Spider Families of the World

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Contents

Preamble

The Royal Museum for Central Africa has a long tradition with arachnological studies and was one of the first research centres in the world with a specialization in systematics of Afrotropical spiders. The earliest such papers were published almost half a century ago and articles in the same field are still being produced today. In this context, a very large collection of arachnids from Central Africa was established, later completed with high numbers of specimens from East and West Africa. This provided the senior author of the present book an ideal opportunity to collaborate with Anna Dippenaar-Schoeman, an expert arachnologist from South Africa. The collaboration resulted in the production of a manual for the identification of Afrotropical spiders. The vastness of the Afrotropical realm indeed renders the creation of a manual on its animal groups a daunting task for a single author. But Dippenaar-Schoeman and Jocqué combined their knowledge on different parts of Africa and with the help of the complementary collections they were able to compile the knowledge on the spiders of the African continent as it had accumulated until the end of the previous century.

This fruitful collaboration based on their balanced knowledge was a perfect starting point to complete the effort and write an overview of the spider families of the world. As Africa harbours more than two thirds of the world's spider families the task might have appeared reasonably simple but an extended effort lasting for almost ten years was necessary to complete it. The rapidly changing situation in the field of systematics, certainly in a group like that of spiders for which the expertise must be considered as the trail-blazing methodology for studies on hyperdiverse arthropod groups, surely complicated the undertaking.

This book may stand as an example for intense and constructive collaboration between experts from different continents. It may also be the final milestone in the epoch of morphological spider studies at the onset of the era of molecular systematics. But perhaps exactly because of that, the book will remain an interesting document. Although the primary audience for this book is the interested scientist, the public at large, which is fascinated by the beauty and variation of organisms, may continue to find the morphological approach easier to appreciate.

The Royal Museum for Central Africa gratefully acknowledges the support received for this research from the Belgian Federal Science Policy Office, and from the Belgian Directorate General for Development Cooperation, which facilitated the collaboration with our African research partners.

Guido Gryseels
Director General
Royal Museum for Central Africa

Foreword

Spiders have inhabited Earth for some 400 million years and are the most profuse and diverse predators on land today. They are familiar animals to everyone. Spiders inhabit almost all terrestrial and some aquatic habitats, and many species have developed quite extraordinary methods to live in extreme environments. Understanding the importance of spiders in ecosystems is essential for the development of procedures for pest control in agriculture. Furthermore, because some species which are venomous to man have synanthropic habits, some countries have severe problems with spiders as pests. Even where spiders pose no threat, many people are afflicted with a tangible phobia in their presence. Readers of this book will, of course, be aware of the significance of spiders, be captivated by their beauty and ingenuity, and have a sincere desire to learn more about these fascinating animals.

The complete spider fauna is known for only a very few, small areas of the globe, thanks to the dedicated efforts over many years of enthusiastic arachnologists. For most of the world, however, our knowledge of the diversity of spiders is imperfect, deficient or negligible. A great deal more information would become available if those who visit and collect spiders in areas where our knowledge is impoverished were able to easily identify, even to family or genus level, the spiders they encounter. In Britain, interest in our spider fauna enjoyed a real boost following the availability of the first field guide; and the recent publication of *Spiders of North America: an identification manual* (Ubick *et al*., 2005) provided an excellent introduction to identifying North American spiders. Some other parts of the world have excellent field guides or general books which introduce the reader to their araneofauna, but there is no book which brings together *all* world spider families between its covers. In my own research on fossil spiders, I regularly need to obtain basic information about a range of spider families, many of which I might never have encountered 'in the flesh', and many arachnologists have a desire to learn about spider families from other parts of the world out of simple curiosity.

It will be obvious to many readers that this book follows up on the authors' successful *African spiders: An Identification Manual* (Agricultural Research Council, South Africa, 1997). The African book opened up a whole new world to those unfamiliar with the spiders of this region. For many, like myself, who sought concise descriptions of a number of spider families with clear illustrations and up-to-date references, the African manual was a godsend. Oh to have a similar book covering all the world families! Well, the authors have taken heed of our entreaties and produced this volume. The tried-and-tested format of the text and illustrations from the African spider book have been followed and extended to a further 40 or so families. Simple keys are provided for those who like to follow them, and include one for webs. Clear line drawings were an indispensable feature of the African book, and continue to be valuable here. An additional bonus in this new book is the inclusion of some 150 high-quality colour photographs illustrating representatives of each family.

This book will be useful to professional and amateur arachnologists the world over. It is hoped that it will appeal not only to confirmed arachnophiles but also to others looking for a general overview of the world spider fauna. Armed with this volume, it will be much more straightforward to track down unidentified spiders throughout the world. As I write this, news is breaking of many new species across all terrestrial groups being discovered in a previously unexplored highland forest area in New Guinea. One wonders: how many new species, genera – even families? – of spiders exist there? We have a great deal more to learn.

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This book would probably never have seen the light of day without the generous help of John Murphy who assisted in all stages of its preparation. First of all he gave us the opportunity to loan specimens from his remarkably diverse collection. He allowed the use of the drawings made by M. Roberts for his book on South East Asia, and offered free access to the amazing collection of photos by his late wife, Frances. And on top of that he gave comfortable accommodation to the senior author on the numerous visits we paid him.

Loan of material was essential for this work and we are grateful to Christine Rollard, Norman Platnick, Lou Sorkin, Robert Raven, Mark Harvey, Leon Baert and Jason Bond who all provided specimens.

Many colleagues kindly read the text on families that can be considered their field of specialization, particularly Charles Griswold, Robert Raven, Gustavo Hormiga, Martin Ramírez and Matjaz Kuntner who provided some of the corrections. In the same context we also thank Mark Alderweireldt, Fernando Alvarez-Padilla, José Guadanucci, Bernhard Huber, Peter Jäger, Christian Kropf, Lara Lopardo, Milan Řezáč and Michael Rix. The comments of Jörg Wunderlich, Christian Kropf and Michael Roberts on the first edition were much appreciated. Samuel Zschokke was very helpful with the preparation of the key to webs.

Apart from the photos by Frances Murphy, an important collection of pictures was made available by James Cokendolpher for which we are very grateful. We also received pictures from Mark Alderweireldt, Sudhikumar Ambalaparambil, Jason Bond, Misjel Decleer, Charles Griswold, Hans Henderickx, Gustavo Hormiga, Norman Larsen, Astri and John Leroy, Danny Meirte, Jeremy Miller, Les Oates, Robert Raven, Hannah Wood and August Verbruggen (copyright ARABEL, courtesy Koen Van Keer). Samuel Zschokke provided some nice samples to complete the webkey.

Perhaps the most painstaking work was carried out by the artists who had to cope with the endless corrections to the drawings. Alain Reygel and Nadine Van Noppen proved to be 'amply provided with patience' and that was very much appreciated. Some of the drawings made by Elsa Van Niekerk were taken from our *African Spider* book. Jan Bosselaers also provided us with some of his fine drawings for which we are most grateful.

We are very much indebted to Ms Liz Herholdt and Drs Nico Dippenaar and Tony Russell-Smith for their valuable linguistic suggestions.

