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# A NEW GENUS OF JUMPING SPIDER FROM BORNEO WITH NOTES ON THE SPARTAEINE PALP (ARANEAE: SALTICIDAE)

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***ABSTRACT.*** - *Wanlessia sedgwicki*, a new genus and species of Spartaeinae from Borneo, is described and illustrated. The new taxon is the only member of the group with a well-developed palpal conductor. The palp of the spartaeine *Portia* is described and compared with that of *Wanlessia* and several generalised salticids possessing a conductor and a median apophysis.

## INTRODUCTION

The jumping spider subfamily Spartaeinae, established by Wanless (1984) for an inclusive taxon consisting of Simons's (1901) groups Boetheae, Cocaleae, Lineae, Codeteae and Cyrbeae, is one of the better known higher taxa of salticids. These spiders occur in the tropics of the Old World and are represented by some thirteen genera (Wanless, 1984). Like many other Indo-West Pacific taxa the group displays an exceptional diversity in the Malaysian and Indonesian archipelagos.

The spartaeine male palp is characterised by the presence of a ventral tibial apophysis and tegular furrow. A conductor, one of two tegular sclerites present in the groundplan of araneocladan spiders (Coddington, 1990), has not been identified so far in spartaeines, although tegular sclerites believed to be homologous with the conductor as well as the median apophysis have been identified in the palps of several other 'lower' salticids (see below). The discovery of a new spartaeine genus from Borneo which does possess a well developed palpal conductor is therefore of considerable interest.

The format of description and standard abbreviations follow Wanless (1984) and references therein.

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## *Wanlessia*, new genus

### Type species. *Wanlessia sedgwicki*, new species

***Diagnosis***. - *Wanlessia* can be distinguished from other spartaeine genera by the well developed conductor and the conical, mid-retrolateral apophysis of the tibia; from other salticids with palpal conductors (e.g., *Sonoita*) *Wanlessia* may easily be distinguished by its spartaeine features (tegular furrow, ventral tibial apophysis and pattern of promarginal cheliceral dentition), as well as the reduced PME.

***Description***. - Small brown salticids (total length 3.2 mm) with carapace rather large and moderate hair covering. *Carapace*: moderately high, longer than wide; cephalic part wide; thoracic slope posteriorly steep, slightly concave in lateral view; fovea long, sulciform, anterior end at midpoint between PLE; hair covering sparse, pattern faint. *Eyes*: large (except PME), lenses strongly convex; tubercles of AE moderate, of PE slight; AE contiguous, apices level in frontal view; ALE, PLE equal in size, slightly greater than half diameter of AME; PME minute, situated approximately midway between ALE and PLE; PLE placed slightly mediad of lateral margins of carapace in dorsal view; ocular quadrangle rectangular, c. 1.55 times wide as long. *Clypeus*: low, c. 0.26 times diameter of AME; with medial setal triad present. *Chelicerae*: moderately weak, paturon anteriorly convex, more or less parallel; promarginal scopulae weak, setae fine; three promarginal teeth, with diastema between distal and central, retromargin with six teeth; fang slender, evenly curved, inner margin serrate. *Maxillae*: rounded, scopulae weak; apicolateral margins narrowly keeled (serrula). *Labium*: slightly longer than wide, about half length of maxillae. *Sternum*: broadly scutiform, truncate anteriorly, obtusely pointed posteriorly. *Coxae*: more or less equal. *Abdomen*: elongate ovoid, with two pairs of small sigillae; integumentary secretory fields apparently absent; moderately clothed with setae and recumbent hairs; dorsal pattern indistinct, venter pale; spinnerets of medium length, anteriors conical-elongate, longer than posteriors, medians small. *Legs*: formula 4312; of medium length, posterior pairs longer, more slender; spines moderately long, present on all segments (except tarsi); hair fringes and scopulae absent; claws apparently not pectinate; claw tufts present, weak. Spination of leg I: femur d0-2-2; patella p0-1-0, r0-1-0; tibia d1-1-0, p1-0-1, v2-2-2, r1-0-1; metatarsus p1-1-1, v2-2-2, r1-0-1. *Female palp*: unknown. *Male palp*: of moderate size; femur, patella unmodified; tibia with ventral and two retrolateral apophyses; ventral apophysis distally attenuate, retrolaterally shifted; distal retrolateral apophysis dark-hyaline, apparently with membranous base; medial retrolateral apophysis pale, conical, continuous with dorsum of tibia; cymbium broadly oval, obtusely pointed; tegulum narrower proximally than distally, embolar origin basiprolateral, embolus fixed, slender, elongate, supported by well developed conductor; conductor fan-like, prolateral margin with narrow lip; tegular furrow present, partly concealed by conductor; sperm duct marginal, looped before reaching embolar base; subtegulum apparently ring-like, haematodochae not examined. *Epigyne*: unknown.

