

## Halidae, a new spider family from Madagascar (Araneae)

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### Summary

This paper reports on a new family of spiders from a forest area in central Madagascar. Halidae, new family, are characterised by the eye position (4 2/2) and a peculiar carapace shape, higher at the back than in front. The male palp has a central concavity, formed by three, rigidly connected apophyses of the tegulum from where the embolus, also inflexibly attached, originates. The type genus of the family is *Hala*, new genus, represented by the type species *Hala impigra*, new species and *Hala paulyi*, new species. The type species of *Tolma*, the second new genus in this family, is *T. toreuta*, new species. The spiders, all from the same locality, are believed to be web-spiders.

### Introduction

Although new family names appear with a certain regularity in the taxonomy of spiders (e.g. Synotaxidae Forster *et al.*, 1990; Malkaridae Wunderlich, 1986), the description of new taxa at that level based on new species has become a very rare event. Even the families erected by Forster & Wilton (1973) for the remote — from a northern hemisphere standpoint — spiders of New Zealand, were all based at least in part on known species. The last find of new spider taxa representing an unknown family was that of Gradungulidae by Forster (1955) who described two new species, one from New Zealand and one from Australia, which could not be placed in any of the families known at that time.

In these circumstances it is surprising to find an unknown type of spider of which even the habitus only vaguely reminds one of the patterns of spider morphology known to date. It is all the more amazing to find three species, clearly all representing the same unknown family, in a few samples from the same locality. Moreover, considering the differences in somatic characters and in features of the genitalia, the species have to be placed in two genera.

That Madagascar is one of the few places in the world where such surprises may still be expected was illustrated by the discovery of *Gallieniella mygaloides* by Millot (1947), which, with its very unusual combination of characters, also warranted the erection of the family Gallieniellidae (Legendre, 1967).

The present paper reports on three new species collected by Dr A. Pauly in a forest area in central Madagascar. All specimens are from the same locality and they were all collected by the “yellow plate” method. This method is mainly intended to catch flying insects, and consists of a yellow plate filled with water and placed at ground level.

As it is impossible to place the three species in one of the spider families known to date a new family is erected here to accommodate them.

The format follows that of Jocqué (1991). Abbreviations used are as follows: *size and position of eyes*: a=diameter of AME, b=diameter of ALE, c=diameter of PME, d=diameter of PLE, e=distance AME-AME, f=distance AME-ALE, g=distance PME-PME, h=distance PME-PLE; *other abbreviations*: \*(after a number) spines in a row, ALS=anterior lateral spinnerets, AMS=anterior median spinnerets, d=dorsal, F=femur, Ht=holotype, Mt=metatarsus, P=patella, PMS=posterior median spinnerets, pl=prolateral, PLS=posterior lateral spinnerets, rl=retrolateral, t=tarsus, T=Tibia, v=ventral.

For the study of the tracheal system abdomina were treated in cold KOH and stained with chlorazol black. All measurements are in mm. The material was deposited in the Koninklijk Museum voor Midden-Afrika (MRAC).

### Halidae, new family

*Diagnosis*: Halidae are recognised by the peculiar eye position (4 2+2) and the shape of the carapace which is higher at the back than in front (Figs. 1, 12–14, 24–26). The tarsi are provided with a pseudo-annulation (Fig. 4). The male palp is characterised by the absence of a paracymbium and by the central excavation formed by different parts of the tegulum, from where the embolus originates (Figs. 17–19, 20–21, 28–29). The epigynal structures are simple with thick-walled spermathecae (Figs. 16, 22–23, 30–31).

*Type genus*: *Hala*, new genus.

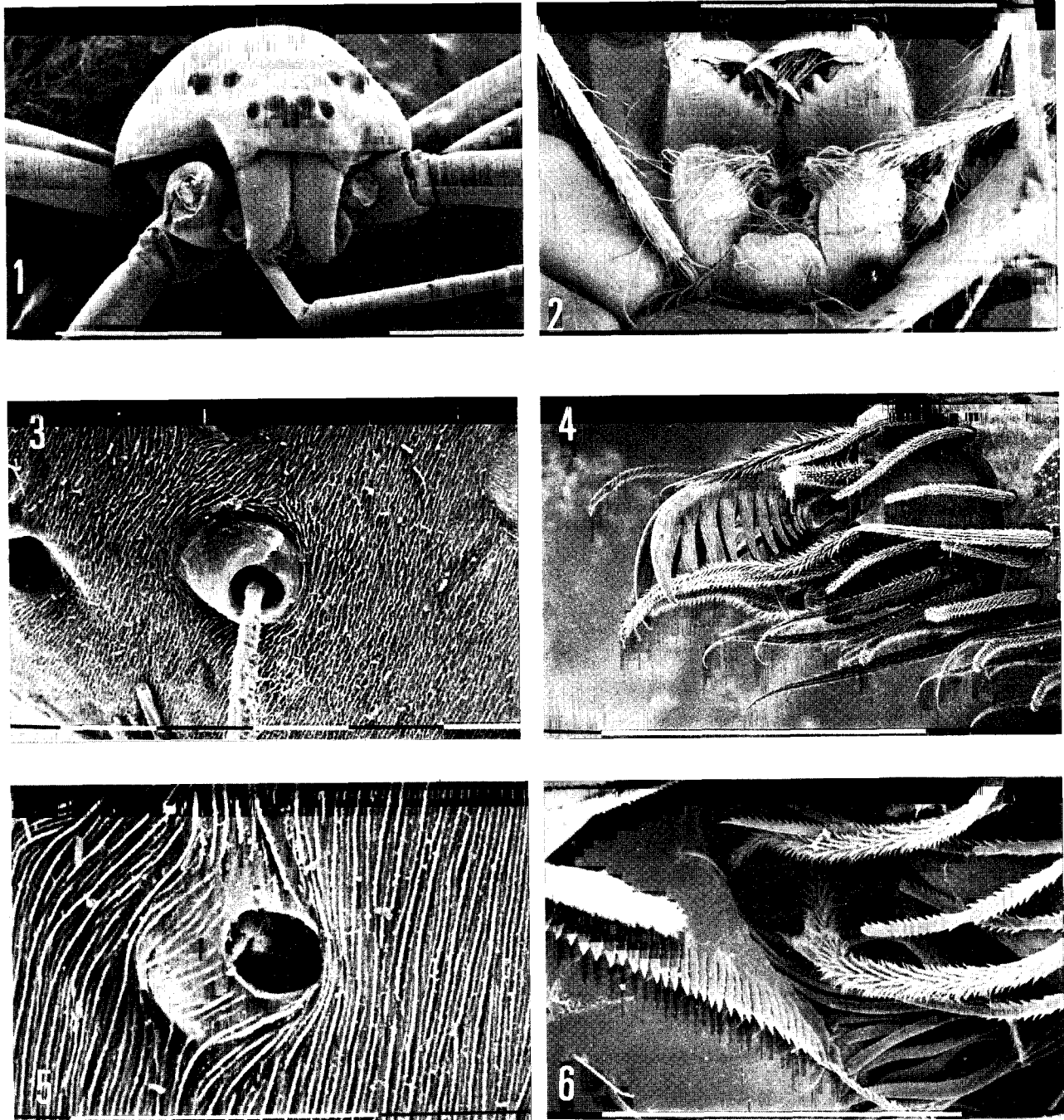
*Natural History*: No report on a living specimen of this family is available. According to the morphology, the data on sex-ratio in the samples (many more males than females), locality and circumstances in which the specimens were collected, possibly the Halidae are web-spiders living in the herb and shrub layer of forests, occupying a niche comparable to that of *Linyphia* species in temperate and some tropical forests.