Introduction

Over the last few years the taxonomic study of spiders has witnessed substantial progress. The fauna in parts of the northern hemisphere is now well known (e.g. Heimer & Nentwig, 1991; Paquin & Dupérré, 2003; Roberts, 1998; Ubick *et al.*, 2005; Yaginuma, 1986) and enough knowledge has accumulated to allow the production of some local atlases (Harvey *et al.*, 2002). For the rest of the world, however, the inventory is in its infancy. Until recently, the literature dealing with the spider faunas of Africa, tropical Asia, Latin America and a large part of Oceania was scattered and relatively inaccessible. However, with the compilations of Dippenaar-Schoeman & Jocqué (1997) for Africa, Murphy & Murphy (2000) and Deeleman Reinhold (2001) for tropical Asia, Song *et al.* (1999) for China, and keys for Australia by Davies (1986) and Raven & Baehr (1997), and Forster & Forster for New Zealand (1999), the situation has changed profoundly. For all of these major regions, almost all taxonomic and much other published information on spiders has been summarized in comprehensive books. The major publications among these provide keys to families, some with descriptions of supra-specific taxa narrowed down to subfamilies (Dippenaar-Schoeman & Jocqué, 1997) or genera (Murphy & Murphy (2000), Song *et al.* (1999)). Some provide complete lists of genera with short descriptions of their distributions. The appearance of these publications has greatly facilitated the study of spiders in these regions of high biodiversity.

The availability of a global, regularly updated catalogue of spiders on the internet (Platnick, 2005) has arguably been even more influential than the recent appearance of regional spider books. This catalogue provides a complete list of all spiders described to date, together with their synonyms, concise account of their distributions and a complete bibliography of the taxonomic literature dealing with the Araneae since Clerck (1757), thus even predating Linnaeus (1758). It further gives the number of genera and species per family as well as the total number of species, genera and families in the Araneae. By the time this book is published, almost 40,000 spiders will have been described in more than 3,500 genera, distributed over 109 families.

Progress has also been made in unravelling the systematics of the Araneae. Thorough analyses have been carried out for several subgroups such as the Gnaphosoidea (Platnick, 1990), the orb weavers (Scharff & Coddington, 1997) and several families such as the Salticidae (Maddison, 1988, 1996), the Zodariidae (Jocqué, 1991) and the Cyatholipidae (Griswold, 2001). Coddington & Levi (1991), Coddington *et al.* (2004) and Coddington (2005e) produced a cladogram of all the spider families. However, some taxa, such as the Amaurobioidea, require corroboration, and some parts of the tree remain unresolved, such as the 'Dionychae'.

A large gap remains, namely the absence of an illustrated overview of the spider families. Although a complete list of these families is available in Platnick's (2005) on-line spider catalogue, no one has compiled a comprehensive account with descriptions and illustrations of representatives of the different families. After having produced the identification manual *African Spiders* (Dippenaar-Schoeman & Jocqué, 1997) in which 71 of the then 109 families were listed and described, we believed that is was feasible to complete an overview and produce a book dealing with all families, including the 38 that had not been previously covered.

Thus the present book appears as a sequel to our manual on African spiders. The format is similar and much of the information and many of the illustrations are taken from the previous book. The task was far more complex than we had anticipated. Not only were new descriptions and illustrations required for the 39 additional families (though a few are synonymized here), the descriptions of the African families required adjustment to account for their variability worldwide. It was clear from the beginning that it would be impossible to produce a dichotomous key with the same detail as that in the 'spider manual'. In the key in that volume, we included all possible

exceptions to the 'normal' family patterns, such as the Zodariids with two claws, gnaphosids with pseudosegmented legs and eyeless prodidomids, to mention but a few. The key we present here is not as detailed. Because we anticipate the appearance soon of family keys on the Internet (similar to the one for the Australian spider fauna by Raven & Baehr), which will have the advantage of being much more flexible and allow continuous improvements, we decided not to invest too much time in creating a dichotomous key that includes all possible exceptions. Our key is therefore a basic one in the sense that it only includes those taxa that present the basic pattern for the family to which they belong. It will, therefore, be impossible to find the family to which, for example, an eyeless lycosid belongs, or the taxonomic rank of a linyphiid lacking cheliceral stridulation ridges.

The main aim of this book is to provide a quick reference to all spider families and an overview of the recent literature. It might be asked whether now is an opportune time to write a book on the world's spider families, as the taxonomy of spiders is bound to change rapidly once the ATOL (Araneae Tree Of Life) project has been implemented (see Hormiga *et al.* 2004). This large-scale project aims to complete a phylogenetic analysis of all spider families by the creation of a character database combining morphological and molecular characters, resulting in a matrix with approximately twenty million cells. Because the molecular characters will outnumber the morphological ones, it is likely that the position of many taxa will change in the near future. As is already obvious in many other taxonomic groups (e.g. Turbellaria; Willems *et al.*, 2006), spider systematics will be increasingly based on molecular, i.e. 'invisible', characters. It is to be expected that spiders with similar morphology that are now considered to be closely related could be assigned to taxa from different evolutionary lineages owing to new molecular evidence. However, there are disciplines, such as palaeontology, in which molecular data is of little use. Our book may well be the last overview based entirely on morphological characters, but it could still be of use in disciplines that rely entirely on morphology long after the basics of spider systematics have been altered by new molecular insights.

In a certain sense, this book was conceived with the following question in mind: what information would a palaeontologist require to identify a fossil spider based on characters that are likely to be preserved? This underlies our lack of emphasis on details that are unlikely to be observed in a fossilized specimen. The degree of detail of the spinneret spigot armature is an excellent example. For many spider families there are now detailed descriptions of the spigots on each spinneret (Platnick, 1990; Platnick *et al.*, 1991), but only a few of these are relevant to the positioning of families in the phylogeny of the Araneae. Only those spigots that have to do with the placement of taxa are mentioned in this book

The example above illustrates the modest scope of this book. The most complete overview of spider morphology and systematics published to date, the monumental monographs of Simon (1892-1903), dates back to 1897. His work summarized almost everything known at that time about the systematics and morphology of spiders. Today, a similar undertaking would require the cooperation of a team of specialists, a task that could be attempted in the coming years. In the interim, however, this book provides a concise overview of the different spider families, summarizes the relevant information that is often scattered across many papers in the literature and sheds light on the position of taxa within the phylogenetic system that is in use today.

Contents of book

This book contains the following:

- Illustrated keys to the families, their diagnostic and descriptive characters, notes on their taxonomic position, and their lifestyles and distribution.
- Apart from the keys to families, a key to spider webs is provided. This is the first time that we have tried to include this in a book, and while doing so we realized the enormous variety

of spider webs. The key is far from complete, but this first attempt at providing information about webs may form the basis for creating more complete keys in future.
- A series of photographs of living spiders, mainly from the collections of James Cokendolpher and the late Frances Murphy, is also provided.
- In the appendices, a general phylogeny of spiders is presented with a list of the main diagnostic characters for each clade.

As mentioned in the Introduction, the keys will only lead to the identification to family level of those specimens that match the diagnostic characters. Certain poorly defined families such as the Stiphidiidae and Desidae have been excluded from the keys.

Family descriptions

The family name in Latin is followed by the name of the author and by a vernacular name for the family. In some cases several names are provided because the family is referred to in different ways. In some instances we had to coin vernacular names, and it was not always possible to find an appropriate vernacular name for those families that are poorly defined and contain a great variety of forms.

At the beginning of each description the **type genus** is given along with information about the size of the family (number of genera and species). This was often based on information in the on-line spider catalogue (Platnick, 2005). The complete list of genera is only provided if their number does not exceed ten.

This is followed by a list of **diagnostic characters**. It summarizes those characters that define the family. Strangely enough, it became apparent that several families lack clear diagnostic features. Some are based on one or a series of plesiomorphic characters (e.g. Gallieniellidae), which is workable, but others are in fact defined through a process of elimination. This is the case with large families that were split in several parts such as the Clubionidae. Most families that were split off (e.g. Selenopidae, Sparassidae) are now well defined, although among these some do not seem to form monophyletic entities (e.g. Liocranidae, Stiphidiidae). But the main problem is with what remains of the original taxon, in this case the Clubionidae, for which no synapomorphies have been recognized. Some families are temporarily retained simply for historical reasons (Desidae).

