

# Revision of the Australian spider genus *Habronestes* L. Koch, 1872 (Araneae: Zodariidae). Species of Tasmania

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# Revision of the Australian spider genus *Habronestes* L. KOCH, 1872 (Araneae: Zodariidae). Species of Tasmania

Barbara C. Baehr & Robert J. Raven

## ABSTRACT

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The genus *Habronestes* L. KOCH, 1872 is revised for the species of Tasmania. The genus now contains 35 species Australia-wide, with 7 newly described and one known species from Tasmania. The species here described belong to the following three species-groups: *Habronestes macedonensis*-group: *H. macedonensis* (HOGG, 1900); *Habronestes australiensis*-group: *H. driesseni* sp. nov., *H. epping* sp. nov., and *Habronestes pictus*-group: *H. bispinosus* sp. nov., *H. boutinae* sp. nov., *H. hickmani* sp. nov., *H. tasmaniensis* sp. nov., *H. thaleri* sp. nov. Most new species are described from specimens of both sexes, but *H. epping* sp. nov. is known only from females. A key is provided for the three groups as well as for the species.

## Introduction

The Ant Spiders, Zodariidae, are one of the main ground-living spider families in Australia (Churchill 1998), often recognised by their attractive, bright yellow orange spots in contrast to a dark brown abdomen, and by their annulated legs. With now 240 described and an estimated 350–400 total species, Australia has the richest known zodariid spider fauna worldwide (Jocqué 1991, 1995a, b; Jocqué & Baehr 1992, 1995, Baehr & Jocqué 2000, 2001; Baehr 2003a, b, c, 2004a, b, 2005; Baehr & Churchill 2003; Jocque & Churchill 2005; Raven & Baehr 2000). The Australian zodariid fauna has their main distribution in the tropical and subtropical region and reaches their southern boundary in Tasmania with only few remaining genera, represented by *Asteron* JOCQUÉ, 1991 (Jocqué & Baehr 2001), *Habronestes* and *Neostorena* RAINBOW, 1914, which is not revised yet.

The yellow spotted *Habronestes* species are medium sized (4.5–8.0 mm), diurnal and feed predominantly on ants, mimicking their behaviour and sometimes even their chemical traits (Allan, Elgar & Capon 1996).

This paper is the second revision of the large, endemic Australian genus *Habronestes* and deals only with the fauna of Tasmania. The work was partially funded by the Tasmanian Department of Primary Industries, Water and Environment and is dedicated to Prof. Dr. Konrad Thaler in honour of his enormously precise spider work. His main interest was focused on community studies of spiders, their structure and origin in the Eastern Alps. Konrad Thaler was Austria's leading arachnologist for decades. His death was a great loss to arachnology, especially in Europe. Konrad Thaler was one of the most important arachnologists to the senior author, he taught her precise identification of even the smallest spider species.

## Material and Methods

Descriptions were generated with the aid of Intkey (Dallwitz & al. 1998) and shortened where possible. Location data and maps were created with Biolink version 1.5 (CSIRO Entomology, Canberra, Australia; <http://www.biolink.csiro.au/>).

Drawings include the body, right palp and epigyne. All measurements are in millimetres. Scales of drawings are 1 mm (body), 0.5 mm (palp), and 0.1 mm (epigyne). Epigynes were cleared in lactic acid. Descriptions of spination and colour patterns follow that in the revision of *Habronestes* (Baehr 2003c). Throughout the text, figures cited from Baehr (2003c) are listed as "fig." those used in this paper as "Fig.".

Abbreviations of used morphological terms and institutions from which material was borrowed are as follows:

ALE	Anterior lateral eyes.
ALE-PLE	Distance between anterior lateral and posterior lateral eyes.
ALS	Anterior lateral spinnerets
AM	Australian Museum (Sydney)
AME-ALE	Distance between anterior median and anterior lateral eyes
AME	Anterior median eyes
AME-AME	Distance between anterior median eyes
CD	Copulatory ducts
CO	Copulatory Opening
cl/cw	Carapace length/carapace width
DTA	Distal tegular apophysis, conductor



DTiA	Dorsal tibial apophysis
LTA	Lateral tegular apophysis
PLE	Posterior lateral eyes
PME-PLE	Distance between posterior median and posterior lateral eyes
PME	Posterior median eyes
PME-PME	Distance between posterior median eyes
PMS	Posterior median spinnerets
QM	Queensland Museum, Brisbane
QVM	Queen Victoria Museum, Launceston
RCF	Retrolateral cymbial fold
S	Spermatheca
sl/sw	Sternum length/sternum width
VTA	Ventral tegular apophysis
VTiA	Ventral tibial apophysis

## Systematics

### Genus *Habronestes* L. KOCH

*Habronestes*: L. Koch (1872): 299; Jocqué (1991): 56; Jocqué (1995b): 143; Baehr (2003c).

Type species:

*Habronestes striatipes* L. KOCH, 1872 by subsequent designation of Petrunkevitch (1928).

Following Jocqué, *H. striatipes* L. KOCH, 1872 must be taken as the type species.

Diagnosis: Cymbium with large, retrolateral fold (RCF). Palp with sickle-shaped VTA, DTA with long stalk and enrolled end covered with spicules, which functions as a conductor; embolus thin, semicircular, embolus base flattened. Tarsi I–IV with 2 rows of short stout ventral spines.

According to the extremely different eye pattern (figs. 7–13), the described Australian species belong to three different species-groups: The *H. australiensis*-group (Figs. 2–4, fig. 7), the *H. macedonensis*-group (fig. 8) and the *H. pictus*-group (Figs. 1, 5–8, figs. 9, 10).

The systematics and the genus description are explicitly explained in Baehr (2003c).

Female species descriptions mention only the differences from the male.



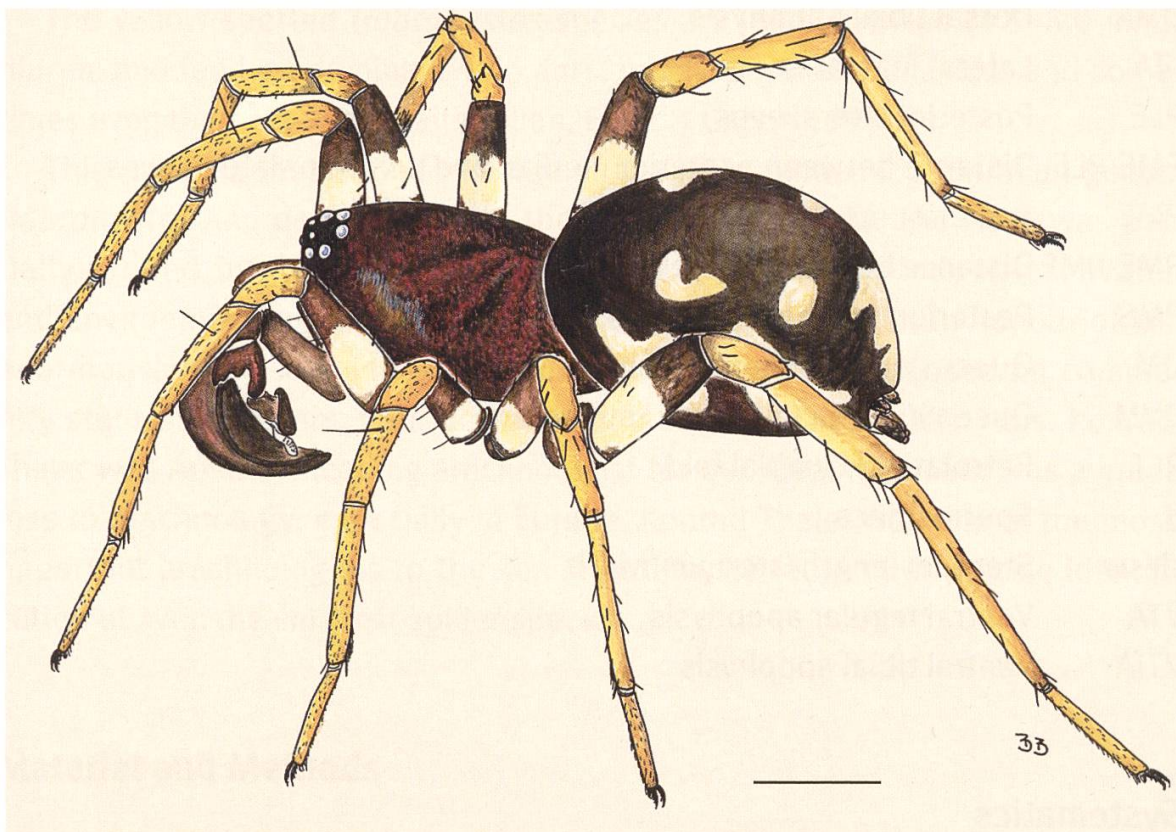


Fig. 1. *Habronestes* body, lateral view, *Habronestes thaleri* sp. nov.