*Description*: Carapace broad, higher at back than in front (Figs. 12–14, 24–26). Eight eyes, anterior straight row of four, followed by two groups of two; orientation of eyes unusual (Figs. 12–14, 24–26). ALE smallest, remainder subequal. Chelicerae with lateral condyle and teeth on both margins. Labium free, wider than long or as wide as long (Figs. 15, 27). Maxillae slightly converging and provided with serrula and anteromesal scopula (Figs. 2, 6, 15, 27). Legs long and slender with numerous long spines. Trochanters unnotched. Tarsi with pseudo-annulation (Fig. 4). Three tarsal claws: upper claws with teeth in single row. Trichobothria in three rows on T, one on Mt, and two on t; bothria simple, with transverse ridge on each side of central depression (Fig. 3). Tarsal organ a simple pit (Fig. 5). Abdomen with four muscle points. Cribellum and calamistrum lacking. Colulus present (Fig. 11). Six spinnerets, ALS largest. Tracheal system absent or if present very poorly developed. Male palp with retrolateral tibial apophysis (Figs. 17, 20, 28); without paracymbium. Bulbus composed of large basal haematodocha, small proximal subtegulum connected to tegulum by a membrane. Tegulum with three apophyses

(proximal, distal and lateral), sperm duct passing through base of distal one; tegulum with apophyses and embolus forming rigid complex with central concavity from where embolus arises (Figs. 18, 21, 29). Epigyne simple, with short, lateral entrance ducts and thick-walled spermathecae; fertilisation ducts anterior to latter (Fig. 22).

*Affinities:* Halidae show superficial resemblance to some of the haplogyne spiders (Scytodoidea, Pholcidae) in the shape of the carapace and the leg modification with pseudo-annulation, but the structure of their genitalia excludes this possibility. According to the structure of the spinnerets, Halidae are non-cribellate araneomorph entelegyne web-spiders but apparently do not belong in the Araneoidea (Coddington, 1990) because of

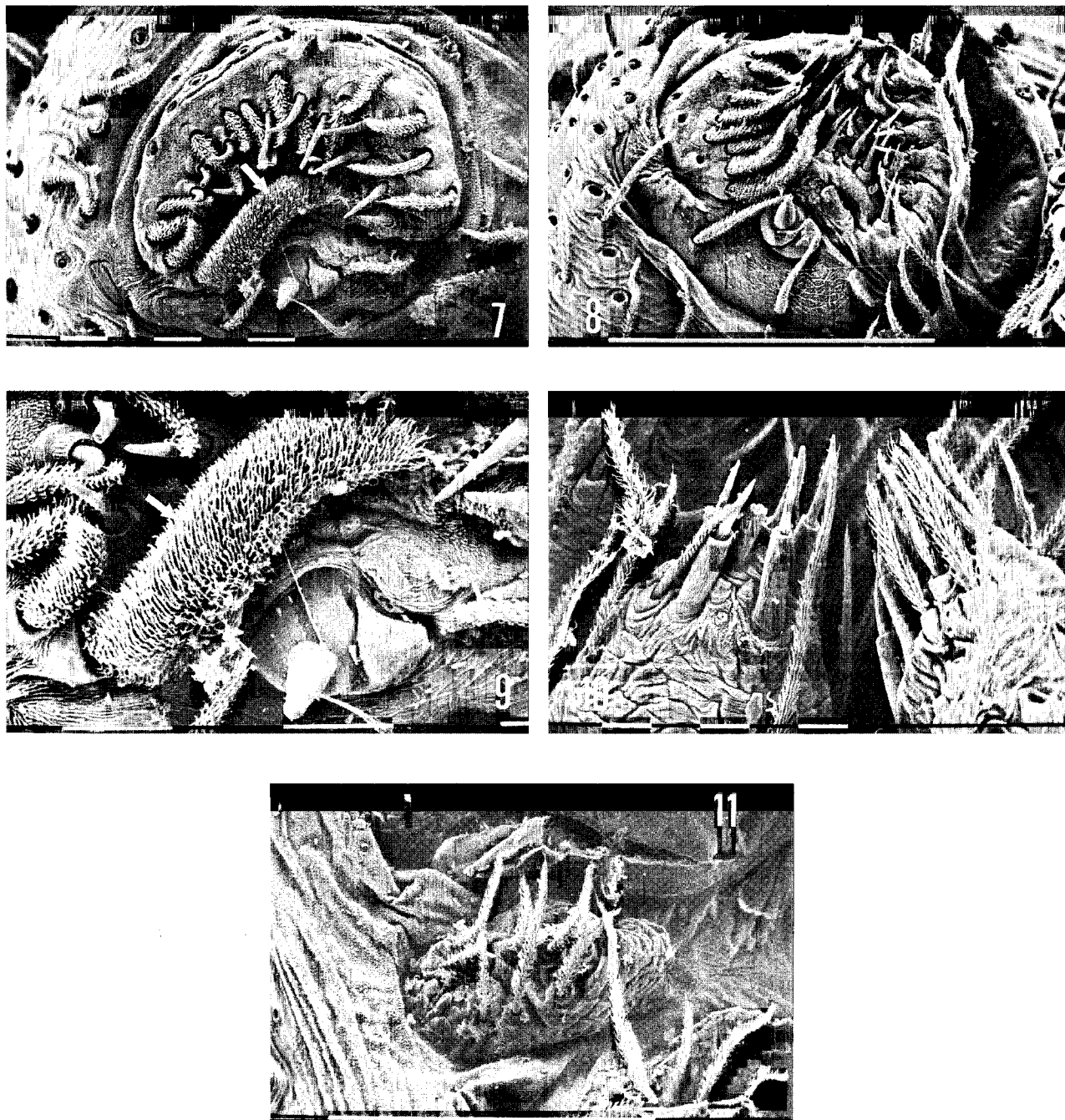
the absence of a paracymbium, the largely separate lateral eyes and the presence of only aciniform spigots on PMS and PLS. There is little doubt that Halidae belong in the RTA-clade as defined by Coddington & Levi (1991). Placement in the Amaurobioidea is difficult because the labium may be wider than long (*Hala*) or as long as wide (*Tolma*) and the trichobothriotaxy does not completely match: there are two rows of tarsal trichobothria and they do not increase in length distally. Moreover they lack the typical distal metatarsal trichobothrium with a sharp backward bend that may be a synapomorphy of the Amaurobioidea. Here this trichobothrium is recurved but lacks the characteristic bend. Therefore the Halidae may belong in the poorly-defined group Dictynoidea. Some of the taxa in that



