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RELATIONSHIPS OF SPARTAEINE AND OTHER PRIMITIVE JUMPING
SPIDERS, WITH REVIEWS OF CYRBA AND COCALUS AND DESCRIPTION
OF A NEW GENUS (ARACHNIDA: ARANEAE: SALTICIDAE)

by

Dilrukshan Priyantha Wijesinghe

A dissertation submitted to the Graduate Faculty in
Biology in partial fulfillment of the requirements for the
degree of Doctor of Philosophy, The City University of New
York.

1997

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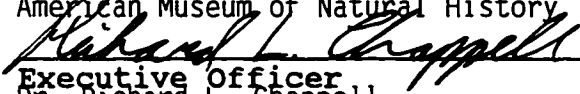
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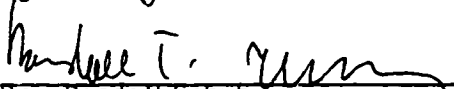
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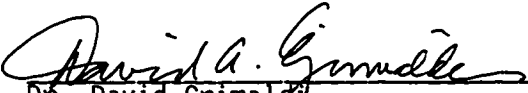
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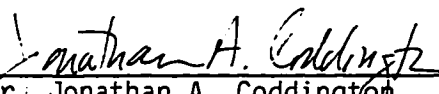

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Abstract

RELATIONSHIPS OF SPARTAEINE AND OTHER PRIMITIVE JUMPING
SPIDERS, WITH REVIEWS OF CYRBA AND COCALUS AND DESCRIPTION
OF A NEW GENUS (ARACHNIDA: ARANEAE: SALTICIDAE)

by

Dilrukshan Priyantha Wijesinghe

Adviser: Norman I. Platnick

The first part of this thesis is a phylogenetic analysis of several groups of primitive salticid spiders, together with exemplars of advanced salticids. These groups include the lyssomanines, spartaeines, and the Holcolaetis and Cocalodes groups. The phylogenetic analysis is preceded by accounts of previous attempts at classifying salticids and hypotheses of salticid relatives, followed by descriptions of the methods of data gathering and analysis employed, and an overview of salticid morphology. Characters used in the analysis are described and illustrated with line drawings. A total of 32 terminal taxa and 62 characters are utilized in the analysis, with a clubionid as the outgroup. The data are subjected to parsimony analysis, unweighted, with successive approximations weighting, and under implied weights. All the results agree on the following points, among others: monophyly of lyssomanines, monophyly of non-lyssomanine salticids, monophyly of spartaeines, monophyly of higher salticids plus

spartaeines, and monophyly of the Gelotia-Cocalus group within the spartaeinae. Based on the systematic analysis the subfamilies Lyssomaninae and Salticinae are redefined and the salticine tribes Holcolaetini, Cocalodini, Spartaeini and Salticini proposed. The lyssomanine Pandisus is synonymized with Asemonea, and the spartaeine Gelotia is synonymized with Cocalus. The second part of the thesis consists of a review, with phylogenetic analysis, of the spartaeine genus Cyrba. Cyrba india based on both sexes is newly described from India. Cyrba boveyi is synonymized with Cyrba nigrimana and the female previously associated with it and another female are described as new species (Cyrba kenya and Cyrba tanzania). The third part of the thesis consists of a review, with phylogenetic analysis, of the spartaeine genus Cocalus, including species previously placed in Gelotia and one formerly misplaced in Meleon. Meleon madagascarensis is transferred to Cocalus, while Gelotia argenteolimbata is synonymized with Cocalus frenatus. Species with a carapace prominence and a distinctive palp (Cocalus sensu Wanless) are considered to represent a single widespread species. The fourth part presents the description of a new genus and species of spartaeine salticid, Lankattus monticola, occupying a basal position in the larger of two major spartaeine clades.

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PART I-RELATIONSHIPS OF PRIMITIVE JUMPING SPIDERS

Introduction

The Salticidae is one of the most distinctive groups of spiders. Members of this family have a characteristic eye arrangement, with the median eyes of the anterior row enormously enlarged and the posterior eyes spaced apart in two rows on the dorsal surface of the carapace behind the anterior eyes. Due to this unique eye arrangement and their cursorial-saltatorial mode of locomotion, jumping spiders, as salticids are commonly called, are easy to recognize. In addition to their distinctive appearance jumping spiders also constitute one of the largest of spider families, with about 500 genera and some 4400 described species (Prószyński, 1990). These spiders occur in a wide range of habitats and in all parts of the world, but appear to be most diverse in the tropics. Jumping spiders are part of the predatory macro-invertebrate fauna of most terrestrial ecosystems, where they undoubtedly play a role in controlling insect populations, including species which are injurious to agriculture or which are of medical importance. Due to their highly developed eyes and unique visual abilities jumping spiders have attracted the attention of students of behaviour and visual physiology, though the number of species on which such studies have been done is still quite small (L. Forster, 1982a, 1982b).

History of Salticid Higher Classification

As for other families of spiders the most influential work on the classification of jumping spiders during the past century has been Eugène Simon's (1901-1903)

'Histoire Naturelle des Araignées'. In this work Simon recognized some 341 salticid genera which were placed by him in 71 'groups', arranged in three 'divisions'. Simon based his 'groups' on such features as position of eyes, shape of cephalothorax, sternum and labium, position of leg spines, and relative length of legs, while his three 'divisions' were based on the dentition pattern of the cheliceral retromargin: Pluridentati (several teeth), Unidentati (one tooth or none), and Fissidentati (one tooth with two or more cusps) (Cameron and Wijesinghe, in press). In retrospect, Simon's philosophy of classification can be thought of as eclectic, with general similarities being considered as equally useful for establishing supraspecific taxa as special similarities. That this could result in unnatural groups Simon was well aware, but he looked at his classification primarily from a utilitarian view point and considered ease of identification its main function.

Contemporaneously with the appearance of Simon's monograph F. O. Pickard-Cambridge published a

classification of salticids in a more limited work dealing with the Central American fauna (Pickard-Cambridge, 1897-1905). In this work Pickard-Cambridge grouped salticid spiders into two subfamilies, the Toxeinae (ant-like salticids) and the Salticinae (salticids that were not ant-like). In his discussion of salticid higher classification Petrunkevitch (1928) referred to Pickard-Cambridge's scheme with some approval, even though the latter's Salticinae (a classic 'not-A' group) included such diverse groups as the lyssomanines and the dendryphantines. More recently, a dichotomous classification of jumping spiders on lines similar to those of Pickard-Cambridge was adopted by Prószyński (1971).

Petrunkevitch (1928) criticized Simon's higher classification of salticids, particular his 'divisions' based on cheliceral dentition, yet formed his own classification of jumping spiders essentially on simple modifications of Simon's scheme. Petrunkevitch claimed that Simon's divisional grouping separated taxa that otherwise appeared to be closely related, but he continued to classify all jumping spiders into three primary divisions, as done by Simon, using cheliceral dentition. He made use of the information in Simon's monograph for grouping genera within the three 'divisions'. Based on the

information in Simon's keys, Petrunkevitch merged some of Simon's 'groups' to produce 23 subfamilies, to which he assigned (again based on Simon's data and keys) the 405 genera recognized by him.

Simon in his monograph regarded Lyssomanes and several other genera which were considered by him to be related (forming the group Lyssomaneae) as somewhat aberrant, providing a 'link' between the Oxyopidae and the Salticidae. ['Links' or 'intermediates' featured commonly in the 'chain of being' concept of systematic pattern to which many early systematists subscribed (Lovejoy, 1936).] In an important paper on the classification of spiders Petrunkevitch (1933) separated lyssomanines from other salticids as a family, based on the observation that the tracheae of typical salticids (e.g., Ballus, Evarcha, Heliophanus, Salticus, Sitticus) extended into the cephalothorax, whereas in Lyssomanes they were confined to the abdomen. Roewer (1954) adopted this modification to Petrunkevitch's earlier classification in his catalogue of spiders, with nine lyssomanine genera forming the Lyssomanidae and 464 genera of 'typical' salticids, grouped into 22 subfamilies, forming the Salticidae. Within subfamilies genera were arranged into 'groups', based on Simon's original divisional and group classification.

This was essentially the state of salticid classification until Prószyński's (1976) landmark paper. Prószyński used genitalic features, particularly the conformation of the male palpal organ, to reclassify into eleven subfamilies various jumping spiders from the Holarctic region and elsewhere. Within some of Prószyński's subfamilies genitalic features appeared to be remarkably uniform (e.g., dendryphantines, euophryines) and these groups appeared to show little agreement with the groups recognized by previous authors such as Simon (1901-1903) and Roewer (1954). These findings were responsible for the emerging view that natural groups within the Salticidae could be characterized more reliably by special genitalic similarity than by features such as body shape and relative position of eyes, which were difficult to homologise with much confidence.

Another outcome of Prószyński's study was the realization that the classical 'unidentate' and 'fissidentate' cheliceral dentition patterns were related conditions, i.e., homologous states. This conclusion came from the fact that groups such as the euphryines and dendryphantines which had been delimited by special genitalic similarity were either unidentate or fissidentate but not pluridentate. This and a number of other characters bearing on the higher phylogeny of

salticids were discussed by Maddison (1987) in one of the most important recent contributions to the subject. Maddison proposed that the reduction of retromarginal cheliceral dentition to a single tooth (unidentate and fissidentate conditions) and the presence of the cheliceral medial mound, a newly discovered character, among others, delimited the higher salticids, his Salticinae division. Simon's 'Pluridentatae' was clearly a paraphyletic assemblage of unrelated salticids.

Simon's pluridentate group Lyssomaneae was defined by the posterior position of the anterior lateral eyes and the presence of a medio-apical spine on the leg patellae. Ever since Petrunkevitch's separation of Lyssomanes from other salticids at the family level on grounds of restriction of the tracheal system to the abdomen the systematic position and rank of Lyssomanes and putative relatives has been a matter of debate, even though the close relationship between 'lyssomanines' and other salticids has never been in serious doubt. As pointed out by Galiano (1976), in some species of Lyssomanes the tracheae extend into the cephalothorax and a posterior position of the anterior lateral eyes is also seen in certain other genera (Athamas, Synemosyna, Viciria) which clearly belong with higher salticids. Also, although the medio-apical leg patellar spine had been used by Simon to

define the group it was actually characteristic only of Lyssomanes and Chinoscopus, the two New World genera. These findings cast considerable doubt on the validity of the group as a whole.

From 1978 to 1988 F. R. Wanless published an impressive series of important revisions of pluridentate Old World salticids which extended considerably our knowledge of the morphology of many previously poorly known taxa. Wanless's studies concerned the following 'groups' in Simon's classification: Lyssomaneae (Old World genera), Boetheae, Cocalodeae, Cocaleae, Lineae, Codeteae, Astieae, Cyrbeae, Hisponeae and Holcolaeteae, plus scattered genera in other groups. The main 'groups' studied by Wanless represented the following subfamilies in Petrunkevitch's (1928) classification: Lyssomaninae (Lyssomanidae; Petrunkevitch, 1933) (Lyssomaneae), Boethinae (Boetheae, Cocaleae, Cocalodeae, Holcolaeteae and Lineae), Magoninae (part, only Astiae and Codeteae) and Thiodininae (part, only Cyrbeae and Hisponeae).

The traditional concept of the family Salticidae included, in addition to the unique eye arrangement, features such as the absence of a female palpal claw, reduction of the posterior median eyes, absence of leg scopulae and asymmetry in the leg claw dentition. Wanless's studies revealed that at least some of these

features were not applicable to the pluridentate taxa studied by him. In addition to displaying features atypical of salticids, such as the presence of female palpal claws, many of the jumping spiders studied by Wanless possessed relatively large posterior median eyes, unlike typical higher salticids in which these eyes are reduced to a vestigial condition. Petrunkevitch (1928) had combined in one subfamily, the Boethinae, those groups in Simon's classification which contained salticids with relatively large posterior median eyes. Wanless's revisionary studies on 'boethines' and other pluridentate taxa led to the discovery that many of these genera shared a number of features of the male palp not seen elsewhere within the Salticidae. This enabled Wanless to drastically redefine the subfamily, removing several genera while adding some others (including a number of new genera), with a change in name (Boethinae to Spartaeinae) being necessitated as a result of homonymy involving the nominate genus Boethus (now Spartaeus).

Studies of lyssomanines, spartaeines, and a few other taxa by Wanless and others have suggested that these are primitive salticids, not closely related to 'typical' or 'higher' jumping spiders. Because of the relatively basal position occupied by these spiders in the family Salticidae a resolution of the major patterns of

diversification among jumping spiders hinges on understanding the relationships of these taxa to each other and to higher salticids. The present study is a preliminary attempt to discover the basal branching pattern of jumping spiders, by means of a cladistic analysis of lyssomanines, spartaeines, members of the Cocalodes and Holcolaetis groups and the higher salticids.

Salticid Relatives

Simon (1901) considered salticids to be related to the Oxyopidae and Thomisidae. In particular, he indicated the Lyssomaneae as forming a link between the Oxyopidae and Salticidae. Salticids have been associated with oxyopids also by Lehtinen (1975) on grounds of similarities in setal morphology. However, his comparison was between oxyopids and advanced salticids rather than basal salticids and the similarities detected by him are clearly convergences. Salticids have been associated with thomisids by Loerbroks (1984) on grounds of similarities in thomisid and spartaeine male palpal morphology and function.

Petrunkévitch (1928, 1933) associated the Salticidae with the Clubionidae in his *Dionycha* (two-clawed araneomorphs) based on the presence of a simple four-tubed tracheal system restricted to the abdomen in clubionids

and lyssomanines. He regarded the more complex tracheal pattern of typical salticids a feature peculiar to them. In their valuable review of spider higher phylogeny Coddington and Levi (1991) also favoured a 'clubionoid' relationship for jumping spiders. The Dionycha and several related entelegyne taxa were placed within the so-called 'RTA Clade', an informal group characterized by the possession of a retrolateral tibial apophysis on the male palp. Within the Dionycha Coddington and Levi placed the Clubionidae, Anyphaenidae and Salticidae together, citing the apparent secondary loss of cylindrical silk gland spigots in these three families. Other taxa placed in the Dionycha by these authors include the corinnids and liocranids, gnaphosoids, thomisids, zorids, selenopids, sparassids, and philodromids.

Ono (1987) in discussing the spider Humua takeuchii referred to the relatively large size of the anterior median eyes and arrangement of the posterior eyes in this species and described these as 'prototypal' of the condition of the eyes of salticids. However, other than the size of the anterior median eyes the arrangement of the eyes in Humua is only superficially similar to that of salticids. In Humua the two pairs of posterior eyes are of similar diameter, while the anterior lateral eyes are the smallest; in contrast, in all salticids the anterior

laterals are similar in size to the second row posterior eyes, while the first row posterior eyes are always the smallest, even when they are not vestigial. In other respects Humua appears to be a typical castianeirine corinnid.

Methods of Examination

Specimens of spiders used in this study were obtained from various collections (see Appendices 1 and 2). The specimens were examined in washed sand, in 70% ethanol, under a dissecting microscope with top illumination and a magnification of up to 100X. Illustrations were made with the aid of a camera lucida attached to the microscope. In a few cases where dissection of specimens was not possible or where specimens could not be obtained for detailed examination information was obtained also from the descriptions provided by Wanless (1978-1988).

Specimens used for scanning electron microscopy (SEM) were cleaned in an ultrasonic cleaner for a few minutes in 70% ethanol before subsequent preparation. The cleaned specimens were dehydrated gradually up to 100% ethanol, critical point dried, mounted on SEM stubs, sputter coated and examined under the scanning electron microscope. Female genitalia and male palps were subjected to additional preparation before drying and mounting as described below.

Female Genitalia: In order to examine the spermathecae and ducts under the light microscope a clearing agent (e.g., clove oil) is normally used to render the muscle and other soft tissue transparent. For SEM studies these tissues need to be removed completely and this is usually done by treating the specimen with a warm solution of potassium hydroxide. However, as pointed out by Sierwald (1989, 1990a), the potassium hydroxide invariably attacks the more fragile structures of the spermathecae and ducts, rendering this method unsatisfactory for critical studies. An alternative method using an easily available proteolytic enzyme was described by Sierwald (1990a) and adapted for the present study. After dissecting it out the epigynal region was soaked in distilled water for about an hour to get rid of some of the alcohol in the specimen. It was then treated with an enzyme ('ReNu Effervescent Enzymatic Contact Lens Cleaner', active ingredient subtilisin; Bausch and Lomb, Rochester, New York) in order to remove muscle and other soft tissue obscuring the sclerotised internal parts of the genitalia (spermathecae and associated ducts). The enzyme solution was made by dissolving one enzyme tablet in about a milliliter of distilled water and the specimens were left in the solution for 1-3 days. Following complete digestion of the soft tissue the specimen was very briefly

cleaned in an ultrasonic cleaner in distilled water and dehydrated gradually up to 100% ethanol. Some amount of additional manual cleaning was usually necessary, in particular to remove the transparent membrane which stretches between the two apodemes of the fertilization ducts and partly covers the spermathecae and ducts dorsally. The cleaned and dehydrated specimens were then critical point dried and mounted as described above.

Male Palps: In order to examine the individual components of the male palpal organ it is necessary to expand the palp artificially. This simulates the conformation of the palp during copulation, when the palp is expanded as a result of increased hydrostatic pressure within the palp causing flexible and expandable membranous hematodochae to inflate and untwist, exposing sclerites which are hidden in the unexpanded palp. Artificial expansion of spider male palps is generally achieved by treating the specimen with hot potassium hydroxide followed by immersion in distilled water. Exposure to the potassium hydroxide solution softens the membranous hematodochae while immersion in distilled water leads to the expansion of the hematodochae through osmosis. As shown by Sierwald (1990b), however, although the hot potassium hydroxide-distilled water treatment is quick the highly corrosive effect of the hot alkali can severely

damage palpal structures. The alternative procedure used in this study was that suggested by Sierwald using a weak cold solution of potassium hydroxide in which the specimens were left overnight or longer (depending on the degree of sclerotization of the specimen) followed by immersion in distilled water. Once expanded the palps are usually stored and examined in distilled water to avoid collapsing inflated membranes. Solutions used in preparing the specimens should be free of particles which may adhere to the alkali treated specimens. Because of the danger of disrupting the fragile hematodochae cleaning by ultrasonic treatment cannot, of course, be used once the palps are expanded.

The possibility of collapsing membranes during dehydration in preparing the specimens for SEM studies has generally been viewed as precluding examination of expanded palps using SEM. In the course of this study, however, it was found that fully expanded palps could be dehydrated, critical point dried and examined by SEM without significant collapsing of hematodochae. The key to successfully achieving this lies in ensuring that the palps are initially expanded completely and then dehydrating the specimens slowly, by adding alcohol at first drop-wise to the distilled water containing the specimens. Although some amount of shrinking/collapsing is

unavoidable, particularly during critical point drying, satisfactory results were generally obtained with palps which had been expanded completely. The critical point dried palps were mounted on metal points (made by clipping off the tips of entomological 'minuten' pins) which in turn were cemented to SEM stubs. The metal points enabled better viewing of the specimens than is possible when the specimens are mounted on the stubs directly.

Methods of Analysis

Classifications of organisms based on recency of common ancestry, using character data and the principle of parsimony, have been shown to be the best general reference system for biology and the most efficient summary of information concerning the organisms (Hennig, 1966; Farris, 1983). Classifications derived in this manner are predictive (Nelson and Platnick, 1981) and can inform and guide studies ranging from behaviour to ecology (Brooks et al., 1995). Such classifications can play an important role in making decisions concerning the allocation of limited resources for the conservation of biological diversity (Stiassny, 1992).

The unweighted data obtained in this study (see matrix, Table 1) were analysed with the aid of the computer programs Hennig86 (Farris, 1988) and NONA

(Goloboff, 1993c) which run on IBM PC compatible microcomputers using MS-DOS. Character polarization was achieved using the species Clubiona pallens (as a representative of the family Clubionidae) as an outgroup. All characters were treated as nonadditive (unordered) (command ccode-.), in the absence of convincing external evidence about the relationship of states within characters. For Hennig86 a heuristic tree search procedure using the command sequence mhennig*; bb*; was used as the exact algorithm (using the command ie) was found to be too time consuming.

Since homoplasy appeared to be a significant factor in the dataset, leading to character conflict and excessive multiple equally parsimonious trees, successive approximations weighting was used with the Hennig86 analysis (Farris, 1988; Carpenter, 1988). Here, the command xsteps w is used to set character weights according to their fit to the trees in the input tree file, based on the product of the character consistency and character retention indices. Successive approximations weighting was implemented using the command sequence mh*; bb*; xs w; cc; iteratively until the character weights (and tree lengths) no longer changed.

In addition to Hennig86 and NONA Goloboff's Pee-Wee (Goloboff, 1993b), another MS-DOS-based parsimony analysis

program, was used in the analysis of the data. The theoretical aspects of Pee-Wee have been dealt with by Goloboff (1993a). Like successive approximations weighting Goloboff's method uses homoplasy to estimate character weights but, unlike successive approximations weighting, it is not an iterative procedure. Tree search and calculation of character weights are combined by searching for the trees with maximum total fit, where character fit is defined as a concave function of homoplasy. According to this view not all extra steps in characters on a tree are equal: an extra step in a 'good' character (one with less homoplasy) is more significant than an extra step in a 'bad' character (one with more homoplasy). All characters were treated as unordered and tree searching was done with the command sequence hold 100; hold/20; mult*15;, recommended by Goloboff as the best searching strategy for most data sets.

Salticid Morphology

The basic morphology of jumping spiders is similar to that of other spiders. The body consists of an anterior cephalothorax (prosoma) and a posterior abdomen (opisthosoma), attached via a narrow pedicel. The eyes of the anterior row occupy the vertical front surface of the cephalothorax, dominated by the large anterior median eyes

which are flanked by the smaller anterior laterals. The posterior eyes (posterior medians and posterior laterals) are situated behind these in two rows and a slit-like fovea of variable extent is located between the posteriormost eyes. The cephalothorax is broad and somewhat elevated in the region of the eyes and slopes down posteriorly behind the ocular quadrangle towards the lateral and posterior margins. The prosoma is usually clothed with hairs and a variable number of stronger setae occur near the eyes and on the clypeus. The anterior eyes are typically fringed with the forward directed tips of hairs covering the carapace and clypeus. Three relatively strong anteriorly directed setae occupy the center of the clypeus forming a medial triad between and just below the anterior median eyes, with one or two pairs of similar setae located below each anterior median eye. The clypeal margin is furnished with a row of shorter setae.

The chelicerae are vertical and sometimes display sexual dimorphism, in which case the chelicerae of the male are much longer than those of the female. The medial margin of the basal segment or paturon is armed along its anterior (pro-) and posterior (retro-) margins with several teeth. The patterns of retromarginal cheliceral dentition have featured prominently in salticid classifications. The medial margin of the paturon may have

a small seta-bearing tubercle, the medial cheliceral mound, in some taxa. The apical cheliceral segment or fang is finely serrated along its inner margin, with an opening for the venom duct on the outside close to the tip. The maxillary endites and labium are relatively unmodified, with a single-rowed serrula along the anterolateral margins of the former. The palpi of females are also relatively unmodified, with a terminal tarsal claw in some taxa which is absent in higher salticids. The legs are variable in structure, hair covering and spination pattern. In some taxa the leg segments may be slender and long, while in others they may be short and robust. Leg spination patterns were used by Simon in his keys to salticid groups and are still of value in diagnosing some taxa, e.g., the spination pattern of the femora shows similarities among salticids excluding lyssomanines, while the medioapical leg patellar spine of Lyssomanes and Chinoscopus is a special similarity shared by these two genera. Hair fringes or tufts are sometimes present on the ventral or dorsal surfaces. In a few spartaeine taxa the femora of the first pair of legs in males may carry ventrally a pore-bearing tubercle or groove (femoral organ). Claw tufts are present but scopulae are typically absent, except in some basal taxa. When reduced the scopulae may be recognized by their more or less notched

sockets. The tarsal claws carry teeth, except in some taxa with extreme tarsal claw asymmetry when the posterior claw may have few teeth compared to the anterior claw or none at all. The tarsal organ is a simple round or drop-shaped hole. The tarsi and metatarsi carry several trichobothria along their dorsal surface in a single row, with the pattern on the tibia being less regular. They increase in length towards the distal end of each leg segment. The trichobothrial bases are longitudinally finely ribbed in some taxa (similar to sculpture of body surface) while they are transversely pleated more coarsely in others.

The oval or elongate abdomen is normally clothed with fine setae and hairs. These hairs, like the hair covering elsewhere on the body, are morphologically diverse with a wide range of shape and structure. In spite of this diversity a distinction can be made between simple hairs with widely spaced branches and complex hairs with typically an elongate leaf like shape and a ventral longitudinal ridge, usually with closely spaced branches which may be modified into a more solid structure. On the abdominal dorsum typically two or three pairs of sigilla marking dorso-ventral muscle attachment sites can be seen. In some salticids a patch of integument between the first pair of sigilla is modified to form a fairly characteristic pustuliform or mytiliform field comprising

of many small round or mussel shell shaped smooth pore-bearing areas with raised margins. These fields were suspected by Wanless (1984b) to be pheromone dispersing organs but to date such a function for these structures has not convincingly been demonstrated. Ventrally on either side of the genital fold are situated the book lungs. The tracheal spiracle is indistinct and located close to the spinnerets. A colulus appears to be absent although a pair of setae at the base of the spinnerets may mark its position. The anterior lateral spinnerets are moderately robust, close together, with the apical article bearing numerous piriform gland spigots and a pair of major ampullate gland spigots. The base of one of the ampullate gland spigots is excavated and curved round the base of the other. The small posterior medial spinnerets bear several to many aciniform gland spigots and two larger spigots which appear to be ampullate gland spigots. The posterior lateral spinnerets are elongate, with a moderately long apical article which typically bears numerous aciniform spigots. Aciniform spigots appears to be the only type of spigot present on the the posterior lateral spinnerets. The short conical anal tubercle is located close to and just above the bases of the posterior lateral spinnerets.

The female genitalia of jumping spiders are of the entelegyne type (R. R. Forster, 1980), with a sclerotized

ventral plate (epigynum), spermathecae, copulatory ducts and separate fertilization ducts. The pore-bearing heads of the spermathecae (Sierwald, 1989) are generally conspicuous in appropriately prepared material. Considerable variation on this basic pattern is seen between different taxa and even between apparently related species.

As in all spiders the palp of male salticids forms an intromittant organ which is engaged with the female epigynum during copulation. The palpal organ of jumping spiders is generally thought of as a relatively simple structure. While this may be the case for higher salticids observations on certain others show that this is not true for many taxa occupying a basal position in salticid phylogeny. The major features of palpal organ morphology among spiders belonging to the larger groups containing the Salticidae (Dionycha and 'RTA Clade') appear to be fairly uniform. Sierwald (1990) has provided a particularly valuable discussion of palpal organ morphology based on the Pisauridae. Interestingly, many of her general observations are applicable also to the palps of salticids.

The palpal organ is formed by expansion and ventral excavation of the distal segment (tarsus) to form a cup-like cymbium within which is located the rigid sclerotized

structures and flexible membranous components that together make up the palpal organ. Immediately attached to the margins of the cymbial excavation (alveolus) is a fairly large membranous balloon-like structure, the basal hematodocha. The basal hematodocha is attached at its distal end to a more or less ring like plate, the subtegulum, which is dorsoventrally somewhat expanded at the near margin to form the lunate plate. Weakly sclerotized parallel extensions from this structure form annuli holding the folds of the basal hematodocha in concertina-like fashion. A more or less elongate sclerite, the petiole, forms an articulation between the near edge of the alveolus and the lowermost or basal annulus of the subtegulum. The tegulum, usually the main plate-like structure visible in ventral view of the unexpanded palp, is attached to the subtegulum by a second membranous component, the median hematodocha. Unlike the basal hematodocha, however, the median hematodocha is not extensive. The tegulum and its associated sclerites form a relatively complex structure. Due to the considerable diversity in shape and conformation of some of these elements formulation of homology statements involving these components is difficult. Arising from the prolateral region of the tegulum is the more or less slender and elongate embolus, a spiniform structure which enters the

female's copulatory ducts during mating and delivers sperm into the spermathecae. While the embolus appears to be fixed and continuous with the prolateral tegular margin in some taxa in others it forms a clearly distinct and separate sclerite articulating with the tegulum. Sperm is delivered to the embolus via the sperm duct which traverses the tegulum. Its proximal end forms a reservoir or fundus within the subtegulum and is usually visible through the lunate plate. In many taxa the terminal opening of the embolus is entire and the sperm duct contents evidently pass through the hollow embolus to reach the opening. In the spartaeines, however, the embolus bears a distinct groove along its inner edge which is continuous with the terminal opening and ends proximally in a funnel-like orifice or groove at the inner margin of the embolus base. In the aberrant genera Asemonea and Pandisus the base of the embolus is very greatly modified, forming a flat plate-like structure superficially taking on a tegulum-like appearance. This is particularly marked in Asemonea and apparently even misled Wanless (Wanless, 1980c: fig. 10F), who referred to the true tegulum of this genus as the 'subtegulum' and misidentified the expanded embolar base as the 'tegulum'. In spartaeines the tegulum bears a usually more or less crescentic groove, the tegular furrow. Two tegular

sclerites, the median apophysis and conductor, are commonly recognized in the male palps of spiders. Of these the term median apophysis is usually applied to a short hook-shaped, pointed or rounded structure arising from the tegulum usually via a flexible base or socket. The term conductor is applied to a usually rather wide sclerite which supports or protects the embolus. Among higher salticids no tegular sclerites corresponding to a median apophysis or conductor are usually seen. In the spartaeines only Wanlessia shows a well developed conductor (Wijesinghe, 1992). In other spartaeines the tegular extension referred to as M3 by Wanless (1984a) appears to represent in a reduced form the type of conductor seen in Wanlessia. The palpal tibia (and sometimes other segments) carry apophyses which presumably facilitate engaging of the palpal organ and female epigynum during copulation. The retrolateral tibial apophysis appears to delimit a major group of spiders including jumping spiders and other dionychans. In spartaeines in addition to a retrolateral apophysis the palpal tibia possesses a ventral apophysis. Together with the tegular groove the ventral tibial apophysis appears to form a special mechanism for aligning the palpal organ while rotating during copulation by the action of expanding and untwisting hematodochae (Loerbroks, 1984),

and appears to be convergently developed in spartaeine salticids and thomisid crab spiders.

Descriptions of Characters

Character 0: Diameter of anterior median eyes. States:

Much greater than other eyes-1 (Figs. 21, 29, 53, 65, etc.), Not much greater than other eyes-0 (Fig. 1).

Character 1: Arrangement of posterior eyes on dorsum of

carapace. States: Spaced apart in two rows (well separated from anterior eyes)-1 (Fig. 28, 53, 93, etc.), In a single row-0 (Fig. 1).

Character 2: Clypeal setal triad. States: Distinct with

unpaired (superior) seta inferior to centers of anterior median eyes-1 (Fig. 29, 55, 65, 301, 355, etc.), Setal triad indistinct or unpaired seta superior to centers of anterior median eyes-0

Character 3: Female palpal claw. States: Vestigial or

absent-1 (Fig. 358, 368), Well developed-0 (Fig. 255)

Character 4: Position of first (distal) prolateral spine

on leg femora II-IV. States: Close to first (distal) dorsal spine (relative to retrolateral spine)-1 (Fig. 192), Not appreciably close to first (distal) dorsal spine-0 (Fig. 30).

Character 5: Seta-bearing tubercle (cheliceral mound) on

proximal medial margin of chelicerae. States: Present-1 (Fig. 357, 365), Absent-0.

Character 6: Position of second prolateral spine on leg femora leg II-IV. States: Distally shifted and located next to first prolateral spine-2 (Fig. 367), Distally shifted to between first (distal) and second dorsal spines-1 (Fig. 210), Not distally shifted (about same level as second dorsal spine)-0 (Fig. 38).

[Inapplicable when second prolateral spine is absent as in Neobrettus tibialis, Spartaeus spinimanus, Asemonea tenuipes and Onomastus nigricauda.]

Character 7: Position of second retrolateral spine on leg femora II-IV. States: Distally shifted and located closer to first dorsal/prolateral spine than to second dorsal spine-2 (Fig. 367), Distally shifted to midway between first (distal) and second dorsal spines-1 (Fig. 235), Not distally shifted (about same level as second dorsal spine)-0 (Fig. 38). [Inapplicable when second retrolateral spine is absent as in Neobrettus tibialis, Phaeacius wanlessi, Asemonea tenuipes, Onomastus nigricauda and Phidippus audax.]

Character 8: Size of posterior median eyes. States: Minute (diameter much less than 0.5 diameter of anterior lateral eyes or posterior lateral eyes)-1 (Fig. 21, 93, 363), Not minute (diameter about 0.5 or greater than diameter of anterior lateral eyes or posterior lateral eyes)-0 (Fig. 1, 120).

- Character 9: Medioapical (distal dorsal) spine on leg patellae (at least legs III-IV). States: Present-1 (Fig. 37), Absent-0.
- Character 10: Tegular furrow. States: Long and shallow-1 (Fig. 167, 201), Pit-like and retrolateral-2 (Fig. 117), Pit-like and prolateral-3 (Fig. 304), Absent-0.
- Character 11: Ventral tibial apophysis of male palp. States: Present-1 (Fig. 259), Absent-0.
- Character 12. Number of teeth on cheliceral retromargin. States: One-1 (Fig. 364), Many-0 (Fig. 96).
- Character 13: Number of robust retrolateral/dorsal spines on female palpal tarsus. States: One or none-1 (Figs. 197, 368, 358), Two or more-0 (Fig. 24, 149, 302).
- Character 14. Groove along inner edge of embolus from distal opening to base. States: Present-1, Absent-0
- Character 15: Size of apically directed membranous flap (M1) at embolus base. States: Moderate-1 (Fig. 245), Large leaf shaped-2 (Fig. 156, 167), Small-3 (Fig. 322), Large petal shaped-4 (Fig. 131), Long filament like-5 (Fig. 216), Absent-0
- Character 16: Funnel-like orifice or groove at inner margin of embolus base. States: Present-1, Absent-0
- Character 17: Medial apophysis of tegulum. States: Absent-1, Present-0 (Fig. 72)
- Character 18. Structure of conductor. States: Membranous-3 (Figs. 45, 47), Absent-2, Modified as tegular ledge

(with extension M3)-1 (100, 103, 201), Modified as
tegular shelf (with no extension)-4 (Fig. 346, 349),
Well developed and supporting embolus-0 (Fig. 25, 72,
90)

Character 19: Structure of base of embolus. States:

Flattened and plate-like (teguliform)-1 (Figs. 59, 61,
63), Not flattened (not teguliform)-0

Character 20: Ventral groove in male palpal femur. States:

Present-1, Absent-0

Character 21: Distal ventrolateral spiniform apophysis on

male palpal femur. States: Present-1, Absent-0

Character 22: Dorsal apophysis on male palpal tibia.

States: Present-1 (Fig. 61), Absent-0

Character 23. Fan-like (not diffuse) ventral hair fringes

on anterior tibiae. States: Present-1 (Figs. 177, 195,
249, 274A), Absent-0

Character 24: Anterior tarsi ventro-prolaterally with

scopular hairs with notched sockets. States: Absent-1,
Present-0

Character 25: Retrolateral anterior tegular shoulder.

States: Present-1 (Figs. 201, 347, 361), Variable
(shoulder not distinct)-0

Character 26: Retrolateral tibial apophysis of male palp.

States: With a section clearly separated from rest of
apophysis by a membranous area or socket-1 (Figs. 90,

181, 279, 286, 312), Retrolateral tibial apophysis
apparently entire-0

Character 27: Number of teeth on cheliceral promargin.

States: Two-2 (Fig. 356), Three-1 (Fig. 96), More than
three-0

Character 28: Structure/position of ventral pore-bearing

area (femoral organ) on male femur I. States: Proximal
groove-1 (Fig. 194), Mid-proximal more or less acute
tubercle with pores on proximal face and no surrounding
hairs-2 (Figs. 145, 146, 147, 295, 338, 339), Distal
slightly raised area (not tubercle) with surrounding
hairs-3 (Figs. 111, 113), Femoral organ absent-0

Character 29: Shape of tarsal organ opening (male leg I).

States: Circular or drop shaped-1, Proximal edge
extended into a slit (keyhole shaped)-0

Character 30. Surface structure of trichobothrial base

(distal trichobothrium of male metatarsus I). States:
With only longitudinal ridges-1, With only transverse
pleats-2, base poorly developed with no distinct
sculpture-3, With longitudinal ridges proximally and
transverse pleats distally-0

Character 31: Tarsal claws (male tarsus I). States:

Strongly dissimilar with posterior claw having much
shorter/fewer teeth than anterior claw or no teeth at
all-1, claws similar or only moderately dissimilar-0

- Character 32. Groove along distal edge of tegulum (for reception of embolus). States: Present-1, Absent-0
- Character 33. Shape of cymbium distal to alveolus. States: Digitiform-1, Not digitiform-0
- Character 34: Strong medioapical (distal dorsal) spine on female palpal patella. States: Present-1, Absent or weak (hair-like)-0
- Character 35: Position of anterior lateral eyes. States: superior and posterior to anterior median eyes-1 (Figs. 53, 66), About the same level as anterior median eyes-0 (Figs. 93, 353)
- Character 36: Dorsal cymbial-tibial articulation of male palp consisting of proximal lobe-like apophysis on cymbium and distal apophysis on tibia. States: Present-1 (Figs. 260, 323), Absent-0
- Character 37: Conformation of embolus. States: curved upward towards alveolus-1 (Figs. 238, 243, 259, 277, 287, 292, 306, 307, 321, 332), Not curved upward-0
- Character 38: Structure of membranous process M2 of spartaeine distal hematodocha. States: Lobe-like-1, Distally enlarged and massive-2 (Figs. 243, 245, 309, 332), Distally extended and delicate (Mintonia)-3 (Figs. 100, 106), Spartaeus type-4 (Figs. 139), Absent-0

- Character 39: Well developed horn-like ventral process on male intercheliceral sclerite. States: Present-1 (Figs. 84, 85), Absent-0
- Character 40: Proximal retrolateral alveolar margin of cymbium produced into a distally acute and thin hyaline extension closely applied to tegulum. States: Yes-1 (Figs. 181, 168), No such cymbial modification-0
- Character 41: Intercheliceral sclerite length. States: Short-1 (Fig. 366), Long-0 (Fig. 68)
- Character 42. Convexity of anterior median eyes lenses. States: Strongly convex-1 (Figs. 28, 53, 66), Moderately convex-0 (Figs. 93, 271, 353, 363)
- Character 43: Position of thoracic fovea. States: Between or only slightly behind posteriormost eyes-1 (Fig. 353), Well behind posterior eyes-0 (Fig. 53)
- Character 44. Lateral patellar spines (at least on legs III-IV). States: Absent-1 (Fig. 37), Present-0
- Character 45: Size and arrangement of cheliceral retromarginal teeth. States: Minute and spaced apart-1, Minute and contiguous-2, Not minute-0
- Character 46. Abdomen dorsally with a pair of strong hair tufts on posterior third. States: Present-1, Absent-0
- Character 47: Path of sperm duct on prolateral tegulum before reaching embolus base. States: Close to tegular edge without loops-1 (Figs. 100, 141, 261), Not so-0

- Character 48: Male with dorsal abdominal secretory field between first pair of sigilla. States: Present-1, Absent-0
- Character 49: Female with dorsal abdominal secretory field between first pair of sigilla. States: Present-1, Absent-0
- Character 50: Number of rows of tarsal trichobothria (male leg I). States: One-1, Two-0
- Character 51: Complex scales with keeled central shaft on abdomen. States: Palm leaf type-1, Solid multishafted-2, Absent-0
- Character 52: Embolus origin on tegulum. States: Embolus well separated from and articulating with tegulum-1 (Figs. 18, 25, 43, 48, 59, 60), Embolus more or less continuous with tegulum or only separated by a membranous area-0 (Figs. 5, 72, 184)
- Character 53. Position of prolateral extensione (M3) of tegular ledge. States: Anteriorly shifted-1 (Figs. 227, 239, 258, 279, 286, 291, 304, 309, 322, 331), Not anteriorly shifted-0 [Inapplicable where no tegular ledge is absent.]
- Character 54: Male palpal tibia with heavily pigmented ridge ventro-retrolaterally extending posteriorly from base of ventral apophysis. States: Present-1 (Figs. 258, 279, 304, 322, 331), Absent or indistinct-0

[Inapplicable where ventral tibial apophysis is absent.]

Character 55: A lobe or sliver of prolateral tegulum near embolus base separated from rest of tegulum by a membranous fissure. States: Present-1 (Figs. 261, 289, 292, 293, 307, 308, 336), Absent-0

Character 56: Origin of embolus on tegulum. States: Intermediate-1 (Fig. 201), Distal-2 (Fig. 286), Proximal-0 (Figs. 72, 90)

Character 57: Epigynum posteriorly with a pair of medially directed flanges. States: Present-1 (Fig. 73), Absent-0

Character 58: Narrow keel separating epigynal atria. States: Present-1 (Fig. 252), Absent-0

Character 59: Proximal retrolateral area of cymbium enlarged and with longitudinal ridge dorsally. States: Present-1 (Figs. 36, 42), Absent-0

Character 60: Lunate plate of subtegulum. States: Exposed and occupying posterior space of alveolar cavity in unexpanded palp-1 (Figs. 36, 42), Not markedly exposed (subtegulum more or less covered by tegulum posteriorly in unexpanded palp)-0

Character 61: Copulatory ducts curved laterally from adjacent anterior origin from spermathecae. States: Yes-1 (Figs. 165, 166), No-0 [Inapplicable in taxa with short/absent ducts.]

List of Terminal Taxa

Clu_pal Clubiona pallens Hentz
 Bre_cin Brettus cingulatus Thorell
 Coc_gib Cocalus gibbosus Wanless
 Cyr_alg Cyrba algerina (Lucas)
 Gel_arg Gelotia argenteolimbata (Simon)
 Gel_bim Gelotia bimaculata Thorell
 Gel_rob Gelotia robusta Wanless
 Gel_syr Gelotia syringopalpis Wanless
 Lan_mon Lankattus monticola n. gen. & sp. (see Part IV)
 Mel_ken Meleon kenti (de Lessert)
 Mel_mad Meleon madagascariensis (Wanless)
 Mel_rus Meleon russata (Simon)
 Min_tau Mintonia tauricornis Wanless
 Neo_tib Neobrettus tibialis (Prószyński)
 Pha_wan Phaeacius wanlessi Wijesinghe
 Por_sch Portia schultzii Karsch
 Spa_spi Spartaeus spinimanus (Thorell)
 Tar_sol Taraxella solitaria Wanless
 Vei_dur Veissella durbanii (Peckham & Peckham)
 Wan_sed Wanlessia sedgwicki Wijesinghe
 Yag_sex Yaginumanis sexdentatus (Yaginuma)
 Ase_ten Asemonea tenuipes O. P.-Cambridge
 Chi_xxx Chinoscopus sp.

Gol_xxx Goleba sp.

Lys_vir Lyssomanes viridis (Walckenaer)

Ono_nig Onomastus nigricauda Simon

Pan_xxx Pandisus sp.

Alc_xxx Allococalodes sp.

Cld_pap Cocalodes papuanus Simon

Hol_vel Holcolaetis vellerea Simon

Son_lig Sonoita lightfooti Peckham & Peckham

Phi_aud Phidippus audax (Hentz)

Plx_pay Plexippus paykullii (Audouin)

Results of Analysis

Analysis of the unweighted (i.e., equally weighted) data using Hennig86 with all characters treated as unordered resulted in 338 equally most parsimonious trees, of length 149 and consistency and retention indices of 0.56 and 0.76, respectively. A strict consensus tree for this result is presented. Successive approximations weighting (tree statistics stabilized after three cycles) resulted in 88 trees, of length 609 and consistency and retention indices of 0.87 and 0.94, respectively. A strict consensus tree of the trees obtained by successive approximations weighting is presented. With respect to the unweighted data the trees obtained from successive approximations weighting have a length of 153 steps.

Analysis of the data using Pee-Wee with all characters treated as unordered resulted in a single tree, with fitness 463.7. With respect to the unweighted data this tree has a length of 154, five steps more than the length (149) of the 338 equally most parsimonious trees obtained by parsimony analysis of the unweighted data, and one step longer than the length (153) of the 88 equally most parsimonious trees obtained from successive approximations weighting, using Hennig86. The single tree obtained from the Pee-Wee analysis is presented.

All these trees agree in several important respects. The Salticidae represented in the present study clearly fall into two major groups, one of which corresponds to the classical Lyssomaninae, while the other includes all the remaining taxa. Within the Lyssomaninae all the trees agree in the placement of Chinoscopus with Lyssomanes, and Asemonea with Pandisus, while the position of Onomastus and Goleba are more problematic. Both the weighted analyses, however, indicate that Onomastus is the sister group of the remaining lyssomanines.

Of the remaining taxa all the trees agree on the following: Cocalodes + Allococalodes (Cocalodes group), Holcolaetis + Sonoita (Holcolaetis group), and Phidippus + Plexippus (higher salticids or Salticinae), while the Spartaeinae emerge as monophyletic and forming the sister

group of the higher salticids. The results of the unweighted analysis places the Holcolaetis group as the sister group of the Spartaeinae + Salticinae, with the Cocalodes group as the sister group of this large group, while both weighted analyses reverse the positions of the Cocalodes group and the Holcolaetis group in this arrangement, with the latter in the more basal position. Among the spartaeines all the analyses agree on the group Spartaeus + Taraxella, and in the placement of Cocalus deep among the traditional Gelotia species forming another group. In the unweighted analysis Wanlessia is grouped with Mintonia, while in both the weighted analyses Wanlessia emerges as the sister group of all spartaeines while Mintonia is placed with what may be termed the Spartaeus group: (Mintonia (Yaginumanis (Spartaeus, Taraxella))). The weighted analyses also support the group Portia + Phaeacius. The weighted analyses indicate that, excluding Wanlessia, the Spartaeinae comprise of two major divisions. One clade consists of the Spartaeus group while the other includes all remaining spartaeines. Both weighted analyses place the new taxon Lankattus in a basal position within the second clade. The result from successive approximations weighting puts Meleon madagascariensis as the sister group to Gelotia (including Cocalus), while the Pee-Wee result indicates in addition

the following grouping: (Meleon (Veissella, Gelotia)), where Gelotia represents Meleon madagascariensis + Gelotia. The Pee-Wee analysis places Portia + Phaeacius as the sister group to this Meleon-Veissella-Gelotia clade, with Brettus being the sister group to the combined group. The Pee-Wee analysis associates Cyrba with Neobrettus in a relatively basal position within the second spartaeine clade.

As Goloboff (1993a) has stated "the most parsimonious cladogram is the hypothesis with greatest explanatory power, given the weights that the characters deserve". The same author also stated that "it is not that parsimony does not preclude weighting, but rather that it requires weighting". To weight all characters the same implies that they are equally important, which, as Goloboff has pointed out, is falsified in almost every cladistic analysis of real data. For this reason, inspite of the fact that the tree obtained by the Pee-Wee analysis is 5 steps longer than the equally most parsimonious cladograms obtained from the unweighted data it is felt that this tree is a better hypothesis of the relationship of the taxa studied here. It will thus form the basis for taxonomic proposals made in this work.

Character support for the major salticid groups revealed by all the analyses are as follows (see Fig.

372A). Monophyly of the Salticidae (node 63) is supported by the enlarged anterior median eyes (character 0: 0-->1), posterior eyes in two rows (character 1: 0-->1), distinct clypeal setal triad (character 2: 0-->1), circular or drop shaped tarsal organ (character 29: 0-->1), and single row of tarsal trichobothria (character 50: 0-->1). Monophyly of the lyssomanines (node 46) is supported by loss of scopular hairs on anterior legs (character 24: 0-->1), superior and posterior position of anterior lateral eyes (character 35: 0-->1), strongly convex lenses of anterior median eyes (character 42: 0-->1), and embolus well separated from tegulum (character 52: 0-->1). Monophyly of Lyssomanes + Chinoscopus (node 40) is supported by the presence of a medioapical spine on leg patellae III-IV (character 9: 0-->1), enlarged and ridged proximal retrolateral cymbium (character 59: 0-->1), and lunate plate of subtegulum occupying posterior alveolus in unexpanded palp (character 60: 0-->1). The grouping of Pandisus with Asemonea (node 39) is supported by the plate-like embolus base (character 19: 0-->1), presence of a ventral groove in male palpal femur (character 20: 0-->1), presence of a distal spiniform apophysis on male palpal femur (character 21: 0-->1), and presence of a dorsal apophysis on male palpal tibia (character 22: 0-->1). Due to these reasons recognition of two genera within

this clade is unwarranted, as proposed below.

The monophyly of the non-lyssomanine salticids (node 62) is supported by the anterior position of the thoracic fovea (character 43: 0-->1) and the presence of complex scales with keeled central shafts on the abdomen (character 51: 0-->1). The grouping Sonoita + Holcolaetis (node 42) is supported by the presence of a dorsal abdominal secretory field in females (character 49: 0-->1) and the presence of medially directed posterior epigynal flanges (character 57: 0-->1). The grouping Allococalodes + Cocalodes (node 41) is supported by the presence of a horn-like ventral process on the male intercheliceral sclerite (character 39: 0-->1). The monophyly of spartaeines + higher salticids (node 60) is supported by the loss of the medial apophysis of the tegulum (character 17: 0-->1) and the presence of a distinct anterior retrolateral tegular shoulder (character 25: 0-->1). Spartaeine monophyly (node 59) is supported by the presence of a tegular furrow (character 10: 0-->1), the presence of a ventral tibial apophysis in male palps (character 11: 0-->1), the presence of a groove along the inner edge of the embolus (character 14: 0-->1), the presence of a funnel-like orifice or groove at inner margin of embolus base (character 16: 0-->1), and the presence of a membranous-based section on the retrolateral

tibial apophysis of male palps. The monophyly of higher salticids (Plexippus + Phidippus) (node 43) is supported by the loss of the female palpal claw (character 3: 0-->1), the presence of the cheliceral mound (character 5: 0-->1), the reduction of the number of retromarginal cheliceral teeth to one (character 12: 0-->1), the reduction of the number of promarginal cheliceral teeth to two (character 27: 1-->2), the strong asymmetry in anterior leg tarsal claws (character 31: 0-->1), and the reduction in length of the intercheliceral sclerite (character 41: 0-->1).

As indicated earlier, the strict consensus tree of the results from successive approximations weighting and the single fittest tree obtained using implied weights are both more resolved than the strict consensus tree of the unweighted results. The two weighted results show some similarity in topology which are either not present in the strict consensus tree of the unweighted results or which are contradicted by the latter. The groupings shown by the weighted results are as follows (see Fig. 372A). Within the lyssomanines a group (node 45) consisting of all but Onomastus is supported by the presence of a medioapical spine on the female palpal patella (character 34: 0-->1). The placement of the group Cocalodes + Allococalodes as the sister group of spartaeines + higher salticids to the

exclusion of Holcolaetis + Sonoita (node 61) is supported by the proximity of the distal prolateral leg femoral spine to the distal dorsal spine (character 4: 0-->1) and the reduction in the number of promarginal cheliceral teeth from many to three (character 27: 0-->1). Within spartaeine salticids a group consisting of all except Wanlessia (node 58) is supported by the reduction of the conductor to a tegular ledge (with extension M3) (character 18: 0-->1). The monophyly of Mintonia + Yaginumanis + Spartaeus + Taraxella (node 38) is supported by the reduction of the tegular furrow to a retrolateral pit (character 10: 1-->2), the monophyly of the latter three genera (node 37) is supported by the reversal of the male palpal retrolateral tibial feature of socketed to entire condition (character 26: 1-->0), and the monophyly of Spartaeus + Taraxella (node 36) is supported by the homoplasious change in position of the second prolateral leg femoral spine (character 7: 2-->1), the reversal in the number of retromarginal cheliceral dentition from three to many (character 27: 1-->0), and the reduction of retromarginal cheliceral teeth to spaced apart denticles (character 45: 0-->1). The monophyly of the second main spartaeine clade consisting of Lankattus plus the remaining genera (node 57) is supported by the origin of a leaf-shaped membranous flap M1 at embolus base (character

15: 0-->2) and the origin of a lobe-like membranous process M2 (character 38: 0-->1). The monophyly of this second clade excluding Lankattus (node 56) is supported by a change in position of the second retrolateral spine of leg femora (character 7: 2-->1) and a change in the point of origin of the embolus at the tegulum (character 56: 2-->1). The grouping Cyrba + Neobrettus (node 33) is supported by the presence of a groove along the anterior tegulum for the reception of the embolus (character 32: 0-->1) and the lateral curving of the copulatory ducts from their anterior spermathecal origins (character 61: 0-->1). The monophyly of the remaining spartaeines comprising of Brettus, Phaeacius, Portia, Meleon, Veissella, and the Cocalus-Gelotia assemblage (node 55) is supported by a change in position of the second prolateral spine of the leg femora (character 6: 2-->1), while the monophyly of this clade excluding Brettus (node 54) is supported by a reduction in size of membranous flap M1 from large leaf shaped to moderate (character 15: 2-->1). Within this clade the grouping Phaeacius + Portia (node 42) is supported by the homoplasious reversal of the retrolateral tibial apophysis from the socketed to entire condition (character 26: 1-->0) and the presence of a pair of strong dorsal hair tufts on the abdomen (character 46: 0-->1). The monophyly of Meleon, Veissella and the

Gelotia-Cocalus assemblage (node 53) is supported by the anterior shifting of the prolateral extension of the tegular ledge (M3) (character 53: 0-->1) and a change from intermediate to distal origin of embolus at tegulum (character 56: 1-->2). The monophyly of Veissella + Gelotia-Cocalus (node 52) is supported by the strong upward curving of the embolus toward the alveolus (character 37: 0-->1) and the enlargement of membranous process M2 (character 38: 1-->2). Finally, the monophyly of the Gelotia-Cocalus assemblage is supported by the

It is instructive to compare the results obtained in this study with the analysis of spartaeines and the Cocalodes and Holcolaetis groups, with Asemonea as outgroup, undertaken by Rodrigo and Jackson (1992). Interestingly, they too found the group consisting of Brettus + Cocalus + Cyrba + Phaeacius + Portia + Gelotia + Meleon + Neobrettus + Veissella, and the group Spartaeus + Taraxella, although their group Cyrba + Phaeacius + Portia is not supported by the present study. Their grouping of Cocalodes and Allococalodes with Holcolaetis and Sonoita is also surprising, as is the placement of the first two genera, rendering the Cocalodes-Allococalodes group seen here paraphyletic. The grouping of Spartaeus + Taraxella with the Cocalodes-Holcolaetis assemblage, with Yaginumanis and Mintonia in relatively basal positions is also not supported by the present study.

Taxonomic Summary

Family Salticidae

Diagnosis: Dionychan araneomorph spiders having a retrolateral tibial apophysis in the male palp and lacking cylindrical gland spigots and possessing the following features: enlarged anterior median eyes; posterior eyes in two rows; distinct clypeal setal triad; circular or drop shaped tarsal organ; tarsal trichobothria in a single row.

Subfamily Lyssomaninae

Diagnosis: Salticid spiders with the following features: no scopular hairs on anterior legs; anterior lateral eyes located superior and posterior to anterior median eyes; anterior median eyes with strongly convex lenses; embolus well separated from tegulum.

Included genera: Onomastus Simon, Goleba Wanless, Lyssomanes Hentz, Chinoscopus Simon, Asemonea O. P.-Cambridge (including Pandisus Simon-NEW SYNONYMY).

Subfamily Salticinae

Diagnosis: Salticid spiders with the thoracic fovea located anteriorly and having complex scales with keeled central shafts on the abdomen.

Included genera: All non-lyssomanine salticid genera.

Tribe Holcolaetini NEW TRIBE

Diagnosis: Salticine spiders with dorsal abdominal secretory fields and medially directed posterior epigynal flanges.

Included genera: Sonoita Peckham and Peckham, Holcolaetis Simon.

Tribe Cocalodini NEW TRIBE

Diagnosis: Salticine spiders with a horn-like ventral process on the male intercheliceral sclerite.

Included genera: Allococalodes Wanless, Cocalodes Pocock.

Tribe Spartaeini REVISED STATUS

Diagnosis: Salticine spiders having the following features: a tegular furrow; a ventral tibial apophysis in male palps; a groove along the inner edge of the embolus; a funnel-like orifice or groove at inner margin of embolus base; a socketed anterior section to the retrolateral tibial apophysis of male palps.

Included genera: Wanlessia Wijesinghe, Mintonia Wanless, Yaginumanis Wanless, Taraxella Wanless, Spartaeus Thorell, Lankattus (NEW), Cyrba Simon, Neobrettus Wanless, Brettus Thorell, Portia Karsch, Phaeacius Simon, Meleon Wanless, Veissella Wanless, Cocalus C. L. Koch (including Gelotia Thorell-NEW SYNONYMY).

Tribe: Salticini NEW TRIBE

Diagnosis: Salticine spiders having the following features: no female palpal claw; a seta-bearing cheliceral

mound on inner cheliceral margin; number of retromarginal cheliceral teeth reduced to one; number of promarginal cheliceral teeth reduced to two; strong asymmetry in anterior leg tarsal claws; intercheliceral sclerite small. Included genera: Plexippus C. L. Koch, Phidippus C. L. Koch, and at least all other unidentate genera.

PART II-REVIEW OF THE GENUS CYRBA

Introduction

In his valuable revision of the Cyrba Simon, Wanless (1984b) recognized the following seven species (known sexes after Wanless):

Cyrba algerina (Lucas) ♂♀

Cyrba bimaculata Simon ♂♀

Cyrba boveyi de Lessert ♂♀

Cyrba legendrei Wanless ♂♀

Cyrba lineata Wanless ♀

Cyrba nigrimana Simon ♀

Cyrba ocellata (Kroneberg) ♂♀

The number of valid species and the association of sexes within species indicated in Wanless's revision requires modification in the light of new information and interpretations. As shown elsewhere (Wijesinghe, 1993), the name Cyrba bimaculata Simon is a homonym, for which Cyrba simoni has been proposed as a replacement. In the course of the present study Cyrba boveyi (based on male) was found to be a synonym of Cyrba nigrimana (based on female). The female regarded by Wanless as conspecific with Cyrba boveyi is here described as a new species,

Cyrba kenya. Two additional species, Cyrba tanzania (female only) and Cyrba india (male and female) are also described as new below. Thus the following nine species of Cyrba are recognized in the present study (with known sexes indicated and abbreviations used in the cladistic analysis within square brackets):

Cyrba algerina (Lucas) ♂♀ [Cyr_alg]
Cyrba india new species ♂♀ [Cyr_ind]
Cyrba kenya new species ♀ [Cyr_ken]
Cyrba legendrei Wanless ♂♀ [Cyr_leg]
Cyrba lineata Wanless ♀ [Cyr_lin]
Cyrba nigrimana Simon ♂♀ [Cyr_nig]
Cyrba ocellata (Kroneberg) ♂♀ [Cyr_oce]
Cyrba simoni Wijesinghe ♂♀ [Cyr_sim]
Cyrba tanzania new species ♀ [Cyr_tan]

The phylogeny of the nine species of Cyrba recognized here was examined by parsimony analysis, with Neobrettus tibialis as the outgroup. The methods of analysis used were as described in Part I above and are not repeated here. The choice of Neobrettus as the outgroup was based on the sister-group relationship of this genus to Cyrba, revealed from the analysis of spartaeine higher phylogeny using implied weights (Fig. 372A). The grouping of Cyrba

with Neobrettus is supported by the presence of an anterior tegular groove for the reception of the embolus in the male palp and the lateral curving of the copulatory ducts from their anterior origin on the spermathecae.

Descriptions of Characters

Character 0: Eyes of middle row. States: Reduced-1, Not reduced-0.

Character 1: Copulatory ducts. States: With an elbowed lateral loop-1 (Figs. 165, 166), Not so-0.

Character 2: Embolus. States: With a proximal prolateral apophysis-1 (Fig. 398), No such apophysis-0.

Character 3: Ascending and descending portions of copulatory ducts. States: Fused-1 (Fig. 382, 384, 391, 397), Not so-0 (Figs. 395, 401).

Character 4: Lateral ends of copulatory duct loops. States: Ventrally twisted-1 (Figs. 381, 383, 390, 396), Not so-0 (Figs. 376, 385, 392, 394, 400).

Character 5: Copulatory ducts. States: Long-2 (Fig. 381), Medium-1, Short-0 (Fig. 401).

Character 6: Posterolateral epigynal plate. States: With a pair of pockets-1 (Figs. 393, 395), No pockets-0.

Character 7: Ventral epigynal integument. States: With a pair of depressions or grooves-1 (Figs. 394, 400), No such depressions-0.

Character 8: Patella and tibia of female leg I. States:

With no lateral spines-1, With lateral spines-0.

Character 9: Ascending and descending portions of lateral loops of copulatory ducts. States: Parallel (posterior-anterior) in dorsal view-1 (Fig. 382), Not parallel (dorsal-ventral)-0 (Fig. 377).

Character 10: Anterior legs. States: Without ventral hair fringes-1, With ventral hair fringes-0 (Fig. 177).

Character 11: Copulatory openings. States: Close together (separated only by thin septum)-1, Wide apart-0.

Character 12: Copulatory openings. States: Anteriorly covered by common hood-1 (Figs. 392, 394, 396), Not covered by a common hood-0.

Character 13: Anterior retrolateral tibial apophysis. States: With an additional posterior portion-1 (Figs. 373, 398), Not so-0.

Character 14: Male palpal tibia. States: With a short conical fixed posterior retrolateral tibial apophysis-1 (Fig. 387), Not posterior fixed apophysis-0.

Results

Parsimony analysis of the unweighted (i.e., equally weighted) data with Hennig86 (Farris, 1988) and NONA (Goloboff, 1993b) produced two equally most parsimonious trees (Figs. 402, 403) with a length of 19 steps, and a

consistency index of 0.84 and retention index of 0.85. They disagree only on placing Cyrba lineata with C. tanzania (to the exclusion of C. nigrimana) or with C. nigrimana (to the exclusion of C. tanzania). Analysis with Pee-Wee (Goloboff, 1993a) produced a single tree (Fig. 405) with a total fit of 83.5. This tree agreed with one of the trees obtained with the Hennig86 and NONA analyses in placing C. tanzania as the sister species to C. lineata + C. nigrimana and is the preferred tree.

The monophyly of the genus Cyrba is supported by the reduction of the size of the eyes of the middle row (character 0: 0-->1), the presence of elbowed lateral loops in the copulatory ducts (character 1: 0-->1), the loss of lateral spines on female patellae and tibiae I (character 8: 0-->1), the loss of ventral hair fringes on the anterior legs (character 10: 0-->1), the close proximity of the copulatory opening (separated only by a thin septum) (character 11: 0-->1), and the presence of a common hood anteriorly over the copulatory openings (character 12: 0-->1). Cyrba is seen to be comprised of two groups of species, the first clade composed of algerina + tanzania + lineata + nigrimana and the second clade composed of kenya + india + ocellata + legendrei + simoni. The monophyly of the first clade is supported by the presence of an additional posterior portion to the

retrolateral tibial apophysis of the male palp (character 13: 0-->1), while the monophyly of the second clade is supported by the fusion of the ascending and descending portions of the copulatory ducts (character 3: 0-->1). Within the first clade the monophyly of tanzania + lineata + nigrimana is supported by the presence of a pair of depressions or grooves on the ventral epigynal integument (character 7: 0-->1), while the grouping lineata + nigrimana is supported by the reversal in copulatory duct length (short) (character 5: 1-->0). Within the second clade the monophyly of india + ocellata + legendrei + simoni is supported by the ventrally twisted lateral ends of the copulatory duct loops (character 4: 0-->1), the increase in length of the copulatory ducts (character 5: 1-->2), and the parallel position of the ascending and descending portions of lateral loops of the copulatory ducts in dorsal view (character 9: 0-->1). The grouping legendrei + simoni is supported by the presence of a short conical fixed posterior portion to the retrolateral tibial apophysis (character 14: 0-->1).

