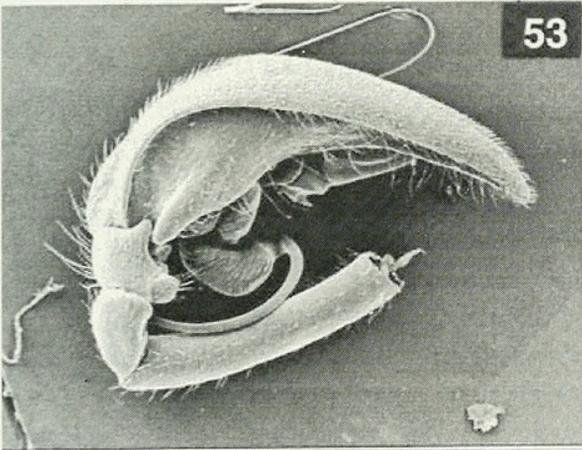
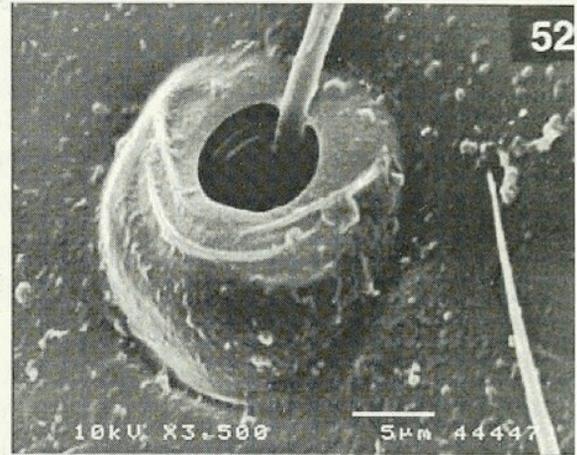
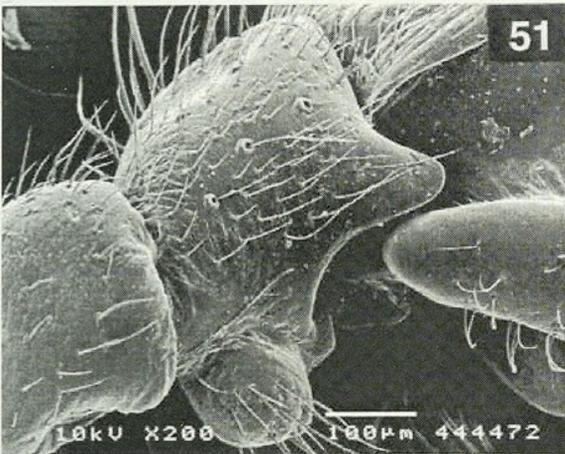
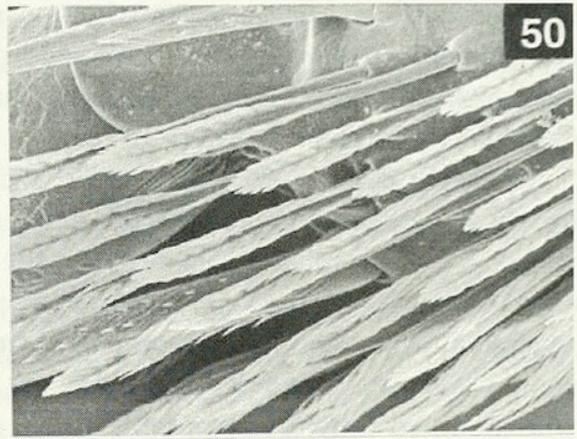
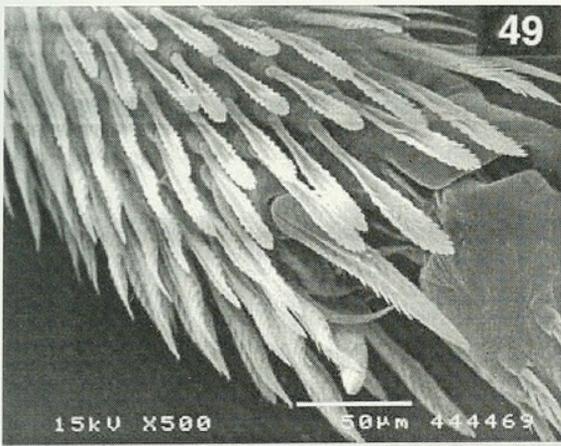
Chilum (Figs 62, 64) developed as a single triangular sclerite, drawn out into a point, pointing forward. Chelicerae slender, almost glabrous apart from a prolateral distal group of hairs; condyle well-developed; no teeth along cheliceral groove; fangs short, with thick base. Maxillae (Fig. 64) narrowed toward extremity, provided with fine anteromesal scopulae. Labium triangular, with constricted base. Sternum (Fig. 64) heart-shaped, concave in front, accommodating posterior part of labium; short extensions fitting into concavities of leg coxae; posterior end protruding between coxae IV, its tip indented. Pleurites present.



Figs 43-48

Heradion pernix gen. n., sp. n. Base of femur I (43). Ventral abdominal plate in front of spinnerets (44). Ditto, detail (45). Carapace, dorsal view (46). ALS (47). Ditto, more strongly magnified, indicating MAP (48).

Leg formula 4123. Coxae of legs I and IV elongate. Males of some species with elongated femora, metatarsi and tarsi. Femora inflated at position of proximal dorsal spine (Figs 43, 84). Spination: few spines on legs I and II, numerous spines on legs III and IV. A proximal dorsal spine present on each femur, prolateral spines only on femora I. Patellae with a short prolateral and sometimes also with a retrolateral spine



FIGS 49-54

Heradion damrongi gen. n., sp. n. Leg II, modified hairs of preening bush (49). Ditto, leg IV, magnified (50). Male palpal tibia showing a row of trichobothria (51). Trichobothrium (52) on palpal tibia. Male palp, retrolateral view (53). Ditto, prolateral view (54).

on posterior legs. Ventral tuft of metatarsal preening bush with modified chisel-shaped hairs (Figs 49, 50). A row of trichobothria present on palpal tibiae (Fig. 51); bothria simple, with double crescent-shaped ridges (Fig. 52). Claw tufts absent.

Abdomen oval, almost hairless, with sclerotized ring in anterior part; prolateral sigilla small, lightly sclerotized; small dorsal sclerotized field or dorsal scutum in

anterior half present in males of some species. Six spinnerets; anterior pair long, conical and biarticulate (Figs 44, 47, 48); posterior and median pairs much smaller and shorter. A sclerotized field with rows of hairs just in front of spinnerets (Figs 44, 45). Colulus represented by groups of hairs.

Male palp: Tibia with one or two lateral apophyses: ventrolateral apophysis lightly sclerotized, blunt or sharply pointed; retrolateral one relatively dark, pointed in ventral view. Cymbium longer than wide; retrolateral cymbial fold long, extended to distal extremity (Fig. 53); chemoreceptive hairs absent. Tegulum elongate, not clearly separated from embolic base, prolateral side with membranous rim. Tegulum with two apophyses: distal one large, membranous, with field of sclerotization, retrolateral side with modified structure of variable shape; median apophysis situated just short of distal one. Embolic base originating from posterior end of tegulum. Embolus long and thin, describing half a loop.

Epigyne developed as a simple sclerotized plate provided with two prominent copulatory orifices; copulatory ducts long, S-shaped, leading to simple or coiled spermathecae near posterior margin of epigyne.

Species included. *Heradion damrongi* sp. n., *H. luctator* sp. n., *H. naiadis* sp. n., *H. pernix* sp. n. and *H. peteri* sp. n.

Distribution. Thailand and Malaysia.

Key to the species of *Heradion* gen. n.