Figs. 1-6: *Tolma toreuta*, male. **1** Frontal view of prosoma, palps and right first leg removed; **2** Mouthparts; **3** Bothrium Mt III; **4** Tip of t IV showing pseudo-annulation; **5** Tarsal organ t IV; **6** Serrula. Scale lines=1 mm (Fig. 1), 0.1 mm (Figs. 2, 4, 6), 0.01 mm (Figs. 3, 5).

group also have only one major ampullate gland spigot. The presence of a praetarsus (called onychium by Forster, 1970), which is here referred to as a pseudo-annulation, is another character that resembles at least some Dictynoidea (e.g. *Viridictyna*, *Toxops*) (see Forster, 1970: 18). There is a further resemblance with the Toxopidae (currently placed as a subfamily in the Desidae, although it is very unlikely that they are confamilial with *Desis*, like a number of other taxa placed there) in which several genera have an equally unusual, though different eye position (Forster, 1970). In the Toxopidae, which I consider a separate family, at present four genera are included: *Toxops* Hickman from Tasmania, *Hapona* Forster, *Laestrygones* Urquhart and *Toxopsoides* Forster from New Zealand. Its composition

has thus dramatically changed since the revision of the family by Forster (1964). They all have a strongly developed tracheal system running into the cephalothorax, and small eyes in the anterior row, which is strongly recurved. In Halidae the tracheal system is apparently poorly developed, the anterior eyes are in a procurved row and the AME are subequal to the PE. The structure of the male palp is also basically different in Toxopidae and lacks the central tegular concavity and the central placement of the embolus but has a well defined median apophysis, absent in Halidae. The Australian fauna contains undescribed taxa (in Australian Museum, examined) that, considering the palpal conformation and the shape of the cephalothorax with higher posterior part, would come nearer to the definition of the Halidae



Figs. 7-11: **7, 9** *Hala impigra*, male; **8, 10, 11** *Tolma toreuta*, male. **7-9** ALS, showing huge seta (arrowed in 7, 9, absent in *Tolma*) near ampullate gland spigot, and field with piriform gland spigots in *H. impigra*; **10** PMS and PLS; **11** Colulus. Scale lines=0.01 mm.

but so far their position is not entirely clear. The precise position of Halidae will only become apparent when data on the web (if web-building) are available as well as more details on the structure of the tapetum and the tracheal system which could not be found so far. Many specimens lack the abdomen and only a few could be cleared for study of the tracheal apparatus.

### *Hala*, new genus

**Diagnosis:** Representatives of this genus have the ALS with a huge seta next to the major ampullate gland spigot; the male palp has a simple cymbium and no patellar apophysis; the lateral tegular apophysis is split; the epigyne is provided with two large depressions at the base of which are the entrance openings.

**Etymology:** *Hala* is the name for spider in Merina, the language of central Madagascar. The gender is feminine.

**Description:** Small to medium sized (3–5) with smooth tegument. Carapace very broad; widest at level of coxae II, narrowed at level of clypeus to half maximum width in females, to about 0.45 maximum width in males. Profile domed with highest point behind fovea, then falling sharply towards posterior margin. Colour: carapace, chelicerae, legs and sternum yellowish brown, sometimes with faint darker network pattern; abdomen variable; dorsal pattern faint, usually consisting of few chevrons behind pale median stripe.

Eyes in three groups; anterior one almost straight or slightly procurved as seen from in front, second row in two well-separated groups far apart. Posterior eyes larger than anterior, or AME, PLE and PME subequal, ALE smaller. Direction of eyes strongly pronounced: AME upwards, ALE forwards; PME upwards, PLE sideways. All eyes circular and pale except ALE dark. Chilum well developed, convex upper margin much wider than inferior margin; with some tiny bristles. Chelicerae slender with long hairs along margin; 2 teeth on anterior margin, 3 on posterior margin. Labium wider than long (1.4 times). Endites roughly rectangular, slightly constricted in middle; with well-developed serula and anteromesal scopula. Sternum triangular with sinuous sides, and long posterior tip extending between posterior coxae. No inter- or precoxal sclerites.

Legs: formula 4123 or 1423; long and slender, T and Mt up to 20 times as long as their diameter in middle. Spination: spines numerous and long, longer on anterior legs. Tarsal claws with 5–8 teeth. Single claw on well-developed onychium. Trichobothria in three rows on tibiae, forming proximal group on T III and IV, in one row on Mt, in two rows on t. No claw tufts or scopulae.

Abdomen oval; muscle points faint. Tracheal system absent or poorly developed; spiracle small, not sclerotised, just in front of spinnerets. Spinnerets six, all two-segmented: ALS strongest, PMS smallest; ALS with huge seta near major ampullate gland spigot (Figs. 7, 9); PMS and PLS apparently with aciniform gland spigots only. Colulus present; with about 6 setae.

Male palp: patella without apophysis but with one strong spine. Tibia with retrolateral apophysis and two strong setae. Cymbium not modified; no paracymbium;

subtegulum well developed, occupying basal part of bulbus. Tegulum with strongly sclerotised mesal part and membranous lateral part; proximal apophysis large, flat and rounded; lateral apophysis split, accommodating distal part of embolus which arises from central concavity delimited by tegular apophyses; embolus slender and short.