***Etymology***. - The generic name is in honour of Fred R. Wanless, London, whose outstanding revisionary studies of various 'lower' salticid groups of the Old World tropics have provided much of the information used in interpreting the structural features of this new taxon. It is considered feminine in gender.

### ***Wanlessia sedgwicki*, new species**
(Figs. 1-11)

***Material.*** - Holotype - male, (American Museum of Natural History, New York), Kapit area, Sarawak, East Malaysia [NW Borneo], W. Sedgwick, 2.viii.1981.

***Diagnosis.*** - This unique species may be distinguished from all other salticids by the features indicated in the generic diagnosis (i.e., the combined presence of spartaeine features and the presence of a well developed fan-like conductor); however, the reduced PME, small body size and lack of superficially obvious characteristics may cause *W. sedgwicki* to escape notice in cursory examination. The structure of the tibial apophyses is also diagnostic.

Male holotype (in fair condition). *Carapace*: dark yellowish brown, anterior cephalic part and sides darker, with irregular black markings, posterior cephalic part and narrow thoracic medial line paler; sparsely clothed with pale amber or whitish hairs; cephalic area rubbed, bare integument lightly punctate (hair bases), faintly irridescent; several strong anteriorly directed setae laterally and anteriorly between eyes. *Eyes*: with dark surrounds, anteriors fringed with pale amber hairs. *Clypeus*: yellowish brown, bare except for strong medial setal triad, row of weak pale setae along lower margin. *Chelicerae*: yellowish brown, anterior surface with dense, irregular black markings; promargin with three teeth, distal and central large, retromargin with six small teeth. *Maxillae and labium*: pale yellowish brown. *Sternum*: yellowish brown, sparsely clothed with erect setae. *Coxae*: pale yellowish brown. *Abdomen*: whitish buff, posteriorly with irregular black markings; moderately clothed with long setae and recumbent amber-grey hairs. *Legs*: dark yellowish brown, moderately spiny, sparsely clothed with fine setae and hairs; more or less distinct blackish annulations, distally on femora, proximally and distally on tibiae. *Spination of leg I*: femur d0-2-2; metatarsus p1-1-1, v2-2-1, r1-0-1. *Palp*: femur yellowish brown, finely speckled greyish, distally blackish; patella, tibia, cymbium, yellowish brown; tibia with two retrolateral apophyses, distal retrolateral apophysis dark-hyaline, laterally concave with a medial keel, anteriorly narrowed, crescentic in ventral view, medial retrolateral apophysis pale, conical, continuous with dorsum of tibia; tibia clothed with long white setae, dorsum with single robust proximal spine. Dimensions (mm): total length 3.20; carapace length 1.63, breadth 1.33, height 1.05; abdomen length 1.45; eyes, anterior row 1.30, middle row 1.13, posterior row 1.30; quadrangle length 0.84; diameters, AME 0.42, ALE 0.23, PME 0.70, PLE 0.23; interocular distances ALE-PME-PLE 0.25-0.23; clypeus 0.11. For measurements of legs, see Table 1 below:

**Table 1. Leg measurements of *Wanlessia sedgwicki*, new species**

| Legs | 1 | 2 | 3 | 4 | Palp |
|---|---|---|---|---|---|
| Femur | 1.01 | 1.01 | 1.00 | 1.25 | 0.54 |
| Patella | 0.52 | 0.52 | 0.46 | 0.50 | 0.25 |
| Tibia | 0.74 | 0.70 | 0.73 | 1.03 | 0.28 |
| Metatarsus | 0.74 | 0.74 | 0.86 | 1.18 | - |
| Tarsus | 0.39 | 0.39 | 0.39 | 0.46 | 0.59 |
| Total | 3.40 | 3.36 | 3.44 | 4.42 | 1.66 |