- | | | |
|---|---|--------------------|
| 1 | ♂♂ | 2 |
| - | ♀♀ | 6 |
| 2 | Papal tibia with obvious basal swelling (Figs 75, 80) | 3 |
| - | Palpal tibia without swelling | 4 |
| 3 | Median apophysis of bulb strongly sclerotized, beak-shaped (Fig. 75) | |
| | | <i>H. damrongi</i> |
| - | Median apophysis of bulb bifid (Fig. 80) | <i>H. luctator</i> |
| 4 | Cymbial fold reaching apex, DA short (Figs 70, 71) | <i>H. pernix</i> |
| - | Cymbial fold not reaching apex, DA very long, almost reaching cymbial extremity | 5 |
| 5 | DA spear-shaped, reaching cymbial extremity; cymbial fold extended far beyond middle of cymbium (Figs 65, 66) | <i>H. peteri</i> |
| - | DA blunt (Fig. 55); cymbial fold extended just beyond middle of cymbium (Figs 56, 57) | <i>H. naiadis</i> |
| 6 | Copulatory orifices in anterior part of epigyne (Fig. 68) | <i>H. peteri</i> |
| - | Copulatory orifices in posterior part of epigyne | 7 |
| 7 | Spermathecae coiled | 8 |
| - | Spermathecae not coiled, in some specimens strongly curved | 9 |
| 8 | Posterior rim of epigyne convex and smoothly rounded; spermathecae with four coils (Figs 77, 78) | <i>H. damrongi</i> |
| - | Posterior rim of epigyne indented; spermathecae with two coils (Figs 82, 83) | <i>H. luctator</i> |
| 9 | Course of copulatory ducts S-shaped (Fig. 59) | <i>H. naiadis</i> |
| - | Course of copulatory ducts with more curves (Fig. 73) | <i>H. pernix</i> |

Heradion naiadis sp. n.

Figs 55-64

Type material. HOLOTYPE: ♂, eastern THAILAND: Nakhon Ratchasima Province, Pak Chong District, Khao Yai National Park, Khao Khieo, montane rain forest, 1150 m, leaf litter sample, 29.VII.2000 (MHNG THMA-00/07).

PARATYPES: THAILAND: Nakhon Ratchasima Province, Pak Chong District, 1♀, same data as for holotype (MHNG THMA-00/07); 1♂, from the type locality, 29.X.1997 (PDC ZO0123); 2♂, 1♀, Khao Yai National Park, rainforest near Orchid Waterfall, 500 m, 4.V.1987 (MHNG, KBIN). All leg. P. J. Schwendinger.

Diagnosis. Males of *Heradion naiadis* sp. n. can be recognized by the complex median apophysis and the horn-shaped distal tegular apophysis; females are characterized by the strongly sclerotized posterior margin of the epigyne and the simple, round spermathecae.

Etymology. Latin, *nais* (genitive *naiadis*) is a nymph of the woods and the species name alludes to the beauty of this forest-dwelling species.

Description. ♂ (holotype). Total length 5.36. Carapace 2.53 long, 1.79 wide. Abdomen 2.25 long.

Coloration and pattern: carapace reddish brown, smooth and shiny, without hairs. Chelicerae and sternum medium brown. Legs orange. Abdomen dark sepia to black; dorsum with pattern of pale spots and stripes (Fig. 60): anteriorly with two longitudinal bands followed by two large spots and transverse bands. Ventral abdominal sclerotized field in front of spinnerets yellow, lightly sclerotized.

Eye sizes and interdistances: AME 0.11, ALE 0.12, PME 0.10, PLE 0.12; AME-AME 0.06, AME-ALE 0.10, PME-PME 0.07, PME-PLE 0.23, ALE-PLE 0.05; MOQ 0.38 long, front width 0.33, back width 0.30. Clypeus 0.51 high.

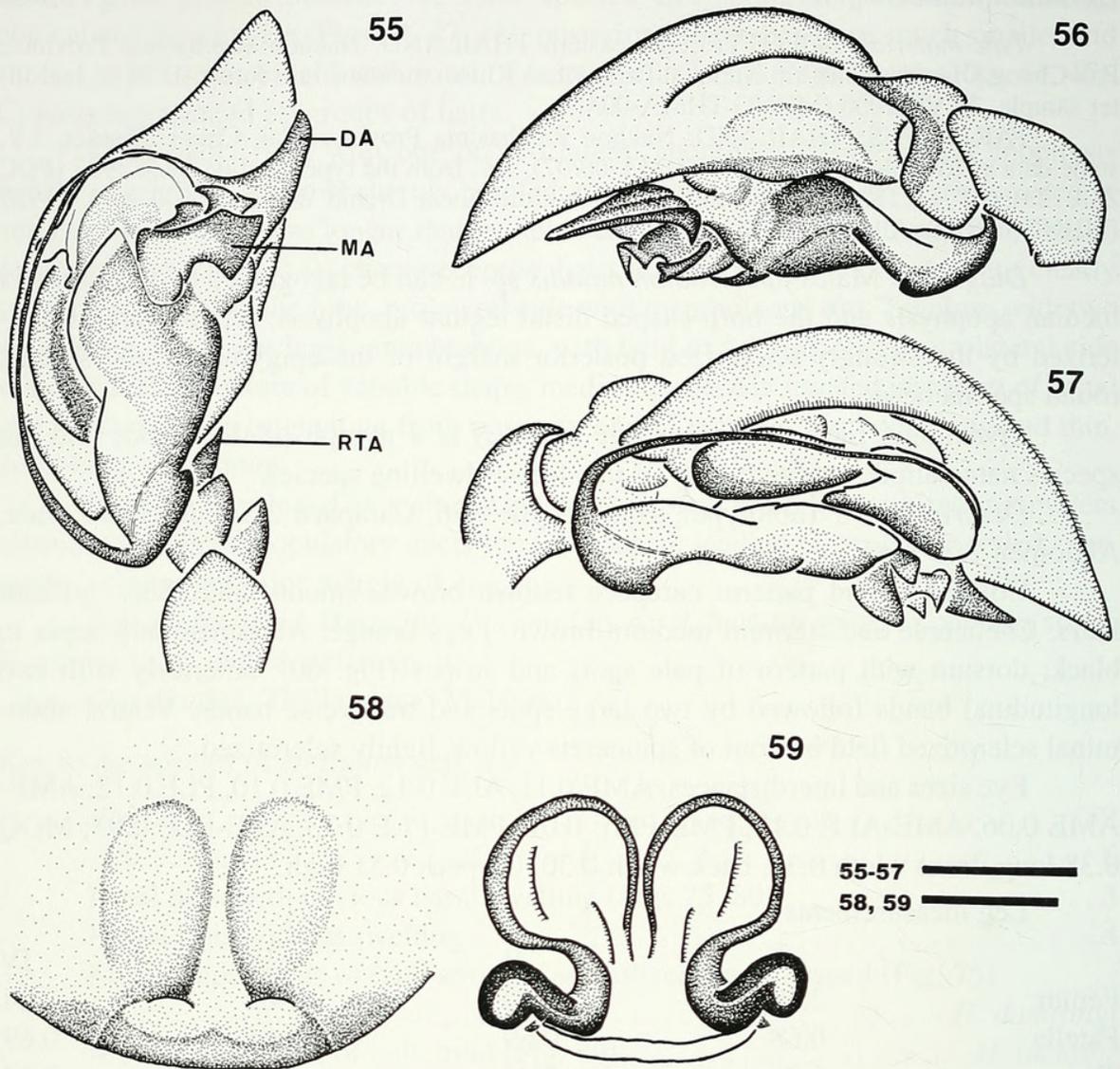
Leg measurements:

	I	II	III	IV
Femur	2.20	1.76	1.65	2.24
Patella	0.68	0.69	0.65	0.69
Tibia	1.96	1.41	1.27	2.14
Metatarsus	1.65	1.38	1.45	2.41
Tarsus	1.41	1.17	1.03	1.45
Total	7.90	6.41	6.05	8.93

Spination: femora I d1 pl1 II d1 III d1 IV d3; patellae III pl1 IV pl1; tibiae I v1-1-2 II v1-1-2 III d1-1 pl1 rl1 v1-1-1-2 IV d1-1-1 pl1 rl1 v1-1-1-1-2; metatarsi I v1-1-1-1 II v2-2-1-1 III d2-2 rl1 v2-1-1 IV d1-1-2 pl1 rl1 v2-1-1-2.