Descriptions of Species

Cyrba algerina (Lucas, 1846)

(Figs. 373-378)

Salticus algerinus Lucas, 1846: 148.

Cyrba algerina: Wanless, 1984b: 452 (synonymy).

Diagnosis. Males are easily identified by the presence of a robust posterior ramus to the retrolateral tibial apophysis, while females may be distinguished by the shape of the posterior epigynal margin and the faintly creased appearance of the epigynal integument.

Description. Male (from Corsica, in good condition).

Carapace: dull amber, ocular area mostly blackish grey, grey markings on sides at posterior, also margins narrowly grey; no distinct pattern, clothed with amber/translucent or whitish hairs, white hairs especially around PLEs; fovea distinct and long, anterior end about level with posterior margin of PLE, posterior end well behind ocular area; some short anteriorly directed setae associated with AEs, a few short setae lateral to PEs. Eyes: with large dark surrounds, AEs fringed with greyish amber and white hairs, PMEs minute. Clypeus: blackish grey, medial setal triad present, about three medially directed long setae below each AME, lateral-most apparently homologous with lateral seta below AME in other taxa, shorter setae and

hairs at clypeal margin. Chelicerae: blackish grey, mediodistal margins pale yellowish amber; three promarginal teeth, distal two slightly spaced apart and larger than proximal, six small retromarginal teeth. Maxillae and labium: greyish amber, broadly tipped whitish, scopulae and serrulae well developed. Sternum: greyish amber, sparsely clothed with erect hairs. Coxae: greyish amber, fourth pair largest, second and third smallest. Abdomen: mostly blackish grey, dorsum anteriorly yellowish, with two inverted shallow 'M' shaped marks of white hairs, a tuft of white hairs forming an elongate white spot above anal tubercle, rest of dorsum clothed with blackish and pale yellowish hairs; a few scattered fine dark setae anteriorly. Spinnerets: greyish, posteriors well separated. Legs: blackish to greyish amber, all tarsi, patellae dorsally, and a proximal and middle band on posterior tibiae and metatarsi paler (dull amber), a couple of thin dorsolateral stripes on anterior tibiae, anterior femora ventrolaterally with a large elongate pale streak and spot, anterior legs moderately robust, fourth pair long, with slender tibiae, metatarsi and tarsi, anterior tarsi and metatarsi prolaterally with weak scopulae (prey capture setae); clothed moderately thickly with long blackish and pale hairs. Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-

0; tibia p1-0-1, v2-2-2, r1-0-1; metatarsus p0-1-1, v2-0-2, r0-1-1. Palp: greyish amber, patella and cymbium blackish; femur distally with white hairs, cymbial tip and scopula pale amber; patella dorsally with acute distal apophysis, RTA with two branches, basally separate and movable, anterior slender and resting just below lateral cymbial apophysis, posterior more robust but distally acute, cymbium with short retrolateral apophysis, cymbial side concave below apophysis, palpal organ typical of genus.

Dimensions (mm): total length 4.07; carapace length 1.86, breadth 1.33, height 1.05; abdomen length 2.19; eyes, anterior row 1.40, middle row 1.16, posterior row 1.25; quadrangle length 0.82; diameters, AME 0.44, ALE 0.25, PME 0.05, PLE 0.23; interocular distances ALE-PME-PLE 0.30-0.20; clypeus 0.10. fovea 0.38.

Legs	1	2	3	4	Palp
Femur	1.33	1.31	1.25	0.83	0.61
Patella	0.67	0.66	0.58	0.68	0.30
Tibia	0.97	0.90	0.89	1.33	0.29
Metatarsus	0.87	0.84	0.95	1.60	---
Tarsus	0.53	0.49	0.48	0.61	0.76
Total	4.37	4.20	4.15	5.05	1.96

Female (from Corsica, in good condition). Carapace: amber, ocular area blackish, straitions at sides and behind and carapace margings greyish, clothed with amber or blackish hairs, row of setae along AEs, a few lateral to PEs and behind PLE and in ocular area; fovea distinct and long, from PLE to beginning of posterior declivity. Eyes: with dark surrounds, AEs fringed with amber hairs; PME minute. Clypeus: greyish, clothed at sides with amber hairs, medial setal triad present, other clypeal setae and hairs also as in male but longer. Chelicerae: amber, greyish in middle, proximally slightly rounded, long setae near medial and lateral margins; three promarginal teeth, distal two separated and slightly larger than proximal, five-six small retromarginal teeth, posterior face with hair tuft. Maxillae and labium: pale amber, proximally greyish, scopulae and serrulae well developed. Sternum: amber, faintly greyish in center, clothed with erect dark hairs. Coxae: amber, largest to smallest 4123. Abdomen: dorsum anteriorly greyish brown, posteriorly blackish, several large pale chevrons, a transverse spot anterior to first pair of sigilla and another at tip of abdomen whitish, secretory field at anterior pale spot; clothed with blackish, amber and white hairs, many black setae, venter paler. Spinnerets: blackish, anteriors close, posteriors apart. Legs: pale amber and grey, anterior

tibiae dark, femora, tibiae and metatarsi of all legs marked or banded with black, dorsal pale stripes on anterior tibiae, patches of white hairs on some segments, spines reduced, no ventral hair fringes but hair cover moderately dense; anterior legs stout, fourth legs long, with long metatarsi. Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0; anterior metatarsi and tarsi with scopulae (prey capture setae). Palp: greyish amber, tarsi with three dorsolateral spines, patella-tarsus clothed with long hairs, shorter and denser on prolateral tarsus, distal white fringes on all segments except tarsi; taral claw present. Epigyne: posterior lip with median notch bordered by acute lobes, ventral epigynal integument anteriorly with transverse creases; dorsal view of spermathecae & ducts].

Dimensions (mm): total length 4.22; carapace length 2.17, breadth 1.54, height 1.06; abdomen length 2.13; eyes, anterior row 1.67, middle row 1.41, posterior row 1.49; quadrangle length 0.98; diameters, AME 0.53, ALE 0.32, PME 0.06, PLE 0.29; interocular distances ALE-PME-PLE 0.36-0.24; clypeus 0.04. fovea 0.36.

Legs	1	2	3	4	Palp
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Femur	1.35	1.31	1.27	1.67	0.61
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Patella	0.78	0.74	0.65	0.76	0.36
Tibia	0.93	0.87	0.87	1.35	0.40
Metatarsus	0.82	0.80	0.93	1.56	---
Tarsus	0.49	0.49	0.48	0.61	0.65
Total	4.37	4.21	4.20	5.95	2.02

Distribution. Southern Europe, Mediterranean, North Africa, Middle East.

Material examined. No locality: 6♀♀, 1934 (Menton, NHMB: 507f). Canary Is.: 2♂♂, 5subad♂♂, 6subad♀♀/juv (J. G. Stehlin, NHMB: 507a), Vilaflor: 1juv, 95 (Dr. Stehlin, NHMB: 507b). Mallorca: 2♂♂, scrub, April 1975 (JFMC: 4372). Cyprus: 1♂, 1♀, April 1982 (JFMC: 12620), 1♂, cliffs, April 1982 (JFMC: 12583). Corsica: 1♀, scrub, May 1989 (JFMC: 18159), 1♂, hillside, May 1989 (JFMC: 18036), 2♂♂, roadside, May 1989 (JFMC: 17878). Crete: 1♂, 1♀, scrub, April 1979 (JFMC: 7440), 1♂, hillside, April 1972 (JFMC: 1095), 1♀, scrub, April 1979 (JFMC: 7988), 1♀, scrub, April 1981 (JFMC: 9443), 1♂, hillside, April 1981 (JFMC: 9555). Portugal: 1♂, garrigue, April 1971 (JFMC: 93), 1♂, garrigue, April 1971 (JFMC: 38). Spain: 1♂, sierra, April 1985 (JFMC: 17156), 1♂, 1♀, garrigue, April 1987 (JFMC: 14425), 1♂, garrigue, April 1987 (JFMC: 14438), 1♀, sierra, September 1982 (JFMC: 17131), Benidorm, Alicante: 7♀♀, 1961 (Maj. Karl W. Haller, AMNH)

(det. J. Prószyński, 29.V.86), 1♂, 1961 (Maj. Karl W. Haller, AMNH). Algeria: 1♂ Timgad, 1072m, 14 May 1981 (Edward S. Ross, CASC). Morocco: 1♀, Taghazoute, N. of Agadir on Hwy P-8, 10m, 11 June 1981 (Edward S. Ross, CASC). Also many others.

Cyrba india new species

(Figs. 379-382)

Diagnosis. Males can be identified by the basally relatively wide and robust embolus with a flange on its outer margin in the middle and the dense tuft of hairs and setae on the retrolateral tibial apophysis. Females may be distinguished by the shape of the posterior margin of the epigynum and the shape of atrial openings.

Description. Male (holotype from near Tuni, Andhra Pradesh, India, California Academy of Sciences, in good condition). Carapace: integument pale amber, uniformly clothed with decumbent dark amber or brown hairs, a narrow medial white line extending from between AMEs to posterior edge, widening posteriorly, lateral margins also narrowly white; bare integument iridescent in some angles; anteriorly directed setae along AEs, many also lateral and posterior to PEs and in anterior ocular area. Eyes: with dark surrounds, PMEs minute, AEs fringed with dark amber and white hairs. Clypeus: sides clothed with greyish amber

hairs, long white hairs in middle (continuation of white dorsal stripe), medial setal triad present, two long setae below each AME. Chelicerae: greyish at front, mediodistally pale amber, fine amber hairs and scopulae; three promarginal teeth, almost similar and equidistant, four-five smaller retromarginal teeth. Maxillae and labium: pale amber, whitish at tips, scopulae and serrulae well developed. Sternum: pale amber, with erect hairs. Coxae: pale amber, fourth pair largest. Abdomen: dorsum and sides clothed with long dark brown flat scale-like hairs, iridescent in some angles, possibly some chevron marks in middle of dorsum (partly rubbed), posterior tip with small white spot above spinnerets, venter uniformly pale; no setae, secretory field evidently absent. Spinnerets: anteriors greyish, others pale. Legs: pale amber, clothed with amber or dark brown hairs, faint dark stripes on femora, patellae, tibiae and metatarsi prolaterally with pale bands, tarsi distally pale, legs spiny; fourth leg long, with slender tibia and metatarsus. Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia d0-1-0, p1-0-1, v2-2-2, r1-0-1; metatarsus p2-0-1, v2-0-2, r1-0-1. Palp: femur, patella and tibia pale greyish olive, cymbium greyish amber, patella and tibia with acute distal dorsal apophyse, anterior RTA slender, posterior apparently replaced with

bunch of stiff setae, cymbial apophysis acute, palpal organ typical of genus but embolus robust close to base, with a distinct outer lobe just before backward curve.

Dimensions (mm): total length 4.95; carapace length 2.32, breadth 1.67, height 1.20; abdomen length 2.66; eyes, anterior row 1.63, middle row 1.39, posterior row 1.50; quadrangle length 1.03; diameters, AME 0.52, ALE 0.31, PME 0.06, PLE 0.29; interocular distances ALE-PME-PLE 0.36-0.25 ; clypeus 0.13. fovea 0.44.

Legs	1	2	3	4	Palp
Femur	1.60	1.56	1.48	2.00	0.74
Patella	0.80	0.78	0.70	0.80	0.36
Tibia	1.25	1.12	1.10	1.63	0.30
Metatarsus	1.12	1.06	1.20	1.94	---
Tarsus	0.61	0.57	0.55	0.74	1.03
Total	5.38	5.09	5.03	7.11	2.43

Female (from near Udamalpet, South India, California Academy of Sciences, in good condition; smaller of 2 specimens in vial, with epigyne dissected & cleared). Similar to male except as noted. Carapace: bright amber, anterior ocular area darker, uniformly clothed with decumbent amber hairs, faint indication of a narrow pale

median stripe when viewed dorsolaterally, narrow white margins, some greyish striations at sides and back; many forward directed setae near AEs and lateral to PEs, several shorter setae in ocular area and behind; fovea distinct, long, extending well behind from PLE. Eyes: with dark surrounds, PMEs minute, AEs fringed with amber (above) or white (below and sides) hairs. Clypeus: sides with short amber hairs, middle and margins with long white hairs, medial setal triad present, couple of setae below each AME. Chelicerae: dark amber, proximally rounded at front, scattered amber setae, scopulae; three promarginal teeth, almost equidistant, distals larger, four small retromarginal teeth. Maxillae and labium: amber, distally whitish, scopulae and serrulae well developed. Sternum: shiny amber, with scattered fine erect hairs. Coxae: shiny amber, fourth pair largest. Abdomen: sides and back end with dark brown hairs, dorsum clothed with pale amber, brown and whitish hairs, several pale chevrons and pairs of pale spots posterior, many dark or amber setae, two pairs of sigilla, pale area anterior to first pair with secretory field, venter pale with a faint dark medial stripe. Spinnerets: anteriors greyish, others paler. Legs: more or less uniformly dark amber, spination similar to male but reduced on anteriors, clothed fairly uniformly with amber or brown hairs, anterior metatarsi and tarsi

ventrolaterally with scopulae (prey capture setae);
ventral hair fringes absent. Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0. Palp: dark greyish amber, tibia and tarsus with long hairs, denser prolaterally, tarsus with three dorsolateral spines, tarsal claw present. Epigyne: posterior margin 'W' shaped, with medial notch and diagonal sides, posterior 'lip' medially wide, atria forming a pair of deep depresions, medial ducts and ventrally directed loops visible, dorsal view of spermathecae & ducts].

Dimensions (mm): total length 5.23; carapace length 2.24, breadth 1.63, height 1.10; abdomen length 2.78; eyes, anterior row 1.65, middle row 1.38, posterior row 1.52; quadrangle length 0.97; diameters, AME 0.52, ALE 0.32, PME 0.06, PLE 0.29; interocular distances ALE-PME-PLE 0.38-0.24; clypeus 0.11. fovea 0.49.

Legs	1	2	3	4	Palp
Femur	1.50	1.44	1.37	1.75	0.68
Patella	0.75	0.74	0.65	0.74	0.36
Tibia	1.08	0.99	0.95	1.43	0.44
Metatarsus	0.91	0.87	1.00	1.58	---
Tarsus	0.53	0.49	0.51	0.63	0.70
Total	4.77	4.53	4.48	6.13	2.18

Variation. The second Udamalpet female in the vial is much larger than one described but epigynes identical. Carapace length 2.40, abdomen length 3.45.

Distribution. India.

Material examined. Holotype: India: Andhra Pradesh: 8mi. NE of Tuni, 30m, ♂, 5 February 1962 (E. S. Ross & D. Q. Cavagnaro, CASC). Paratypes: same data as holotype, 1♂; Tamil Nadu: Alagarkoil, 21 km NE of Madurai: 1♀, 27-28 December 1989 (V. & B. Roth, CASC); 10mi. S. Udamalpet, 450m: 2♀♀, 19 March 1962 (E. S. Ross & D. Q. Cavanagro, CASC).

Etymology. Named for the country in which the species was discovered; a noun in apposition.

Cyrba kenya new species

(Figs. 385-386)

Diagnosis. Easily distinguished from other Cyrba females by the distinctive mouth-like shape of the posterior epigynal margins.

Description. Male Unknown.

Female (holotype, from Kenya, in good condition).

Carapace: yellowish brown, ocular area darker (blackish on left); clothed with adpressed translucent-amber hairs; bare integument lightly punctate, faintly iridescent; several strong setae lateral to ALE and PE, two behind

PLE, row of setae behind AE partly localized between AME and ALE, many scattered fine short setae in ocular area, many stronger setae on upper thoracic declivity; fovea moderately long, front end anterior to posterior margins of PLE. Eyes: with dark surrounds, AE with hair fringes. Clypeus: low, yellowish amber, sparsely clothed with amber hairs at sides and few white hairs in middle, medial setal triad normal, two long erect-medially directed setae below each AME, two more pairs medially at margin, margin with white hairs. Chelicerae: yellowish amber, shiny, moderately convex, many fine setae, stronger proximomedially, promarginal scopulae normal; three promarginal teeth, proximal smaller, diastema indistinct, three retromarginal teeth, more or less equal. Maxillae: amber tinged grey, blackish streak proximomedially, medially, medioapically white, scopulae (with anterior tuft), serrulae well developed. Labium: about half length of maxillae, amber tinged grey, sides darker, tip white. Sternum: dull amber, oval, extensions opposite coxae IV, slight elevations opposite coxae with setal tufts (strongest at posterior), other erect hairs. Coxae: dorsally yellowish amber, coxae IV largest. Abdomen: dull mouse-brown, faint medial chevron marks, secretory field between first pair of sigilla whitish; clothed with uniform adpressed hairs and setae; ventrally paler, with

four whitish stripes. Spinnerets: more or less uniformly pale brown, posteriors not longer than anteriors, colulus vestigial. Legs: yellowish amber, clothed with brownish hairs, spines of anterior legs reduced (lateral and dorsal spines patellae-metatarsi absent); preycapture setae on anterior metatarsi and tarsi. Spination of leg I: femur d0-1-3, p0-0-1; tibia v2-2-2; metatarsus v2-0-0. Palp: greyish brown, femur with dorsal spines 1-1-2, tibia, tarsus clothed with long hairs, denser prolaterally, tarsus with three retrolateral spines. Epigyne: atrium mouth-like, with notched posterior margin and broad hood, spermathecae dark, copulatory duct loops long, integument with weakly sclerotized area between anterior atrium and spermathecae, dorsal view typical of genus, fertilization ducts arising from posterior tips of spermathecae, copulatory ducts curving back towards spermathecae but tips not directed ventrally, posterior plate moderately wide.

Dimensions (mm): total length 5.25; carapace length 2.35, breadth 1.85 (behind ALE), height 1.23; fovea 0.48; abdomen length 0.72; eyes, anterior row 1.86, middle row 1.54, posterior row 1.69; quadrangle length 1.20; diameters, AME 0.57, ALE 0.35, PME 0.07, PLE 0.31; interocular distances ALE-PME-PL 0.41-0.26; clypeus 0.93.

Legs	1	2	3	4	Palp
Femur	1.60	1.50	1.43	1.94	0.73
Patella	0.86	0.86	0.76	0.86	0.40
Tibia	1.11	1.05	1.05	1.55	0.51
Metatarsus	0.99	0.98	1.13	1.86	---
Tarsus	0.57	0.55	0.52	0.66	0.73
Total	5.13	4.94	4.89	6.87	2.37

Distribution. Kenya.

Material examined. Holotype: Kenya: ♀, July 1974 (J. & F. Murphy, JFMC: 3792).

Etymology. Named after the type locality; a noun in apposition.

Cyrba legendrei Wanless, 1984

(Figs. 387-391)

Cyrba legendrei Wanless, 1984b: 458.

Diagnosis. Males can easily be identified by the presence of a short conical fixed posterior retrolateral tibial apophysis. Females may be identified by the distinctly squarish posterior epigynal margins.

Description. Male (holotype, from Manjakatempo, Madagascar). Carapace: uniform light orangish amber,

ocular area tinged olive; evenly clothed with pale translucent adpressed hairs; bare integument lightly punctate, faintly iridescent; several setae lateral and posterior to ALE and PLE, a row behind AE, a few setae in ocular area; fovea moderately long, just behind ALE. Eyes: with dark surrounds, PME reduced, anteriors with pale hair fringes. Clypeus: amber tinged with greyish, subclypeal membrane blackish, sparsely clothed with few medially directed whitish hairs, medial setal triad present, a long seta below each AME, a second more medial seta closer to margin, several setae and hairs along margin. Chelicerae: amber, anteriorly lightly streaked with greyish, several fine hairs and setae at medial margins, promarginal scopulae moderate; three equally spaced promarginal teeth, no distinct diastema, proximal smallest, five retromarginal teeth (four on right), distals smaller. Maxillae: amber, tinged with greyish, distally broadly whitish, serrulae, scopulae well developed, short blackish streak proximomedially. Labium: amber tinged with greyish, tip narrowly paler, proximolaterally darker. Sternum: pale amber, convex, moderately shiny, slight elevations opposite coxae, many erect hairs and setae mainly posteriorly. Coxae: pale amber, coxae IV largest. Abdomen: dorsally orangish amber, posteriorly greyish, narrow whitish medial stripe along entire length, secretory field

just anterior to first pair of sigilla; ventrally amber tinged olive, a narrow whitish medial stripe and pair of lateral stripes; no setae, hair cover even. Spinnerets: pale olive, basally with short whitish streaks, posteriors not longer than anteriors. Legs: pale amber, distal segments darker, anterior femora with black prolateral streaks reduced to a spot in femora III, absent in femora IV, patella, tibiae with dark ventero-prolateral stripes, metatarsi with dark dorsal streaks, numerous spines on all segments except tarsi, dorsodistal femoral spines type 2-3, dorsal spines on anterior tibiae absent, one on posteriors, clothed with pale and dark hairs forming faint dorsal stripes on femora, anterior metatarsi and tarsi with preycapture setae. Spination of leg I: femur d0-1-4; patella p0-1-0, r0-1-0; tibia p1-0-1, v2-2-2, r0-0-1; metatarsus p1-0-1, v2-0-2, r0-1-0. Palp: femur, patella brownish amber, tibia, cymbium blackish brown, retrolateral tibial apophysis with blackish spiniform process with membranous base and short proximal ramus, dorsodistal patellar and tibial apophyses normal, cymbium with proximal prolateral tubercle, retrolateral tubercle slight; palpal organ typical of genus, with large M1, anterior tegular concavity for embolus.

Dimensions (mm): total length 4.40; carapace length 1.93, breadth 1.36, height 1.06, fovea 0.34; abdomen length

2.45; eyes, anterior row 1.19, middle row 1.05, posterior row 1.16; quadrangle length 0.78; diameters, AME 0.35, ALE 0.20, PME 0.04, PLE 0.21; interocular distances ALE-PME-
PLE 0.28-0.20; clypeus 0.16.

Legs	1	2	3	4	Palp
Femur	1.20	1.17	1.15	1.42	0.61
Patella	0.65	0.60	0.55	0.62	0.29
Tibia	0.87	0.80	0.80	1.18	0.30
Metatarsus	0.83	0.80	0.86	1.29	---
Tarsus	0.49	0.46	0.45	0.55	0.80
Total	4.04	3.83	3.81	5.06	2.00

Female (**paratype**, from Manjakatombo, Madagascar, in loose but good condition). Similar to male except as noted.

Carapace: amber, faintly marked with greyish on sides; evenly clothed with adpressed amber-translucent hairs; bare integument lightly punctate, iridescent purplish in some angles; row of setae behind AE, longer at middle, many long setae lateral to ALE and PE, two behind PLE, several short fine setae in ocular area; fovea moderately long, front at midpoint between PLE. Eyes: with dark surrounds, AE fringed with amberish hairs. Clypeus: amber, sparsely clothed with long white hairs, longer and denser

at sides, medial setal triad present, two long setae below each AME, subclypeal sclerite weak, wide. Chelicerae: amber, proximally lightly straked with greyish, anteriorly convex (inflated); three promarginal teeth, proximal smallest, diastema not distinct, six retromarginal teeth, small. Maxillae: greyish amber, broadly whitish mediodistally, blackish proximomedial streak, scopulae, serrulae moderate. Labium: greyish amber, tip and sides whitish. Sternum: oval-scutiform, shiny, greyish amber, many setae opposite coxae on slight elevation, several (three+) strong setae at apex of posterior angle. Coxae: greyish amber, coxae IV largest, III smallest. Abdomen: dorsally yellowish amber, posteriorly darker, brownish, clothed with adpressed amber hairs and short setae, secretory field between anterior sigilla, ventral colour yellowish amber, greyish at tip, with a pair of whitish lateral stripes. Spinnerets: blackish grey, basal membrane whitish, posteriors not longer than anteriors. Legs: greyish amber, faint paler dorsal streaks on femora and tibiae, anterior patellae-metatarsi without lateral or dorsal spines, other spines normal, anterior metatarsi and tarsi with preycapture setae, clothed with amberish hairs. Spination of leg I: femur d0-1-3, p0-0-1; tibia v2-2-2; metatarsus v2-0-0. Palp: amber-grey, tibia and tarsus darker, femur dorsodistally with spines 1-1-1, tarsus with

2 retrolateral-ventral spines. Epigyne: with posterior margin squarish, medial notch wide inverted 'V', openings under posterior hood, large spherical spermathecae and lateral loops of anterior ducts typical of genus, dorsal view spermathecae and ducts typical of genus.

Dimensions (mm): total length 5.60 (stretched); carapace length 2.05, breadth 1.51, height 1.08; abdomen length 3.15; eyes, anterior row 1.37, middle row 1.22, posterior row 1.38; quadrangle length 0.85; diameters, AME 0.41, ALE 0.23, PME 0.05, PLE 0.23; interocular distances ALE-PME-PLP 0.28-0.23; clypeus 0.09.

Legs	1	2	3	4	Palp
Femur	1.29	1.24	1.18	1.52	0.61
Patella	0.76	0.73	0.65	0.73	0.36
Tibia	0.85	0.85	0.79	1.21	0.40
Metatarsus	0.76	0.76	0.88	1.35	---
Tarsus	0.44	0.41	0.43	0.49	0.63
Total	4.10	3.99	3.93	5.30	2.00

Distribution. Madagascar.

Material examined. Holotype: Manjakatampo, Ankararatra, Madagascar: ♂, February 1967 (R. Legendre, MNHN).

Paratype: same data as holotype: 1♀.

Cyrba lineata Wanless, 1984

(Figs. 392-393)

Cyrba lineata Wanless, 1984b: 465.

Diagnosis. Distinguished from other Cyrba females by the shape of the posterior epigynal margin, with an inverted U-shaped medial notch and sharply pointed lobes with concave sides.

Description. Male. Unknown.

Female (holotype, from Natal, South Africa, in good condition, loose). Carapace: pale yellowish amber; ocular area rubbed, sides and back clothed with adpressed amber hairs; bare integument lightly punctate, iridescent in some angles; row of setae behind AE, many setae lateral to ALE and PE, two behind PLE, many on thoracic declivity and ocular area; fovea moderately long, immediately behind PLE. Eyes: with dark surrounds, AE with amber-transparent hair fringes. Clypeus: amber grey, low, sparsely clothed with greyish adpressed hairs with longer erect white hairs at lower margin and at center; medial setal present, two plus several setae below each AME. Chelicerae: amber, anteriorly convex, with scattered erect setae and moderate promarginal scopulae; three promarginal teeth, medial closer to proximal than distal, proximal smallest, four small retromarginal teeth, distal;s smallest. Maxillae:

pale yellowish amber, paler medially, scopulae and serrulae normal, blackish streak proximomedially. Labium: pale yellowish amber, proximal sides darker. Sternum: pale yellowish amber, oval with short lateral extensions, posterior angle very wide due to extensions opposite coxae IV, clothed with erect hairs and setae, including several strong setae at posterior. Coxae: similar to sternum, shiny, with scattered hairs/setae, some strong. Abdomen: dorsally densely clothed with short adpressed reddish brown hairs, laterally faintly streaked, prominent narrow medial line whitish, pair of whitish spots in middle and three faint inverted 'V' marks posteriorly; secretory field prominent, whitish, anterior to anterior sigilla, sides similar to dorsum, venter with paler yellowish-edged elongate quadrangular, anterior to furrow whitish, pair of white spots near base of spinnerets. Spinnerets: greyish yellow, compact, posteriors not longer than anteriors, colulus vestigium distinct with many setae. Legs: uniformly yellowish amber, distal segments slightly darker, anterior patellae-metatarsi without/reduced dorsal, lateral spines, dorsodistal femoral spines type 2/3, clothed with dark hair, anterior metatarsi and tarsi with preycapture setae. Spination of leg I: femur d0-1-3, p0-0-1; tibia v2-2-2; metatarsus v2-0-0. Palp: femur, patella whitish yellow, tibia, tarsus greyish; femur

dorsally with setae 1-1-1, tarsus with 2-3 retrolateral-ventrolateral setae, ventrolateral variable. Epigyne: sclerotized dark amber, posterior margin pointed on either side of medial notch, posterior plate deep, with pair of lateral sclerotized pockets and shallower medial depressions, pair of weakly sclerotized amber crescentic areas more or less continuous with lateral pockets; dorsal view typical of genus, ducts shorter, ends of loops not ventrally directed, paired crescentic raised areas on either side of spermathecae deepest anteriorly, lateral pockets on posterior plate distinct.

Dimensions (mm): total length 6.40 (stretched); carapace length 2.63, breadth 2.00, height 1.33; fovea 0.39; abdomen length 3.20; eyes, anterior row 1.89, middle row 1.74, posterior row 1.90; quadrangle length 1.24; diameters, AME 0.56, ALE 0.31, PME 0.07, PLE 0.31; interocular distances ALE-PME-PLE 0.38-0.34; clypeus 0.12.

Legs	1	2	3	4	Palp
Femur	1.63	1.58	1.53	1.96	0.74
Patella	0.94	0.88	0.75	0.89	0.44
Tibia	1.13	1.03	1.01	1.58	0.54
Metatarsus	1.00	0.95	1.08	1.78	---
Tarsus	0.51	0.49	0.48	0.60	0.78

Total	5.21	4.93	4.85	6.81	2.50
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Distribution. South Africa.

Material examined. South Africa. Pinetown, Natal: Holotype ♀ (M. E. Baddeley, MRAC: 152.164).

Cyrba nigrimana Simon, 1900

(Figs. 398-401)

Cyrba nigrimana Simon, 1900: 389.

Cyrba boveyi de Lessert, 1933: 145. NEW SYNONYMY.

Cyrba nigrimana: Wanless, 1984b: 465.

Cyrba boveyi: Wanless, 1984b: 463 (male only).

Diagnosis. Males are easily identified by the long dagger-like spur arising from the prolateral base of the embolus and the highly distinctive fan-like posterior portion of the retrolateral tibial apophysis. Females can also be identified easily by the large epigynal plate with a membranous median area and two lateral longitudinal grooves and the posterior margin with the sharply pointed lobes separated by an inverted V-shaped median notch.

Description. Male (from Tshowe River, Matetsi Safari Area, Zimbabwe, NMZ/A6961, NMBZ, in fair condition). Carapace: uniform amber, ocular area greyish; clothed with whitish translucent decumbent hairs; integument at ocular area faintly iridescent; several forward pointing setae behind

AEs, a few lateral to PEs; fovea long, just behind PLE.

Eyes: with dark surrounds, AEs fringed with amber whitish hairs. Clypeus: pale amber, clothed with semi-erect white hairs continuous with sides, midclypeal triad present, a long seta below each AME. Chelicerae: amber, anteriorly faintly grey, mostly bare; three promarginal teeth, distals separated, three retromarginal denticles. Maxillae and labium: pale amber, distally whitish, scopulae and serrulae well developed. Sternum: pale amber, shiny, sparsely clothed with erect pale hairs. Coxae: pale amber, fourth pair largest. Abdomen: pale amber with pale greyish markings, darker posteriorly, thinly clothed with amber hairs and short fine setae, setae darker and longer anteriorly; two pairs of sigilla, pale secretory field anterior to first pair; venter pale buffy yellow.

Spinnerets: pale greyish, posteriors rather small and short. Legs: uniform pale amber, tibiae, metatarsi and proximal tarsi of first pair blackish, a blackish dorsal streak on metatarsi and proximal tarsi of remaining legs, a pair of thin pale stripes dorsally on dark tibiae I; spination as in others in genus, hair cover sparse.

Spination of leg I: femur d0-1-2, p0-0-2; patella p0-1-0 ; tibia p1-0-1, v2-2-2; metatarsus p1-0-1, v2-0-2. Palp: femur, patella dull amber, tibia and cymbium blackish; patella with a distally rounded retrolateral apophysis,

RTA greatly modified, forming a funnel-like structure; base of embolus prolaterally with an anteriorly directed distally acute robust apophysis, M1 large.

Dimensions (mm): total length 4.35; carapace length 1.90, breadth 1.44, height 1.03; abdomen length 2.36; eyes, anterior row 1.37, middle row 1.18, posterior row 1.31; quadrangle length 0.84; diameters, AME 0.42, ALE 0.24, PME 0.05, PLE 0.23; interocular distances ALE-PME-PLP 0.30-0.24; clypeus 0.29. fovea 0.36

Legs	1	2	3	4	Palp
Femur	1.41	1.37	1.29	1.69	0.70
Patella	0.70	0.63	0.59	0.70	0.34
Tibia	1.06	0.93	0.91	1.37	0.28
Metatarsus	0.99	0.91	0.97	1.58	---
Tarsus	0.55	0.48	0.48	0.61	0.87
Total	4.71	4.32	4.24	5.95	2.19

Female (from Transvaal, South Africa, Acc. no. NMZ/A342, NMBZ, in fair condition). Similar to male except as noted.

Carapace: uniform pale yellowish amber, anterior ocular area faintly greyish; thinly covered with decumbent pale amber hairs; several anteriorly directed setae along AEs, several lateral to PEs, few behind on sides of thoracic

declivity. Eyes: with dark surrounds, AEs fringed with pale amber hairs. Clypeus: whitish yellow, with semi-erect whitish hairs[; midclypeal triad present, two medially directed setae below each AME. Chelicerae: pale yellowish amber, anteriorly rounded; three promarginal teeth, distal two separated, three small retromarginal teeth. Maxillae and labium: pale yellowish amber, scopulae and serrulae well developed. Sternum: pale yellowish amber, with erect setae. Coxae: pale yellowish amber, fourth and first pairs largest. Abdomen: dorsum and sides uniform pale greyish brown, clothed with amber hairs and fine setae, setae larger anteriorly; two pairs of sigilla, secretory field distinct, whitish, anterior to first pair of sigilla; venter uniform pale yellowish, margins of venter paler. Spinnerets: pale greyish, colulus in white membranous base as slump of hairs. Legs: uniform pale yellowish amber, tibiae, metatarsi and tarsi of first pair washed greyish; spination as in male, thinly covered with amber or greyish hairs. Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0. Palp: femur, patella pale yellowish amber, tibia and tarsus washed pale greyish; tarsus with only a ventrodiscal spine, patella, tibia and tarsus with long setae, tarsal claw present. Epigyne: ventral plate massive, posterior medial notch 'V' shaped with acute corners, a pair of deep longitudinal grooves on

either side of atrial area, hood of copulatory opening shifted posteriorly to near guides, median area membranous, dorsal view of spermathecae & ducts].

Dimensions (mm): total length 5.10; carapace length 2.18, breadth 1.60, height 1.12; abdomen length 2.63; eyes, anterior row 1.60, middle row 1.50, posterior row 1.53; quadrangle length 0.95; diameters, AME 0.48, ALE 0.27, PME 0.06, PLE 0.25; interocular distances ALE-PME-PLE 0.38-0.28; clypeus 0.13. fovea 0.27

Legs	1	2	3	4	Palp
Femur	1.44	1.35	1.31	1.77	0.68
Patella	0.81	0.76	0.68	0.80	0.44
Tibia	0.97	0.87	0.89	1.43	0.49
Metatarsus	0.87	0.84	0.95	1.62	---
Tarsus	0.51	0.48	0.49	0.61	0.72
Total	4.60	4.30	4.32	6.23	2.33

Distribution. Southern Africa.

Material examined. South Africa. Pretoria or Makapan: 1♀ (lectotype of Cyrba nigrimana Simon) (MNHN: 20124-part), 3♀♀, 1juv (paralectotypes) (MNHN: 20124-part); Transvaal: 1♀ (paralectotype) ('From E. Simon', '83', '4123', G. W. & E. G. Peckham Coll., MCZC). N.W. Transvaal, Waterberg,

Klipfontein, 24°08'S, 28°18'E: 1♀, 7.xii.1979 (C.A. Car & Falcon College, NMBZ: NMZ/A342). Angola. Chimporo, 1060m., à 50km. O. du Kubango depuis le poste A (XI): 1♂ (holotype of Cyrba boveyi de Lessert) (Monard, MHNG). Mozambique (Portugese East Africa). Vila Pery (XI): 1♂ (paratype of Cyrba boveyi de Lessert) (P. Lesne, MHNG). Zimbabwe. Falcon College, 20°13'S, 28°58'E: 1♂, 1juv, 10-17 November 1990 (V. D. & B. Roth, CASC). Zimbabwe 2028B1, Noelvale, Zvishavane: 1♂, 1♀, 29.xi.1984 (M. Bing, NMBZ: NMZ/A2772); Zimbabwe 2028B1, Ntabazinduna: 1♂, 6.xii.1992 (M. FitzPatrick, NMBZ: NMZ/A10457); Zimbabwe 1825D2, Tshowe River, Matetsi Safari Area: 1♂, 6.xii.1988 (J. Minshull, NMBZ: NMZ/A6961).

Cyrba ocellata (Kroneberg, 1875)

(Figs. 383-384)

Euophrys ocellata Kroneberg, 1875: 48.

Cyrba ocellata: Wanless, 1984b: 455 (synonymy).

Diagnosis. The male palp is most similar to that of Cyrba legendrei but lacks the posterior conical retrolateral tibial apophysis of that species. The female epigynum also resembles that of C. legendrei but its posterior margin is not angled at the sides but rounded.

Description. Male (from Yala, Sri Lanka, in good condition). Carapace: dark greyish amber, anterior ocular

area blackish, clothed with decumbent translucent-whitish hairs, partly rubbed, no distinct pattern; setae rubbed but apparently similar to other species. Eyes: with dark surrounds, AEs fringed with translucent-whitish hairs.

Clypeus: blackish amber, sparsely clothed with long whitish hairs, medial setal triad present, setae below AMEs normal. Chelicerae: greyish or blackish amber,

mediodistal margins amber; three promarginal teeth, equidistant, middle largest, four retromarginal teeth.

Maxillae and labium: greyish amber, mediodistally broadly whitish, scopulae, serrulae well developed. Sternum: shiny greyish amber, sparsely clothed with erect white hairs.

Coxae: shiny greyish amber, fourth pair largest, second and third smallest. Abdomen: olive amber or greyish amber, clothed with greyish hairs, anterior margin, transverse spot at first pair of sigilla and spot at end of abdomen white, secretory field at first pair of sigilla evidently present, venter greyish, a large whitish patch on each

side. Spinnerets: blackish. Legs: olive amber-blackish, distal tarsi pale, distolateral pale spot on anterior

femora, pale lateral stripes on some segments, moderately spiny, ventral scopulae (prey capture setae) on anterior

metatarsi and tarsi. Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia d0-1-0, p1-0-1, v2-2-2, r1-0-1; metatarsus p0-2-2, v2-0-2. r1-1-1 Palp:

femur, patella greyish amber, tibia and cymbium blackish, femur with whitish hairs above and below; dorsal distal patellar and tibial apophyses acute, anterior RTA pointed, with basal lobe, posterior branch shorter, forward pointing, cymbial apophysis and retolateral concavity present; palpal organ typical of genus. Dimensions (mm): total length 4.54; carapace length 2.03, breadth 1.50, height 1.10; abdomen length 2.55; eyes, anterior row 1.43, middle row 1.25, posterior row 1.35; quadrangle length 0.87; diameters, AME 0.43, ALE 0.26, PME 0.06, PLE 0.25; interocular distances ALE-PME-PLE 0.34-0.23; clypeus 0.12. fovea 0.38.

Legs	1	2	3	4	Palp
Femur	1.48	1.37	1.29	1.75	0.67
Patella	0.76	0.68	0.61	0.72	0.32
Tibia	1.12	0.91	0.91	1.41	0.27
Metatarsus	1.05	0.91	1.00	1.63	---
Tarsus	0.61	0.53	0.51	0.67	0.91
Total	5.02	4.40	4.32	6.18	2.17

Female (from Yala, Sri Lanka, in good condition). Similar to male except as noted. Much lighter than male. Carapace: amber, clothed with decumbent greyish amber hairs, no

distinct colour pattern; forward directed setae along AEs, several lateral and posterior to PEs, fovea distinct, long, extending well back from PLE. Eyes: with dark surrounds, AEs fringed with greyish amber hairs. Clypeus: greyish amber, with amber hairs, medial setal triad present, three medially directed setae below each AME, other setae and hairs at clypeal margin. Chelicerae: amber, proximally rounded at front, some long medial setae; three equidistant promarginal teeth, proximal smallest, four-five smaller retromarginal teeth, distals smallest. Maxillae and labium: greyish amber, mediodistally broadly paler, scopulae, serrulae well developed. Sternum: amber, with sparse erect dark hairs/setae. Coxae: amber, fourth largest, third smallest. Abdomen: dorsum mouse brown, sides and back darker, with five pale chevron marks, a pale mark at first pair of sigilla, secretory field evidently present, clothed with greyish brown hairs and dark setae (longer at front), venter pale. Spinnerets: greyish. Legs: greyish amber, uniformly coloured but some whitish tufts prolaterally on some segments, spines similar to male but reduced, anterior metatarsi and tarsi with scopulae (prey capture setae). Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0. Palp: femur, patella and tibia greyish amber, tarsus amber, tarsus with three

dorsolateral spines, tarsal claw present; with some long hairs, dense on prolateral tarsus. Epigyne: [ventral, dorsal view of spermathecae & ducts].

Dimensions (mm): total length 4.65; carapace length 0.91, breadth 1.52, height 1.10; abdomen length 2.62; eyes, anterior row 1.46, middle row 1.27, posterior row 1.41; quadrangle length 0.91; diameters, AME 0.46, ALE 0.27, PME 0.06, PLE 0.25; interocular distances ALE-PME-PLE 0.34-0.23; clypeus 0.04. fovea 0.34

Legs	1	2	3	4	Palp
Femur	1.41	1.31	1.24	1.63	0.63
Patella	0.80	0.72	0.64	0.76	0.36
Tibia	0.95	0.84	0.84	1.33	0.44
Metatarsus	0.82	0.82	0.93	1.52	---
Tarsus	0.49	0.46	0.46	0.93	0.74
Total	4.47	4.15	4.11	6.17	2.17

Distribution. Most of South and South-east Asia to Queensland, Australia.

Material examined. Sri Lanka. Yala: 1♂, 2♀♀, 10 February 1979, night collecting (W. Sedgwick, WSCC). Burma. Bet. Tannggyi & Kelaw: 1♂, 16 July 1982 (W. Sedgwick, WSCC). India. West Bengal, Kanchrapara: 1♂, June 1944 (Mont A.

Cazier, AMNH); 1♂, Sethmudai, nr. Pollachi, 375m, 18 March 1962 (Ross & Cavanagro, CASC). Philippines. Luzon, Los Pinas, Rizal Province: 1♀, 11-30 July 1945 (E. Malkin, AMNH). Plus others.

Cyrba simoni Wijesinghe, 1993

(Figs. 396-397)

Cyrba bimaculata Simon, 1886: 392.

Cyrba bimaculata: Wanless, 1984b: 461.

Cyrba simoni Wijesinghe, 1993: 136 (replacement name).

Diagnosis. Males are easily identified by the short, robust hook-like prolateral spur arising from the base of the embolus. Females have the posterior epigynal margin with diagonal sides and lobes separated by a U- or V-shaped median notch.

Description. Male (from Kenya, Murphy Coll. 9137, in fair condition). Carapace: Uniform amber, anterior ocular area darker; partly rubbed, thinly covered with recumbent white hairs, ocular area with amber hairs; bare integument punctate, faintly iridescent; setae rubbed but apparently similar to other species (along AEs and lateral to PEs); fovea distinct and long, behind PLEs. Eyes: with dark surrounds, PME's minute, AEs fringed with pale greyish hairs. Clypeus: amber, with a pair of wide black stripes from each AME to clypeal margin, wider at front, a fainter

pair of dark stripes below each ALE, amber areas enclosed by black stripes covered with whitish hairs, medial setal triad present. Chelicerae: pale amber, some long whitish hairs medially and at sides; three promarginal teeth, more or less equidistant, four or five small retromarginal teeth. Maxillae and labium: amber, distally pale, scopulae and serrulae normal. Sternum: amber, with erect pale hairs/setae. Coxae: amber, fourth and first largest. Abdomen: pale buffy whitish, dorsum very slightly sclerotized; mostly rubbed but evidently clothed with pale amber or greyish hairs and setae; two pairs of sigilla, secretory field indistinct anterior to first pair; venter uniformly pale, genital area and thin ring round spinneret bases greyish. Spinnerets: pale greyish. Legs: amber, metatarsi and proximal tarsi black, tibiae with a pair of ventrolateral stripes, tibiae of first pair also with dorsal black stripe, moderately spiny, thinly clothed with amber and greyish hairs, long on some segments, anterior metatarsi and tarsi with weak scopulae (prey capture setae). Spination of leg I: femur d0-1-2, p0-0-2; patella p0-1-0; tibia p1-0-1, v2-2-2, r1-0-1; metatarsus p0-1-1, v2-0-2, r0-1-1. Palp: femur, patella, amber, tibia and cymbium blackish; RTA pointed, anteriorly directed, simple, a large curved prolateral apophysis at embolar base.

Dimensions (mm): total length 4.73; carapace length 2.00, breadth 1.60, height 1.21; abdomen length 2.74; eyes, anterior row 1.50, middle row 1.37, posterior row 1.50; quadrangle length 0.91; diameters, AME 0.48, ALE 0.27, PME 0.06, PLE 0.25; interocular distances ALE-PME-PLP 0.34-0.25; clypeus 0.22. fovea 0.30.

Legs	1	2	3	4	Palp
Femur	1.41	1.37	1.29	1.75	0.68
Patella	0.76	0.70	0.65	0.74	0.38
Tibia	1.05	0.97	0.95	1.41	0.30
Metatarsus	0.97	0.93	1.00	1.62	---
Tarsus	0.55	0.51	0.48	0.63	0.91
Total	4.74	4.48	4.37	6.15	2.27

Female (from Kenya, Murphy Coll. Tube 4152, in fair condition). Similar to male except as noted. Carapace: uniform amber; mostly rubbed, thinly covered with whitish or amber hairs; bare integument punctate and iridescent in ocular area; setae rubbed, probably similar to other species. Eyes: with dark surrounds, AEs fringed with translucent amber hair. Clypeus: much narrower than in male, no pattern, amber, clothed with semi-erect amber whitish hairs, medial setal triad present, a long seta

below each AME. Chelicerae: amber, anteriorly rounded, with some amber hairs and setae medially; three promarginal teeth, almost equidistant, five small retromarginal teeth. Maxillae and labium: amber, distally pale, scopulae and serrulae normal. Sternum: amber, sparsely covered with erect amber hairs. Coxae: amber, fourth and first largest. Abdomen: dorsally whitish yellow, rubbed but apparently originally clothed with greyish amber hairs (and setae?) which cover rest of abdomen, hairs darker (greyish) at posterior end; two pairs of sigilla, secretory field indistinct, anterior to first pair. Spinnerets: pale, sides greyish. Legs: uniform amber, tibiae of first pair slightly darker, no dark markings or other pattern, spines typical for genus, hair cover thin, short; anterior metatarsi and tarsi with scopulae (preycapture setae). Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0. Palp: femur, patella yellowish amber, tibia, cymbium amber; tarsus with two dorsolateral spines; clothed with erect amber hairs/setae, long on sides of tibia, denser ventroprolaterally on tarsus, tarsal claw present. Epigyne: plate posteriorly produced into rounded and wide 'V', medially notched, corners of notch not very acute, ducts and spermathecae visible through integument, 'cyrboid wings' of ducts apparently ventrally twisted;

this specimen not dissected.

Dimensions (mm): total length 5.18; carapace length 2.01, breadth 1.56, height 1.10; abdomen length 2.89; eyes, anterior row 1.51, middle row 1.35, posterior row 1.51; quadrangle length 0.93; diameters, AME 0.49, ALE 0.28, PME 0.06, PLE 0.26; interocular distances ALE-PME-PLP 0.36-0.25; clypeus 0.11. fovea 0.15.

Legs	1	2	3	4	Palp
Femur	1.41	1.35	1.27	1.67	0.61
Patella	0.76	0.70	0.65	0.73	0.36
Tibia	0.93	0.87	0.87	1.33	0.42
Metatarsus	0.86	0.82	0.95	1.51	---
Tarsus	0.49	0.47	0.48	0.55	0.68
Total	4.45	4.21	4.22	5.79	2.07

Variation. Males: 1♂ from Br. Cameroons (CASC) pale, legs unmarked, embolar apophysis slightly different. Females: there appears to be some variation in posterior extension of epigynum (acute or obtuse 'V', etc.).

Distribution. West, Central and East Africa.

Material examined. Congo. Landana: 1♀ (lectotype of Cyrba bimaculata Simon, designated by Wanless, 1983; specimen teneral, very pale whitish, only spermathecae and ducts

partly sclerotized) (MNHN: 75nn?). Kenya: 1♂, 1♀, leaf litter, August 1974 (JFMC: 4152); 1♂, leaf litter, August 1974 (JFMC: 9137). Senegal. Dakar Peninsula: 2♀♀, July 1945 (Eldon H. Newcomb, AMNH). British Cameroons. Tiko Plantation, Matute: 1♂, 24 April-6 May 1949 (B. Malkin, CASC).

Cyrba tanzania new species

(Figs. 394-395)

Diagnosis. Epigynum very similar to that of Cyrba simoni but ventral integument with a pair of shallow round depressions at level with spermathecae.

Description. Male Unknown.

Female (holotype from Serengeti, Tanzania, AMNH, in poor condition). Carapace: dark amber, ocular area blackish, unpatterned; posteriorly thinly clothed with fine whitish hairs, traces of translucent greyish hairs in ocular area; bare integument of ocular area faintly iridescent; setae rubbed, apparently similar to other species. Eyes: with indistinct dark surrounds, PME minute, AEs fringed with pale greyish hairs. Clypeus: narrow, uniform dark amber, thinly covered with greyish hairs, midclypeal setal triad present, a long seta below each AME, whitish hairs at margin. Chelicerae: dark amber, margins paler, anteriorly faintly greyish, thinly clothed with fine black setae;

three promarginal teeth, distals larger slightly apart, four smaller retromarginal teeth (similar to proximal promarginal tooth), scopulae of long hairs. Maxillae and labium: dull brownish amber, distally pale, scopulae and serrulae normal. Sternum: dark amber, sparsely clothed with erect hairs. Coxae: amber, fourth pair largest. Abdomen: dorsally heavily rubbed and somewhat shrunk, integument brownish grey, cardiac mark pale yellowish, small pale spots, two pairs of sigilla, secretory field anterior to first pair, venter brownish greyish, clothed with recumbent greyish hairs, margined with a pair of pale stripes. Spinnerets: blackish grey. Legs: uniform amber, irregular blackish markings, black dorsal streaks on tibiae, metatarsi and tarsi, first pair of legs from distal patellae to tarsi blackish, tibiae with a pair of narrow pale dorsal stripes, spines as in other species, greyish hairs, mainly on tibiae; anterior metatarsi and tarsi with scopulae (preycapture setae). Spination of leg I: femur d0-1-2, p0-0-2; tibia v2-2-2; metatarsus v2-0-0. Palp: femur, patella dark amber, distally blackish, tibia, and tarsus blackish amber; hairs long prolaterally, tarsus with three dorsolateral spines, tarsal claw present. Epigyne: posterior margin of epigynal plate acutely W-shaped, with straight sides, medial notch rather acute, corners of notch very acute, lips at sides narrow,

epigynal plate with pair of large oval depressions in region spermathecae, dorsally spermathecae typical of genus, ducts not ventrally twisted, round, closely applied but not fused at least at lateral loops.

Dimensions (mm): total length 6.08; carapace length 2.41, breadth 1.90, height 1.33; abdomen length 3.75; eyes, anterior row 1.71, middle row 1.50, posterior row 1.63; quadrangle length 1.00; diameters, AME 0.55, ALE 0.30, PME 0.08, PLE 0.29; interocular distances ALE-PME-PLE 0.37-0.30; clypeus 0.09. fovea 0.49.

Legs	1	2	3	4	Palp
Femur	1.75	1.63	1.52	1.98	0.72
Patella	1.03	0.92	0.80	0.86	0.49
Tibia	1.18	1.03	1.00	1.56	0.53
Metatarsus	1.08	1.03	1.15	1.82	---
Tarsus	0.63	0.61	0.57	0.70	0.80
Total	5.67	5.22	5.04	6.92	2.54

Distribution. Tanzania.

Material examined. Holotype: ♀, Tanzania, Serengeti, Ndutu, 14/VI/73, K5 (W. Sedgwick, AMNH).

Etymology. Named for the country in which the species was discovered; a noun in apposition.

PART III-REVIEW OF THE GENUS COCALUS

Introduction

As part of his review of spartaeine jumping spiders Wanless (1984a) revised several previously known genera (e.g., Gelotia Thorell), provided additional information on others which had been revised by him before (e.g., Portia Karsch, Cocalus Thorell) and described several new genera (e.g., Meleon). In Part I of the present study evidence was presented in support of a group comprising of the species placed in the genera Gelotia and Cocalus, plus Meleon madagascarensis. That M. madagascarensis was misplaced in Meleon had been indicated previously (Wijesinghe, 1994) when its relationship to certain South-east Asian species of Gelotia was pointed out, although no explicit transfer to that genus was made. The genus Cocalus (sensu Wanless, 1981b and Wanless, 1984a) previously included several nominal species (mostly known only from types) which are interspecifically similar and share a number of distinctive features. These nominal species are here considered together to represent a single widespread species.

In this part of the present study the relationships of these taxa are analysed further and the results used to propose certain taxonomic changes. The methods of analysis

were as described in Part I of this study and are not repeated here. Veissella durbanii was used as the outgroup, based on the sister species relationship shown by this species to the Cocalus-Gelotia assemblage from the analysis based on implied weights (Fig. 372A). This is supported by the dorsal curving of the embolus toward the alveolus and the enlarged membranous process M2 in the male palp. The previous nomenclature is adopted in the phylogenetic analysis, as shown in the following list. New taxonomic changes based on the analysis are shown in the species descriptions. The following terminal taxa were included in the analysis (with known sexes, and abbreviations used in data matrix in square brackets):

Gelotia bimaculata Thorell ♂♀ [Gel_bim]
Gelotia argenteolimbata (Simon) ♂♀ [Gel_arg]
Gelotia robusta Wanless ♂ [Gel_rob]
Gelotia salax Wanless ♂ [Gel_sal]
Gelotia lanka Wijesinghe ♂♀ [Gel_lan]
Gelotia syringopalpis Wanless ♂♀ [Gel_syr]
Meleon madagascarensis Wanless ♂♀ [Mel_mad]
Cocalus gibbosus Wanless ♂♀ [Coc_gib]

Description of Characters

Character 0: First row posterior eyes (PME). States:

Minute-1, Not minute-0.

- Character 1: Apically directed membranous flap (M1) at embolus base. States: Small or absent-1, Moderate-0 (Fig. 289).
- Character 2: Fan-like (not diffuse) ventral hair fringes on anterior tibiae. States: Vestigial or absent-1, Well developed-0 (Figs. 249).
- Character 3: Movable hyaline portion of retrolateral tibial apophysis. States: Robust-1 (Figs. 260, 279, 286, 304, 322, 331), Vestigial-0.
- Character 4: Femoral organ on male femur I. States: Present-1 (Figs. 295, 296, 338, 339), Absent-0.
- Character 5: Dorsal tibio-cymbial articulation of male palp. States: With posterior lobe-like apophysis on cymbium and anterior apophysis on tibia-1 (Figs. 260, 323, 407), Not so-0.
- Character 6: Dorsal abdominal secretory field between first pair of sigilla in female (at least). States: Present-1, Absent-0.
- Character 7: Male palpal tibia ventrally with a dark ridge extending back retrolaterally from base of ventral apophysis. States: Present-1 (Figs. 258, 279, 304, 322, 331, 406, 409), Absent-0.
- Character 8: Prolateral tegulum near embolus base. States: Separated from rest of tegulum by a membranous fissure as a lobe or sliver-1 (Figs. 261, 289, 290, 293, 307, 308, 336), Not so-0.

- Character 9: Spermathecae. States: Relatively small-1 (Fig. 344, 414), Relatively large-0 (Figs. 253, 320).
- Character 10: Tegular ledge. States: Antero-posteriorly stretched-1 (Fig. 286, 322), Transversely aligned (with only prolateral lobe anteriorly shifted)-0.
- Character 11: Prolateral margin of male palpal tibia in ventral view. States: Relatively long and straight-1 (Figs. 322, 406, 409), Shorter and rounded-0.
- Character 12: Movable portion of retrolateral tibial apophysis. States: Triangular-1 (Figs. 322, 406), Not so-0.
- Character 13: Movable portion of retolateral tibial apophysis. States: With a posterior ramus-1 (Figs. 332, 410), Not so-0.
- Character 14: Copulatory ducts. States: Short and swollen-1 (Figs. 344, 414), Not so-0.
- Character 15: Anterior tegulum-embolus complex. States: Distorted and complex-1 (Figs. 331, 409), Relatively simple-0.

Results

Parsimony analysis of the unweighted (i.e., equally weighted) data with Hennig86 (Farris, 1988) and NONA (Goloboff, 1993b) gave two equally shortest trees of length 21 steps (Fig. 415, 416), with a consistency index

of 0.76 and retention index of 0.73. The same two trees were also obtained using Pee-Wee (Goloboff, 1993a) with a total fit of 117.5. The two trees differ only in the placement of frenatus: bimaculatus + frenatus as sister group to the rest of the species or bimaculatus as sister species to frenatus + the rest of the species. Not surprisingly, a strict consensus tree (Fig. 417) leads to an unresolved trichotomy but is used as the basis for the following observations.

The rest of the tree topology places Cocalus gibbosus (representing Cocalus sensu Wanless) as the sister group to the other species (Fig. 417, node 13). In the latter clade two distinct groups are seen: lanka + syringopalpis on one hand (node 9), and madagascarensis + (robusta + salax) (node 11) on the other. With the relatively deep placement of Cocalus gibbosus in the Cocalus-Gelotia assemblage Gelotia Thorell, 1890 (type species Gelotia frenata Thorell, 1890) becomes a synonym of Cocalus C. L. Koch, 1846 (type species Cocalus concolor C. L. Koch, 1846) (see also Part I above).

Character support for the phylogeny adopted here is as follows. The monophyly of Cocalus (as revised here, including Gelotia) (Fig. 417, node 15) is supported by the loss or reduction of ventral leg hair fringes (character 2: 0-->1), the presence of a large movable (socketed)

retrolateral tibial apophysis (character 3: 0-->1), the presence of dorsal abdominal secretory fields at least in females (character 6: 0-->1), the separation by a membranous fissure of a lobe of the prolateral tegulum at embolus base (character 8), and the antero-posterior stretching of the tegular ledge (character 10: 0-->1). The monophyly of a group consisting of all the species except argenteolimbata and bimaculata (node 13) is supported by reduction in the size of membranous process M1 (character 1: 0-->1) and the relatively long and straight prolateral margin of the male palpal tibia (character 11: 0-->1). The monophyly of lanka + syringopalpis + madagascarensis + robusta + salax (node 12) is supported by reduction in spermathecal size (character 9: 0-->1). The group lanka + syringopalpis (node 9) is supported by the presence of a femoral organ on male femur I (character 4: 0-->1), the presence of a posterior ramus to the movable retrolateral tibial apophysis of the male palp (character 13: 0-->1), the short and swollen copulatory ducts (character 14: 0-->1), the relatively distorted anterior tegulum-embolus complex (character 15: 0-->1). The group madagascarensis + robusta + salax (node 11) is supported by the presence of a tibio-cymbial articulation with a posterior lobe-like cymbial apophysis (character 5: 0-->1). The group robusta + salax (node 10) is supported by the triangular shape of

the movable (socketed) retrolateral tibial apophysis of the male palp.

Descriptions of Species

Cocalus frenatus (Thorell, 1890) NEW COMBINATION

(Figs. 277-285)

Gelotia frenata Thorell, 1890: 345. ♀.

Codeta argenteo-limbata Simon, 1900: 33. ♂. NEW SYNONYMY.

Gelotia frenata: Wanless, 1984a: 170.

Gelotia argenteolimbata: Wanless, 1984a: 174.

Diagnosis. Males can easily be identified by the spiny ventral apophysis on the palpal femur. Females may be identified by the structure of the epigynum, with a relatively large anterior hood and elongate atrial depressions.

Description. Male (from Kerinci National Park, Sumatra, Coll. Deeleman, in fair condition). Carapace: dark grey-brown, with a pair of white lateral stripes a little above carapace margins and narrower dorsal median stripe on posterior declivity; dark areas clothed with narrow amber/translucent hairs iridescent in some angles, pale areas clothed with white hairs; bare integument finely punctate; forward directed setae above AE and a few lateral to PLE. Eyes: posterior eyes with dark surrounds

(retinal areas), anteriors fringed with amber hairs of carapace; PME rather small. Clypeus: mostly devoid of hair cover, greyish amber, lateral pale stripes curving up to touch ALEs, medial setal triad present, a long seta below each AME, another more medial closer to clypeal edge, a row of weaker setae at clypeal edge. Chelicerae: amber brown, anteriorly with some fine greyish spots and some setae medially and laterally; scopulae well developed; posterior surface with long hairs mid-medially and short setae proximally; three promarginal teeth, distal two large, proximal two close together, four retromarginal teeth, distal teeth large. Maxillae and labium: greyish amber, maxillae with proximal oval area grey, with strong scopulae and serrulae. Sternum: yellowish amber, a weak narrow medial blackish stripe posteriorly, clothed with erect pale hairs and fine setae. Coxae: pale yellowish amber, shiny. Abdomen: ground colour pale but clothed with greyish brown hairs, iridescent in some angles, 2-3 pair of sigilla visible, dark dorsum slightly constricted about 1/3 from posterior end, a pair of pale yellowish lateral stripes, venter greyish white; no strong setae. Spinnerets: anteriors and posteriors greyish, medians pale, anteriors robust, subconical, others slender. Legs: pale yellowish, with strong spines, clothed with dark setae and yellowish and brownish hairs; fairly uniformly

pale but distal ends of posterior metatarsi dark.

Spination of leg I: femur ; patella ; tibia ; metatarsus .

Palp: dark amber brown; femur with diagnostic spiny distal apophysis, RTA movable and slender, cymbium proximally with several elevated areas.

Dimensions (mm): total length 6.38; carapace length 2.70, breadth 1.88, height 1.58; abdomen length 3.38; eyes, anterior row 2.01, middle row 1.67, posterior row 1.96; quadrangle length 1.33; diameters, AME 0.68, ALE 0.37, PME 0.09, PLE 0.34; interocular distances ALE-PME-PLE 0.49-0.40; clypeus 0.23.

Legs	1	2	3	4	Palp
Femur	2.36	2.15	2.07	2.64	0.91
Patella	0.95	0.87	0.78	0.91	0.55
Tibia	2.01	1.71	1.52	2.17	0.30
Metatarsus	--	1.90	1.86	2.96	--
Tarsus	--	1.29	0.82	0.97	1.25
Total		7.92	7.05	8.65	3.01

Female Described by Wanless (1984b) as Gelotia frenata.

Distribution. Singapore, Sumatra (Indonesia).

Material examined. Singapore: 1♂ (lectotype of Codeta argenteolimbata Simon, designated by Galiano August 1959 &

Wanless 1982) (E. Simon, MNHN: 12820). Indonesia. Sumatra: 1♂, Kerinci, N. Park, 800m, nr. river, from leaves, 21-30 July 1988 (Suh. Djojosedharmo, CLDR).

Cocalus bimaculatus (Thorell, 1892) NEW COMBINATION

(Figs. 286-303)

Gelotia (?) bimaculata Thorell, 1892: 348.

Gelotia bimaculata: Wanless, 1984a: 172.

Diagnosis. Males may be identified by the shape of the retrolateral tibial apophysis and cymbial apophyses. Females can be distinguished by the narrow anterior hood to the epigynum and the shallow wide atrial depressions separated by a distinct keel.