Following the list of diagnostic characters, an overview is given of important external characters. Considering the variability within some families, it was often impossible to describe the entire range of variation in certain characters, and we consequently attempted to list the different character states according to subfamilies. In some cases an approach at the genus level would have been necessary to illustrate the entire range of variation within a family, but we considered this to be beyond the scope of our study.

Under the heading **taxonomic status,** the present status of the family is summarized and, where relevant, a short historical account of its systematic position is given. For the smaller families, the availability of revisions of particular genera is mentioned.

The **distribution** of a family may be important because it will indicate whether it has been found in a particular region. However, one of the main purposes of the book is to enable a person to identify taxa that may be encountered outside their known geographic range.

Under the heading **lifestyle,** a brief account is provided of what kind of predator the spider is, and in what habitats it may be found.

Each family account ends with a list of **relevant literature**, that is, the books and articles on which the information in the text is based. Many of these sources required meticulous analysis of lists of characters, matrices and cladograms, often in cryptic form, to retrieve useful information.

The significance of and fascination with spiders

Spiders form one of the largest groups of invertebrate animals, nearing 40,000 known species (Platnick, 2005). They are distributed worldwide, occur on all continents except Antarctica, and are found in every conceivable terrestrial habitat, including caves, snow-covered tundra, high mountains and intertidal zones. One species, *Argyroneta aquatica,* has even adopted an aquatic lifestyle. All spiders are carnivorous, and in principle, all are hunters, although many of them use webs to catch their prey (Shear, 1986; Dippenaar-Schoeman & Jocqué, 1997). Despite the similarity in their biology, details of the lifestyles of spiders vary greatly. Their enormous range in size provides a hint of this variation. For example, the body length of spiders ranges from a large 120 mm (*Theraphosa blondi*) to somewhat less than 0.4 mm (*Patu digua*), and there is as much variation in their biology as in their size.

For each family, we provide a short summary of the lifestyle, mentioning only the most common types of behaviour. Far more detailed accounts have been published elsewhere; for example, Shear (1986) provides comprehensive information on webs and how they are used. The classic work by Bristowe (1958), and the first spider publication to contain spectacular colour photographs by Kullman & Stern (1981), contain more information on this topic. The volumes edited by Witt & Rovner (1982), Barth (1985) and Nentwig (1987), and the works by Foelix (1992) and Barth (2001) focus on many different aspects of spider biology. Jackson & Pollard (1996) focus on behaviour. These works are 'compulsory reading' for all those who wish to familiarize themselves with the lives of spiders.

More general information on the lifestyles of spiders from various continents is available. Dippenaar-Schoeman & Jocqué (1997) deal with African spiders, Forster & Forster (1999) with spiders from New Zealand, Murphy & Murphy (2000) with South-East Asia, and Ubick *et al.* (2005) with North America. These books are general works. There is also a wealth of local books on spiders from many countries, which usually contain chapters on biology and behaviour.

Spiders are excellent models for the study of sexual selection. Their exposed male copulatory organs range in complexity from a simple intromittent 'thorn' to a long whip-like structure accompanied by amazingly complex supporting appendages. The variety and complexity of these organs and the accompanying variety in secondary sexual characters and courting behaviour, all part of what is called the 'mating module' (Jocqué & Szüts, 2001), provide suitable and often preferred models for the study of sexual selection (Huber, 2005c).

The wealth of literature on spiders, mentioned above, leads us to the conclusion that spiders belong to a large taxon with a vast array of adaptations ranging from generalist to those narrowly adapted to particular ecological circumstances.

Spiders have other 'properties' that make them ideal subjects for the study of biodiversity in general and the evaluation of natural habitats in particular.

In contrast to other mega-diverse terrestrial groups with large numbers of species such as the Acari, Nematoda and Collembola, spiders are relatively large animals. Because their external copulatory organs are species-specific, it is fairly simple to identify them. No time-consuming dissections are required for their identification, and sorting spiders by morphospecies is thus fairly straightforward. Surveys of spiders are, therefore, the most simple to conduct, and spiders appear to be the ideal animals to use for rapid biodiversity assessments. Simple identification, ease of collection and fine-tuned distributions make these animals study objects *par excellence* for decision-makers who require information about the intrinsic biological value of any particular habitat. Spiders provide such information about the value of any particular habitat better than higher plants

or vertebrates (Mittermeier *et al*., 1999), and thus offer small-scale data for the selection of biodiversity 'hot spots' that is required for triage purposes.

And there is more! Jocqué (1981) and Volrath (1999) showed that size in spiders is dependent on the quality of the habitat. Monitoring their size can, therefore, be considered an 'early-warning-system', revealing changes in habitat quality. In assessing the quality of rainforest patches, the preferred indicator taxon is Ctenidae. The density of occurrence of these spiders can be reliably estimated by night collecting using the light from a headlamp that reflects off the tapetum in the back of their eyes (Jocqué *et al.,* 2005).

Spiders are important in another way. They are a vital component of most terrestrial ecosystems, not least of agricultural systems. They strongly affect the density of insect populations and have been shown to limit insect pests in the agricultural environment. Wise (1993) summarized the research on this subject.

Morphology and terminology

The body of a spider is divided into two major regions: the cephalothorax (prosoma) and abdomen (opisthosoma), connected by a narrow pedicel (figs 1a, b). The following morphological details are considered in the family discussions: **cephalothorax**: carapace, sternum, eyes, chelicerae, mouthparts; **appendages**: legs and palps; **abdomen**: dorsum and venter of abdomen, spinnerets and genitalia.

Carapace (fig. 1a): it can be divided into the cephalic and thoracic regions. In some species the division is clearly demarcated by the cervical groove. Behind the cervical groove a depression, known as the fovea, is present in most families. It serves as an attachment for the dorsal muscles of the sucking stomach and the muscles to each chelicera. The shape of the fovea can be longitudinal or transverse. When transverse it can be straight, pro- or recurved. The shape and setation of the carapace are important taxonomic traits. The venom gland is located in the cephalothorax and consists of a long, cylindrical portion and an adjoining duct that terminates at the tip of the cheliceral fang.

Sternum (figs 1b, c): the undivided sternal plate (sternum) lies on the ventral side of the carapace. Anteriorly, the sternum is marked by a distinct groove, the labiosternal junction, but it can be fused in some families (e.g. Filistatidae). In the Mygalomorphae, the sternum bears sigilla, small circular impressions on the sternum that vary in position, shape and number between families. Precoxal sclerites are sometimes present between the sternum and coxae, and intercoxal sclerites between the coxae.

Eyes (figs 2b, c): most spiders have eight simple eyes, while some have six, four, two or none. The eyes are arranged in rows or groups. The most common arrangement is in two rows that can be straight, procurved or recurved. The eyes are named according to their position on the carapace:anterior median eyes (AME), anterior lateral eyes (ALE), posterior median eyes (PME) and posterior lateral eyes (PLE). The median ocular quadrangle (MOQ) is the area of the four median eyes. The eyes are sometimes situated on an eye tubercle, carina, keels or a protuberance. A tapetum is sometimes present in the secondary eyes (AME, PLE, PME), which then appear pale in colour and purportedly allow nocturnal vision.