Male palp (Figs 55-57): palpal tibia with simple dorsolateral apophysis, its tip sharp and pointed (Fig. 56). Cymbium with relatively broad fold occupying half of cymbial length; basolateral concavity shallow. Tegulum simple, elongate, separated from embolic base by small prolateral membranous area. Median apophysis (Fig. 55) complicated, lightly sclerotized. Distal tegular apophysis partly sclerotized; dorsolateral sclerotized area well-developed as a large horn-shaped extension with obliquely truncate tip, broad at base, pointing distolaterad. Embolic base originating in posterior part of tegulum. Embolus relatively thick proximally, remainder whiplike, long and slender.

♀ (paratype). Total length 6.01. Carapace 2.64 long, 1.76 wide. Abdomen 2.43 long.



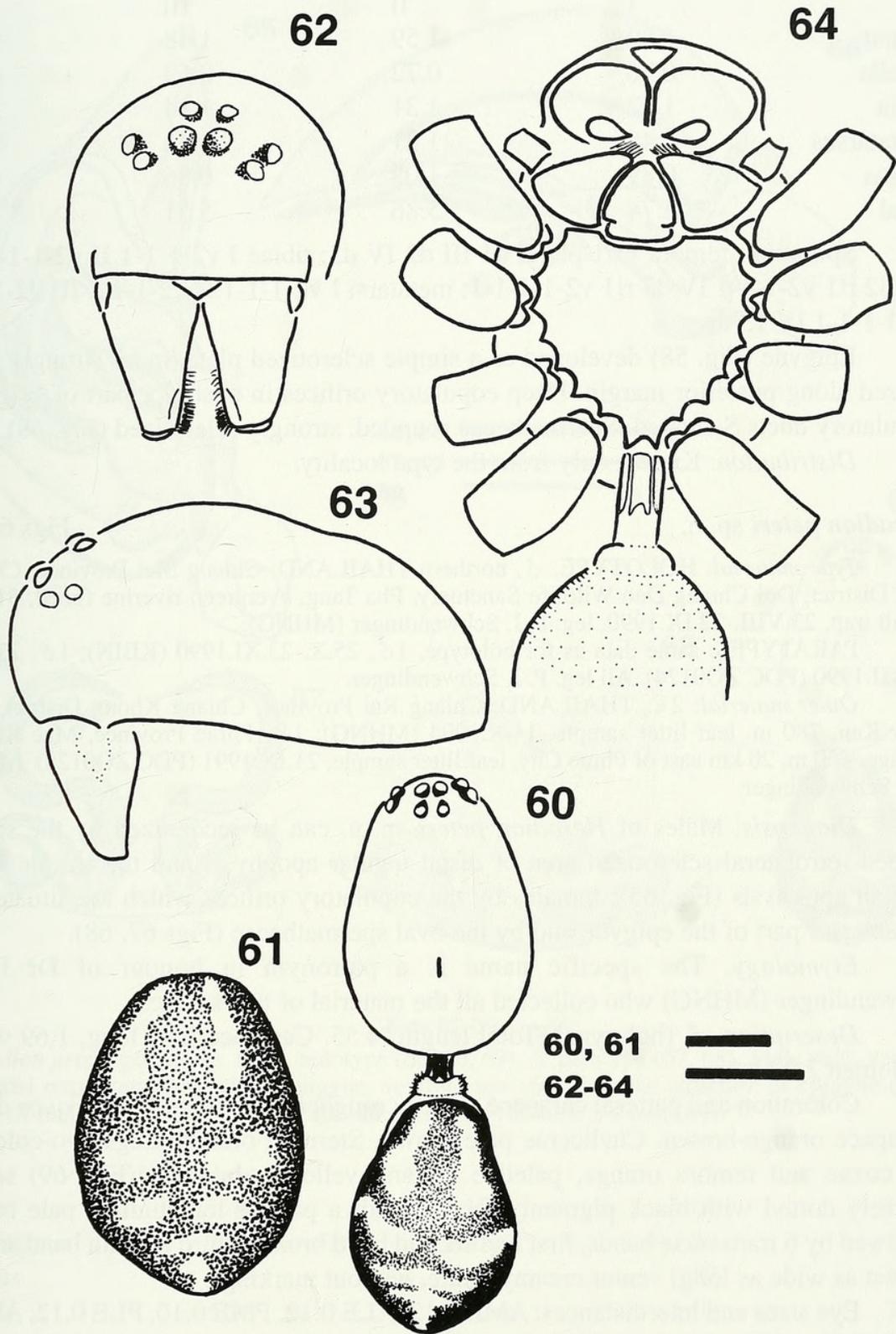
FIGS 55-59

Heradion naiadis gen. n., sp. n., ♂ holotype (55-57), ♀ paratype (58, 59). Male palp, ventral (55), prolateral (57) and retrolateral (56) view. Epigyne, ventral view (58). Internal structure of epigyne (59). Scale lines: 0.5 mm (58, 59); 0.75 mm (55-57).

Coloration and pattern: as in male but coloration generally darker: carapace dark reddish brown; chelicerae and sternum medium brown; abdomen dark sepia; dorsum with two longitudinal bands followed by two pairs of pale spots and interconnected chevrons (Fig. 61).

Eye sizes and interdistances: AME 0.10, ALE 0.12, PME 0.10, PLE 0.10; AME-AME 0.06, AME-ALE 0.15, PME-PME 0.06, PME-PLE 0.28, ALE-PLE 0.06; MOQ 0.38 long, front width 0.28, back width 0.29. Clypeus 0.53 high.

Leg measurements:



Figs 60-64

Heradion naiadis gen. n., sp. n., ♂ holotype (60, 62-24), ♀ paratype (61). Body of male, dorsal view (60). Abdomen of female, ventral view (61). Carapace of male, frontal (62) and lateral (63) view. Sternum, labium and maxillae (64). Scale lines: 1.5 mm (60, 61); 2.0 mm (62-64).

	I	II	III	IV
Femur	1.89	1.59	1.48	2.00
Patella	0.76	0.72	0.69	0.76
Tibia	1.72	1.31	1.14	2.00
Metatarsus	1.48	1.21	1.34	2.27
Tarsus	0.89	1.03	0.86	1.24
Total	6.74	5.86	5.51	8.27

Spination: femora I d1 pl1 II d1 III d2 IV d3; tibiae I v2-1-1-1 II v2-1-1-1 III d3 pl2 rl1 v2-1-1-1 IV d3 rl1 v2-1-1-1-1; metatarsi I v2-1-1-1 II v2-1-1-1 III d2-1 pl2 v2-1-1-1-1 IV 13 disp.

Epigyne (Fig. 58) developed as a simple sclerotized plate, more strongly sclerotized along posterior margin. Deep copulatory orifices in posterior part of epigyne; copulatory ducts S-shaped. Spermathecae rounded, strongly sclerotized (Fig. 59).

Distribution. Known only from the type locality.

Heradion peteri sp. n.

Figs 65-69

Type material: HOLOTYPE: ♂, northern THAILAND: Chiang Mai Province, Chiang Dao District, Doi Chiang Dao Wildlife Sanctuary, Pha Tang, evergreen riverine forest, 510 m, pitfall trap, 23.VIII.-22.IX.1990, leg. P. J. Schwendinger (MHNG).

PARATYPES: same data as for holotype, 1 ♂, 25.X.-23.XI.1990 (KBIN); 1 ♂, 23.XI.-22.XII.1990 (PDC ZO0124). All leg. P. J. Schwendinger.

Other material: 2 ♀, THAILAND: Chiang Rai Province, Chiang Khong District, Ban Kew Kan, 780 m, leaf litter sample, 14.X.1994 (MHNG); 1 ♀, Phrae Province, Mae Khaem Village, 560 m, 20 km east of Phrae City, leaf litter sample, 21.IX.1991 (PDC ZO0125). All leg. P. J. Schwendinger.

Diagnosis. Males of *Heradion peteri* sp. n. can be recognized by the spear-shaped retrolateral sclerotized area of distal tegular apophysis and the simple, bifid median apophysis (Fig. 65); females by the copulatory orifices which are situated in the anterior part of the epigyne and by the oval spermathecae (Figs 67, 68).

Etymology. The specific name is a patronym in honour of Dr Peter Schwendinger (MHNG) who collected all the material of this species.