Description. Male (from Pasoh Forest Reserve, Negri Sembilan, Malaysia, fair-poor condition). Carapace: integument reddish brown, mostly rubbed, clothed with narrow amber translucent hairs iridescent in some angles, traces of pale (white) lateral stripes at carapace margins; bare integument punctate, shiny, fovea distinct and between PLE; setae not evident. Eyes: with dark surrounds, bases of PLE swollen medially, AE fringed with carapace hairs; PME rather small. Clypeus: reddish brown, similar to dorsal carapace, not clothed with hairs, medial setal triad and seta below each AME present, row of setae at clypeal edge, chilum very large. Chelicerae: reddish

brown with some darker striations anteriorly, pair of proximolateral bosses present anteriorly; three promarginal teeth, distal two well separated and large, six retromarginal teeth, distal larger than others.

Maxillae and labium: brownish amber, distally pale, scopulae and serrulae of maxillae well developed. Sternum: shiny amber, sparsely clothed with fine erect hairs.

Coxae: yellowish amber, shiny, first and fourth larger.

Abdomen: pale mouse brown, cardiac area reddish brown; anterior dorsum slightly elevated, setae not evident, anteriorly clothed with coarse grey-brown hairs, two pairs of sigilla evident. Spinnerets: grey brown, anteriors subconical, others slender, distal segments of anteriors and posteriors distinct. Legs: amber brown, with moderately strong spines, sparsely clothed with amber or brownish hairs; unpatterned. Spination of leg I: leg I (both) missing. femur ; patella ; tibia ; metatarsus .

Palp: [femur, patella, tibia, cymbium colour]; [tibial & other apophyses]; [tibial hair cover & setae].

Dimensions (mm): total length 7.05; carapace length 2.93, breadth 2.12, height 1.65; abdomen length 4.43; eyes, anterior row 2.05, middle row 1.69, posterior row 1.96; quadrangle length 1.52; diameters, AME 0.68, ALE 0.36, PME 0.10, PLE 0.37; interocular distances ALE-PME-PLE 0.44-0.49; clypeus 0.14.

Legs	1	2	3	4	Palp
Femur	---	1.98	1.90	2.55	0.95
Patella	---	0.84	0.82	0.91	0.46
Tibia	---	1.56	1.48	2.20	0.36
Metatarsus	---	1.60	1.75	3.04	---
Tarsus	---	0.74	0.68	0.80	1.18
Total	---	6.72	6.63	9.5	2.95

Female (from Malaysia, Negri Sembilan, Pasoh Forest Reserve, 2-3 May 1979, M. Wong & P. Becker leg., Cameron, in good-fair condition). Similar to male except as noted.

Carapace: integument dark amber brown, mostly rubbed; posterior clothed with amber/dark brown (blackish in some angles) hairs, white hairs forming a pair of lateral stripes close to margins, a narrower white medial stripe at posterior declivity; bare integument finely punctate, slightly iridescent; no setae evident. Eyes: with distinct dark surrounds, anteriors fringed with brownish hairs.

Clypeus: pale amber, sparsely clothed with amber hairs, medial setal triad present, a pair of setae below each AME (slightly lateral), another medial pair close to clypeal edge, row of short setae at clypeal edge; chilum very large. Chelicerae: amber, shiny, anteriorly moderately

inflated, proximal lateral bosses anteriorly, medially many strong setae, laterally some whitish hairs, brownish hairs elsewhere; three promarginal teeth, distal large and well separated, five retromarginal teeth, second distal largest; anterior scopulae well developed. Maxillae and labium: amber, distally whitish, maxillae with well developed scopulae and serrulae. Sternum: yellowish amber, shiny, sparsely clothed with hairs (rubbed). Coxae: yellowish amber, shiny, fourth pair largest, third pair smallest. Abdomen: integument whitish yellow, clothed with brown or dark amber hairs (rubbed dorsally), a broad dark encircling band near spinneret bases, another band across middle of dorsum, venter with broad stripe of dark hairs, sides pale, somewhat mottled; no strong setae; two pairs of sigilla; secretory field between first pair of sigilla. Spinnerets: pale greyish yellow, anteriors subconical, distal segments of posteriors conical. Legs: pale amber, hair covering forming irregular dark and light annulations on all segments; with moderately strong spines; ventral hair fringes on tibiae I (entire) and IV (distal only) short but distinct; broad dark proximal and distal rings on femora and tibiae, medial and distal and narrow on metatarsi; metatarsi and tarsi of leg IV (and to a lesser degree leg III) slender and long; metatarsi and tarsi of legs I-II with prey-capture setae (scopulae)

ventrolaterally. Spination of leg I: femur d0--2-1, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia p1-1-0, v2-2-2; metatarsus v2-1-1. Palp: yellowish white, tarsus distally pale amber, patella and tibia clothed with long white lateral hairs, tarsus also with stronger ventral setae, tarsus dorsolaterally with five spines, tarsal claw present. Epigyne: ventral plate somewhat rounded, atria wide with thin crescentic lips, separated by thin septum, copulatory openings protected by elongate anterior hood, dorsally spermathecae very large, fused, ducts anterior and short.

Dimensions (mm): total length 6.23; carapace length 2.68, breadth 2.22, height 1.62; abdomen length 3.57; eyes, anterior row 1.90, middle row 1.71, posterior row 1.86; quadrangle length 1.33; diameters, AME 0.61, ALE 0.32, PME 0.21, PLE 0.30; interocular distances ALE-PME-PLP 0.46-0.44; clypeus 0.15.

Legs	1	2	3	4	Palp
Femur	2.09	1.98	1.79	2.20	0.99
Patella	1.12	0.95	0.82	0.95	0.46
Tibia	2.01	1.44	1.29	1.79	0.65
Metatarsus	1.60	1.44	1.56	2.53	---
Tarsus	0.82	0.72	0.68	0.80	0.95

Total	7.64	6.53	6.14	8.27	3.05
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Distribution. Indonesia.

Material examined. Indonesia. Sumatra: 1♂ (lectotype of Codeta bouchardi Simon, det. Wanless), Foret du Nirou, Palembang Prov. (M.J. Bouchard, MNHN: 22187). Malaysia. Negri Sembilan: 1♂, Pasoh Forest Reserve, Gap, 20 August 1978 (M. Wong & P. Becker, UMMZ-Cameron); 1♀, Pasoh Forest Reserve, 2-3 May 1979 (M. Wong & P. Becker, UMMZ-Cameron). Johore: 1♂, Gunong Sumalayan, 20 July 1976 (J. Koh, JHKK: 76.07.20.00). Sarawak, Borneo: 1♀, Gunung Mulu N.P., alluvial forest, environ of base camp, April 1978 (P. Chapman, BMNH), 1♂, Gunung Mulu N.P., Melinau Gorge, environs of base camp, 18 May 1978 (Roy. Geog. Soc. Mulu Exped., F.R. Wanless, BMNH). Mentawai I: 1♂ Sereinu (NHMW, Wien).

Cocalus lanka (Wijesinghe, 1991) NEW COMBINATION

(Figs. 409-414)

Gelotia lanka Wijesinghe, 1991a: 275.

Diagnosis. G. lanka closely resembles G. syringopalpis by the presence of posterior ramus to the male palpal retrolateral tibial apophysis and the presence of a pair of mammiform tubercles on the copulatory ducts of females; however, it can easily be distinguished from that species

by the posteriorly keeled dorsal cymbial apophysis and the different structure of the retrolateral tibial apophysis in males and the shallow, wide epigynal atrium and distally bulbous copulatory ducts in females.

Description. Male (holotype, from Opatha, Sri Lanka, in good condition). Carapace: reddish brown, with faint blackish markings; eye region lightly punctate, faintly iridescent, clothed with brownish hairs, darker on sides and thoracic region; margins narrowly blackish, pair of broad white bands above margins, narrower medial band on thoracic region. Eyes: encircled in black; few short setae laterally, row of setae behind anterior eyes; anteriors fringed with brown and white hairs. Clypeus: yellow-brown, clothed with white hairs; pair of long setae below each AME, triad between and below AME; row of white hairs at margin. Chelicerae: yellow-brown, tinged greyish; clothed with white hairs and setae proximally, many long fine setae distally and medially; promargin with three, retromargin with five teeth. Maxillae and labium: pale yellow-brown, scopulae strong. Sternum: yellow-brown, tinged greyish, shiny; with scattered white hairs. Coxae: pale yellow-brown. Abdomen: dorsally pale yellow-brown, greyish at sides and posterior, clothed with short setae and scattered iridescent brown hairs; ventrally whitish, tinged grey posteriorly; spinnerets pale greyish brown.

Legs: moderately long and slender; yellow-brown, femora with dark subterminal bands; femora I retrolaterally greyish, with small tubercle (femoral organ) ventroprolaterally; spines numerous. Spination of legs I: femora d0-1-4, p0-0-1; patellae p0-1-0, r0-1-0; tibiae d1-1-0, p1-0-1, v2-2-2, r1-0-1; metatarsi v2-0-1, p1-1-0, d0-1-2, r1-1-1. Palp: retrolateral tibial apophysis biramous, basally membranous, base of anterior ramus continuous with tibia dorsally, base of posterior ramus rounded, condyle-like, articulating with socket on retrolateral face of tibia; cymbium with well-developed posteriorly keeled dorsal apophysis, proximal retrolateral flange mammiform dorsally; tegular furrow J-shaped, embolar complex hyaline.

Dimensions (mm): total length 5.25; carapace length 2.33, breadth 1.79, height 1.45; abdomen length 2.55; legs, I 6.73, II 5.64, III 5.78, IV 7.87; eyes, anterior row 1.80, middle row 1.62, posterior row 1.75; quadrangle length 1.28; diameters, AM 0.55, AL 0.31, PM 0.19, PL 0.29; interocular distances AL-PM-PL 0.40-0.37; clypeus 0.19.

Legs	1	2	3	4	Palp
Femur	1.65	1.54	1.59	2.05	
Patella	0.85	0.72	0.71	0.78	

Tibia	1.65	1.30	1.29	1.80
Metatarsus	1.70	1.40	1.55	2.46
Tarsus	0.88	0.68	0.64	0.78
Total	6.73	5.64	5.78	7.87

Female (paratype, from Opatha, Sri Lanka, in good condition). Carapace: dark reddish brown, with irregular blackish markings; eye region lightly punctate, faintly iridescent, clothed with fine translucent hairs; sides and thoracic region with dark and pale hairs; margins blackish, pair of broad white bands above margins, narrower medial white band on thoracic region. Eyes: encircled in black; few short setae laterally, row of setae behind anterior eyes, anteriors fringed with white and brown hairs. Clypeus: reddish brown; two long setae below each AME, triad between and below AME; row of white hairs along margin. Chelicerae: reddish brown, anteriorly convex; medially with many long setae; three promarginal and six retromarginal teeth. Maxillae and labium: pale reddish brown. Sternum: pale brown, tinged grey, shiny; sparsely clothed with white hairs. Coxae: similar to sternum. Abdomen: dorsally fawn, paler folium widened posteriorly, with two pairs of white spots; clothed with short setae and fine iridescent hairs; ventrally blackish, pair of elongate pale blotches posteriorly at sides;

spinnerets grey-brown. Legs: dark yellow-brown, legs I-II darker, with blackish annulations; spines numerous. Palps: similar to legs, tibiae and tarsi with long white hairs; terminal claw present. Spination of legs I: femora d0-1-4, p0-0-1; patellae p0-1-0, r0-1-0; tibiae p1-0-1, v2-2-3; metatarsi, p0-1-0, v2-0-0, r0-1-0. Epigynum: atrium shallow, wide; spermathecae spherical, close together, copulatory ducts distally bulbous, heavily sclerotized, proximally with pair of large mammiform tubercles dorsally near spermathecae; postepigynal region with more or less triangular sclerotizations at sides.

Dimensions (mm): total length 6.2; carapace length 2.80, breadth 2.13, height 1.68; abdomen length 3.4; legs, I 7.13, II 6.38, III 6.14, IV 8.12; eyes, anterior row 2.01, middle row 1.82, posterior row 2.00; quadrangle length 1.33; diameters, AM 0.61, AL 0.35, PM 0.20, PL 0.34; interocular distances AL-PM-PL 0.43-0.41; clypeus 0.16.

Legs	1	2	3	4	Palp
Femur	1.95	1.83	1.73	2.19	
Patella	1.04	0.96	0.84	0.93	
Tibia	1.66	1.44	1.34	1.89	
Metatarsus	1.64	1.44	1.56	2.51	
Tarsus	0.84	0.71	0.67	0.60	

Total	7.13	6.38	6.14	8.12
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Variation. Females (n=3): total length 6.2-7.9; carapace length 2.80-3.20. Sclerotization of the postepigynal region is variable in extent, though present in all three specimens.

Distribution. Sri Lanka.

Material examined. Opatha, Gampaha District: ♂ (holotype), on vegetation, 23 November 1986 (T. Wijesiri, AMNH). Same data as holotype: 2♀♀, 1 juv. (paratypes) (AMNH); Sinharaja Forest, Ratnapura District: 1♀ (paratype), on vegetation, 20-23 October 1984, (D.P. Wijesinghe, CNMS).

Cocalus syringopalpis (Wanless, 1984) NEW COMBINATION

(Figs. 331-345)

Gelotia syringopalpis Wanless, 1984a: 178.

Diagnosis. Distinguished from C. lanka which it closely resembles by the smaller cymbial apophysis and differently shaped retrolateral tibial apophyses of the male palp and the narrower atrium and smaller mammiform tubercles of the female epigynum.

Description. Male (from Singapore, J. Koh coll., 87.09.21.01, in good condition). Carapace: dark amber, ocular area, lateral areas and an anteriorly narrowed medial line on posterior declivity pale; partly rubbed but

darker areas clothed with narrow amber hairs and lateral and medial stripes evidently clothed with white hairs; integument slightly shiny, fovea distinct, anterior end about level with anterior margins of ALEs, posterior end well behind posterior margins of PLEs.; anteriorly directed setae above AEs, a few lateral to PEs. Eyes: with dark surrounds, bases of PLE medially slightly elevated (i.e., PLE below flat top of carapace. Clypeus: dark amber, sparsely clothed with scattered pale hairs, medial setal triad present, two pairs of medially directed setae below each AME, one more medial (and closer to clypeus edge than other). Chelicerae: dark amber, mediodistally paler, some strong setae medially and shorter setae laterally, a pair of small bosses proximolaterally anteriorly, scopulae well developed; three promarginal teeth, distal well separated and larger than proximal, six retromarginal teeth, second and third distals larger than others. Maxillae and labium: pale amber, greyish medioproximally, maxillary serrulae and scopulae well developed. Sternum: pale amber, with erect hairs, a faint greyish middle line. Coxae: pale amber, first and fourth largest, third smallest. Abdomen: ground colour yellowish amber, dorsally clothed with dark hairs and pale hairs iridescent in some angles, also short dark setae, ventrally mostly yellowish amber, with 2-4 pairs of dark

longitudinal striations. Spinnerets: blackish, anteriors robust and subconical, posterior more slender, distal segments of posteriors about 0.5-0.33 length of basal segment. Legs: uniform pale amber, sparsely clothed with amber or dark hairs, moderately slender, spines normal, some rather long, no ventral hair fringe any legs; femur I with well developed acute proximal ventroprolateral femoral organ. Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia d1-1-0, p1-1-0, v2-2-2, r1-1-0; metatarsus p-1-1-1, v2-2-0, r1-1-2. Palp: dark-blackish amber, dorsal distal patellar apophysis acute, tibia with two apophyses, anterior with membranous base, bifid at tip, posterior apophysis slender and directed back, base rounded and articulating with tibia. Dimensions (mm): total length 4.65; carapace length 2.17, breadth 1.75, height 1.48; abdomen length 2.53; eyes, anterior row 1.78, middle row 1.67, posterior row 1.77; quadrangle length 1.18; diameters, AME 0.57, ALE 0.33, PME 0.21, PLE 0.31; interocular distances ALE-PME-PLP 0.37-0.33; clypeus 0.17.

Legs	1	2	3	4	Palp
Femur	1.67	1.56	1.44	2.20	0.76
Patella	0.83	0.76	0.67	0.74	0.43

Tibia	1.41	1.16	1.05	1.52	0.36
Metatarsus	1.41	1.25	1.25	2.01	---
Tarsus	0.69	0.55	0.49	0.57	1.12
Total	6.01	5.28	4.90	7.04	2.67

Female (from Singapore, garden foliage, Mount Pleasant Road, J. Koh coll. no. 88.12.08.07, in good condition). Similar to male except as noted. Carapace: dark amber, ocular area and sides slightly paler; clothed with amber or dark hairs, lateral borders (mostly rubbed) and an anteriorly narrowed medial stripe on posterior declivity with white hairs, medial stripe bordered with dark hairs; integument smooth-lightly punctate, fovea distinct, extending from between PLE to well behind posterior margins of ALE; anteriorly directed setae associated with AEs, several lateral to PEs. Eyes: with blackish surrounds, anteriors with slight hair fringes, bases of PLE slightly raised medially. Clypeus: amber, sparsely clothed with a few hairs, medial setal triad present, two pairs of long medially directed setae below each PME (similar to male), whitish hairs at lower margin. Chelicerae: dark shiny amber, anteriorly rounded (swollen), some long setae near medial margin; three promarginal teeth, distal two large and well separated, six retromarginal teeth, third distal largest, tuft of

long hairs on posterior face. Maxillae and labium: dark amber, maxillary serrulae and scopulae well developed. Sternum: pale amber, clothed with erect hairs. Coxae: amber, third pair smallest. Abdomen: dorsal integument mouse brown, with some pale spots, anterior cardiac area whitish, unrubbed areas clothed with amber hairs and short dark setae; two pairs of sigilla, an apparent secretory field anterior to first pair of sigilla, venter mouse brown, with two pairs of pale stripes. Spinnerets: blackish, tips pale. Legs: uniform amber, sides of anterior femora blackish, moderately long, ventral hair fringes completely absent on any legs, spination normal, sparsely clothed with amber or dark hairs; anterior metatarsi and tarsi prolaterally with scopulae (prey capture setae). Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0; tibia p1-1-0, v2-2-2; metatarsus v2-2-0. Palp: amber, femur and patella distally greyish, patella, tibia and tarsus laterally with some thick long white hairs and fine dark hairs, more numerous ventrally on tarsus, six dorsolateral tarsal spines, tarsal claw present. Epigyne: [ventral, dorsal view of spermathecae & ducts].

Dimensions (mm): total length 6.15; carapace length 2.62, breadth 2.05, height 1.63; abdomen length 3.49; eyes, anterior row 1.99, middle row 1.89, posterior row 2.00;

quadrangle length 1.29; diameters, AME 0.63, ALE 0.36, PME 0.21, PLE 0.35; interocular distances ALE-PME-PLP 0.43-0.36; clypeus 0.14.

Legs	1	2	3	4	Palp
Femur	1.98	1.77	1.67	2.20	0.93
Patella	1.05	0.91	0.82	0.89	0.49
Tibia	1.49	1.25	1.16	1.75	0.63
Metatarsus	1.37	1.24	1.35	2.20	---
Tarsus	0.61	0.55	0.49	0.55	0.95
Total	6.50	5.72	5.49	7.59	3.00

Distribution. Singapore.

Material examined. Singapore: 1♂, 27 September 1987 (J. Koh, JHKK: 87.09.21.01);
1♀, Mount Pleasant Road, garden foliage, 8 December 1988 (J. Koh, JHKK: 88.12.08.07); 1♂ (Workman, Peckham Collection, MCPM).

Cocalus madagascarensis (Wanless, 1978) NEW COMBINATION
(Figs. 258-270)

Portia madagascarensis Wanless, 1978: 114.

Meleon madagascarensis: Wijesinghe, 1994: 59 (synonymy).

Diagnosis. Males can be identified by the robust retrolateral tibial apophysis of the palp and shape of the

cymbium. Females may be distinguished by the protuberant epigynum.

Description. Male (holotype, from Mt. Ambohisanga, in fair condition). Carapace: pale amber, uniformly colored except dense irregular whitish guanine deposits in ocular area; clothed with fine whitish or amber hair, some hairs (ocular area) moderately iridescent; bare integument lightly punctate; with several setae, mostly forming row above AMEs; very faint striations radiating from moderately short fovea. Eyes: with dark surrounds, anteriors with pale amber hair fringes. Clypeus: pale amber, with subintegumental guanine; medial setal triad present, one seta below each AME, two other pairs of setae (one more medial) close to margin, virtually hairless except some small setae along lower margin. Chelicerae: pale amber, shiny, faintly iridescent, slightly indented at sides near bases; many fine setae near inner margin and at sides; three promarginal teeth with diastema, subdistal largest, five retromarginal teeth, subdistal largest, with additional distal denticle on left. Maxillae: pale yellow-amber, rounded and wider distally, apicomedial scopulae thick, several setae apicolaterally, serrulae distinct. Labium: similar to maxillae, tip and diagonal sides straight, narrowed near base. Sternum: scutiform, pale yellow-amber, shiny, sparsely clothed with fine setae and

hairs, slight elevations opposite coxae I-III and at back.

Coxae: similar to sternum, subequal, III slightly

smaller, IV slightly larger. Abdomen: dorsum and venter

uniform pale yellowish cream (whitish); two pairs of

sigilla; clothed dorsally with fine setae anteriorly and

flat decumbent shiny iridescent hairs. Spinnerets:

moderately short, compact, similar to abdomen. Legs:

moderately long and slender, uniform pale yellowish amber

but distal segments of anterior legs much darker; numerous

spines, clothed with hair but no fringes; no clear rows of

preycapture setae but perhaps present; leg I with both

claws toothed, anterior claw teeth possibly longer and

paler, leg IV with both claws evidently equally toothed

(pale, long); no femoral organ on leg I. Spination of leg

I: femur d0-1-2, p0-0-2, r0-1-2; patella p0-1-0, r0-1-0;

tibia d1-1-1, p1-1-0, v2-2-2, r1-0-1; metatarsus d0-1-0,

p1-0-1, v2-1-2, r1-1-1. Palp: femur, patella pale whitish

yellow, patella dorsodistally slightly sclerotized, tibia

and cymbium with dark amber sclerotizations; tibia with

finger-like dorsodistal apophysis, retrolateral apophysis

massive, anteriorly curved and excavate, with membranous

fissure separating apophysis into fixed proximodorsal and

movable distal portions, movable apophysis posteriorly

rounded, ventral apophysis pointed, not shifted, somewhat

Brettus-like, cymbium postero-prolaterally produced, a

second smaller lobe-like apophysis, dorsodistal tibial apophysis fitting between cymbial processes, postero-retrolaterally concave, dorsally keeled, with lateral spine opposing tip of retrolateral tibial apophysis, cymbial tip elongate, distal cymbium retrolaterally open for dorsally curving embolus; palpal organ complex, with distinct tegular lobe, with prolateral fissure between tegulum and embolar base, embolus dorsally curved, with distinct embolar groove.

Dimensions (mm): total length 4.85; carapace length 2.25, breadth 1.80, height 1.50; abdomen length 2.58; eyes, anterior row 1.54, middle row 1.26, posterior row 1.43; quadrangle length 1.14; diameters, AME 0.50, ALE 0.27, PME 0.17, PLE 0.23; interocular distances ALE-PME-PLE 0.35-0.40; clypeus 0.21.

Legs	1	2	3	4	Palp
Femur	2.50	2.09	1.81	2.19	0.94
Patella	0.89	0.81	0.74	0.78	0.43
Tibia	2.33	1.75	1.38	1.88	0.34
Metatarsus	2.33	1.86	1.79	2.78	---
Tarsus	0.91	0.68	0.56	0.65	1.33
Total	8.96	7.19	6.28	8.28	3.04

Female (holotype of Portia oreophila Wanless, from Mt. Ambohisanga, in fair condition). Carapace: amber, ocular area paler with subintegumental guanine, sides and narrow medial line white, medial line indistinct does not reach carapace posterior; hair cover even, thin on ocular area; bare integument lightly punctate; a few setae beside eyes, row of long setae behind anterior eyes. Eyes: with dark surrounds, anteriors with amber hair fringes; fovea rather short. Clypeus: yellowish amber (with subintegumental guanine), mostly bare, a transverse row of few amber hairs below each AME, medial setal triad present, a long seta below each AME and another more medial pair closer to lower margin, a row of amber hairs along lower margin. Chelicerae: pale amber, slight greyish streaks, shiny, sparsely clothed with fine setae; three promarginal teeth, middle largest, with diastema, six retromarginal teeth, distal slightly apart from rest, small, denticle like on left; each posterior face with a tuft of long hairs. Maxillae: pale amber, wider apically than at base, serrula distinct, some curved setae apicolaterally, scopulae thick. Labium: pale amber, tip and diagonal sides straight, basally narrowed at sides, base darker and procurved. Sternum: yellowish amber, moderately shiny, scutiform, clothed with small fine hairs, more robust setae in loose clumps opposite coxae I-III and posteriorly

on slight elevations. Coxae: yellowish amber, sparsely clothed with fine setae and hairs, coxae I perhaps more than rest; tufts of setae arising intercoxally from under carapace. Abdomen: dorsum pale amber, with a pair of white stripes (matching white sides of carapace), sides with another pair of white stripes, venter uniform whitish cream; clothed evenly with hair colored as above, a few setae at anterior; two pairs of sigilla, with another small pair at back; secretory field evidently present between first pair of sigilla, type uncertain but possibly simple (pustuliform). Spinnerets: pale yellowish, moderately short. Legs: pale yellowish amber, posterior legs paler, moderately long (esp. posterior legs), with numerous spines, clothed with assorted hairs; prolateral femora I with scattered narrow white scale-like hairs, short dark hair fringes present on femora-tibiae of legs I, interrupted in tibiae (coinciding with paler middle), very slight on tibiae II; claw tufts present, rows of small preycapture setae on anterior legs; both claws of leg I toothed, possibly fewer on posterior claw, both claws of leg IV toothed, evidently equally; no distinct pattern but tibiae and metatarsi of anterior legs with slight light and dark bands. Spination of leg I: femur d0-1-3, p0-1-1, r0-1-2; patella p0-1-0, r0-1-0; tibia d1-1-0, p1-0-1, v2-2-0, r1-0-1; metatarsus d0-2-0, p1-0-1, v2-1-2,

r1-0-1. Palp: whitish, tarsus tip slightly yellowish, no spines except two small dorsodistally on femur, tibia and tarsus with many long inclined whitish hairs; tarsus moderately long and slender, with claw. Epigyne: ventrally (and posteriorly) moderately bulbous, rather small, copulatory openings anterior, dorsally spermathecae sperical, ducts wide, slightly curved, anteroventrally directed, a small finger-like medial tubercle on inner ventral face of epigyne.

Dimensions (mm): total length 4.75; carapace length 2.60, breadth 2.30, height 1.48; abdomen length 2.60; eyes, anterior row 1.56, middle row 1.27, posterior row 1.45; quadrangle length 1.14; diameters, AME 0.52, ALE 0.28, PME 0.17, PLE 0.24; interocular distances ALE-PME-PLE 0.35-0.0.38; clypeus 0.19.

Legs	1	2	3	4	Palp
Femur	2.26	1.99	1.74	2.40	0.88
Patella	0.95	0.88	0.78	0.83	0.39
Tibia	1.84	1.53	1.30	1.82	0.63
Metatarsus	1.85	1.63	1.74	2.85	---
Tarsus	0.76	0.63	0.56	0.66	0.89
Total	7.66	6.66	6.12	8.56	2.79

Distribution. Madagascar.

Material examined. Madagascar, Mt. Ambohisanga, 15°31'S-49°06'E: 1♂, January 1951 (A. Pierrard, MRAC: 142.917) (holotype of Portia madagascarensis Wanless, 1978), 1♀ (A. Pierrard, MRAC: 142.913) (holotype of Portia oreophila Wanless, 1978).

Cocalus robustus (Wanless, 1984) NEW COMBINATION

(Figs. 321-328)

Gelotia robusta Wanless, 1984a: 174.

Diagnosis. Distinguished from other males by the shape of the tip of the retrolateral tibial apophysis.

Description. Male (holotype, from Papua New Guinea, in fair condition). Carapace: reddish brown, sides marked with blackish, some faint lines radiating from fovea; top and back clothed with decumbent pale amber or whitish hairs, hairs at lower sides blackish brown; bare integument lightly punctate, faintly iridescent; several long setae behind anterior eyes, ocular area devoid of setae except one; fovea moderate, located in slight depression, behind posterior margins of PLE. Eyes: with dark surrounds, anterior eyes fringed with amber hairs. Clypeus: uniformly colored, covered with pale amber hairs which overhang lower margin, medial setal triad present, a single seta below each AME. (Retracted chelicerae

precludes checking for presence of subclypeal sclerite).

Chelicerae: yellowish brown, anteriorly marked diagonally with blackish; many narrow white scale-like hairs near inner margin; three promarginal teeth on right, four on left (additional small tooth in diastema), five retromarginal teeth. Maxillae: moderately long (like G. salax), greyish amber, inner margins whitish, scopulae thick, serrulae distinct. Labium: similar to maxillae, tip whitish with several dark setae. Sternum: grey-brown, with two irregular yellowish patches, shiny; clothed with fine erect setae, more or less clumped thicker setae opposite coxae I-III and at posterior. Coxae: pale yellowish, coxae I anteriorly blackish. Abdomen: dorsally whitish yellow, sides blackish, black extending medially at middle and back to partially subdivide whitish dorsum into large anterior and smaller posterior portions; two pairs of sigilla; secretory fields evidently absent; clothing of short hairs most rubbed; venter whitish, diffusely greyish broadly along midline. Spinnerets: of moderate size, anteriors conical-elongate, posteriors cylindrical with conical apical segments; indication of colulus. Legs: pale yellowish/yellow-brown, uniformly colored except patches of brownish hairs dorsally, especially on femora, and dark annulations distally on tibiae and metatarsi IV; with numerous short spines, dorsodistal series types 2-3; no

hair fringes, but ventral white hairs of femora rather long (as in Phaeacius); preycapture setae well developed (prolaterally) on metatarsi-tarsi I-II (esp. latter); tarsi I anterior claw with more teeth than posterior claw (claws asymmetric); trichobothria: tarsus II: 5 in single row with possible 6th prolaterad to 1st proximal, increasing in length distally, tarsal organ distal to 1st distal; metatarsus II: 4 in single row, widely spaced and increasing in length distally; tibia II: 3-4 irregular rows of 2-4, slightly different to those of tarsi & metatarsi. [Seem to vary among legs, also distinctions b/w trichobothria & other erect hairs unclear; precise description difficult]. Spination of leg I: femur d0-1-5; patella p0-1-0, r0-1-0; tibia d1-0-1, p0-1-1, v2-2-2, r1-1-1; metatarsus p1-1-1, v2-2-0, r-1-1-1. Palp: reddish brown, femur unmodified, with dark brown hairs dorsally, patella with short dorsodistal apophysis which fits into concavity on tibia, clothed with whitish hairs; tibia with retrolateral apophysis movable, more or less flat, trapezoid, upturned at tip, attached to tibia dorsally via membranous area, dorsodistal tibial apophysis fitting between two short posterior cymbial apophyses, ventral apophysis small, retrolaterally hooked; posterior retrolateral corner of cymbium produced into small lobe; embolar region complex, twisted, dorsally curved, fissure

between tegular lobe and prolateral tegulum, M2, M3 stretched.

Dimensions (mm): total length (pedicel extended) 7.65; carapace length 3.08, breadth 2.33, height 1.89; abdomen length 4.18; eyes, anterior row 1.82, middle row 1.59, posterior row 1.81; quadrangle length 1.32; diameters, AME 0.56, ALE 0.29, PME 0.21, PLE 0.29; interocular distances ALE-PME-PLE 0.42-0.44; clypeus 0.26.

Legs	1	2	3	4	Palp
Femur	2.10	2.10	1.95	2.36	1.05
Patella	1.11	1.08	0.90	0.99	0.60
Tibia	1.74	1.66	1.54	1.88	0.58
Metatarsus	1.61	1.56	2.13	2.06	---
Tarsus	0.73	0.70	0.71	0.80	1.33
Total	7.29	7.10	7.23	8.09	3.56

Female. Unknown.

Distribution. Papua New Guinea.

Material examined. Holotype: ♂, Keravat, Gazelle Peninsula, East New Britain, New Guinea, pyrethrum knockdown sample (S. Smith, 021-024; MCZC).

Cocalus salax Thorell, 1877 COMBINATION REVISED

(Figs. 406-408)

Cocalus salax Thorell, 1877: 594.

Gelotia salax: Wanless, 1984a: 176.

Diagnosis. Distinguished from other males by shape of the retrolateral tibial apophysis and by the embolus being distally slender and long..

Description. Male (lectotype, from Celebes, in poor condition). Carapace: reddish brown; clothed with whitish hairs; integument faintly punctate and iridescent; several setae associated with anterior eyes. Eyes: with dark surrounds, anterior eyes with amber-whitish hair fringes.

Clypeus: reddish brown, sparsely clothed with amber hairs, no color pattern; medial setal triad present, one seta below each AME, row of smaller setae along lower margin; weakly sclerotised, large subclypeal sclerite present.

Chelicerae: reddish brown, paler distally, with faint dark marks but no distinct pattern, many long setae on inner distal margins; three promarginal teeth with diastema, apical and subapical equal, five retromarginal teeth, subapical largest. Maxillae and labium: maxillae

moderately long, whitish apically, thick scopulae, distinct serrulae. Sternum: yellow-brown, shiny, more or less flat, sparsely clothed with short setae and hairs.

Coxae: yellow-brown. Abdomen: extensively damaged, mouse

brown, clothed with amber hairs and scattered setae, some narrow hairs iridescent; secretory fields evidently absent (?). Spinnerets: greyish brown, moderately large and elongate, posteriors more slender than anteriors, with conical apical segments. Legs: femora yellowish brown, similar to coxae, distal segments paler, uniformly colored; numerous short spines, no distinct hair cover or fringes; femoral organ on leg I apparently absent.

Spination of leg I: femur d0-2-4; patella p0-1-0, r0-1-0; tibia 1-1-0, p1-0-1, v2-2-2, r2-0-1; metatarsus d0-1-0, p1-0-1, v2-2-0, r2-0-1. Palp: yellow brown, with apophyses reddish brown/dark amber; femur unmodified, patella with short dorsodistal apophysis fitting into concavity in tibia, tibia with triangular movable retrolateral apophysis and fixed dorsodistal apophysis fitting between two posterior apophyses of cymbium, base of RTA membranous dorsally; ventral apophysis small, hooked retrolaterally; see figures for palpal organ, embolus long and slender.

Dimensions (mm): total length c. 7.1; carapace length 3.40, breadth 2.70, height 2.30; abdomen length (damaged) 4.10; eyes, anterior row 2.18, middle row 1.91, posterior row 2.09; quadrangle length 1.56; diameters, AME 0.67, ALE 0.34, PME 0.23, PLE 0.30; interocular distances ALE-PME-PLE 0.44-0.51; clypeus 0.28.

Legs	1	2	3	4	Palp
Femur	2.63	2.43	2.36	2.85	1.26
Patella	1.36	1.33	1.11	1.20	0.65
Tibia	2.31	1.99	1.84	2.34	0.63
Metatarsus	2.21	1.95	2.07	2.80	---
Tarsus	0.93	0.82	0.79	0.87	1.50
Total	9.44	8.52	8.17	10.06	4.04

Female. Unknown.

Distribution. Celebes [=Sulawesi], Indonesia.

Material examined. Lectotype σ , Kandari, Celebes
[=Sulawesi], Indonesia, 1874 (O. Beccari, MCSN).

Cocalus concolor C. L. Koch, 1846

(Figs. 304-320)

Cocalus concolor C. L. Koch, 1846: 180.

Cocalus limbatus Thorell, 1878: 283, 311. NEW SYNONYMY.

Cocalus murinus Simon, 1899: 102. NEW SYNONYMY.

Cocalus gibbosus Wanless, 1981b: 258. NEW SYNONYMY.

Diagnosis. Both sexes and immatures of this distinctive species can easily be identified by the conical prominence on the middle of the carapace, and the narrow and elongate abdomen, sternum, maxillae and labium. The male palp is

highly characteristic, with a modified embolar region, large hyaline retrolateral apophysis and a digitiform fixed process.

Description. Male (from Opatha, Gampaha District, Sri Lanka, 26.X.1986, T.A. Wijesiri coll., [male of figured pair, part of series], CNMS, in fair-good condition).

Carapace: integument reddish amber, a low conical elevation in posterior ocular area between PEs, thoracic region rather large, fovea short, behind PLEs; partly rubbed but sides around eyes and thoracic area clothed with decumbent white hairs, longer and erect at posterior margins, not patterned; no strong setae. Eyes: with dark surrounds, bases of PEs medially raised into slight tubercles, AEs fringed with whitish hairs. Clypeus: below PMEs amber, sparsely clothed with erect pale hairs, medial setal triad present, single lateral medially directed seta below each, darker hairs and setae at clypeal margin, sides of face below and lateral to ALE thickly covered with decumbent white hairs forming a pair of white patches, possibly similar to original hair cover of sides of carapace. Chelicerae: deep amber brown, moderately robust and long; three promarginal teeth, distal two slightly apart, middle one largest, four smaller retromarginal teeth, distal two small. Maxillae and labium: moderately elongate, greyish amber, distal ends

whitish, scopulae and serrulae well developed. Sternum: elongate, narrowed at anterior and posterior ends, shiny dull amber, sparsely covered with erect greyish hairs. Coxae: dull amber, third pair smallest, proximally crowding in sternum, sparsely covered with greyish or whitish hairs. Abdomen: moderately slender and elongate, dorsum apparently weakly sclerotized, amber, grey at posterior, thinly clothed with decumbent translucent hairs, hairs longer and white around anterior margin, grey posteriorly, two pairs of sigilla, secretory field distinct between first pair; venter clothed uniformly with short grey hairs, sides streaked. Spinnerets: grey, in compact group, posteriors moderately elongate with well developed distal segments. Legs: more or less uniformly amber, moderately clothed with whitish or greyish hairs, white and long particularly ventrally on femora, tibiae, etc.; spines well developed but not long; anterior tarsi prolaterally with scopulae (prey capture setae); anterior legs with no sign of femoral organ. Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia d1-1-1, p2-1-0, v2-2-2, r1-1-1; metatarsus d0-1-0, p2-0-0, v2-0-0, r1-1-1. Palp: femur, patella, tibia amber, apophyses and palpal organ dark reddish amber, cymbium dark; anterior RTA robust dark-hyaline, with membranous base, posterior RTA finger like and closely applied to

anterior RTA; patella with white hairs, tibia and cymbium with amber whitish hairs.

Dimensions (mm): total length 8.10; carapace length 3.11, breadth 2.55, height 2.05; abdomen length 5.03; eyes, anterior row 1.98, middle row 2.05, posterior row 2.17; quadrangle length 1.43; diameters, AME 0.61, ALE 0.30, PME 0.19, PLE 0.29; interocular distances ALE-PME-PLE 0.51-0.49; clypeus 0.30.

Legs	1	2	3	4	Palp
Femur	2.43	2.13	2.00	2.62	1.14
Patella	1.50	1.35	1.06	1.16	0.67
Tibia	2.15	1.81	1.44	1.90	0.53
Metatarsus	1.80	1.56	1.46	2.19	---
Tarsus	0.91	0.76	0.67	0.72	1.52
Total	8.79	7.61	6.63	8.59	3.86

Female (from Opatha, Gampaha District, Sri Lanka, 26.X.1986, T.A. Wijesiri coll., [female of figured pair, part of same series as male described above], CNMS, in fair-good condition). Carapace: Deep reddish amber, anterior ocular area paler, slightly rubbed but fairly uniformly clothed with decumbent white hairs, structure as in male; no setae. Eyes: as in male, fringed with white

hairs. Clypeus: with no significant difference between hair cover of central clypeus and sides of face, reddish amber, thinly covered with white hairs, hairs at clypeal margin also white, medial and subocular setae as in male. Chelicerae: reddish amber, robust, anteriorly rounded, sparsely clothed with white hairs, hairs long and fine medially; three promarginal and four retromarginal teeth, similar to male. Maxillae and labium: as in male. Sternum: as in male. Coxae: as in male. Abdomen: dorsum apparently not sclerotized, integument brownish grey spotted with yellowish, sides and posterior end darker, greyish cardiac streak, two pairs of sigilla, secretory field between first pair, rubbed but evidently more or less uniformly clothed with decumbent whitish translucent hairs, longer around anterior margin, venter brownish grey, margined dirty whitish, hair cover short, uniform, sides streaky. Spinnerets: similar to male, greyish, distal segments of posterior pair rather long. Legs: as in male, dull amber, clothed with whitish hairs, long ventrally (but not forming hair fringes), spines as in male, anterior tarsi and metatarsi laterally with well developed and long scopular hairs (prey capture setae). Spination of leg I: femur d0-1-2, p0-0-2, r0-0-1; patella p0-1-0, r0-1-0; tibia d1-1-1, p2-1-0, v2-2-2, r2-0-1; metatarsus d0-1-0, p1-1-0, v2-0-0, r1-1-1. Palp: dull amber, patella, tibia

and tarsus laterally with long white hairs, prolateral tarsus with denser amber hairs; femur with five spines, tibia with one, tarsus with sex dorsolateral and one small ventrodistal spines, tarsal claw present. Epigyne: ventral atria a relatively small excavation near posterior margin, dorsally spermathecae large, well sclerotized blackish red, resembling a pair of wide beans, ducts not visible in dorsal view.

Dimensions (mm): total length 10.5; carapace length 3.94, breadth 2.85, height 2.33; abdomen length 6.60; eyes, anterior row 2.20, middle row 2.31, posterior row 2.48; quadrangle length 1.63; diameters, AME 0.67, ALE 0.34, PME 0.23, PLE 0.31; interocular distances ALE-PME-PLE 0.56-0.57; clypeus 0.30.

Legs	1	2	3	4	Palp
Femur	2.58	2.32	2.24	3.04	1.10
Patella	1.69	1.60	1.29	1.44	0.76
Tibia	2.15	1.82	1.60	2.15	0.80
Metatarsus	1.63	1.48	1.58	2.66	---
Tarsus	0.78	0.72	0.68	0.78	1.54
Total	8.83	7.94	7.39	10.07	4.20

Distribution. Sri Lanka to Queensland, Australia..

Material examined. Sri Lanka. Opatha, Gampaha: 4♂♂, 5♀♀, 5imm♂♂, 1imm♀, 2juv, ex sphecid wasp nest, 26 October 1986 (T. A. Wijesiri, CNMS). Singapore. Macritchie Reservoir: 1♀, 10 October 1982 (J. Koh, JHKK: 82.10.10.04).

Indonesia. Sumatra: 1♀ (MNHN: 16290) (lectotype of Cocalus murinus Simon, designated by Wanless 1980). Amboina: 1♂ (O. Beccari, MCSN) (type of Cocalus limbatus Thorell).

Australia. NE Queensland. Lockerie, Cape York: 1♂, 30 January-1 February 1975 (R. J. Raven, QMBA: S846) (holotype of Cocalus gibbosus Wanless). Shiptons Flat: 1♀, 1975 (L. & C. Roberts, QMBA: S15480).

PART IV-DESCRIPTION OF A NEW SPARTAEINE GENUS

Introduction

In his important review of spartaeine salticids Wanless (1984a) recognized the following thirteen genera: Spartaeus, Yaginumanis, Taraxella, Mintonia, Gelotia, Cocalus, Brettus, Neobrettus, Cyrba, Meleon, Veissella, Phaeacius and Portia. A fourteenth spartaeine genus, Wanlessia, was described by Wijesinghe (1992). In Part I of the present study the relationship of these genera to one another and to a number of other basal salticids, as well as higher salticids, was examined (Figs. 371, 372, 372A). Based on that analysis the genus Gelotia was synonymized with Cocalus (see also Part II).

During the course of the present study it was possible to study the Salticidae collected in Sri Lanka by the Lund University Ceylon Expedition of 1962 (Brinck, Andersson and Cederholm, 1971). A single male spartaeine which could not be assigned to any known genus was discovered in this material. Inclusion of this species in the phylogenetic analysis of spartaeines and other primitive salticids has confirmed its position as a member of this clade (Figs. 371, 372, 372A), occupying a relatively basal position in the group. The results from the weighted analyses (successive approximations weighting

and implied weights, Figs. 372, 372A; see also Part I: Methods of Analysis) indicate that it is the sister species to the second major spartaeine lineage (Fig. 372A, node 57). Evidence for this placement includes the origin of a large leaf-shaped membranous flap M1 and lobe-like membranous process M2. This unique new species requires a new genus for its reception and this is described below.

Lankattus new genus

Type species. Lankattus monticola new species.

Diagnosis. Differentiated from other spartaeine salticids by the presence of an apparently sclerotized M1 process at embolus base and the minute, comb-like series of proximal teeth on the cheliceral retromargin (Fig. 154). From Cyrba, to which it is superficially similar in male palp shape, it can be further differentiated by the large cheliceral promarginal teeth (several) and the lack of an anterior tegular groove in the male palp.

Description. Moderately small brown salticids with uniform hair cover. Carapace: moderately high; cephalic part dorsally wide, anterior declivity shallow; thoracic part high behind PLE before reaching steep posterior declivity; fovea moderately long, located on high thoracic part of carapace just behind PLE; hair covering more or less even, broad pale median stripe posteriorly. Eyes: large, except

reduced PME, lenses convex; anterior tubercles normal, posteriors less developed; anterior eyes contiguous, apices more or less level in frontal view; diameters of ALE, PLE about equal, 0.5-0.6 of diameter of AME; PME small, located more or less equidistant from ALE and PLE; PLE dorsally positioned slightly mediad of carapace sides; width of ocular quadrangle about 1.6 times length.

Clypeus: low, about 0.19 times diameter of AME; medial setal triad present. Chelicerae: rather small, paturon convex; promarginal scopulae well developed, setae long; promarginal teeth 4 or 5, no diastema between apical and next tooth, retromarginal teeth very small, located close together in comb-like series; fang moderately long, inner margin weakly serrate. Maxillae: wider distally than proximally, inner distal margins more or less straight, outer margins rounded, ventrally convex, scopulae well developed; serrula present. Labium: wider proximally than distally, proximal margin distinct from sternum, distal margin slightly indented, labium length about half length of maxillae. Sternum: scutiform, slightly elongate, anterior margin slightly concave, posterior obtusely pointed. Coxae: subequal, coxae IV larger than others. Abdomen: ovoid, two pairs of indistinct sigilla integumentary secretory fields absent; clothed with recumbent hairs and some setae; wide pale medial stripe

dorsally, venter uniform. Spinnerets: of moderate proportions, anteriors elongate-conical, posteriors more slender, cylindrical, with conical apices, intermediates well developed; colulus vestigial. Legs: formula 4132; moderately long, tibiae not markedly slender; spines rather long, numerous, present on all segments except tarsi; dorsodistal femoral series normal; hair fringes completely absent, scopulae present; claws evidently symmetrical, pectination consisting of 6-8 teeth, claw tufts present. Spination of leg I: femur d0-2-3, p0-0-1; patella p-0-1-0, r0-1-0; tibia p1-0-1, v2-2-2, r0-1-0; metatarsus p0-1-1, v2-2-2, r0-0-1. Female palp: not known. Male palp: moderately large, femur, patella unmodified, tibia with well developed ventral and retrolateral apophyses, latter slender, dark; cymbium broadly ovoid, somewhat similar to Cyrba; palpal organ with tegular sperm duct broad, narrowing sharply before embolar base, well-developed sclerotized M1, anterior tegulum with tegular furrow recessed; subtegulum and haematodochae not examined. Epigyne: not known.

Etymology. Derived from 'Lanka', from Sri Lanka, and Attus (jumper), an obsolete generic name in the Salticidae.

Lankattus monticola new species.

(Figs. 151-155B)

Diagnosis. See description of genus. The structure of the male palp is unique among spartaeines.

Description. Male (holotype, in good condition). Carapace: dull dark amber, ocular area blackish, pale area at fovea continued back as a stripe, lower margins blackish, sides with some irregular dark markings; clothed with amber hairs, brighter at sides and back; ocular area almost devoid of setae, row of setae above anterior eyes, several setae at sides just below lateral eyes; bare integument punctate, iridescent under some angles. Eyes: with dark surrounds, anteriors with amber hair fringes. Clypeus: greyish amber, little hair cover, medial setal triad present, two long seta below each AME, several shorter setae at margin. Chelicerae: amber, anteriorly marked greyish, paler distally and medially; four (right) or five (left) promarginal teeth, basal smallest, no diastema between apical and next tooth, retromargins with eight or more minute teeth, close together forming comb-like series at level of basal two promarginal teeth, promarginal scopulae long. Maxillae: amber, paler apically, blackish at inner basal margin, with thick scopulae. Labium: amber, greyish basally. Sternum: amber, short grey medial streak posteriorly, thinly clothed with fine hairs. Coxae: amber,

thinly clothed with fine hairs. Abdomen: bright amber, broad pale medial stripe posteriorly with greyish chevrons; clothed with decumbent hairs and fine setae, stronger anteriorly, integumentary secretory fields absent; ventrally uniform bright amber, darker posteriorly. Spinnerets: amber-yellow, laterally greyish, colulus vestigial. Legs: amber brown like body, uniform except posterior tibiae faintly banded, with numerous spines and uniform hair covering, no hair fringes, no femoral organ. Spination of leg I: femur d0-2-3, p0-0-1; patella p-0-1-0, r0-1-0; tibia p1-0-1, v2-2-2, r0-1-0; metatarsus p0-1-1, v2-2-2, r0-0-1. Palp: uniform greyish amber, femur with three dorsal spines, femur, patella unmodified, tibia with well developed ventral and retrolateral apophyses, latter slender, dark; cymbium broadly ovoid; palpal organ with tegular sperm duct broad, narrowing before embolar base, well-developed sclerotized M1, anterior tegulum with tegular furrow recessed.

Dimensions (mm): total length 4.25; carapace length 1.96, breadth 1.45, height 1.10; abdomen length 2.00; eyes, anterior row 1.39, middle row 1.16, posterior row 1.38; quadrangle length 0.86; diameters, AME 0.43, ALE 0.24, PME 0.05, PLE 0.26; interocular distances ALE-PME-PLP 0.26-0.28; clypeus 0.08.

Legs	1	2	3	4	Palp
Femur	1.25	1.23	1.25	1.53	0.68
Patella	0.69	0.64	0.63	0.66	0.34
Tibia	0.93	0.86	0.89	1.26	0.31
Metatarsus	0.84	0.85	0.95	1.38	---
Tarsus	0.49	0.44	0.46	0.55	0.82
Total	4.20	4.02	4.18	5.38	2.15

Female: Unknown.

Distribution. Sri Lanka.

Material examined. Holotype: Male, Horton Plains, Central Province, altitude 7000ft., 12miles SSE of Nuwara Eliya, Sri Lanka, at the edge of the jungle, under stones, 19 March 1962 (Lund University Ceylon Expedition 1962, P. Brinck, H. Andersson & L. Cederholm, MZLU).

Etymology. The specific name refers to the highland type locality of this species and means 'mountaineer'.

```

xread
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-----0----4 5---9 0---4 5---9 0---4 5---9 0---4 5---9 0---4 5---9 0---4 5---9 0---4'
62 33
Clu_pal 00000 00000 0000- 00000 00000 00000 00010 00000 00000 00000 000?? 00000 00
Bre_cin 11101 01100 11011 21110 00010 11111 10010 00010 10010 00000 11000 01000 00
Coc_gib 11101 02200 31001 01110 00000 11101 11010 00120 00010 00111 11011 12000 00
Cyr_alg 11101 02110 11001 21110 00000 11101 10110 000-0 00010 00011 11000 01000 01
Gel_arg 111-1 02210 110-- 1-110 00000 11101 1001- 00120 00010 0010- 1-011 -2--0 0-
Gel_bim 11101 02210 11001 11110 00000 11121 10010 00120 00010 00101 11010 12010 00
Gel_rob 111-1 02200 110-- 3-110 0000- 1110- --01- 01120 0-010 0011- --011 12--0 0-
Gel_syr 11101 02200 11001 31110 00000 11121 10010 00120 00010 00111 1-011 12000 00
Lan_mon 111-1 02210 110-- 2-110 00000 1-001 1001- 00010 00010 2000- 1-000 02--0 0-
Mel_ken 11101 01100 11011 11110 00010 11101 10010 00010 00010 00000 11010 02000 00
Mel_mad 11101 01100 1101- --110 0000- 1110- -0010 011-0 0-010 00000 --011 12000 00
Mel_rus 11101 01100 --01- ----- --1- --1-- -1--0 0---- --010 00--1 ----- --00- -0
Min_tau 11101 02200 21001 01110 00001 11131 10000 00030 00010 00000 11000 02000 00
Neo_tib 11101 0??00 11011 21110 00010 10101 11100 000-0 10010 00000 11000 01000 01
Pha_wan 11101 01?00 11001 51120 00000 10101 11000 00000 00010 01000 11000 01000 00
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Spa_spi 11101 0?100 21001 01110 00000 10021 10010 00040 00010 10000 11000 02000 00
Tar_sol 111-1 02100 210-1 4-110 00001 10001 1000- 00000 00010 1000- 11000 02--0 00
Vei_dur 11101 01200 11011 11110 00010 10101 10000 00120 00010 00000 1-010 02010 00
Wan_sed 111-1 02210 110-1 01100 00001 11131 1000- 000-0 00010 0000- 1-0?0 00--0 0-
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Ase_ten 11100 0??00 00000 00121 11101 00101 10001 10000 00101 00000 101?? 0?000 00
Chi_xxx 11100 00011 00000 00030 00001 00101 10011 10000 00101 00000 1-1?? 0?001 10
Gol_xxx 11100 ---00 000-- 0-000 0000- 0010- --01- 100-0 0-100 00--- ---?? 0?000 -0
Lys_vir 11100 00011 00000 00030 00001 00101 10011 10000 00101 00000 101?? 0?001 10
Ono_nig 11100 0??10 00000 00000 00001 00001 10010 10000 00100 00000 101?? 0?000 00
Pan_xxx 1110- ---10 000-- 0-021 1110- 0010- --01- 100-0 0-100 00--- --1?? 0-000 00
Alc_xxx 11--- ---00 000-- 0-000 0000- 00-0- --01- 000-1 0-010 000-- --0?? 01--0 0-
Cld_pap 11101 00100 00000 00000 00000 0010- 00010 00001 00010 00000 110?? 00000 00
Hol_vel 11100 02000 00010 00000 00000 00001 31000 00000 00010 00011 110?? 00100 00
Son_lig 11--- ---00 000-- 0-000 0001- 0000- --000 000-0 0-010 000-1 --0?? 00100 00
Phi_aud 11111 12?10 00110 00140 00001 10201 21000 00000 01010 00000 120?? 02000 00
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proc/;

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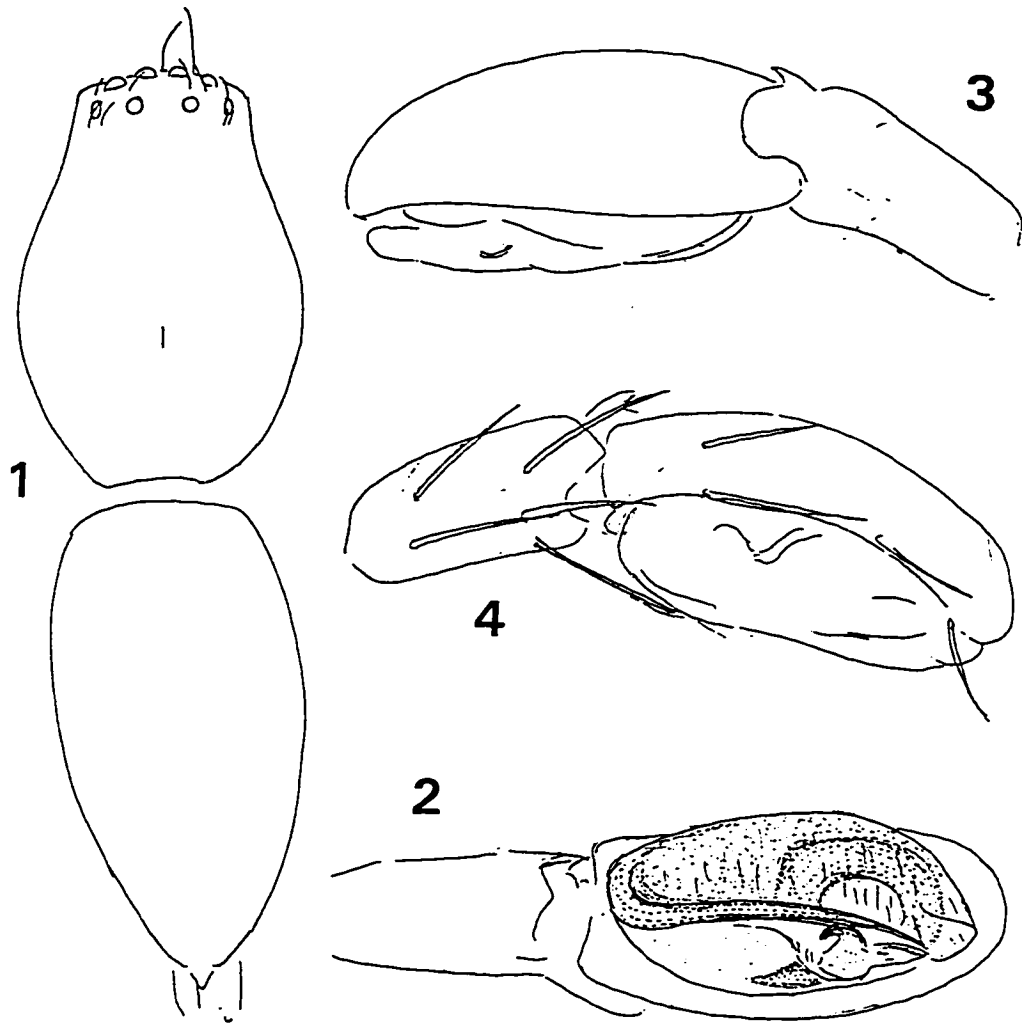
Table 1: Data matrix for salticid higher phylogeny.

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Cyr_ind 11011 20011 11100
Cyr_ken 11-10 10010 111--
Cyr_leg 11011 20011 11101
Cyr_lin 11-00 01110 111--
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proc/;
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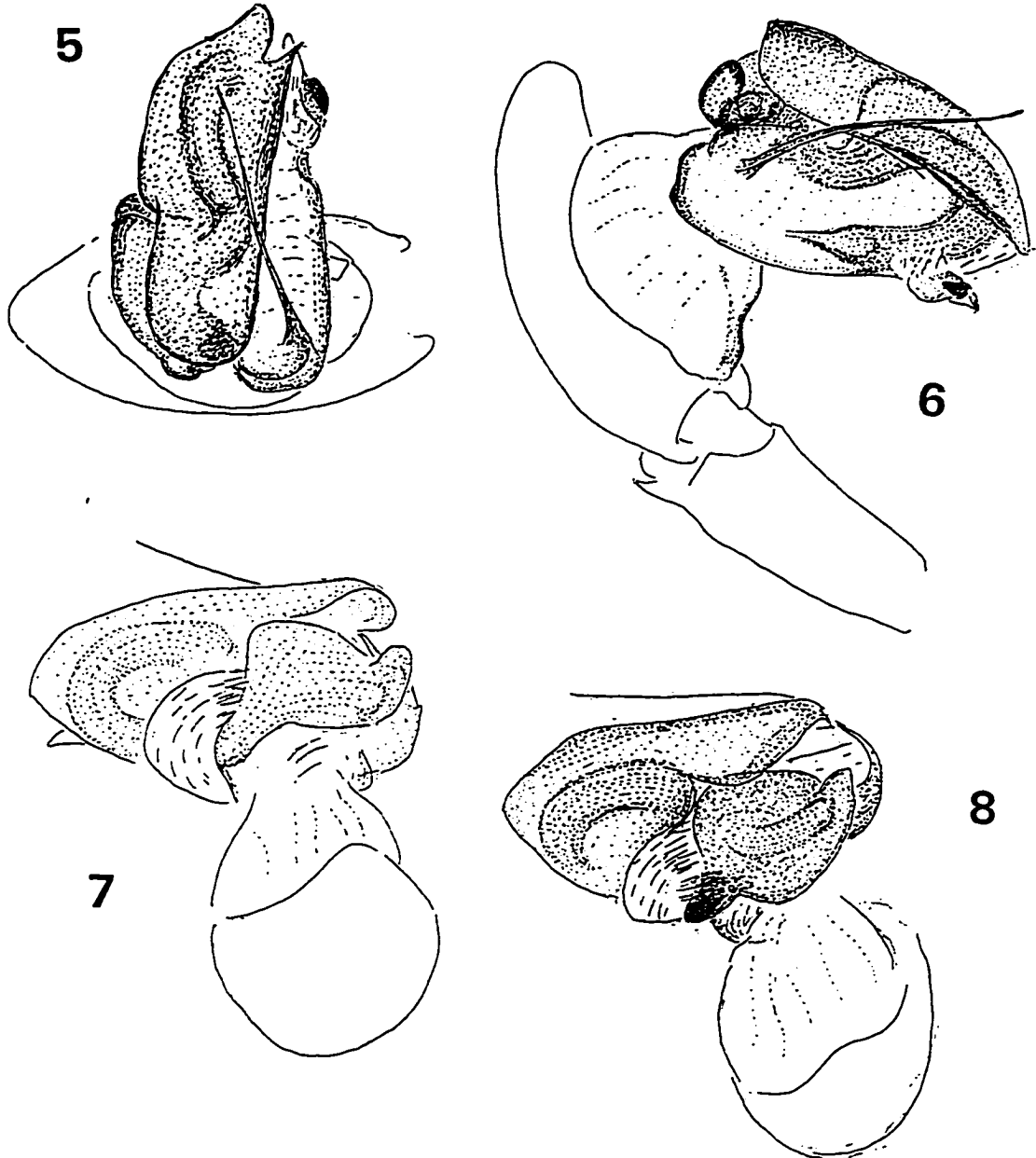
Table 2: Data matrix for Cyrba species.

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-----0---4 5---9 0---4 5---9 '
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Coc_gib 01110 01110 11000 0
Gel_bim 10111 01010 10000 0
Gel_fre 10110 0-1-0 10000 0
Gel_lan 01111 00111 11011 1
Gel_rob 01110 1-11- 1110- 0
Gel_sal 01110 1-11- 1110- 0
Gel_syr 01111 01111 11011 1
Mel_mad 01110 11111 00000 0
proc/;
```

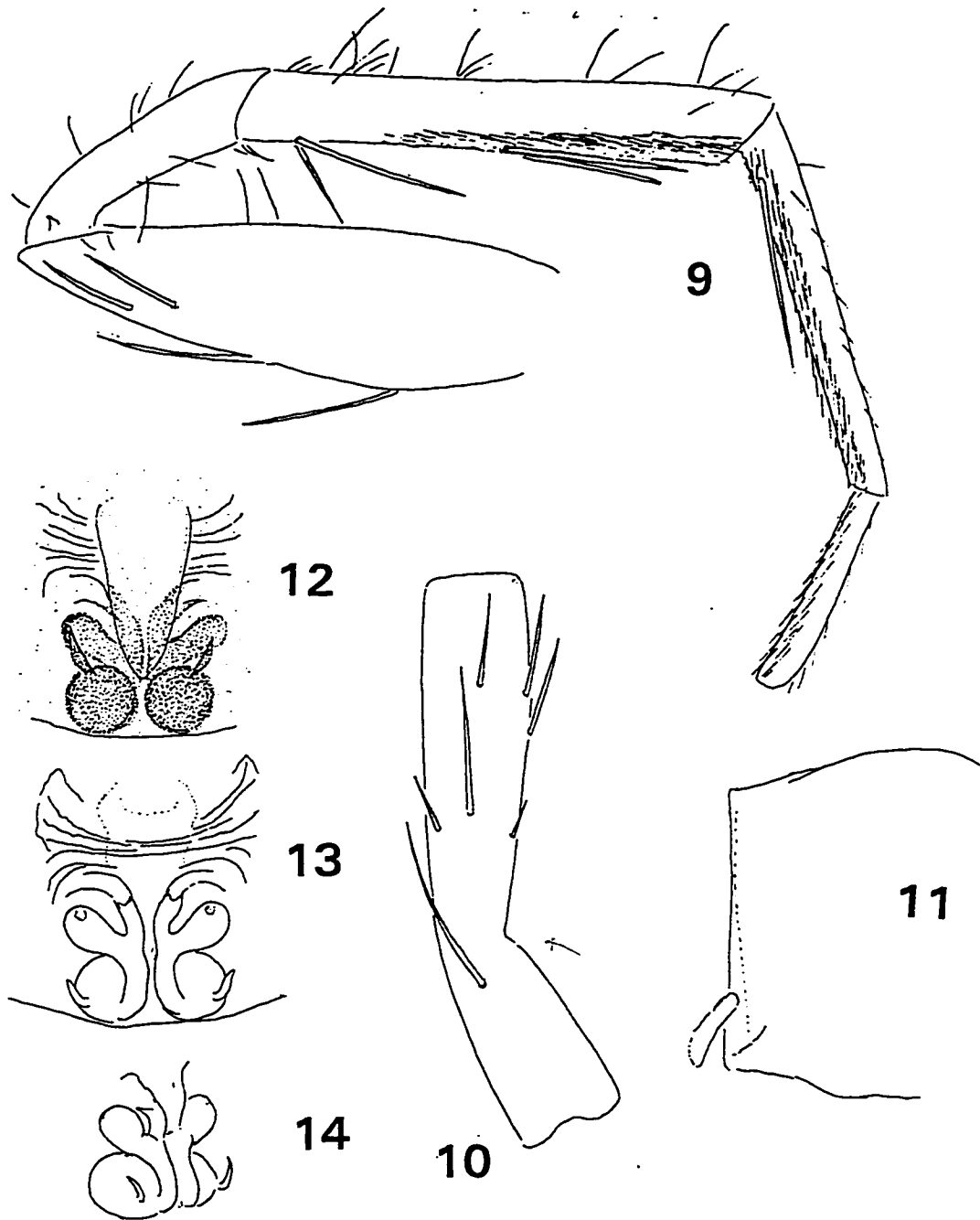
Table 3: Data matrix for Cocalus-Gelotia group.