Chelicerae (figs 2a, b, d): each chelicera consists of a stout basal section (paturon) and a smaller, movable distal section, the fang. The chelicerae are either free or fused (e.g. Symphytognathidae). The fang usually rests in a groove, the cheliceral furrow. One or both sides of the furrow are often armed with teeth (promarginal and retromarginal teeth). Spiders with such teeth masticate their prey, while spiders without teeth suck the fluid out of their prey. The chelicerae in some groups are chelate, closing down on a tooth-like process. Others bear laminae or keels (e.g. Gnaphosidae), peg teeth (e.g. Archaeidae) or stridulating files (Linyphiidae). The fangs can be short and stout (Zodariidae), very long (Desidae) or provided with keels (Migidae). The movement of the chelicerae is either paraxial or diaxial. The anterior portion of the paturon is usually provided with strong spines in most of the burrowing mygalomorph spiders. These spines, collectively known as a rastellum, are used to excavate burrows.

Mouthparts (figs 1b, c, 2a): the basal segment (coxa) of the palp is enlarged to form the chewing mouthparts, the endites (gnathocoxae). In the Mygalomorphae (fig. 1c) the endites are broadened

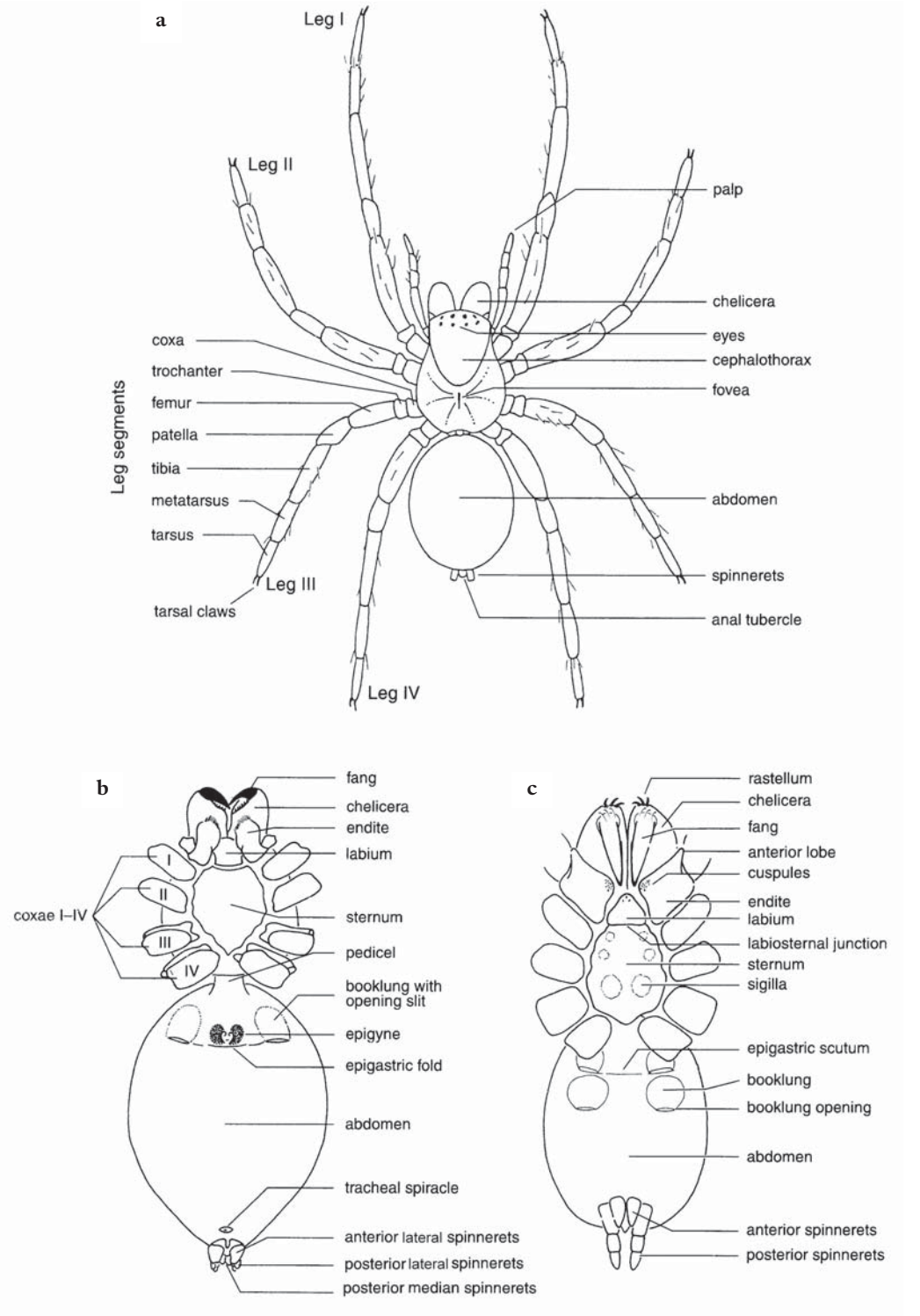


Fig. 1. **External morphology. a.** Araneomorphae, dorsal view; **b.** Araneomorphae, ventral view; **c.** Mygalomorphae, ventral view.