***Distribution.*** - Northwest Borneo

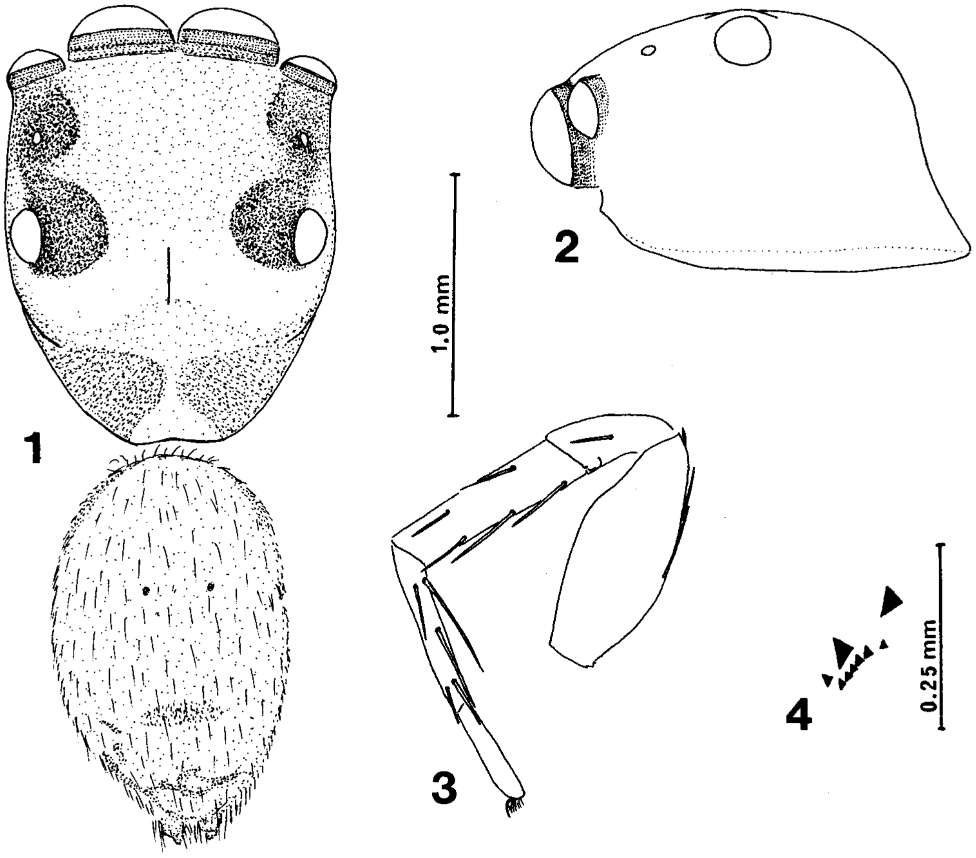
***Etymology.*** - The specific name honours Walter Sedgwick, San Francisco, collector of the holotype.