### Key to species-groups and species of *Habronestes* males of Tasmania

- 1 Eyes, PLE, AME biggest (Figs. 2–4, figs. 7, 8, 11, 12)..... **2**
- Eyes, PLE equal to others (Figs. 1, 5–8, figs. 9, 10) ..... ***H. pictus*-group 3**
- 2 PLE biggest (Figs. 2, 3), dorsal tibial apophysis long, excavated (Figs. 9, 10, circle) ..... ***H. australiensis*-group, *H. driesseni* sp. nov.**
- AME biggest (fig. 37), dorsal tibial apophysis not excavated (figs. 8, 12, 41) ..... ***H. macedonensis*-group, *H. macedonensis* (HOGG)**
- 3 Distal part of LTA with ridges (Figs. 11, 12, circle) ..... ***H. hickmani* sp. nov.**
- Distal part of LTA without ridges (Figs. 13–20) ..... **4**
- 4 VTA without thin, translucent extension on tip, dorsal tibial apophysis slightly divided (Figs. 13, 14, circle) ..... ***H. thaleri* sp. nov.**
- VTA with translucent thin extension on tip, dorsal tibial apophysis undivided (Figs. 15–20) ..... **5**
- 5 Abdominal pattern with pale chevrons (Fig. 5), retrolateral tip of LTA thick without any spines, retrolateral view conical (Fig. 16, circle) ..... ***H. boutinae* sp. nov.**
- Abdominal pattern with 2–3 pairs of white patches on anterior part (Figs. 6, 8), retrolateral tip of LTA with spines, retrolateral view flat (Figs. 17–20) ..... **6**



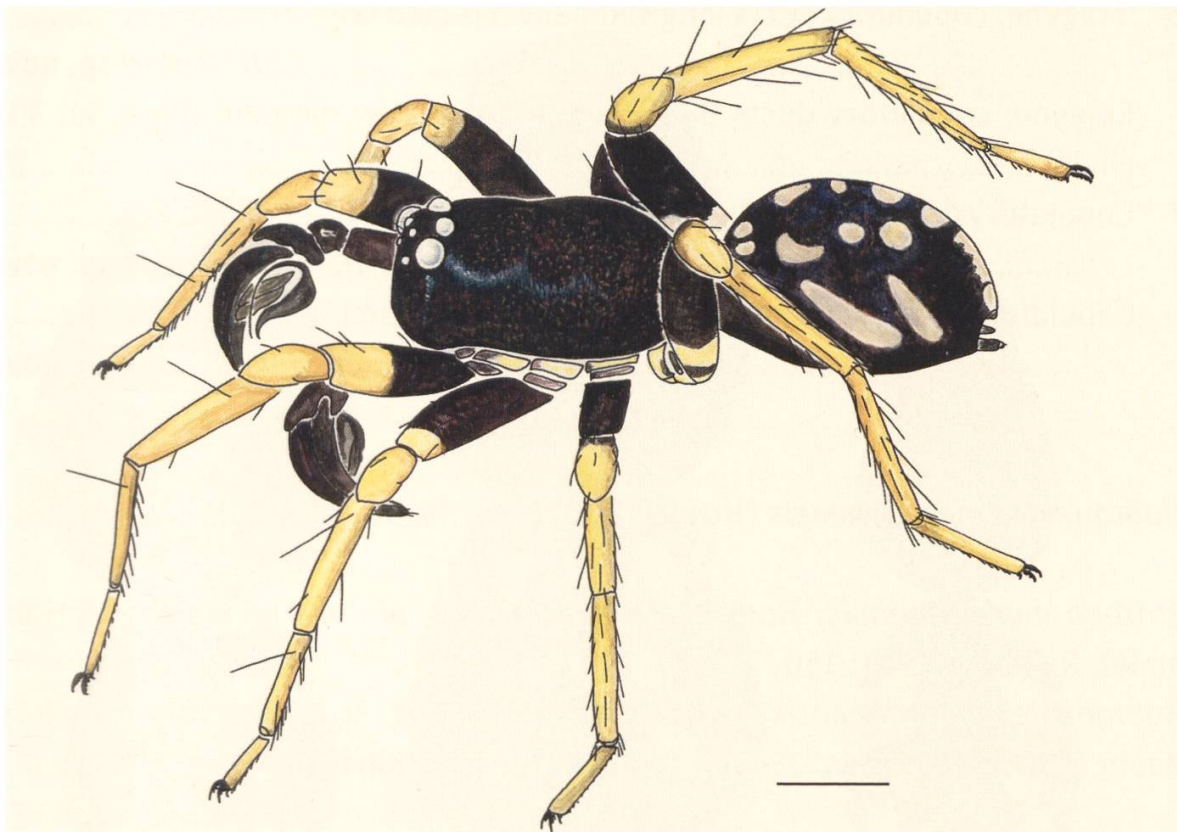


Fig. 2. *Habronestes* body, lateral view, *Habronestes driesseni* sp. nov.

- 6 LTA with retrolateral thin, bent hook (Figs. 17, 18 circle) ..... *H. tasmaniensis* sp. nov.
- LTA with two retrolateral spines in u-shaped position (Fig. 19, circle) ..... *H. bispinosus* sp. nov.

#### Key to species-groups and species of *Habronestes* females of Tasmania

- 1 Eyes, PLE, AME biggest (Figs. 2–4, figs. 7, 8, 11, 12) ..... 2
- Eyes, PLE equal to others (Figs. 1, 5–8, figs. 9, 10) ..... *H. pictus*-group 4
- 2 PLE biggest (Fig. 4) ..... *H. australiensis*-group 3
- AME biggest (fig. 37) ..... *H. macedonensis*-group, *H. macedonensis* (HOGG)
- 3 Epigyne with long, lanceolate scapus (Fig. 21) ..... *H. driesseni* sp. nov.
- Epigyne without scape, with inverted drop-shaped copulatory opening (Fig. 23) ..... *H. epping* sp. nov.
- 4 Abdomen dorsally with nearly tuning fork-shaped pale pattern (Fig. 7), epigyne (Figs. 25, 26) ..... *H. hickmani* sp. nov.
- Abdominal pattern different ..... 5
- 5 Abdominal pattern with chevrons (Fig. 5), epigyne with u-shaped scapus (Figs. 29, 30) ..... *H. boutinae* sp. nov.
- Abdominal pattern with 2–3 pale patches on anterior part (Figs. 1, 6, 8) ... 6

- 6 Epigyne, copulatory ducts longitudinally directed (Fig. 27, circle) ..... *H. thaleri* sp. nov.
- Epigyne, copulatory ducts diagonally transversally directed (Figs. 31, 33, circle) ..... 7
- 7 Copulatory ducts diagonally directed (Fig., 31 circle) ..... *H. tasmaniensis* sp. nov.
- Copulatory ducts transversally directed (Fig. 33, circle) ..... *H. bispinosus* sp. nov.

***Habronestes macedonensis* (HOGG, 1900)** (figs. 35, 36, 37, 40, 41, 46, Fig. 36)

*Storena macedonensis*; Hogg (1900): 2, 97, 98, pl. 14, fig. 4 (description male); Rainbow, 1911: 150;

*Habronestes macedonensis*: Jocqué (1995b): 145, fig. 3c–d (description male); Baehr (2003c): 351, figs. 35–37, 40, 41, 46 (description male, female).

Remarks: The male of *H. macedonensis* was first described by Hogg, 1900 as *Storena macedonensis*. Jocqué (1995) has reexamined the holotype and placed the species in *Habronestes* because of the special palp structure.

Holotype: BMNH 1907.2.24.38 Victoria, Macedon, examined by Jocqué, 1995b.

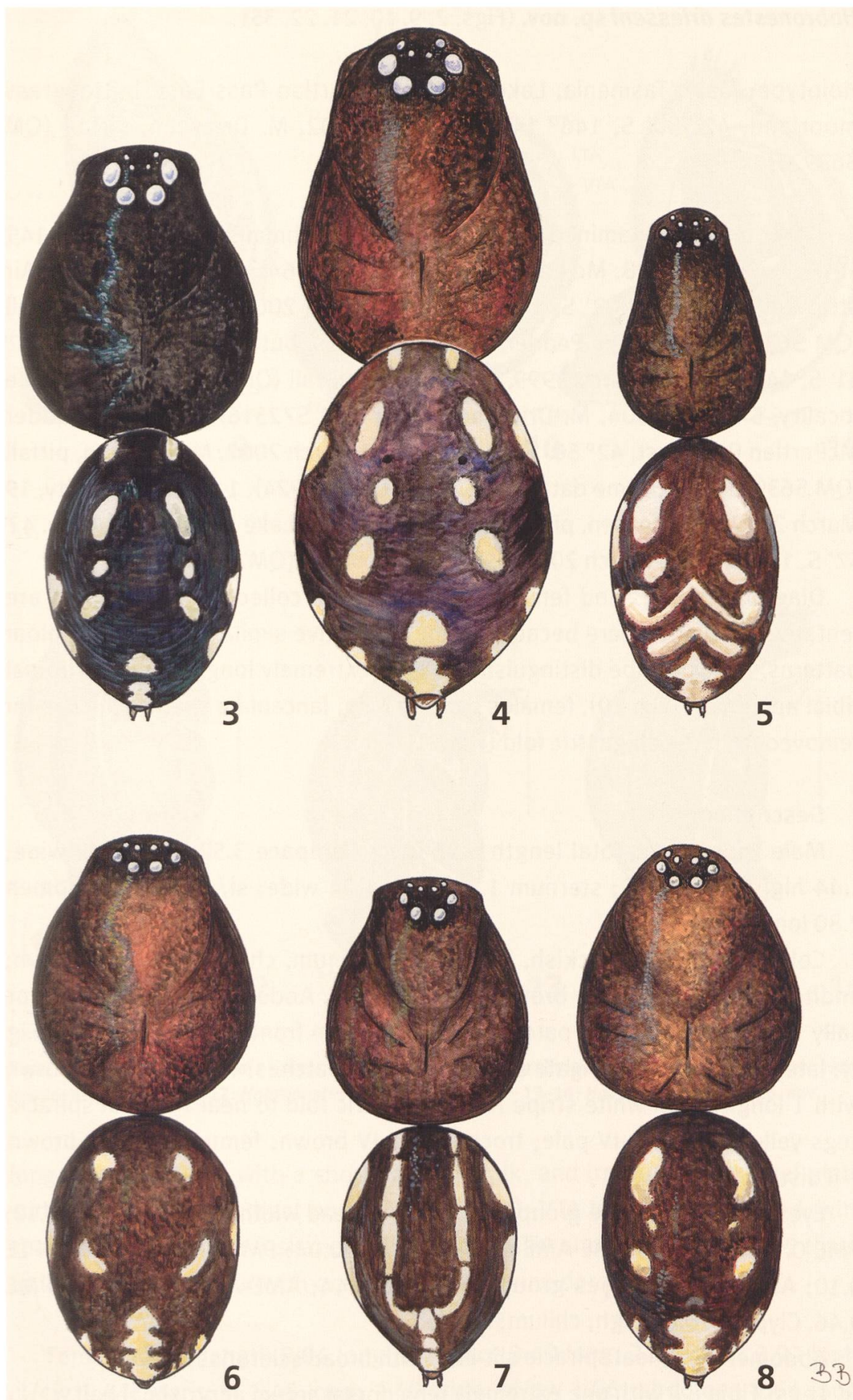
Other material examined: Tasmania: 1 ♂, Epping Forest, 41° 46' S, 147° 22' E, 13 Mar. 1991, L. Manka, pitfall (QVM 13:42151); 1 ♂, Sandy Bay, on wall of building, 42° 54' S, 147° 20' E, Mar. 1969, J.L. Hickman (AM KS30352).