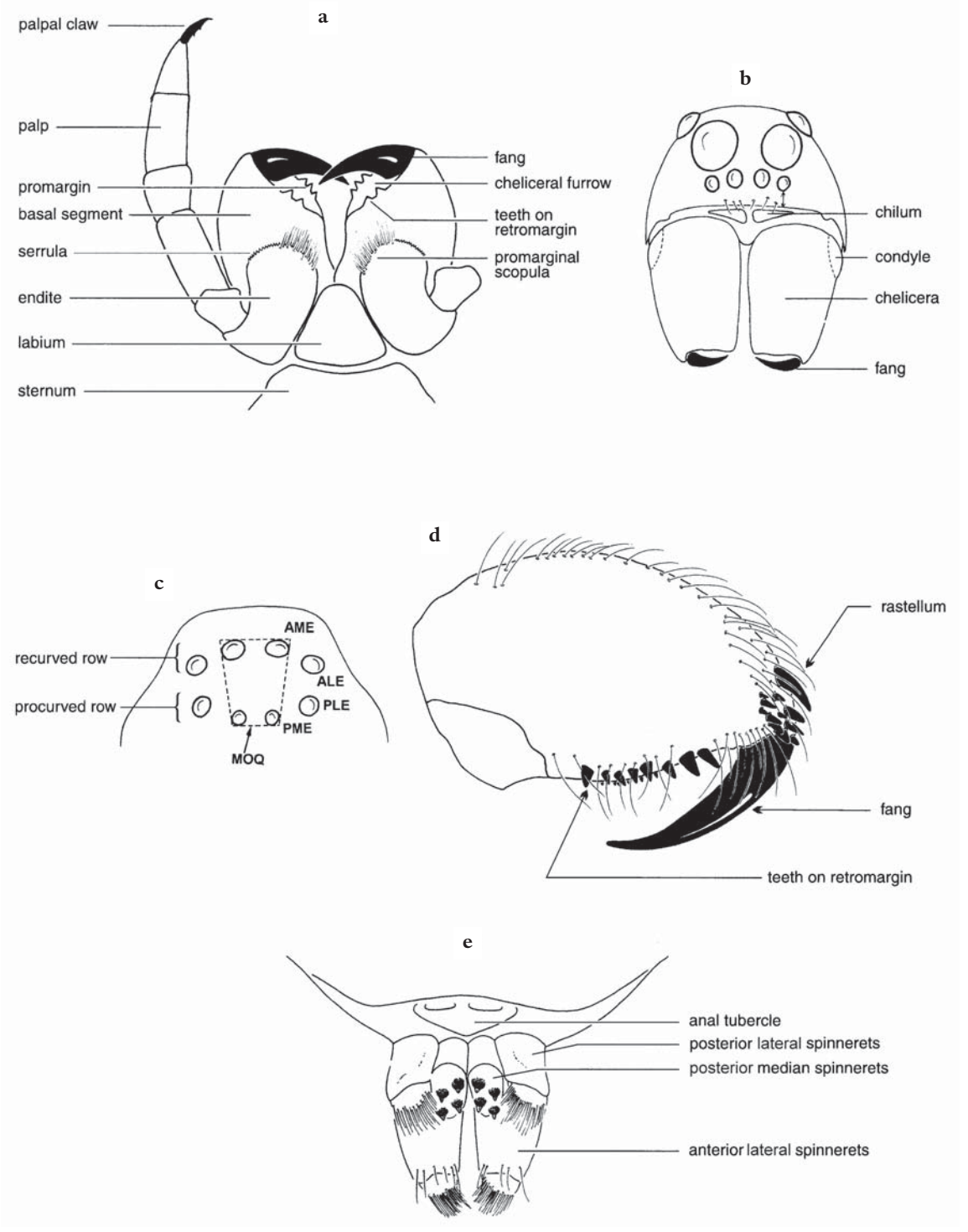


Fig. 2. **External morphology. a.** mouthparts and palp, ventral view; **b.** chelicerae and eyes, frontal view; **c.** eye pattern, dorsal view; **d.** chelicera, lateral view showing rastellum; **e.** spinnerets, dorsal view. ALE: anterior lateral eyes; AME: anterior median eyes; PLE: posterior lateral eyes; PME: posterior median eyes.

laterally. In most spiders the rim of the endite bears a cuticular, serrated ridge known as the serrula. This is used in a saw-like fashion to cut prey. The promargins of the endites are fringed with scopulae, a dense cover of setae used to filter the liquefied food. In between the endites is the labium, which is free from the sternum but sometimes fused to it (e.g. Filistatidae). In a few families the distal end of the labium is thickened and strengthened, i.e. rebordered (e.g. Linyphiidae). In the Mygalomorphae the endites and labium frequently bear cuspules (fig. 1c).

Legs (fig. 1a): four pairs, each consisting of seven leg segments, the legs are usually covered with setae, spines, various sensory setae and receptors. Distinct sensory setae are the fine, hair-like setae set vertically in conspicuous sockets, the trichobothria. Some groups have dense, short, stiff setae, the scopula, positioned ventrally on one or more tarsi or even metatarsi. All spiders have at least two claws on each tarsus. In most of the web-living groups a smaller third claw is present (fig. 39d). The two-clawed spiders usually have a dense brush of setae, the claw tuft (fig. 75g) below each claw. In some species the claws are situated on an extended part of the tarsus, the onychium. In some three-clawed spiders, serrated bristles known as accessory claws are present. In the Theridiidae and Nesticidae, tarsus IV bears a comb of serrated bristles (fig. 104c). In cribellate spiders a calamistrum, consisting of a comb of setae, is present on metatarsi IV (110k).

Palpi (figs 2a, 3a-c): these are leg-like appendages consisting of six segments (compared to the seven leg segments). The palpal metatarsus is lacking. In females the palp is simple and usually bears a single tarsal claw. In adult males, some segments of the palp are modified into a secondary copulatory organ and can either be simple in structure (haplogyne palp, fig. 3c) or complex (entelegyne palp, figs 3a, b). The tibia and sometimes the patella and femur are provided with one or more apophyses (dorsal, ventral or retrolateral). In the entelegyne type of palp the tarsus is usually provided with a bowl-shaped cavity, the cymbium, and a genital bulb. In some families the cymbium bears a basal appendage, the paracymbium (e.g. Linyphiidae). The genital bulb consists of more or less sclerotized tegulum, with the winding sperm ducts frequently discernable, and an intromittant organ, the embolus. The embolus usually rests on a plate or membranous appendage, the conductor. The tegulum is sometimes provided with a sclerotized appendage with a membranous insertion, the median apophysis.

Abdomen (figs 1a-c): the abdomen is joined to the cephalothorax by a thin pedicel through which the circulation and feeding systems are canalized. The exoskeleton of the abdomen is much thinner than that of the cephalothorax and this allows great expansion of the abdomen when prey is being fed upon, or when a large number of eggs are being formed in the female. The abdomen is quite variable in size and configuration. In many spiders it is elliptical, oval or globose and either soft or covered with sclerites known as scuta. Many species, however, have distinct abdominal shapes, decorated with projections and protuberances. The heart is frequently visible as a longitudinal mark through the integument. The dorsum can also be decorated with patterns consisting of, for example, spots, bands, chevrons or a folium.

Spinnerets (fig. 2d): most spiders have three pairs of spinnerets, the anterior, median, and posterior pairs, situated in front of the anal opening. The spinnerets are very mobile and well provided with muscles. The spinning glands, consisting of ampullate, aciniform, tubuliform, aggregate, piriform or flagelliform glands, terminate as small spigots on the surface of each spinneret. The position, thickness and number of spinneret segments and the number and shape of the spigots are characters used at generic level. In the cribellate group a sieve-like plate, the cribellum, is present. The special type of silk emitted by this organ is combed out by the calamistrum on metatarsi IV.