## *WANLESSIA* AND THE SPARTAEINE PALP

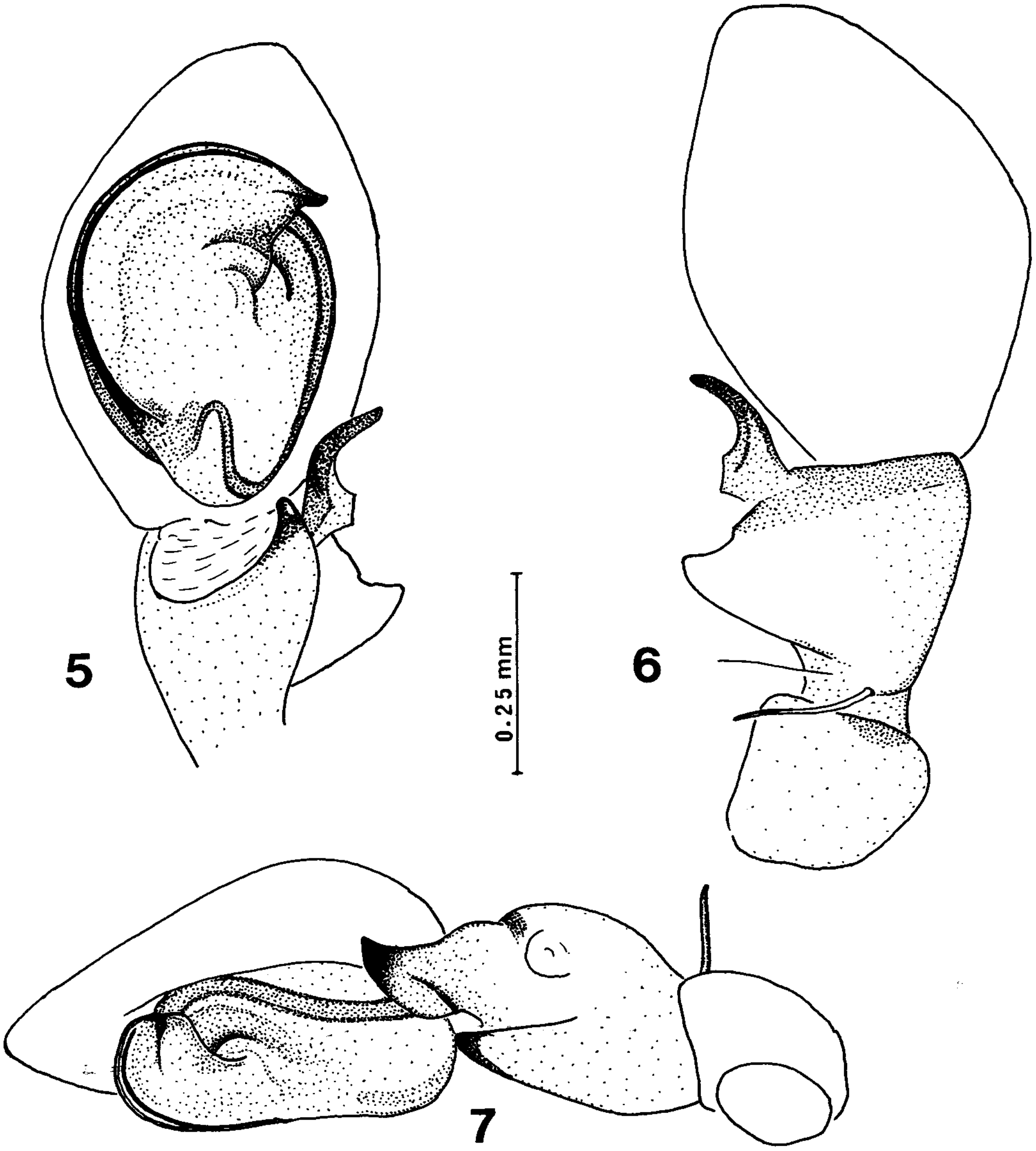
The spartaeine palp in its relatively generalised condition is seen in forms such as *Portia* (figs. 12-15, 16). The tegulum is ovoid in outline, ventrally more or less flat, with a well developed crescentic tegular invagination - the tegular furrow - located anteriorly. The embolus is moderately elongate and originates subapically or apically from the prolateral margin of the tegulum. A narrow membranous area occurs between the tegulum and embolar base and is referred to as the distal haematodocha by Wanless (1978, 1984), though the homology of the spartaeine structure with the similarly named structure of other spider families (and indeed of other salticids: e.g. euophryines, dendryphantines) remains uncertain (see below). The terminal portion of the distal haematodocha (M1 of Wanless, 1984) is frequently produced into a more or less distinct transparent flap and is sometimes modified into a characteristic form (e.g., in *Phaeacius* it is long and filamentous, in *Cyrba* and certain other genera it is broadly foliate). A funnel-like ventral opening occurs on the retrolateral edge of M1, close to the distal extremity of the tegular sperm duct, and appears to be continuous with the ventral groove of the embolus (see also Wanless, 1978). Immediately next to the terminal portion of the distal haematodocha, and partly overlying it, is a lobe-like tegular extension (M3 or tegular ledge of Wanless) which runs transversely as a more or less horizontal keel, usually terminating at a point posterior to the tegular furrow origin. Just anterior to or hidden by the prolateral end of this tegular extension is another, usually loboid, structure (M2 of Wanless) which partly overlies the tegulum. These three structures (M1, M2, M3) were considered elements of a tripartite distal haematadocha by Wanless (1978) but later (1984) the same writer stated that, while two of these elements (M1 & M2) appeared to be associated with the distal haematodocha, the third element (M3 or tegular ledge) could not be considered part of the distal haematodocha. Indeed, Wanless went so far as to state that "the tegular ledge seems to have no parallel in other salticids" and that "the complexity of the distal haematodocha and the presence of a tegular ledge may in themselves be synapomorphic for Spartaeinae".