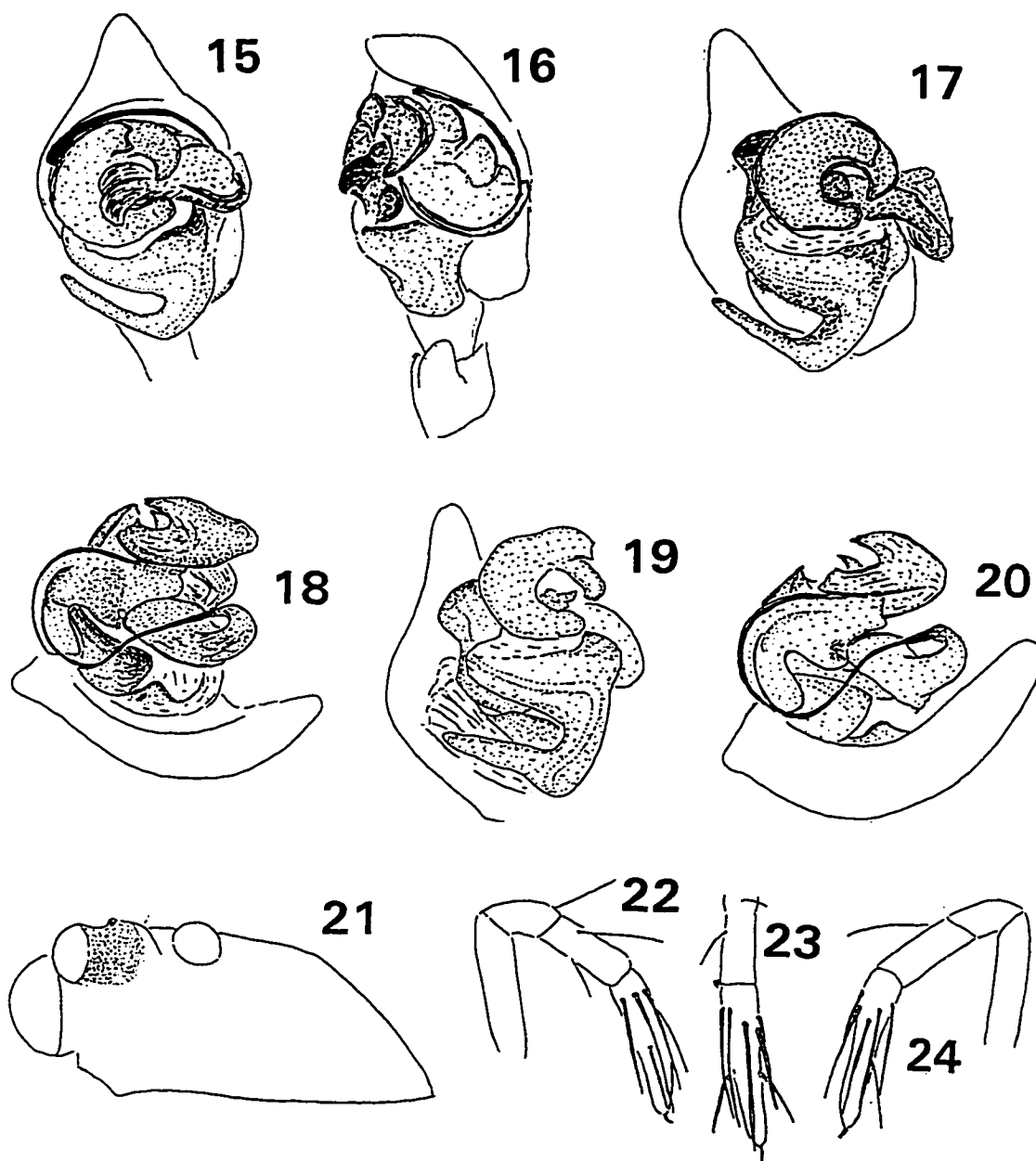
Figures 1-4: Clubiona pallens. 1. Thorax and abdomen. 2-4. Male palp.



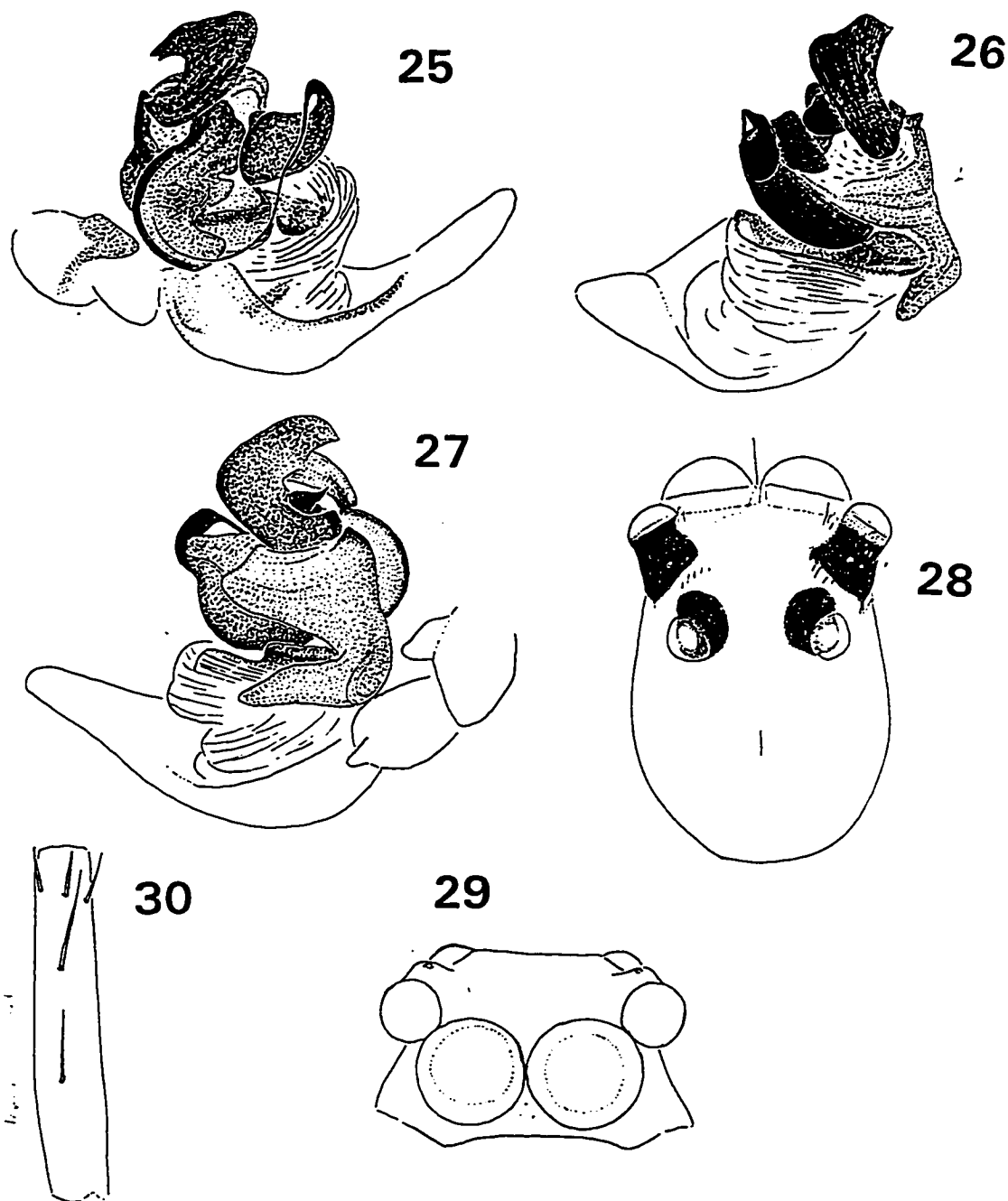
Figures 5-8: Clubiona pallens, expanded palp.



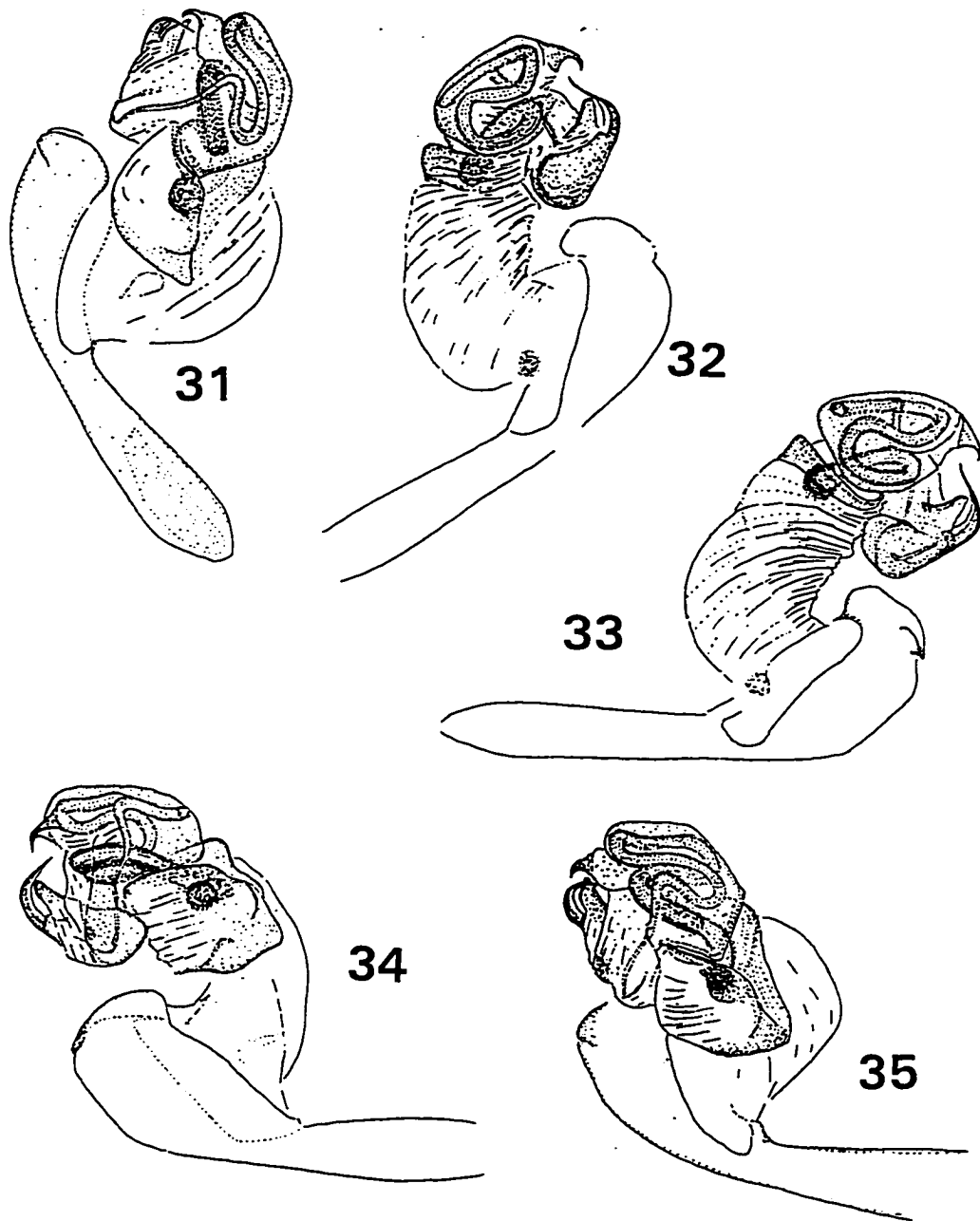
Figures 9-14. Clubiona pallens. 9. Male left leg I. 10. Femur, dorsal. 11. Intercheliceral sclerite and chelicerae. 12. Epigynum. 13. Spermathecae and ducts, dorsal. 14. Spermathecae and ducts.



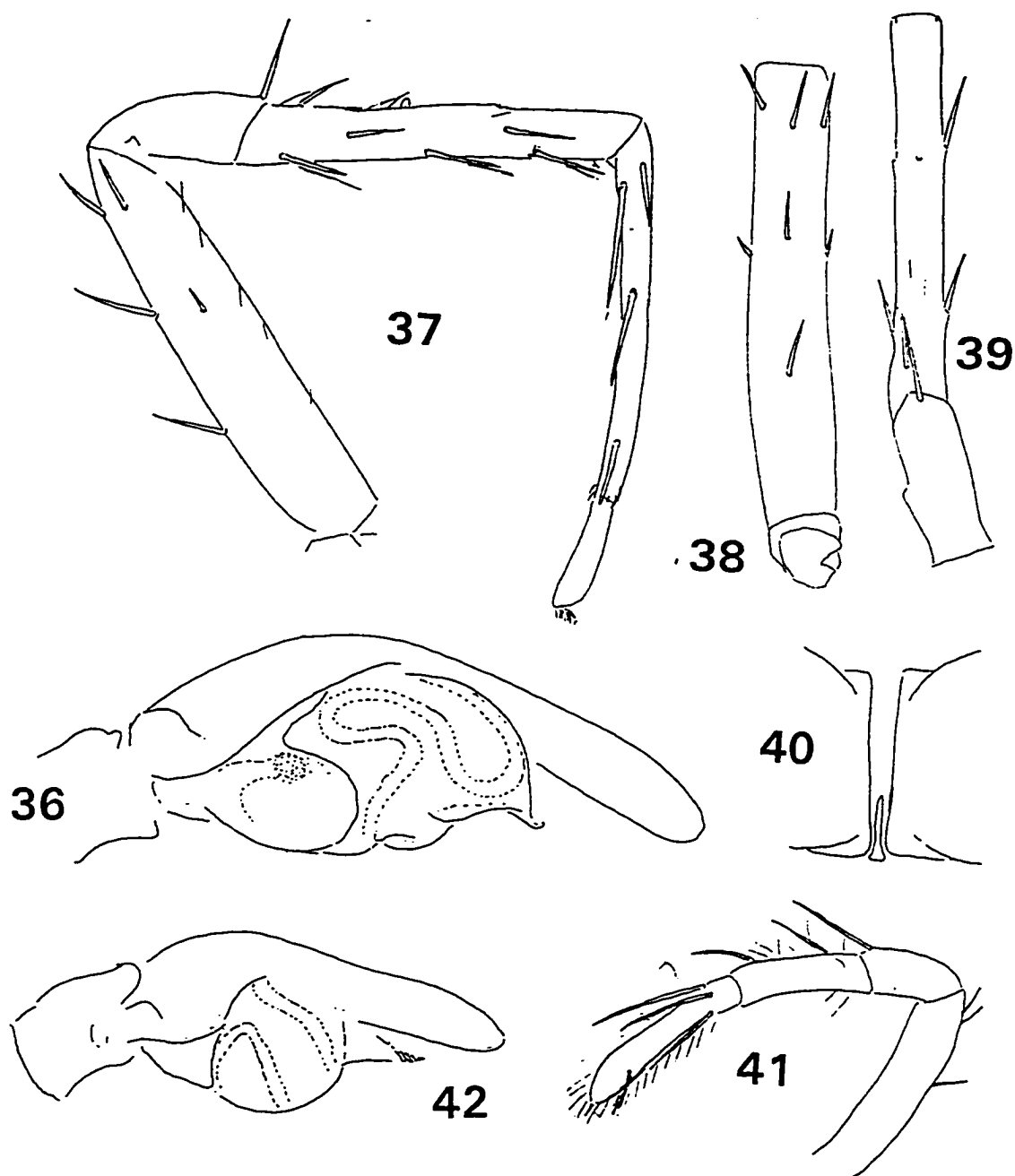
Figures 15-24: *Onomastus nigricauda*. 15-20. Male palp (18-20 expanded). 21. Cephalothorax, lateral. 22-24. Female palp.



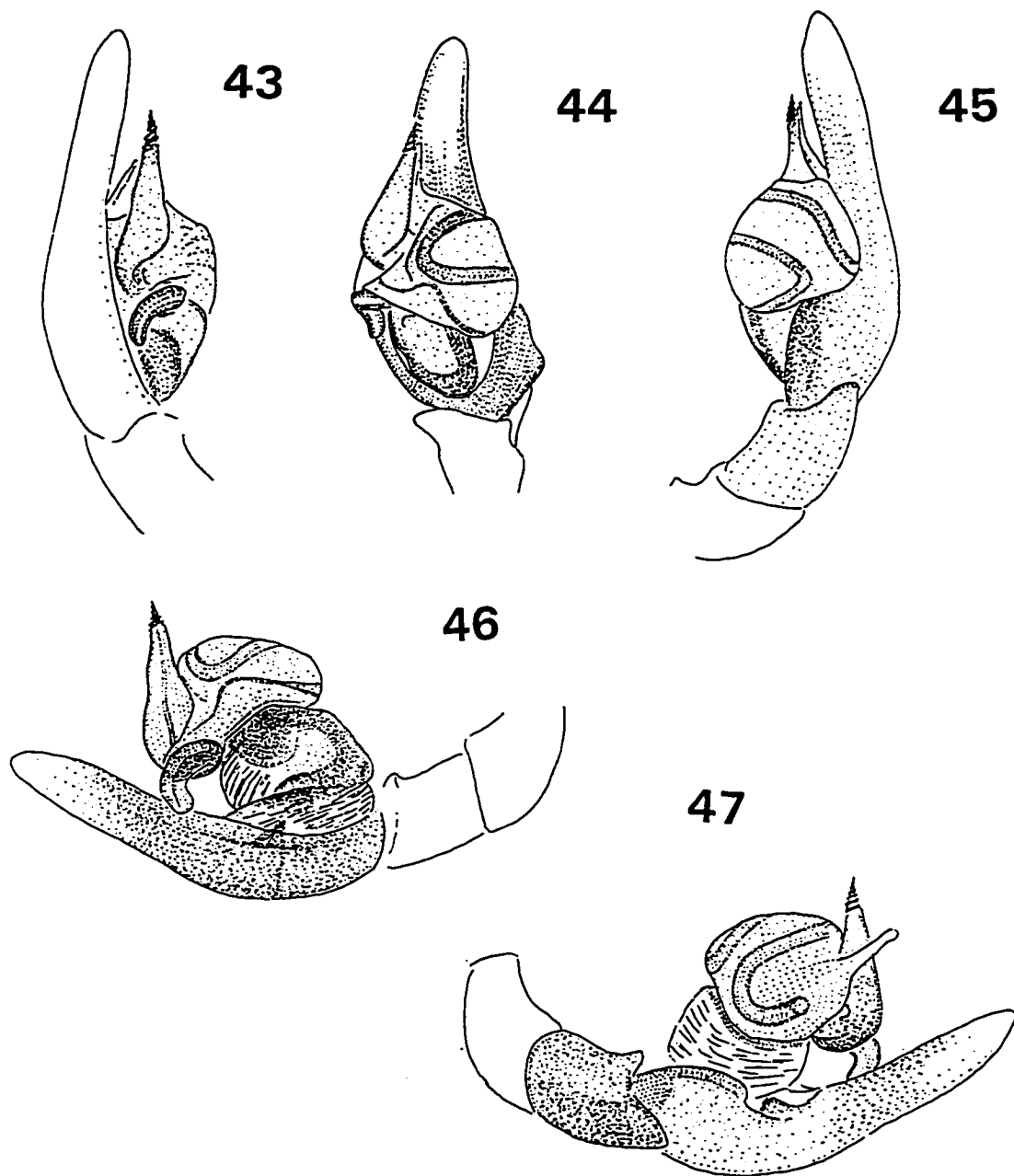
Figures 25-30: *Onomastus nigricauda*. 25-27. Male palp, expanded. 28. Cephalothorax, dorsal. 29. Face. 30. Male femora I, dorsal.



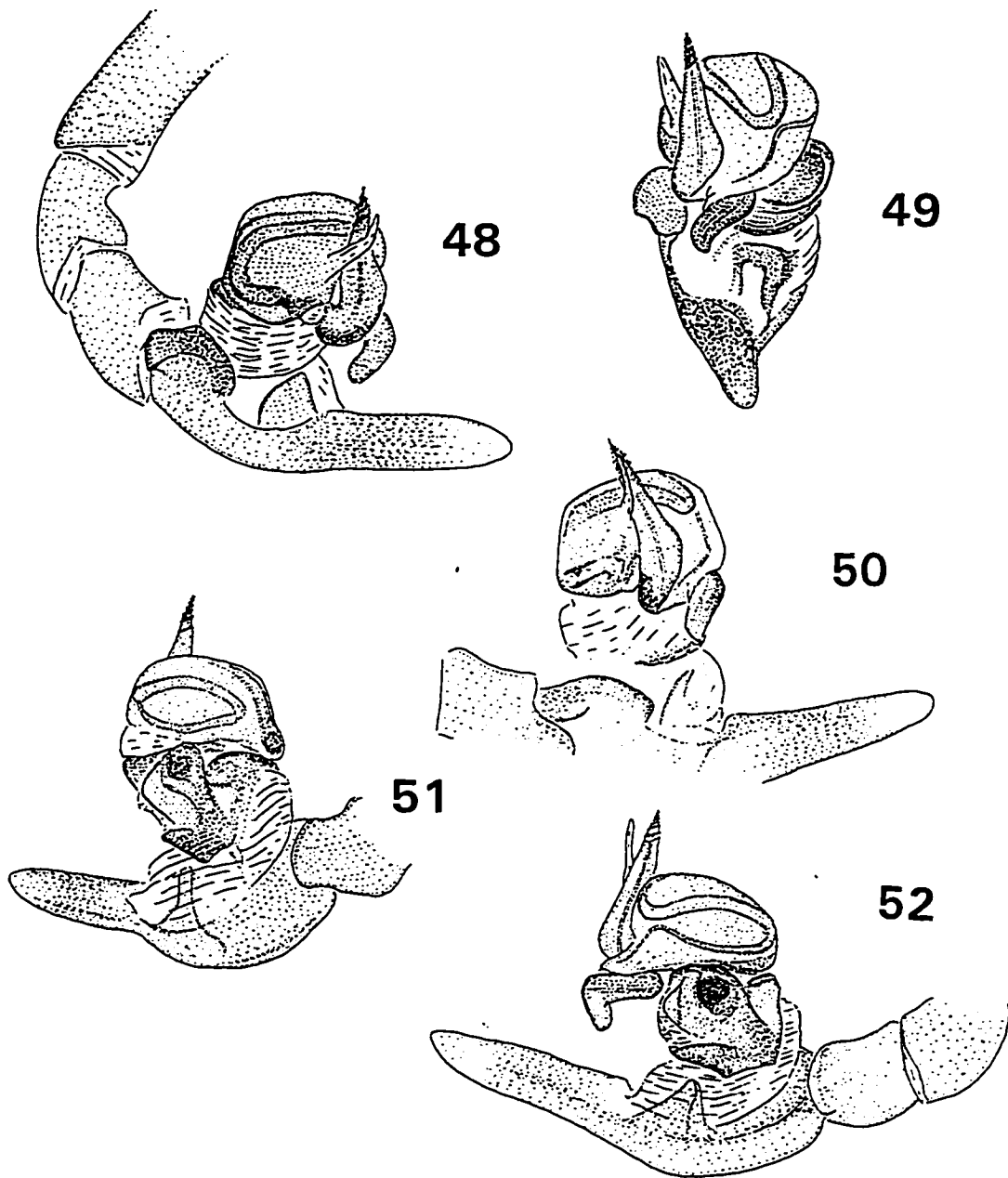
Figures 31-35: *Lyssomanes viridis*, male palp (expanded).



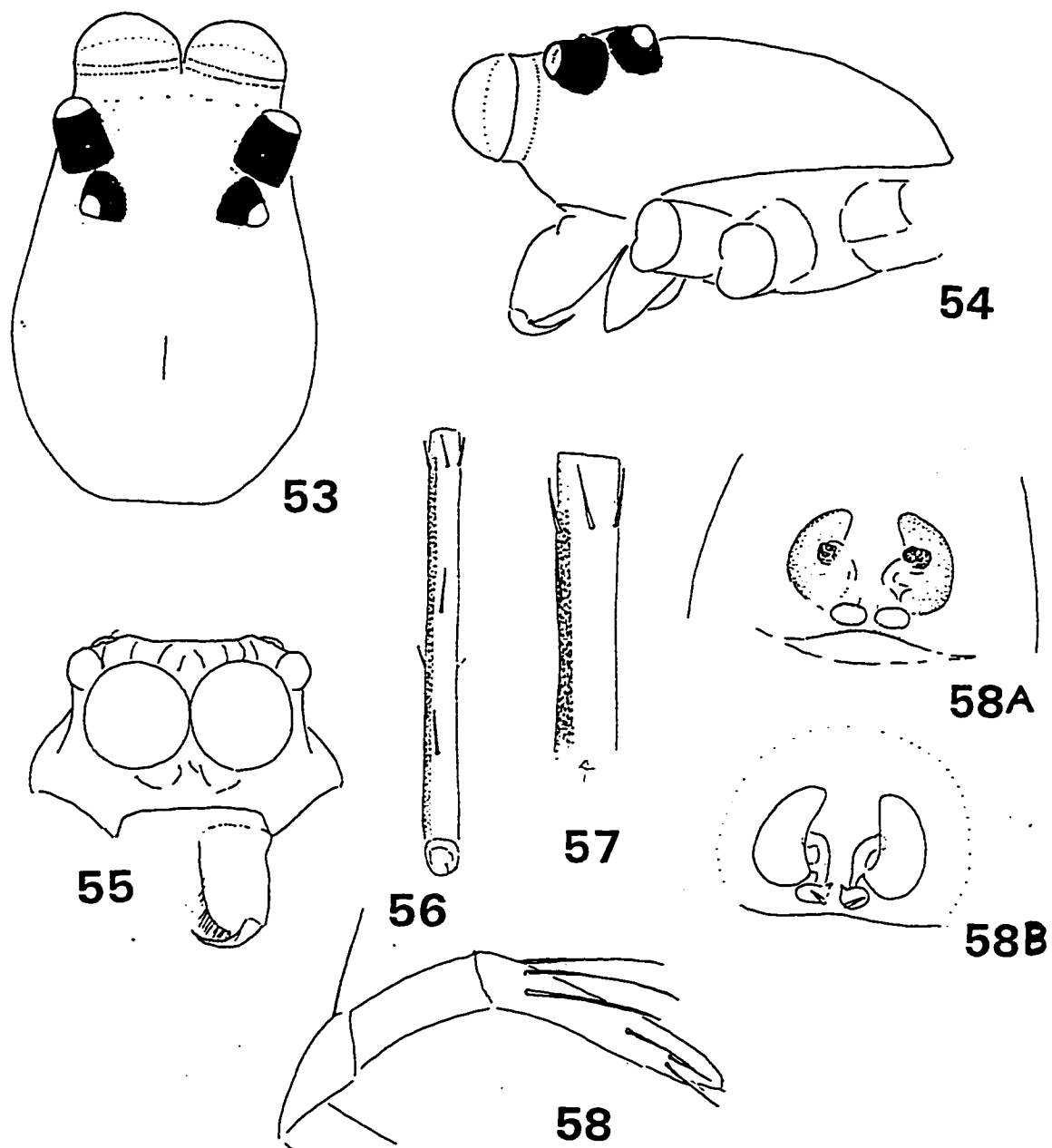
Figures 36-41: Lyssomanes viridis. 36. Male palp, prolateral. 37. Male left leg II. 38. Femur. 39. Patella and tibia. 40. Intercheliceral sclerite and chelicerae. 41. Female palp, retrolateral. Figure 42: Chinoscopus sp. Male palp, prolateral.



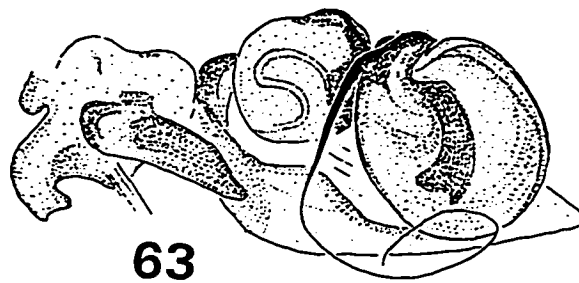
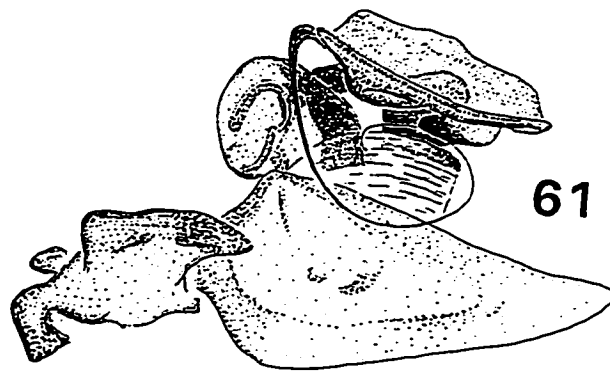
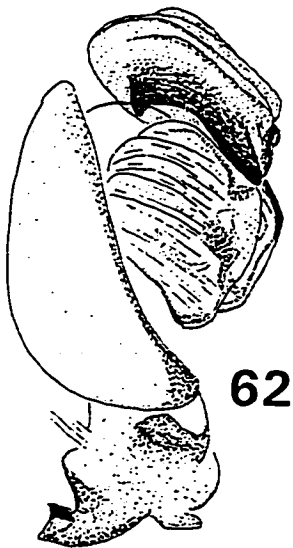
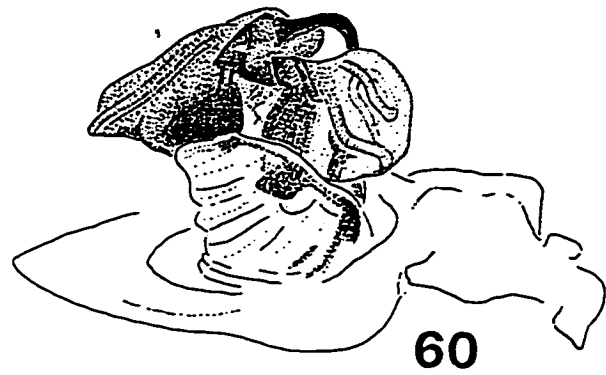
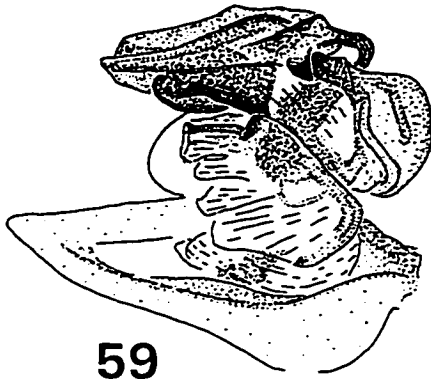
Figures 43-47: Chinoscopus sp. Male palp (46-47 expanded).



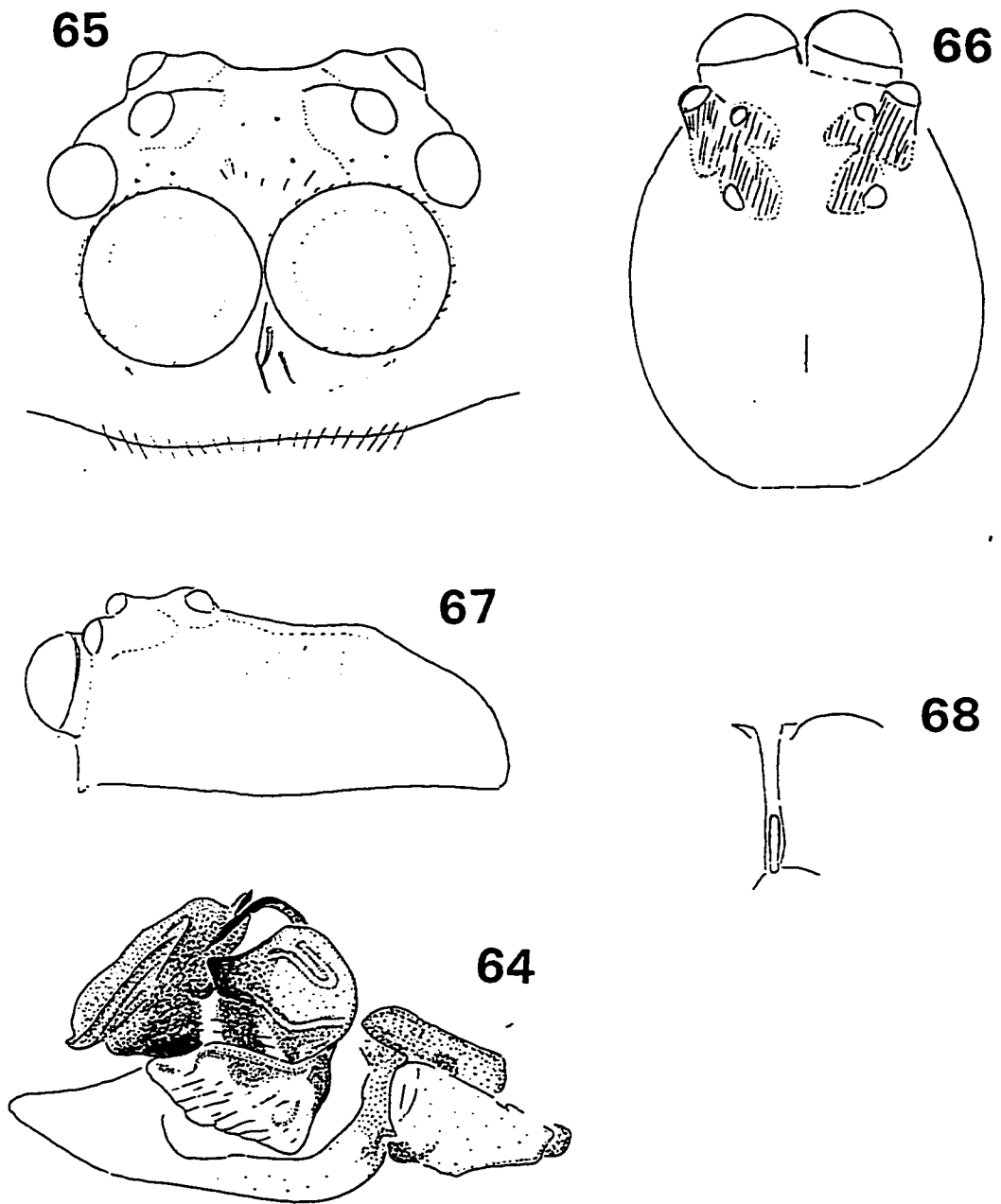
Figures 48-52: Chinoscopus sp. Male palp, expanded.



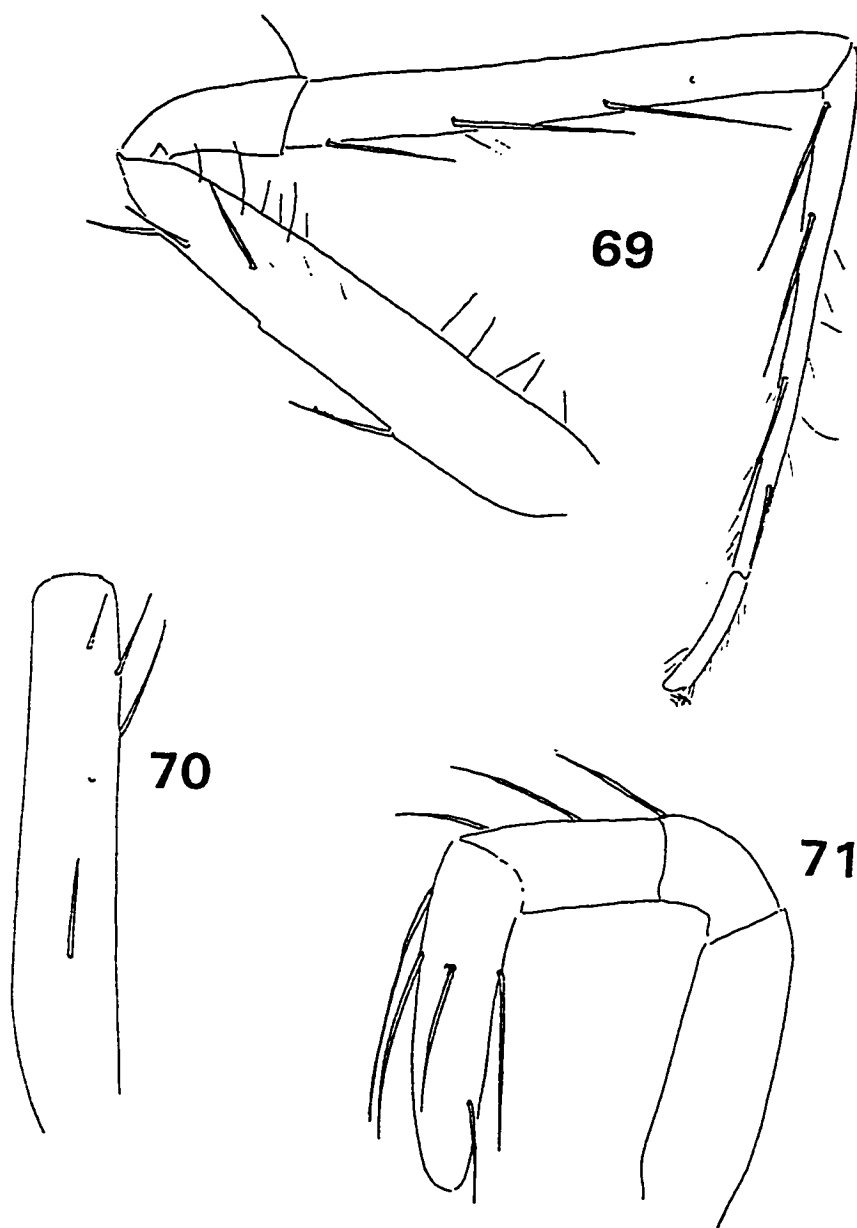
Figures 53-58B: Chinoscopus sp. 53. Cephalothorax, dorsal. 54. Cephalothorax, lateral. 55. Face. 56-57. Left femora II. 58. Left female palp. 58A. Epigynum. 58B. Spermathecae and ducts, dorsal.



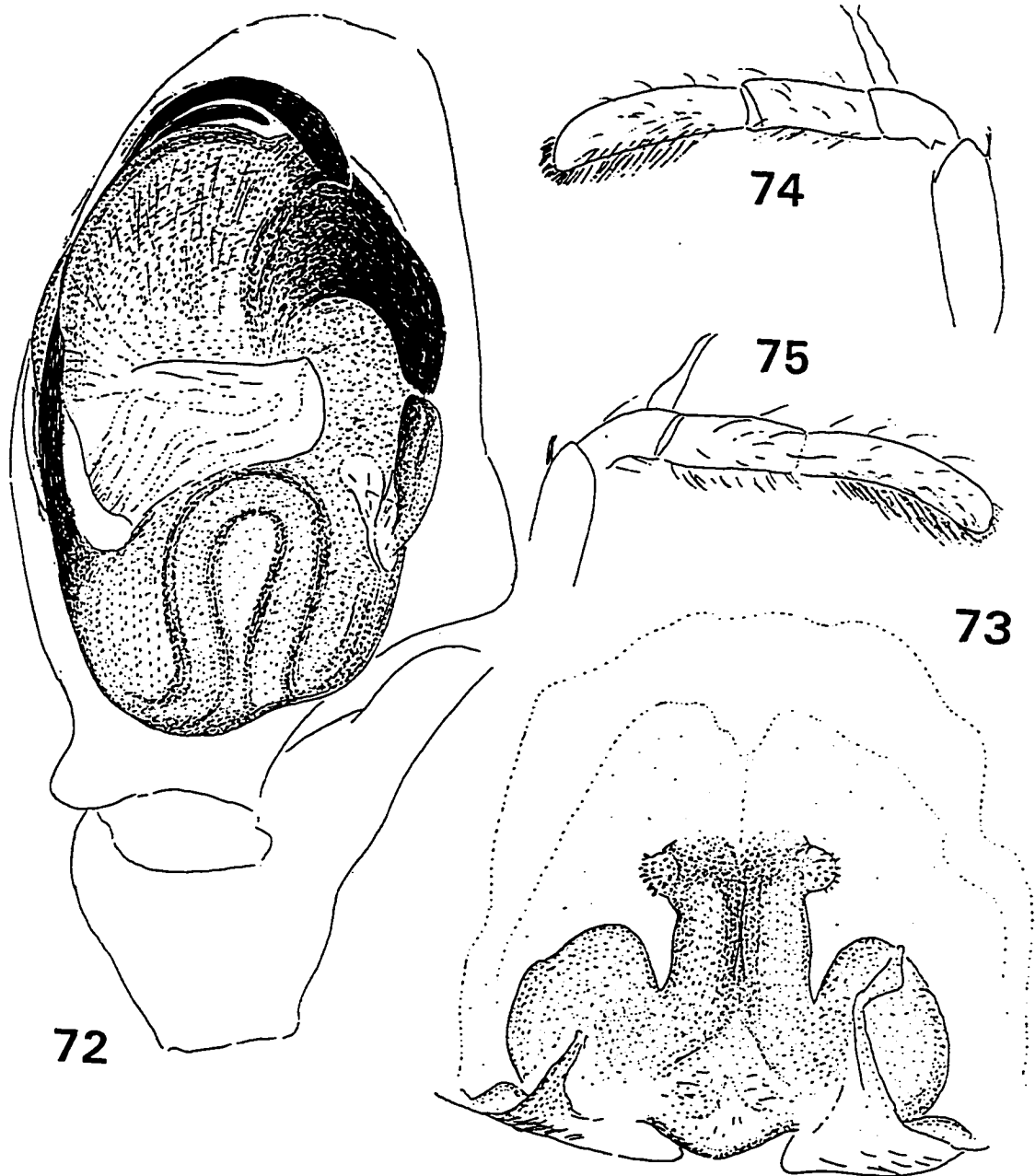
Figures 59-63: Asemonea tenuipes. Male palp, expanded.



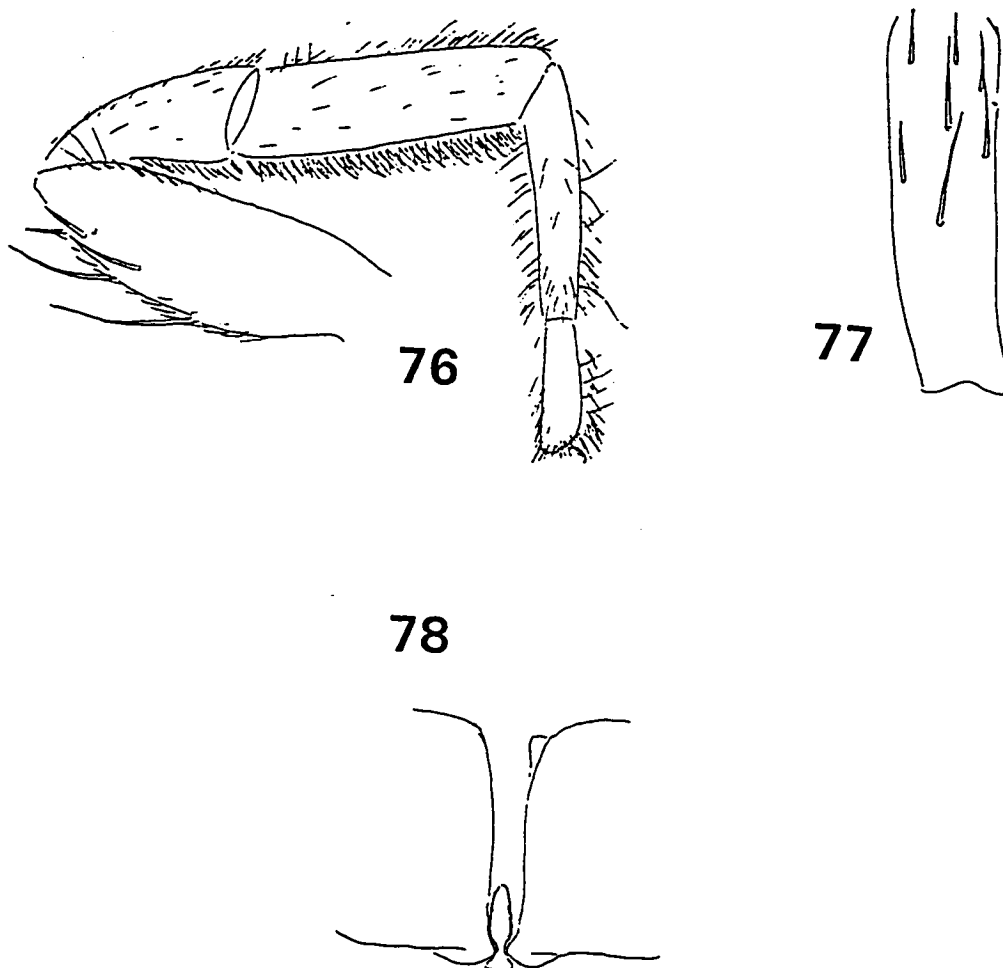
Figures 64-68: *Asemonea tenuipes*. 64. Male palp, expanded. 65. Face. 66. Cephalothorax, dorsal. 67. Cephalothorax, lateral. 68. Intercheliceral sclerite and chelicerae.



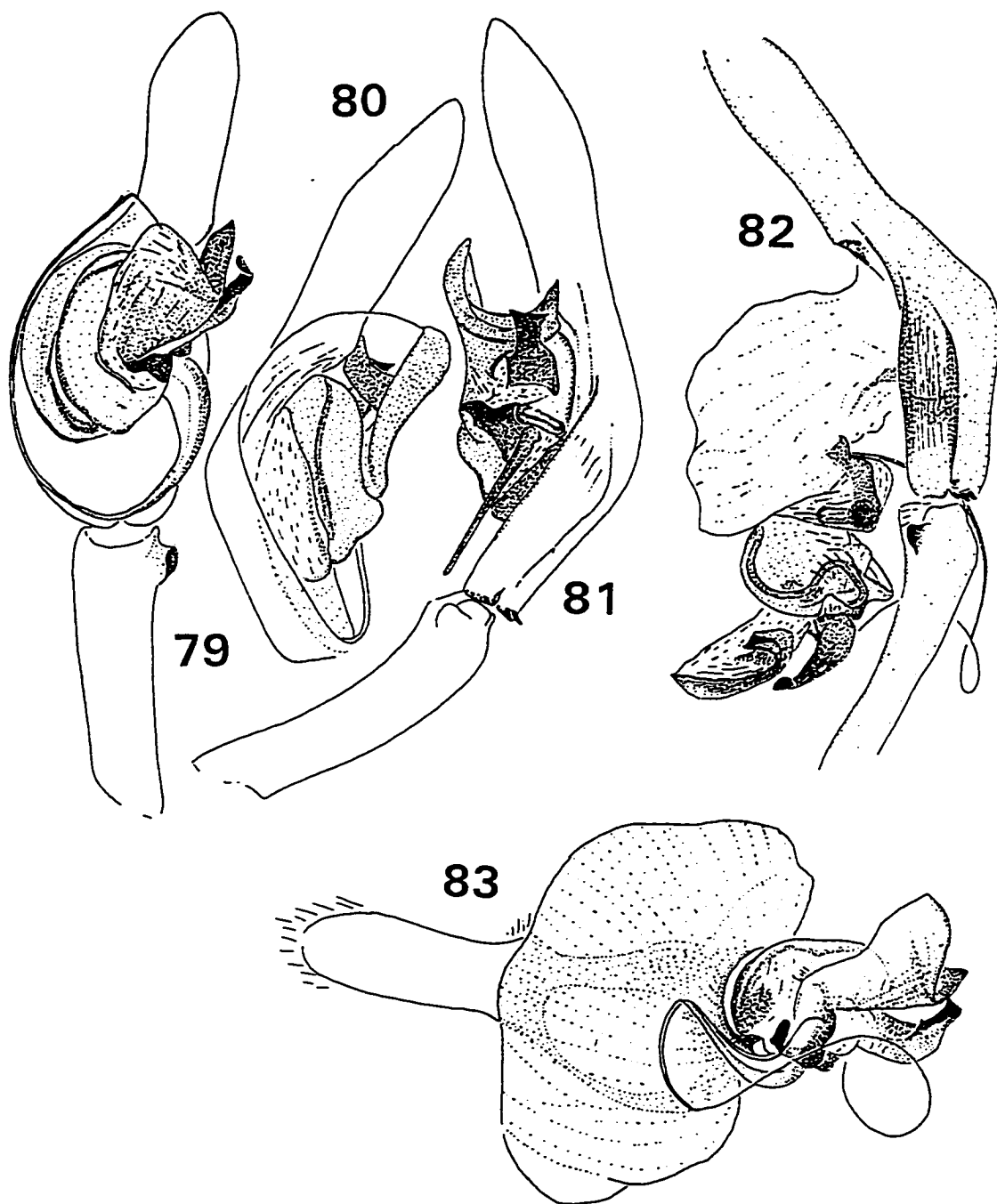
Figures 69-71: Asemonea tenuipes. 69. Male left leg I. 70. Femur I, dorsal. 71. Female palp, retrolateral.



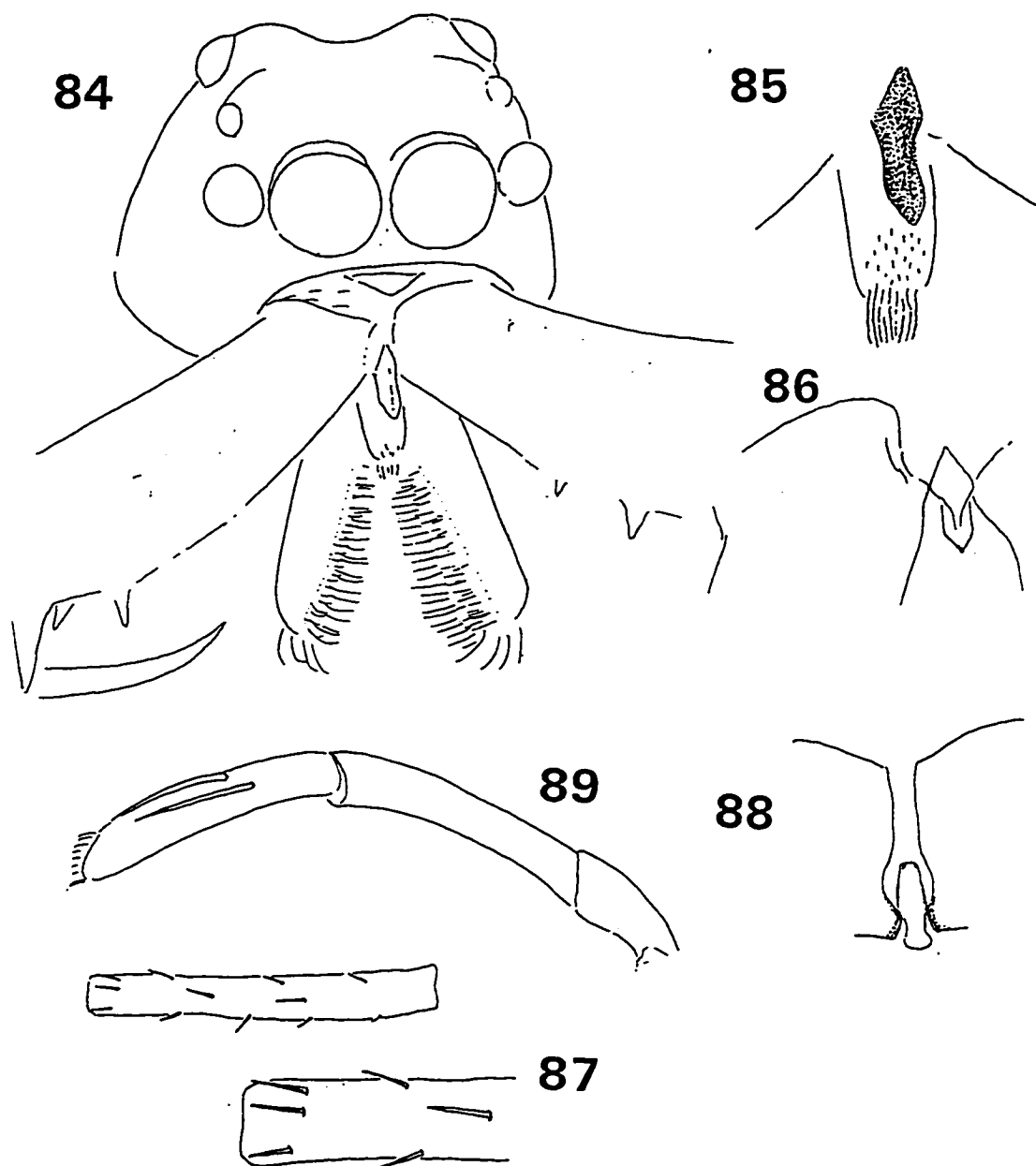
Figures 72-75: Holcolaetis vellerea. 72. Male palp. 73. Epigynum. 74-75. Left female palp.



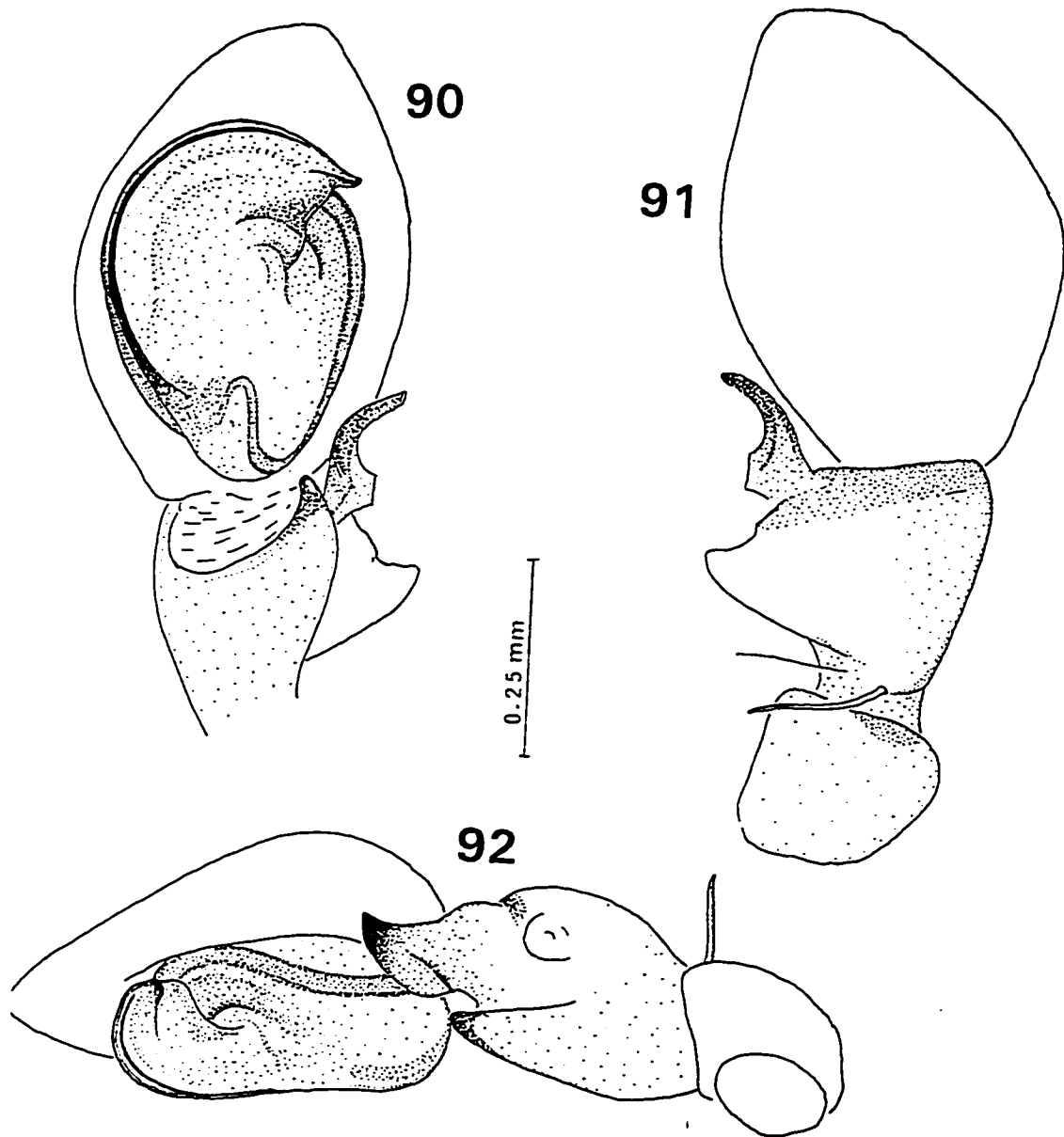
Figures 76-78: Holcolaetis vellerea. 76. Left leg I. 77. Femur I. 78. Intercheliceral sclerite and chelicerae.



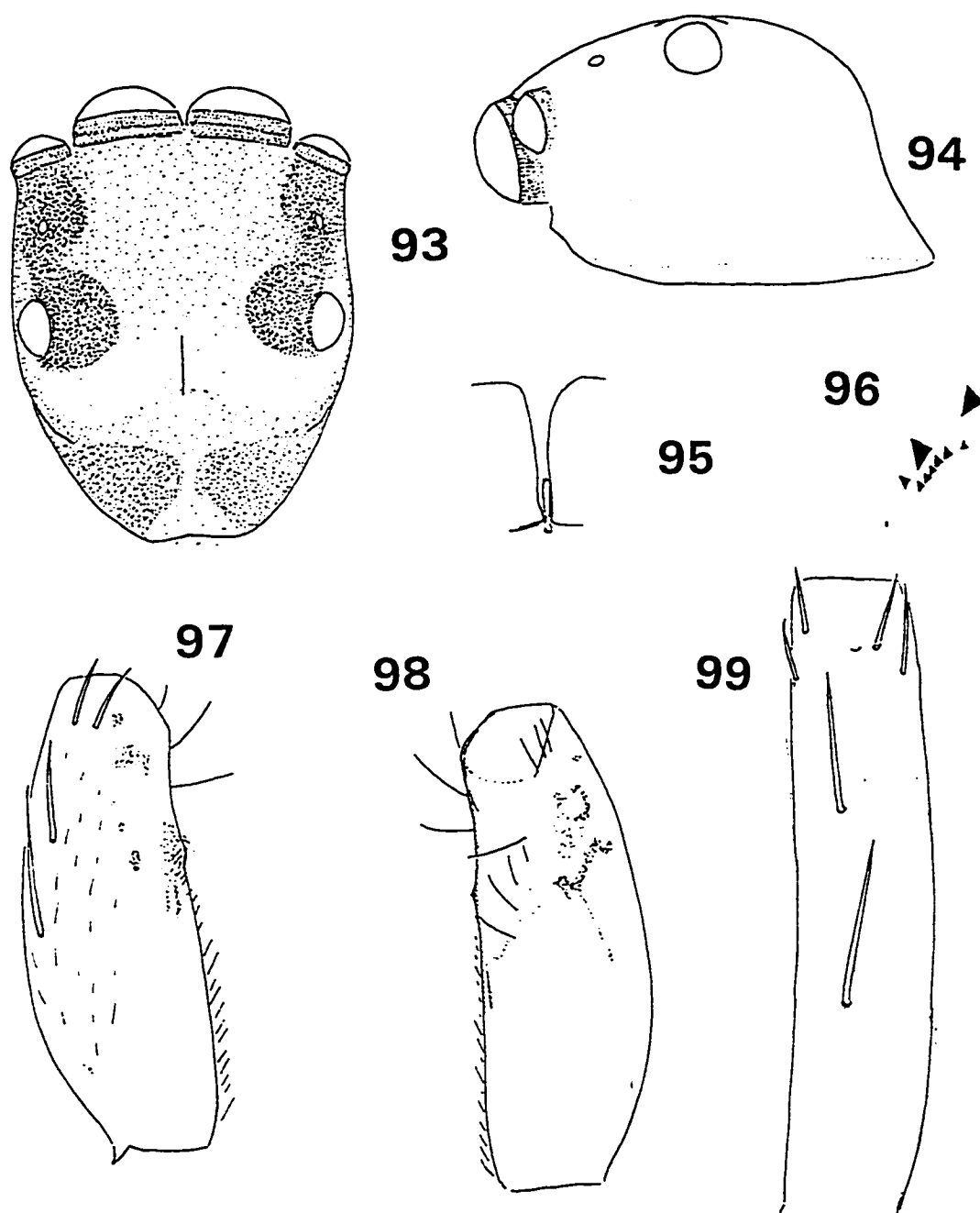
Figures 79-83: *Cocalodes papuanus*. Left male palp (82-83 expanded).



