Linyphiid spiders of the granitic islands of Seychelles (Araneae, Linyphiidae)

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Abstract

Three linyphiid spiders are recorded from the granitic Seychelles. One of them *Microbathypantes palmarius* (Marples, 1955) n. comb. = *Microbathyphantes asiaticus* Helsdingen, 1985 n. syn. belongs to the subfamily Linyphiinae Blackwall, 1859 and two others, *Nesioneta benoiti* (Helsdingen, 1978) n. comb. and *Theoa tricaudata* (Locket, 1982) n. comb. to the subfamily Micronetinae Hull, 1920. *Priscipalpus* Millidge in Beatty, Berry & Millidge, 1991 is placed as a junior synonym of *Microbathyphantes* Helsdingen, 1985, n. syn. *Meioneta benoitia* Helsdingen, 1978 is transferred to *Nesioneta* Millidge in Beatty, Berry & Millidge, 1991. A new genus, *Theoa* n. gen. is created for *Theonina tricaudata* Locket, 1982 which is a new record from the granitic islands of Seychelles.

Introduction

With well over 3500 species the family Linyphiidae Blackwall, 1859 is the second most diverse spider family. They are found all over the world but especially in temperate regions. Their size range between 0.8-12 mm. Linyphiids can be found in a large variety of habitats, mostly living among low vegetation or especially in litter, moss, under stones etc. They are usually not very colourful although there may be some kind of pattern on the abdomen. Linyphiids make horizontal sheet webs, which are usually very small, they live and run on the undersides of these sheets.

Linyphiids are ecribellate spiders with eight eyes in two transverse rows. The chelicerae have teeth on the inner and outer margins and lateral stridulatory organs. Autotomy of legs occurs between the patella and tibia. There is a single dorsal trichobothrium on metatarsi (occasionally lost from MtIV). In the descriptions below its position is given by the expression: TmI = *a*/*b* (i.e. on the metatarsus of the first leg, where *a* is the distance of the trichobothrium from the proximal end of the metatarsus and *b* is the total length of the segment). Male palp with a paracymbium. Its shape and complexity varies within the family but is basically a separate, well sclerotised structure articulating basally via a membranous area with the cymbium on its retro-lateral side. Bulbus with a suprategulum and a more or less complicated embolic division is connected to it with a short,

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membraneous column. A thin and usually highly translucent extension arises from the column. Its apical part is in a close association with the apical part of the embolus.

At present three linyphiid species have been found in the granitic Seychelles. One of them, *Microbathypantes palmarius* (Marples, 1955) represent the subfamily Linyphiinae Blackwall, 1859 and two others, *Nesioneta benoiti* (Helsdingen, 1978) and *Theoa tricaudata* (Locket, 1982) belong to the subfamily Micronetinae Hull, 1920. The general distribution and distribution in the granitic Seychelles are given for each species. All these three species have a wide distribution which suggest that they either move easily with man or are fairly active aeronauts.

The material treated below belong to the following collections:

MRAC = Musée Royal de l'Afrique Centrale, Tervuren, Belgium.
MZT = Zoological Museum of Turku University, Finland.

In the figures the following abbrevations have been used

1. male palp:

c = embolus
cd = embolic plate
cp = embolus proper
fe = fenestra
fgl = Fickert's gland
ia = inferior apophysis
lc = lamella characteristica
mm = median membrane
pa = posterior apophysis
ph = pit hook
r = radix
sa = superior apophysis
sd = sperm duct
st = suprategulum
t = tegulum
ta = terminal apohysis

2. epigyne:

at = atrium
bc = bursa copulatrix
dll = depression on epigyne
dps = distal part of scape
ec = epigyneal cavity
ed = entrance duct
epo = pocket-like depression on epigyne
ll = lateral lobe of scape
lp = lateral pocket
pi = pit
pmp = posterior median plate
pps = proximal part of scape
sb = scapoid base
re = receptacula

Genus *Microbathyphantes* Helsdingen, 1985

Microbathyphantes Helsdingen, 1985: 21. - Type species by original designation *Microbathyphantes asiaticus* Helsdingen, 1985 from Sri Lanka [= *Linyphia palmaria* Marples, 1955 from Western Samoa. **New synonymy**]

Priscipalpus Millidge in Beatty, Berry & Millidge, 1991: 265. - Type species by original designation and monotypy *Linyphia palmaria* Marples, 1955. **New synonymy.**

Species included: *M. palmarius* (Marples, 1955) and *M. spedani* (Locket, 1968).