Female palp with tarsal claw; several long spines. Epigyne: simple; with large depressions containing entrance holes, separated by central protrusion or lip. Vulva rather simple; fertilisation ducts situated in anterior half and thick-walled spermathecae in posterior half.

**Type species:** *Hala impigra*, new species.

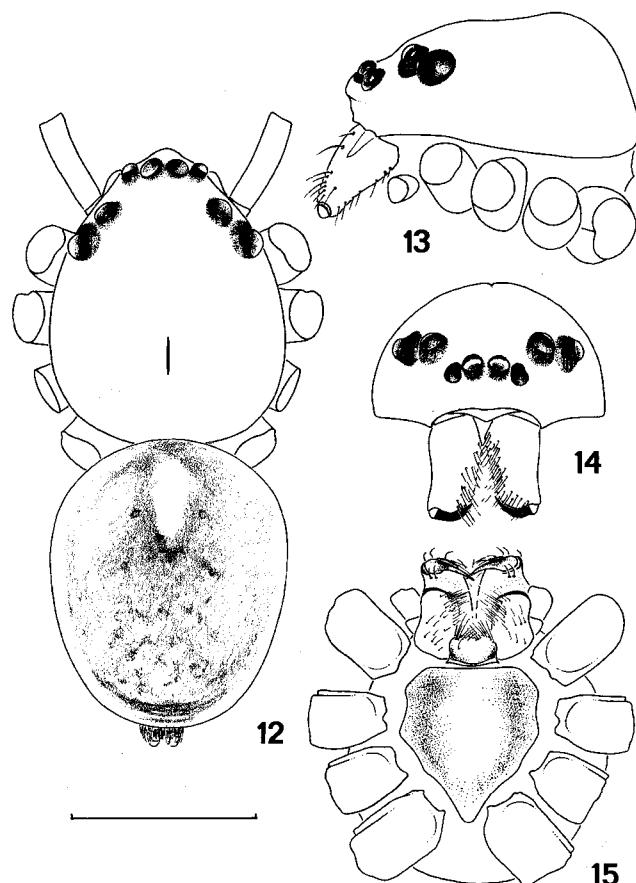
**Other species included:** *Hala paulyi*, new species.

**Distribution:** Central Madagascar.

### *Hala impigra*, new species (Figs. 7, 9, 12–19)

**Type material:** Male holotype: Madagascar, Tamatavé, Manakambahiny Est, 17°45'S, 48°43'E, forest, 1–15 April 1991, yellow plate, A. Pauly (MRAC 174.639). Paratypes: 8 ♂ 1 ♀, together with Ht (MRAC 174.391); 2 ♂, 1–17 January 1991, other data as Ht (MRAC 174.499).

**Diagnosis:** The male is recognised by the shape of the tibial apophysis which is twisted and bifid at its extremity; the female epigyne has a long narrow lip extending backwards from the anterior margin.



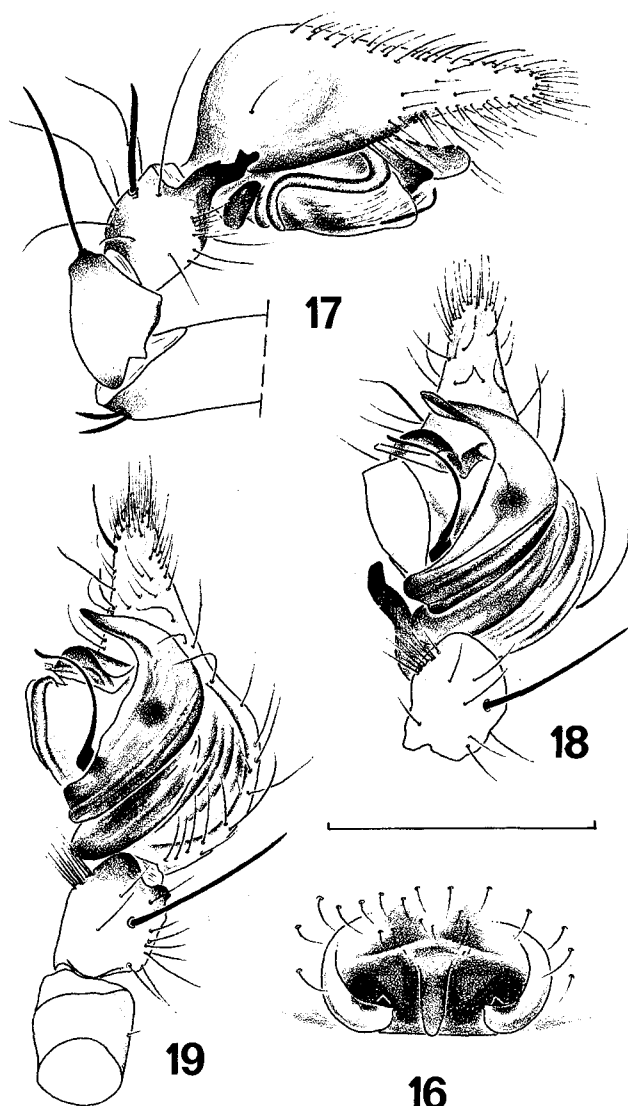
Figs. 12–15: *Hala impigra*. 12 Male habitus; 13 Male carapace, lateral view; 14 Male carapace, frontal view; 15 Mouthparts and sternum. Scale line = 1 mm.

*Etymology:* *impiger* (Latin: zealous) refers to the fact that this species is an excellent example of the Halidae.

*Description:* Note: most specimens have lost the hair cover and many spines and setae.

*Male* (range of paratypes in brackets): Total length 3.01 (3.01–3.40); carapace 1.54 (1.48–1.75) long, 1.26 (1.23–1.46) wide. Colour: carapace pale yellowish brown, with darker central area separated from margin by large paler band, darkened by dark network pattern. Eyes on small dark spots. Chelicerae uniform pale yellowish brown. Sternum brownish yellow suffused with dark on sides. Legs pale brownish yellow; femora with dark pro- and retrolateral stripes; metatarsi suffused with grey, contrasting with pale yellow tarsi. Abdomen pale with faint darker pattern of few chevrons behind paler longitudinal central stripe in front; sides dark, venter paler in middle.