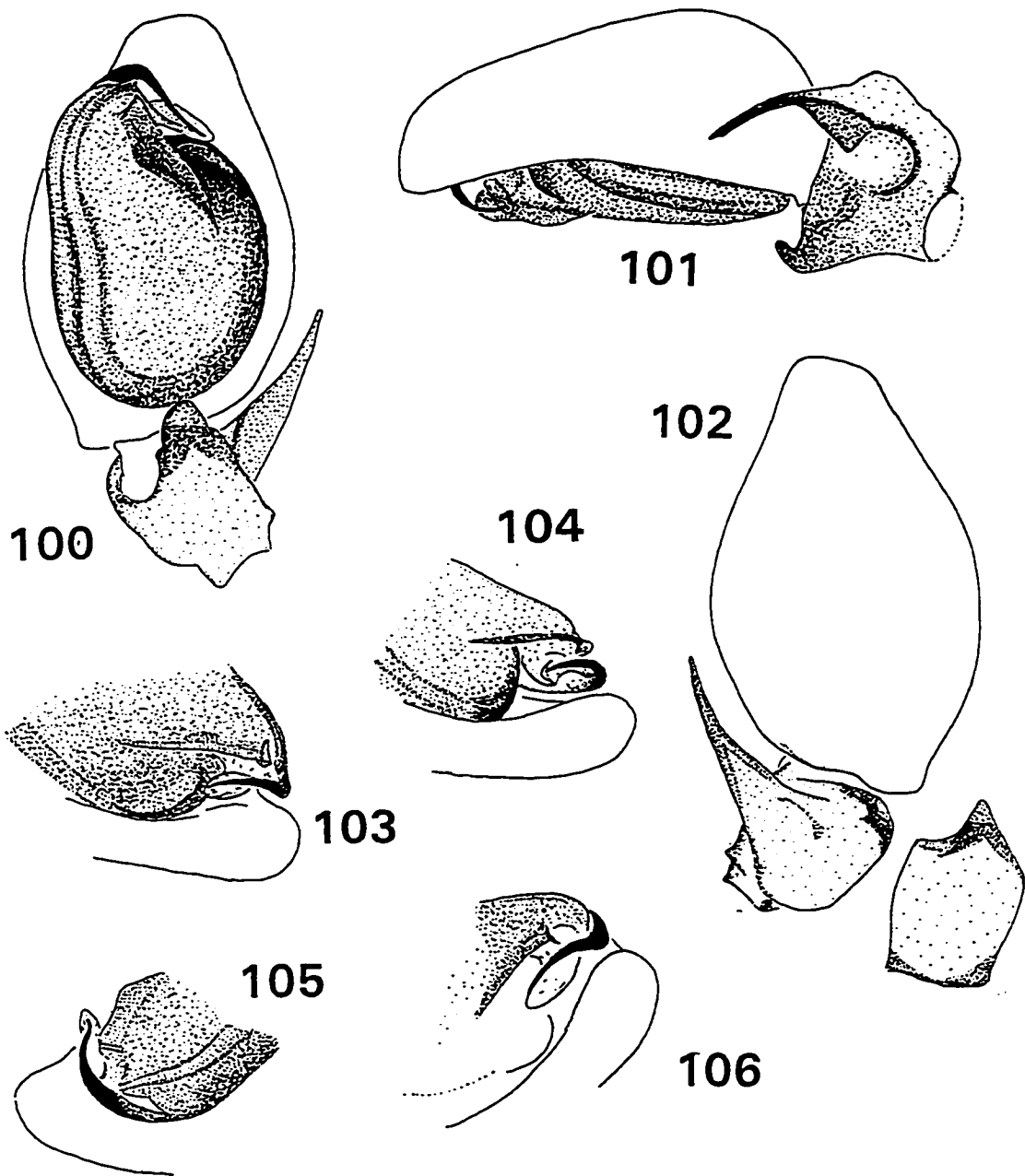
Figures 84-89: *Cocalodes papuanus*. 84. Male face, chelicerae, maxillae and intercheliceral sclerite. 85-86. Male intercheliceral sclerite. 87. Femur, dorsal. 88. Female intercheliceral sclerite. 89. Left female palp.



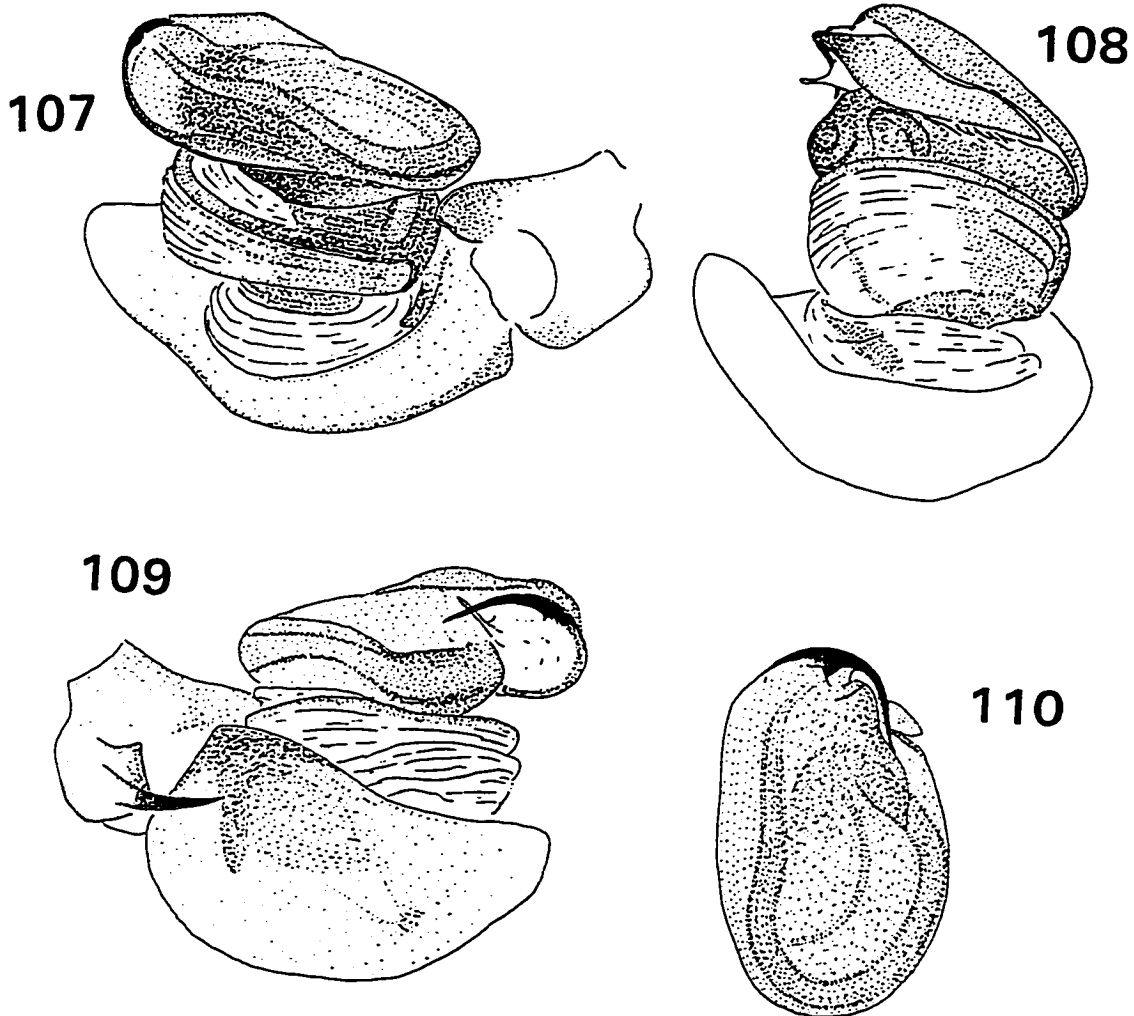
Figures 90-92: *Wanlessia sedgwicki*. Left male palp.



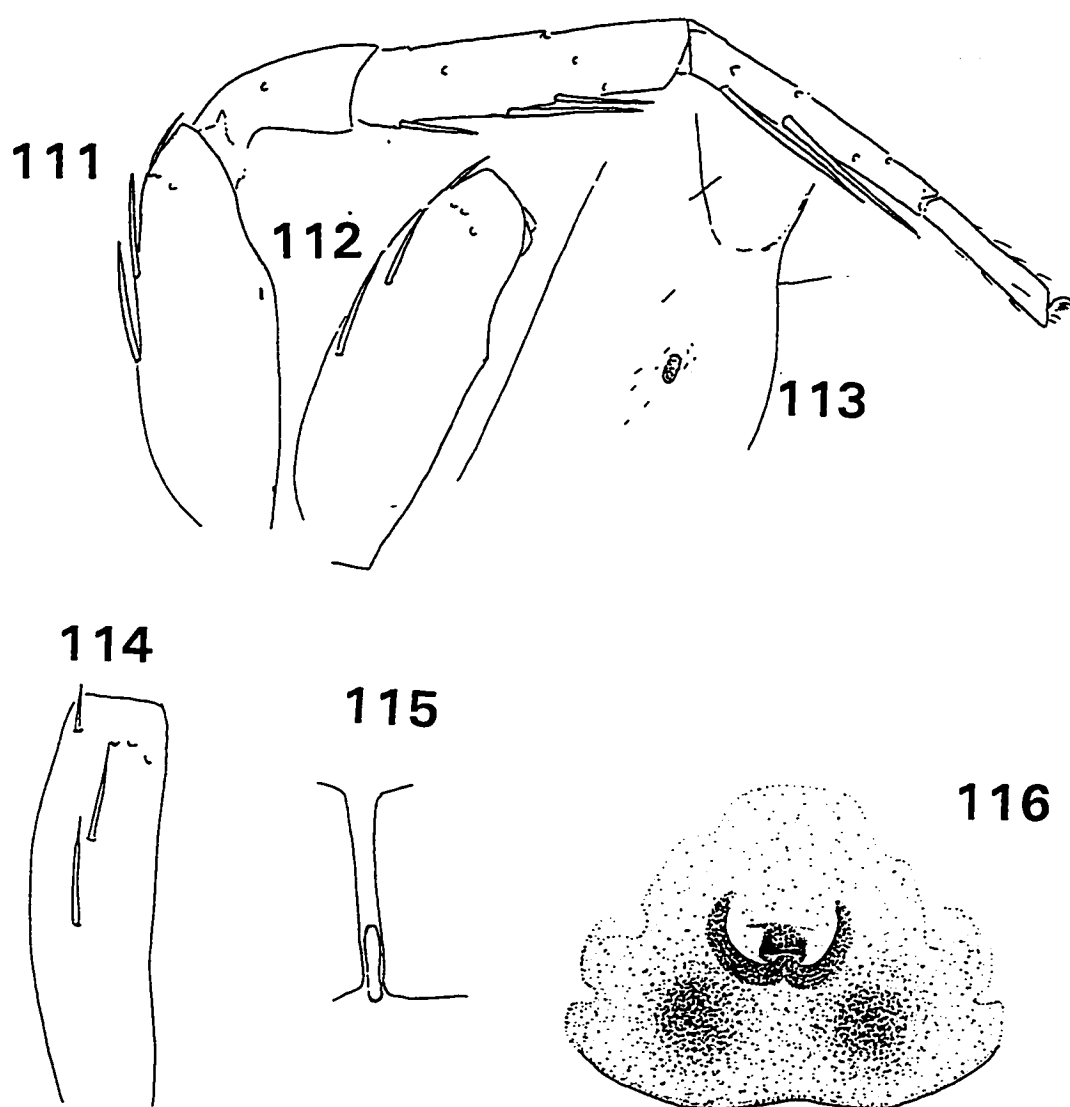
Figures 93-99: Wanlessia sedgwicki. 93. Cephalothorax, dorsal. 94. Cephalothorax, lateral. 95. Intercheliceral sclerite and chelicerae. 96. Cheliceral dentition. 97-98. Left femur I. 99. Left femur IV.



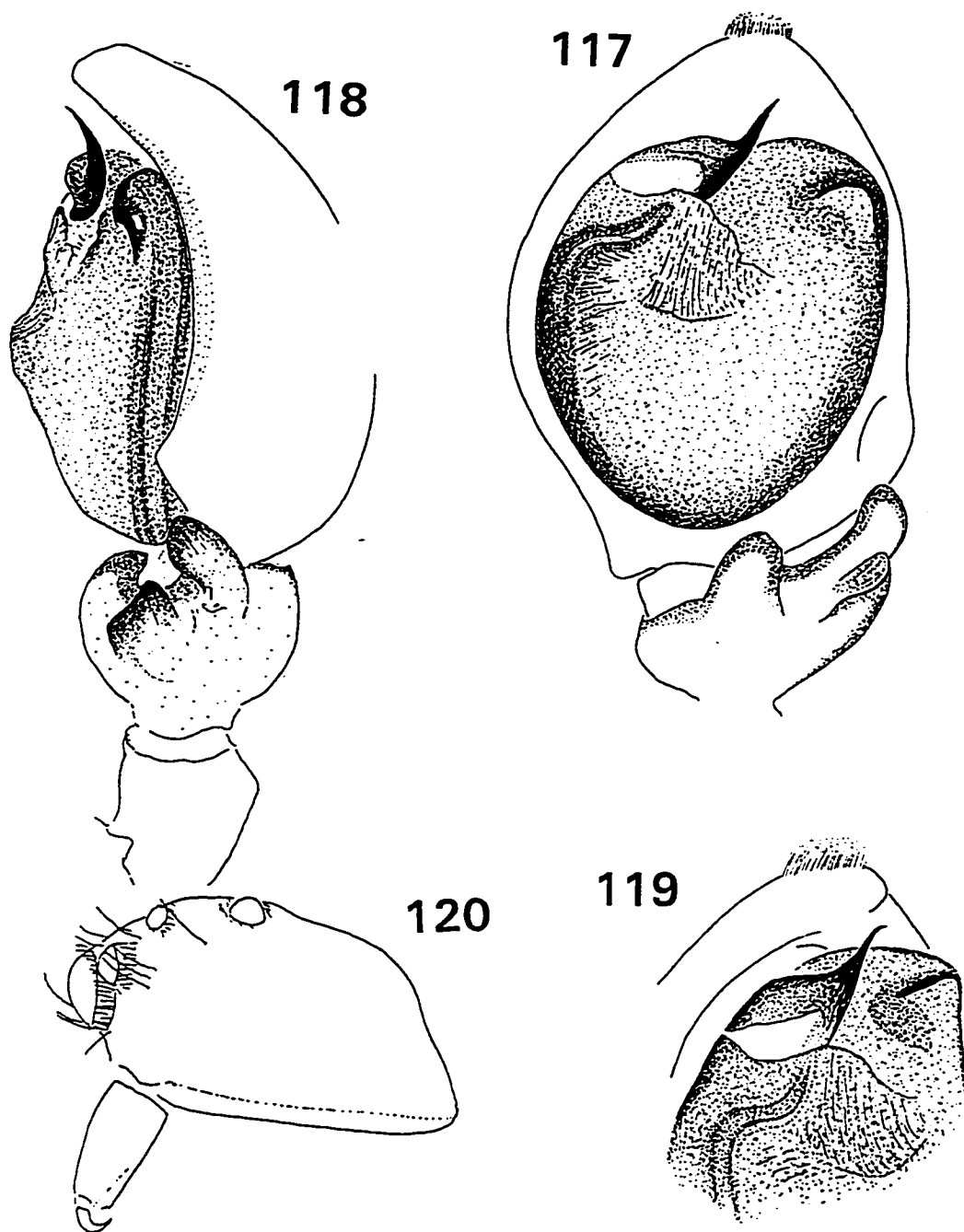
Figures 100-106: *Mintonia tauricornis*. Left male palp. (103-106 detail of anterior end).



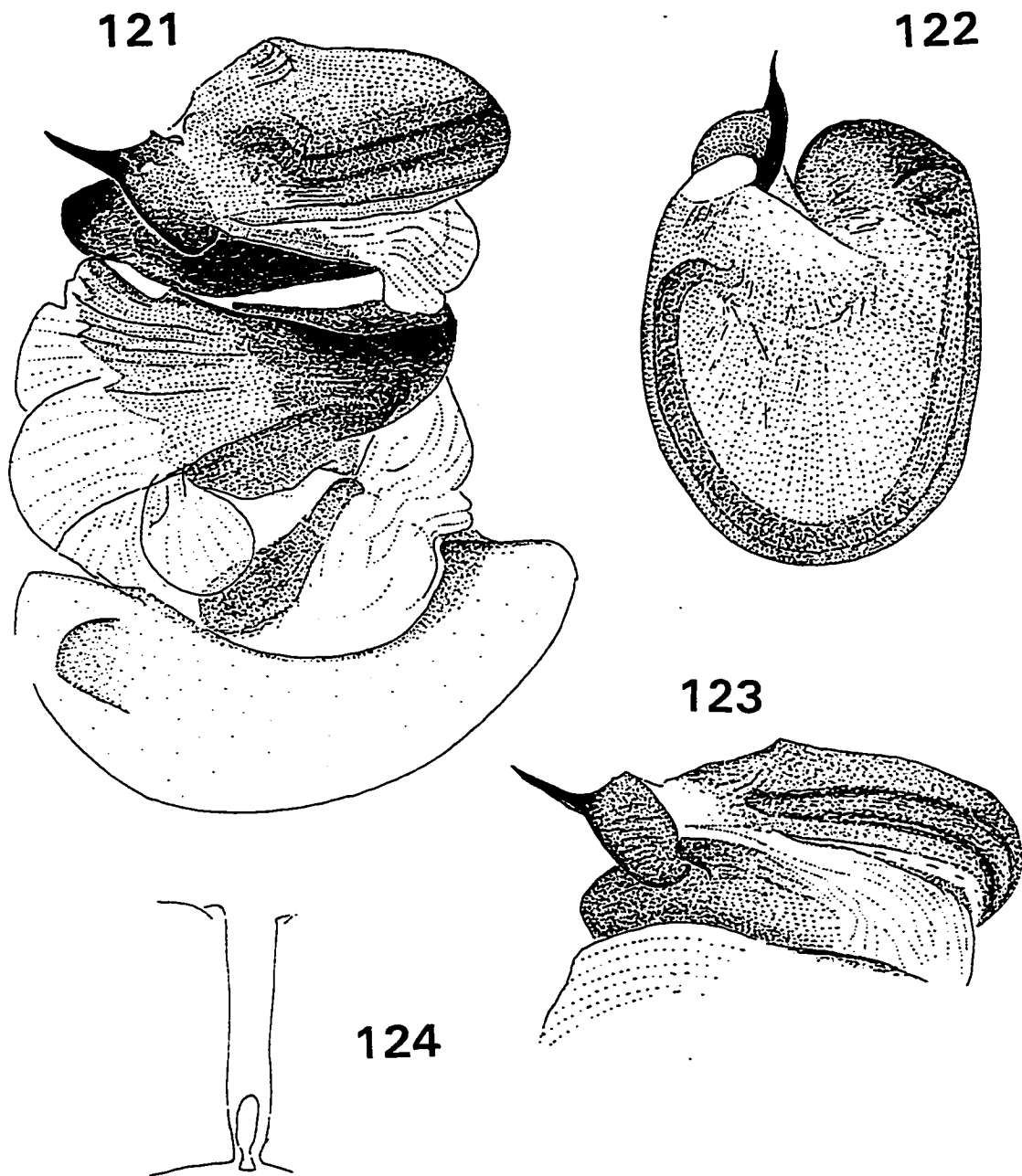
Figures 107-110: *Mintonia tauricornis*. Male palp, expanded.



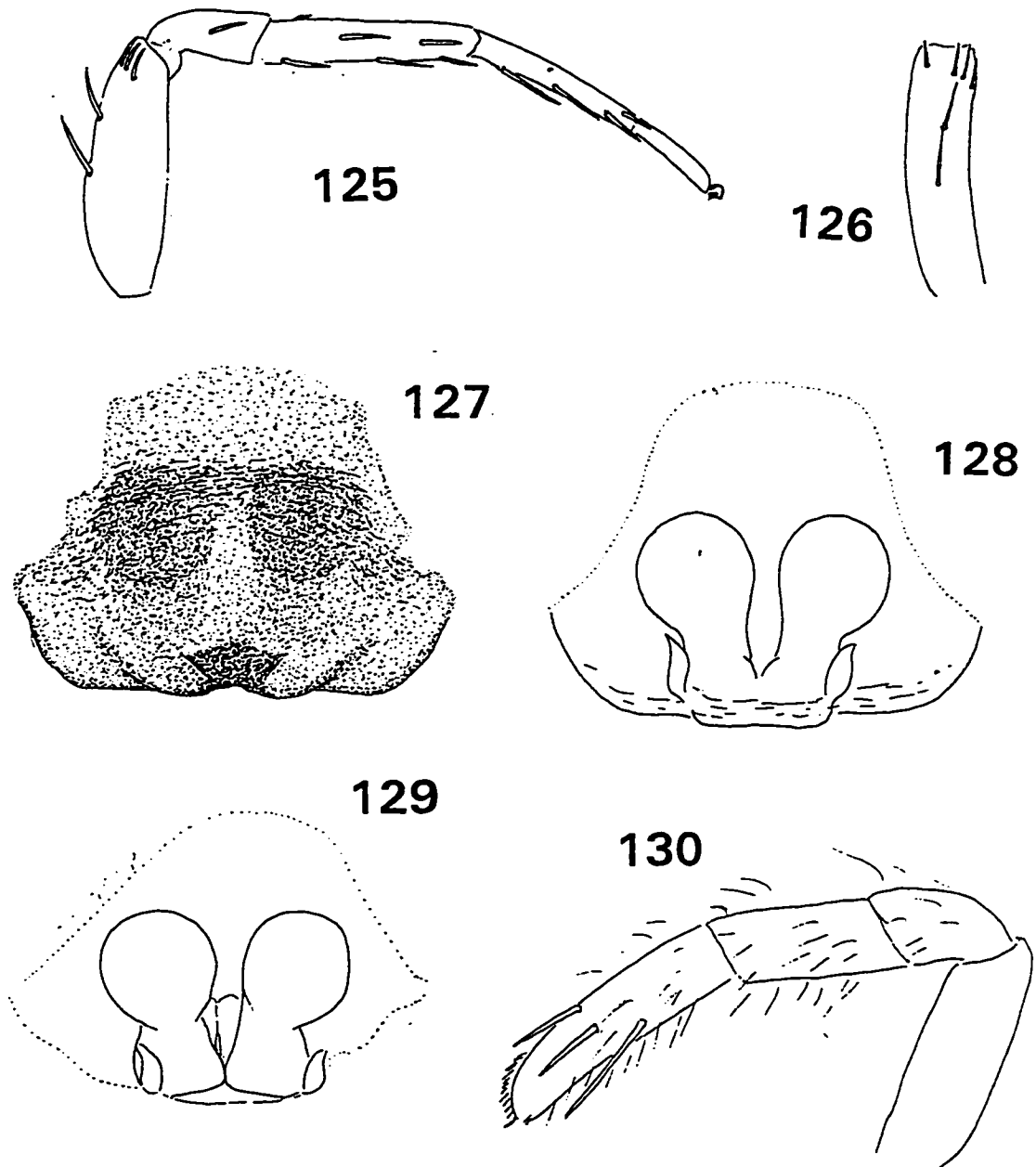
Figures 111-115: Mintonia tauricornis. 111. Left leg I. 112-114. Femur. 115. Intercheliceral sclerite and chelicerae. Fig. 116: Mintonia ramipalpis. Epigynum.



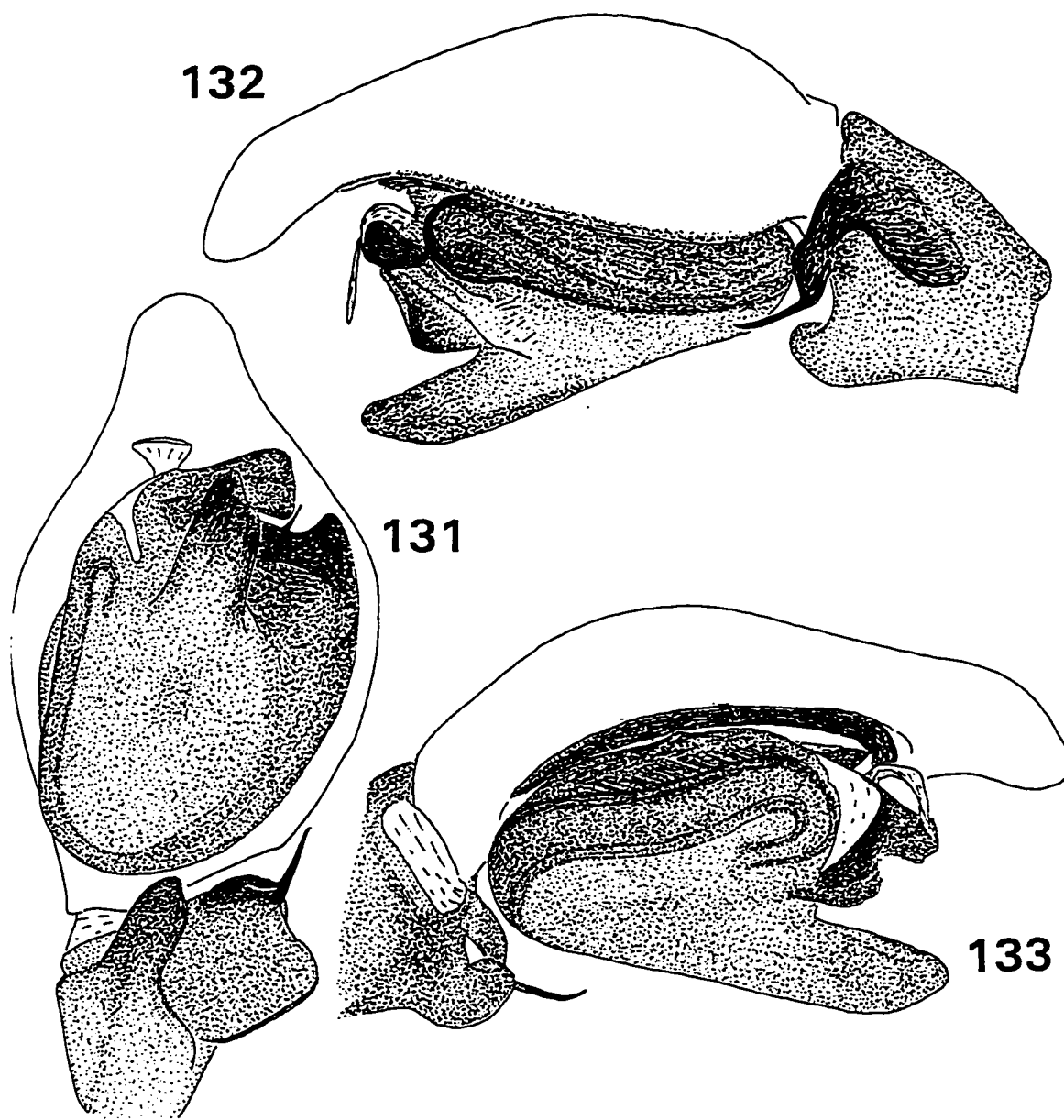
Figures 117-120: *Yaginumanis sexdentata*. 117-119. Left male palp. 120. Cephalothorax, lateral.



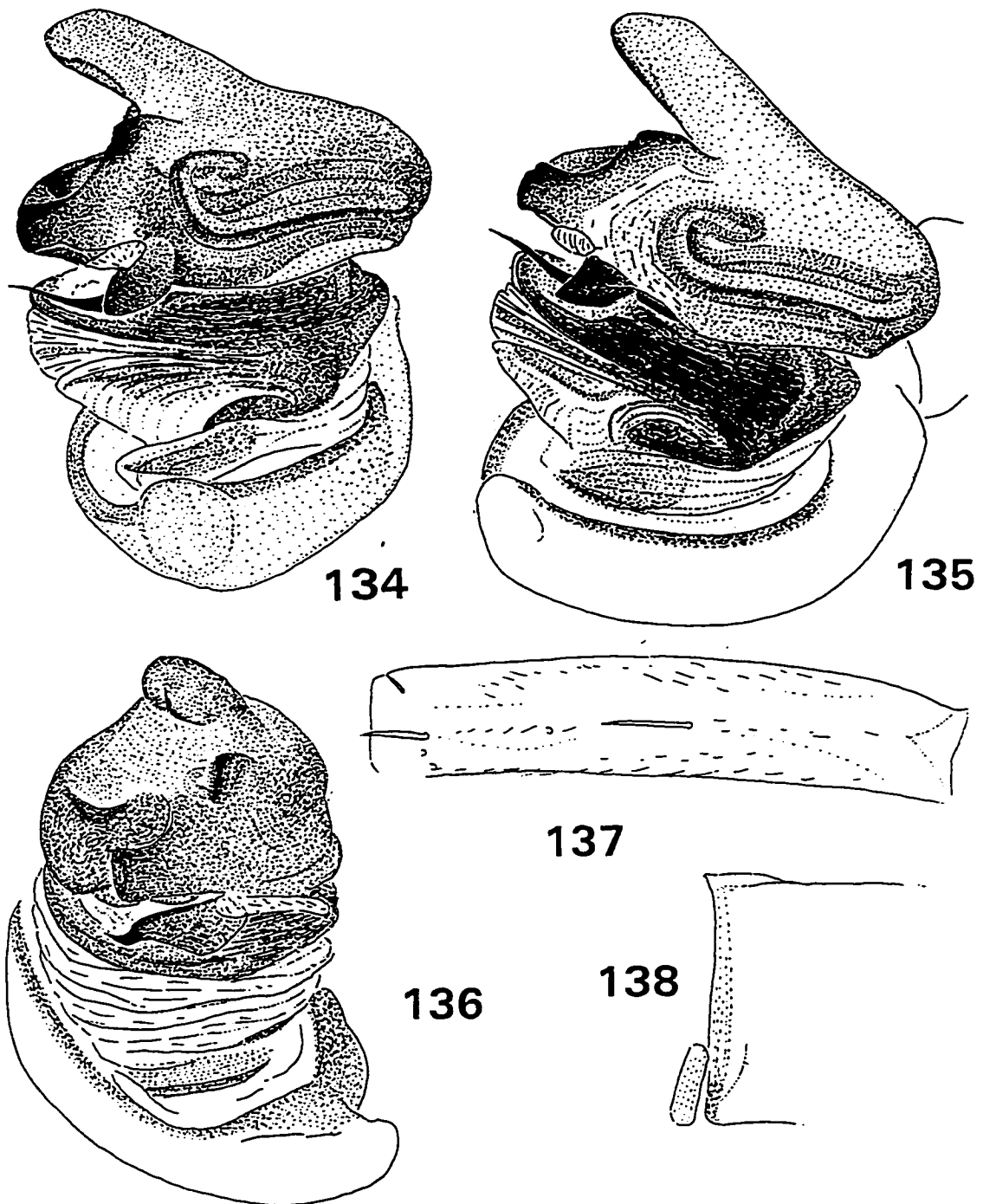
Figures 121-124: *Yaginumanis sexdentata*. 121-123. Male palp, expanded. 124. Intercheliceral sclerite and chelicerae.



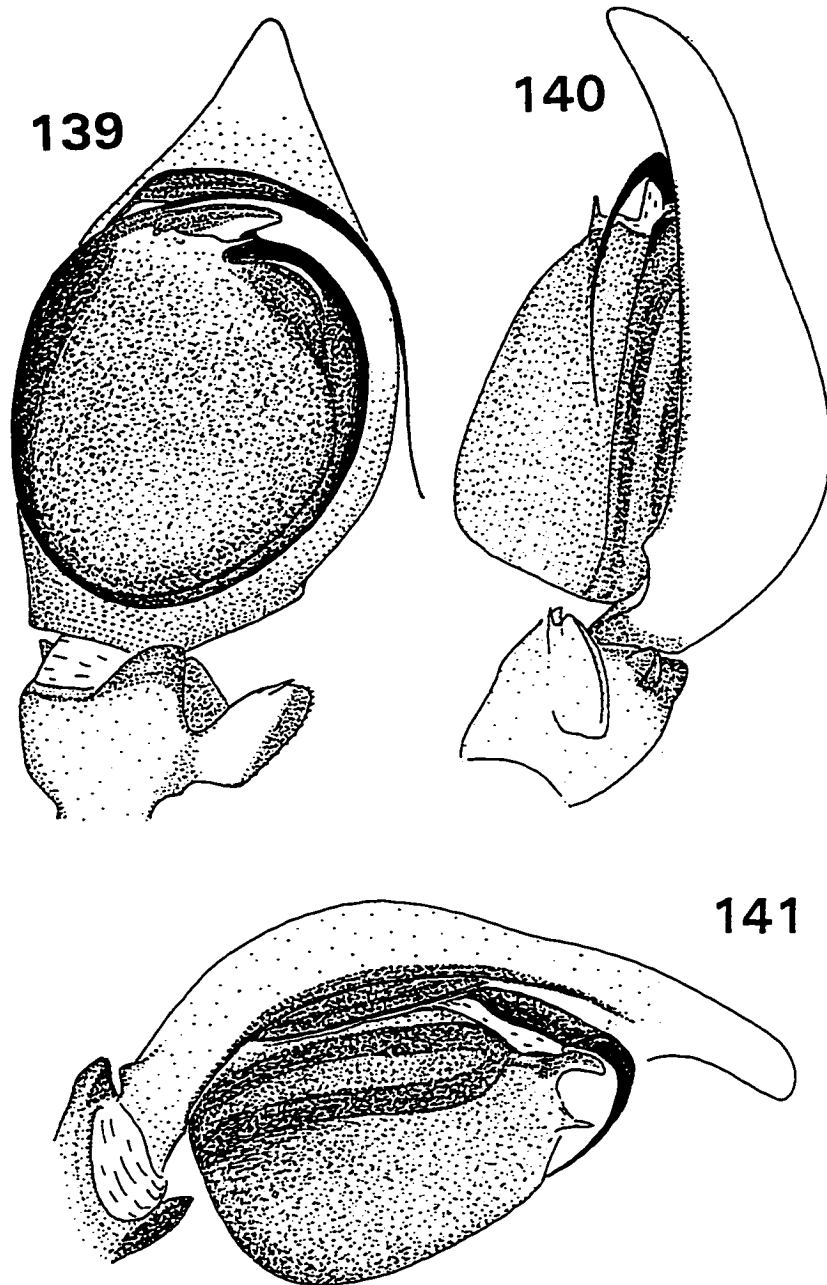
Figures 125-130: Yaginumanis sexdentata. 125. Left leg I. 126. Femur I. 127. Epigynum. 128-129. Spermathecae and ducts, dorsal. 130. Left female palp.



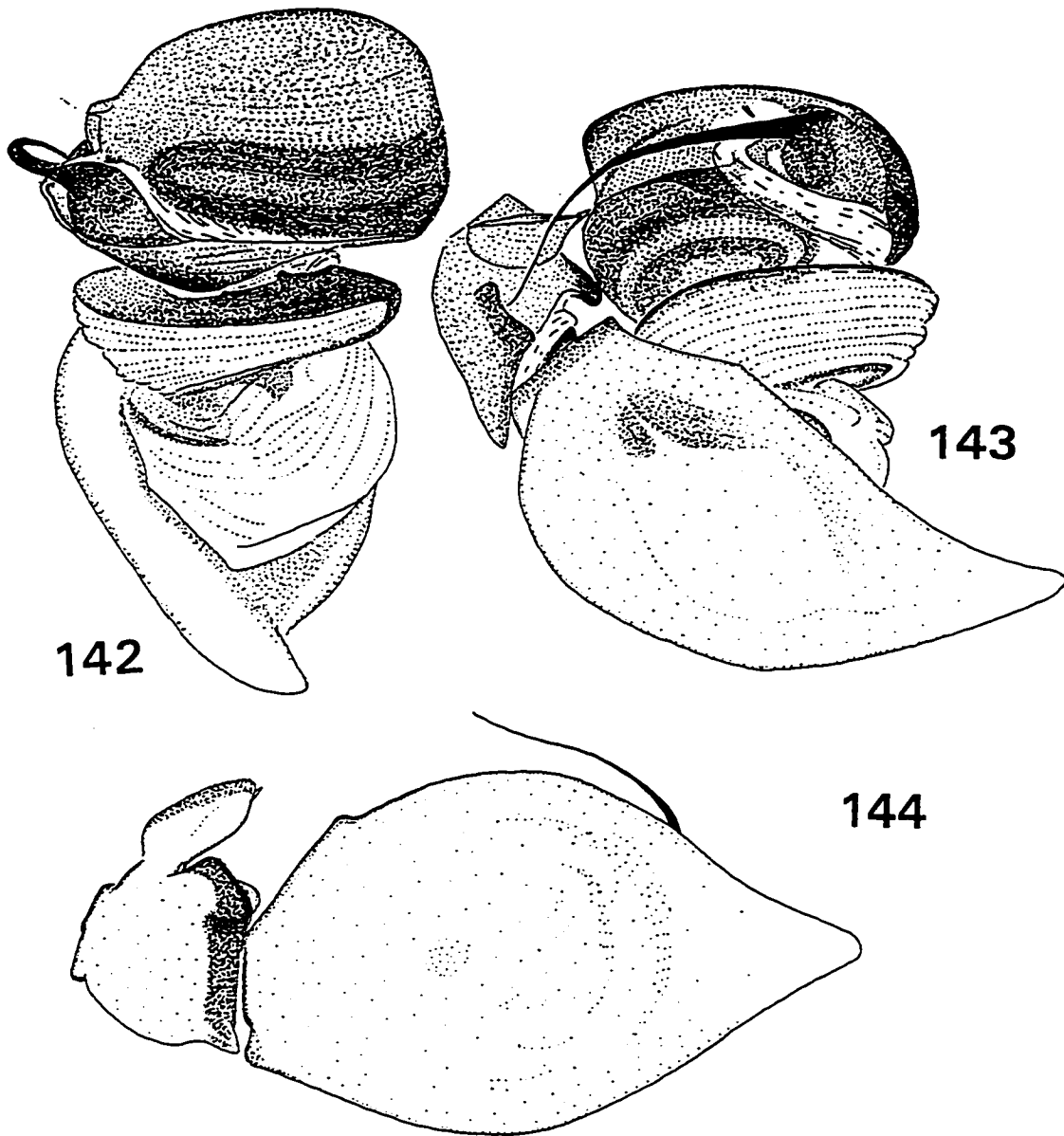
Figures 131-133: Taraxella solitaria. Left male palp.



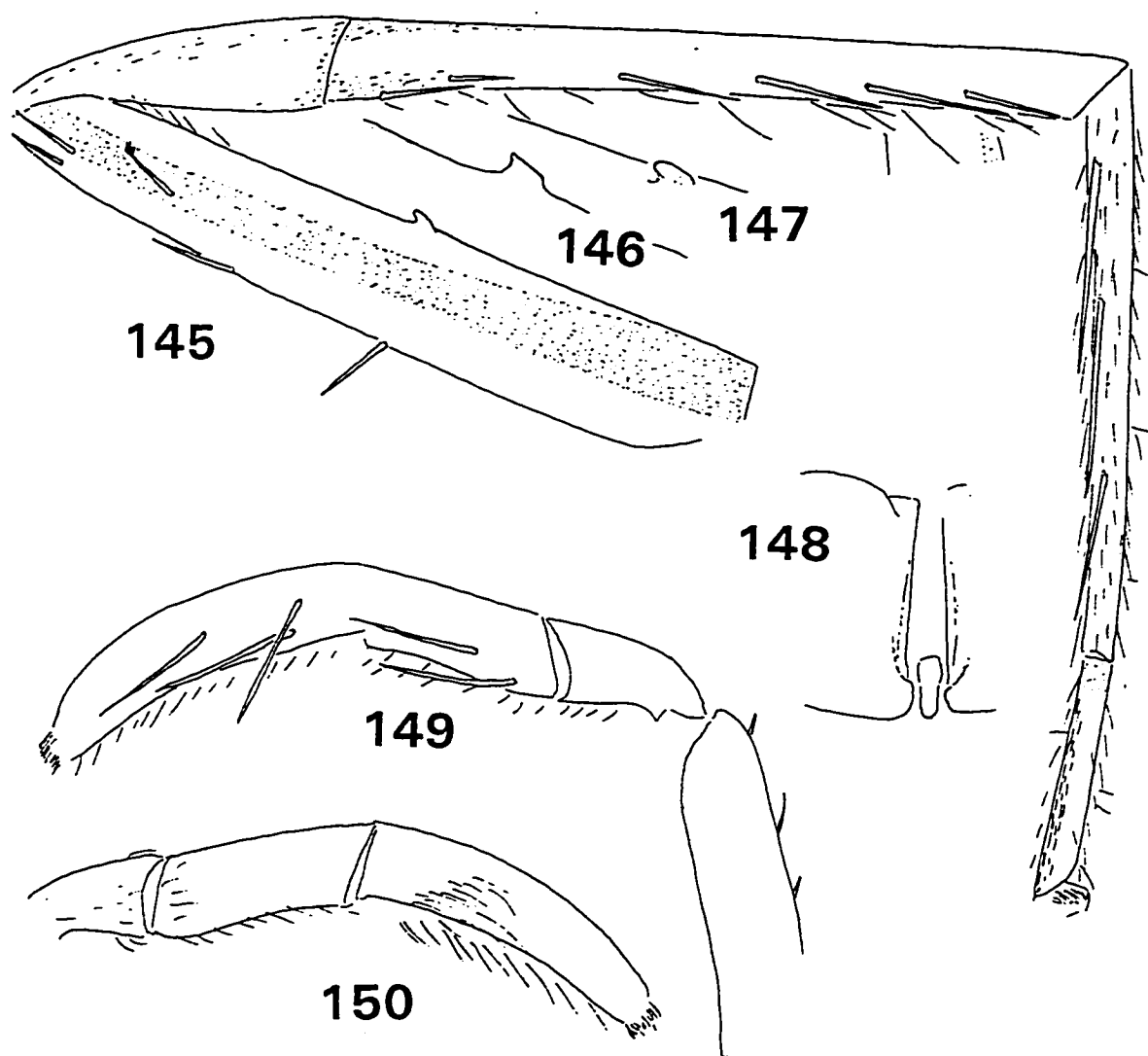
Figures 134-138: *Taraxella solitaria*. 134-136. Male palp, expanded. 137. Right femur I. 138. Intercheliceral sclerite and chelicerae.



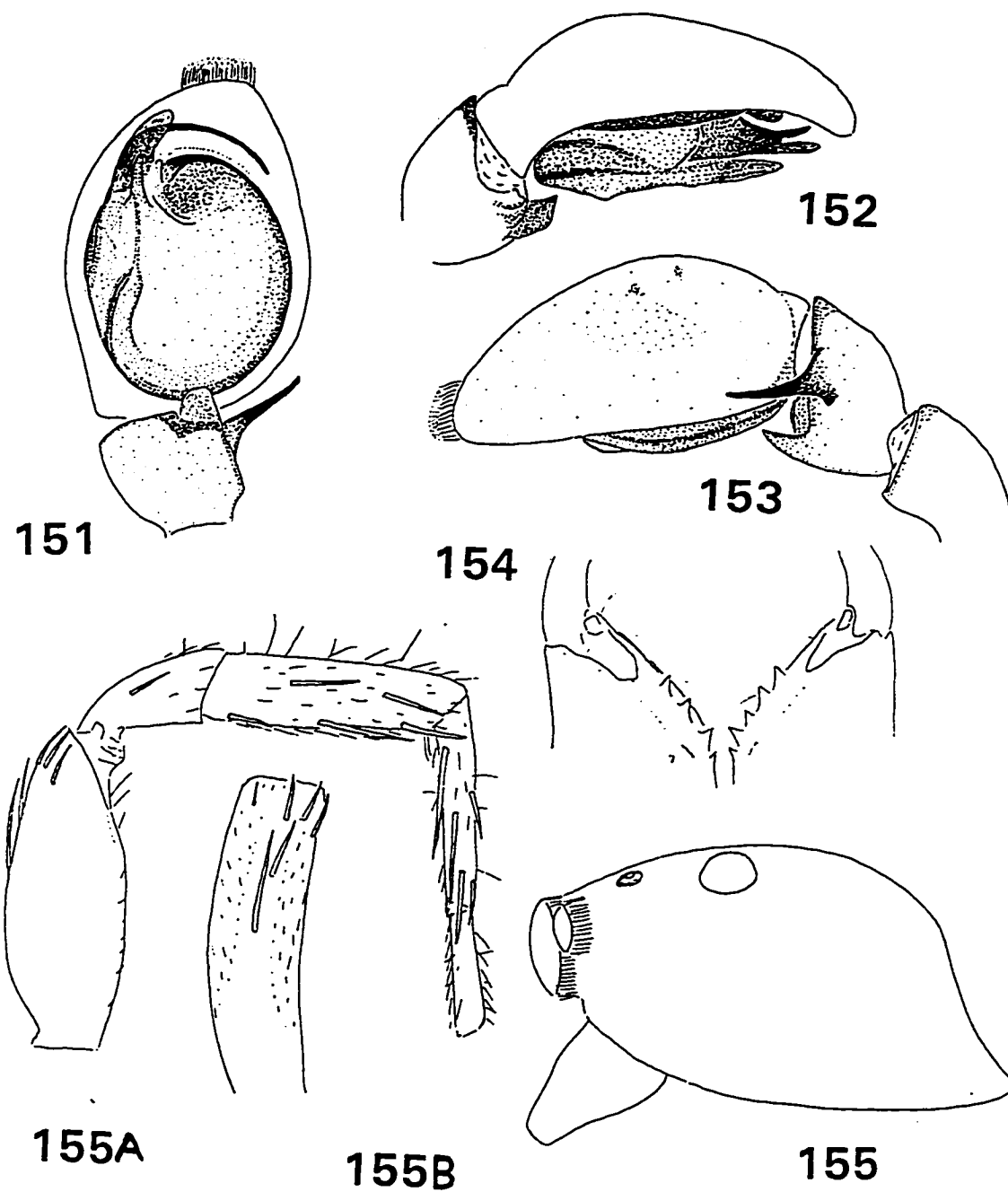
Figures 139-141: Spartaeus spinimanus. Left male palp.



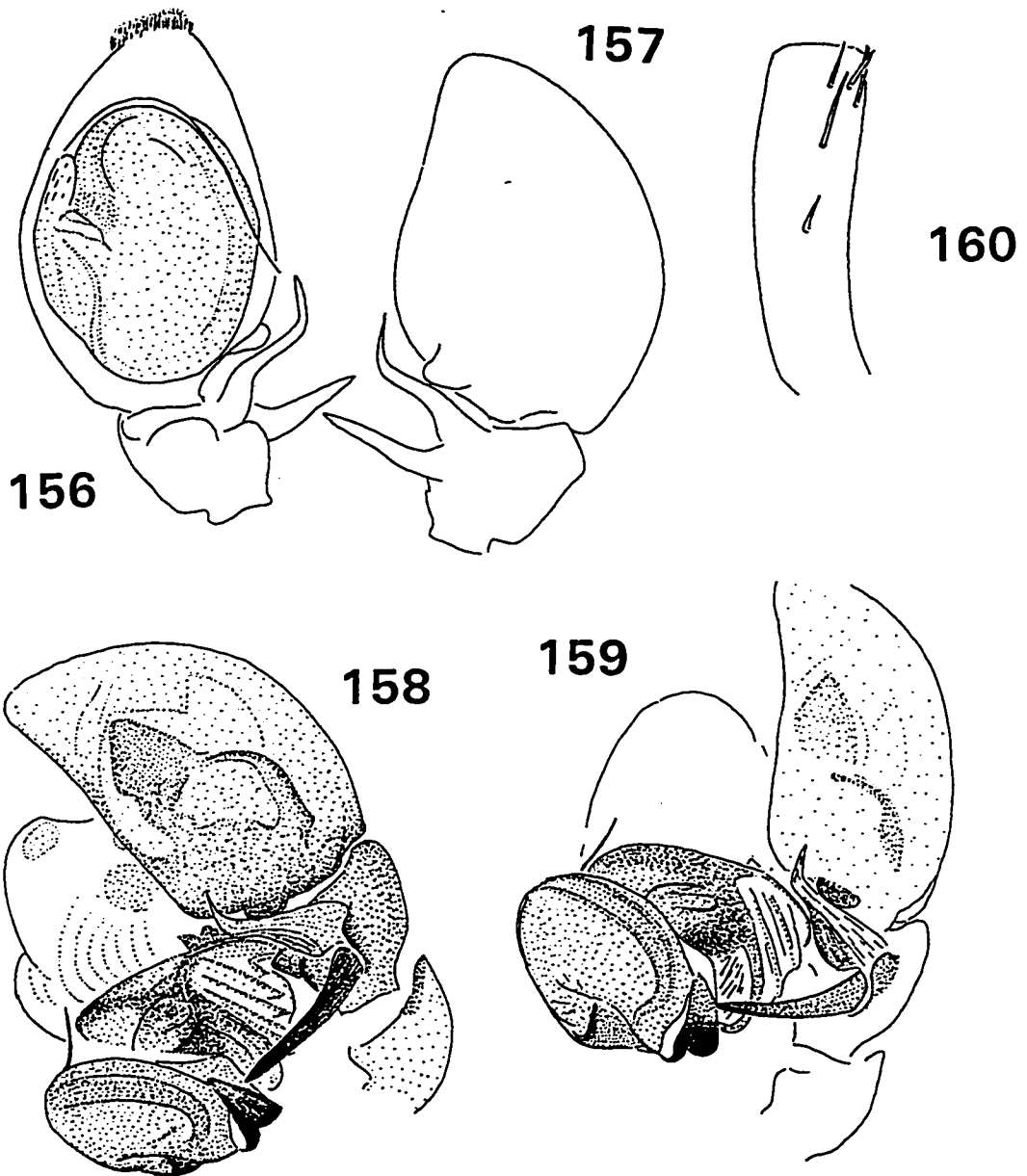
Figures 142-144: Spartaeus spinimanus. 142-143. Male palp, expanded. 144. Cymbium and tibia.



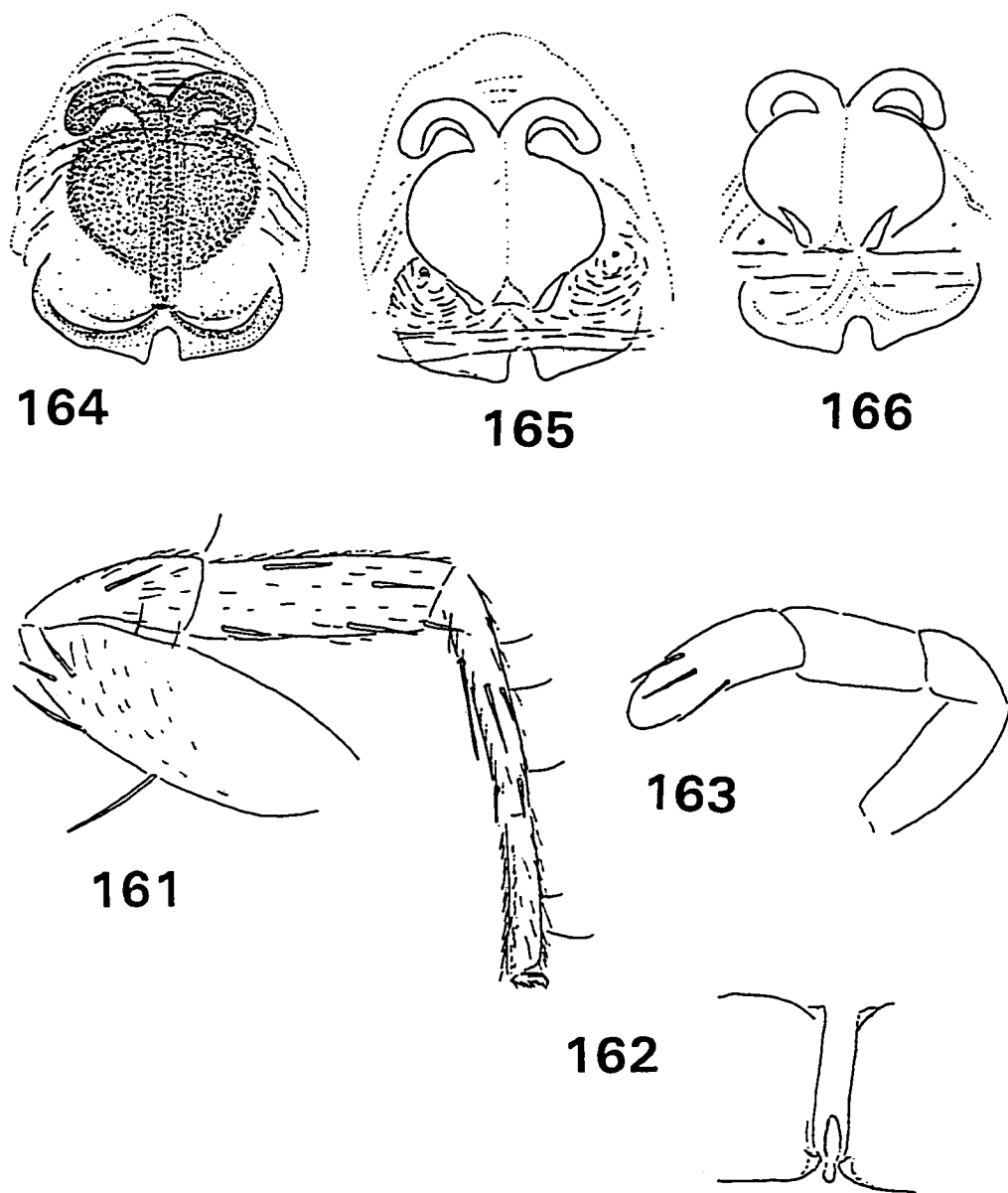
Figures 145-150: Spartaeus spinimanus. 145. Left leg I. 146-147. Femoral organ. 148. Intercheliceral sclerite and chelicerae. 149-150. Left female palp.



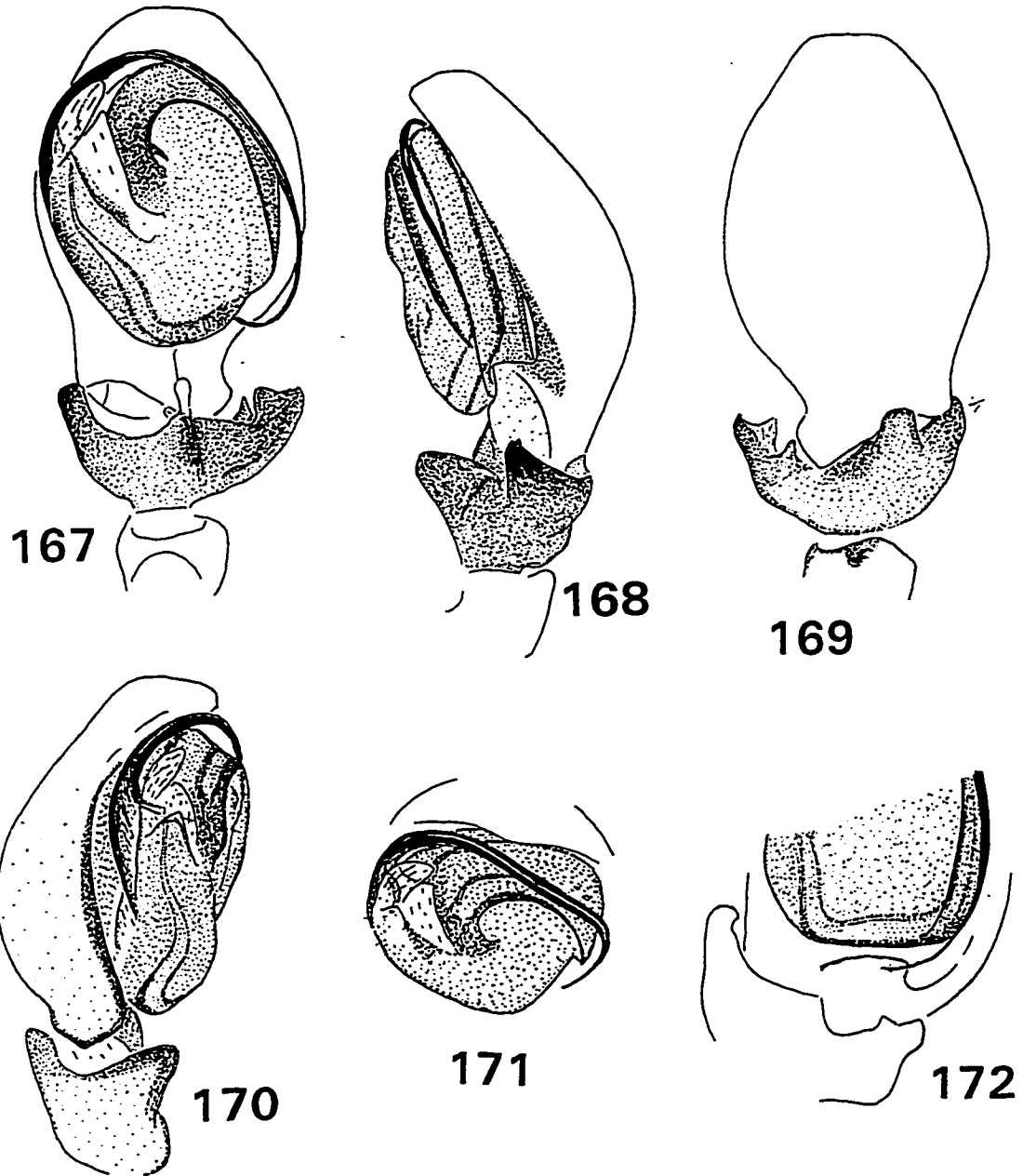
Figures 151-155B: *Lankattus monticola*. 151-153. Left male palp. 154. Chelicerae. 155. Cephalothorax, lateral. 155A. Left leg I. 155B. Femur I.



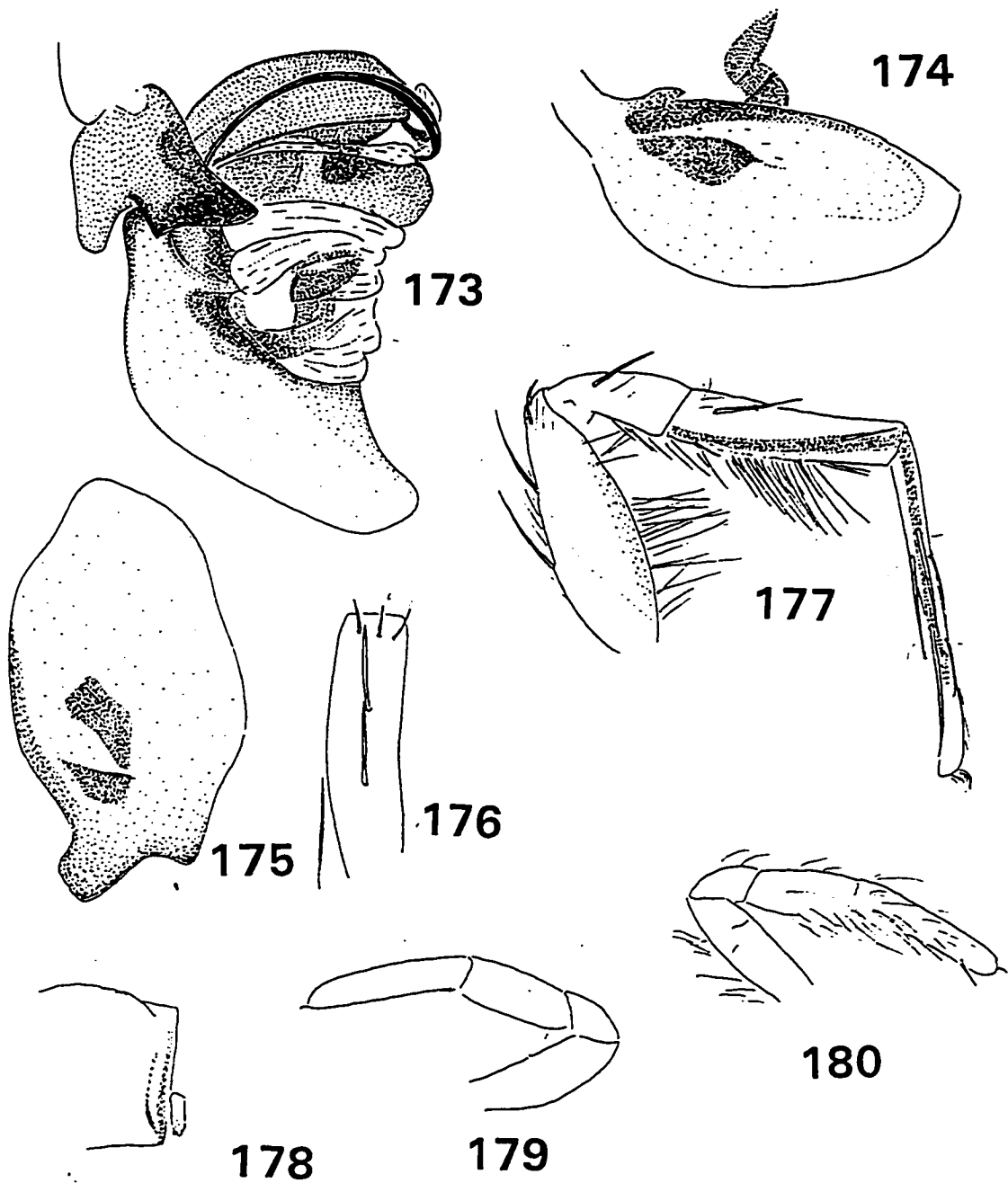
Figures 156-160: *Cyrba algerina*. 156-159. Left male palp (158-159 expanded). 160. Left femur I.



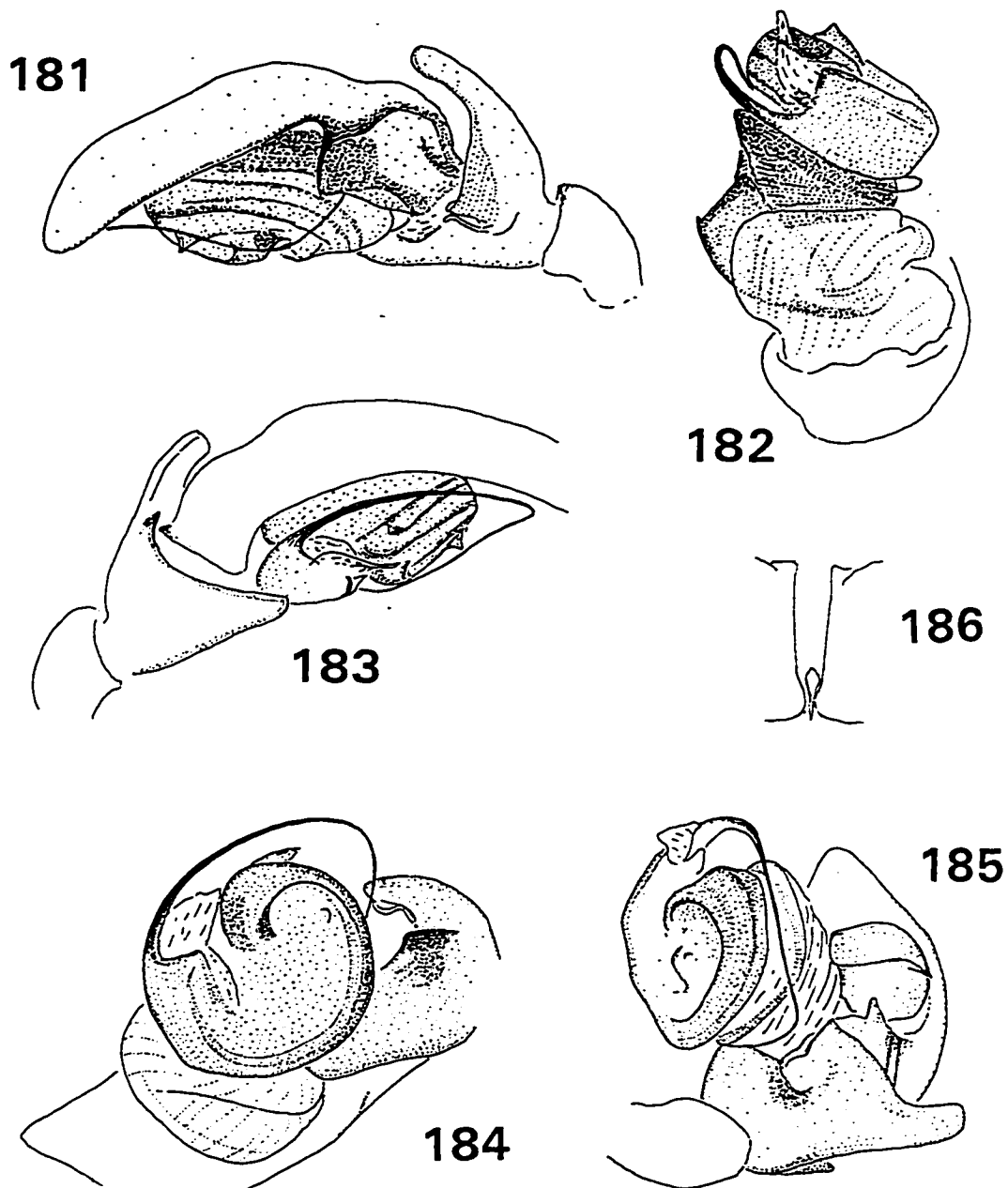
Figures 161-166: *Cyrba algerina*. 161. Male left leg I. 162. Intercheliceral sclerite and chelicerae. 163. Left female palp. 164. Epigynum. 165-166. Spermathecae and ducts, dorsal.