Diagnosis: The genus is most easily recognized by the elongated, distally bifurcated superior apophysis of the embolic plate of the male palp.

Description: Fairly small spiders, total length ca. 1.7-2.1 mm. Legs proportionally long and slender. TmI = 0.22-0.25. TmIV absent. Chaeto-taxy (dorsal-prolateral-retrolateral-ventral spines): FeI = 1-1-0-0, FeII-III = 1-0-0-0, FeIV = 0-0-0-0, TiI-II = 2-1-1-0, TiIII-IV = 2-0-0-0, MtI-IV= 0-0-0-0. Posterior eyes large and close to each other. Chelicerae with three frontal teeth.

Cymbium without dorsal outgrowth. Paracymbium (pc) simple, more or less flat crook. Suprategulum relatively small, without any hook-like structures. Main body of the embolic division consists of a flat plate, here called the embolic plate (epl). From its anterior face project superior (sa) and inferior apophyses (ia) (=lamella of Helsdingen 1985) while its posterodorsal corner (pdc) is drawn out into a sharply pointed projection. Embolus (e) smooth, coiled, forming a full circle. Its basal part is buried inside the embolic plate freely moving against it. A very thin and translucent membrane, here called the median membrane (mm), arises at junction of the embolus and embolic plate.

The epigyne appears to be relatively simple without any pit in the posteromedian plate. This is apparently associated with the hookless condition of the suprategulum.

Taxonomic position: According to the secondary genital organs the genus is closely related to the *Porrhomma-Bathyphantes* group of the subfamily Linyphiinae. The embolic division is of a fundamentally different type compared to the corresponding structure of representatives of the subfamily Micronetinae (Saaristo 1971: Fig. 1, here Figs. 2C and 3C). Contrary to the statement of Millidge (in Beatty, Berry & Millidge, 1991: 272) there is a suprategulum present in the male palp of *Microbathyphantes*.

Microbathyphantes palmarius (Marples, 1955), **new combination** (Fig. 1A-E)
Linyphia palmaria Marples, 1955: 492 (male & female).
Microbathyphantes asiaticus Helsdingen, 1985: 22, f. 11-12 (male & female). **New synonymy.**
Priscipalpus palmarius Millidge in Beatty, Berry & Millidge, 1991: 272, f. 33-36 (male & female)