Carapace (Figs. 12–14) much higher at back than in front, falling sharply behind fovea. With sparse cover of short dark hairs and flattened pale hairs in eye region. With boss in front of AME. Eyes:  $a=0.11$ ,  $b=0.07$ ,  $c=0.11$ ,  $d=0.12$ ;  $e=0.03$ ,  $f=0.03$ ,  $g=0.48$ ,  $h=0.12$ .



Figs. 16–19: *Hala impigra*. 16 Epigyne, ventral view; 17 Male palp, lateral view; 18 Male palp, ventral view; 19 Male palp, ventromesal view. Scale line=0.5 mm.

Clypeus 0.14 high or 2.0 times diameter of ALE. Labium (Fig. 15) 0.26 wide, 0.19 long. Sternum (Fig. 15) 0.84 long, 0.78 wide; with sinuous sides, protruding between posterior coxae.

Legs: Spination:

	F	P	T	Mt
I	pl2*d3*r1l	d1	pl2*d1rl1v2-2-2-2	pl2*r13*v2
II	pl2*d3*r14*	d1	pl2*d1rl1v2-2-2	pl2*r13*v2
III	pl2*d3*r12*	d1	pl1d2*r1l1v2-2	pl3*d1rl3*v2-1-1
IV	d3*r1l	d1	pl1d2*r1l1v1-1	pl2*r12*v2*

Spines long, lateral spines of Mt I 4.4 and ventral spines of T I 5.0 times diameter of segment; less long on posterior legs. Femora sparsely covered with small dark hairs as on carapace. Trichobothria long and numerous; in three rows on T III and IV, forming proximal group on T III; in one row on Mt, in two rows on tarsi. Measurements:

	F	P	T	Mt	t	Total
I	1.99	0.47	2.04	2.12	0.86	7.48
II	1.65	0.37	1.61	1.61	0.68	5.92
III	1.34	0.41	1.17	1.23	0.56	4.71
IV	2.14	0.45	1.83	2.02	0.78	7.22

Abdomen oval; AS with large seta inserted near major ampullate gland spigot (Figs. 7, 9).

Palp (Figs. 17–19): patella with long dorsal seta, tibia with one dorsal and two mesal setae; lateral tibial apophysis twisted, slightly curved down and with tiny tooth along dorsal margin; extremity turned up, bifid, dorsal tip sharp, ventral one rounded. Tegulum with membranous lateral part and large sickle-shaped distal apophysis forming central hole from where strongly curved embolus originates. Tip of embolus resting against sclerotised extremity of tegulum.

*Female:* Total length 3.44; carapace 1.75 long, 1.48 wide. Colour: carapace darker than in male, pale band between margin and centre less well defined; femora with broad dark pro- and retrolateral stripes; otherwise as in male. Abdomen dark without chevrons, but with well-defined pale longitudinal central stripe; sides dark, venter pale in middle. Carapace much higher at back than in front. With boss in front of AME. Eyes:  $a=0.11$ ,  $b=0.08$ ,  $c=0.12$ ,  $d=0.16$ ;  $e=0.03$ ,  $f=0.03$ ,  $g=0.51$ ,  $h=0.03$ . Clypeus 0.13 high or 1.6 times diameter of ALE.

Legs: Chaetotaxy as in male. Measurements:

	F	P	T	Mt	t	Total
I	2.01	0.49	2.24	2.18	0.89	7.81
II	1.87	0.49	1.85	1.89	0.74	6.84
III	1.57	0.49	1.30	1.54	0.62	5.52
IV	2.31	0.56	2.18	2.35	0.84	8.24

Epigyne (Fig. 16): with large lateral openings; anterior margin with long narrow lip projecting backwards.

*Distribution:* Known only from type locality.

#### *Hala paulyi*, new species (Figs. 20–23)

*Type material:* Male holotype: Madagascar, Tamatave, Manakambahiny Est, 17°45'S, 48°43'E, forest, 1–7 February 1991, yellow plate, A. Pauly (MRAC 174.464).

Paratypes: 1 ♂ 1 ♀, together with Ht (MRAC 174.642); 1 ♀, 17–23 March 1991, other data as Ht (MRAC 174.560); 2 ♂ 2 ♀, 1–15 April 1991, other data as Ht (MRAC 174.640); 1 ♂ 1 ♀, 1–17 January 1991, other data as Ht (MRAC 174.641).

**Diagnosis:** The male is characterised by the shape of the tibial apophysis which is rounded at its extremity; the female epigyne has two large entrance holes, each flanked by a strongly sclerotised crescent-shaped swelling and separated by a sclerotised oval protrusion.

**Etymology:** *pauyi* is a patronym in honour of the entomologist Alain Pauly who collected all the specimens of the Halidae so far known.

**Description:** Note: most specimens have lost the hair cover and many spines and setae.

**Male** (range of paratypes in brackets): Total length 3.81 (only one male with abdomen); carapace 1.96 (1.75–1.96) long, 1.75 (1.57–1.75) wide. Colour: carapace pale yellowish brown, with darker radiating striae ending near broad paler band; margin darker; eyes on small dark spots. Chelicerae uniform pale yellowish brown. Sternum yellow slightly suffused with dark on sides. Legs uniform pale yellow. Abdomen pale with faint darker pattern of few chevrons behind paler longitudinal central stripe near front; sides dark, venter paler in middle.

Carapace higher at back than in front, falling sharply behind fovea. With sparse cover of short dark hairs.

With swelling in front of AME. Eyes:  $a=0.13$ ,  $b=0.09$ ,  $c=0.12$ ,  $d=0.14$ ;  $e=0.06$ ,  $f=0.04$ ,  $g=0.50$ ,  $h=0.13$ . Clypeus 0.24 high or 2.7 times diameter of ALE. Labium 0.28 wide, 0.25 long. Chelicerae slender; with two teeth on promargin, three teeth on retromargin. Sternum 0.97 long, 0.95 wide.