Recognition of homologous features among organisms is the cornerstone of systematics, since the distribution of homologs delimits natural (monophyletic) groups. Remane (1952) formulated three criteria for identifying homologous features: (a) topographical position, (b) special structure, and (c) continuity through intermediates. In some respects the last is the most interesting: features of two or more organisms not known to be homologous are shown to be so by virtue of developmental stages or intermediate adult forms bridging the extreme manifestations of the features.

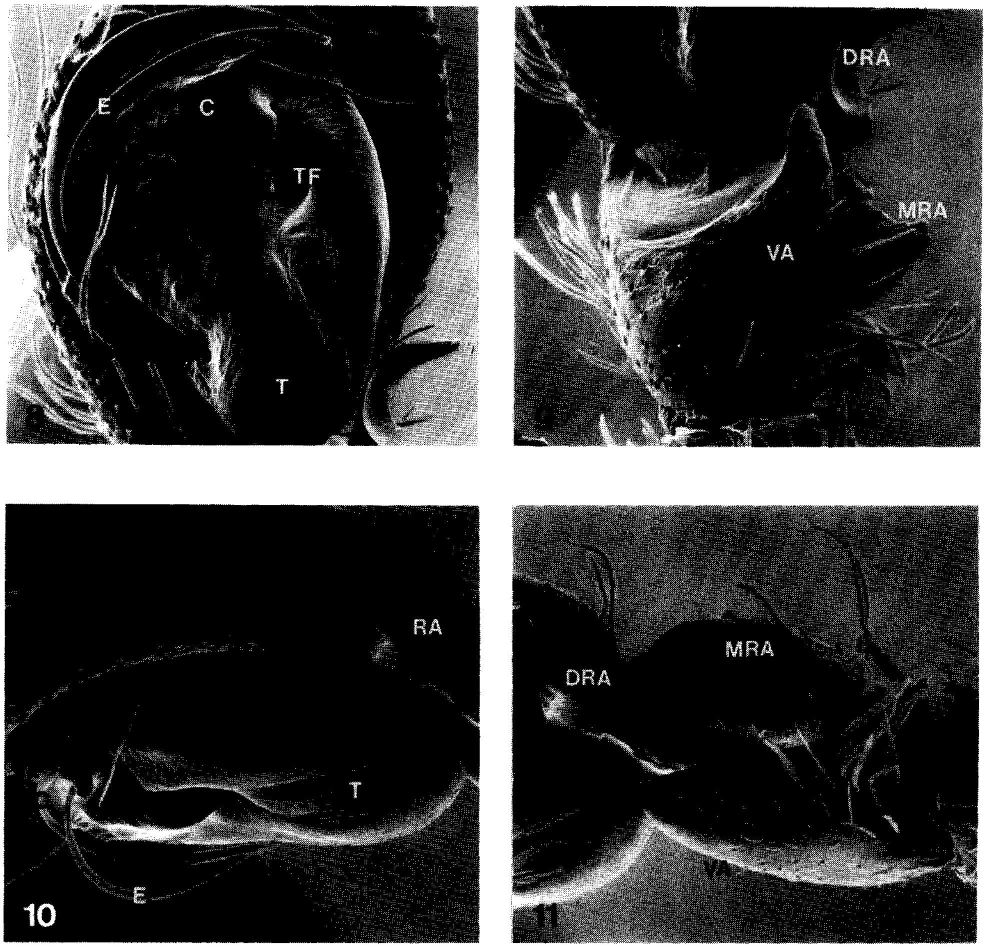
The discovery of *Wanlessia*, with its spartaeine features and well developed conductor, naturally raised the question whether other spartaeines possess a structure that could be interpreted as a conductor. It became evident immediately that the tegular ledge (M3), hitherto believed to be peculiar to spartaeines, occupies a topographical position in *Portia* and other generalised spartaeines that is identical to the situation of the conductor in *Wanlessia*. Outgroup comparison between spartaeines and other 'lower' salticids (i.e., those with female palpal claws and unreduced PME) suggest that a conductor and median apophysis are plesiomorphic for salticids. A more or less well developed conductor and median apophysis are present in the non-spartaeine genera *Cocalodes, Allococalodes, Holcolaetis* and *Sonoita* (Wanless, 1982, 1985) (figs. 16-21) and these are evidently homologous with similar structures of other spider families (cf. Coddington, 1990: figs. 9-21). It is worth noting that in none of the four genera mentioned above is there any indication of a tegular furrow or ventral tibial apophysis (as seen in *Wanlessia*