Diagnosis: Eyes in 2 rows, both rows procurved, AME largest. Abdomen dorsally with 2 pairs of white patches on ateripart, the first elongated nearly divided in 2 and 2 in front of the spinnerets. Shape of LTA fan-like covered with small spigots (figs. 40, 46).

Description: See Baehr (2003c).

Figs. 3–8. *Habronestes* carapace and abdomen, dorsal view. – 3: *Habronestes driesseni* sp. nov.; – 4: *Habronestes epping* sp. nov.; – 5: *Habronestes boutinae* sp. nov.; – 6: *Habronestes bispinosus* sp. nov.; – 7: *Habronestes hickmani* sp. nov.; – 8: *Habronestes tasmaniensis* sp. nov.







***Habronestes driesseni* sp. nov.** (Figs. 2, 9, 10, 21, 22, 35)

Holotype: Male, Tasmania, Lake Pedder, McPartlan Pass East, buttongrass moorland, 42° 50' S, 146° 14' E, 12 Mar. 2002, M. Driessen, pitfall (QM S63923).

Other material examined: Tasmania: 2 ♀, Frenchmans Cap, 42° 16' S, 145° 50' E, 1 April 1980, B. Mc Causland, (QVM 13: 43264); 1 ♂, Lake Pedder, Air-strip Rd Site 4L, 43° 02' S, 146° 20' E, 15 March 2000, M. Driessen, pitfall (QM S63925); 1 ♂, Lake Pedder, Mc Partian Pass, buttongrass moorland, 42° 51' S, 146° 11' E, 5 March 1999, M. Driessen, pitfall (QM S70002); 1 ♂, same locality, 5 March 2004, M. Driessen, pitfall (QM S72316); 1 ♂, Lake Pedder, McPartlan Pass East, 42° 50' S, 146° 14' E, 12 March 2002, M. Driessen, pitfall (QM S63922); 1 ♂, same data as previous (QM S63924), 1 ♂, same locality, 19 March 2002, M. Driessen, pitfall (QM S63921); 1 ♂, Lake Pedder, Mt. Anne, 42° 57' S, 146° 21' E, 5 March 2004, M. Driessen, pitfall (QM S70558).

Diagnosis: Males and females have not been collected together but are tentatively matched here because of the respective similarities in their colour patterns. Males can be distinguished by the extremely long, excavated dorsal tibial apophysis (Fig. 10), females by their long, lanceolate scape, which is far removed from the epigastric fold (Fig. 21).

Description

Male (holotype): Total length 6.32 long. Carapace 3.52 long; 2.32 wide; 1.44 high; cl/cw 1.52; sternum 1.32 long; 1.24 wide; sl/sw 1.06; abdomen 2.80 long; 2.12 wide.

Colour: Carapace blackish, iridescent. Sternum, chelicerae sepia brown; endites and labium sepia brown, distally white. Abdomen sepia brown, dorsally with 4 pairs of white patches on top and 2 in front of the spinnerets (Fig. 2); laterally with 2–3 elongate and broad white patches; ventrally dark brown; with 1 longitudinal white stripe from epigastric fold to near tracheal spiracle. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV dark brown, I–II distal part yellow.

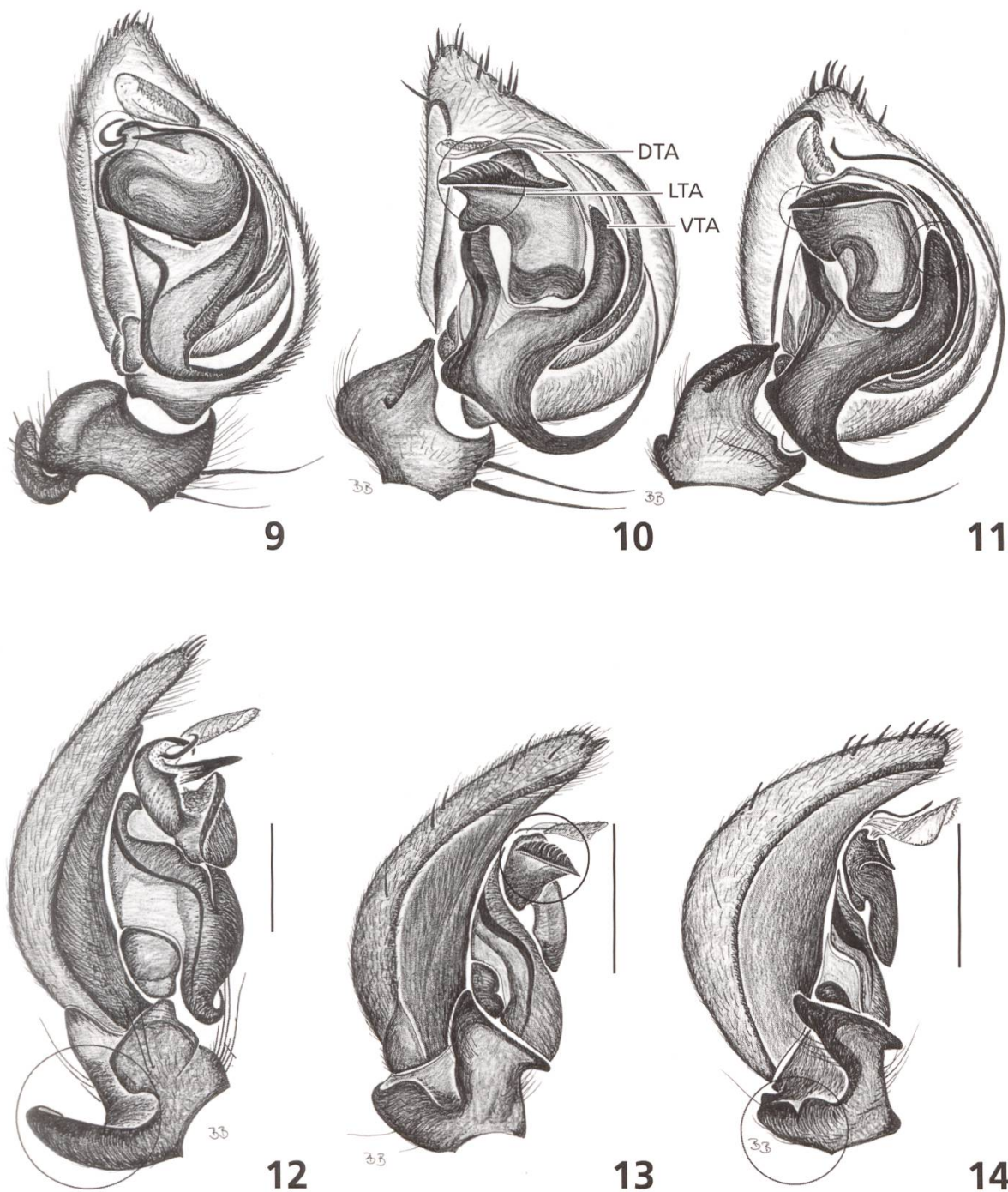
Eyes: PLE largest; eye group width 0.66 of head width; AME 0.12; ALE 0.10; PME 0.16; PLE 0.22; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.14; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.44; AME-AME 0.28; PME-PME 0.46. Clypeus: 0.88 high; chilum: divided.

Abdomen: Tracheal spiracle slit-like, with broad sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 9, 10): Retrolateral concavity deep, 2/3 of the cymbium





Figs. 9–14. *Habronestes* male palps, ventral view (top), lateral view (bottom). – 9–10: *Habronestes driesseni* sp. nov.; – 11–12: *Habronestes hickmani* sp. nov.; – 13–14: *Habronestes thaleri* sp. nov.

long. Tegulum (LTA) with a short vertical stalk, and irregular horizontal plate, with retrolateral thin, bent hook (Fig. 9, circle); VTA long, sickle-shaped, with sharp tip; sperm duct S-shaped. Tibia short; VTiA short; DTiA short, 1.5 times as long as tibia. Femur with one short, stout spine dorsally.

Female: Total length 8.04 long. Carapace 3.40 long; 2.36 wide; 0.92 high; cl/cw 1.44; sternum 1.48 long; 1.40 wide; sl/sw 1.06; abdomen 4.64 long; 3.56 wide.