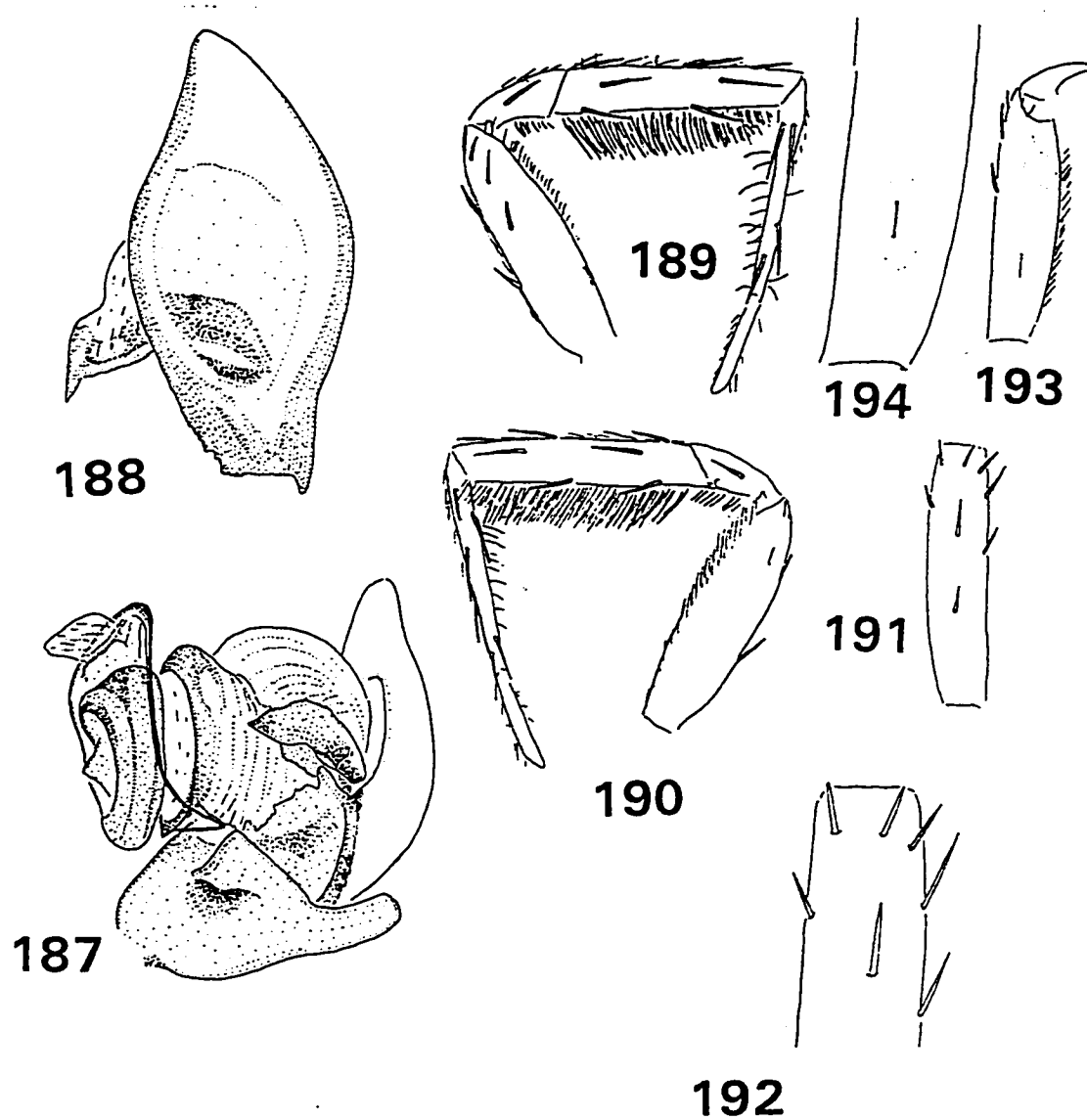
Figures 167-172: *Neobrettus tibialis*. Left male palp.



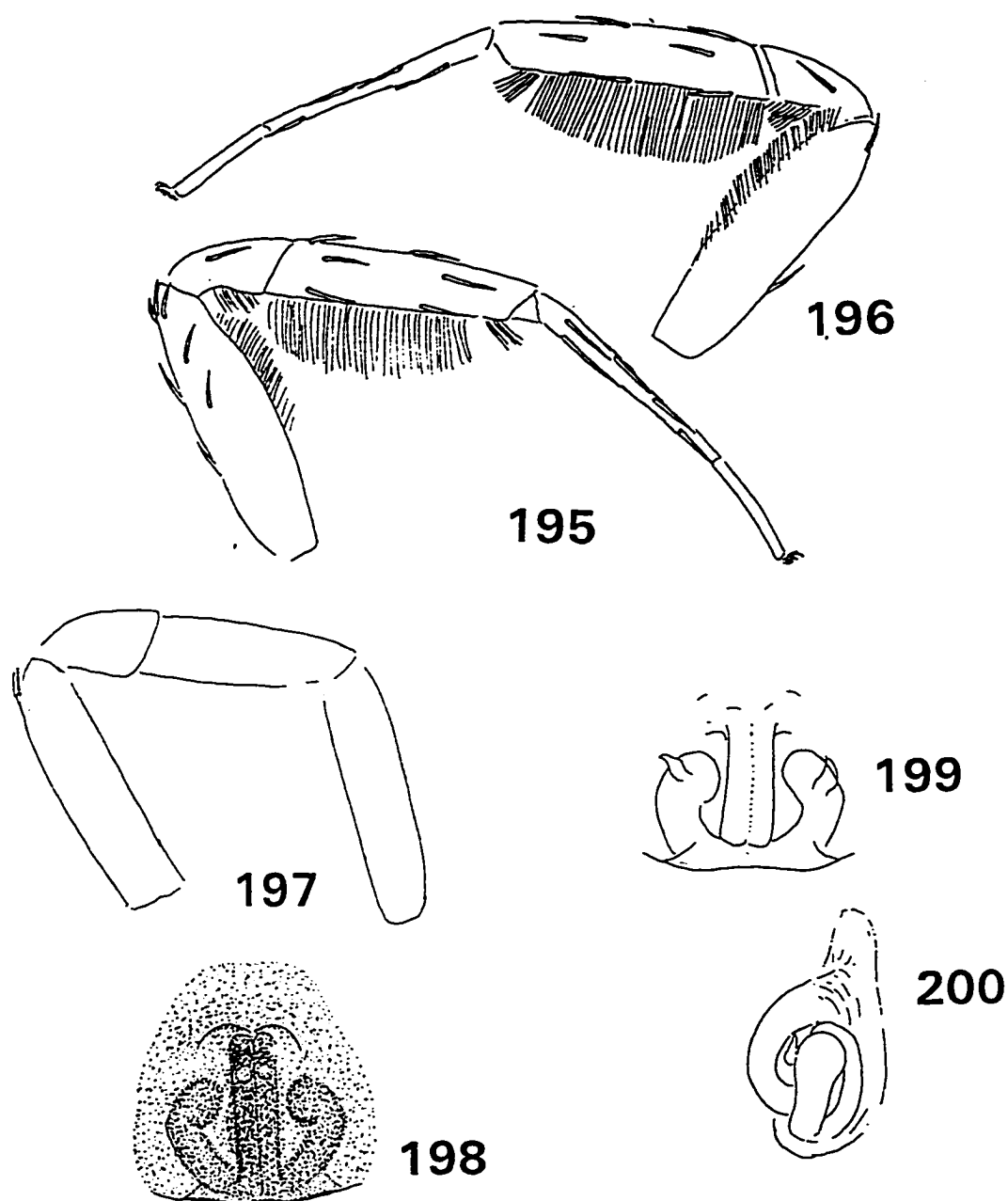
Figures 173-180: *Neobrettus tibialis*. 173-175. Male palp, expanded. 176. Male left femur I. 177. Male left leg I. 178. Intercheliceral sclerite and chelicerae. 179-180. Left female palp.



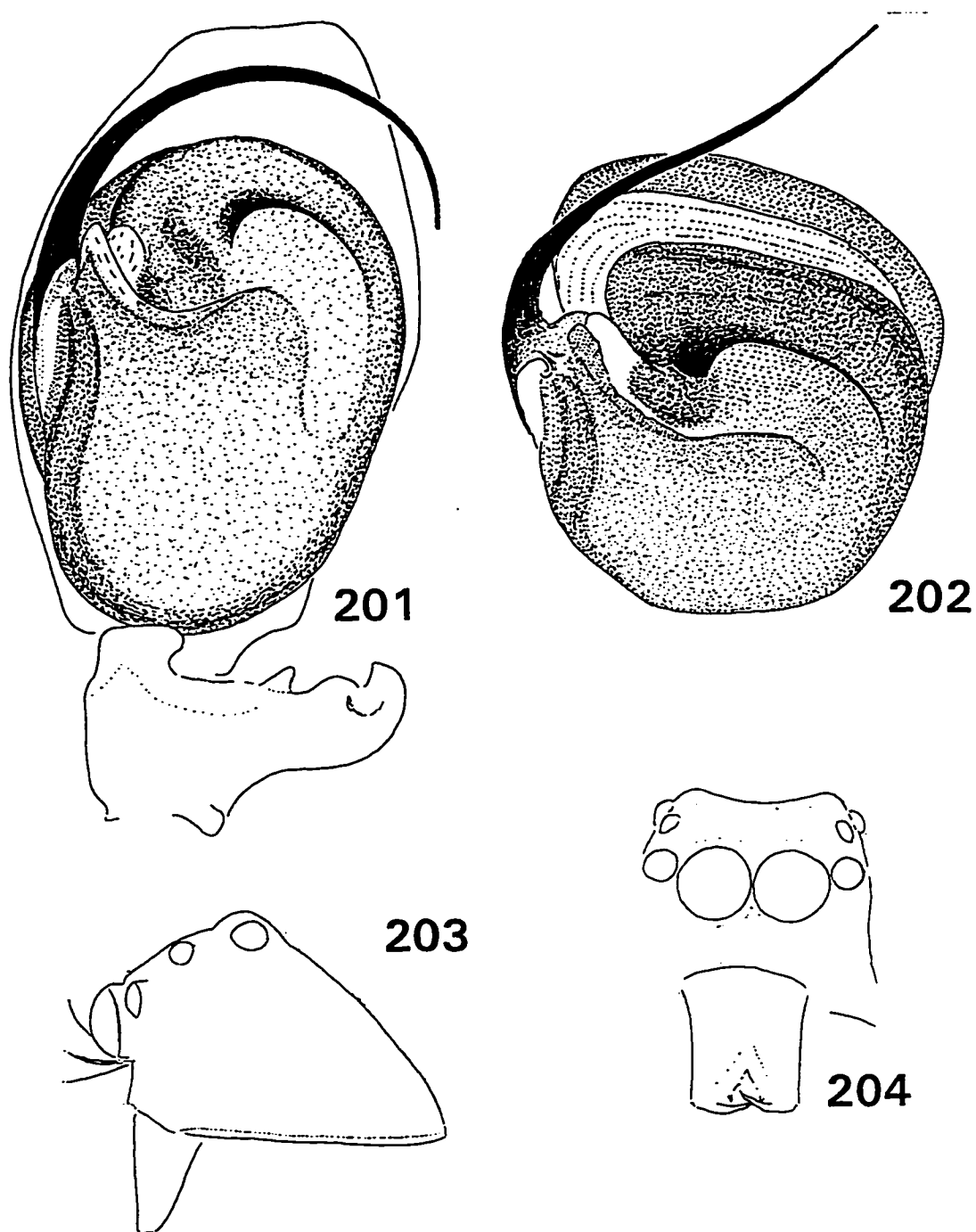
Figures 181-186: Brettus cingulatus. 181-185. Left male palp (182, 184-185 expanded). 186. Intercheliceral sclerite and chelicerae.



Figures 187-194: Brettus cingulatus. 187-188. Left male palp, expanded. 189-190. Left male leg I. 191-194. Left femur I.



Figures 195-200: Brettus cingulatus. 195-196. Left female leg I. 197. Left female palp. 198. Epigynum. 199-200. Spermathecae and ducts (dorsal and lateral).



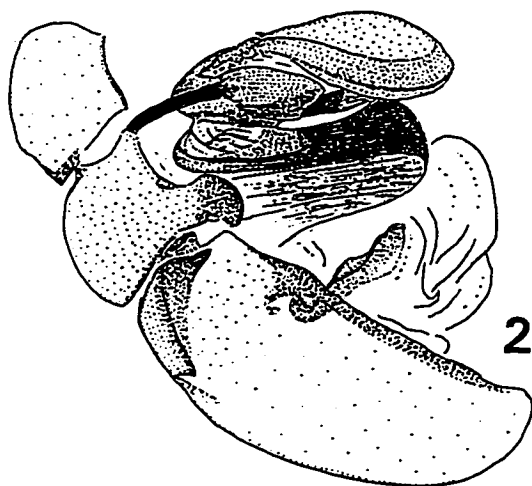
Figures 201-204: *Portia schultzei*. 201-202. Left male palp. 203. Cephalothorax, lateral. 204. Face.



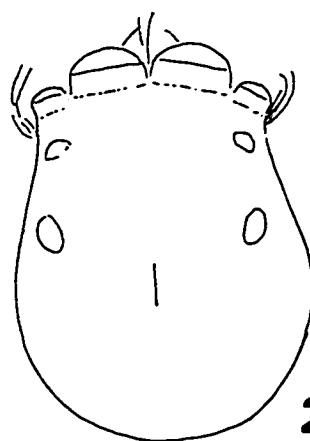
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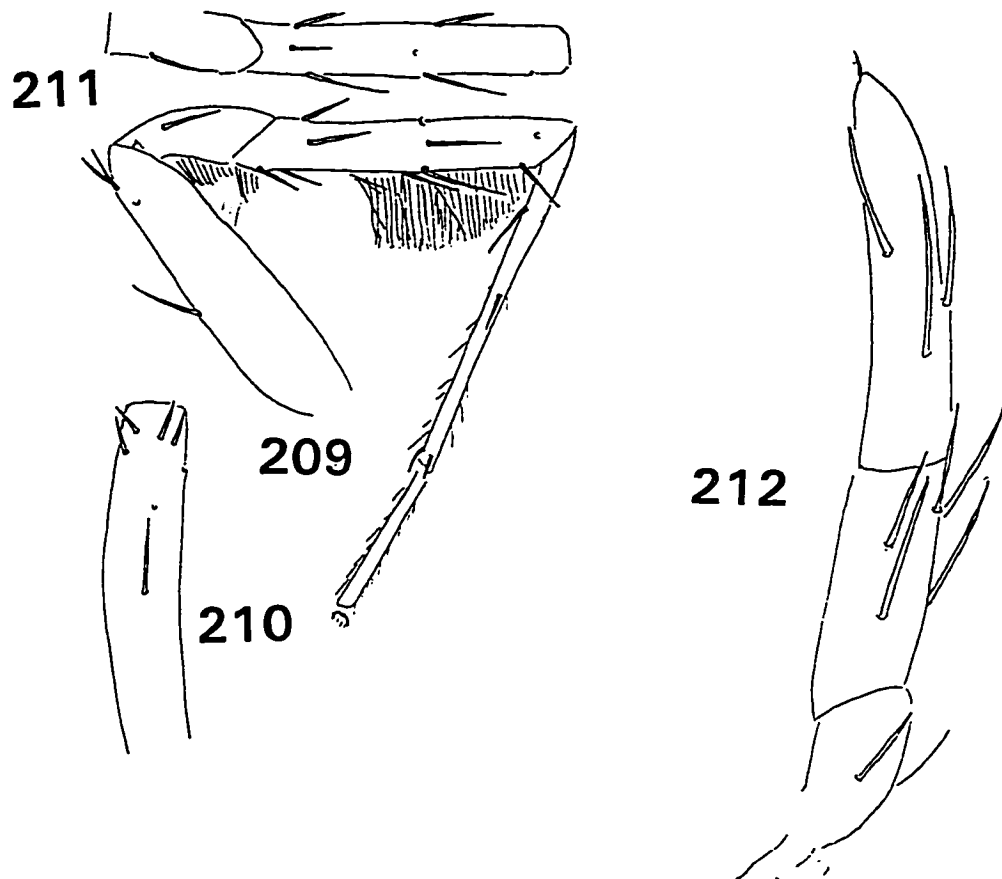


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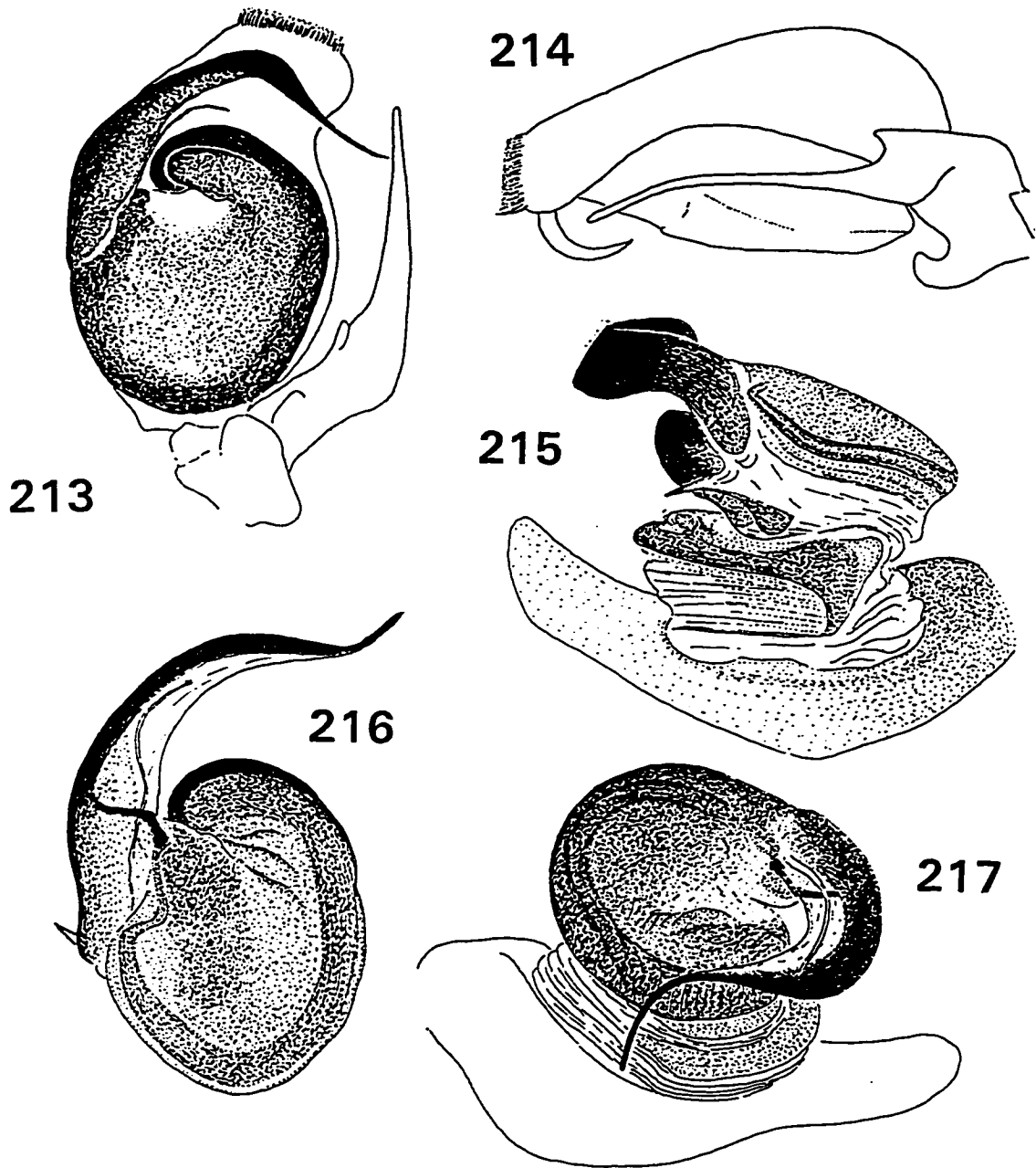


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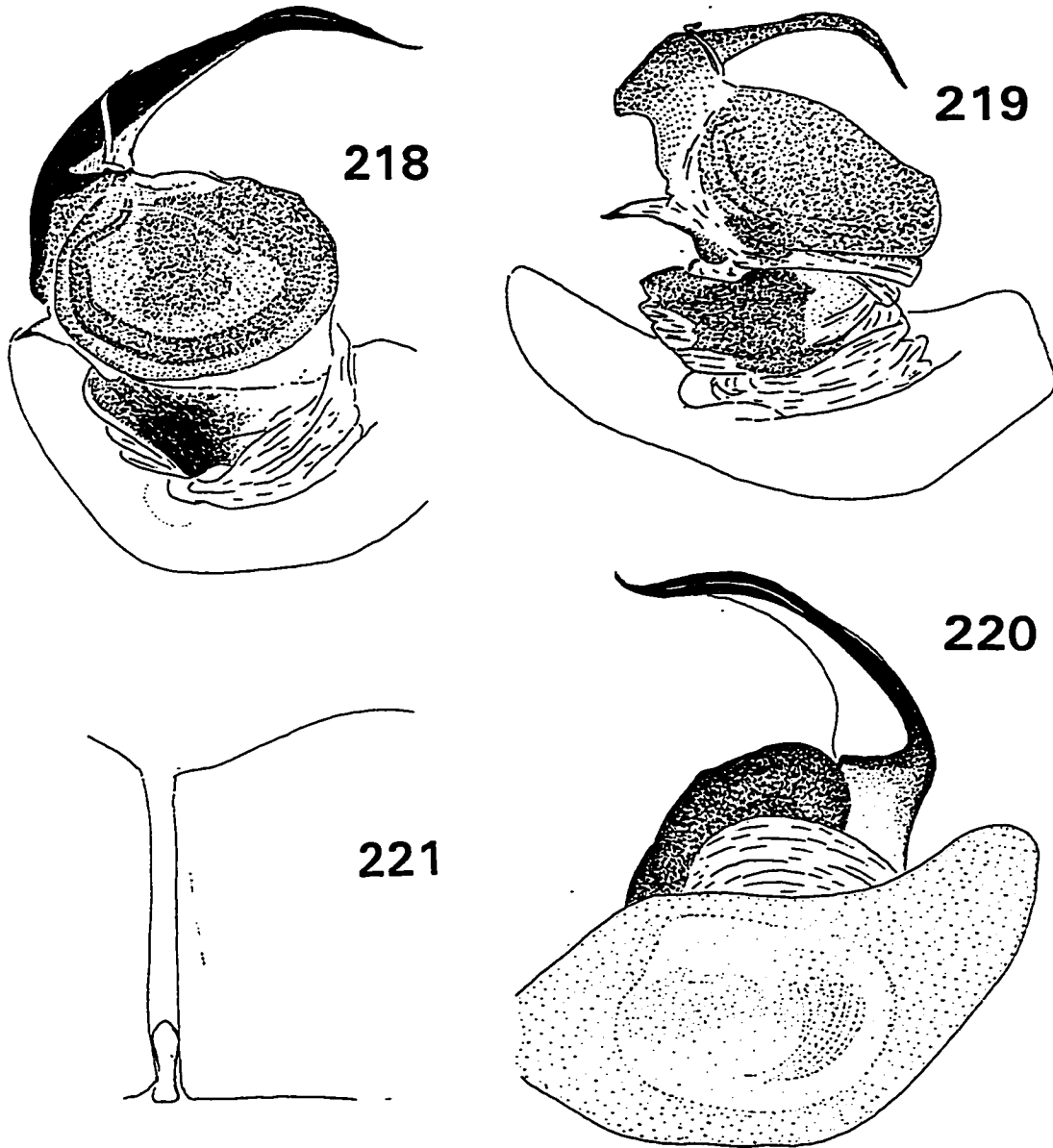
Figures 205-208: Portia schultzei. 205-207. Left male palp, expanded. 208. Cephalothorax, dorsal.



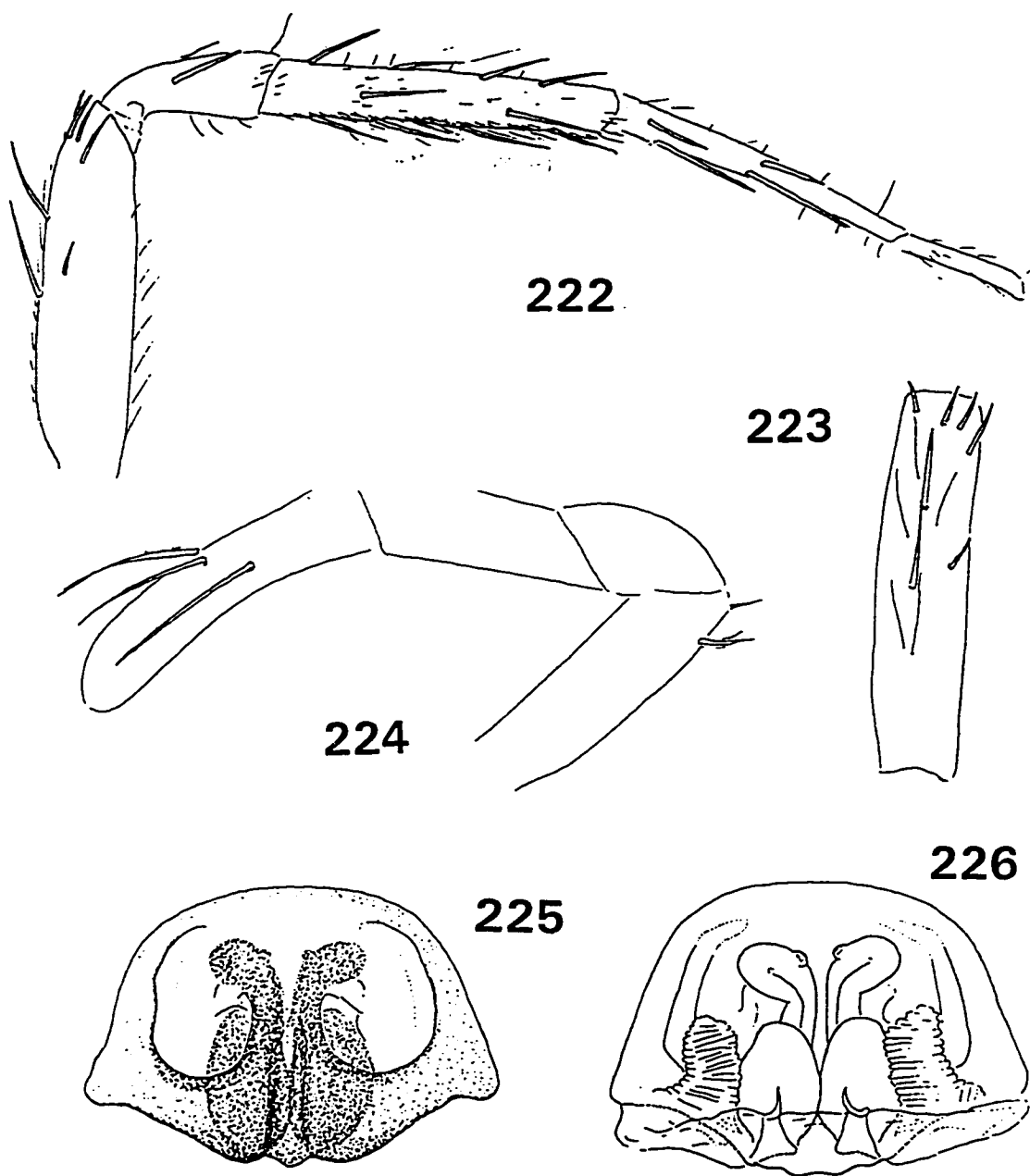
Figures 209-212: Portia schultzii. 209. Male left leg I. 210, Femur. 211. Patella and tibia. 212. Left female palp.



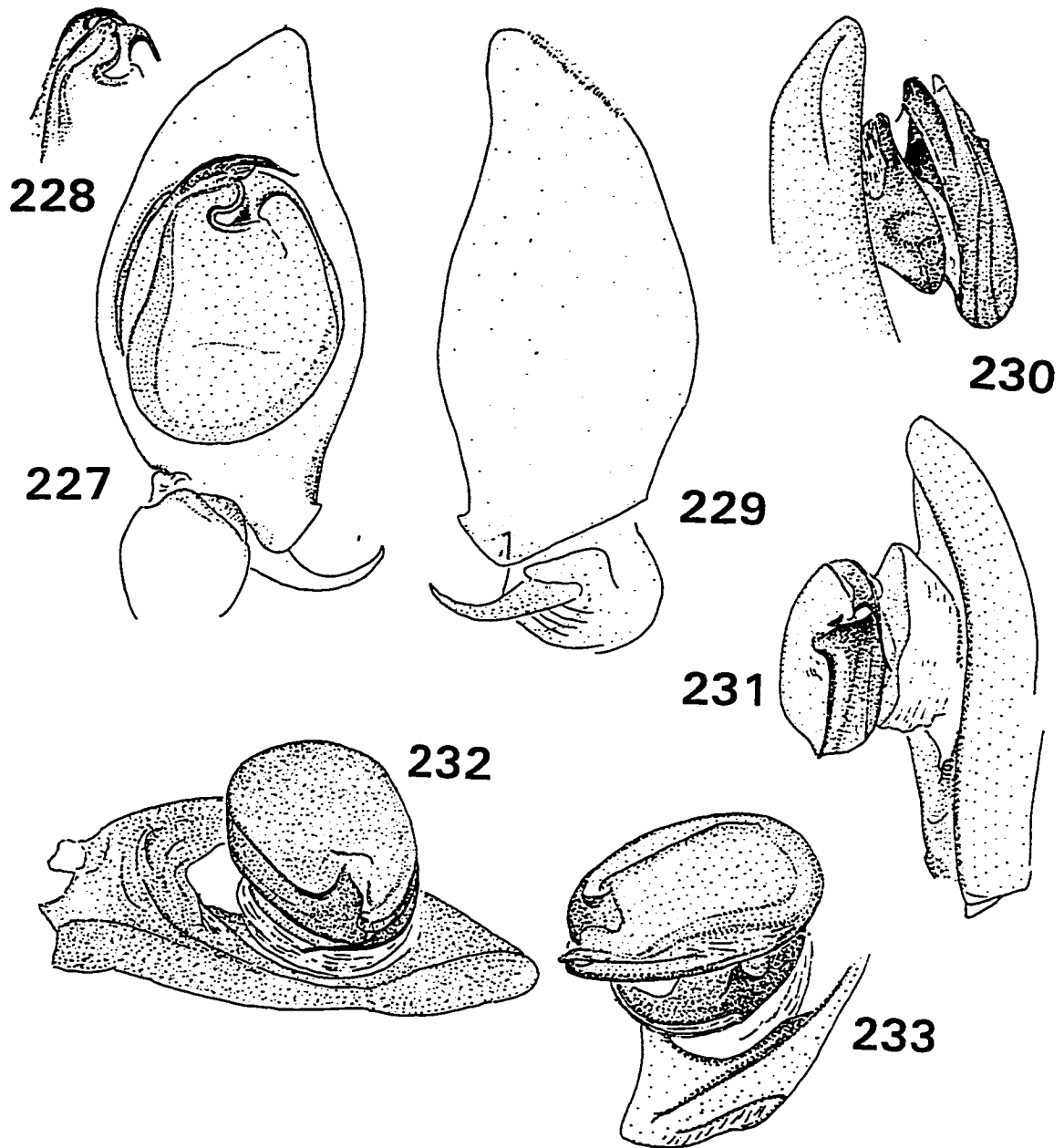
Figures 213-217: Phaeacius wanlessi. Left male palp (215-217 expanded).



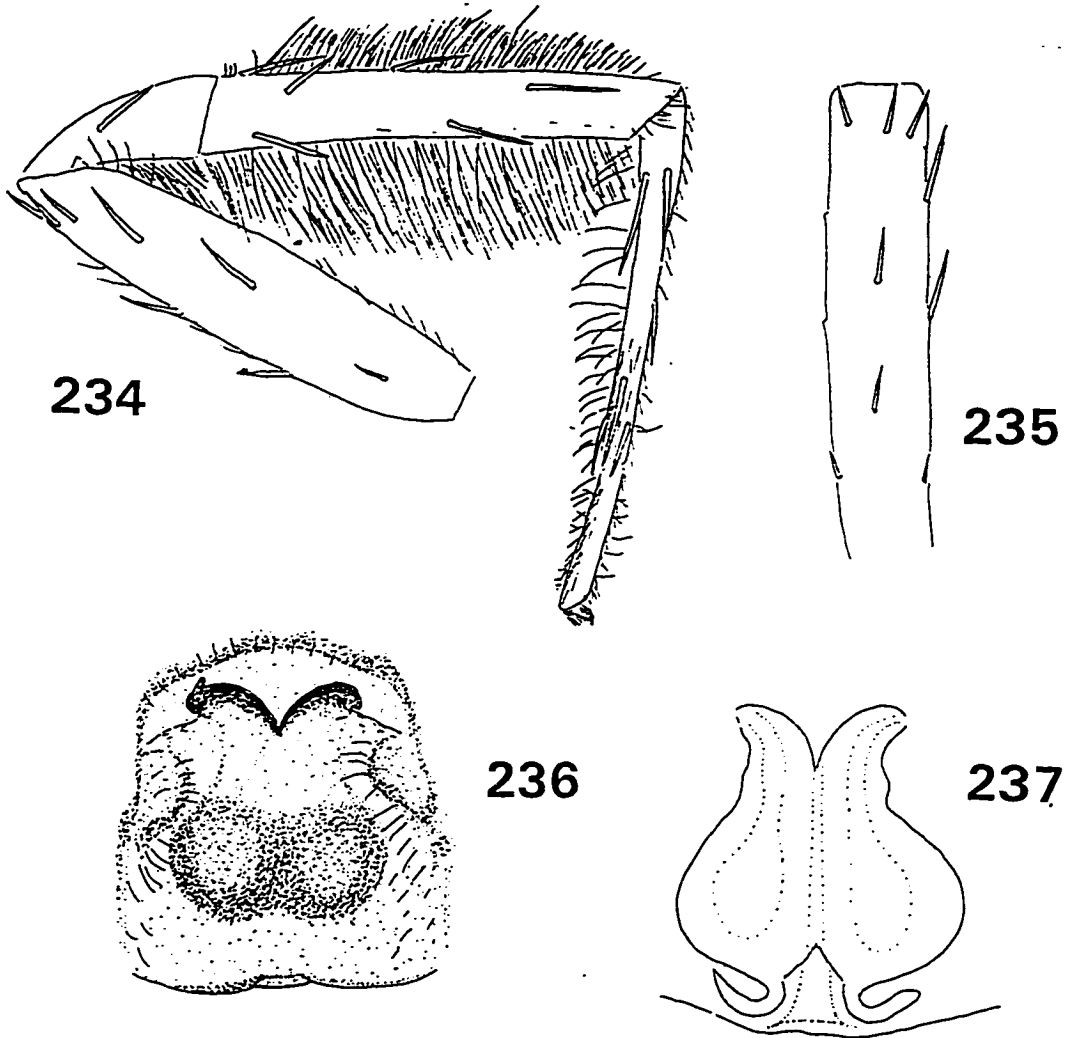
Figures 218-221: Phaeacius wanlessi. 218-220. Male palp, expanded. 221. Intercheliceral sclerite and chelicerae.



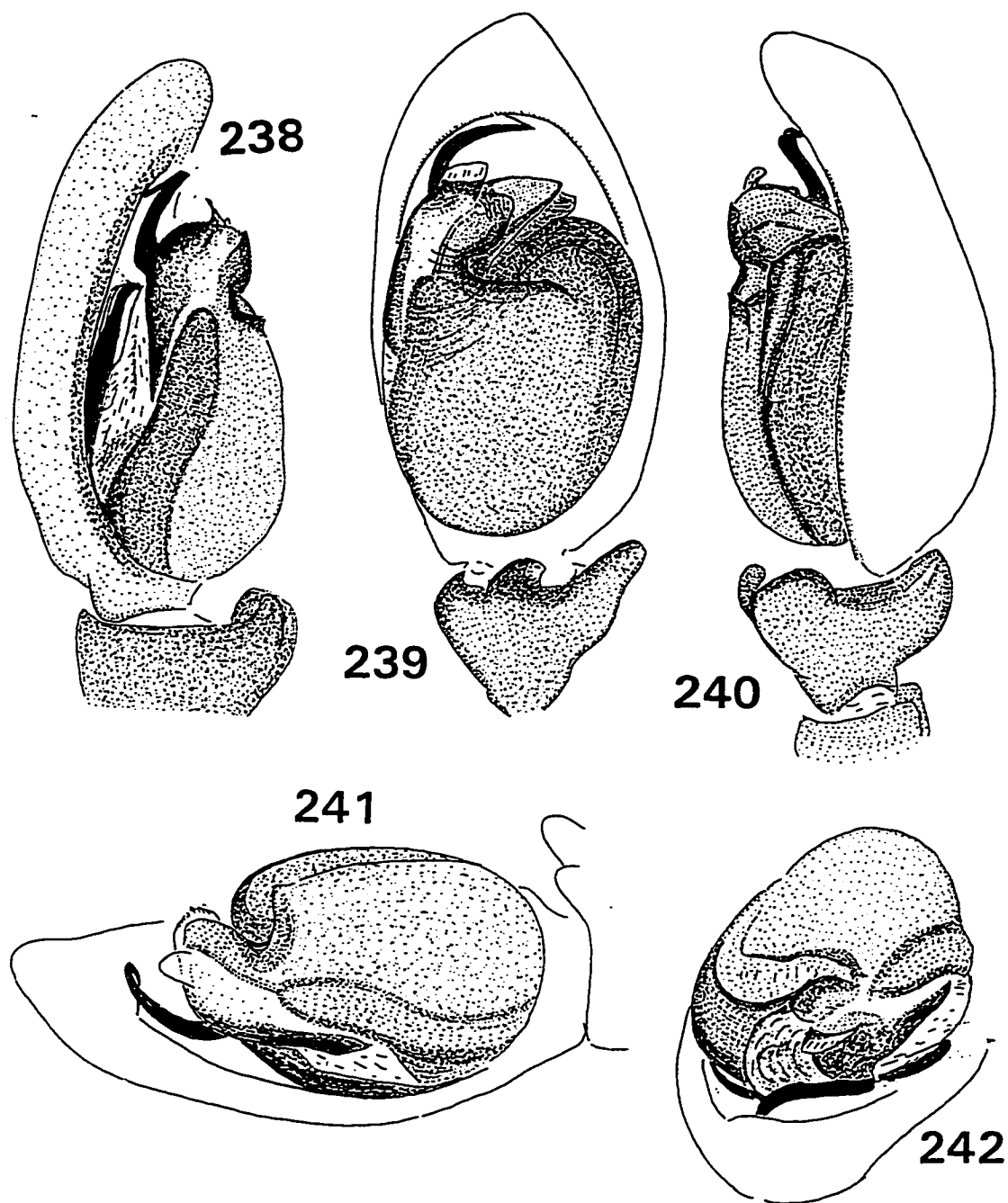
Figures 222-226: Phaeacius wanlessi. 222. Male left leg I. 223. Femur I. 224. Left female palp. 225. Epigynum. 226. Spermathecae and ducts.



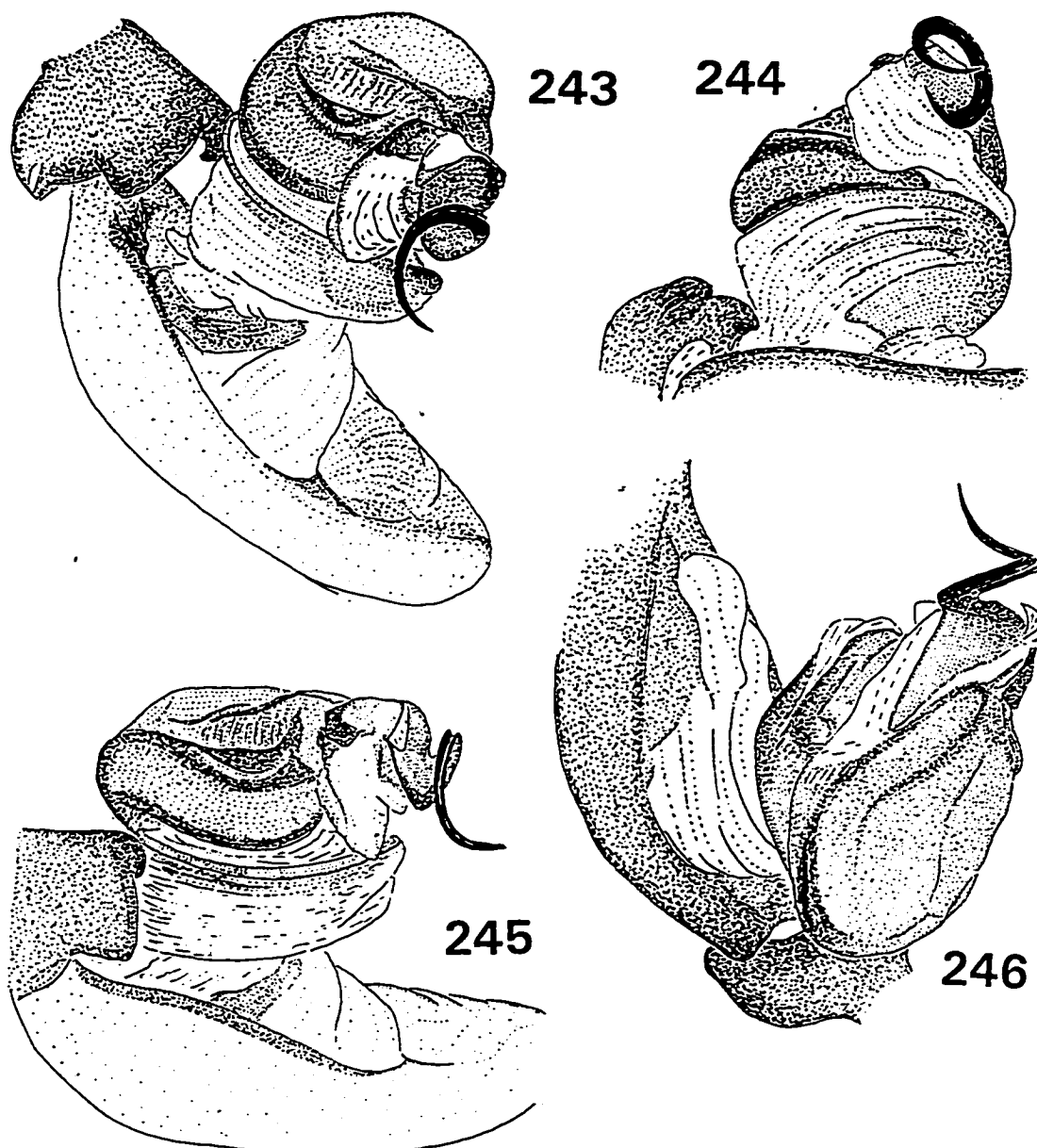
Figures 227-233. Meleon kenti. Left male palp (23-233 expanded).



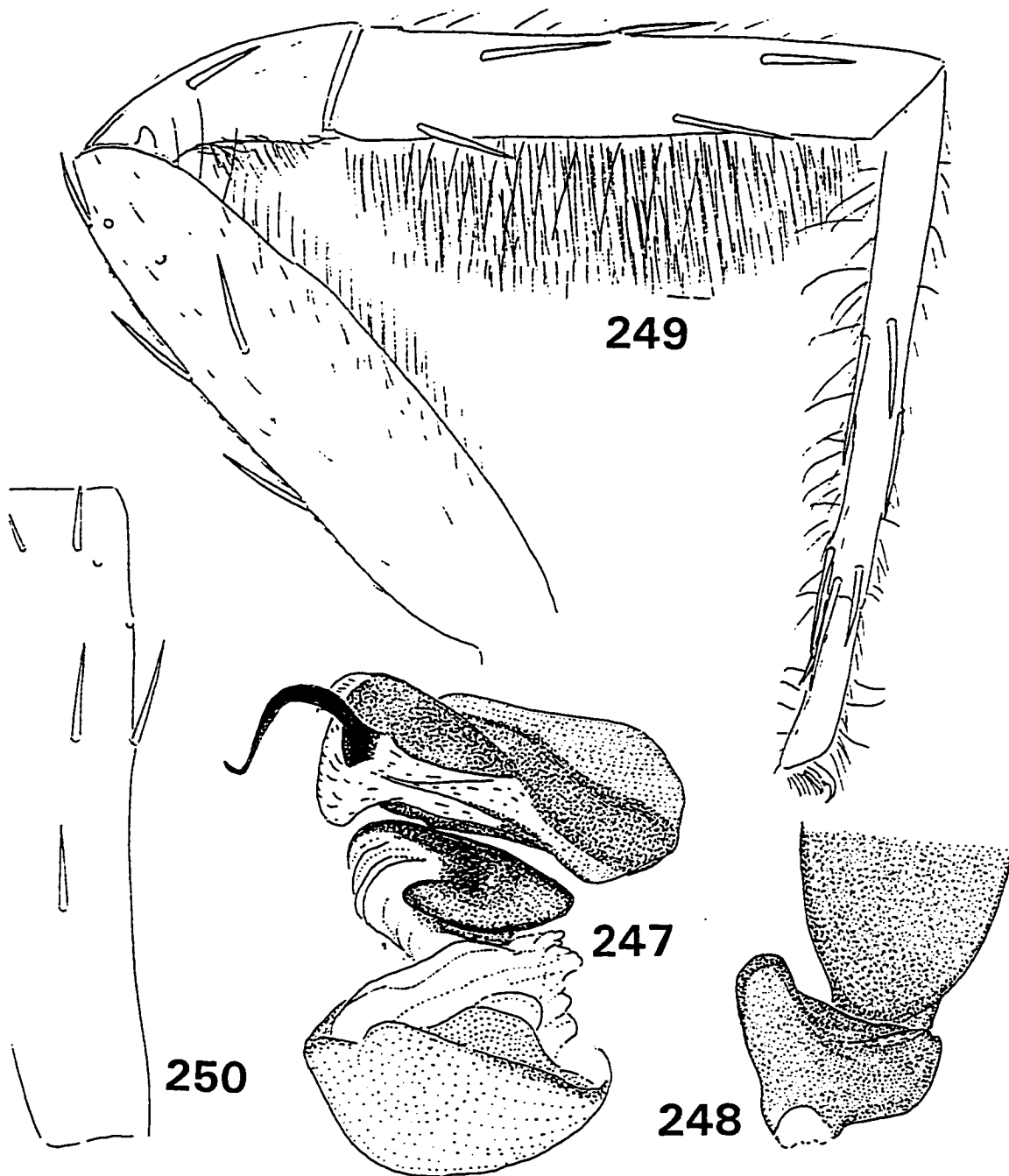
Figures 234-237: Meleon kenti. 234. Male left leg I. 235. Femur I. 236. Epigynum. 237. Spermathecae and ducts, dorsal.



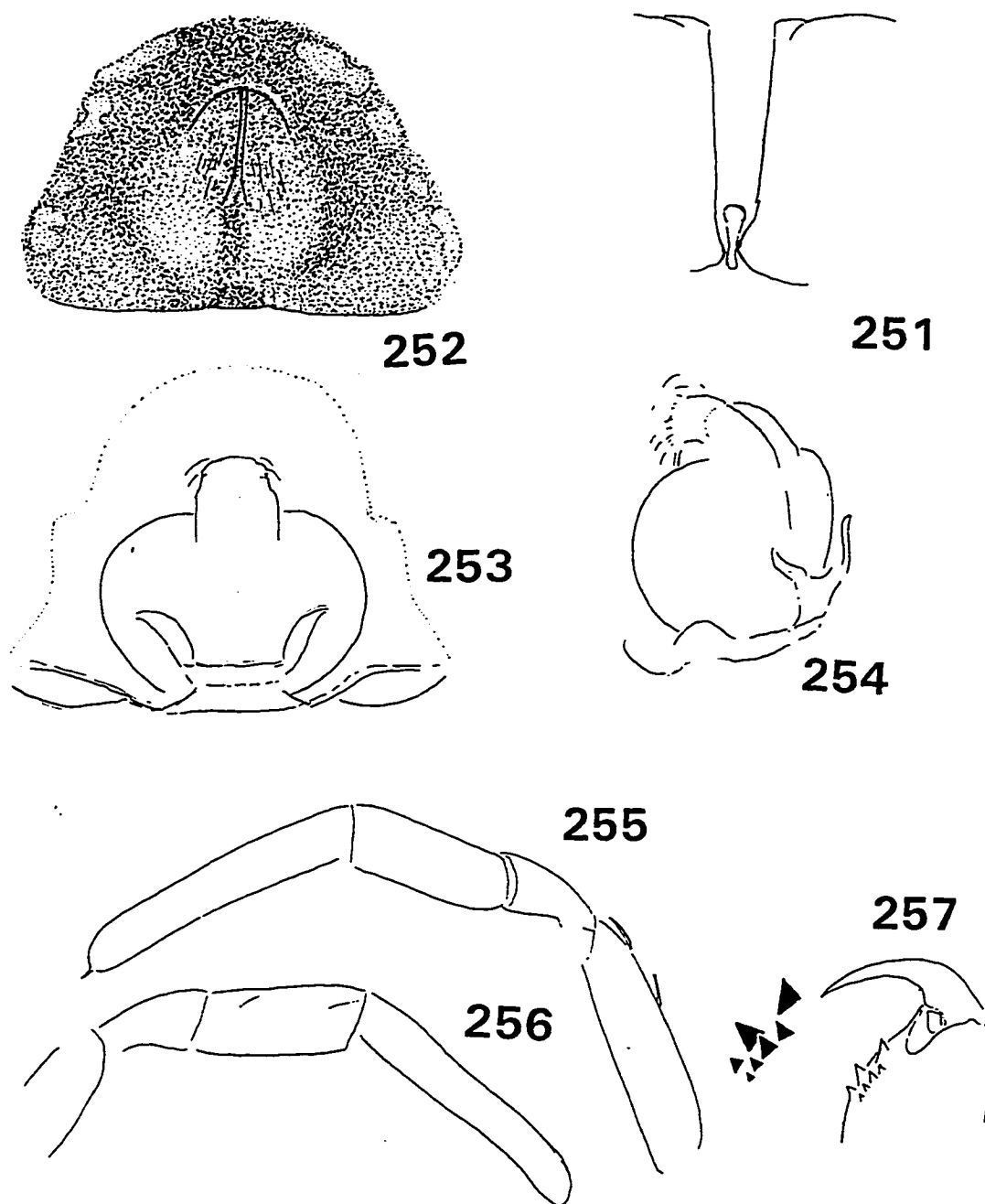
Figures 238-242: *Veissella durbanii*. Left male palp.



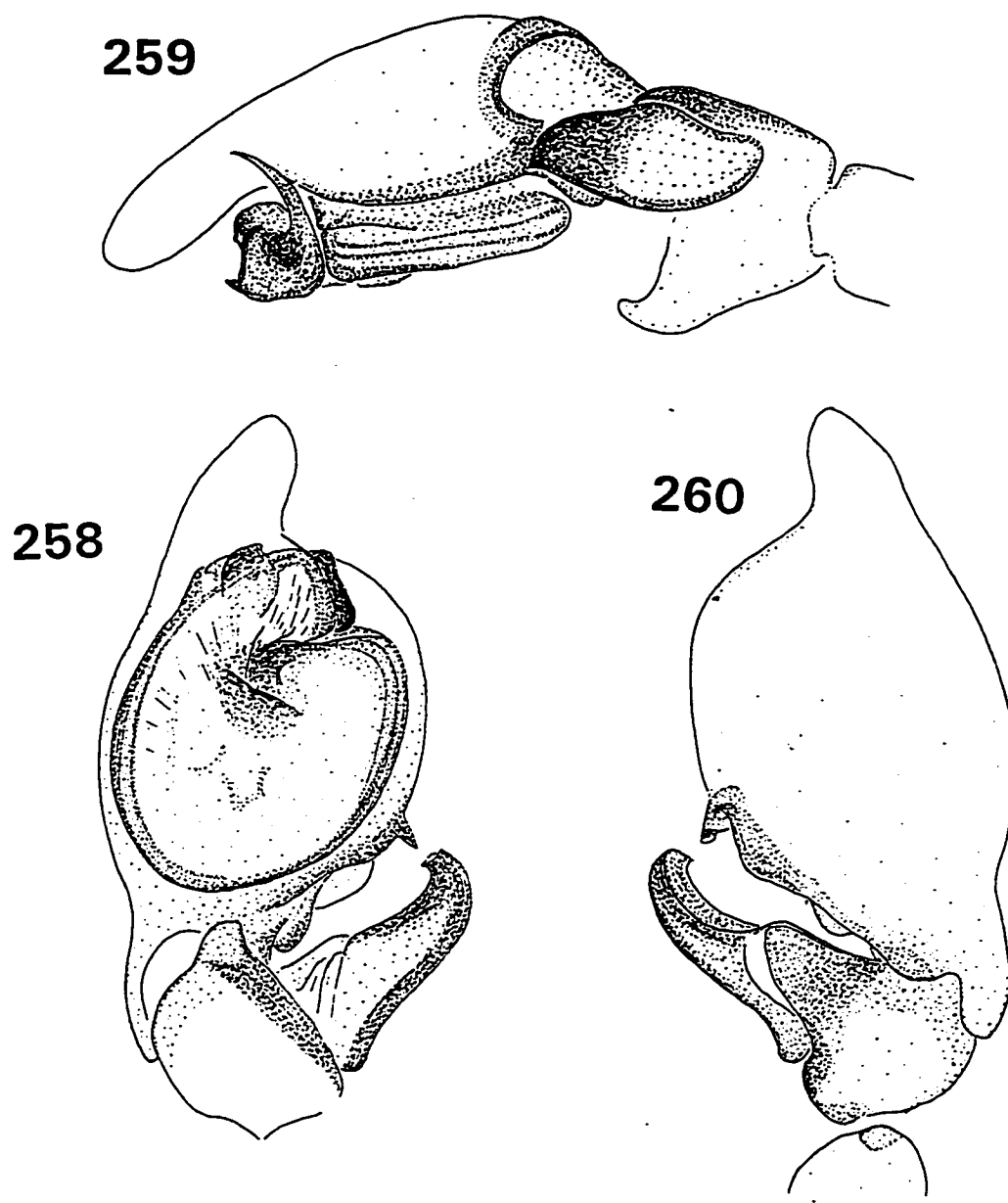
Figures 243-246: *Veissella durbanii*. Left male palp, expanded.



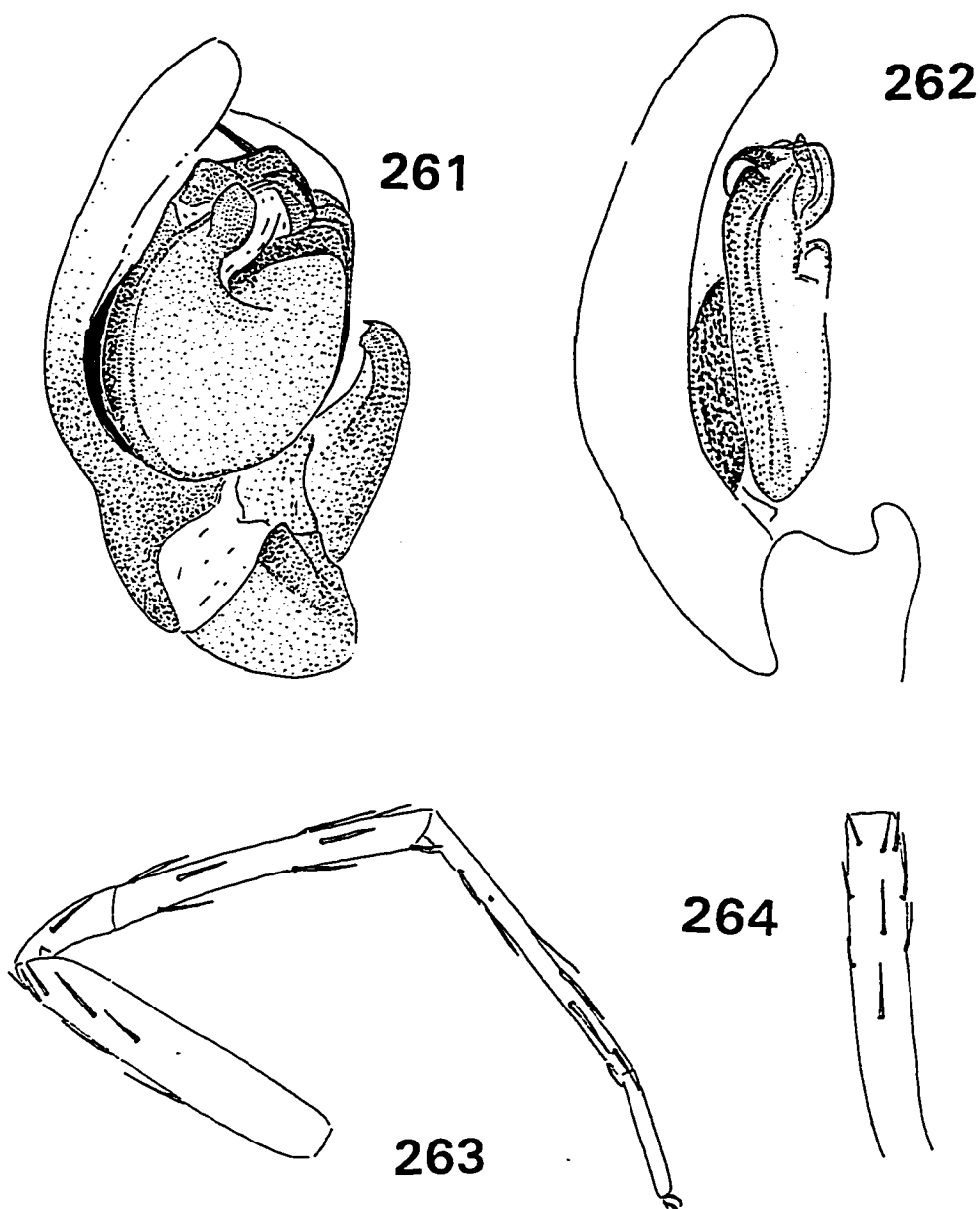
Figures 247-250: *Veissella durbanii*. 247. Left male palp, expanded. 248. Tibia, dorsal. 249. Left male leg I. 250. Femur I.



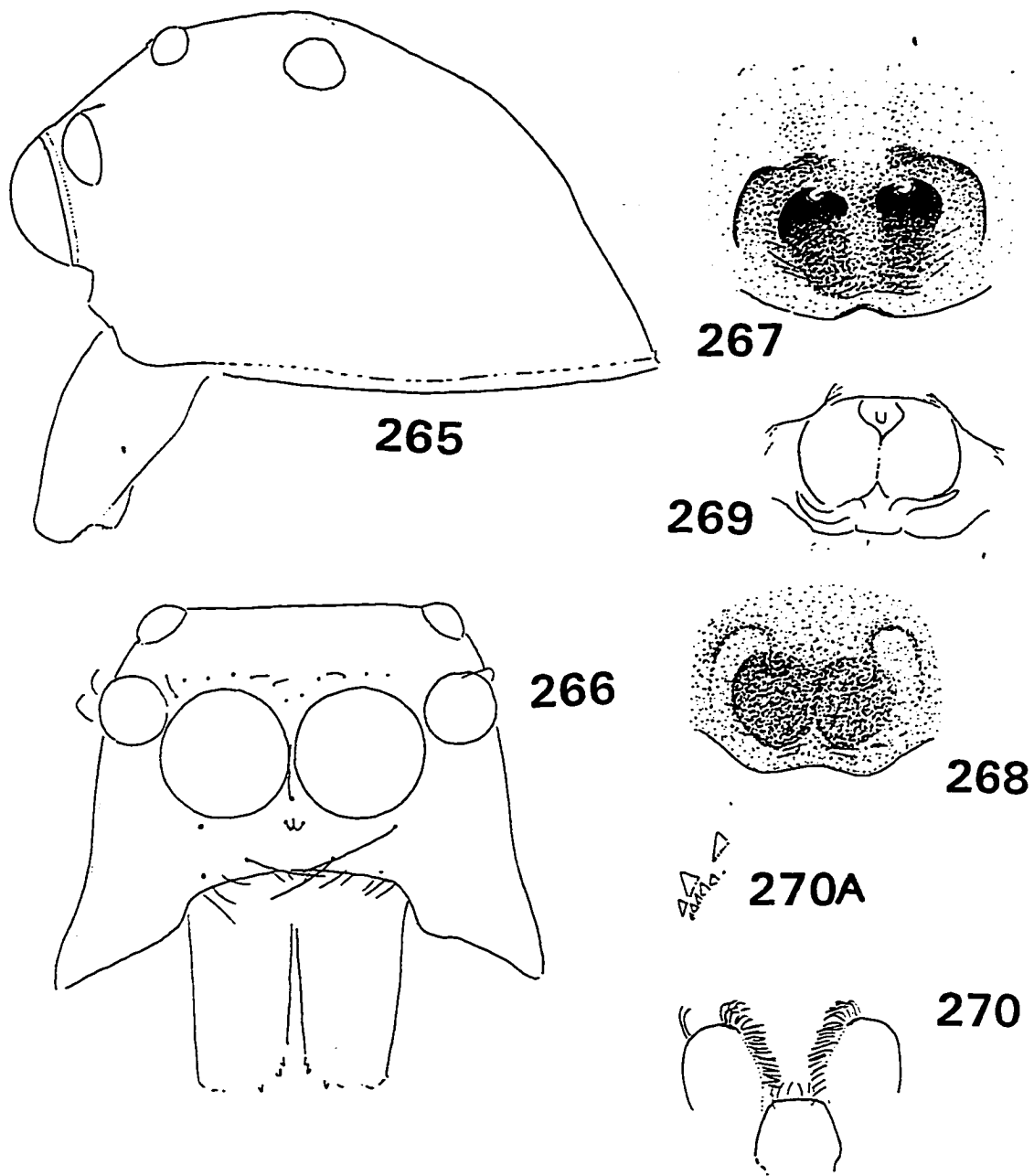
Figures 251-257: *Veissella durbanii*. 251. Intercheliceral sclerite and chelicerae. 252. Epigynum. 253-254. Spermathecae and ducts (dorsal and lateral). 255-256. Left female palp. 257. Chelicerae.