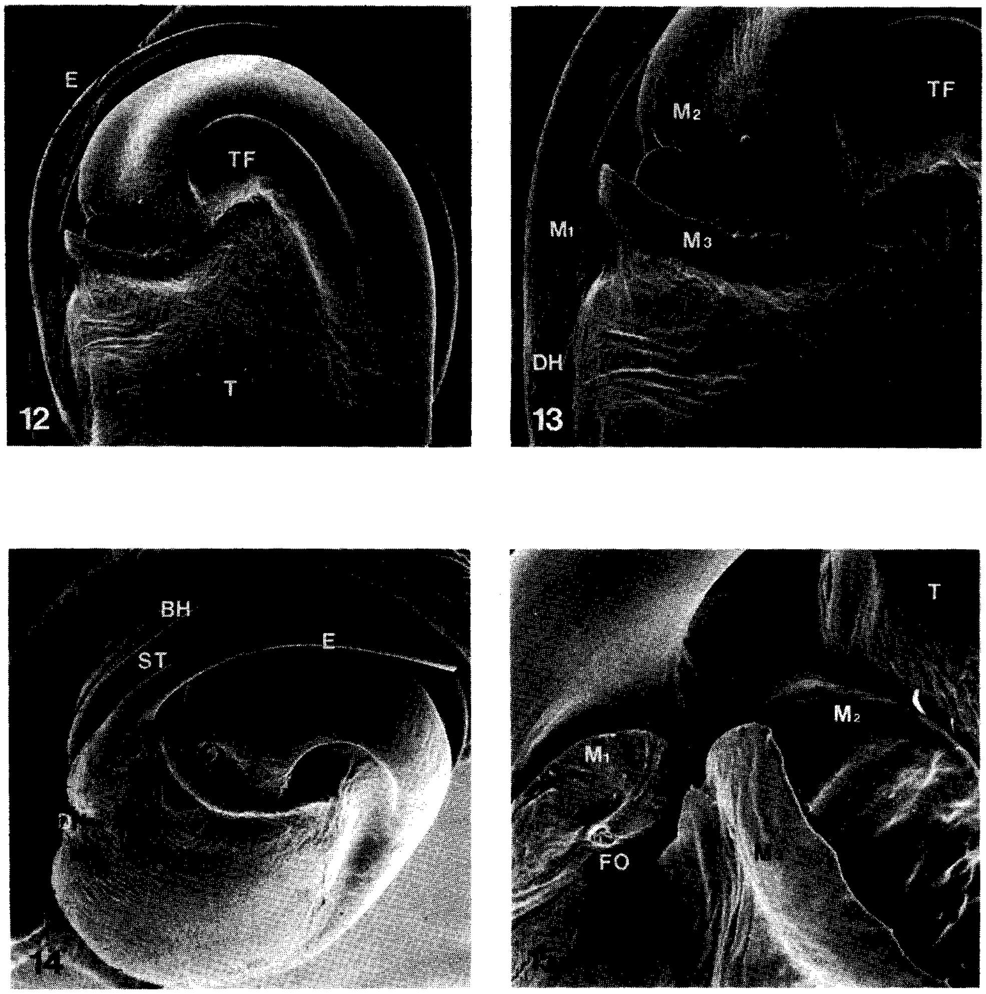
Figs. 1-4. *Wanlessia sedgwicki*, new species. 1, carapace and abdomen, dorsal. 2, carapace, lateral. 3, left leg I, retrolateral. 4, cheliceral dentition.