Colour: Carapace blackish, iridescent. Sternum sepia brown; chelicerae sepia brown; endites and labium sepia brown, distally white. Abdomen sepia brown; dorsally with 4 pairs of white patches on top and 2 in front of the spinnerets; laterally with 2–3 elongate and broad white patches; ventrally dark brown; with 1 longitudinal white stripe from epigastric fold to near tracheal spiracle. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal part white, distal part dark brown.

Eyes: PLE largest; eye group width 0.51 of head width; AME 0.12; ALE 0.10; PME 0.2; PLE 0.26; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.12; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.46; AME-AME 0.28; PME-PME 0.52. Clypeus: 0.84 high; chilum: divided.

Abdomen: Tracheal spiracle slit-like, with broad sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Epigyne (Figs. 21, 22): Copulatory opening hidden by long, lanceolate scape, which is far removed from the epigastric fold, with short epigynal ducts and compact sausage-shaped contiguous spermathecae.

Distribution: Tasmania, found in buttongrass moorland (Fig. 35).

Etymology: The specific name honours Dr. Michael Driessen, World Heritage Area Zoologist, from the Department of Primary Industry, Water and Environment, Hobart, Tasmania, the collector of the holotype.

### ***Habronestes epping* sp. nov.** (Figs. 4, 23, 24, 35)

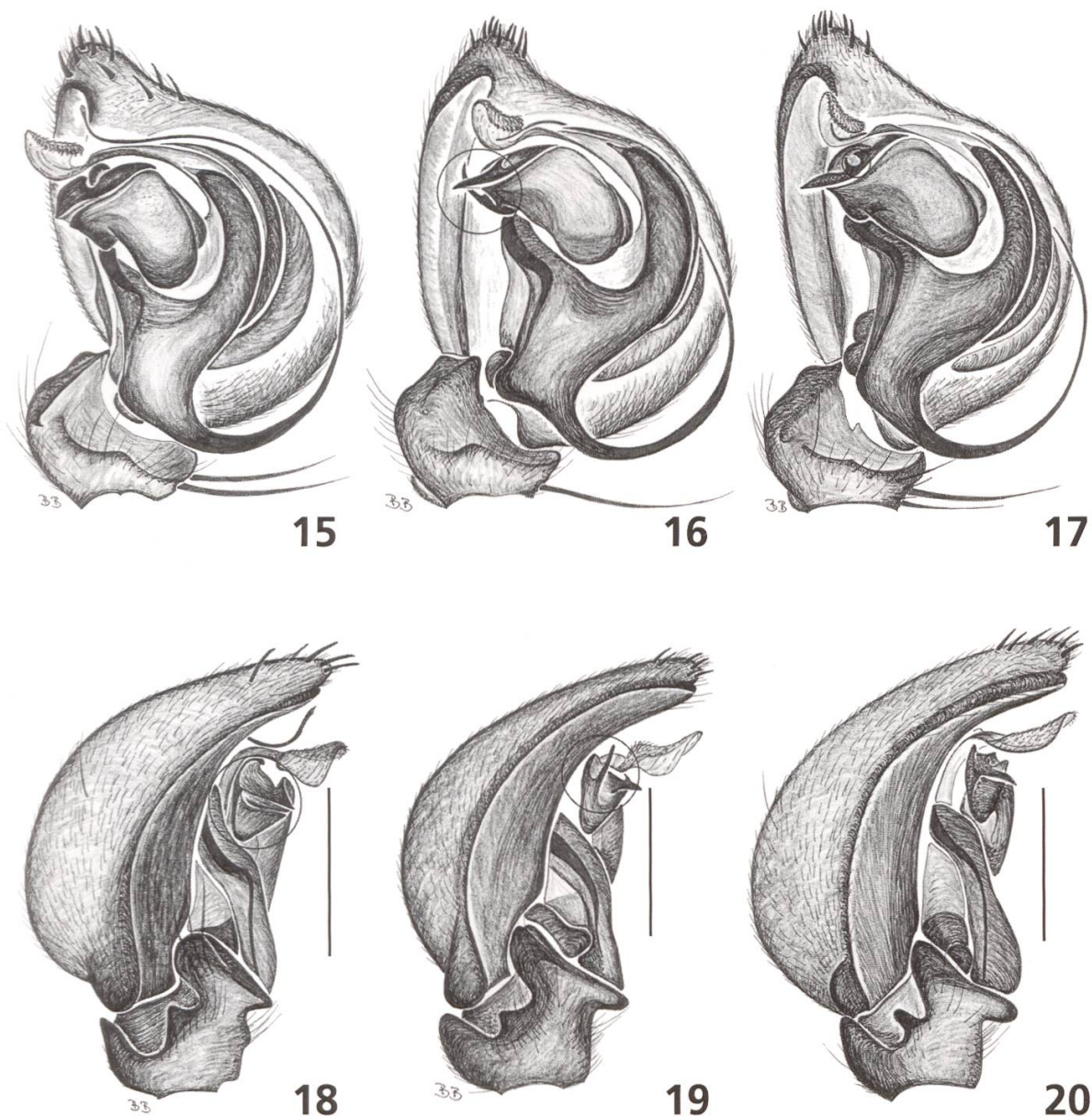
Holotype: Female, Tasmania, Epping Forest, 41° 46' S, 147° 22' E, 20 Mar. 1991, L. Manka, pitfall (QVM13: 42172).

Diagnosis: Females resemble those of *H. driesseni* in having short epigynal ducts and compact sausage-shaped contiguous spermathecae, but can be easily recognized by the inverted drop-shaped copulatory opening without a scape.

#### **Description**

Female (holotype): Total length 7.32 long. Carapace 3.52 long; 2.40 wide; 1.68 high; cl/cw 1.47; sternum 1.44 long; 1.40 wide; sl/sw 1.03; abdomen 3.80 long; 2.68 wide.

Colour: Carapace, sternum and chelicerae sepia brown; endites and labium medium brown, distally white. Abdomen sepia brown, bluish, iridescent; frontally with 1 pair of white dots; dorsally with 3 pairs of white patches on top and 1–2 in front of the spinnerets (Fig. 4); laterally with 2 elongate white



Figs. 15–20. *Habronestes* male palps, ventral view (top), lateral view (bottom). – 15–16: *Habronestes boutinae* sp. nov.; – 17–18: *Habronestes tasmaniensis* sp. nov.; – 19–20: *Habronestes bispinosus* sp. nov.

patches; ventrally dark brown; with 1 longitudinal white stripe from epigastric fold to near tracheal spiracle. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I yellow with prolateral brown patch, II–IV proximal part white, distal part dark brown.

Eyes: PLE largest; eye group width 0.5 of head width; AME 0.12; ALE 0.12; PME 0.20; PLE 0.22; AME-AME 0.06; AME-ALE 0.06; PME-PME 0.16; PME-PLE 0.16; ALE-PLE 0.08; eyes group AME-PME 0.30; AME-AME 0.52; PME-PME 0.56. Clypeus: 0.88 high; chilum: undivided.

Abdomen: Tracheal spiracle slit-like, with broad sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.



Epigyne (Figs. 23, 24): With inverted drop-shaped copulatory opening which is far removed from epigastric fold, short epigynal ducts and compact sausage-shaped contiguous spermathecae.

Male: Unknown.

Distribution: North East Tasmania (Fig. 35).

Etymology: The specific name is a noun in apposition taken from the type locality.

***Habronestes bispinosus* sp. nov.** (Figs. 6, 19, 20, 33, 34, 36)

Holotype: Male, Tasmania, Warra, near Geeveston, 43° 09' S, 146° 55' E, 17 Mar. 1998, D. Bashford, malaise trap (QVM 13:44369). Allotype female, same (QVM 13:44371).