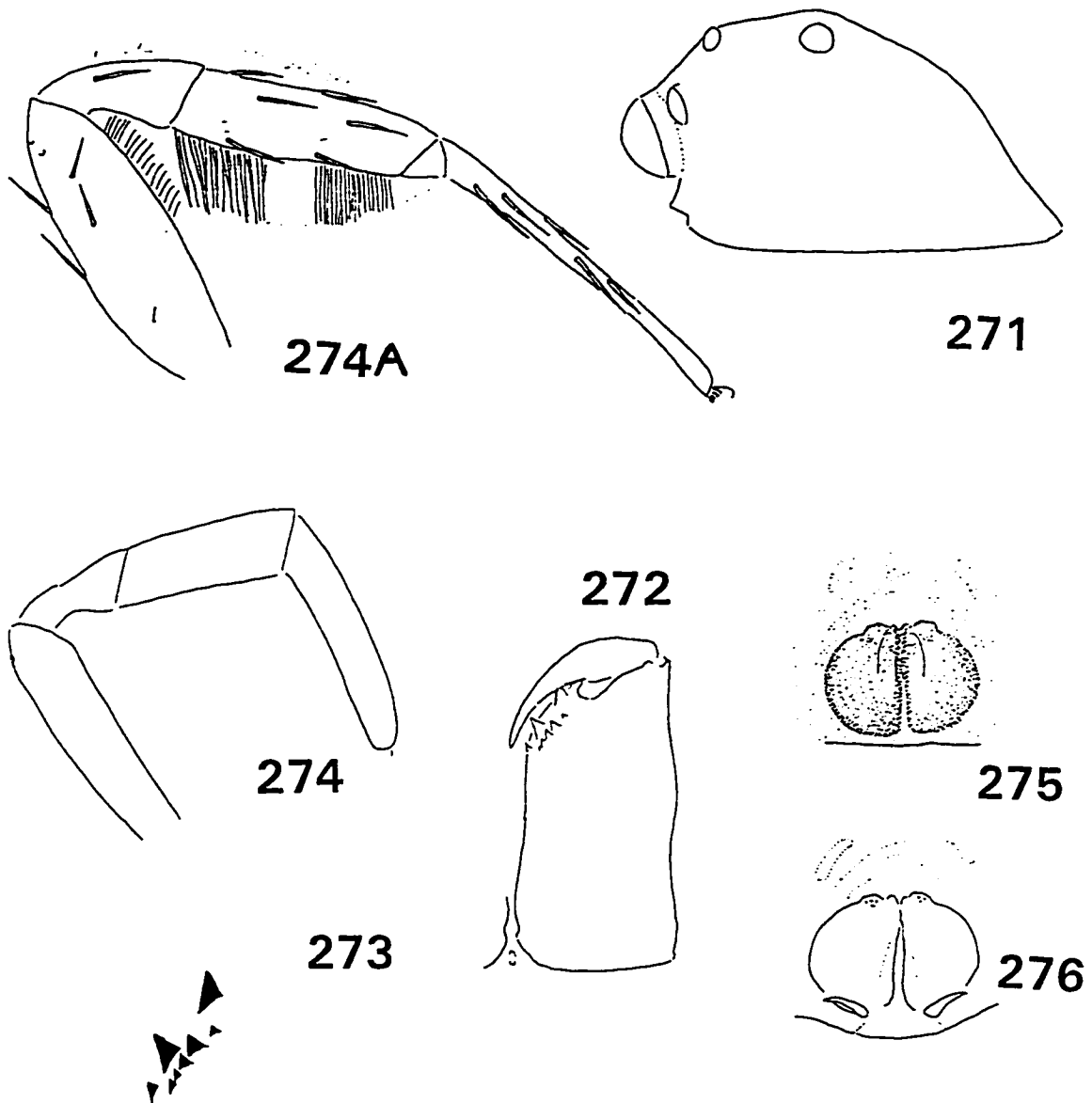
Figures 258-260: *Cocalus* ('*Meleon*') *madagascariensis*. Left male palp.



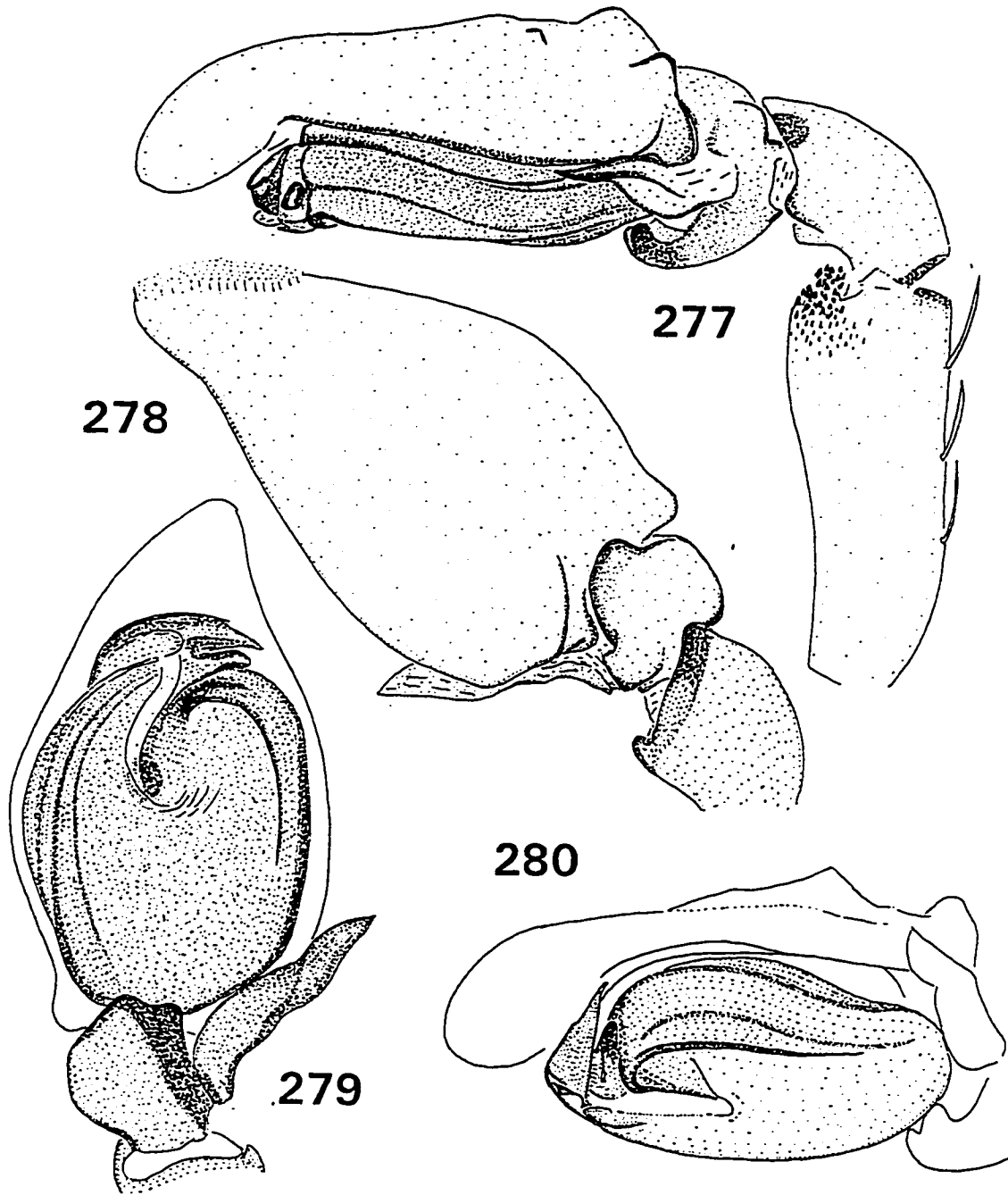
Figures 261-264. Cocalus ('Meleon') madagascariensis. 261-262. Left male palp. 263. Left male leg I. 264. Femur I.



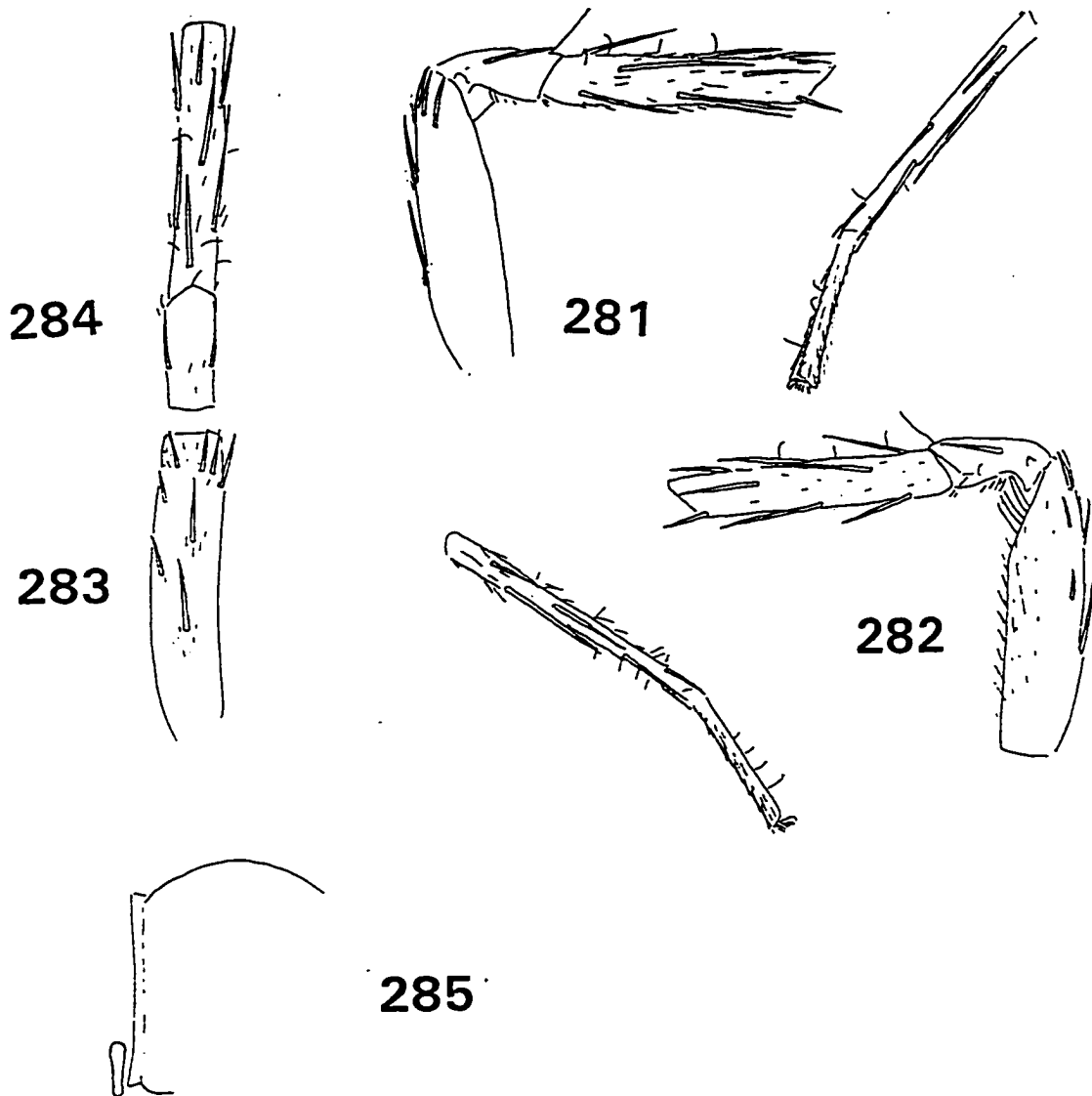
Figures 265-270: Cocalus ('Meleon') madagascariensis.
 265. Cephalothorax, lateral. 266. Face. 267-268. Epigynum.
 269. Spermathecae and ducts, dorsal. 269. Cheliceral
 dentition. 270. Maxillae and labium.



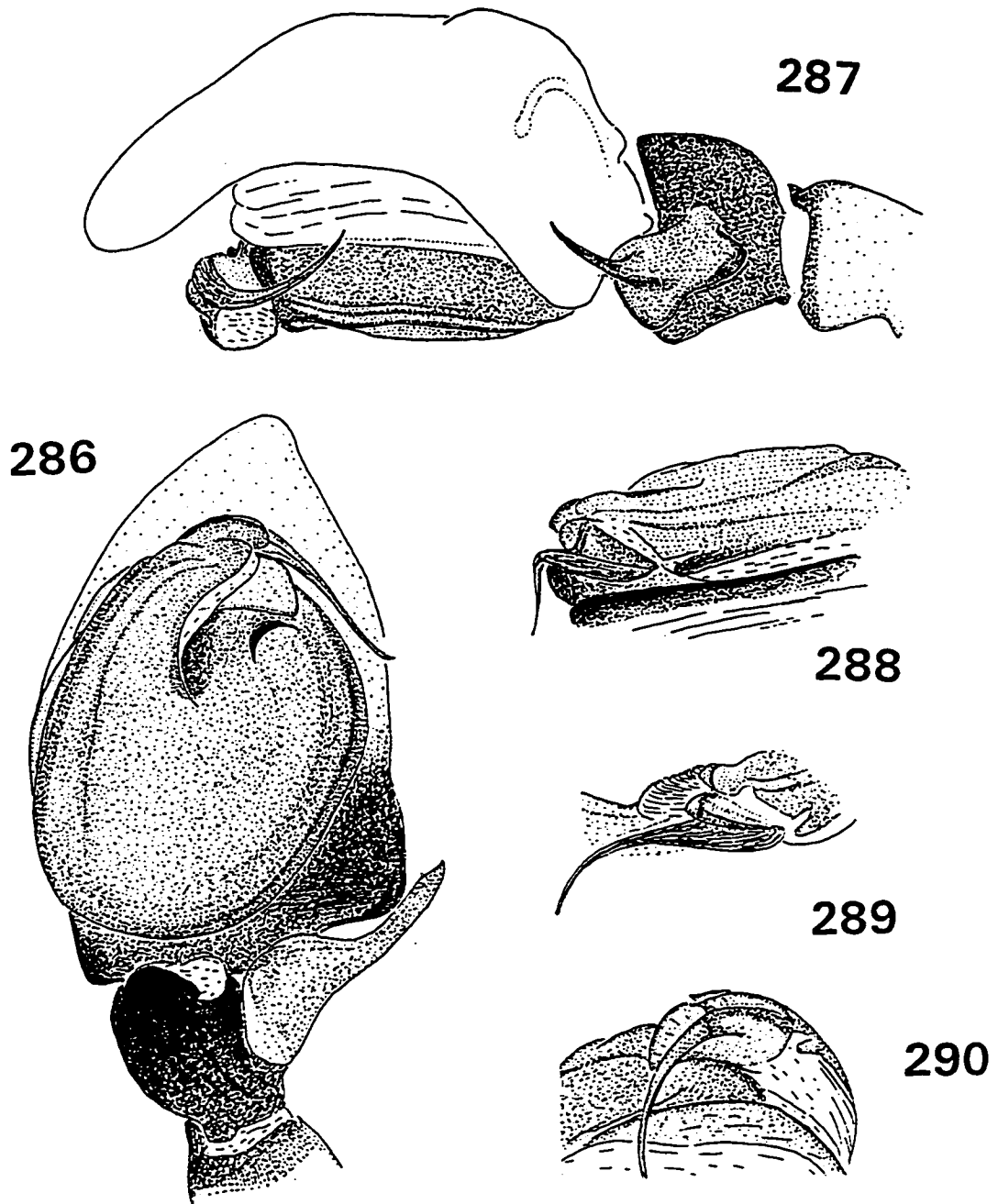
Figures 271-276: 'Meleon' russata. 271. Cephalothorax, lateral. 272. Chelicerae. 273. Cheliceral dentition. 274. Left female palp. 275. Epigynum. 276. Spermathecae and ducts, dorsal.



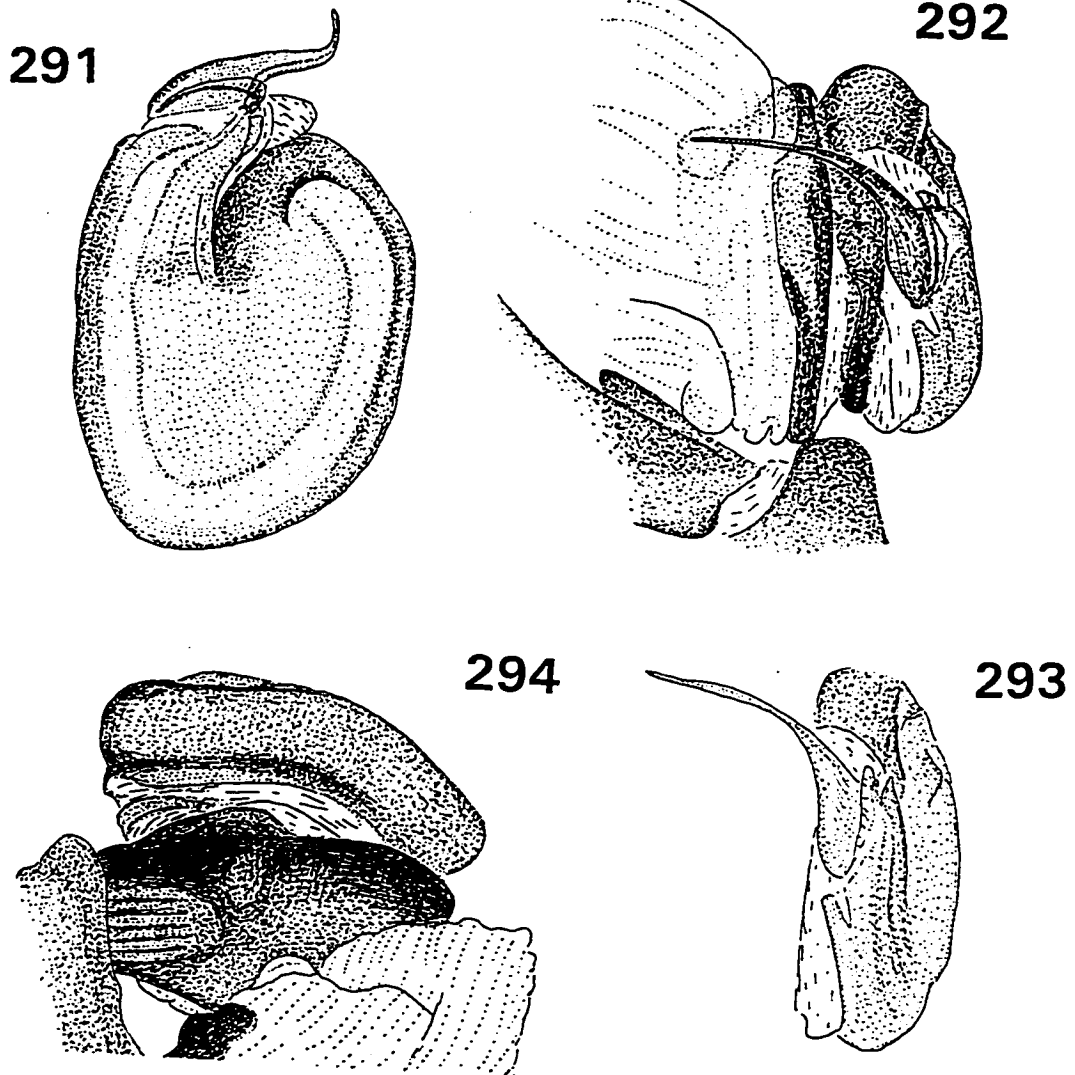
Figures 277-280: Cocalus frenatus (= Gelotia argenteolimbata). Left male palp.



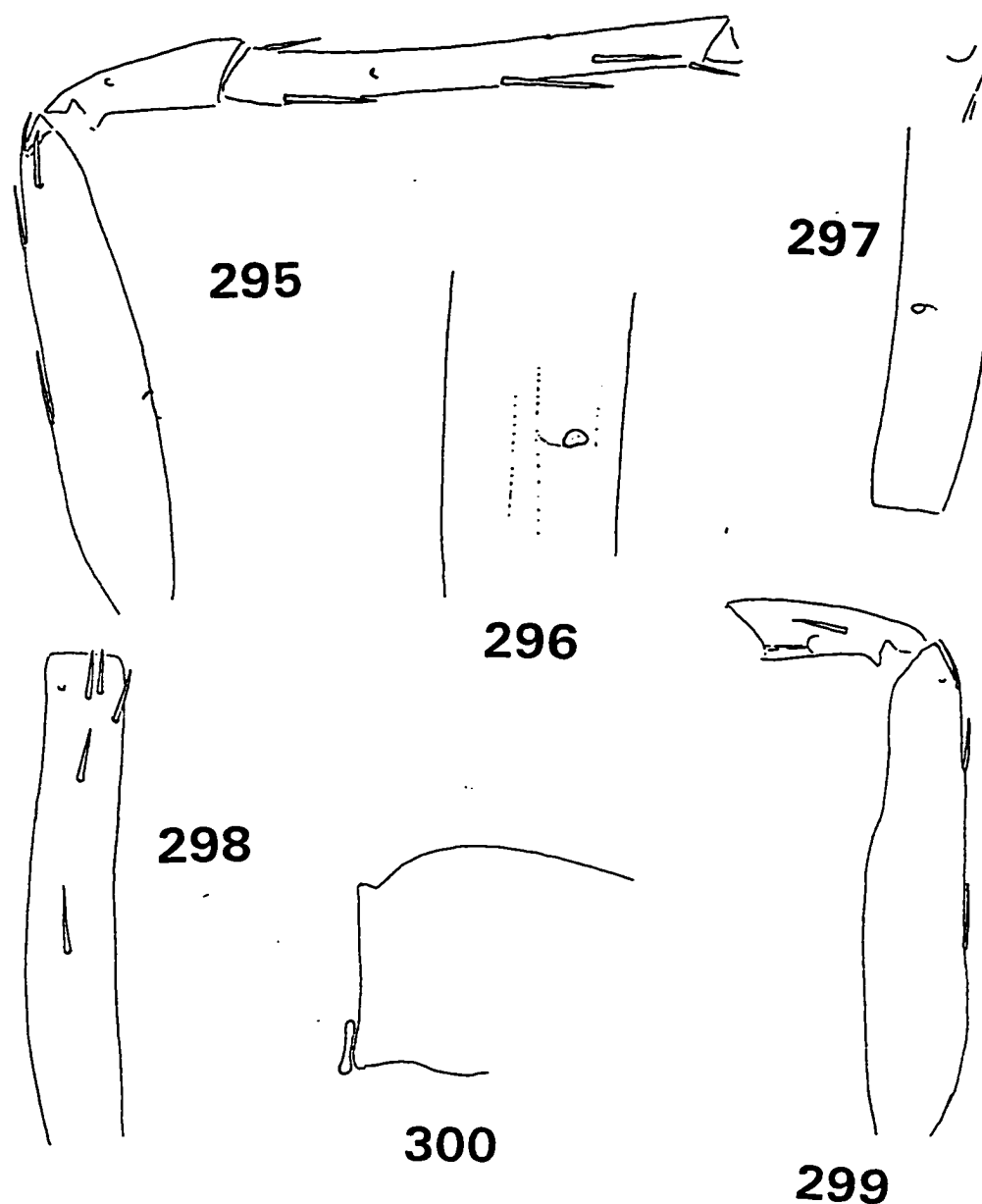
Figures 281-285: Cocalus frenatus (= Gelotia argenteolimbata). 281-282. Mlae left leg I. 283. Femur. 284. Patella and tibia. 285. Intercheliceral sclerite and chelicerae.



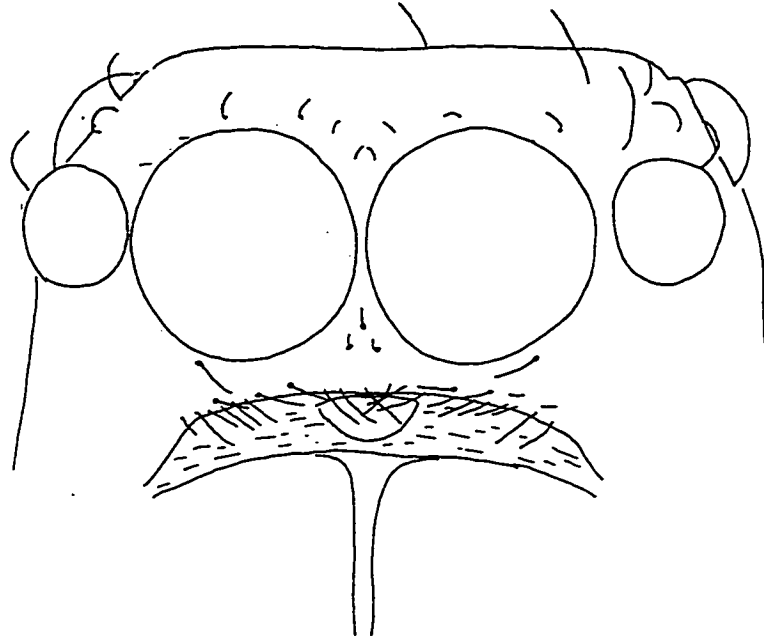
Figures 286-290: Cocalus (=Gelotia) bimaculata. Left male palp (288-290 detail).



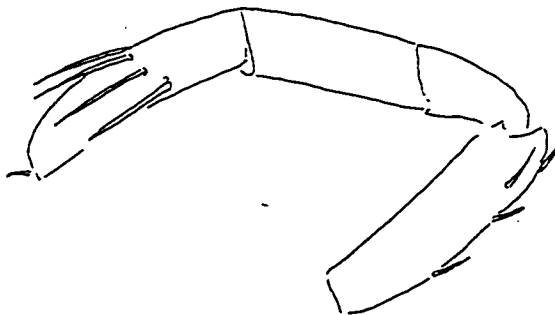
Figures 291-294: Cocalus (=Gelotia) bimaculata. Left male palp, expanded.



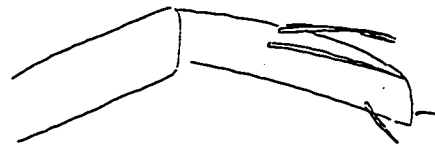
Figures 295-299: Cocalus (=Gelotia) bimaculata. 295. Male left leg I. 296-299. Femur I (296 femoral organ). 300. Intercheliceral sclerite and chelicerae.



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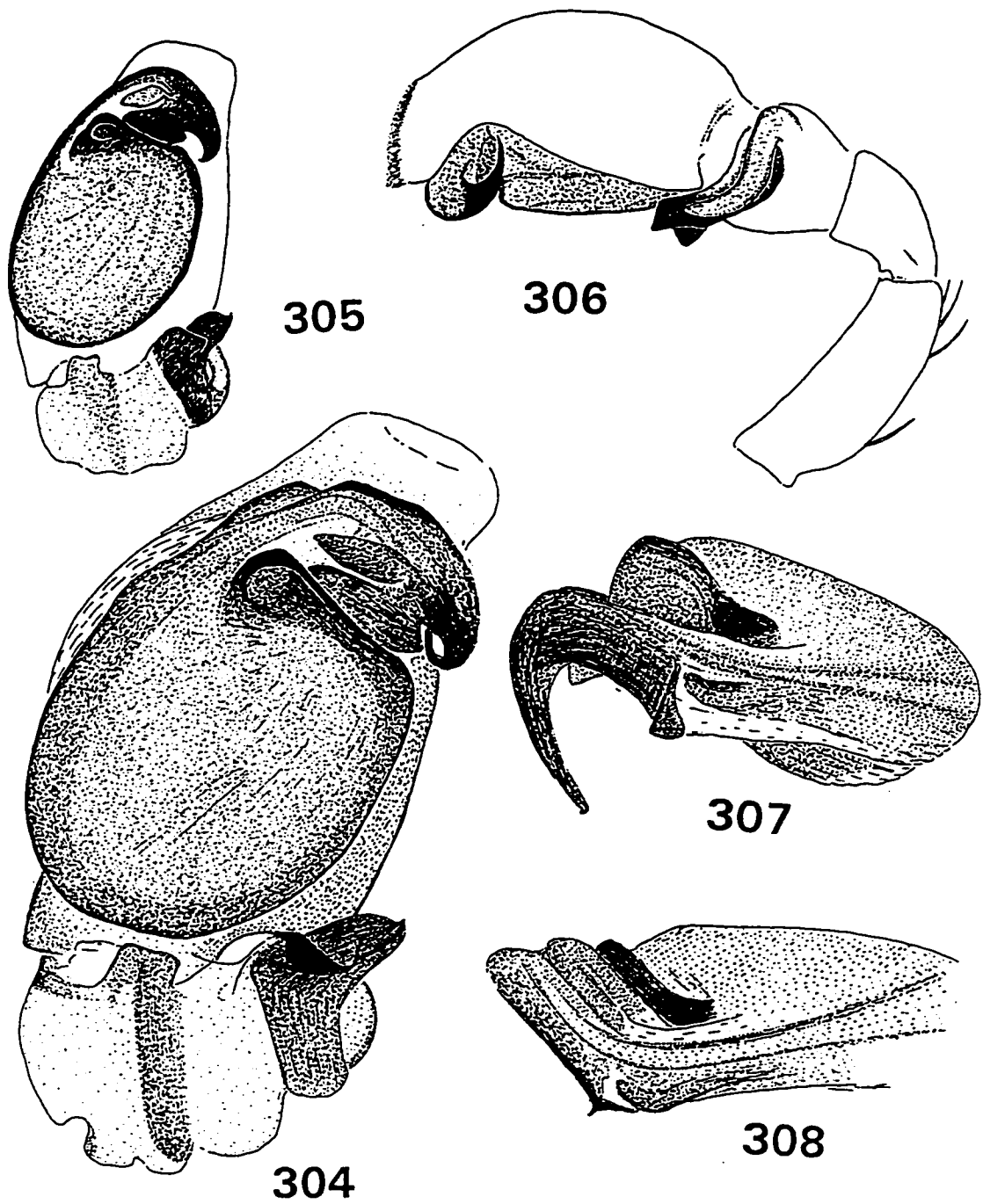


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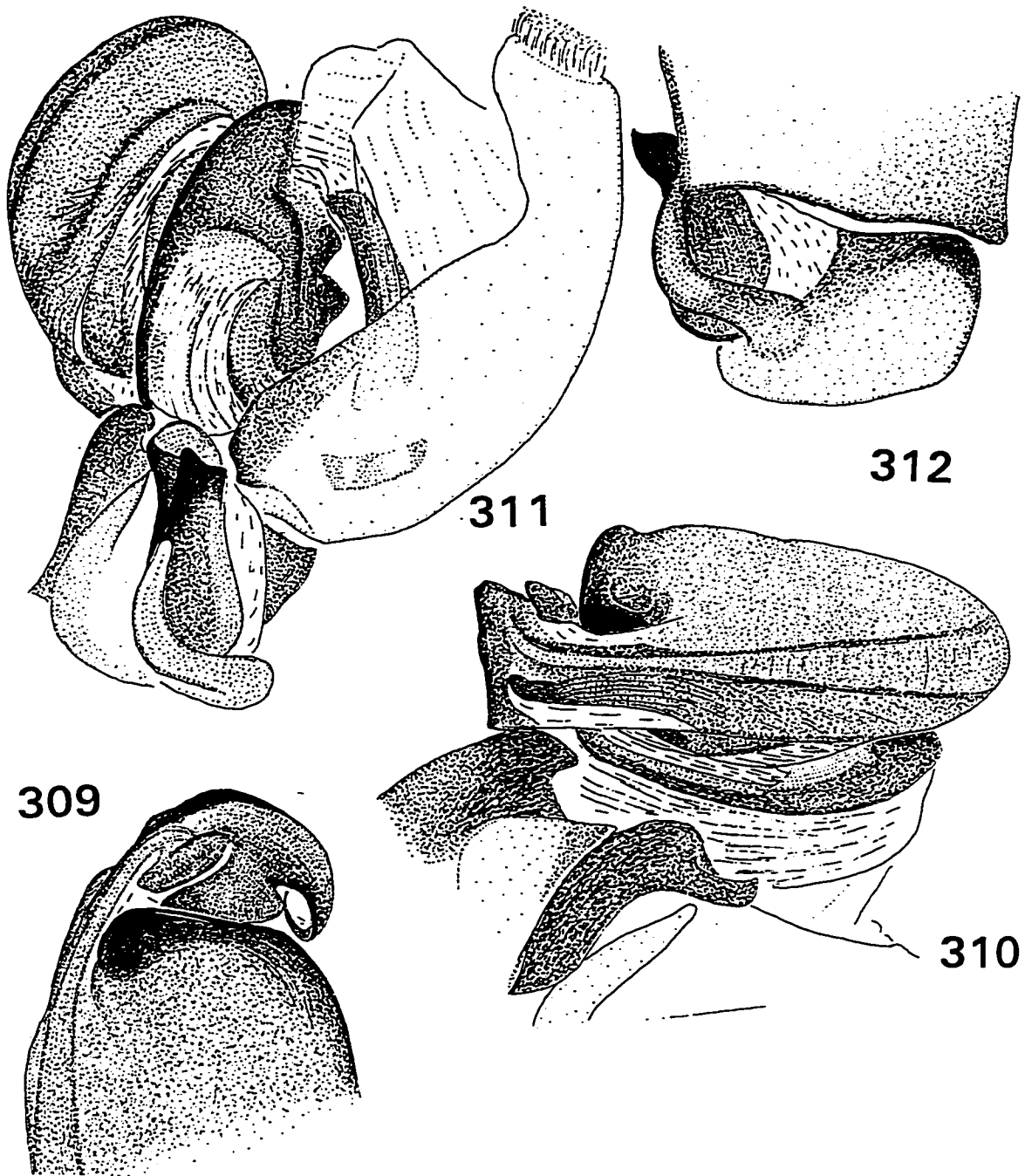


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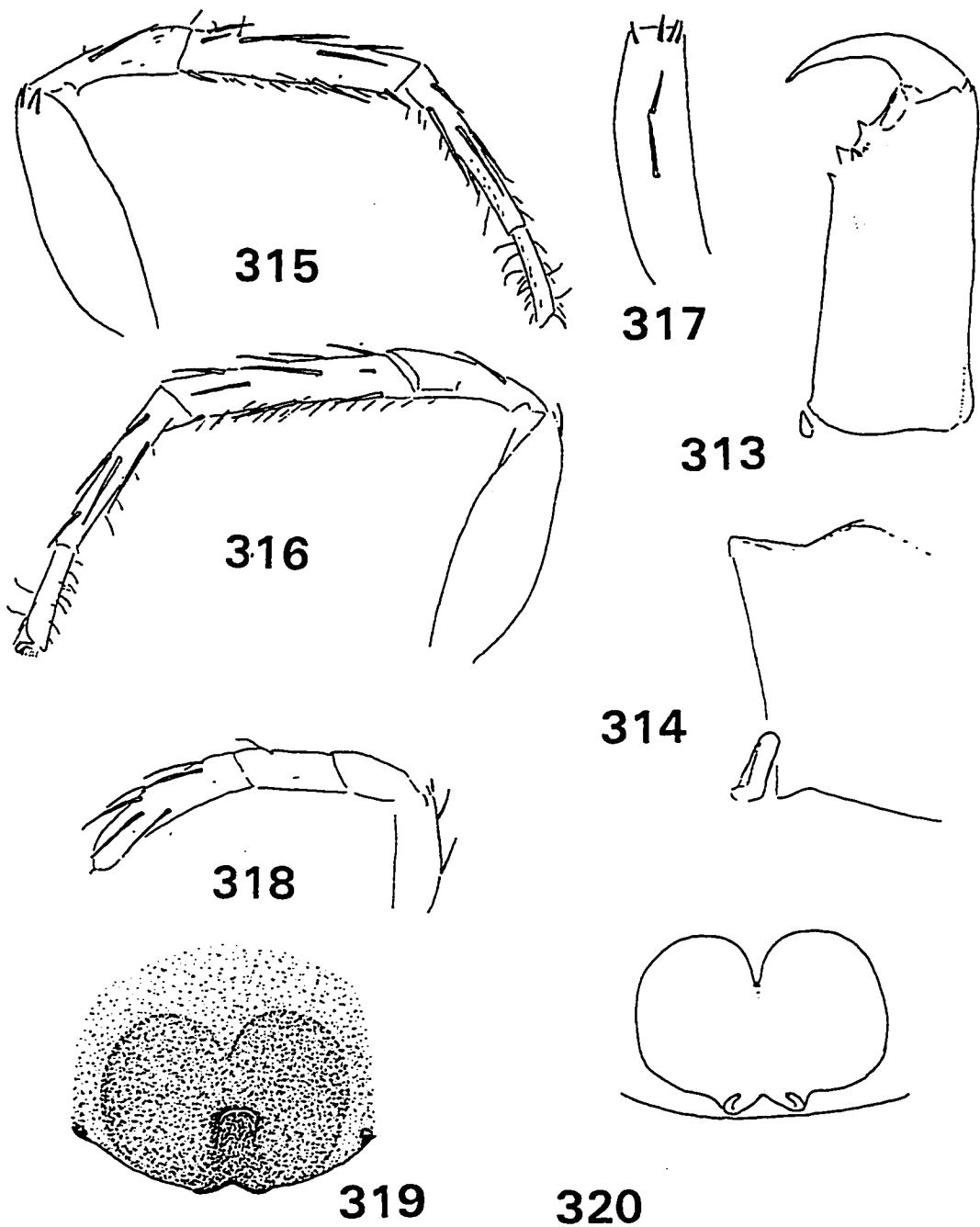
Figures 301-303: Cocalus (=Gelotia) bimaculata. 301. Face.
302-303. Left female palp.



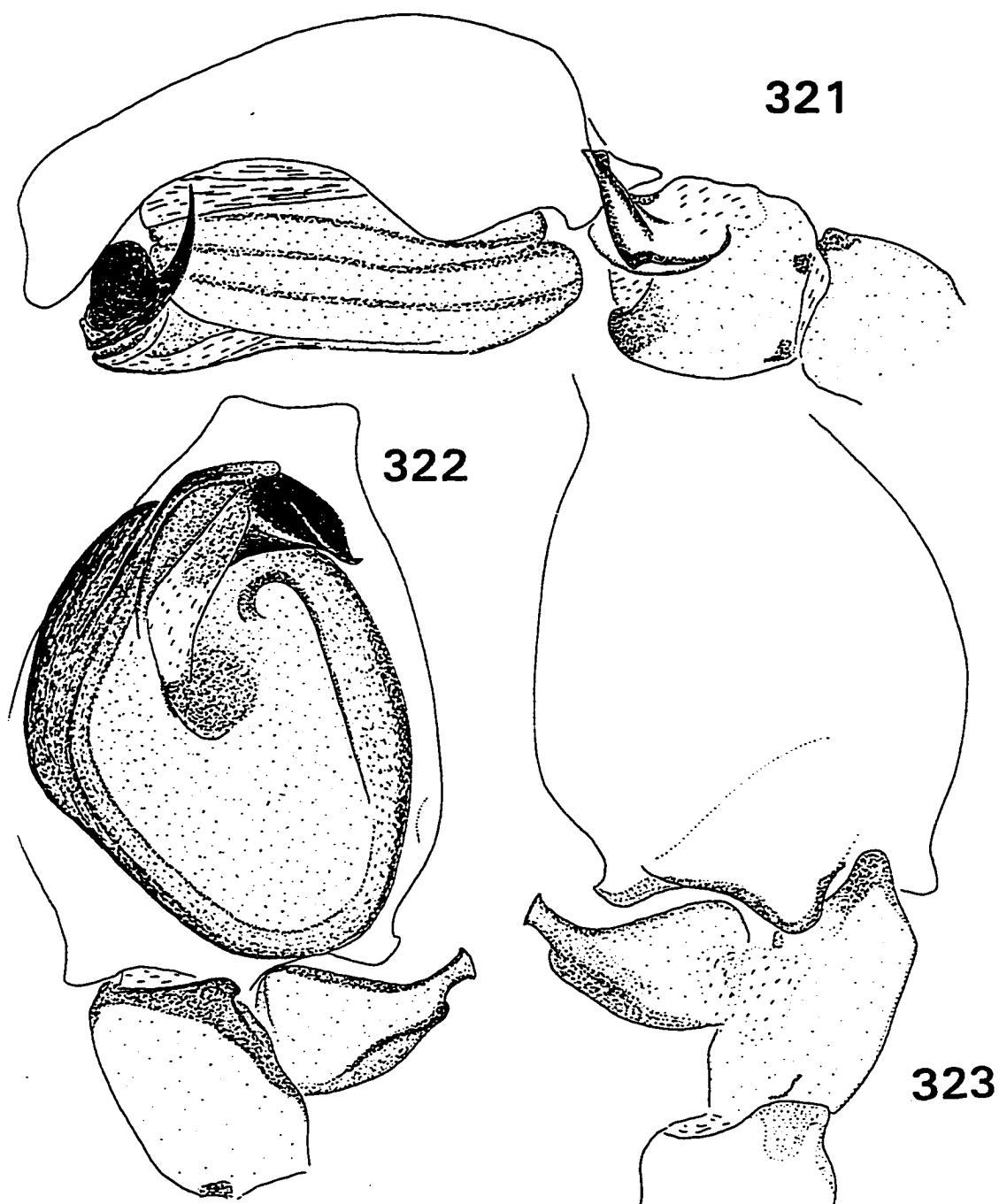
Figures 304-308: Cocalus concolor (=gibbosus). Left male palp.



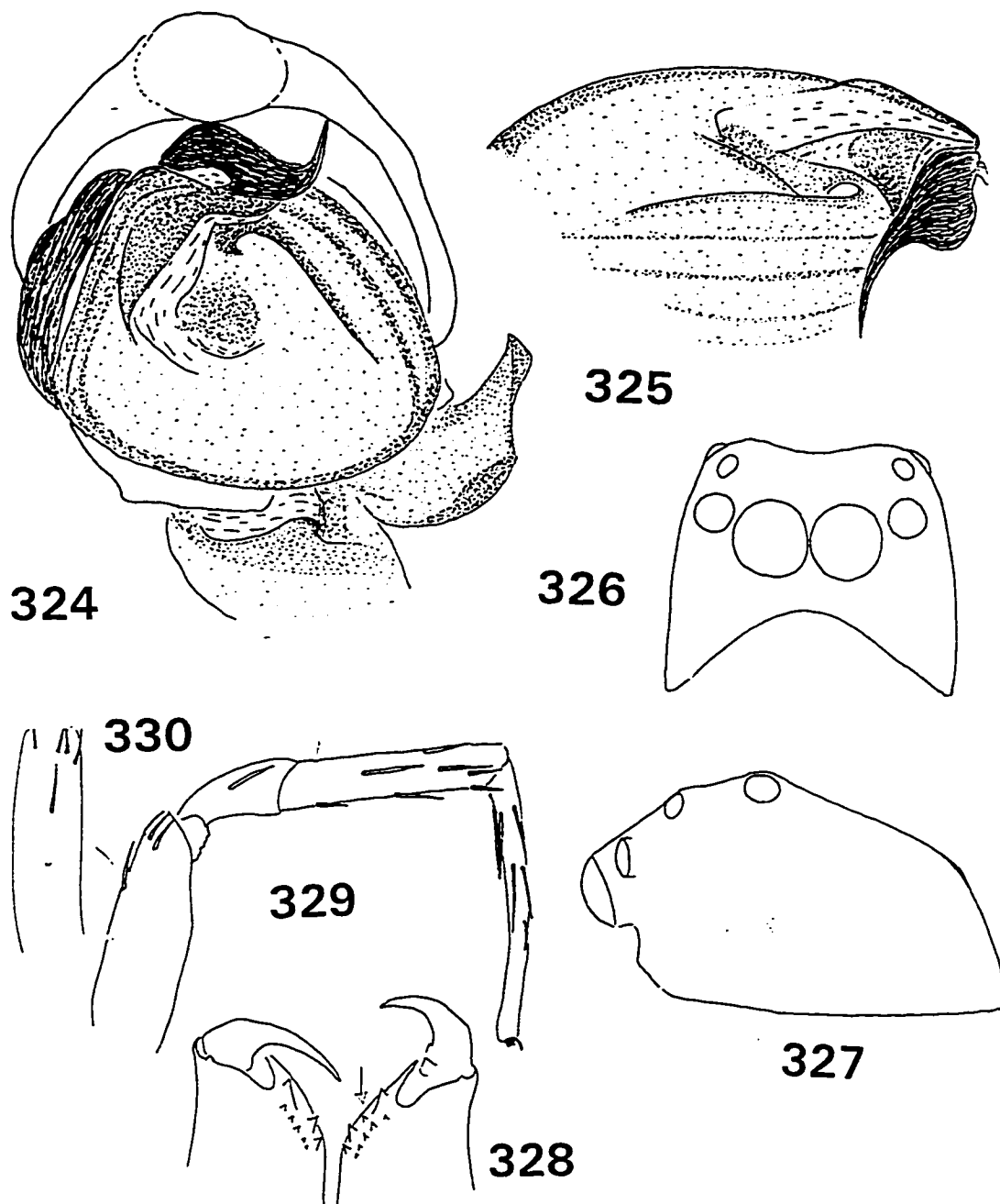
Figures 309-312: *Cocalus concolor* (=gibbosus). Left male palp, expanded.



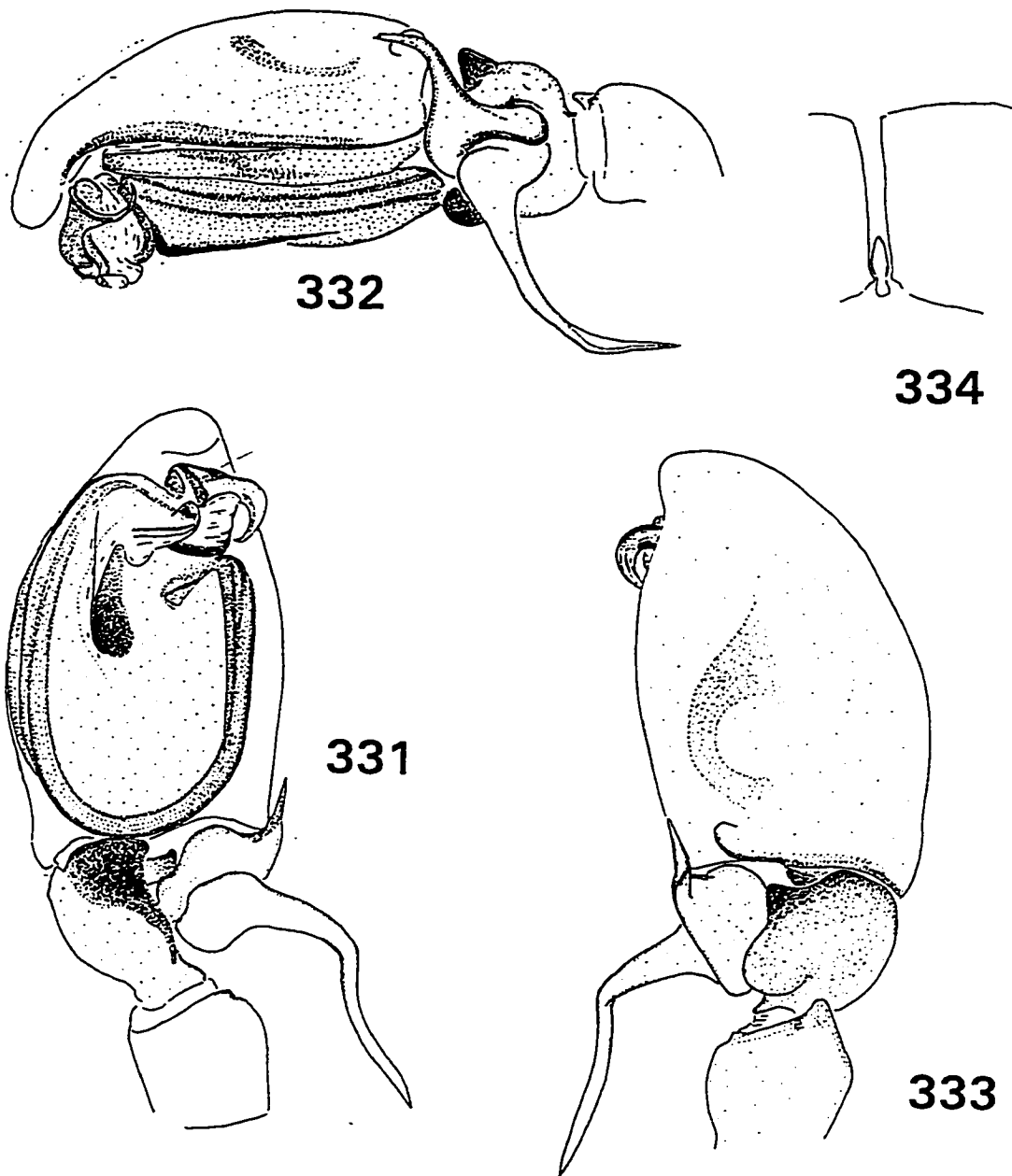
Figures 313-320: *Cocalus concolor* (=gibbosus). 313. Chelicerae. 314. Intercheliceral sclerite and chelicerae. 315-316. Male left leg I. 317. Femur I. 318. Female left palp. 319. Epigynum. 320. Spermathecae and ducts, dorsal.



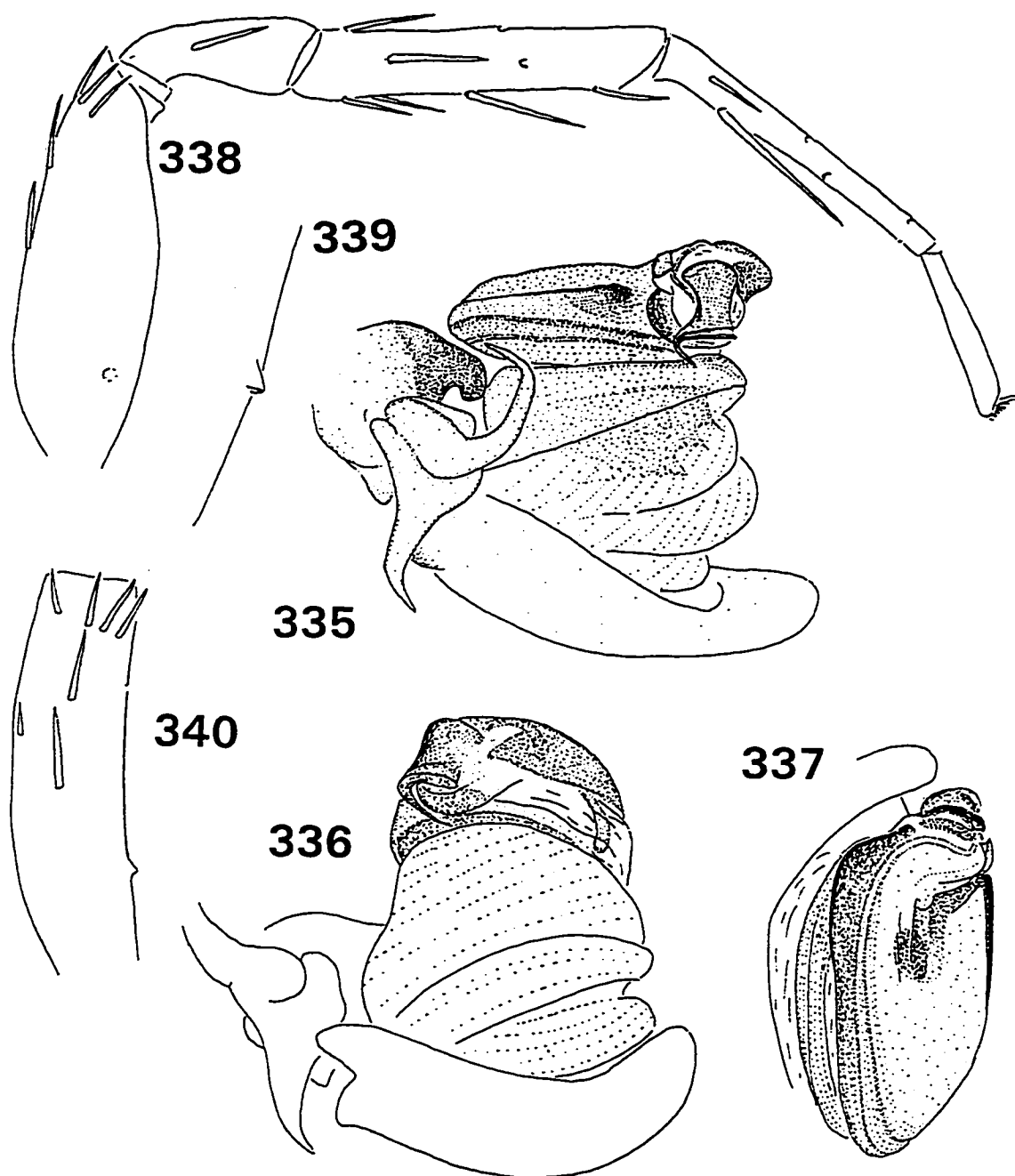
Figures 321-323: Cocalus (=Gelotia) robusta. Left male palp.



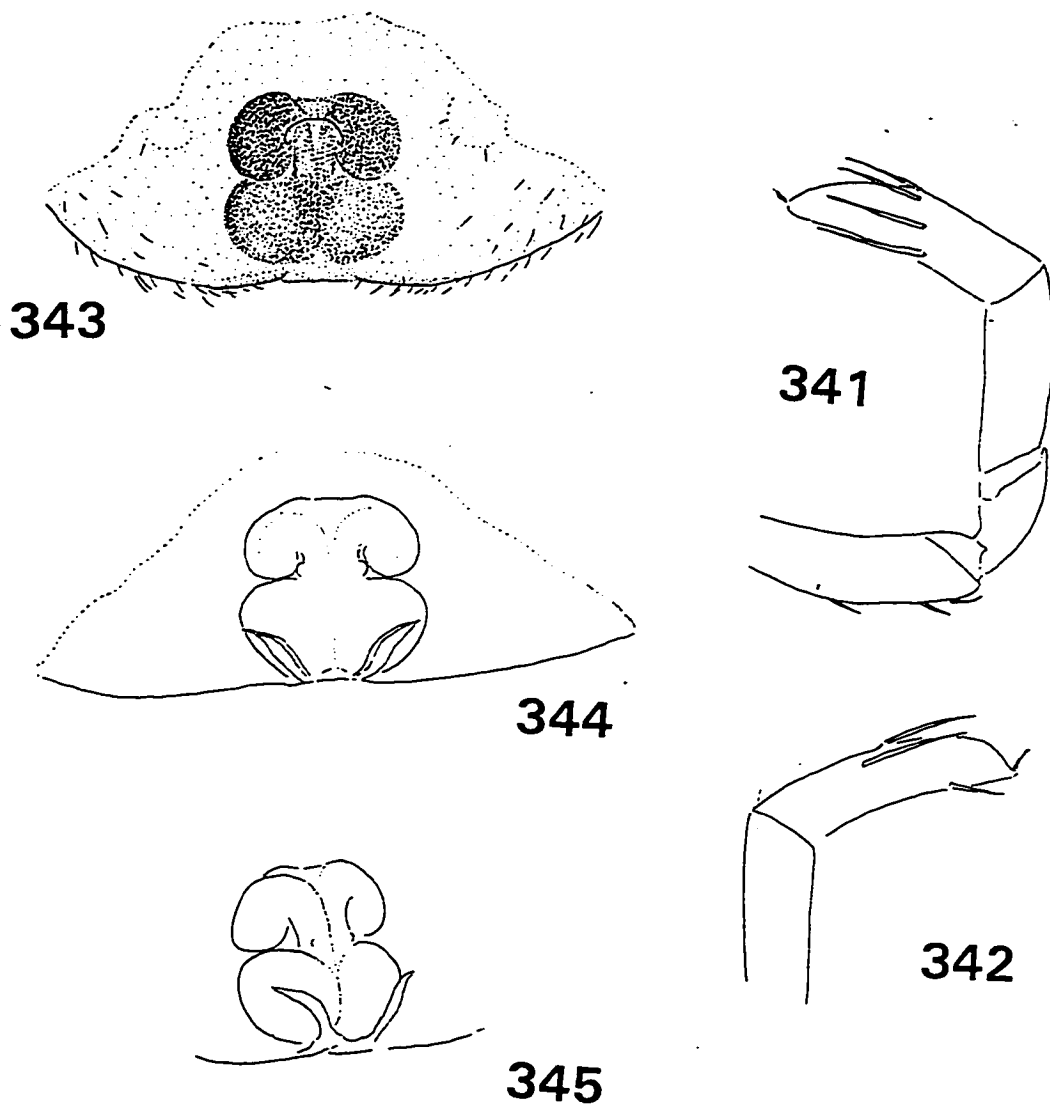
Figures 324-328: Cocalus (=Gelotia) robusta. 324-325. Left male palp. 326. Face. 327. Cephalothorax, lateral. 328. Chelicerae. 329. Male left leg I. 330. Femur I.



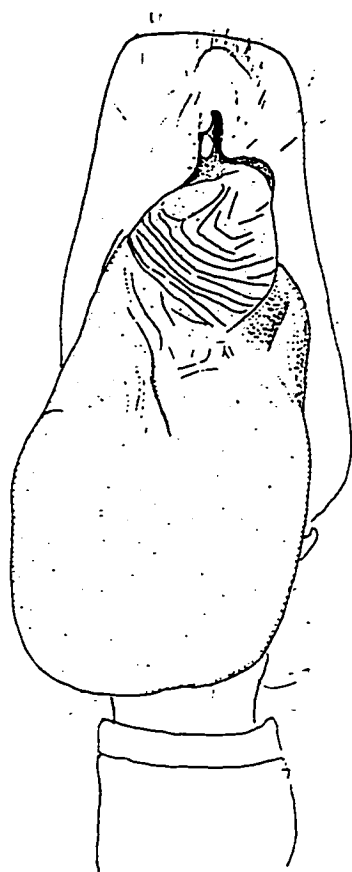
Figures 331-334: *Cocalus* (=Gelotia) *syringopalpis*. 331-333. Left male palp. 334. Intercheliceral sclerite and chelicerae.



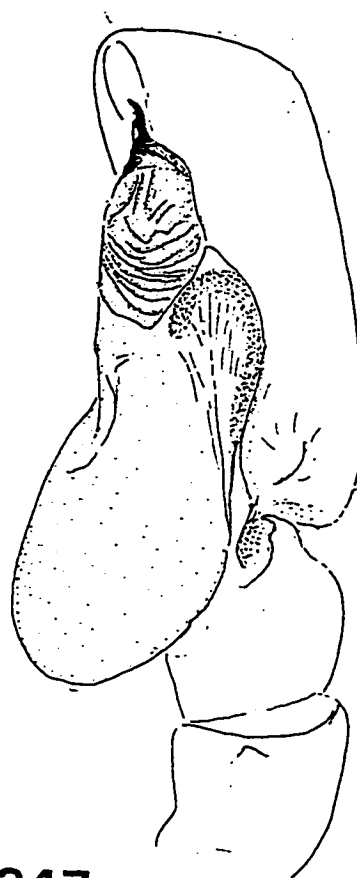
Figures 335-340: Cocalus (=Gelotia) syringopalpis. 335-337. Left male palp, expanded. 338. Left male leg I. 339. Femoral organ. 340. Left femur I.



Figures 341-345: Cocalus (=Gelotia) syringopalpis. 341-342. Left female palp. 343. Epigynum. 344-345. Spermathecae and ducts, dorsal.

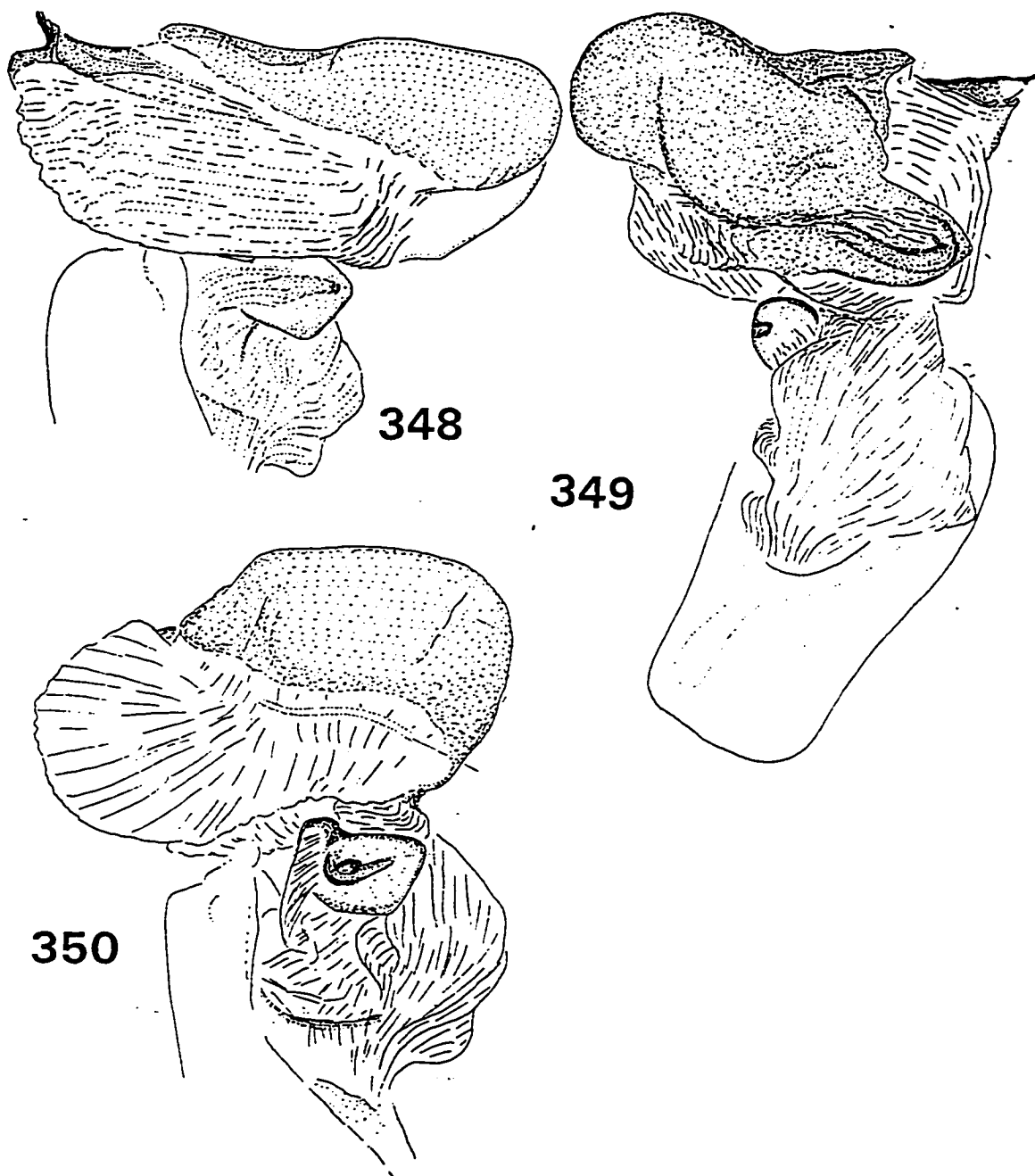


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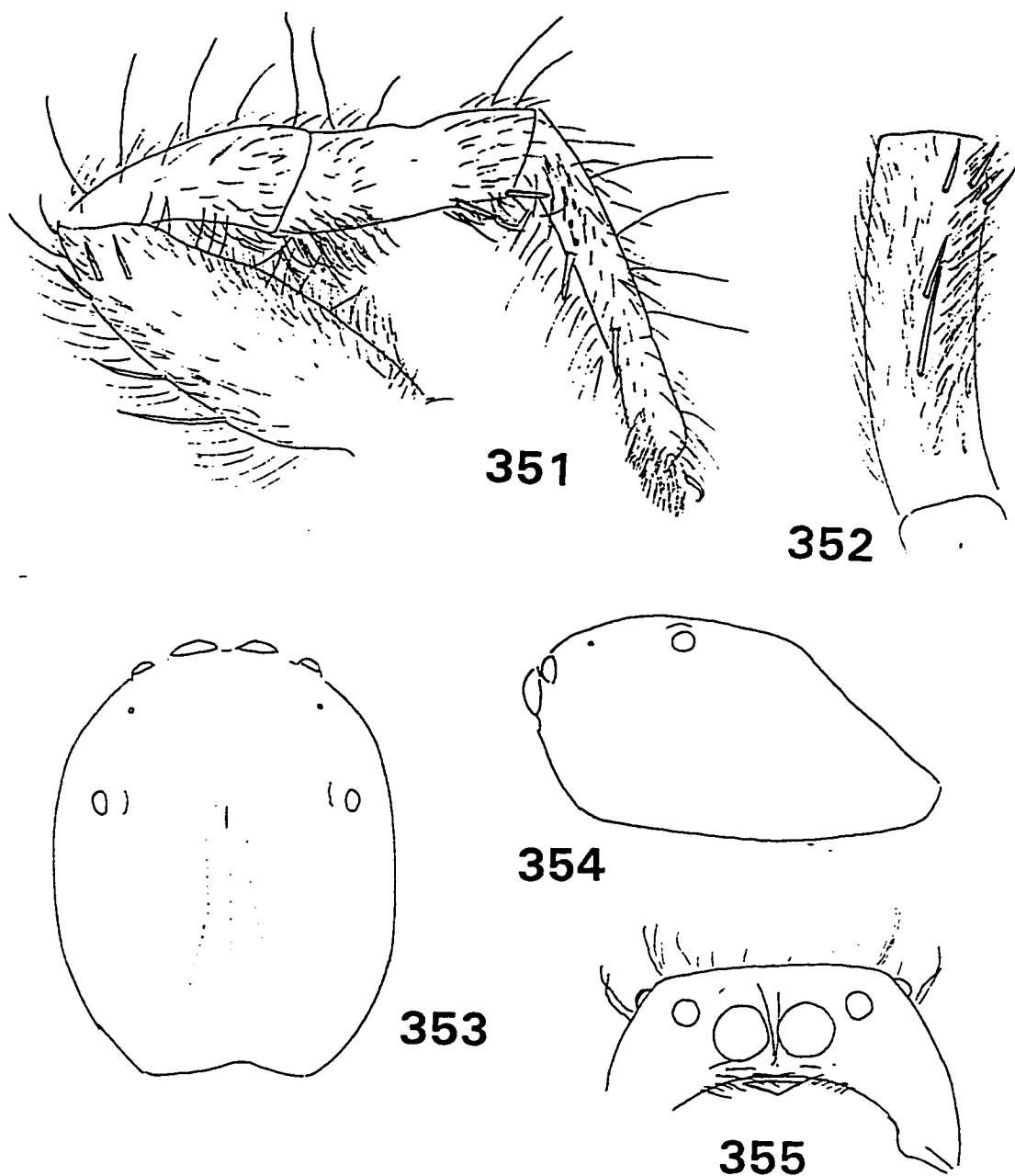


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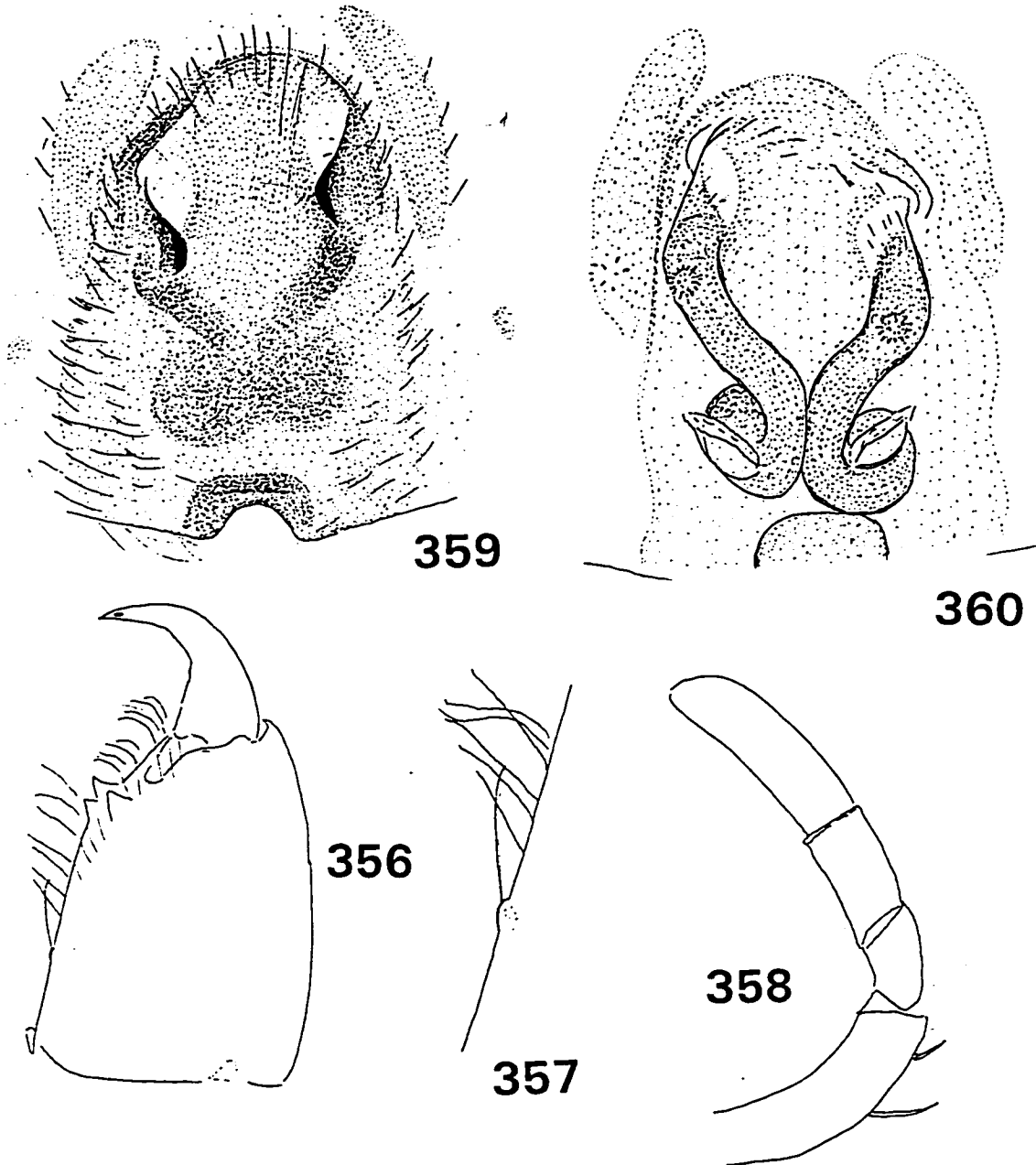
Figures 346-347: *Phidippus audax*. Left male palp.