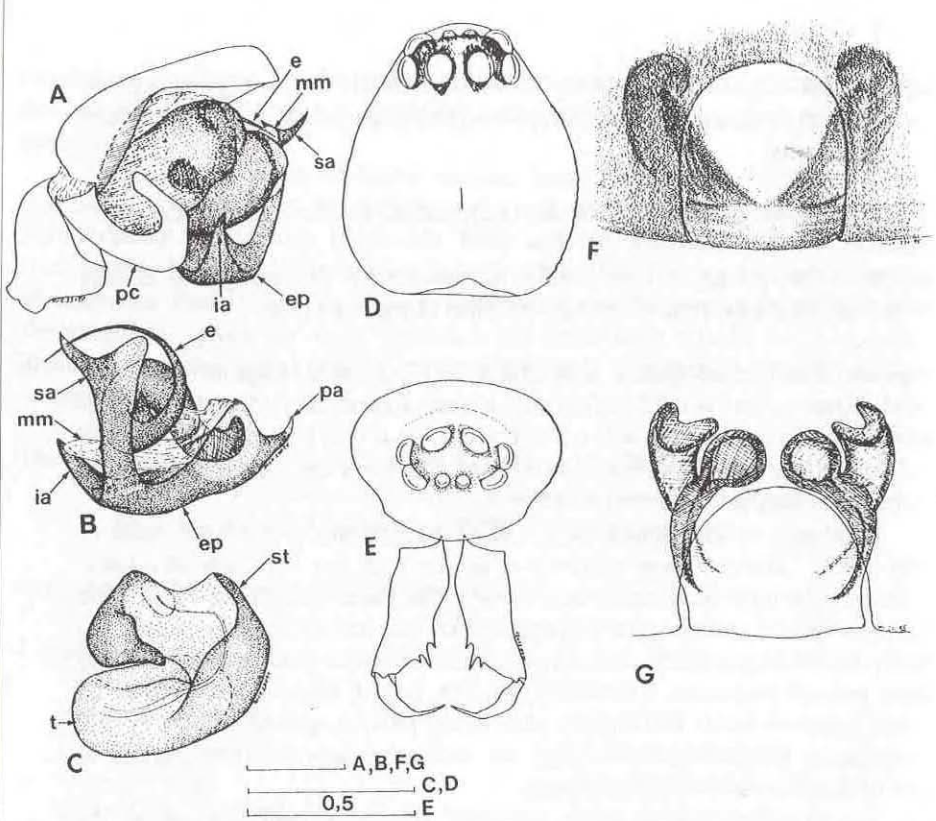

Fig. 1. *Microbathyphantes palmarius* (Marples, 1955). A-E = original figures, F-G after Helsdingen 1985; Beatty, Berry & Millidge 1991. Unless otherwise stated scale bar = 0.1mm.
A) Right male palp ectally. B) Embolic division dorsally. C) Suprategulum dorsally. D) Male carapace dorsally. E) Male carapace and chelicerae frontally. F) Epigyne ventrally. G) Vulva ventrally.

Diagnosis: The male of this species is most easily recognized by the shape of the apical part of the superior apophysis (Fig. 1B). Its anteriorly pointing branch is sharp tooth-like and pointed while the posterior one is somewhat larger, lobe-like and with a round apex.

Description: The species have been well described both by Helsdingen (1985) and by Millidge (Beatty, Berry & Millidge 1991).

Distribution: The species has a very wide distribution; Seychelles, Sri Lanka, Burma, Mariana Islands, Fiji, Samoa and Cook Islands (Helsdingen 1985, Beatty, Berry & Millidge 1991). In the Seychelles the species have been found on:

Cousin: 2 males, 1978, Hugh Watkins legend (MZT AA 0.274 & AA 0.274)

Mahé: Helsdingen (1985).

Discussion: The type locality of the holotype of *Microbathyphantes asiaticus* is Sri Lanka and its paratypes come from the Seychelles and Burma. *Linyphia palmaria* was described from Western Samoa. The Seychelles specimens were compared with the samples of *L. palmaria* from Upolu, Western Samoa (MZT, P.T. Lehtinen legend) and were found to be identical. The minor differences between the figures presented by Helsdingen (1985) for *M. asiaticus* and those of *L. palmaria* (Millidge in Beatty, Berry & Millidge, 1991) are due to the different angles of inspection and drawing techniques.

Genus *Nesioneta* Millidge in Beatty, Berry & Millidge, 1991

Nesioneta Millidge in Beatty, Berry & Millidge, 1991: 265. - Type species by original designation *Nesioneta lepida* Millidge in Beatty, Berry & Millidge, 1991 from Marshall Islands.

Species included: *N. benoiti* (Helsdingen, 1978), *N. pacificana* (Berland, 1935) **new combination** [= *N. concinna* Millidge in Beatty, Berry & Millidge, 1991 **new synonymy**], *N. elegans* Millidge in Beatty, Berry & Millidge, 1991, *N. lepida* Millidge in Beatty, Berry & Millidge, 1991, *N. similis* Millidge in Beatty, Berry & Millidge, 1991, and *N. sola* (Millidge & Russell-Smith, 1992) **new combination**.

Diagnosis: The genus is most easily recognized by the anteriorly flattened male palpal tibia bearing a few wart-like apophyses armed with a single hair.

Description: Fairly small spiders, total length ca. 1.4-1.9 mm. Legs moderately long and slender. TmI = 0.25-0.30. TmIV absent. Chaetotaxy: TiI-IV = 2-0-0-0. No femoral or metatarsal spines.