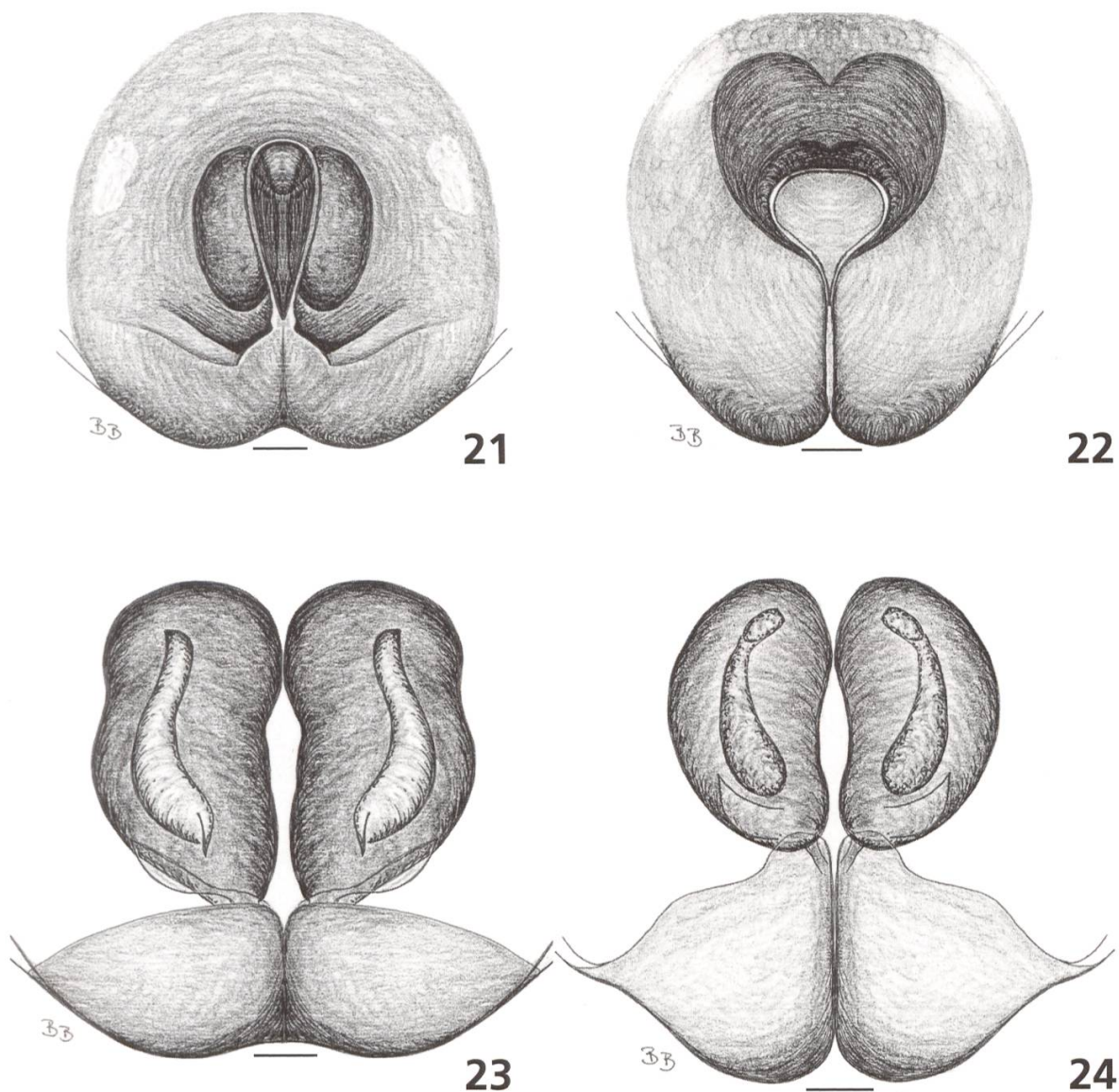
Other material examined. Tasmania: 1 ♀, Launceston, Cataract Gorge, *Migas plumleyi* survey, 41° 25' S, 147° 08' E, 12 Oct. 2001, S. Leighton, pitfall (QVM 13:44382); 1 ♂, Maggs Mtn. 41° 45' S, 146° 09' E, 17 Feb. 1981, R.H. Green, pitfall (QVM 13:42099); 1 ♀, same, 14 Jan. 1991 (QVM 13:23866); 1 ♀, Mathinna Tower, Hill, 41° 29' S, 147° 53' E, Mar. 2001, M. MacDonald, pitfall (QVM ex 13:44417), 1 ♀, NE Tasmania, 41° 17' S, 147° 40' E, among 35 year *Eucalyptus obliqua* wet sclerophyll, 2 Jul. 1974, J. Madden et al. (AM KS25976); 1 ♂, Picton Valley, 43° 13' S, 146° 40' E, 28 Feb. 1994, K. Michaels, pitfall (QVM 13:44403); 1 ♂, 1 ♀, same, 17 Jan. 1995 (QVM 13:44402); 1 ♀, Tarraleah, 42° 18' S, 146° 26' E, 27 Dec. 1956, V. V. Hickman (AM KS30323); 1 ♂, Warra, 43° 05' S, 146° 43' E, 12 Feb. 1998, D. Bashford, pitfall (QVM 13:44367); 1 ♀, Warra Forest, 43° 09' S, 146° 55' E, Dec. 1997, D. Bashford, (QVM 13:44368); 1 ♀, same, 29 Nov. 2001, L. Boutin (QVM 13:44372); 1 ♂, same near Geeveston, 12 Feb. 1998, D. Bashford, malaise trap (QVM 13:44367); 1 ♂, 1 ♀, same, 22 Apr. 1998 (QVM 13:44366); 1 ♀, Willie's Saddle, 9 km W Geeveston, Eucalypt forest, 310 m, 43° 09' S, 146° 55' E, 10 Feb. 1980, A. Newton, M. Thayer (AMNH).

Diagnosis: Males resemble those of *H. tasmaniensis* but lack the additional thin, bent hook on the retrolateral end of LTA (Fig. 19); females also resemble those of *H. tasmaniensis* but have a smaller copulatory opening and the ventrally visible copulatory ducts are transversally directed (Figs. 33, 34).

**Description**

Male (holotype): Total length 5.68 long. Carapace 2.96 long; 2.24 wide; 1.36 high; cl/cw 1.32; sternum 1.24 long; 1.20 wide; sl/sw 1.03; abdomen 2.72 long; 1.84 wide.





Figs. 21–24. *Habronestes* epigynes, ventral view (top), vulvae dorsal view (bottom). – 21–22: *Habronestes driesseni* sp. nov.; – 23–24: *Habronestes epping* sp. nov.

Colour: Carapace sepia brown. Sternum and chelicerae medium brown; endites and labium medium brown, distally white. Abdomen sepia brown; dorsally with 2 pairs of white patches on anterior part and 1 in front of the spinnerets (Fig. 6); laterally with 3 elongate and broad white patches; ventrally dark brown; mottled with white. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal margin brown, medium part white, distal part dark brown.

Eyes: Equal in size; eye group width 0.64 of head width; AME 0.14; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.06; PME-PME 0.08; PME-PL 0.12; ALE-PL 0.06; eyes group AME-PME 0.38; AME-AME 0.30; PME-PME 0.36. Clypeus: 0.64 high; chilum: undivided.

Abdomen: Tracheal spiracle small slit-like, with sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 19, 20): Retrolateral concavity deep, 3/4 of the cymbium long; tegulum (LTA) with a short vertical stalk, and irregular horizontal plate with two retrolateral spines (Fig. 19, circle); VTA long, sickle-shaped, with thin extension on tip; sperm duct weakly S-shaped, not crossing TF. Tibia short; VTiA bipartite, hooked, bird-head shaped; DTiA short, rounded.

Female (allotype): Total length 5.84 long. Carapace 3.00 long; 1.96 wide; 1.16 high; cl/cw 1.53; sternum 1.20 long; 1.16 wide; sl/sw 1.03; abdomen 2.84 long; 2.16 wide.

Colour: Same as in male.

Eyes: Nearly equal sized; eye group width 0.65 of head width; AME 0.13; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.06; PME-PME 0.08; PME-PLA 0.12; ALE-PLA 0.06; eyes group AME-PME 0.38; AME-AME 0.28; PME-PME 0.36. Clypeus: 0.6 high.

Epigyne (Figs. 33, 34): Copulatory opening broadly oval, connected to sinuous epigastric fold; epigynal ducts long, curved with sausage-shaped spermathecae.

Distribution: Over most of Tasmania (Fig. 36).

Etymology: The species name is an adjective (Latin: *bispinosus* = with two spines) taken because of the two spines on the retrolateral part of the LTA of the male palp.

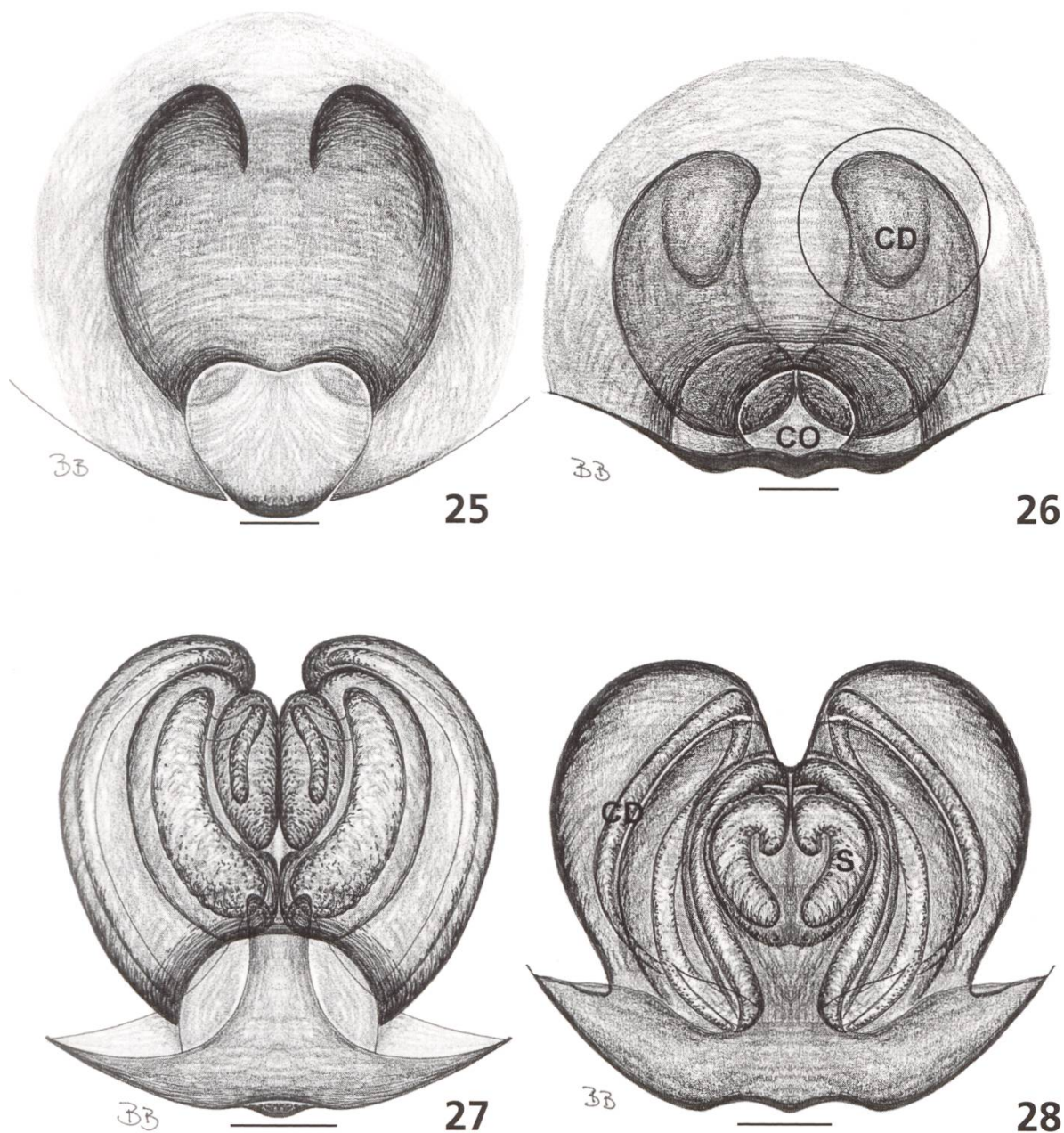
### ***Habronestes boutinae* sp. nov.** (Figs. 5, 15, 16, 29, 30, 36)