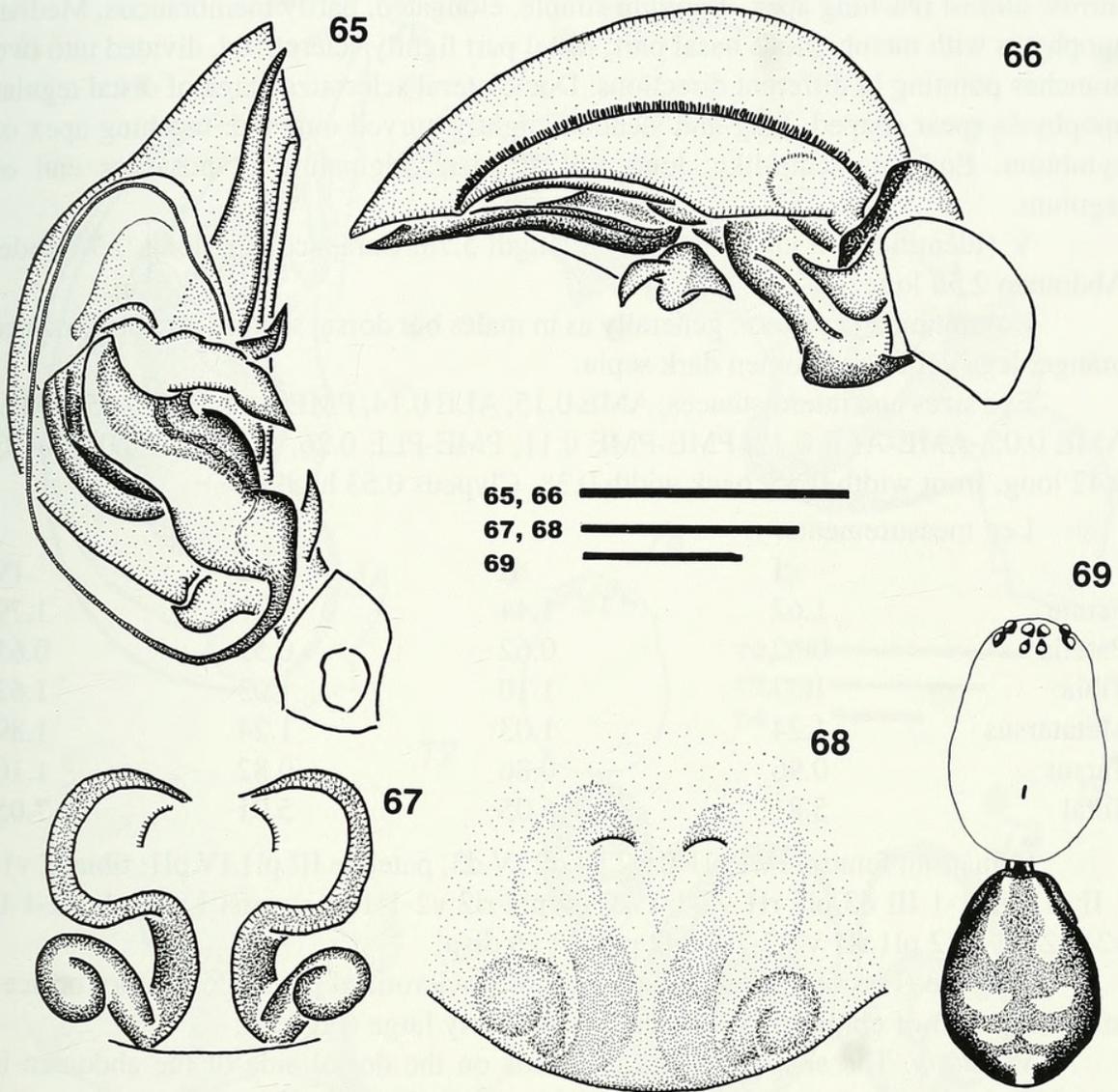
Description. ♂ (holotype). Total length: 4.55. Carapace 2.41 long, 1.69 wide. Abdomen 2.00 long.

Coloration and pattern: carapace slightly roughened, without hairs. Fovea deep. Carapace orange-brown. Chelicerae pale brown. Sternum orange. Legs two-colored, i.e. coxae and femora orange, patellae to tarsi yellow. Abdomen (Fig. 69) sepia, sparsely dotted with black pigment; dorsum with a pair of longitudinal pale bands followed by 6 transverse bands, first and second band broken, third to sixth band small, almost as wide as long; venter creamy white, without markings.

Eye sizes and interdistances: AME 0.12, ALE 0.12, PME 0.10, PLE 0.12; AME-AME 0.05, AME-ALE 0.07, PME-PME 0.10, PME-PLE 0.27, ALE-PLE 0.07; MOQ 0.38 long, front width 0.30, back width 0.33. Clypeus 0.51 high.

Leg measurements:

	I	II	III	IV
Femur	1.62	1.44	1.34	1.72
Patella	0.55	0.55	0.58	0.58



Figs 65-69

Heradion peteri gen. n., sp. n., ♂ holotype (65, 66, 69), ♀ paratype (67, 68). Male palp, ventral (65) and retrolateral (66) view. Epigyne, ventral view (68). Internal structure of epigyne (67). Body of male, dorsal view (69). Scale lines: 1.0 mm (65-68); 2.0 mm (69).

Tibia	1.48	1.17	1.00	1.68
Metatarsus	1.20	1.03	1.34	1.93
Tarsus	1.13	0.93	0.82	1.17
Total	5.98	5.12	5.08	7.08

Spination: femora I d1 pl1 II d1 III d1 IV d3; patellae III pl1 IV pl1; tibiae I v1-2 II pl1 v1-1-1-1 III d2 pl2 r11 v2-2 IV 11 disp; metatarsi I v2-2-2 II v2 III d2 v2-2 IV d2 pl2 r12 v1-1.

Male palp (Figs 65, 66): palpal tibia with lateral swelling. Ventrolateral tibial apophysis digitiform, small and thin as seen from the side (Fig. 66), sharp and pointed as seen from below (Fig. 65). Cymbium longer than wide, provided with deep and long

furrow almost reaching apex. Tegulum simple, elongated, partly membranous. Median apophysis with membranous basal part; distal part lightly sclerotized, divided into two branches pointing in different directions. Dorsolateral sclerotized area of distal tegular apophysis spear shaped, long and slender, slightly curved outward, reaching apex of cymbium. Embolus whip-like, long and slender, originating at posterior end of tegulum.

♀ (Identification uncertain). Total length 5.78. Carapace 2.67 long, 1.74 wide. Abdomen 2.56 long.

Coloration and pattern: generally as in males but dorsal scutum absent; carapace orange; legs yellow; abdomen dark sepia.

Eye sizes and interdistances: AME 0.15, ALE 0.14, PME 0.14, PLE 0.15; AME-AME 0.05, AME-ALE 0.12, PME-PME 0.11, PME-PLP 0.26, ALE-PLP 0.05; MOQ 0.42 long, front width 0.35, back width 0.38. Clypeus 0.53 high.

Leg measurements:

	I	II	III	IV
Femur	1.62	1.44	1.37	1.79
Patella	0.62	0.62	0.55	0.65
Tibia	1.37	1.10	1.03	1.62
Metatarsus	1.24	1.03	1.24	1.89
Tarsus	0.96	0.86	0.82	1.10
Total	5.81	5.05	5.01	7.05

Spination: femora I d1 pl1 II d2 III d2 IV d3; patellae III pl1 IV pl1; tibiae I v1-1 II pl1 v2-1-1 III d3 pl1 r11 v2-1-1 IV d3 pl2 r12 v2-1-1; metatarsi I v1-1-1-1-1 II v2-2-2 III d2-2 pl1 r11 v2-2-2 IV d2 pl2 r12 v6 disp.

Epigyne (Fig. 68) developed as a slightly sclerotized plate. Copulatory orifices in anterior part of epigyne. Spermathecae relatively large (Fig. 67).

Variation. The shape of the pale bands on the dorsal side of the abdomen is variable: the anterior patches are of variable sizes; the following pale areas may be present as round patches or as a transverse, usually broken band; third to sixth transverse bands may be connected or fused, forming a dorsal longitudinal band in front of the spinnerets.