Legs: Spination:

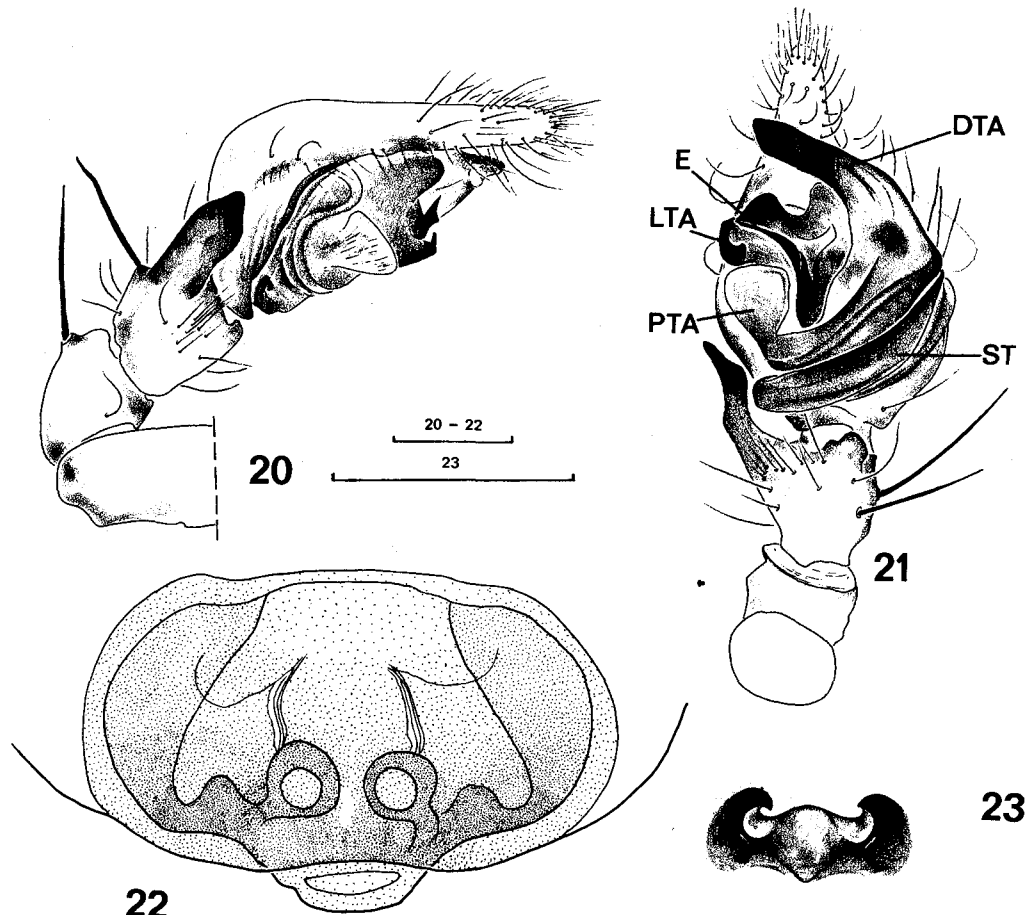
	F	P	T	Mt
I	pl2*d4*r13*	d1	pl2*d1rl2v2-2-2-2	pl3*r13*v1
II	pl2*d3*r13*	d1	pl2*d1rl2v2-2-2-2	pl3*r13*
III	pl3*d3*r12*	d1	pl2*d2*r12*v2-2-2	pl2*r12*v2-2-2
IV	pl3*d3*r12*	d1	pl2*d2*rl1v1-1	pl3*r13*v4

Spines relatively short, never longer than 3.6 times diameter of segment; longest on T I. Femora sparsely covered with short dark hairs as on carapace. Trichobothria long and numerous; in three rows on T III and IV, forming proximal group on T III and IV; in one row on Mt, in two rows on tarsi. Measurements:

	F	P	T	Mt	t	Total
I	2.73	0.59	2.94	2.77	1.36	10.39
II	2.47	0.55	2.43	2.21	1.10	8.76
III	1.79	0.51	1.53	1.49	0.68	6.00
IV	2.81	0.55	2.56	2.51	1.15	9.58

Abdomen oval, sparsely covered with rather long hairs. ALS as in *H. impigra*.

Palp (Figs. 20–21): patella with long dorsal seta, tibia with one dorsal and two mesal setae; lateral tibial



Figs. 20–23: *Hala paulyi*. 20 Male palp, lateral view; 21 Male palp, ventral view (E=embolus, DTA=distal tegular apophysis, LTA=lateral tegular apophysis, PTA=proximal tegular apophysis, ST=subtegulum); 22 Vulva, dorsal view; 23 Epigyne, ventral view. Scale lines=0.25 mm.

apophysis mesolaterally flattened, with parallel dorsal and ventral margins, extremity strongly tapering with rounded tip. Tegulum with strongly sclerotised distal apophysis, pointing forwards, transverse posterior part and poorly sclerotised lateral part together forming central concavity from where embolus emerges; embolus short, slender, slightly curving outwards; extremity closely adjacent to hook-shaped tegular excrescence.

*Female* (range of female paratypes in brackets): Total length 4.88 (3.91); carapace 2.20 (2.10–2.24) long, 1.96 (1.85–2.04) wide. Colour: carapace darker than in male, pale band between margin and centre less well defined; legs pale yellow faintly annulated with pale brown. Abdomen dark with three faint chevrons behind poorly-defined pale longitudinal central stripe; dorsum with three types of setae: short black ones dispersed all over, long black ones more numerous towards front and white ones forming patches near back; sides dark, venter paler in middle. Carapace as in male. Eyes:  $a=0.15$ ,  $b=0.12$ ,  $c=0.15$ ,  $d=0.16$ ;  $e=0.06$ ,  $f=0.07$ ,  $g=0.63$ ,  $h=0.15$ . Clypeus 0.23 high or 1.9 times diameter of ALE. Sternum 1.17 long, 1.11 wide.

Legs: Spination:

	F	P	T	Mt
I	pl3*d3*r13*	d1	pl2*d1r1lv2-2-2-2	pl2*r13*v2-2-1
II	pl3*d3*r13*	d1	pl2*d1r12*v2-2-2-2	pl3*r12*v2-2
III	pl3*d3*r13*	d1	pl2*d1r12*v2-2-2	pl2*d1r12*v2-2-1
IV	pl3*d3*r11*	d1	pl1d2*r12*v2-1-2	pl3*d1r13*v3

Spines longer than in male; up to 4.6 times diameter of segment on Mt I. Otherwise as in male. Measurements:

	F	P	T	Mt	t	Total
I	2.77	0.55	3.11	2.47	1.15	10.05
II	2.60	0.55	2.60	2.13	0.98	8.86
III	2.04	0.51	1.70	1.66	0.68	6.59
IV	2.81	0.68	1.58	2.73	1.11	8.91

Female palp with long spines: F4 P1 T3 t4; with tarsal claw.