Holotype: Male, Tasmania, Old Chum Dam area, Pioneer WHS project, forest, 41° 06' S, 148° 05' E, Feb. 2000, M. McCormack, pitfall (QVM 13: 44471). Allotype: Female, same (QVM 13: 44472).

Other material examined: Tasmania: 1 ♂, Blue Tier, 41° 11' S, 148° 00' E, Mar. 2001, M. MacDonald, pitfall (QVM 13:44377); 1 ♂, same (QVM 13: 44378); 6 ♂, Fingal, 41° 38' S, 147° 58' E, 17 Feb. 1987, R. Bashford (QVM 13: 44389); 1 ♂, Launceston, Cataract Gorge, 41° 25' S, 147° 08' E, 3 Dec. 2001, S. Leighton, pitfall (QVM 13:44381); 2 ♂, same, 12 Oct. 2001 (QVM 13:44444); 3 ♂, 2 ♀, Old Chum Dam, Pioneer WHS project, forest, 41° 06' S, 148° 05' E, Feb. 2000, M. McCormack, pitfall (QMV13:44408); 2 ♂, 6 ♀, same, Dec. 2000 (QVM 13:44413); 12 ♂, same (QVM 13:44410).

Diagnosis: Females and males resemble those of *H. tasmaniensis* and *H. bispinosus* in having a similar shaped retrolateral tegular apophysis and long,





Figs. 25–28. *Habronestes* epigynes, ventral view (top), vulvae dorsal view (bottom). – 25–26: *Habronestes hickmani* sp. nov.; – 27–28: *Habronestes thaleri* sp. nov.

curved epigynal ducts but can easily be recognized by the thick retrolateral tip of the LTA without any spines in males and the widely v-shaped copulatory opening, with broad spatulate scape, close to epigastric fold in females (Fig. 29).

#### Description

Male (holotype): Total length 4.76 long. Carapace 2.56 long; 2.00 wide; 1 high; cl/cw 1.28; sternum 1.12 long; 1.04 wide; sl/sw 1.08; abdomen 2.20 long; 1.60 wide.



Colour: Carapace and sternum sepia brown; chelicerae medium brown; endites and labium medium brown, distally white. Abdomen sepia brown, dorsally with pale chevrons (Fig. 5); laterally with 3 elongate and broad white patches; ventrally dark brown; mottled with white. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal margin brown, medium part white, distal part dark brown.

Eyes: Nearly equal sized, AME smallest; eye group width 0.58 of head width; AME 0.10; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.04; PME-PL 0.08; ALE-PL 0.04; eyes group AME-PME 0.30; AME-AME 0.24; PME-PME 0.32.

Clypeus: 0.56 high; chilum: undivided.

Abdomen: Tracheal spiracle small slit-like, with sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 15, 16): Retrolateral concavity deep, 3/4 of the cymbium long; tegulum (LTA) with a short vertical stalk, and irregular horizontal plate with thick retrolateral tip (Fig. 16, circle); VTA long, sickle-shaped, with thin extension on tip; sperm duct S-shaped. Tibia short; VTiA bipartite, hooked, bird-head shaped; DTiA short.

Female (allotype): Total length 5.52 long. Carapace 2.56 long; 1.72 wide; 0.92 high; cl/cw 1.49; sternum 1.08 long; 1.04 wide; sl/sw 1.04; abdomen 2.96 long; 2.04 wide.

Colour: Same as in male.

Eyes: Eye group width 0.63 of head width; AME 0.10; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.06; AME-ALE 0.04; PME-PME 0.08; PME-PL 0.10; ALE-PL 0.05; eyes group AME-PME 0.36; AME-AME 0.26; PME-PME 0.36. Clypeus: 0.48 high.

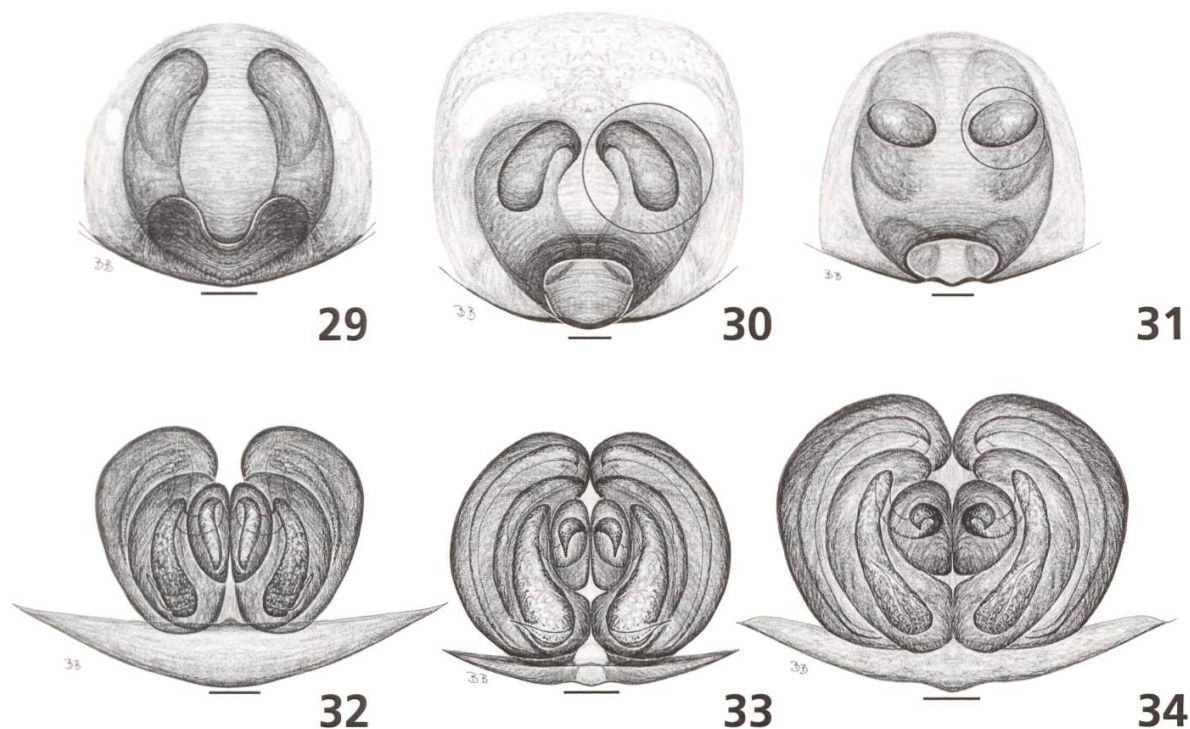
Epigyne (Figs. 29, 30): Copulatory opening widely v-shaped, with broad spatulate scape, close to epigastric fold. Epigynal ducts long, curved, spermathecae sausage-shaped, separated.

Distribution: North-eastern corner of Tasmania (Fig. 36).

Etymology: The specific name is a patronym in honour of Lisa Joy Boutin of the Queen Victoria Museum in Launceston, Tasmania, who discovered the species.

### ***Habronestes hickmani* sp. nov.** (Figs. 7, 11, 12, 25, 26, 35)

Holotype: Male, Tasmania, Waterhouse Point, site 1 NE, 40° 50' S, 147° 40' E, Oct, 1987, T. Churchill, pitfall (QVM 13:1644). Allotype: Female, same, Jan. 1987 (QVM 13:1376).



Figs. 29–34. *Habronestes* epigynes, ventral view (top), vulvae dorsal view (bottom). – 29–30: *Habronestes boutinae* sp. nov.; – 31–32: *Habronestes tasmaniensis* sp. nov.; – 33–34: *Habronestes bispinosus* sp. nov.

Other material examined: Tasmania: 2 ♂ Epping Forest, 41° 46' S, 147° 10' E, 20 Mar. 1991, L. Manka, pitfall (QVM 13:42150); 1 ♂, same, 5 Apr. 1991 (QVM 13:42146); 1 ♂, Hobart, Queens Domain, running on ground, 42° 52' S, 147° 19' E, Feb. 1956, V. V. Hickman (AM KS30354); 1 ♀, Mulgrave Cres., hole in ground, 42° 53' S, 147° 20' E, 19 May 1929, V. V. Hickman (AM KS30340); 1 ♂, Punchbowl, 41° 27' S, 147° 10' E, 15 Feb. 1930, V. V. Hickman (AM KS30350); 1 ♂, Risdon, 42° 59' S, 147° 19' E, V. V. Hickman (AM KS30347); 1 ♂, Waterhouse Point, 40° 50' S, 147° 40' E, Jan. 1987, T. Churchill, pitfall (QVM 13:1459); 1 ♂, same (QVM 13:1730); 1 ♂, same (QVM 13:1632); 1 ♂, same, Mar. 1987 (QVM 13:1642); 1 ♂, same (QVM 13:1699); 1 ♀, same (QVM 13:1447); 1 ♂, same, Jan. 1988 (QVM 13:4845).