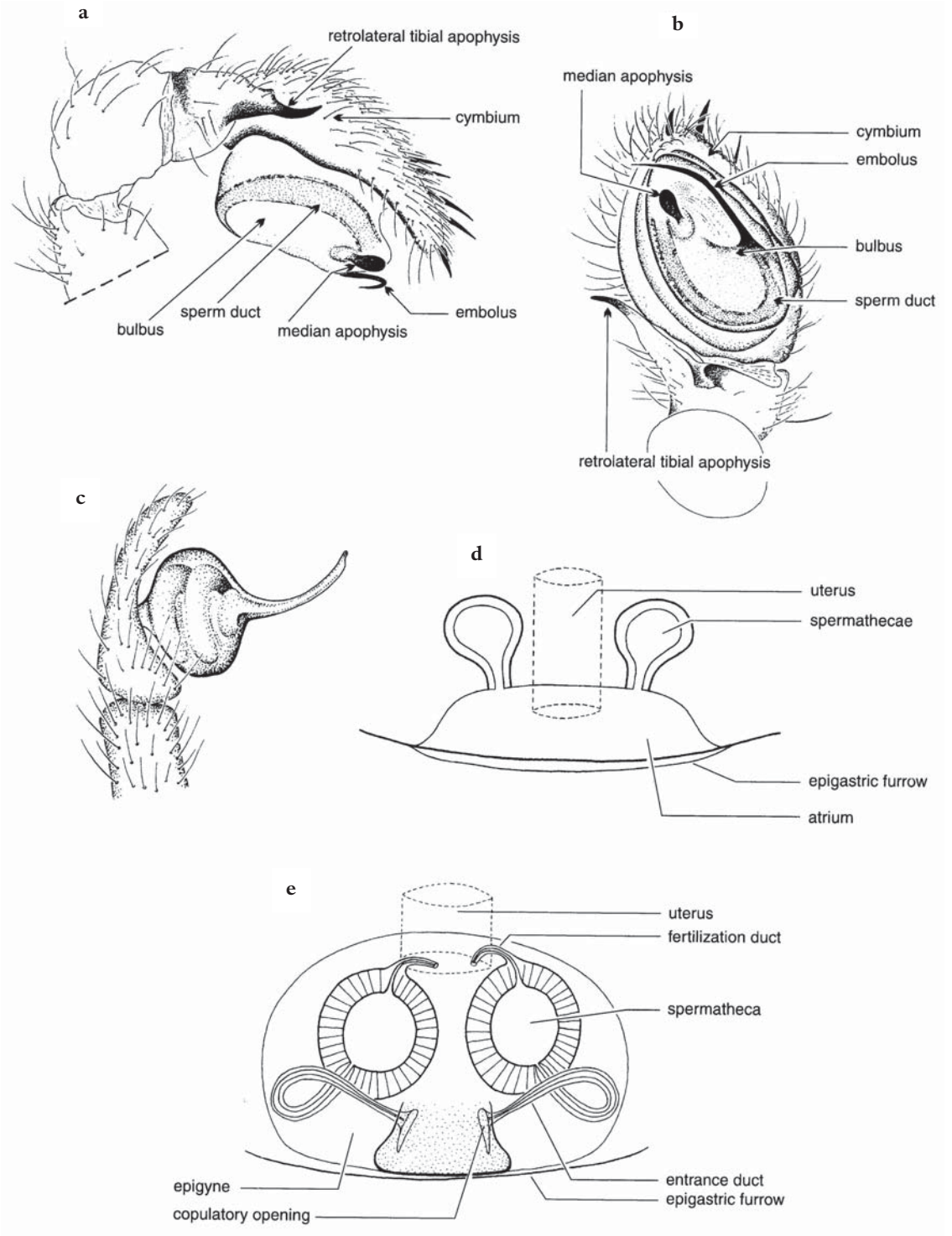


Fig. 3. **External and internal morphology. a.** male palp (entelegyne), lateral view; **b.** male palp (entelegyne), ventral view; **c.** male palp (haplogyne), lateral view; **d.** female genitalia (haplogyne), internal dorsal view; **e.** female genitalia (entelegyne), internal dorsal view.

In many families lacking a cribellum, a small conical appendage, the colulus, is present at the base of the anterior spinnerets.

Respiratory system (figs 1b, c): most spiders possess two kinds of respiratory systems: one or two pairs (Mygalomorphae) of booklungs, and one or two pairs of tubular tracheae. The external openings of the booklungs are present on either side of the epigastric region. The tubular tracheae open through the tracheal spiracle. The tracheae can branch throughout the body and vary in size and pattern of distribution. In the Mesothelae, Mygalomorphae and Hypochilidae, four booklungs are present.

Genitalia (figs 3d, e): close to the pedicel, the epigastric groove runs transversely across the abdomen. The external openings of the genitalia are located in the middle of this furrow. In the females of the entelegyne group a sclerotized, special copulatory organ, the epigyne, is present in front of the genital opening. It is absent in the haplogyne group and Mygalomorphae.

Glossary

s = singular; p = plural.

Abdomen: also called opisthosoma: posterior part of the body of a spider.

Accessory claws: modified setae at the tip of tarsi; only present in web-building spiders; used together with tarsal claws to secure grip on threads.

Alveolation: a small but deep rounded depression.

Anal tubercle: a small tubercle above spinnerets through which the anus opens.

Anterior lateral eyes (ALE): eyes situated at each end of anterior eye row.

Anterior lobe: anterior part of endite, often elongated in Mygalomorphae.

Anterior median eyes (AME): middle pair of eyes in anterior eye row.

Apex: distal tip.

Apomorphy: derived character.

Apophysis (p = apophyses): an excrescence or appendage changing the general cylindrical or globular shape of a sclerite; most often used for description of male palp.

Araneophagous: feeding on spiders.

Atrium (p = atria): internal chamber at entrance of copulation tract in female haplogyne spiders.

Autospasy: casting off a limb. Many spiders have a weak spot or a crack in a particular place on the legs that facilitates autospasy.

Bidentate: provided with two teeth.

Biserially dentate: provided with two rows of teeth.

Booklungs: respiratory organs situated in front of epigastric furrow on ventral side of abdomen, opening through narrow slits.

Branchial operculum: (p = opercula) a pair of plates (two pairs in Mygalomorphae), often pale or orange in colour, on ventral side of abdomen, just in front of epigastric fold; a slit at posterior end opens into booklungs.

Bulbus (p = bulbi) or bulb: complex part of male palp inserted on usually hollow ventral side of cymbium.

Caput (p = capita): another name for cephalic region of cephalothorax.

Calamistrum (p = calamistra): a comb-like row or rows, or oval area, of modified setae on metatarsus IV of cribellate spiders, used to comb silk produced by the cribellum.

Carapace: dorsal sclerite covering cephalothorax, the anterior part of body.

Cervical groove: shallow U-shaped groove, separating cephalic region from thoracic region of carapace.

Cephalothorax: also called the prosoma, anterior part of body covered by the carapace, bearing eyes, legs and mouthparts; composed of two regions: cephalic region in front separated from thoracic region behind cervical groove.

Cephalic region: frontal part of cephalothorax delimited by cervical grooves.

Chelate: said of chelicerae in which the fang closes down on a tooth-like process.

Chelicera (p = chelicerae): inserted at front of carapace, consisting of a large basal portion and a fang.

Cheliceral furrow: a shallow groove on basal portion of chelicera accommodating the fang, usually provided with teeth on its promargin and retromargin.

Cheliceral lamina (p = laminae): a chitinous ridge extending distally on prolateral edge of each chelicera.

Cheliceral teeth: thorn-like extensions of cheliceral furrow promargin (outer or dorsal margin) and retromargin (inner or ventral margin).

Chilum (p = chila): small sclerite at base of chelicerae, just under clypeus.

Claws: see tarsal claws.

Claw tuft: a dense group of setae under the paired tarsal claws usually well developed in hunting spiders.

Clypeus: part of the carapace between eyes and anterior margin.

Collariform: with one curved ridge.

Colulus: short median protuberance in front of spinnerets, considered a modification of the cribellum.

Conductor: part of bulbus, accompanying and supporting the embolus.

Condyle: lateral boss at base of chelicerae.

Copulatory opening: double opening in epigyne through which the embolus is inserted (in entelegynes) or single slit through which male palpal organs are intromitted (in haplogynes).

Coxa: (p = coxae) see legs and palpi.

Crenulate: with a number of longitudinal ridges.

Cribellate: provided with a cribellum.

Cribellum: sieve-like spinning plate in front of spinnerets.

Cryptozoic: living a concealed life.

Cuspules: small, spiny warts on endites and labium of Mygalomorphae.

Cusps: short, mostly blunt spines.

Cymbium: (p = cymbia) dorsal part of male palpal tarsus, most often hollow, carrying the usually complex bulbus.

Dentate: toothed.

Denticle: small tooth.

Desmitracheate: median tracheal trunks with many branches passing into the prosoma (see haplotracheate).

Diad: group of two, a pair.

Diaxial: said of chelicerae extending downwards with fangs closing towards midline.

Dionychous: possessing two claws on tarsus.

Dorsum: dorsal side of abdomen.

Ecribellate: without a cribellum and calamistrum.

Edentate: without teeth.

Embolus: intromitted part of male palpal bulbus, usually slender, sharp-tipped and strongly sclerotized, carrying terminal part of sperm duct.

Endite: basal segment of palp, also called the maxilla or gnathocoxa.

Endite heel: innermost extremity of endite adjacent to anterior tip of labium.

Endosternite: internal sclerite, a remnant of abdominal segmentation.

Entelegyne: refers to spiders with an epigyne, with separate ducts for sperm transport during insemination (towards spermathecae) and fertilization (towards uterus); see haplogyne.

Entrance ducts: ducts in entelegyne epigynes leading from copulatory opening to spermathecae.

Epiandrous: a structure on the abdominal venter in the male, in the vicinity of the epigastric furrow.

Epigastric furrow: a transverse slit on anterior part of ventral side of abdomen. The anterior pair of booklungs opens at edge of furrow as do the gonopores.

Epigyne (p = epigynes): a chitinous plate on ventral side of female abdomen in which the genital openings are located; it is only fully developed in adult females of entelegyne spiders; spiders belonging to Mygalomorphae and 'haplogyne' Araneaomorphae do not have an epigyne.