Male palpal tibia anteriorly flattened, bordered by ectal and mesal brims bearing a few wart-like apophyses armed with a single hair. Cymbium rather simple with a membraneous plate-like extension proximo-mesally. The distal end of the paracymbium (pc) is weakly sclerotized, almost translucent. Suprategulum with a well-developed pit hook (ph) of the same type as in *Agyneta*. Radix (r) U-shaped, heavily sclerotized. Embolus (e) voluminous and very complicated in structure;

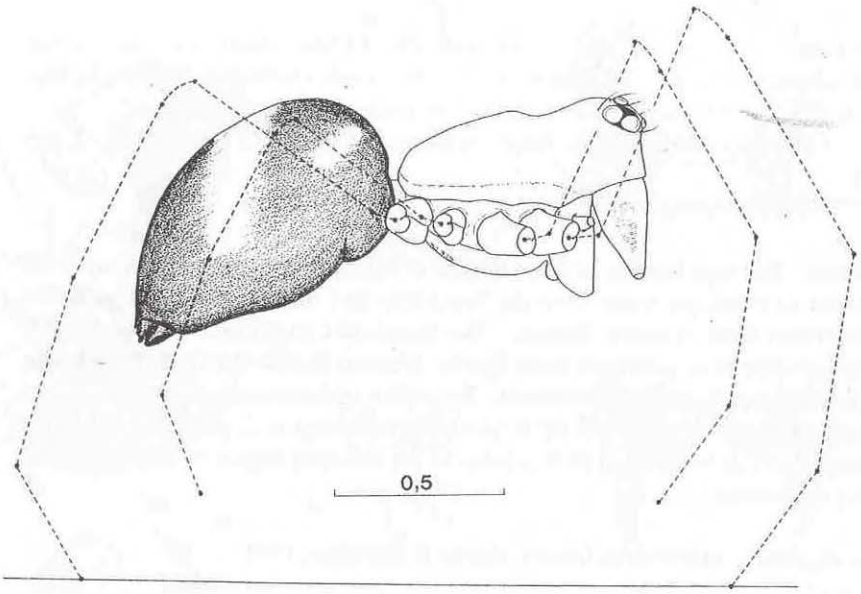

Fig. 2. *Nesioneta benoiti* (Helsdingen, 1978). Dextrolateral view of male. Original figure, scale bar in millimetres.

relatively weakly chitinisized except for a large, somewhat blade-like extension and the two small proximal flaps near the embolus proper (ep). Sperm duct inside the embolus not dilated but makes a large loop within it. Embolus proper basally situated. Lamella characteristica (lc) relatively simple, distally drawn into a narrow, sharp-pointed tip. Terminal apophysis (ta) bipartite like in *Agyneta*.

The epigyne is of the basic Micronetinae pattern. In the ventral view the epigyneal cavity (ec) is completely covered by the proximal part of the scape (pps). The lateral walls of the epigyneal cavity have shallow depressions (dll). The scape itself is S-shaped. Its middle (mps) and distal parts (dps) are mostly buried inside the epigyneal cavity. When the epigyne is artificially extented by KOH treatment it can observed that the middle part of the scape includes a large cavity, here called atrium (at). The starting points of the entrance ducts (ed), bursae copulatrix (bc) lie on either side of the atrium. Lateral lobes (ll) fairly small with shallow lateral pockets (lp). The pit (pi) is situated at the apex of a rather long and narrow extension of the distal part of the scape.

Taxonomic position: The genus belongs the subfamily Micronetinae and is fairly close to the genus *Agyneta* (Saaristo 1973). However, the structure of the male palpal tibia readily distinguishes it from that genus. In addition the shape of the

embolus is quite different and the embolus proper (embolic tooth of Helsdingen 1978) is extremely basally situated. In the epigyne the eye-like structures (lateral lobes) on either side of the proximal part of the scape which are so characteristic of *Agyneta* are not visible because they are small and covered by the middle part of the scape. Further, in harmony with the basally situated embolus proper, the bursae copulatrix have moved to a more proximal position in the scape, lying inside a special cavity in its middle part.

Nesioneta benoiti (Helsdingen, 1978), **new combination** (Figs. 2 & 3A-F)

Meioneta benoiti Helsdingen, 1978: 889-897, f. 1-11 (male & female).
Lepthyphantes brincki Helsdingen, 1985: 18-19, f. 8 (female). **New synonymy.**
Meioneta benoiti, Helsdingen 1985: 21.

Diagnosis: The male of this species is most easily recognized by the structure of the male palpal tibia (Fig. 3A-B). Females may be recognized by the width of the scapoid base being about one third of the width of the proximal posterior edge of the scapus (Fig. 3D).