Diagnosis: Both sexes can be easily recognized by their specific abdominal colour pattern with pale stripes (Fig. 7). Males resemble those of *H. pictus*-group but have ridges at the retrolateral tip of the retrolateral tegular apophysis (Fig. 11, circle); females resemble those of *H. tasmaniensis* but have the spermathecae far removed from the epigastric fold (Fig. 26).

#### Description

Male (holotype): Total length 4.92 long. Carapace 2.56 long; 2.04 wide;



1.08 high; cl/cw 1.25; sternum 1.28 long; 1.16 wide; sl/sw 1.03; abdomen 2.36 long; 1.92 wide.

Colour: Carapace sepia brown. Sternum and chelicerae medium brown; endites and labium pale brown, distally white. Abdomen sepia brown; dorsally with 5 pairs of white spots on top, in u-shaped position and 3 in front of the spinnerets (Fig. 7); laterally with 2 elongate white patches. Legs pale brown; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal part white, distal part dark brown; tibia I–IV proximally pale, distally brown, with brown lateral stripes.

Eyes: Nearly equal sized, AME smallest; eye group width 0.46 of head width; AME 0.12; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.04; PME-PL 0.12; ALE-PL 0.04; eyes group AME-PME 0.36; AME-AME 0.26; PME-PME 0.32. Clypeus: 0.6 high; chilum: undivided.

Abdomen: Tracheal spiracle small slit-like, with a tiny pit.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 11, 12): Retrolateral concavity deep, 3/4 of the cymbium long; tegulum (LTA) with a short vertical stalk, and irregular horizontal plate with ridges on thick retrolateral tip (Fig. 11, circle); VTA long, sickle-shaped, with thin extension on tip. Tibia short, VTiA hooked, bird-head shaped; DTiA short, excavated.

Female (allotype): Total length 6.60 long. Carapace 3.00 long; 2.04 wide; 1.32 high; cl/cw 1.47; sternum 1.24 long; 1.20 wide; sl/sw 1.03; abdomen 3.60 long; 2.52 wide.

Colour: Same as in male.

Eyes: Eye group width 0.45 of head width; AME 0.12; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.08; PME-PL 0.12; ALE-PL 0.04; eyes group AME-PME 0.46; AME-AME 0.26; PME-PME 0.36. Clypeus: 0.64 high.

Epigyne (Figs. 25, 26): Copulatory opening oval, anterior margin slightly arched, posterior lip extends over epigastric fold, epigynal ducts long and curved, spermathecae sausage-shaped, far removed from epigastric fold (Fig. 26).

Distribution: Eastern part of Tasmania (Fig. 35).

Etymology: The specific name is a patronym in honour of Prof. Dr. V. V. Hickman, Tasmania's foremost arachnologist, who collected this species first. He died in Hobart 1984.

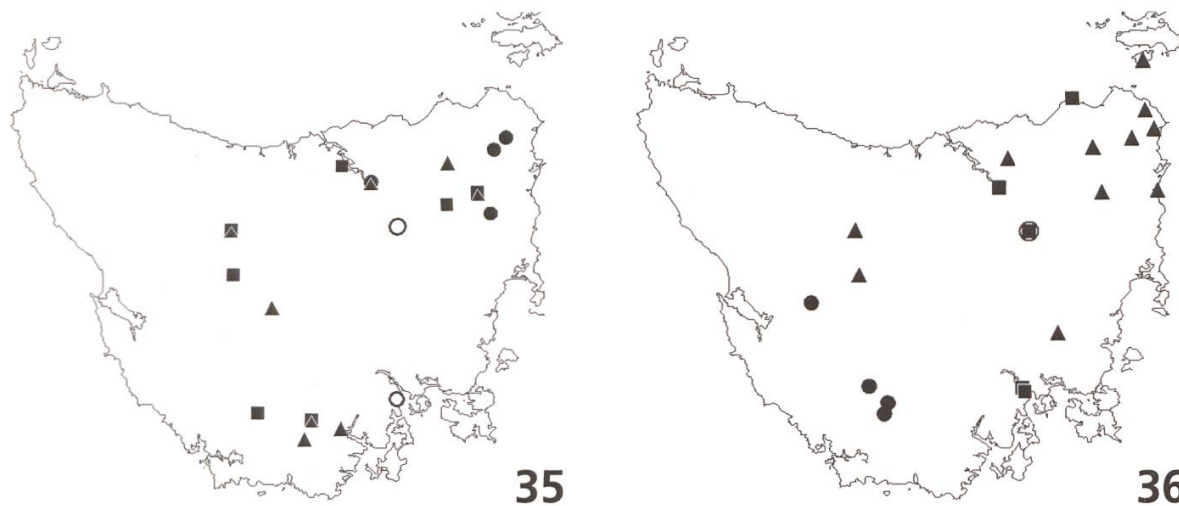


Fig. 35. Map of Tasmania. Circle, *Habronestes driesseni* sp. nov.; square, *Habronestes hickmani* sp. nov.; triangle, *Habronestes thaleri* sp. nov.; ring, *Habronestes epping* sp. nov.

Fig. 36. Map of Tasmania. Circle, *Habronestes boutinae* sp. nov.; square, *Habronestes tasmaniensis* sp. nov.; triangle, *Habronestes bispinosus* sp. nov.; ring, *Habronestes macedonensis* sp. nov.

### *Habronestes tasmaniensis* sp. nov. (Figs. 8, 17, 18, 31, 32, 36)

Holotype: Male, Tasmania, Maggs Mtn., 41° 45' S, 146° 09' E, 17 Apr. 1985, R.H. Green, pitfall (QVM 13:42002). Allotype: Female, same, 22 Feb. 1983 (QVM 13:44360).

Other material examined: Tasmania: 4 ♀, Ben Lomond National Park, Cross Country Ski Circuit, alpine scrub, 41° 34' S, 147° 40' E, 27 Nov. 2002, L. Boutin, B. Evens (QVM 13:44376); 1 ♀, Exeter, 41° 18' S, 146° 56' E, 46, 21 Nov. 1970, R.H. Green (QVM 13:43265); 1 ♂, Lake Pedder, Airstrip Rd site 2B, 200m, 43° 02' S, 146° 20' E, 21 Mar. 2001, M. Driessen, pitfall (QM S70361); 1 ♀, Lake St. Claire, PHP survey, 42° 04' S, 146° 10' E, 10 Dec. 1994, Kingston et al., pitfall (QVM 13:16750); 1 ♀, Maggs Mtn. 41° 45' S, 146° 09' E, 4 Feb. 1980 R.H. Green, pitfall (QVM 13:42624); 4 ♂, 22 Feb. 1983 (QVM 13:44360); 1 ♀, 21 Feb. 1984 (QVM 13:44363); 2 ♂, same, 15 May 1984 (QVM 13:44361); 1 ♂, same, 17 Apr. 1985 (QVM 13:42002); 1 ♀, same, 2 Dec. 1985; (QVM 13:44362); 1 ♂, same, 20 Feb. 1990, (QVM 13:44365); 1 ♀, same, 14 Jan. 1991, (QVM 13:23866); 1 ♂ same, 500 m w of field station, 17 Feb. 1981 (QVM13:44364); 4 ♂, same, 10 Oct. 1983 (QVM13:42604); 1 ♂, same, 28 Feb. 1986 (QVM13:42285); 1 ♂, Mathinna, Tower, Hill, 41° 29' S, 147° 53' E, Mar. 2001, M. MacDonald, pitfall (QVM 13:44417); 1 ♂, Mount Barrow Rd., 570 m, 41° 23' S, 147° 25' E, 17 Feb. 1980, A. Newton, M. Thayer, pitfall, (AMNH traps 583); 1 ♀, Warra, 43° 05' S, 146° 43' E, Dec. 1997, D. Bashford, pitfall (QVM 13:44368); 1 ♂, same, 17 Mar. 1998 (QVM 13:44370).



Diagnosis: Males resemble those of *H. bispinosus* but have an additional retrolateral long, thin, bent hook on the retrolateral tegular apophysis (Fig. 17, circle); females also resemble those of *H. bispinosus* but have a larger copulatory opening (Fig. 31).

#### Description

Male (holotype): Total length 5.80 long. Carapace 2.88 long; 2.28 wide; 1.12 high; cl/cw 1.26; sternum 1.28 long; 1.20 wide; sl/sw 1.07; abdomen 2.92 long; 1.96 wide.

Colour: Carapace sepia brown. Sternum and chelicerae medium brown; endites and labium pale brown, distally white. Abdomen sepia brown, dorsally with 2–3 pairs of white patches on top and 2 in front of the spinnerets (Fig. 8); laterally with 3 elongate and broad white patches; ventrally dark brown, mottled with white. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal margin brown, medium part white, distal part dark brown.

Eyes: Nearly equal sized, AME smallest; eye group width 0.50 of head width; AME 0.13; ALE 0.16; PME 0.16; PLE 0.16; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.04; PME-PL 0.08; ALE-PL 0.04; eyes group AME-PME 0.42; AME-AME 0.3; PME-PME 0.36. Clypeus: 0.6 high; chilum: undivided.