Eye formula: position of eyes is often expressed by digits separated by colons (e.g.: 2:2:2:2 = eyes in four rows comprising two eyes each; 6:2 = eyes in two rows, first row with six, second with two eyes).

Fang: distal part of the chelicerae.

Femur (p = femora): see legs and palpi.

Fertilization ducts: ducts in entelegyne epigynes leading from spermathecae to uterus.

Fissidentate: teeth having more than one point.

Folium (p = folia): leaf-shaped pattern on dorsum of abdomen.

Fovea (p = foveae): a central depression on cephalothorax, often reduced to a longitudinal dark stripe, corresponding with an internal ridge to which muscles are attached.

Fused chelicerae: chelicerae fused together, sometimes only at base or along entire length.

Genital opening: in female the opening of uterine duct in epigastric furrow between booklungs; in males the opening of duct from testes in furrow between booklungs.

Gnathocoxa (p = gnathocoxae): basal segment of palp, also called the maxilla or endite.

Gumfoot web: space web with strands of silk provided with sticky droplets near distal attachment point.

Haplotracheate: median trunks of tracheae unbranched, confined to the abdomen (see desmitracheate).

Haematodocha (p = haematodochae): membranous, inflatable part of bulbus in male palp.

Haplogyne: refers to spiders lacking an epigyne and thus having only one pair of ducts for transport of sperm from uterus to spermathecae during insemination and back to uterus for fertilization; see entelegyne.

Hinged hair: long dark seta with hinged base giving it, unlike ordinary setae, a flexible direction.

Hirsute: hairy.

Intercoxal sclerites: small sclerites between coxae of legs, sometimes connecting sternum and carapace.

Labiosternal junction: junction between labium and sternum, sometimes absent when these sclerites are fused.

Labium (p = labia): sclerite situated between endites in front of sternum.

Labrum (p = labra): upper lip; mouthpart concealed by chelicerae.

Labral spur: short thorn-like extension of labrum.

Lamina (p = laminae): flat, most often translucent, sclerotized excrescence, e.g. on retromargin of chelicerae in some spiders.

Laterigrade: refers to spiders that move like a crab, with legs directed to the side (opp. prograde).

Legs: consist of seven segments: coxa, trochanter, femur, patella, tibia, metatarsus and tarsus. Legs are numbered from the front I to IV.

Leg formula: relative length of legs represented by four numbers in sequence of longest to shortest e.g. 4123 = fourth leg is longest and third leg shortest.

Male palp: refers to the modified tarsus of the palp in male spiders; a copulation organ, not in direct connection with testes. Consists of an enlarged and hollow tarsus (cymbium), sometimes split in two (cymbium and paracymbium), bearing the sexual organs. These vary greatly in shape and complexity and are the most important characters for species identification in male spiders.

Mating spur: strong spur usually present on leg I of males, used during mating.

Maxilla (p= maxillae): see endites.

Median apophysis: an apophysis of male palpal bulbus, usually with membranous insertion.

Metatarsus (p = metatarsi): see legs.

Monophyletic: refers to a systematic grouping which is considered to be natural; in contrast to polyphyletic.

Median ocular quadrangle (MOQ): quadrangle limited by four median eyes.

Median septum: longitudinal sclerite on floor of epigynal atrium.

Notched: describes trochanters with a ventral indentation on distal margin.

Nubbin: a non-functional spigot, usually knob shaped; often a vestige of a spigot that was functional earlier in evolution. Ampullate spigots are more numerous in ancestral Araneomorphae and tend to be replaced by nubbins before they completely disappear.

Onychium (p = onychia): ventral extension of tip of tarsus bearing the claws.

Opisthosoma: see abdomen.

Ostia (s = ostium): slight dilatations with openings of the main hemolymph vessel in the opisthosoma.

Palea (p = paleae): distal, at least partially membranous part of tegulum, well separated from rest of sclerite.

Palp (p= palpi): also called pedipalp; second appendage of cephalothorax in front of leg I, composed of endite, trochanter, femur, patella, tibia and tarsus. This appendage is modified into a copulatory organ in male spiders.

Paracymbium (p = paracymbia): appendage of cymbium on male palp, may be a separate sclerite.

Paraxial: said of chelicerae extending forwards, with fangs closing towards abdomen.

Patella (p = patellae): see legs and palpi.

Paturon: basal segment of the chelicerae.

Pedicel: narrow connection between cephalothorax and abdomen.

Pedipalp: see palp.

Peg teeth: cheliceral teeth in sockets, consisting of short, stout spines on promargin or retromargin of chelicerae.

Petiolus: see pedicel.

Plesiomorphy: ancestral character.

Pleural bars: narrow, horizontal sclerites between coxae and carapace, sometimes connecting intercoxal sclerites.

Plagiognathy: fangs directed obliquely (as apposed to orthognathy or labidognathy)

Pluridentate: having more than one tooth.

Polyphyletic: refers to an artificial grouping of taxa (in contrast to monophyletic, which designates a natural grouping).

Porrect: describes chelicerae directed forwards.

Posterior lateral eyes (PLE): eyes at each end of posterior row.

Posterior median eyes (PME): two intermediate eyes in posterior row.

Precoxal sclerites: small sclerified extensions between sternum and leg coxae.

Preening brush: dense cluster of setae near ventral tip of posterior metatarsi.

Preening comb: a transverse row of stiff setae at ventral tip of posterior metatarsi.

Procursus: a term restricted to Pholcidae where it is used to indicate the strongly developed, often cylindriform paracymbium.

Procurved: describes a structure or a row in which outer edges are in front of the central part.

Prograde: describes spiders with legs directed forwards (I, II) and backwards (III and IV) (opp. laterigrade).

Promargin: dorsal margin of cheliceral furrow.

Prosoma: anterior part of a spider including cephalothorax and its appendages.

Radial anastomosis: radii of web join before reaching the hub.

Rastellum (p = rastella): rake-like structure at extremity of chelicerae in Mygalomorphae, often reduced to a few strong spines; used for burrowing.

Rebordered: with a thickened edge; describes a sclerite in which the margin is thicker than the main part.

Receptaculum (p = receptacula): see spermathecae.

Recurved: describes a structure or a row in which outer edges are behind the central part.

Retromargin: ventral or posterior margin of cheliceral furrow.

Sclerite: a single sclerotized part of external, hardened tegument.

Scapus (p = scapi): an elongate narrow, linguiform (tongue-shaped) appendage of the epigyne.

Scopula (p = scopulae): a brush of setae on either promargin of chelicerae, distal end of endites or the ventral side of terminal leg segments; improves grip on substrate or prey.

Scutum (p = scuta): sclerotized plate on abdomen of some spiders.

Secondary eyes: three eye pairs; anterior lateral eyes, posterior median eyes and posterior lateral eyes, used primarily as movement detectors.

Semichelate: chelicerae in which the fang has restricted mobility.

Serrula (p = serrulae): a row or cluster of tiny teeth along anterior margin of endite, often only visible as a dark line.

Serrated bristle: type of seta that is slightly curved, bearing serrations along one side.

Seta (p = setae): hair-like, tapered and flexible structure on legs and body (*cf.* spine and trichobothrium).

Sperm duct: duct in tegulum of male palp for storing sperm, connected to embolus.

Spermatheca (p = spermathecae): bladder-like structures with glandular lining in vulva of females for storing sperm after insemination.

Sigilla (s = sigillum): circular impressions on sternum of some Mygalomorphae and dorsum in some Araneomorphae, corresponding with internal muscular attachment.

Spigots: tiny cusps or cylindrical excrescences at apex of spinnerets from which silk emerges.

Spine: pointed, rigid structure on body and legs, usually articulating.