Description: The species has been well described by Helsdingen (1978).

Distribution: The species has been reported from the Seychelles and Sri Lanka (Helsdingen 1978 & 1985). It is apparently quite common in the Seychelles and found on:

Aride: 1 male, 12.03.1978, John Rowley legend (MZT AA 0.276)
Cousin: 1 female, 11.04.1978, 1 male, 12.04.1978, 2 male & female, 20.4.1978, and 1 male, 20.04.1978, Hugh Watkins legend (MZT AA 0.278, MZT AA 0.279, MZT AA 0.048 & MZT AA 0.277)
La Digue: Helsdingen (1978)
Mahé: Helsdingen (1978 & 1985)
Praslin: Helsdingen (1978)
Silhouette: Helsdingen (1978)
Petite Soeur: 1 male, 1.IX.1975, 1 male, 10.IX.1975, 1 male, 21.IX.1975, 1 male, 26.IX.1975, M. Mühlenberg legend (MRAC 177.070, MRAC 177.067, MRAC 177.068 & MRAC 177.069).

Discussion: Lepthyphantes brincki was described from a single female from Sri Lanka by Helsdingen (1985). Although he also dealt with *Meioneta benoiti* in the same paper it is clear from his figure of the epigyne of *L. brincki* (Helsdingen 1985, Fig. 8) that this species is a female of *M. benoiti*.