Epigyne (Fig. 22–23): large entrance holes flanked by strongly sclerotised crescent-shaped swelling and separated by slightly sclerotised oval protrusion. Abdomen as in male.

*Distribution*: Known only from type locality.

### *Tolma*, new genus

*Diagnosis*: Males of this genus have a large apophysis on the palpal patella; females are recognised by the epigyne which is plate-like and stands free off the abdomen. ALS without huge seta near major ampullate gland spigot.

*Etymology*: *Tolma* (Greek *τολμα*) means courage and refers to the character of these spiders, emerging in an effervescent epoch in spider taxonomy. The gender is feminine.

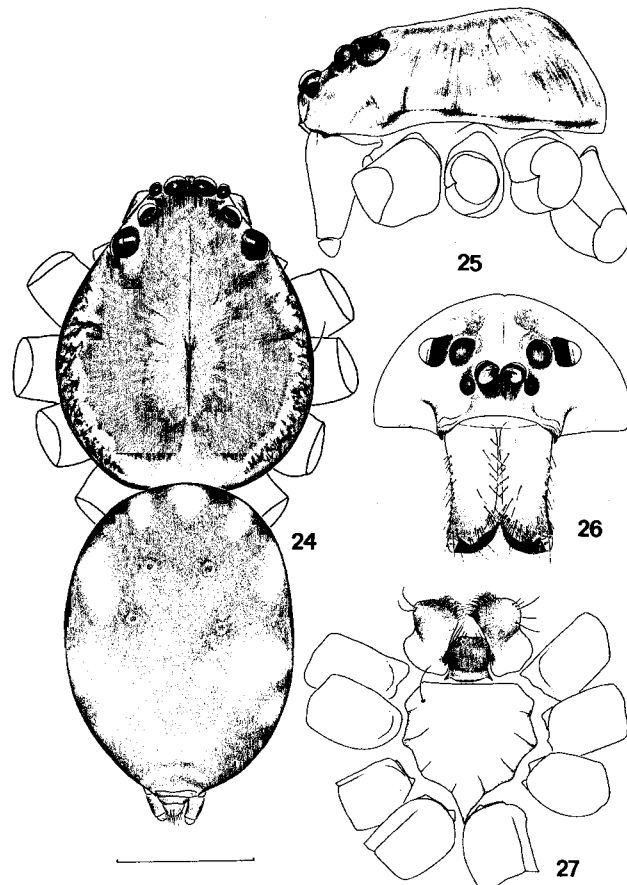
*Description*: Medium size (4.0–5.5) spiders with smooth tegument. Carapace broad; widest at level of coxae II, narrowed at level of clypeus to half maximum width in females, to about 0.45 maximum width in males. Male profile domed with highest point behind fovea, then falling sharply towards posterior margin; female profile somewhat flatter. Colour: carapace, che-

licerae, legs and sternum yellowish brown, with faint darker pattern; abdomen variable; dorsal pattern faint, consisting of few faint chevrons behind pale median stripe.

Eyes in three groups; anterior one almost straight or slightly procurved as seen from in front, second row in two well-separated groups far apart. AME, PLE and PME subequal; ALE smaller. Direction of eyes strongly pronounced: AME upwards, ALE forwards; PME upwards, PLE sideways. All eyes circular and pale except ALE dark. Chilum composed of two small triangles, poorly sclerotised. Chelicerae slender with long hairs along margin; 2 teeth on anterior margin, 3 on posterior margin. Labium as wide as long. Endites roughly rectangular, slightly constricted in middle; with well-developed serrula and anteromesal scopula. Sternum triangular with sinuous sides, and long posterior tip extending between posterior coxae. No inter- or pre-coxal sclerites.

Legs: formula 4123 (♀) or 1423 (♂), long and slender, T and Mt up to 20 times as long as their diameter in middle. Spination: spines numerous and long, t with pseudo-annulation. Tarsal claws with 7–9 teeth. With modified setae. Single claw on well-developed onychium. Trichobothria in three rows on tibiae, forming proximal group on T III and T IV, in one row on Mt, in two rows on t. No claw tufts or scopulae.

Abdomen oval. Tracheal system absent or poorly developed. Spinnerets six: ALS without huge seta. PMS



Figs. 24–27: *Tolma toreuta*. 24 Male habitus; 25 Male carapace, lateral view; 26 Male carapace, frontal view; 27 Mouthparts and sternum. Scale line=1 mm.

and PLS apparently with aciniform gland spigots only. Colulus (Fig. 11) well developed, with few setae.

Male palp: patella with apophysis and strong spine. Tibia with dorsolateral apophysis and two strong setae. Cymbium slender, with lateral fold and pointed tip; no paracymbium; subtegulum well developed, occupying basal part of bulbus. Tegulum with strongly sclerotised mesal part and membranous lateral part; basal apophysis small and triangular; lateral apophysis not split but folded; embolus short and curved, arising from central concavity delimited by tegular apophyses, resting against strongly sclerotised lateral tegular apophysis.

Female palp with toothed tarsal claw; several long spines. Epigyne: plate-like; standing free from abdomen. Thick-walled spermathecae far apart.

*Type species: Tolma toreuta*, new species.

*Other species included: None.*

*Distribution: Central Madagascar.*

***Tolma toreuta*, new species (Figs. 1–6, 8, 10, 11, 24–31)**

*Type material:* Male holotype: Madagascar, Tamatave, Manakambahiny Est, 17°45'S, 48°43'E, forest, 1–15 April 1991, yellow plate, A. Pauly (MRAC 174.644). Paratypes: 8 ♂, together with Ht (MRAC 174.390); 11 ♂, 1–7 February 1991, other data as Ht (MRAC 174.463); ♀, as previous (MRAC 174.643).

*Diagnosis:* So far the only known species in the genus and thus recognisable by the generic diagnosis.

*Etymology:* *toreuta* (L.) means "engraver" and refers to the pointed cymbium, like the tool of a chiseller.

*Description:* Note: most specimens have lost the hair cover and many spines and setae.

*Male* (range of paratypes in brackets): Total length 4.30 (4.05–4.47); carapace 2.17 (2.00–2.68) long, 1.87 (1.62–2.00) wide. Colour: carapace pale yellowish brown, with faint darker bands with sinuous sides on either side of centre and near margin; latter bands separated by pale one from narrow dark margin; eyes on small dark spots. Chelicerae pale yellow with faint darker stripes. Sternum uniform pale yellow with thin slightly brownish margin. Legs pale yellow annulated with dark on F. Abdomen pale grey with faint paler pattern consisting of median stripe in front and faint chevrons at back; sides dark, mottled with pale, venter pale.