Remarks. Female specimens were collected from Chiang Rai and Phrae Provinces, which are 180-200 km away from the type locality in Chiang Mai province. Due to geographical separation, these specimens may not be conspecific. Before this uncertainty is solved by the discovery of males from Chiang Rai and Phrae, the examined females are placed in *Heradion peteri* sp. n. but they are not designated as paratypes.

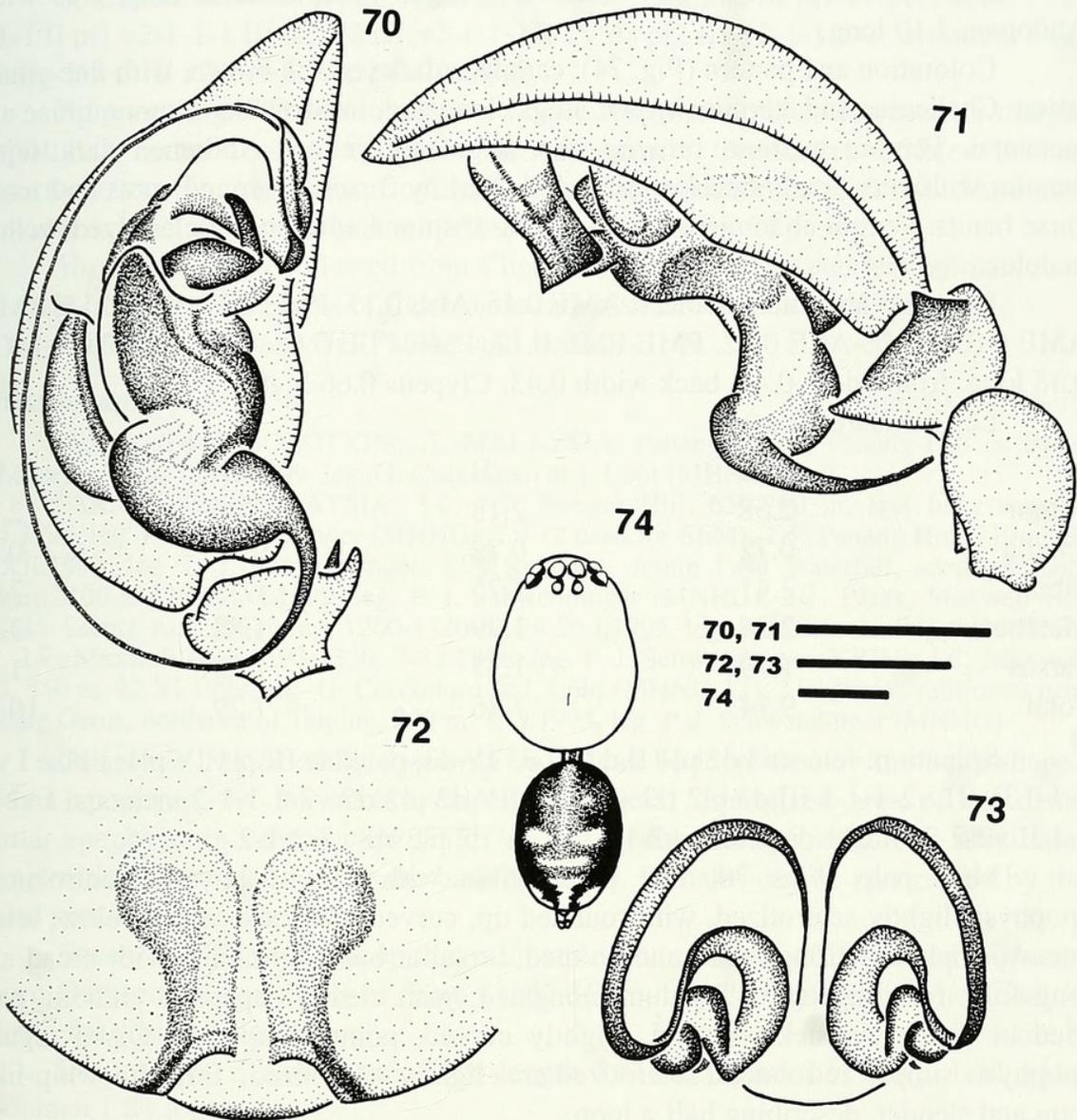
Distribution. Northern Thailand (Chiang Mai, Chiang Rai and Phrae Provinces).

***Heradion pernix* sp. n.**

Figs 43-48, 70-74

Type material: HOLOTYPE: ♂, western MALAYSIA: Pahang, Charas Hill, 3 km north of Panching, 60 m, 9-10.VII.2001, leg. P. J. Schwendinger (MHNG SIM-01/12).

PARATYPES: western MALAYSIA: 6♀, 7♂, same data as for holotype (MHNG SIM-01/12); ♂, Selangor, Templer Park (N 03° 17' 55.2", E 101° 37' 13.5"), north of Kuala Lumpur,



Figs 70-74

Heradion pernix gen. n., sp. n., ♂ holotype (70, 71, 74), ♀ paratype (72, 73). Male palp, ventral (70) and retrolateral (71) view. Epigyne, ventral view (72). Internal structure of epigyne (73). Body of male, dorsal view (74). Scale lines: 1.0 mm (70-73); 2.0 mm (74).

230-370 m, rainforest along stream, 13.VII.2001, leg. P. J. Schwendinger (MHNG SIM-01/14); ♂, Pahang, Fraser's Hill, Jerian Waterfall, 1050 m, under bark, 19.III.1993, leg. I. Löbl & F. Calame (MHNG WM93-12a); 3♂, Perak, rainforest 5 km northeast of Chenderiang (north of Tapah), 290-330 m, 22-31.I.1994, leg. P. J. Schwendinger (KBIN).

Diagnosis. Males of *Heradion pernix* sp. n. are easily recognizable by the sickle-shaped median apophysis and the relatively simple distal tegular apophysis; females by the presence of an epigynal lip and by the spermathecae with overhanging copulatory ducts on top.

Etymology. Latin, *pernix* means 'runner' and refers to the long legs in males. Noun in apposition.

Description. ♂ (holotype). Total 5.57 length. Carapace 2.82 long, 2.05 wide. Abdomen 2.10 long.

Coloration and pattern (Fig. 74): carapace dark reddish brown, with fine granulation. Chelicerae and sternum brown. Legs elongated, in particular femora, tibiae and metatarsi. Femora medium brown, other segments yellow. Abdomen dark sepia; dorsum with very small anterior spots, followed by 2 pairs of round spots and transverse bands. Ventral abdominal plate in front of spinneret strongly sclerotized, yellow in color.

Eye sizes and interdistances: AME 0.16, ALE 0.15, PME 0.12, PLE 0.15; AME-AME 0.07, AME-ALE 0.12, PME-PME 0.12, PME-PLE 0.28, ALE-PLE 0.07; MOQ 0.48 long, front width 0.43, back width 0.43. Clypeus 0.66 high.

Leg measurements:

	I	II	III	IV
Femur	2.58	2.13	2.00	2.79
Patella	0.72	0.72	0.72	0.68
Tibia	2.41	1.75	1.55	2.58
Metatarsus	2.24	1.79	1.82	3.20
Tarsus	1.79	1.37	1.20	1.72
Total	9.74	7.76	7.29	10.97

Spination: femora I d2 pl1 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v1-1-1-1 II pl1 v2-1-1-1 III d3 pl2 rl2 v2-1-1-1 IV d3 pl2 rl2 v2-1-1-1-2 metatarsi I v2-1-1-1 II v2-2-2 III d11 dispersal. v2-1-1-1-1 IV d2 pl2 rl2 v2-2-1-2.

Male palp (Figs 70, 71): palpal tibia with two apophyses: ventrolateral apophysis lightly sclerotized, with rounded tip, curved when seen from below; retrolateral apophysis strong, short and pointed, broad at base. Cymbium with broad and long fold, reaching apex. Tegulum elongated, with clearly separated embolic part. Median apophysis sickle-shaped, slightly curved, pointing upward. Distal tegular apophysis simple, retrolateral sclerotized area lightly sclerotized. Embolus whip-like, long and slender, describing half a loop.