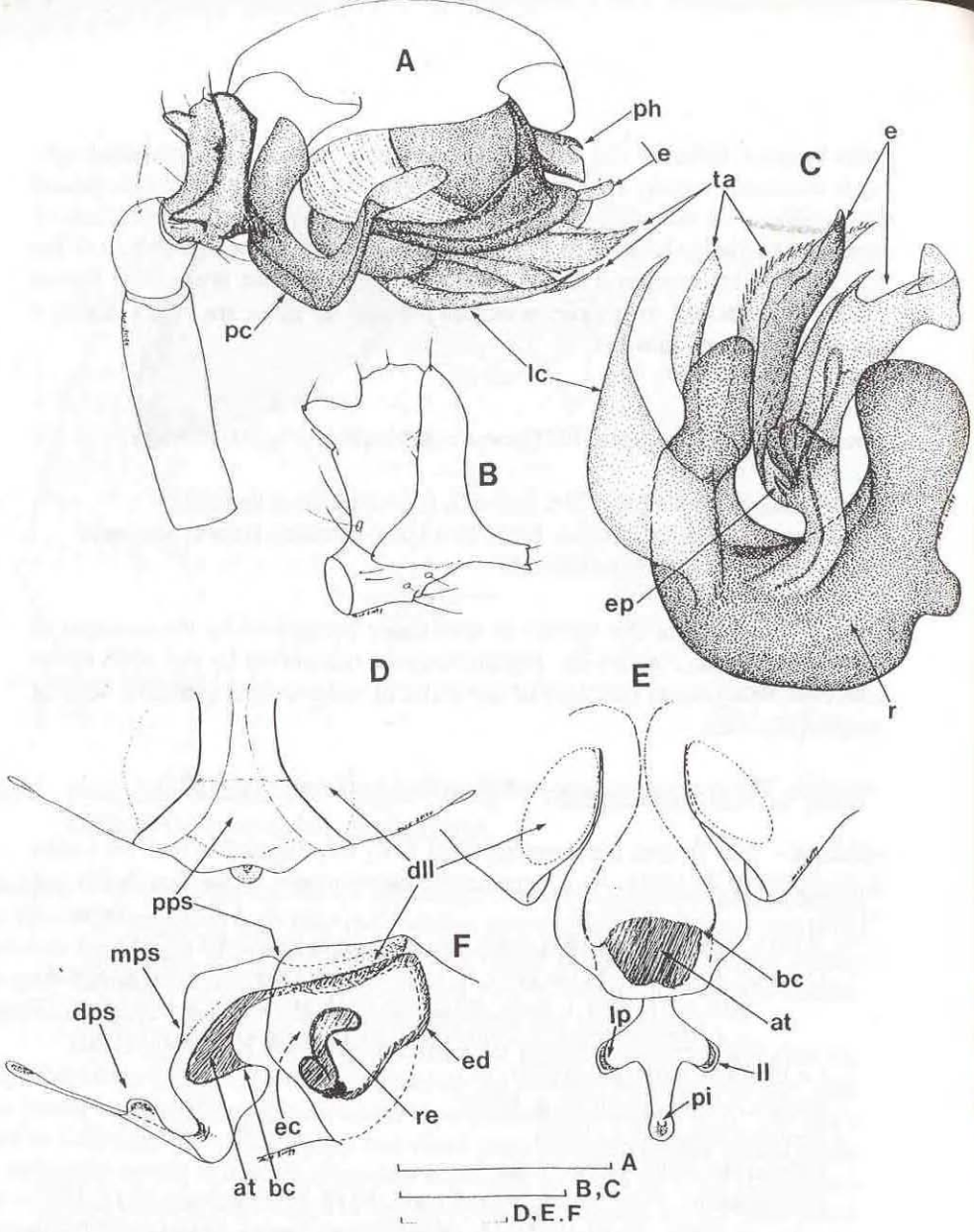

Fig. 3. *Nesioneta benoiti* (Helsdingen, 1978). Original figure, scale bar = 0.1mm. A) Right male palp ectally. B) Male palpal tibia from behind. C) Embolic division dorsally. D) Epigyne ventrally. E) Expanded epigyne ventrally. F) Expanded epigyne dextrolaterally.

It is also possible that *Nesioneta lepida* Millidge in Beatty, Berry & Millidge, 1991 is a further synonym of *M. benoiti*. The male palpal structures of *N.*

lepida figured by Millidge (Beatty, Berry & Millidge 1991, Figs. 1, 2, 4) are especially close to the corresponding parts of *M. benoiti*. The apparently distinct posterior edge of the proximal part of the scape in his figure of the epigyne (Millidge in Beatty, Berry & Millidge 1991, Fig. 3) may have been caused by distortion.

Genus *Theoa*, new genus

Type species: Theonina tricaudata Locket, 1982.

Species included: Only the type species.

Diagnosis: The genus is most easily recognized by the elaborately developed posterior part of the cymbium, combined with the large and complicated terminal apophysis.

Description: Small spiders, total length ca. 1.2 mm. Legs moderately long and slender. TmI = 0.14. TmIV absent. Chaetotaxy: TiI-IV = 1-0-0-0. No femoral or metatarsal spines.

There are no special structures in the male palpal tibia, except that it is somewhat dilated ventrally. Cymbium with tripartite posterior outgrowth and a low dorsal crest. Paracymbium (pc) with a large apical pocket. Suprategular pit hook (ph) slightly bifid. Radix (r) small in relation to other parts of the embolic division. Sperm duct with a spherical dilation inside the embolus (e) which is rather voluminous. Terminal apophysis (ta) large and extremely complicated. When the terminal apophysis is examined mesially it may be seen that in its middle there is a deeper depression (fenestra [fe]) with a weakly chitinized, translucent "floor". Lamella characteristica totally reduced.

Epigyne with pocket-like oval depressions (epo) on either side of the proximal part of the scape. Scape well developed, S-shaped. Its distal part is dilated into a shallow cup containing the bursae copulatrix (bc) and the pit (pi).

Taxonomic position: The genus *Theoa* belongs the subfamily Micronetinae and as Locket (1982) has suggested it seems to be close to the genus *Theonina* Simon, 1929. Saaristo (1974) analyzed the secondary genital organs of *Theonina cornix* (Simon, 1881), the type species of the genus. Although the male palpal structure is basically the same in *Theonina* and *Theoa*, in that both lack lamella characteristica, the separate sclerites are so different that the separation of two different genera is justified. Naturally, what is said about the male palp holds true also for the epigyne.