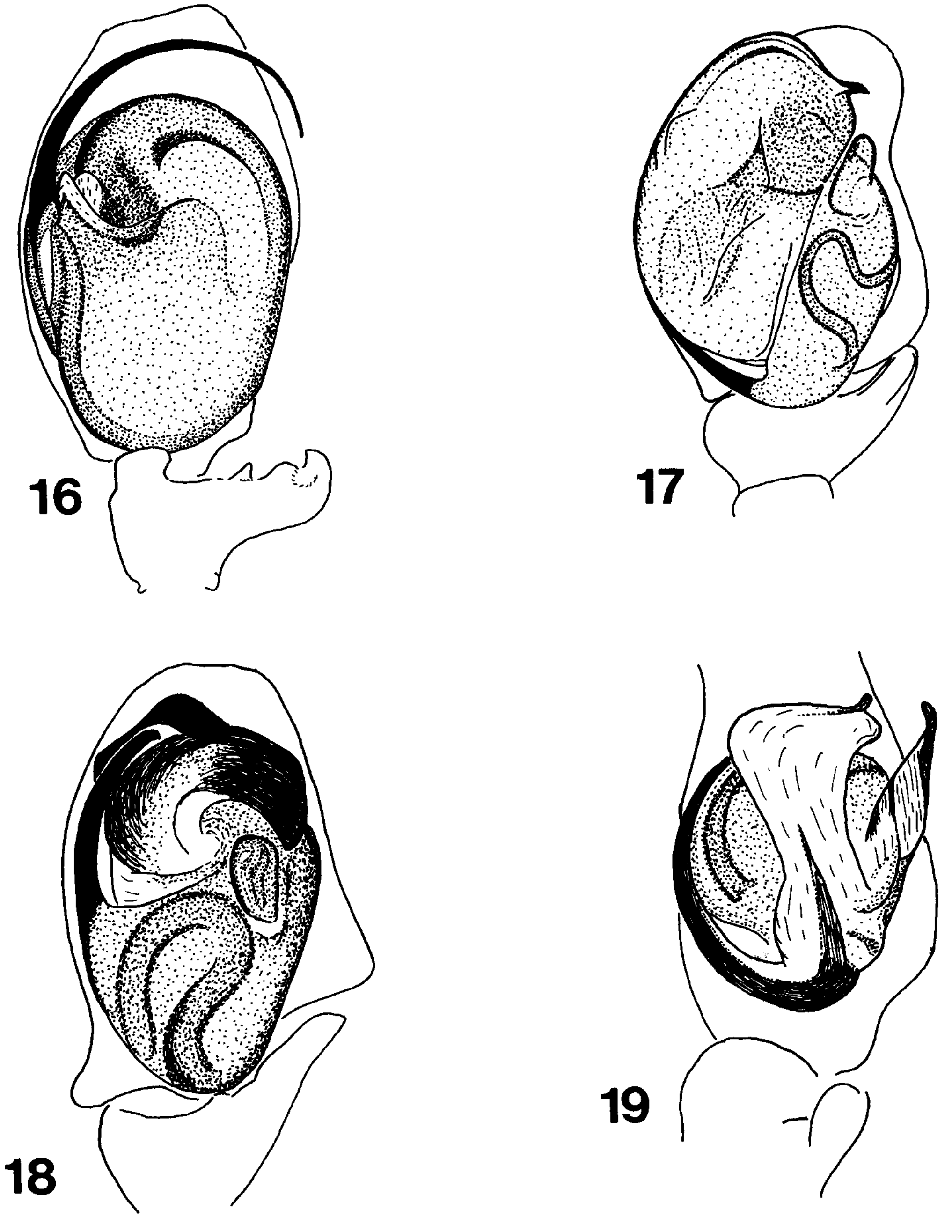
Figs. 5-7. *Wanlessia sedgwicki*, new species, left palp. 5, ventral; 6, dorsal; 7, retrolateral.