♀ (paratype). Total length 6.05. Carapace 2.69 long, 1.87 wide. Abdomen 2.23 long.

Coloration and pattern: as in male but legs shorter: femora and tibiae of normal length.

Eye sizes and interdistances: AME 0.17, ALE 0.12, PME 0.12, PLE 0.15; AME-AME 0.06, AME-ALE 0.12, PME-PME 0.15, PME-PLE 0.28, ALE-PLE 0.07; MOQ 0.44 long, front width 0.44, back width 0.38. Clypeus 0.61 high.

Leg measurements:

	I	II	III	IV
Femur	1.96	1.72	1.55	2.03
Patella	0.68	0.68	0.65	0.65
Tibia	1.75	1.37	1.24	2.10
Metatarsus	1.62	1.34	1.48	2.41
Tarsus	1.37	1.10	1.03	1.44
Total	7.38	6.21	5.95	8.63

Spination: femora I d2 pl1 II d2 III d3 IV d4; patellae III pl1 IV pl1; tibiae I v2-1-1-1 II pl1 v2-1-1-1 III d2 pl2 rl1 v2-1-1-1-1 IV d3 pl2 rl2 v2-1-1-1-1; metatarsi I v2-2-2 II v2-2-2 III v2-2-1-1 IV d2-2-2 v2-2-2.

Epigyne (Fig. 72) developed as a simple sclerotized plate, its posterior margin with lightly sclerotized rim, lip-like in appearance. Copulatory orifices located posteriorly, touching the epigastric furrow. Copulatory ducts running forward and then downward, lying on top of thick-walled spermathecae (Fig. 73).

Variation. Males collected from Chenderiang are smaller and less colorful than the male holotype. The palps of these males are also less sclerotized.

Distribution. Malaysia (Pahang and Perak).

***Heradion damrongi* sp. n.**

Figs 49-54, 75-79

Type material: HOLOTYPE: ♂, MALAYSIA: Penang Island, Penang Hill (= Bukit Bendera), 650 m, 19.XI.1999, leg. G. Cuccodoro & I. Löbl (MHNG 10a.).

PARATYPES: MALAYSIA: 3♀, 1♂, Penang Hill, 650-760 m, leaf litter sample, 18.I.1995, leg. P. J. Schwendinger (MHNG); 7♀ (2 used for SEM), 1♂, Penang Hill, 710 m, 8-19.XII.1997, leg. P. J. Schwendinger; 1♀, Kelantan, Jeram Pasu Waterfall, south of Kota Baharu, 100 m, 10-11.XI.1999, leg. P. J. Schwendinger (MNHG); 2♀, Perak, Maxwell Hill (=Bukit Larut), east of Taiping, 1200-1320 m, 24-26.I.1995, leg. P. J. Schwendinger (MNHG); 1♂, 1♀, Maxwell Hill, 1290-1320, 7-8.I.1996, leg. P. J. Schwendinger (KBIN); 1♂, Maxwell Hill, 950 m, 22.XI.1999, leg. G. Cuccodoro & I. Löbl (MHNG 12); 1♀, Perak, rainforest near Padang Gerus, northeast of Taiping, 200 m, 15.I.1995, leg. P. J. Schwendinger (MNHG).

Diagnosis. Males of *H. damrongi* sp. n. can be identified by the beak-shaped median apophysis, by the anchor-shaped retrolateral sclerotized area of the distal tegular apophysis in ventral view (Fig. 75) and by the blunt ventrolateral tibial apophysis which is membranous at the base (Fig. 76). Females can be recognized by the coiled spermathecae (Fig. 78).

Etymology. The specific epithet is a patronym in honour of His Royal Highness Prince Damrong Rajanubhab of Siam (1862-1943), a great statesman who lived in Penang for almost a decade.

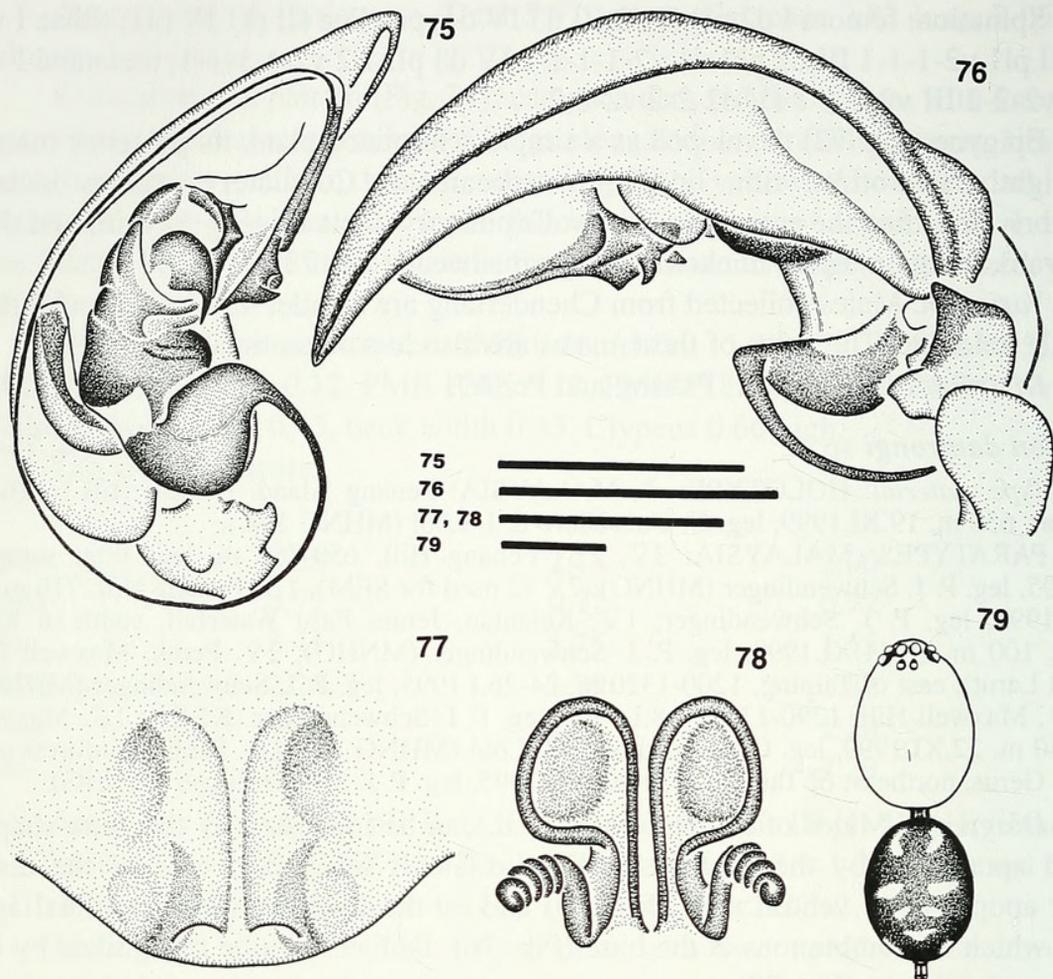
Description. ♂ (holotype). Total length 4.51. Carapace 2.56 long, 1.92 wide. Abdomen 1.84 long.

Coloration and pattern (Fig. 79): carapace reddish brown, finely granular. Legs orange-brown; proximal and distal portion of femora and tibiae with darker color, almost brown. Abdomen sepia; cardiac area pale; first pair of pale patches on dorsum elongated, followed by 2 pairs of round spots and transverse bands. Ventral abdominal plate in front of spinnerets yellow, lightly sclerotized.

Eye sizes and interdistances: AME 0.17, ALE 0.12, PME 0.12, PLE 0.15; AME-AME 0.07, AME-ALE 0.10, PME-PME 0.10, PME-PLE 0.20, ALE-PLE 0.05; MOQ 0.46 long, front width 0.41, back width 0.38. Clypeus 0.58 high.