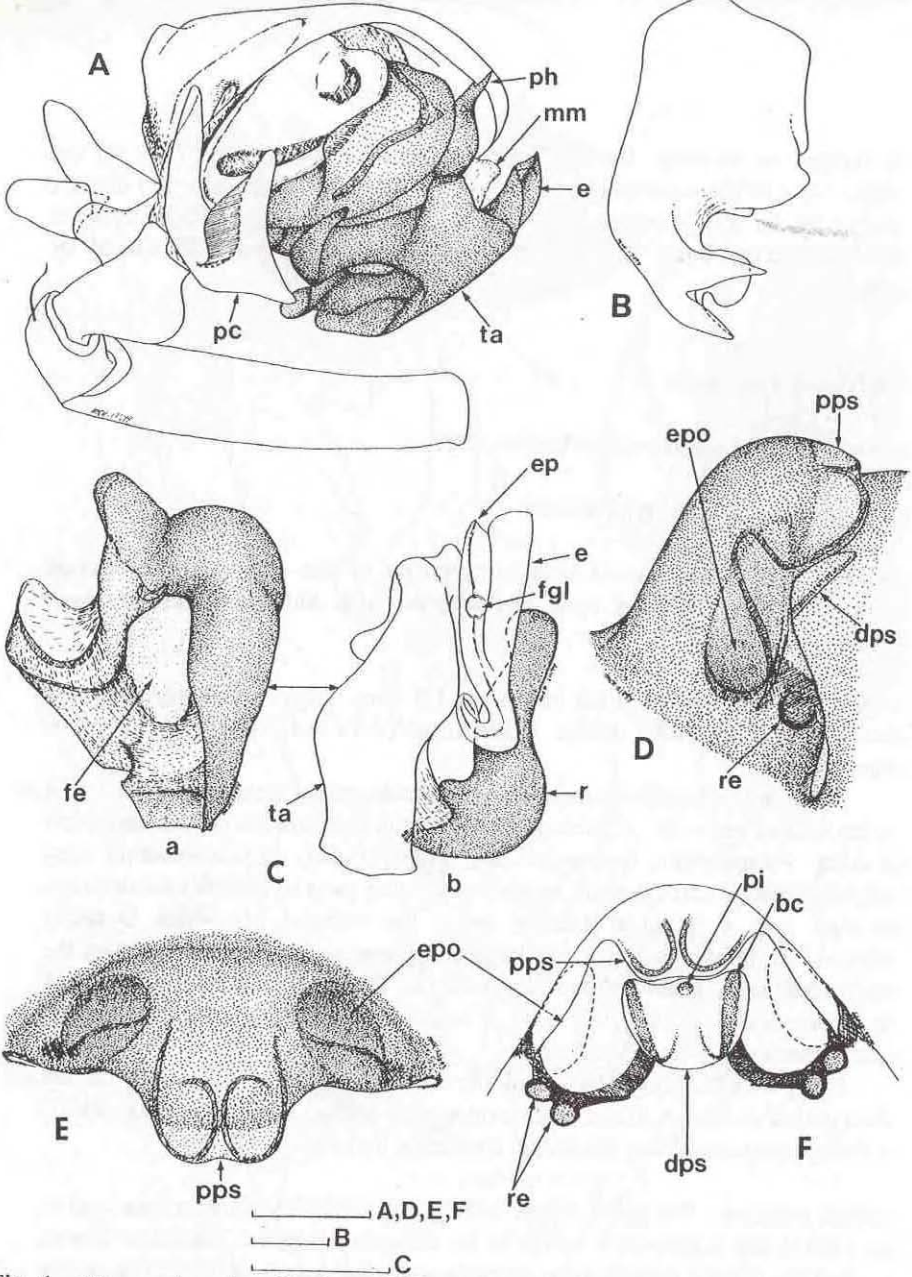

Fig. 4. *Theoa tricaudata* (Locket, 1982). Original figure, scale bar = 0.1mm. A) Right male palp ectally. B) Cymbium mesially. C) Embolic division dorsally. D) Epigyne sinistrolaterally. E) Epigyne ventrally. F) Epigyne dorsally.

Theoa tricaudata (Locket, 1982), **new combination** (Figs. 4A-F)
Theonina tricaudata Locket, 1982: 375-378, f. 80-89 (male & female).

Diagnosis: The male of this species is easily recognised by the complex, trifid cymbial apophysis (Fig. 4A-B) and the female by the structure of the epigyne (Fig. 4D-F).

Description: The species has been well described by Locket (1982).

Distribution: So far the species has been recorded only from Batu, western Malaysia (Locket 1982). It is new to the fauna of the granitic Seychelles and has been found on:

Mahé: 1 male, June 1994, and 1 female, Le Niol, *Cinnamomum* litter, 03. 08.1994, Justin Gerlach legend (MZT AA 0.287 & MZT AA 0.288).

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