Abdomen: Tracheal spiracle small slit-like, with sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 17, 18): Retrolateral concavity deep, 3/4 of the cymbium long; tegulum (LTA) with a short vertical stalk, and irregular horizontal plate, with retrolateral long, thin, bent hook (Fig. 17, circle), and acute retrolateral tip; VTA long, sickle-shaped, with thin extension on tip. Tibia short; VTiA bipartite, hooked, bird-head shaped; DTiA short rounded.

Female (allotype): Total length 5.40 long. Carapace 2.60 long; 1.80 wide; 1.20 high; cl/cw 1.44; sternum 1.08 long; 1.04 wide; sl/sw 1.04; abdomen 2.80 long; 2.12 wide.

Colour: Same as male.

Eyes: Eye group width 0.55 of head width; AME 0.12; ALE 0.15; PME 0.16; PLE 0.16; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.04; PME-PL 0.10; ALE-PL 0.04; eyes group AME-PME 0.38; AME-AME 0.28; PME-PME 0.36. Clypeus: 0.56 high.

Epigyne (Figs. 31, 32): Copulatory opening broadly oval, connected to epigastric fold, with long, curved epigynal ducts and sausage-shaped separated spermathecae.

Distribution: Most parts of Tasmania (Fig. 36), in open eucalyptus forest.

Etymology: The specific name refers to the distribution of the species.



***Habronestes thaleri* sp. nov.** (Figs. 1, 13, 14, 27, 28, 35)

Holotype. Male, Tasmania, Lilydale, Merthyr Park, 41° 15' S, 147° 13' E, 24 Nov. 1998, T.J. Kingston et al., pitfall (QVM 13:44397). Allotype: Female, same (QVM 13:44397).

Other material examined: Tasmania: 1 ♂, 1 ♀, Ansons Bay, 41° 02' S, 148° 15' E, 12 Nov. 1990, R. Bashford, pitfall (QVM 13:44373); 1 ♂, Cascades, 41° 10' S, 147° 49' E, 9 Nov. 1949, V. V. Hickman, (AM KS30351); 1 ♂, Clarke Island, 40° 33' S, 148° 10' E, 11 Nov. 1998, T.J. Kingston, J. Meggs, (QVM 13:25943); 1 ♂, same, Woodland (QVM 13:25941); 5 ♂, same, Wooded Farmland (QVM 13:44384); 26 ♂, Clarke Island, 40° 33' S, 148° 10' E, 12 Nov. 1998, T.J. Kingston, J. Meggs, pitfall (QVM 13:25944); 1 ♀, Lake Saint Claire, Pump House Point, 740 m, PHP survey, 42° 04' S, 146° 10' E, 10 Dec. 1994, Kingston et al., pitfall (QVM 13:16750); 1 ♂, Lilydale, Merthyr Park, 41° 15' S, 147° 13' E, 24 Nov. 1998, T.J. Kingston et al., pitfall (QVM 13:44397); 1 ♂, same (QVM 13:44401); 3 ♂, same (QVM 13:44390); 2 ♂, same (QVM 13:44396); 9 ♂, Maggs Mtn. 500 m w of field station, 41° 45' S, 146° 09' E, 3 Mar. 1979, R.H. Green (QVM13:42623); 1 ♂, Mathinna, Tower Hill, 41° 29' S, 147° 53' E, Jan. 2001, M. MacDonald, pitfall (QVM 13:44425); 1 ♂, same (QVM 13:44427); 1 ♂, same (QVM 13:44429); 1 ♀, same, Mar. 2001, (QVM 13:44414); 2 ♀, same, Mar. 2001 (QVM 13:44422); 1 ♀, Mount William near summit, 40° 54' S, 148° 11' E, 16 Dec. 1999, L. Boutin (QVM 13:44405); 15 ♂, Old Chum Dam, Pioneer, WHS project, 41° 06' S, 148° 05' E, Dec. 2000, M. McCormack, pitfall (QVM 13:44410); 1 ♀, same (QVM 13:44413); 2 ♂, Scamander, dry sclerophyll, 41° 28' S, 148° 16' E, 26 Nov. 1986, R. Bashford, pitfall (QVM 13:44407); 4 ♂, Woodsdale, Joes Hill, dry sclerophyll, 42° 28' S, 147° 34' E, 13 Nov. 1985, R. Bashford, pitfall (QVM 13:44437); 4 ♂, same, 21 Nov. 1985 (QVM 13:44432); 2 ♂, same, 28 Nov. 1985, (QVM 13:44439); 3 ♂, same, 6 Dec. 1985 (QVM 13:44431); 1 ♂, same, 18 Dec. 1985 (QVM 13:44436); 2 ♀, same, 30 Jan. 1986 (QVM 13:44435); 4 ♂, 1 ♀, same, 2 Nov, 1986 (QVM 13:44430); 2 ♂, 1 ♀, 20 Nov. 1986 (QVM 13:44434), 5 ♂, same, 3 Dec. 1986 (QVM 13:44441); 1 ♂, same, Jan. 1992 (QVM 13:44443).

Diagnosis: Females and males resemble those of *H. bispinosus* and *H. tasmaniensis* in having a similar shaped retrolateral tegular apophysis and long, curved epigynal ducts. Males can easily be recognized by the thick retrolateral tip of the LTA without any spines and the absence of the thin extension on the tip, females by the small copulatory opening.



## Description

Male (holotype): Total length 5.44 long. Carapace 2.88 long; 2.24 wide; 1.28 high; cl/cw 1.29; sternum 1.32 long; 1.28 wide; sl/sw 1.03; abdomen 2.56 long; 1.76 wide.

Colour: Carapace sepia brown, iridescent. Sternum and chelicerae sepia brown; endites and labium medium brown, distally white. Abdomen sepia brown; dorsally with 2 pairs of white patches on anterior part and 1 in front of the spinnerets, with 2 pairs of white patches on top and 1 in front of the spinnerets (Fig. 1); laterally with 2 elongate white patches; ventrally dark brown with 1 longitudinal white stripe from epigastric fold to near tracheal spiracle. Legs yellow; coxae I–IV pale; trochanter I–IV brown; femur I–IV proximal margin brown, medium part white, distal part dark brown.

Eyes: Equal sized; eye group width 0.52 of head width; AME 0.13; ALE 0.13; PME 0.13; PLE 0.13; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.10; PME-PLP 0.10; ALE-PLP 0.04; eyes group AME-PME 0.40; AME-AME 0.30; PME-PME 0.36. Clypeus: 0.68 high; chilum: undivided. Carapace side and palpal femur with stridulating organ as file.

Abdomen: Tracheal spiracle small slit-like, with sclerotised cover.

Legs: Tibia I, II with one extremely long dorsal setum at proximal half.

Male palp (Figs. 13, 14): Retrolateral concavity deep, 3/4 of the cymbium long; tegulum (LTA) with a short vertical stalk, and irregular horizontal plate with acute retrolateral tip (Fig. 13, circle); VTA long, sickle-shaped, without thin extension on the tip. Tibia short; VTiA hooked, bird-head shaped; DTiA excavated, short, rounded and slightly divided.

Female (allotype): Total length 6.00 long. Carapace 2.60 long; 1.80 wide; 1.08 high; cl/cw 1.44; sternum 1.20 long; 1.16 wide; sl/sw 1.03; abdomen 3.40 long; 2.48 wide.

Colour: Same as in male.

Eyes: Nearly equal sized; eye group width 0.52 of head width; AME 0.12; ALE 0.12; PME 0.14; PLE 0.14; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.06; PME-PLP 0.10; ALE-PLP 0.04; eyes group AME-PME 0.42; AME-AME 0.28; PME-PME 0.32. Clypeus: 0.64 high.

Epigyne (Figs. 27, 28): Copulatory opening relatively small, oval, connected to sinuous epigastric fold. Epigynal ducts long, curved with sausage-shaped spermathecae.

Distribution: East and central Tasmania (Fig. 35).

Etymology: The specific name is a patronym in honour of Prof. Dr. Konrad Thaler and his enormously precise spider work, whose recent death was a great loss to European arachnology. Konrad Thaler was Austria's leading arachnologist for decades.

## Discussion

Zodariids have their main distribution and diversity in tropical and subtropical parts of Australia and reach their southern distribution in Tasmania with only few genera.

Zodariids are ground dwelling spiders not known to disperse aerially. They are endemic to small areas, sometimes only to small patches of rainforest (e.g., *Tropasteron*, Baehr, 2003b). Their low vagility makes zodariids useful subjects for biogeographic studies.

The yellow spotted Ground Spiders – *Habronestes* – belong to one of the most diverse Ant Spider genera in Australia. 35 species, including those in this paper are described to date, but about 80 species are still without names. Although the genus *Habronestes* is not fully revised yet, there are already some biogeographical patterns evident.

Just eight *Habronestes* species are recorded from Tasmania, but all three known species groups (*H. australiensis*-group, *H. macedonensis*-group and *H. pictus*-group) are represented on the island.

The *H. australiensis*-group: To date, two species *H. driesseni* and *H. epping*, are found in Tasmania. Their closest relative *H. hamatus* occurs in western New South Wales.

The *H. macedonensis*-group: *H. macedonensis* is the only species which was found in Tasmania and in the mainland of Australia in Victoria and north eastern New South Wales.

In the *H. pictus*-group, five species developed in Tasmania. According to their palp and epigyne structure all five species are closely related to *H. grahami*, a widespread species along the east coast of Australia.

This biogeographical distribution pattern indicates that the species-groups must have been developed before Tasmania split from the mainland.

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