Leg measurements:

	I	II	III	IV
Femur	2.34	1.96	1.82	2.34
Patella	0.65	0.65	0.68	0.62
Tibia	2.13	1.55	1.41	2.24
Metatarsus	2.17	1.55	1.72	2.93
Tarsus	1.82	1.31	1.03	1.62
Total	9.11	7.02	6.66	9.75



FIGS 75-79

Heradion damrongi gen. n., sp. n., ♂ holotype (75, 76, 79), ♀ paratype (77, 78). Male palp, ventral (75) and retrolateral (76) view. Epigyne, ventral view (77). Internal structure of epigyne (78). Body of male, dorsal view (79). Scale lines: 0.5 mm (77, 78); 1.0 mm (75, 76); 2.0 mm (79).

Spination: femora I d2 pl1 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v1-1-1-2 II pl1 v1-1-1-2 III d2 pl2 rl1 v1-1-1-2 IV d3 pl3 rl2 v1-1-1-1-2; metatarsi I v1-1-1-1-2 II v1-1-1-1-2 III d2-2-2 v1-1-1-2 IV d2 pl2 rl2 v6 disp.

Male palp (Figs 75, 76): palpal tibia with two apophyses: ventrolateral apophysis short and thick, membranous at base; retrolateral tibial apophysis round at tip. Cymbium elongated, furrow long and deep, reaching apex. Tegulum with strongly sclerotized beak-shaped median apophysis, pointing downward. Distal tegular apophysis elongated, developed as thin membranous sheet; retrolateral field of sclerotization anchor-shaped. Embolic base round, origin of embolus pointing forward; embolus whip-like, very long.

♀ (paratype). Total length 4.85. Carapace 2.56 long, 1.74 wide. Abdomen 2.17 long.

Coloration and pattern: generally as in males but dorsum without pale longitudinal band on cardiac area.

Eye sizes and interdistances: AME 0.12, ALE 0.14, PME 0.12, PLE 0.12; AME-AME 0.06, AME-ALE 0.12, PME-PME 0.10, PME-PLE 0.23, ALE-PLE 0.06; MOQ 0.42 long, front width 0.33, back width 0.38. Clypeus 0.61 high.

Leg measurements:

	I	II	III	IV
Femur	1.93	1.55	1.37	2.00
Patella	0.62	0.58	0.58	0.62
Tibia	1.68	1.27	1.20	1.96
Metatarsus	1.55	1.37	1.37	2.44
Tarsus	1.37	1.03	-	2.44
Total	7.15	5.80	4.52	8.46

Spination: femora I d3 pl1 II d3 III d1-2-1-1 IV d5; patellae III pl1 IV pl1; tibiae I v1-1-1-1 II pl1 v1-1-1-2 III d2 pl2 rl1 v1-1-1-2 IV d3 pl3 rl2 v1-1-1-1-2; metatarsi I v1-1-1-2 II v1-1-1-1-2 III d2 pl2 rl2 v1-1-1-1-2 IV d1-1-1-1-2 v1-1-1-1-2.

Epigyne (Fig. 77): developed as a simple sclerotized plate. Copulatory orifices located posteriorly; spermathecae strongly coiled (Fig. 78).

Distribution: Malaysia (Penang Island, Kelantan and Perak).

Heradion luctator sp. n. –

Figs 80-84

Type material: HOLOTYPE: ♂, MALAYSIA: Terengganu, Lake Kenyir, 5 km southwest of dam, 50 km southwest of Kuala Terengganu, N 4° 58', E 102° 19', 300-400 m, 8.VII.2001, leg. A. Schulz & K. Vock (MHNG M01-163).

PARATYPES: MALAYSIA: 1 ♀, same data as for holotype, 10.vii.2001 (MHNG M01-169); 1 ♀, Selangor, Templer Park (N 03° 17' 55.2", E 101° 37' 13.5"), north of Kuala Lumpur, 230-370 m, rainforest along stream, 13.VII.2001, leg. P. J. Schwendinger (MHNG SIM-01/14); 1 ♀, Perak, Pangkor Island, southwest of Ipoh, 30-150 m, 15-16.XII.1997, leg. P. J. Schwendinger (MNHG).

Diagnosis. Males of *H. luctator* sp. n. can be easily identified by the swollen tibiae of leg I (Fig. 84) and by the bifid median apophysis of the bulb (Fig. 80); females by the coiled, widely separated spermathecae (Fig. 83).

Etymology. Latin, *luctator* means fighter, which refers to the swollen tibiae I of males.

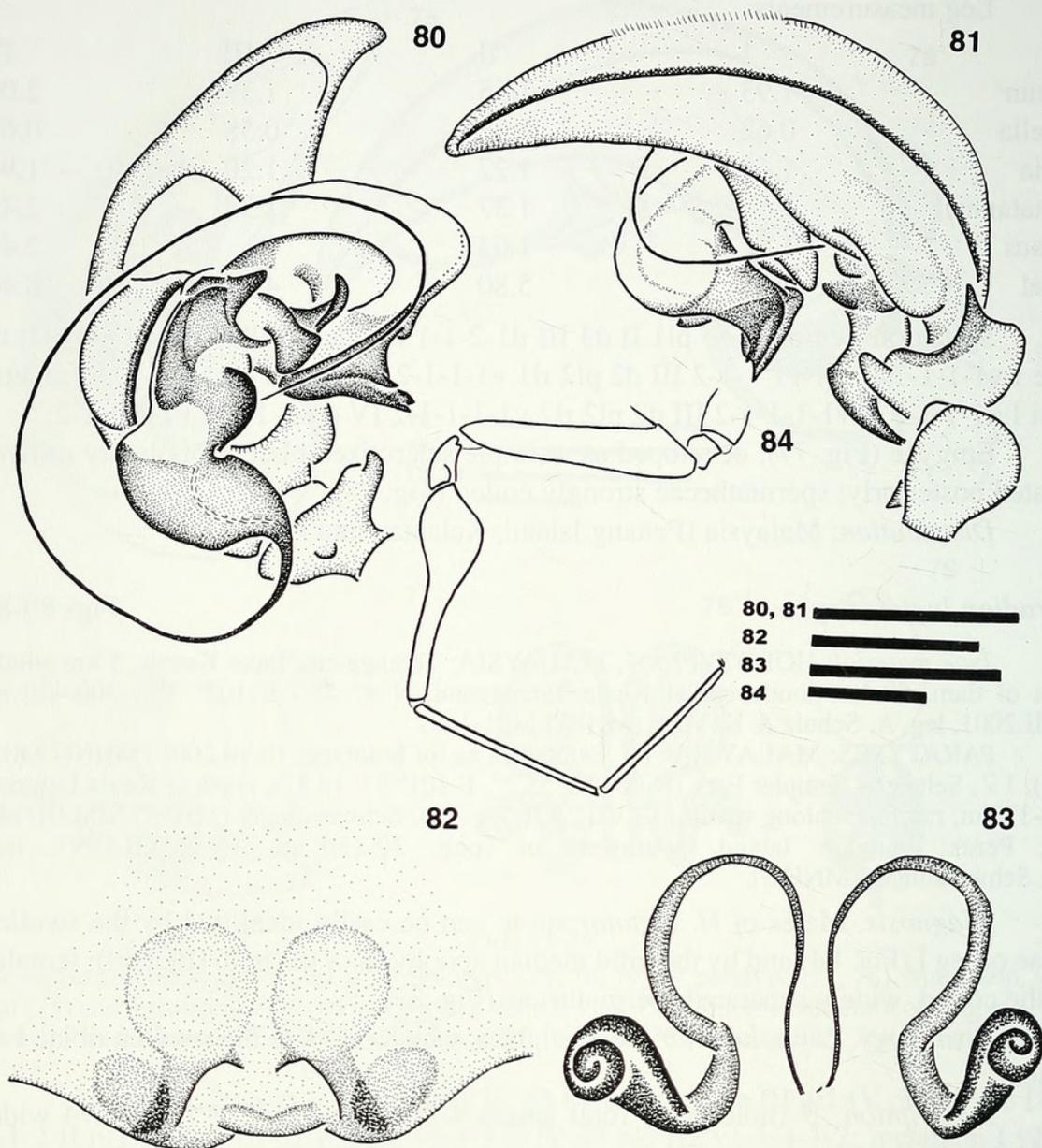
Description. ♂ (holotype). Total length 4.74. Carapace 2.38 long, 1.74 wide. Abdomen 1.69 long.