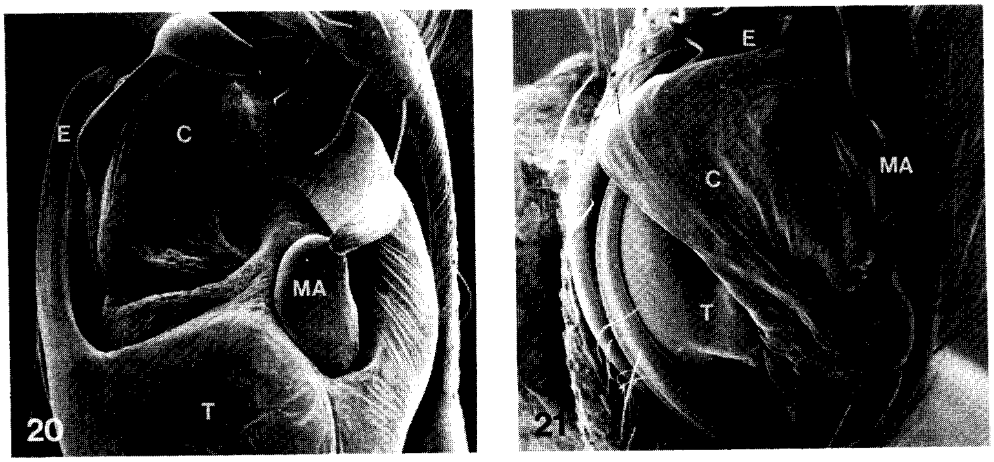
Figs. 8-11. *Wanlessia sedgwicki*, new species, SEMs of palp. 8, tarsus, ventral; 9, tibia, ventral; 10, tarsus, retrolateral; 11, tibia, retrolateral. (C-conductor, DRA-distal retrolateral tibial apophysis, E-embolus, MRA-median retrolateral tibial apophysis, T-tegulum, TF-tegular furrow, V-ventral tibial apophysis).



Figs. 12-15. *Portia schultzii* Karsch, SEMs of left palp. 12, anterior tegulum, ventral; 13, embolar base, processes M1-M3 and tegular furrow; 14, prolateral tegulum, anteroventral; 15, detail of processes M1-M3. (BH-basal haematodocha, DH-distal haematodocha, E-embolus, FO-funnel-like orifice, ST-subtegulum, T-tegulum, TF-tegular furrow).



Figs. 16-19. Comparison of palps of *Portia, Sonoita, Holcolaetis* and *Cocalodes*: 16, *Portia schultzii* Karsch; 17, *Sonoita lightfooti* Peckham & Peckham (after Wanless, 1985); 18, *Holcolaetis xerampelina* Simon; 19, *Cocalodes* cf. *longipes* (Thorell).



Figs. 20-21. *Holcolaetis* and *Cocalodes*, SEMs of palps. 20, *Holcolaetis xerampelina* Simon; 21, *Cocalodes* cf. *longipes* (Thorell). (C-conductor, E-embolus, MA-median apophysis, T-tegulum).

and other spartaeines). The distal haematodocha seen in *Portia* and other spartaeines is apparently absent or poorly developed in *Wanlessia*, though admittedly the insufficiency of material has precluded a detailed study. It is absent in *Holcolaetis* (figs. 18, 20), *Sonoita* (fig. 17) and *Cocalodes* (figs. 19,21). Thus the distal haematodocha appears to be synapomorphic for spartaeine genera excluding *Wanlessia* (i.e., those with the conductor transformed into the tegular ledge), as was suggested by Wanless (1984). Another palpal feature which occurs in different states in *Wanlessia* on one hand and other spartaeines on the other is the loop of the sperm duct in the tegulum before it reaches the embolus base. This loop, flexed towards the centre of the tegulum, is strongly developed in *Wanlessia* and the non-spartaeine genera *Holcolaetis* and *Sonoita* but is weakly sinuate in typical spartaeines. Since a strongly flexed sperm duct loop occurs in many other groups, inside and outside the Salticidae, this state could be considered plesiomorphic and the spartaeine condition apomorphic. It is probable that *Holcolaetis, Sonoita* and the spartaeines form a natural group on the basis of the shared possession of abdominal secretory fields but the distribution of this character needs to be surveyed further (Wanless, 1985).

These findings and interpretations have an important consequence to the search for the sister group of salticids. The possession of a palpal conductor, median apophysis and sub-terminally strongly looped sperm duct but absence of a tegular furrow or ventral tibial apophysis in the groundplan of the salticid palp may weaken the position of the Thomisidae as the sister group of salticids, suggested by Loerbroks (1984), on the basis of a functional analysis of the thomisid palp and similarities detected in spartaeines (tegular furrow, ventral tibial apophysis, with apparently similar operation during copulation). Clearly, any hypothesis of palpal sclerite homology must face the test of congruence with other characters, a point that can hardly be overemphasised in view of the disappointingly widespread homoplasy of these sclerites reported by Coddington (1990) in orbicularian groups. If the homology interpretations made here about palpal sclerites stand, the structural and functional similarities between thomisid and spartaeine palps must be regarded as non-homologous convergences.

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