Carapace (Figs. 1, 24–26) higher at back than in front, falling sharply behind fovea. With sparse cover of short dark hairs. AME on slight bulge. Eyes:  $a=0.16$ ,  $b=0.09$ ,  $c=0.18$ ,  $d=0.16$ ;  $e=0.04$ ,  $f=0.05$ ,  $g=0.45$ ,  $h=0.16$ . Clypeus 0.18 high or 2.0 times diameter of ALE; strongly incurved between pivoting points of cheliceral condyles. Chelicerae slender; with two teeth on promargin, three teeth on retromargin. Labium 0.35 wide, 0.36 long. Sternum 1.05 long, 1.03 wide.

Legs: Spination:

	F	P	T	Mt
I	pl3*d3*r14*	d1	pl2*d1rl2*v2-2-2-2	pl3*d1rl3*v2-2-2-2
II	pl3*d3*r14*	d1	pl2*d2*rl2*v2-2-2-2	pl3*d1rl3*v2-2-2-2
III	pl3*d3*r13*	d1	pl2*d2*rl2*v2-2-2	pl2*rl3*v2-2-2
IV	pl3*d3*rl2*	d1	pl2*d2*rl2*v2-2-2	pl3*rl3*v5

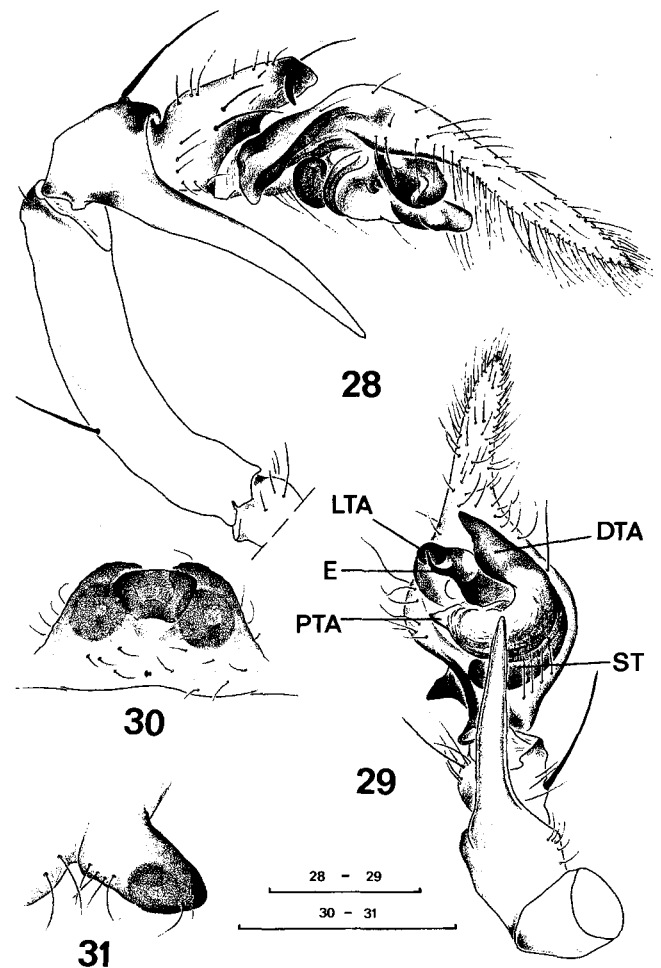
Spines long, longest on Mt III: 5.0 times as long as diameter of segment. F, P and part of T sparsely covered with short dark hairs as on carapace. Trichobothria long and numerous; in three rows on T III and IV, forming proximal group on T III and IV; in one row on Mt, in two rows on tarsi. Measurements:

	F	P	T	Mt	t	Total
I	3.19	0.85	3.45	3.19	1.24	11.92
II	2.98	0.81	2.81	2.77	1.06	10.43
III	2.38	0.72	2.09	2.04	0.85	8.08
IV	3.32	0.77	2.77	2.98	1.19	11.03

Abdomen oval, with a few isolated setae.

Palp (Figs. 28–29): patella with long dorsal seta and with very long ventral apophysis pointing forwards; tibia with dorsolateral apophysis, curved out and forwards; cymbium elongate, slender with pointed tip; with short but deep, proximal lateral fold with thickened inferior margin; tegulum with sclerotised distal apophysis and strongly sclerotised lateral apophysis; embolus originating between them; subtegulum well exposed on unexpanded palp.

*Female:* Total length 5.45; carapace 2.47 long, 2.04 wide. Colour: carapace more brownish than in male, pale band between margin and centre less well defined;



Figs. 28–31: *Tolma toreuta*. 28 Male palp, lateral view; 29 Male palp, ventral view (E=embolus, DTA=distal tegular apophysis, LTA=lateral tegular apophysis, PTA=proximal tegular apophysis, ST=subtegulum); 30 Epigyne, caudal view; 31 Epigyne, lateral view. Scale lines=0.5 mm.



dark lateral band with network pattern; legs more brownish than in male, F annulated, T with proximal dark ring. Abdomen darker than in male. Carapace flatter than in male, with slight dip between fovea and eyes. AME tubercle very weak. Eyes: a=0.15, b=0.09, c=0.16, d=0.16; e=0.06, f=0.07, g=0.50, h=0.14. Clypeus 0.20 high or 2.2 times diameter of ALE. Chelicerae as in male. Chilum composed of two small sclerites. Labium as wide as long: 0.42. Sternum 1.15 long, 1.11 wide.

Legs: Spines slightly longer than in male; up to 5.8 times diameter of segment on Mt I. Chaetotaxy otherwise as in male. Measurements:

	F	P	T	Mt	t	Total
I	2.81	0.89	2.94	2.68	1.02	10.34
II	2.68	0.89	2.77	2.51	0.98	9.83
III	2.30	0.68	2.04	2.04	0.85	7.91
IV	3.07	0.85	2.68	2.98	1.11	10.69

Female palp with numerous spines: F6 P2 T4 t4; length up to 3 times diameter on t; tarsal claw with 4 teeth.

Epigyne (Figs. 30–31): plate-shaped with form of parallelogram; standing free off abdomen; spermathecae far apart, large. Abdomen as in male.

*Distribution*: Known only from type locality.

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