Coloration and pattern: carapace light brown, smooth. Legs yellow. Proximal part of tibiae I swollen (Fig. 84). Abdomen sepia, provided with some white spots. Ventral abdominal plate in front of spinnerets lightly sclerotized, pale yellow.

Eye sizes and interdistances: AME 0.11, ALE 0.12, PME 0.08, PLE 0.12; AME-AME 0.04, AME-ALE 0.07, PME-PME 0.05, PME-PLE 0.17, ALE-PLE 0.05; MOQ 0.48 long, front width 0.37, back width 0.25. Clypeus 0.41 high.

Leg measurements:

	I	II	III	IV
Femur	2.06	1.62	1.55	2.10
Patella	0.62	0.58	0.62	0.68
Tibia	1.89	1.31	1.20	1.89
Metatarsus	1.86	1.37	1.51	2.41
Tarsus	1.48	1.20	0.93	1.55
Total	7.91	6.08	5.81	8.63



Figs 80-84

Heradion luctator gen. n., sp. n., ♂ holotype (80, 81, 84), ♀ paratype (82, 83). Male palp, ventral (80) and retrolateral (81) view. Epigyne, ventral view (82). Internal structure of epigyne (83). Leg I, lateral view (84). Scale lines: 0.5 mm (82, 83); 1.0 mm (80, 81, 84).

Spination: femora I d2 pl1 II d2 III d3 IV d3; patellae III pl1 rl1 IV pl1 rl1; tibiae I v2-1-1-1 II pl1 v2-1-1 III d2-1-1 pl3 rl1 v2-1-2 IV d3 pl4 rl2 v2-1-2; metatarsi I v2-1-1-2 II pl1 v2-1-1-2 III d2-2-2 v2-2-1-1 IV d1-2 pl2 rl2 v2-1-2-1-1.

Male palp (Figs 80, 81): palpal tibia with two apophyses: ventrolateral tibial apophysis blunt, finger-like; retrolateral one small, sharp and pointed. Cymbium elongated, furrow long and deep, relatively broad. Tegulum with bifid median apophysis: basal branch distally broad; upper branch sickle-shaped. Distal tegular apophysis thin, developed as a membranous sheet, retrolateral field of sclerotization complicated. Embolic base separated from tegulum by membranous area. Embolus thin, whip-like.

♀ (paratype). As the male but larger in size, legs of normal size and tibia I not swollen. Total length 5.73. Carapace 2.43 long, 1.66 wide. Abdomen 2.56 long.

Coloration and pattern: coloration darker than in males.

Eye sizes and interdistances: AME 0.17, ALE 0.12, PME 0.11, PLE 0.12; AME-AME 0.05, AME-ALE 0.12, PME-PME 0.10, PME-PLE 0.26, ALE-PLE 0.05; MOQ 0.43 long, front width 0.41, back width 0.33. Clypeus 0.61 high. Leg formula: 4123.

Leg measurements:

	I	II	III	IV
Femur	1.89	1.62	1.55	2.06
Patella	0.62	0.62	0.62	2.03
Tibia	1.72	1.31	1.20	1.93
Metatarsus	1.55	1.27	1.51	2.48
Tarsus	1.37	1.06	1.00	1.37
Total	7.15	5.88	5.88	9.87

Spination: femora I d2 pl1 II d2 III d3 IV d3; patellae III pl1 IV pl1; tibiae I v1-1-1-1 II v1-1-1-2 III d2 pl1 rl1 v1-1-1-2 IV d3 pl2 rl2 v2-1-1-2; metatarsi I 5 dispersal. II v1-2-2 III d1-1-2 pl2 rl2 v1-1-1-1-2 IV 13 dispersal.

Epigyne (Fig. 82): with depression on posterior margin. Copulatory orifices elongated, located posteriorly, almost touching epigastric furrow. Copulatory ducts relatively short. Spermathecae widely separated, coiled (Fig. 83).

Distribution. Malaysia (Terengganu, Selangor and Perak).

DISCUSSION

The presence of a metatarsal preening bush composed of chisel-shaped hairs (Figs 10, 49, 50) in both *Euryeidon* gen. n. and *Heradion* gen. n. clearly shows that these two genera belong to the subfamily Zodariinae. Jocqué (1991) defined the subfamily Storeninae on the base of chisel-shaped hairs but this later appeared to be a paraphyletic group. Jocqué (1992) and Benjamin & Jocqué (2000) reason why the two were united. The two new genera are closely related to *Mallinella*, with which they share the typical dome-shaped cephalothorax, the sternum with triangular extensions fitting in coxal concavities, and the very well-delimited chilum with bulging centre. The structures of the secondary genitalia are also similar. Male palps of these three genera are characterized by the presence of a broad cymbial fold, epigynes by a strongly sclerotized internal structure. The easiest way to separate these genera is to look at the type of armature in front of the tracheal spiracle: in *Mallinella* there is a single row of short spines, whereas in both new genera there is a field with several rows of spine-shaped setae decreasing in length toward the front (Figs 2, 3, 44, 45). These characters could be regarded as different stages of a single character, which again stresses the close relationship between these three genera.

Only a single species of Zodariidae, *Stenomorpho reinholdae*, has previously been recorded from Thailand. Yet, *Mallinella* and *Asceua* are the most abundant zodariid genera that can be found almost everywhere in forests of Thailand, including the summit of Doi Inthanon, the highest mountain culminating at 2565 m. The discovery of species-rich new genera in this part of the tropics was a surprise as *Asceua* and *Mallinella* were indeed considered the only zodariid genera with numerous species.

While several attempts have been made to collect specimens throughout different forests in the northern part of the country, members of *Euryeidon* gen. n. were collected only from the northern part of the Dwana-Tenasserim Range (Chiang Mai and Chiang Rai Provinces). In addition, only two species of *Heradion* gen. n. were collected from the north and the east of Thailand. The remaining three *Heradion* species are widely distributed and quite common in Malaysia.

The syntopic occurrence of three congeneric species of *Euryeidon* gen. n., i.e. *E. musicum* sp. n., *E. anthonyi* sp. n. and *E. sonthichaiiae* sp. n., together with *H. peteri* sp. n. in the evergreen riverine forest of Doi Chiang Dao is another indication for the high biodiversity of tropical forests in Thailand. This phenomenon has previously been reported for another spider family, i.e. the Amaurobiidae at Doi Inthanon (Dankittipakul & Wang, 2003).

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REFERENCES

- BENJAMIN, S. P. & JOCQUÉ, R. 2000. Two new species of the genus *Suffasia* from Sri Lanka (Araneae: Zodariidae). *Revue suisse de Zoologie* 107 (1): 97-106.
- DANKITTIPAKUL, P. & WANG, X.-P. 2003. New species of coelotine spiders (Araneae, Amaurobiidae) from northern Thailand I. *Revue suisse de Zoologie* 110 (4): 723-737.
- JOCQUÉ, R. 1991. A generic revision of the spider family Zodariidae (Araneae). *Bulletin of the American Museum of Natural History* 201: 1-165.
- JOCQUÉ, R. 1992. A new species and the first male of *Suffasia* with a redelimitation of the sub-families of the Zodariidae (Araneae). *Revue suisse de Zoologie* 99: 3-9.
- JOCQUÉ, R. (in press). Six stridulating organs in one spider. – Is this the limit? *Journal of Arachnology*.
- JOCQUÉ, R. & BAEHR, B. 1992. A revision of the Australian spider genus *Storena* (Araneae, Zodariidae). *Invertebrate Taxonomy* 6: 953-1004.
- JOCQUÉ, R. & BOSMANS, R. 1989. A revision of the genus *Storenomorpha* Simon (Araneae, Zodariidae). *Spixiana* 12 (2): 125-134.
- MURPHY, F. & MURPHY, J. 2000. An introduction to the spiders of South East Asia. *Malaysian Nature Society, Kuala Lumpur*, 625 pp.
- PLATNICK, N. I. 2004. The world spider catalog, version 4.0. American Museum of Natural History, online at [http://research.amnh.org/entomology/spiders/catalog 8187 /index.html](http://research.amnh.org/entomology/spiders/catalog%208187/index.html)



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