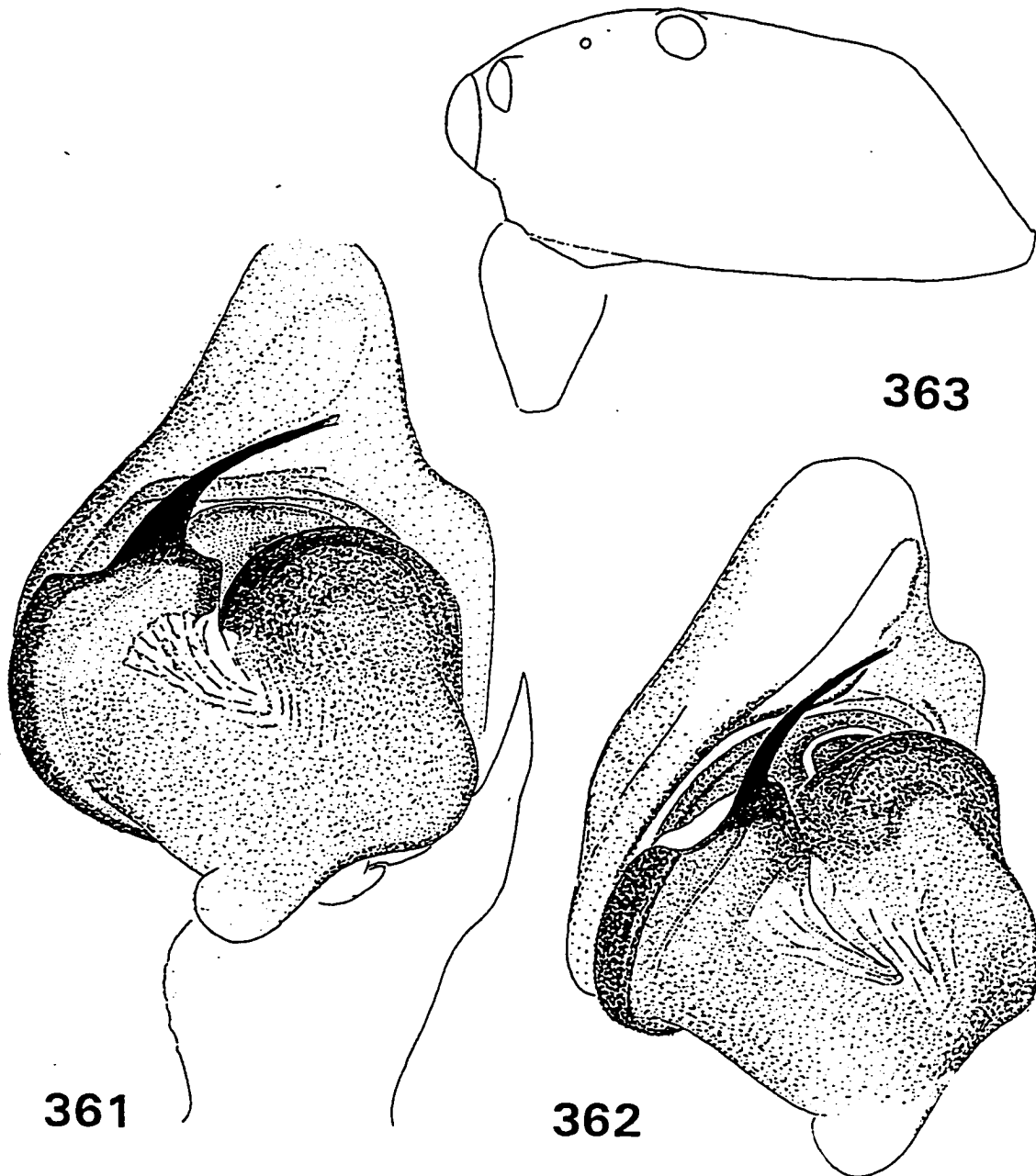
Figures 348-350: *Phidippus audax*. Left male palp, expanded.



Figures 351-355: Phidippus audax. 351. Left male leg I. 352. Femur I. 353. Cephalothorax, dorsal. 354. Cephalothorax, lateral. 355. Face.



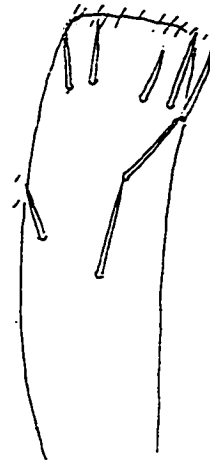
Figures 356-360: Phidippus audax. 356. Female chelicerae. 357. Cheliceral mound. 358. Left female palp. 359. Epigynum. 360. Spermathecae and ducts, dorsal.



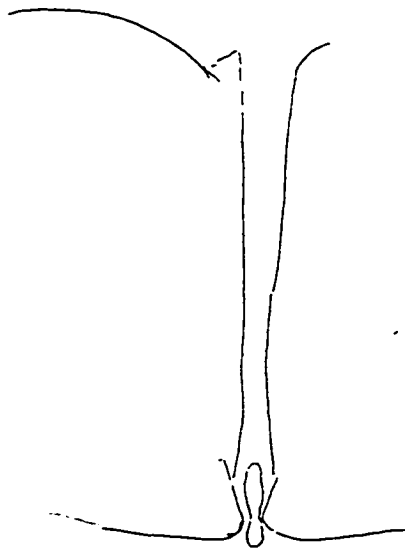
Figures 361-363: Plexippus paykulli. 361-362. Left male palp. 363. Cephalothorax, lateral.



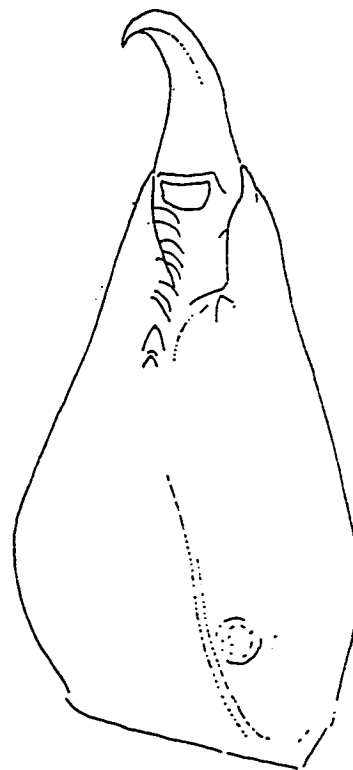
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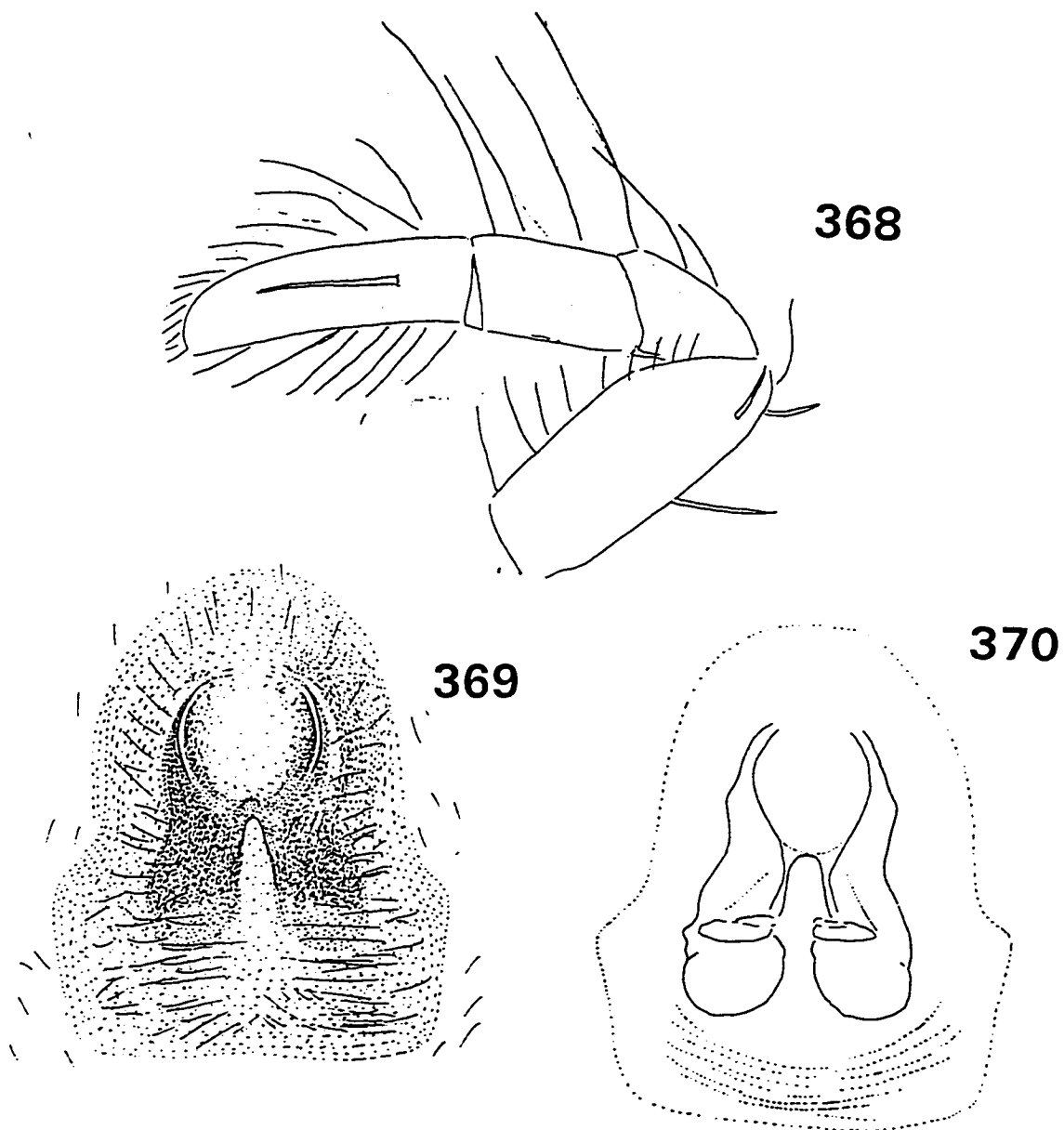


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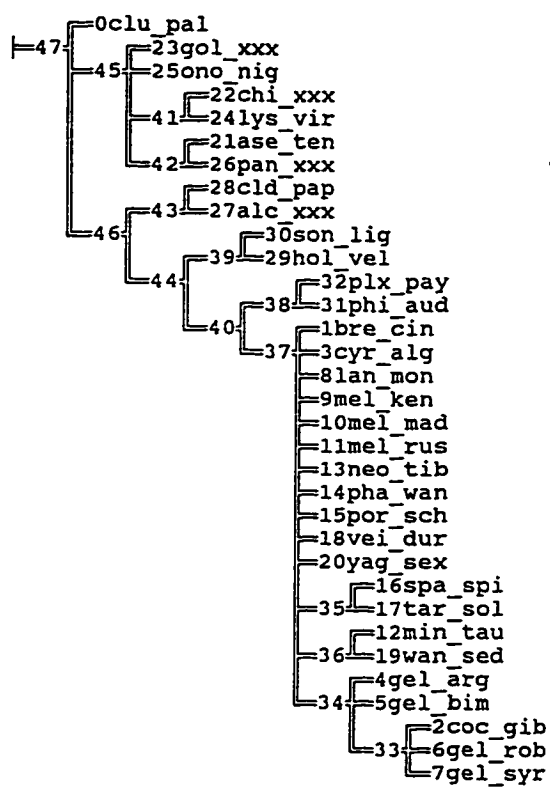


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Figures 364-367: Plexippus paykulli. 364-365. Chelicerae (365 cheliceral mound). 366. Intercheliceral sclerite and chelicerae. 367. Male left leg II.



Figures 368-370: Plexippus paykulli. 368. Left female palp. 369. Epigynum. 370. Spermathecae and ducts.



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Figure 371: Salticid higher phylogeny. Strict consensus tree of 338 shortest trees (length 149, consistency index 0.56, retention index 0.76) obtained from analysis of equally weighted data.

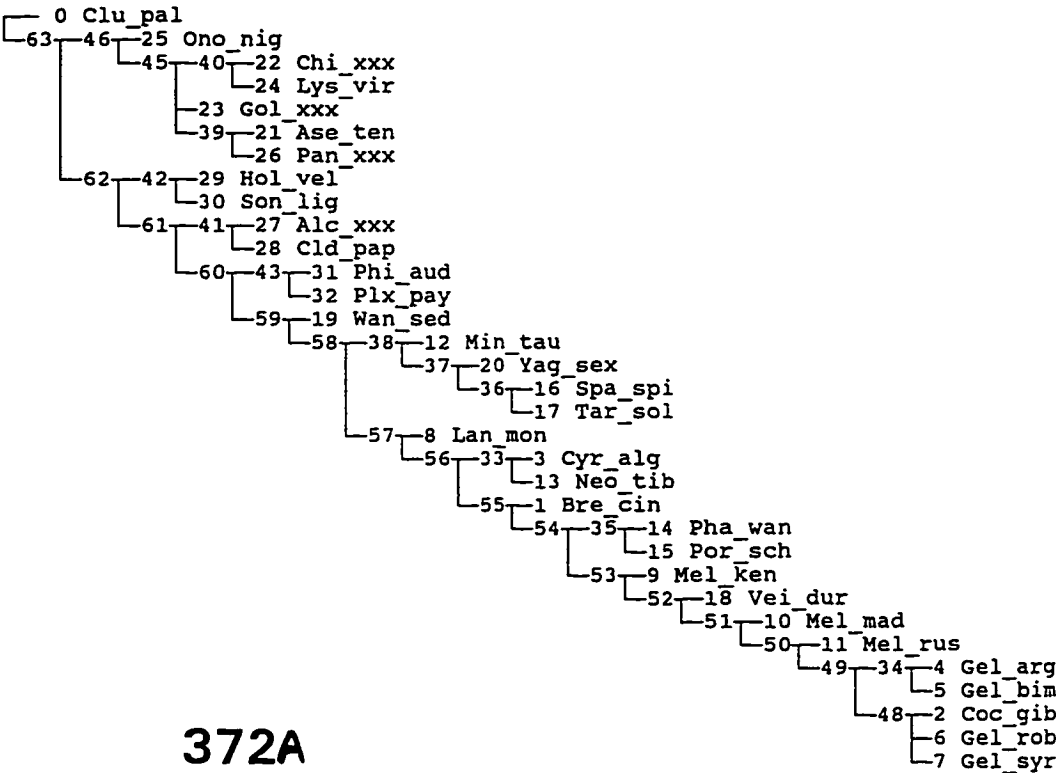
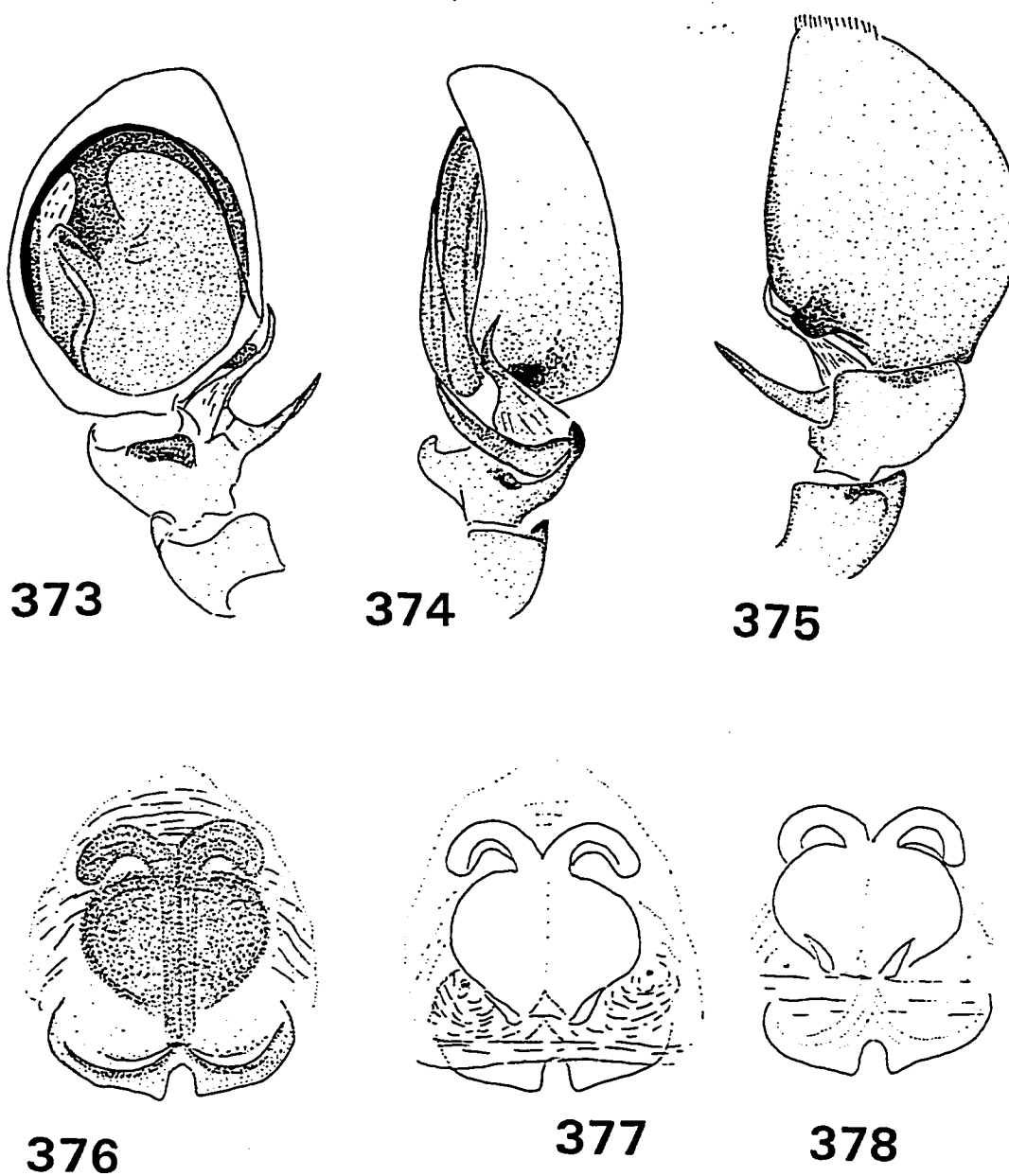
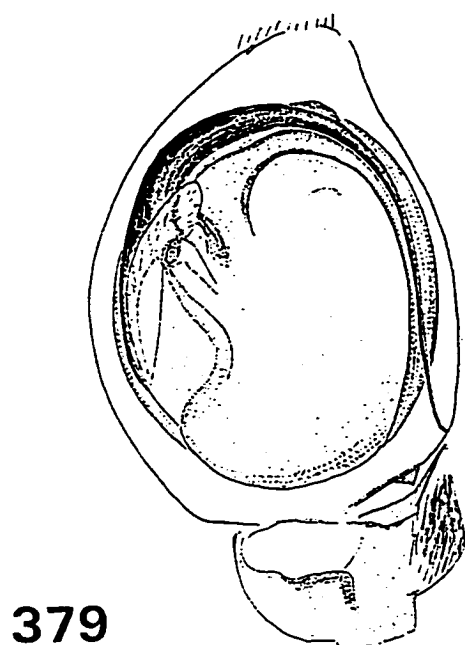


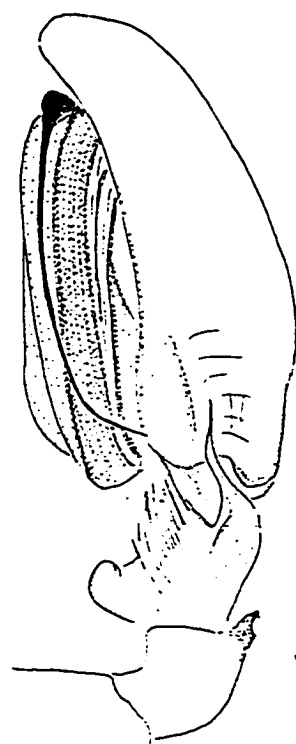
Figure 372A: Salticid higher phylogeny. Single fittest tree (total fit 463.7) obtained under implied weights.



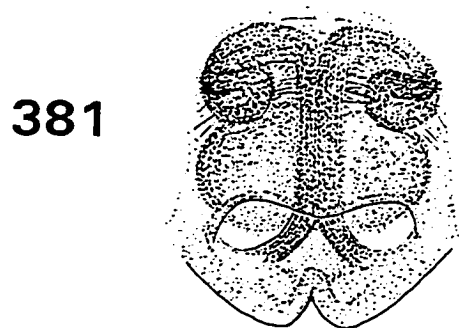
Figures 373-378: Cyrba algerina. 373-375. Left male palp. 376. Epigynum. 377-378. Spermathecae and ducts (dorsal).



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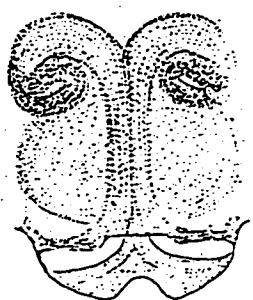
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Figures 379-382: *Cyrba india*. 379-380. Left male palp. 381. Epigynum. 382. Spermathecae and ducts (dorsal).

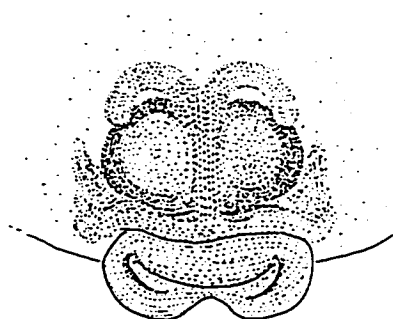
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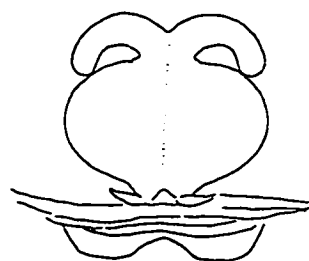
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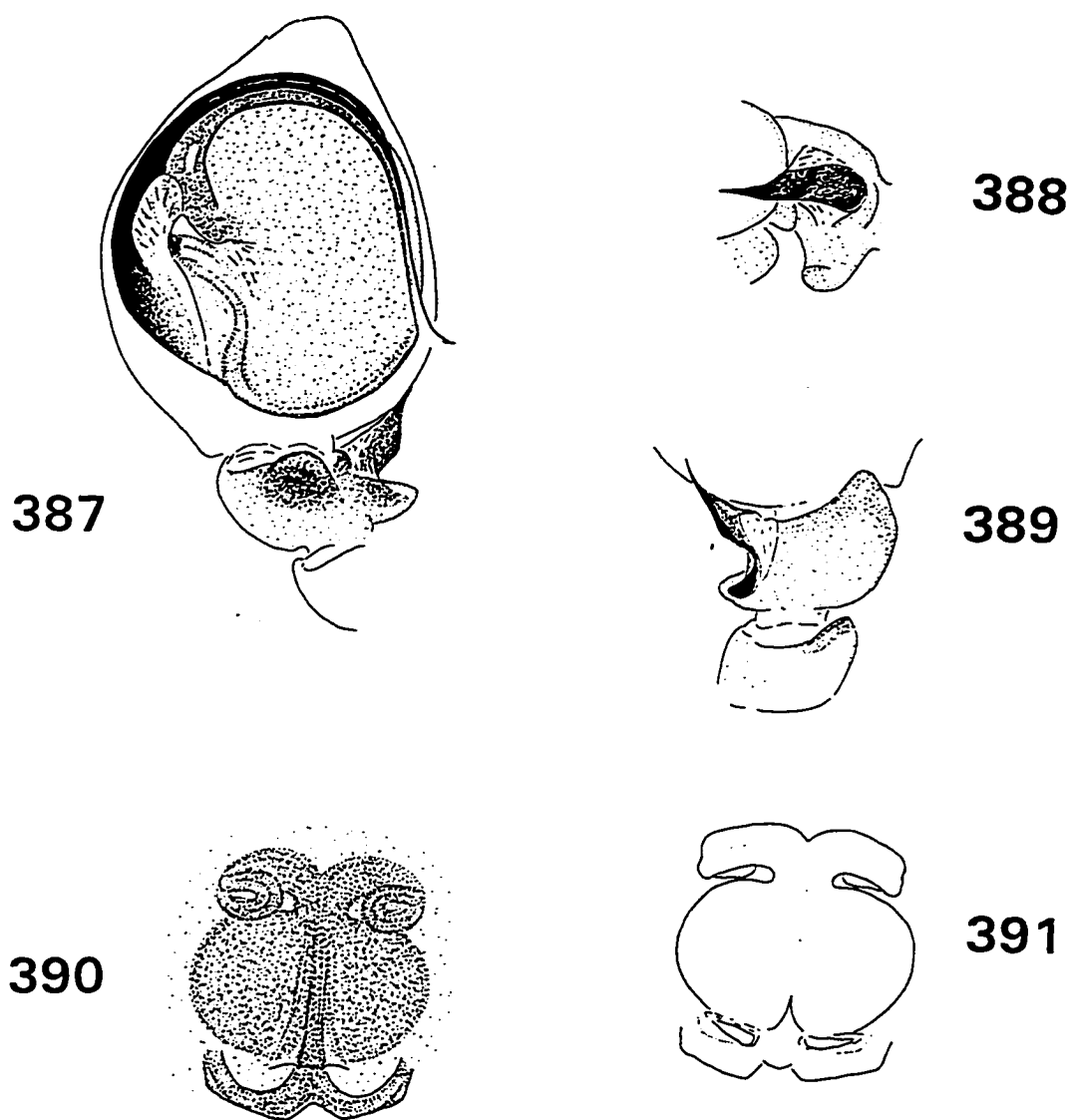
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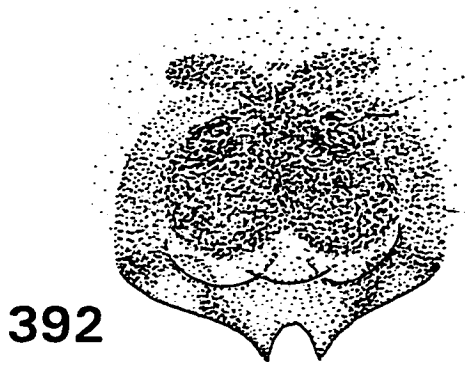
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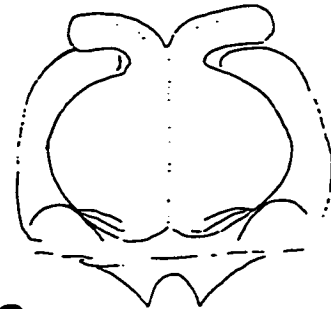
Figures 383-384: Cyrba ocellata. 383. Epigynum. 384. Spermathecae and ducts (dorsal). Figures 385-386: Cyrba kenya. 385. Epigynum. 386. Spermathecae and ducts dorsal.



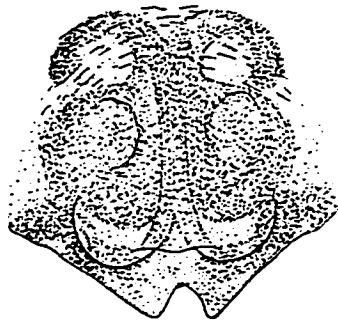
Figures 387-391: *Cyrba legendrei*. 387-388. Left male palp. 390. Epigynum. 391. Spermathecae and ducts (dorsal).



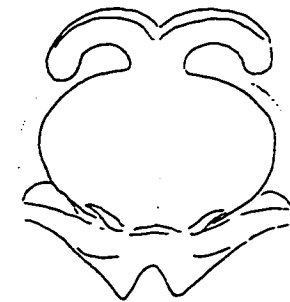
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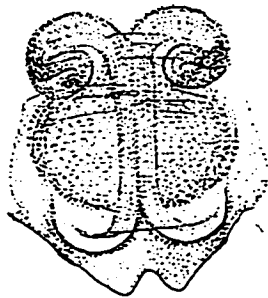
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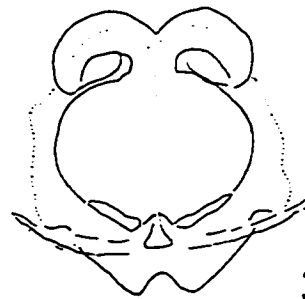
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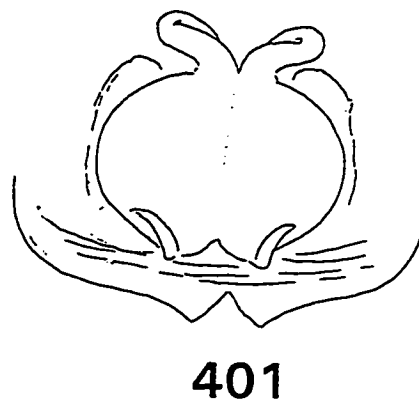
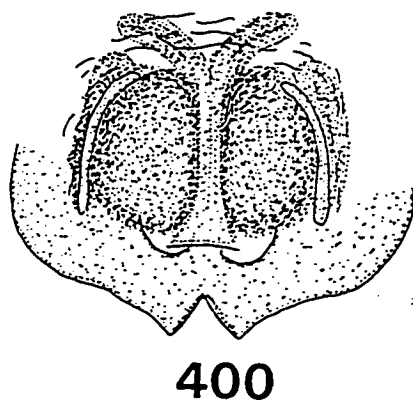
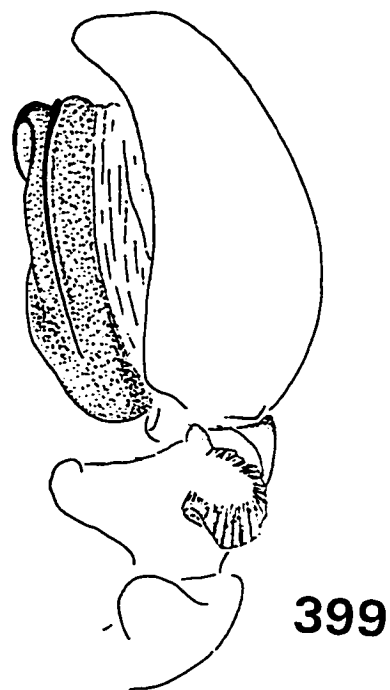
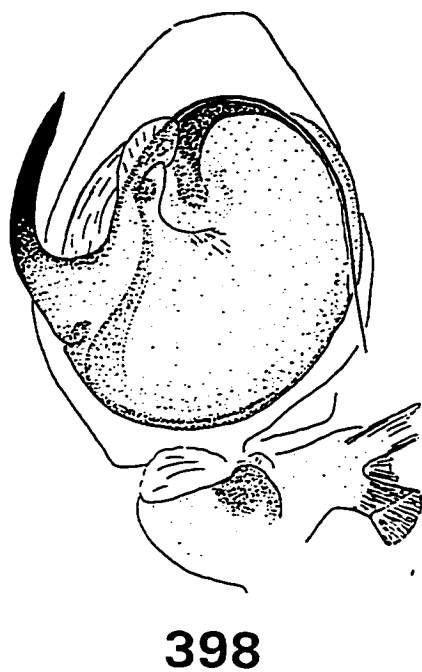


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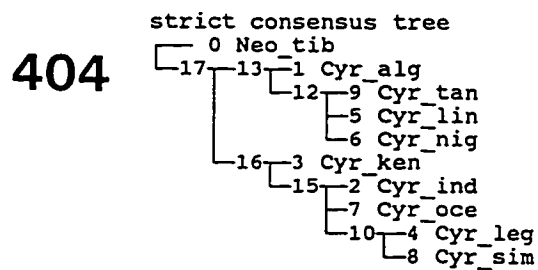
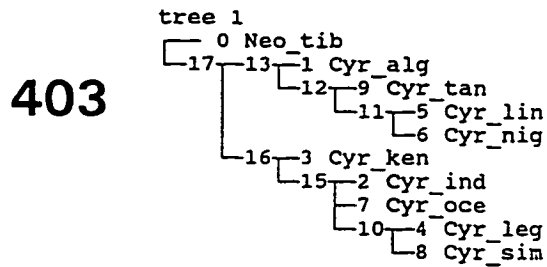
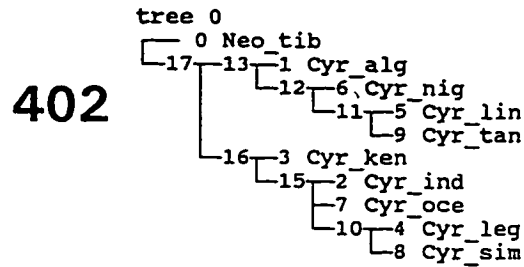


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Figures 392-393: Cyrba lineata. 392. Epigynum. 393. Spermathecae and ducts (dorsal). Figures 394-395: Cyrba tanzania. 394. Epigynum. 395. Spermathecae and ducts (dorsal). Figures 396-397: Cyrba simoni. 396. Epigynum. 397. Spermathecae and ducts (dorsal).



Figures 398-401: *Cyrba nigrimana*. 398-399. Left male palp. 400. Epigynum. 401. Spermathecae and ducts (dorsal).



Figures 402-404: Cladistics of *Cyrba* species. 402-403. Two shortest trees from unweighted data. Length 19 steps, consistency index 0.84, retention index 0.85. 404. Strict consensus tree of two shortest trees.

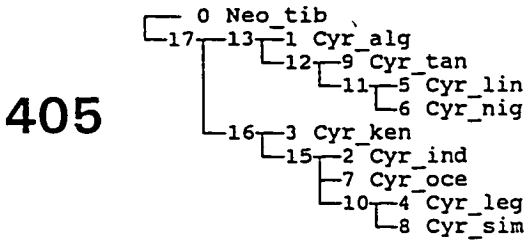


Figure 405: Cladistics of Cyrba species. Single fittest tree (total fit 83.5) under implied weights.

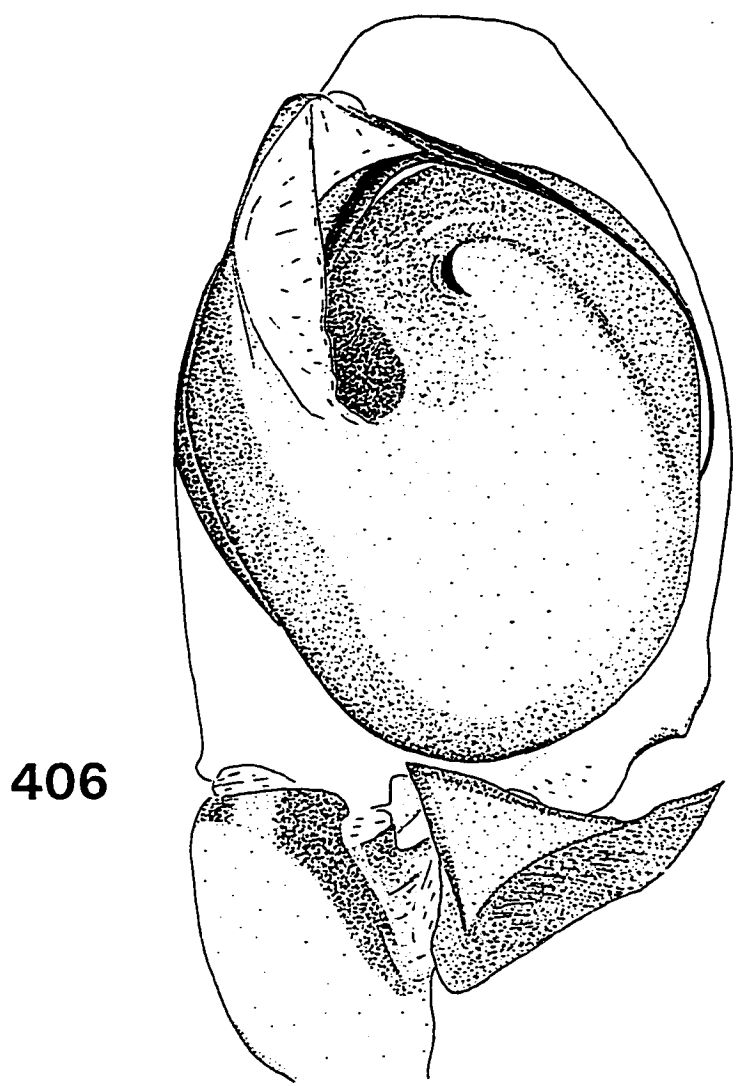
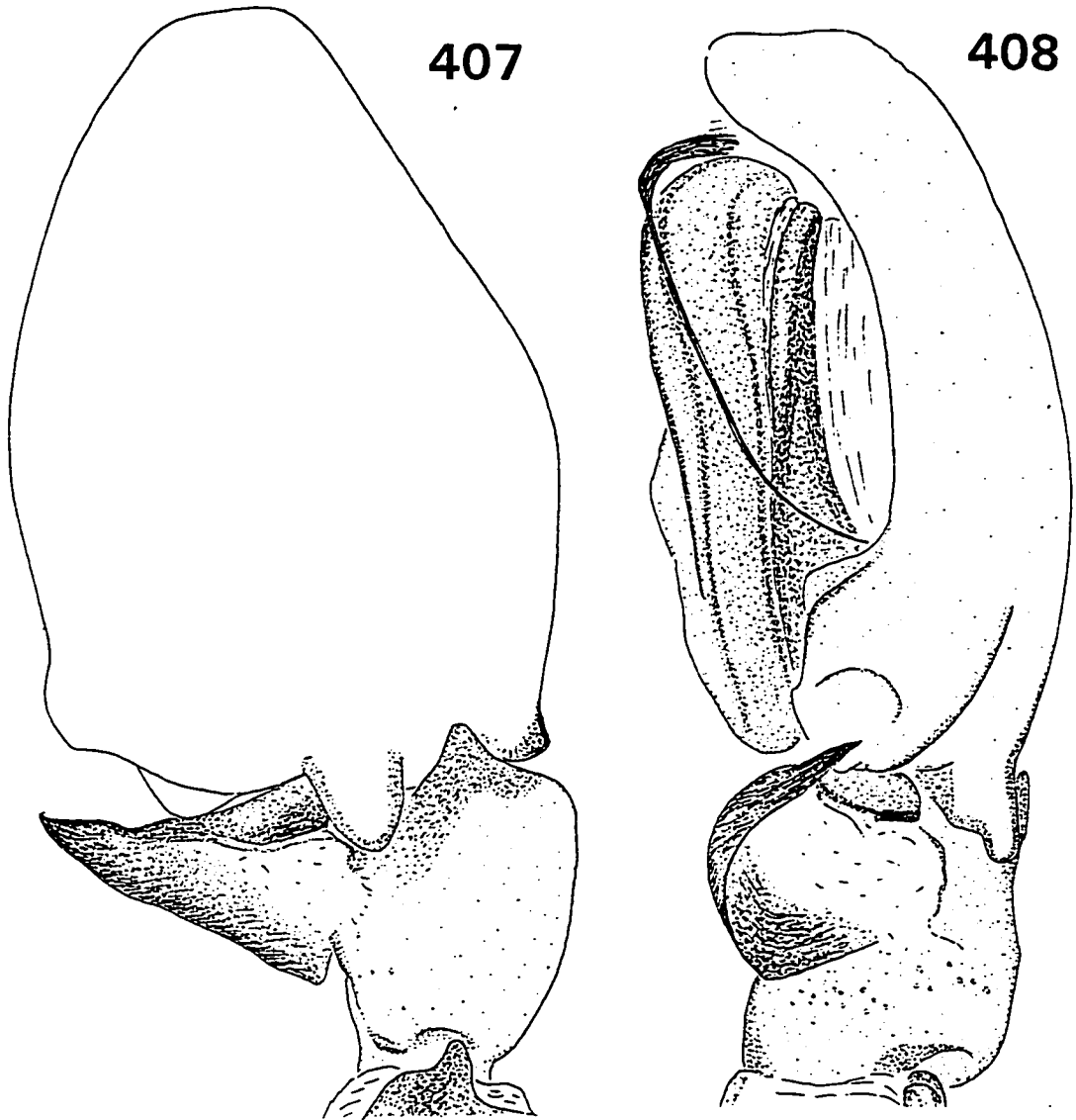
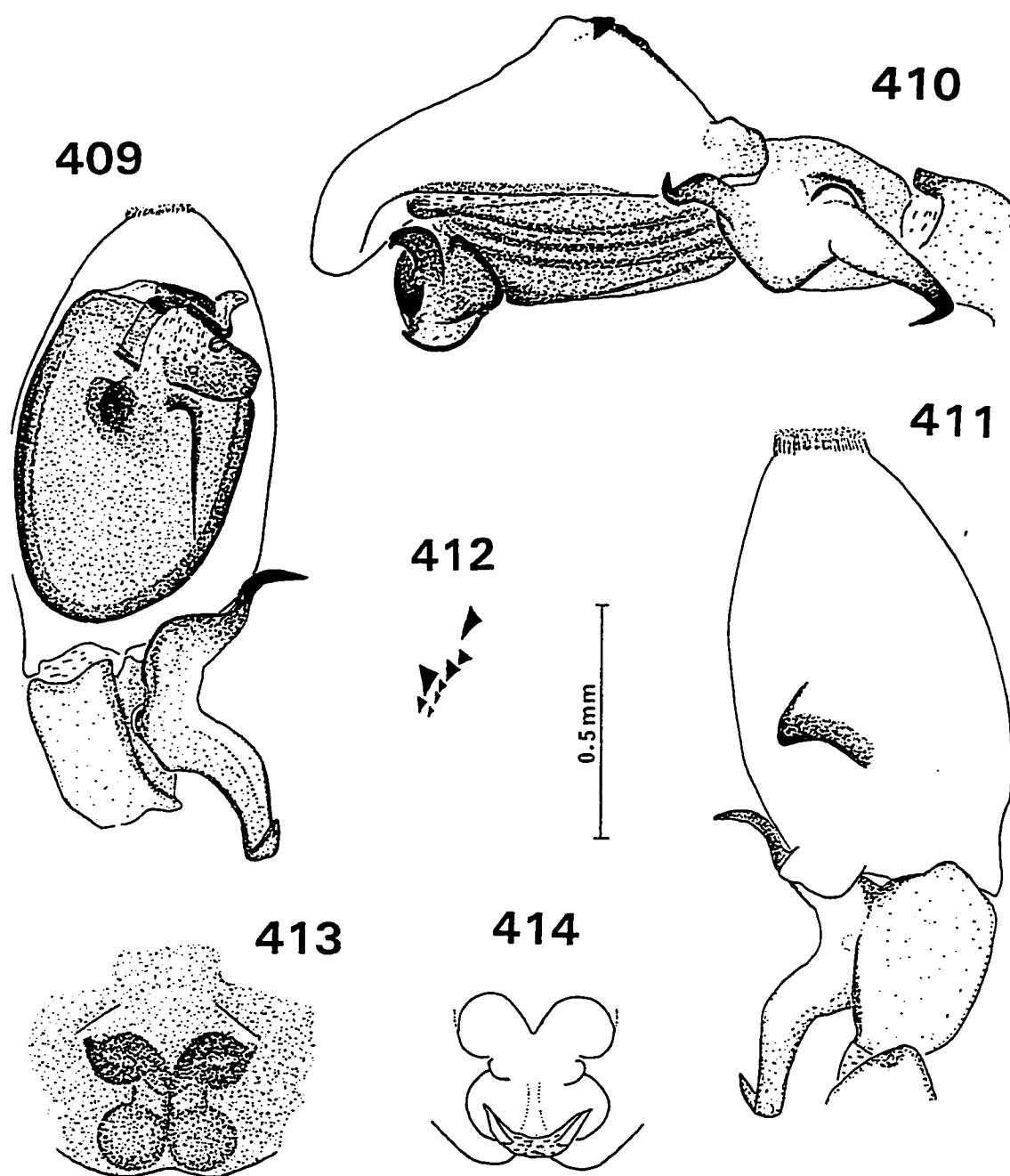


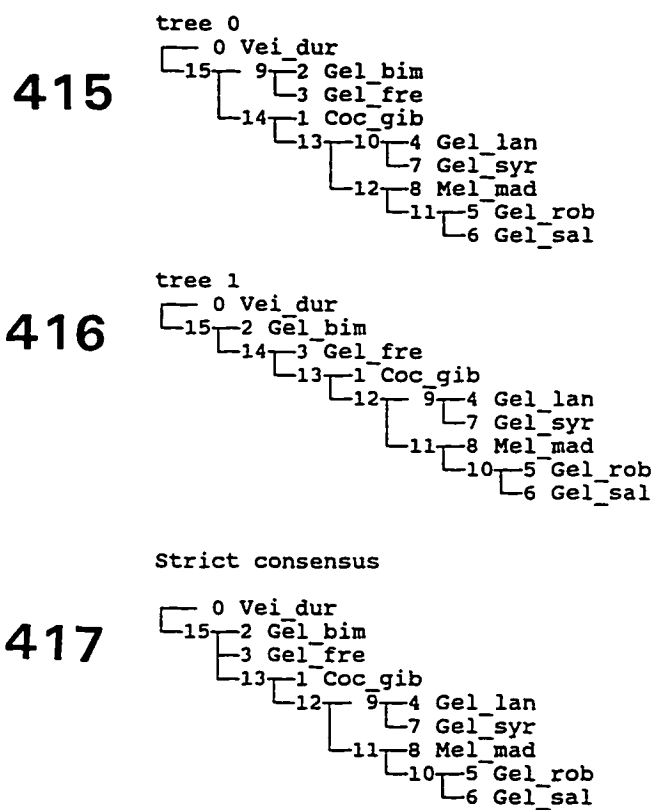
Figure 406: Cocalus (=Gelotia) salax. Left male palp.



Figures 407-408: Cocalus (=Gelotia) salax. Left male palp.



Figures 409-414: Cocalus (=Gelotia) lanka. 409-411. Left male palp. 412. Male chelicerai dentition. 413. Epigynum. 414. Spermathecae and ducts.



Figures 415-417: Cladistics of Cocalus-Gelotia group. 415-416. Two shortest and fittest trees obtained with equal weights and under implied weights. Consistency index 0.76, retention index 0.73, total fit 117.5. 417. Strict consensus tree of two shortest and fittest trees.

APPENDIX 1-SPECIMENS USED IN HIGHER PHYLOGENY

Clubiona pallens

2♂♂, 2♀♀ Jamison Bend, Pennsylvania, USA, October 1953 (W. Ivie, AMNH).

Brettus cingulatus

1♂, 1♀ Kotte, Colombo Dist., Sri Lanka, 11-14 April 1987 (D. P. Wijesinghe, CNMS).

1♂ Ootacamund, Madras, India (G. F. Hampson, BMNH: 1888.57).

1♂, 3♀♀ Peradeniya, Sri Lanka, 8 September 1989 (R. R. Jackson, FSCA: SL352/89).

Cocalus gibbosus

1♂ Lockerie, Cape York, N. Queensland, Australia, 30 January-1 February 1975 (R. J. Raven, QMBA: S846) (holotype of Cocalus gibbosus Wanless).

1♀ Morotai, Netherlands East Indies (=Indonesia) (G. Banner, AMNH).

2♂♂, 2♀♀ Opatha, Gampaha District, Sri Lanka, ex sphecid wasp mud nest, 26 October 1986 (T. A. Wijesiri, CNMS).

Cyrba algerina

1♂ Benidorm, Alicante, Spain, 1961 (K. W. Haller, AMNH).

1♂, 1♀ Crete, April 1979 (JFMC: 7440).

1♂, 1♀ Spain, April 1987 (JFMC: 14425).

2♂♂ Corsica, May 1989 (JFMC: 17878).

1♂, 1♀ Kefallinia, May 1987 (JFMC: 14738).

1♀ Torrejon de Ardoz, Madrid, Spain, 1961 (K. W. Haller, AMNH).

Gelotia argenteolimbata

1♂ Singapore (E. Simon, MNHN: 12820) (lectotype of Codeta argenteolimbata Simon, designated by Galiano).

1♂ Kerinci, National Park, Sumatra, Indonesia, 21-30 July 1988 (S. Djojosedharmo, CLDR).

Gelotia bimaculata

1♂ Foret du Nirou, Palembang Prov., Sumatra (M. J. Bouchard, MNHN: 22187) (lectotype of Codeta bouchardi Simon, designated by Wanless)

1♂ Pasoh Forest Reserve, Negri Sembilan, Malaysia, 20 August 1978 (M. Wong & P. Becker, UMMZ).

1♀ Pasoh Forest Reserve, Negri Sembilan, Malaysia, 2-3 May 1979 (M. Wong & P. Becker, UMMZ).

1♀ Gunung Mulu N.P., Sarawak, Borneo, April 1978 (P. Chapman, BMNH).

1♂ Sereinu, Mentawai Is., [Indonesia?] (NHMW).

Gelotia robusta

1♂ Keravat, Gazelle Peninsula, E. New Britain, Papua New Guinea (S. Smith, MCZC) (holotype).

Gelotia syringopalpis

1♂ Singapore, 27 September 1987 (J. H. K. Koh, JHKK: 87.09.21.01).

1♀ Mount Pleasant Road, Singapore, 8 December 1988 (J. H. K. Koh, JHKK: 88.12.08.07).

1♂ Singapore (Workman, Peckham Collection, MCPM).

Lankattus monticola

1♂ Horton Plains, Central Prov., Sri Lanka, 19 March 1962 (Lund Univ. Ceylon Exped. 1962, P. Brinck, H. Andersson & L. Cederholm, MZLU).

Meleon kenti

1♂ [left palp only!] Umbilo, Natal, South Africa (C. C. Kent, MHNG) (palp of holotype of Portia kenti de Lessert).

1♂ Umbilo, Durban, South Africa (Kent, NMSA) (holotype ♂ of Portia kenti de Lessert).

1♀ Durban, South Africa (in vial of Portia durbanii, ex Milwaukee Museum Peckham Collection, MCZC).

1♂, 1♀ (subadult?) Chintheche, Malawi, January-February 1976 (R. Jocqué, MRAC: 147.921).

2♂♂, 2♀♀ Nhlanga Lake, Kosi Bay, Natal, Zululand, South Africa, March-April 1985, from nests of Sceliphron (CASC).

Meleon madagascariensis

1♂ Mt. Ambohisanga, Madagascar, January 1951 (A. Pierrard, MRAC: 142.917) (holotype of Portia madagascarensis Wanless).

1♀ Antogil, Madagascar (Mocquerys, MNHN: AR 2869).

1♀ Mt. Ambohisanga, Madagascar, January 1951 (A. Pierrard, MRAC: 142.913) (holotype of Portia oreophila Wanless).

Meleon russata

1♀ Antongil, Madagascar (Mocquerys, MNHN: 10257) (lectotype of Portia russata Simon, designated by Wanless 1977).

1♀ Madagascar, (iv) [no other data] (OXUM).

Mintonia tauricornis

1♂ Sumatra [data mixed: Simalur. 1913/Buo (W. Coast). II 1914/Fort de Kock 920M Feb. 1921/Si Rambe/leg E. Jacobson] (NHMW).

Neobrettus tibialis

1♂ Phuntsholing, Bhutan, 21 April 1972 (Nat.-Hist. Museum Basel-Bhutan Expedition 1972, NHMB: 2357a) (holotype).

1♂ Malaysia, garden, August 1979 (JFMC: 8354).
 1♂, 4♀♀, East Slope, Mt. McKinley, Davao Prov., Mindanao, Philippines, 7 September 1946 [Chicago Nat. Hist. Museum Philippine Zool. Exped. (1946-7), Lot#54, F.G. Werner, FMNH].
 1♀ Templar Park, Selangor, Malaysia, 28 June 1976 (W. Sedgwick, WSCC).

Phaeacius wanlessi

1♂, 1♀ Kalutara, Kalutara District, Sri Lanka, 27 June 1987 (D. P. Wijesinghe, AMNH) (holotype and paratype).
 1♂ Peradeniya, Sri Lanka, Sept. 89 (R.R. Jackson, FSCA: SL359/89).
 1♂ Kotte, Colombo District, Sri Lanka, 10 June 1987 (D.P. Wijesinghe, CNMS) (Paratype).
 2♂♂, 4♀♀, 1juv Peradeniya, Sri Lanka, September 1989 (R.R. Jackson, FSCA: SL355/89).
 1♀ Peradeniya, Sri Lanka, 3 September 1989 (R.R. Jackson, FSCA: SL387/89).

Portia schultzei

1♂, 1♀ Kenya, August 1980 (JFMC: 8983).
 2♂♂ Bulawayo, Zimbabwe, November 1990 (V. D. & B. Roth, CASC).
 1♂ Diego Suarez, Madagascar (AMNH).
 2♀♀ Chintheche, Malawi, 30 December 1975 (R. Jocque, MRAC: 148.044).
 1♂, 2♀♀ Baobab Hill, Hwange, Zimbabwe, January 1990 (A. Ellert, NMBZ: NMZ/A7800)

Spartaeus spinimanus

1♂ Belitung, Sumatra, Indonesia, February 1903 (AMNH).
 3♂♂ Kotte, Colombo Dist., Sri Lanka, 31 July 1985 (D. P. Wijesinghe, CNMS).
 1♀ Kotte, Colombo Dist., Sri Lanka, 3 October 1986 (D. P. Wijesinghe, CNMS).

Taraxella solitaria

1♂ Kuching, Sarawak, Borneo, 4 April 1978 (K. Krishna, AMNH).

Veissella durbanii

2♂♂ Nelspruit, South Africa, December 1986 (C. Peterson, PPRI: AcAT/87/116 (part)).
 5♂♂, 1♀ Durban, South Africa (MCZC).
 2♂♂ Durban, South Africa (ex Milwaukee Museum Peckham Collection, MCZC).
 1♀ Natal, South Africa (MNHN: AR 2868).
 1♂ Ashburton, Pietermaritzburg, Natal, South Africa, 2 January 1991 (V. D. & B. Roth, CASC).

1♀ Krantzklouf Nature Reserve, Natal, South Africa, 18 December 1990 (V. D. & B. Roth, CASC).

Wanlessia sedgwicki

1♂ Kapit, Sarawak, Malaysia, 2 July 1981 (W. Sedgwick, WSCC) (holotype).

Yaginumanis sexdentatus

1♂ Myanoshita, Kanagawa Pref., Japan, 24 September 1953 (T. J. Cohen, AMNH).

1♂ Aobayama, Sendai-shi, Miyagi Pref., Japan, 27 August 1983 (K. Sasaki, NSMT: Ar. 796).

1♀ Kasuga, Nara, Japan, 25 July 1947 (T. Yaginuma, NSMT: Ar. 382).

Asemonea tenuipes

2♂♂, 2♀♀ Opatha, Colombo Dist., Sri Lanka, 8 March 1986 (T. Wijesiri, CNMS).

1♂ Opatha, Colombo Dist., Sri Lanka 8 January 1986 (T. Wijesiri, CNMS).

Chinoscopus sp. indet.

1♂1♀ Gamboa, Canal Zone, Panama, 1-4 July 1990 (W. Nentwig, BCCC) (Chinoscopus flavus? det. B. Cutler).

1♂ Monson Valley, Tingo Maria, Peru, 29 November 1954 (CASC).

Lyssomanes viridis

2♂♂, 2♀♀ Tavernier, Florida, USA, 16 February 1951 (A. M. Nadler, AMNH).

Onomastus nigricauda

1♂ Sri Lanka: Sinharaja Forest, Ratnapura Dist., 20-23.X.1984 (D.P. Wijesinghe, CNMS).

1♂, 1♀, Deerwood, Kuruwita, Sabaragamuwa Prov., Sri Lanka, 17-22 February 1962 (Lund Univ. Ceylon Exped. 1962, Brinck-Andersson-Cederholm, MZLU)

Cocalodes papuanus

1♂, 1♀ Maffin Bay, Dutch New Guinea, June-July 1944 (E. S. Ross, CASC).

Holcolaetis vellerea

1♂ Salisbury, Zimbabwe, 31 December 1968 (I. R. Mackay, NMBZ: NMZ/A1450).

1♀ Caconda, Angola, 7 December 1966 (E. S. Ross & K. Lorenzen, CASC).

1♀ Sakeji, Zambia, 20 May 1983 (D. Hancock, NMBZ: NMZ/A1859).

1♂ Kemavanga Camp, Zimbabwe, 26 November 1989 (A. Kumirai, NMBZ: NMZ/A7853).

Phidippus audax

2♂♂, 2♀♀ Veracruz, from banana trucks intercepted at Brownsville, Texas, USA, 25 June 1965 (R. B. Ends, AMNH).

Plexippus paykullii

1♂, 1♀ Wirawila, Sri Lanka, 18 December 1986 (R. R. Jackson, UCNZ: SL39/87).

APPENDIX 2-ABBREVIATIONS OF COLLECTIONS EXAMINED

- AMNH - American Museum of Natural History, New York; N. I. Platnick.
- BCCC - Bruce Cutler, Lawrence, Kansas.
- BMNH - The Natural History Museum, London, United Kingdom; P. D. Hillyard.
- BPBM - Bernice P. Bishop Museum, Honolulu, Hawaii; S. F. Swift.
- CASC - California Academy of Sciences, San Francisco, California; W. J. Pulawski and C. E. Griswold.
- CLDR - C. L. Deeleman-Reinhold, Ossendrecht, The Netherlands.
- CNMS - Department of National Museums, Colombo, Sri Lanka; L. Weeratunge.
- FSCA - Florida State Collection of Arthropods, Gainesville, Florida; G. B. Edwards.
- IZWP - Instytut Zoologii Polskiej Akademii Nauk, Warsaw, Poland; E. Kierych.
- JFMC - J. Murphy, Hampton, United Kingdom.
- JHKK - J. H. K. Koh, Singapore.
- MCPM - Milwaukee Public Museum, Milwaukee, Wisconsin; J. P. Jasse.
- MCSN - Museo Civico Storia Naturale "Giacomo Doria", Genoa, Italy; G. Doria.
- MCZC - Museum of Comparative Zoology, Cambridge, Massachusetts; H. W. Levi.
- MHNG - Museum d'Histoire Naturelle, Geneva, Switzerland; B. Hauser.
- MRAC - Musee Royal de l'Afrique Centrale, Tervuren, Belgium; R. Jocqué.
- MZLU - Lund University, Lund, Sweden; L. Cederholm.
- NHMW - Naturhistorisches Museum, Wien, Austria; J. Gruber.
- NHRS - Swedish Museum of Natural History, Stockholm, Sweden; T. Kronstedt.
- NMBZ - Natural History Museum of Zimbabwe, Bulawayo, Zimbabwe; M. FitzPatrick.
- NMSA - Natal Museum, Pietermaritzburg, South Africa; P. M. C. Croeser.
- OXUM - The University Museum, Oxford, United Kingdom; I. Lansbury.
- PPRI - Plant Protection Research Institute, Pretoria, South Africa; A. Dippenaar-Schoeman.
- QMBA - Queensland Museum, Brisbane, Australia; V. Davies.
- RMNH - Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands; P. J. van Helsdingen.
- SMFD - Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt, Germany; M. Grasshoff.
- UCNZ - University of Canterbury, Christchurch, New Zealand; R. R. Jackson. Now in FSCA.

UMMZ - University of Michigan, Ann Arbor, Michigan; H. D. Cameron.
WSCC - Walter Sedgwick, San Francisco. Now in AMNH.
ZMCD - Zoologisk Museum, Copenhagen, Denmark; H. Enghoff.

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