Spinnerets: appendages of abdomen, arranged in several pairs but reduced to three in most spiders, anterior lateral, posterior median and posterior lateral (here often called resp. anterior, median and posterior spinnerets). Provided with small spigots from which the silk emerges. The anterior median spinnerets are either replaced by a cribellum, a colulus or are totally absent.

Spinules: short spines, almost as thick as they are long.

Spiracle: see tracheal spiracle.

Spur: a cuticular appendage heavier than a spine.

Squamate: with small scales (in connection with tegument).

Stabilimentum (p = stabilimenta): band of dense silk in a web.

Sternum: large sclerite on ventral side of cephalothorax situated between leg coxae and behind the labium.

Stria (p = striae): paired depressions; usually three pairs of darkened stripes radiating from fovea.

Stridulating organ: a series of thin ridges on a sclerite, forming a stridulating file; corresponds with a series of short stiff setae on another part of the body that can be scraped along the file to make a stridulatory sound.

Sustentaculum: a thick macroseta with bent tip situated behind the accessory claws on tarsi IV.

Synapomorphy: shared derived characters.

Tapetum (p = tapeta): a light-reflecting layer in secondary eyes (ALE, PME and PLE); eyes appear pale in colour; assumed to be used for nocturnal vision.

Tarsal claws: situated at tip of tarsus; either a single pair, often concealed in a claw tuft, or a pair and a third single claw, which is much smaller and situated under the paired, usually pectinate claws (= provided with a row of saw-like teeth).

Tarsal organ: a sensory receptor, most often a tiny depression on dorsal side of tarsus; in some families well developed, projecting above surrounding tegument and clearly discernible.

Tarsus (p = tarsi): see legs.

Tartipores: traces of the insertion of spigots representing the position of the spigots during the previous instar.

Tegulum: part of the bulbus housing sperm duct which ends in embolus.

Tegument: external cuticular skin.

Tenent setae: tubular setae with expanded tips present on tarsi to assist in gripping.

Terminal apophysis: most apical sclerite that inserts into embolus via a distal haematodocha.

Thoracic region: posterior part of cephalothorax.

Tibia (p = tibiae): see legs and palps.

Tibial apophysis: an apophysis on tibia of male palp in some spiders.

Tibial suture/crack: present ventrally on tibia in some genera of Miturgidae.

Trachea (p = tracheae): thin, sclerotized, internal tubes, part of respiratory system in many Araneomorphae, opening on venter of abdomen through a trachea spiracle.

Tracheal spiracle: opening of tubular tracheae, a small slit on abdomen.

Triad (p = triads): a group of three. If referring to spinnerets: the three spigots on the posterior lateral spinnerets that produce sticky silk. The central one provides the supporting line from the flagelliform silk gland, while two spigots on either side coat the line with liquid silk from the two aggregate silk glands.

Trichobothrium (p = trichobothria): supple, hair-like structure of variable length, on legs and palpi, implanted in shallow alveolus (*cf*. seta and spine).

Triplet: synonymous with triad in the context of spinneret spigots.

Trochanter (p = trochanters): see legs and palpi.

Unidentate: having one tooth.

Venom gland: venom-secreting gland within cephalothorax; duct opens at tip of fang.

Venter: lower, ventral side of abdomen.

Vulva: internal structure of female copulatory organs, including entrance ducts, spermathecae and fertilization ducts (in entelegyne spiders); internal genitalia including ducts and spermathecae (in haplogyne spiders).

Keys

Spiders with remarkable characters

General appearance:

– Very large and hairy spiders ..... Theraphosidae

Characters of the **legs**

– Frontal tarsi of large anterior legs with large prolateral scopula, carapace oval ..... Palpimanidae
– Frontal tarsi of large frontal legs with prolateral scopula, carapace diamond-shaped ..... Stenochilidae
– Paired tarsal claws very different in size ..... Gradungulidae
– Three leg pairs directed forward, instead of two ..... Segestriidae

Characters of the **carapace**

– Outline of carapace diamond-shaped as seen from above ..... Stenochilidae
– Anterior median eyes are very large ..... Salticidae
– Posterior median eyes are very large ..... Deinopidae
– Anterior part of carapace, the 'head', strangely modified but not drawn out into a neck ..... Linyphiidae (Erigoninae) or Theridiidae (*Argyrodes*)
– Anterior part of carapace drawn out into a neck ..... Archaeidae (check related families)
– Chelicerae strangely modified, provided with horn-like projections or digging scape ..... Ammoxenidae

Characters of the **abdomen**

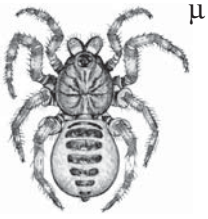
– Abdomen segmented; spider with seven or eight spinnerets ..... Liphistiidae
– Abdomen sharply truncated (phragmotic) ending in sclerotized plate that is used to seal the burrow ..... Ctenizidae (*Cyclocosmia*); Idiopidae (*Galeosoma*, *Idiosoma*)
– With conspicuous large, haired anal tubercle ..... Oecobiidae
– Abdomen provided with longitudinal lateral scutae ..... Tetrablemmidae
– Abdomen with numerous spines ..... Araneidae (Gasteracanthinae; *Pycnacantha*) or Theridiidae ..... (*Phoroncidia*); Theridiosomatidae (*Chtonos*), Chummidae
– Abdomen decorated with strong tubercles or setae ..... (Araneidae: Gasteracanthinae; *Pycnacantha*)
– Abdomen very long, extending past spinnerets ..... (Araneidae, e.g. *Poltys*, *Arachnura*); ..... Thomisidae (e.g. *Monaeses*); Theridiidae (*Argyrodes* spp.)
– Abdomen strangely shaped ..... Theridiidae (*Phoroncidia*)

Characters of the **spinnerets**

– Spinnerets arranged in a line ..... Hahniidae
– Posterior lateral pair of spinnerets as long as abdomen, and long distal segment provided with spigots all along its median side ..... Hersiliidae
– Posterior pair of spinnerets as long as abdomen, long distal segment devoid of spigots all along its median part ..... Dipluridae
– Anterior median spinnerets advanced on ventral side of abdomen and their extremity provided with long fine setae ..... Prodidomidae
– With seven or eight spinnerets ..... Liphistiidae

The main sections

1. – Abdomen segmented (μ); 7 or 8 spinnerets in centre of venter ..... Mesothelae (Liphistiidae) (p. 156)
   – Abdomen not segmented; spinnerets bear on posterior end of abdomen ..... Opistothelae 2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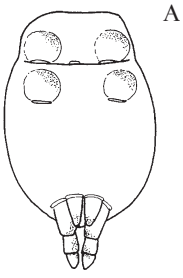
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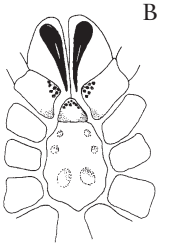
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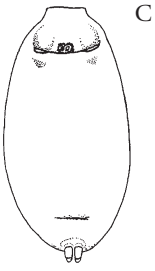
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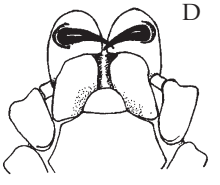
2. – Two pairs of booklungs (A); fangs closing in longitudinal axis (paraxial) (B) ..... Section 1: Mygalomorphae (p. 29)
   – One pair of booklungs (C) or absent; fangs closing in transverse axis (D): ..... Araneomorphae 3
3. – Cribellum (E) and calamistrum (F) present, sometimes absent in males ..... Section 2: Cribellate spiders (p. 31)
   – Cribellum and calamistrum absent 4
4. – Fewer than eight eyes ..... Section 3 (p. 33)
   – Eight eyes 5
5. – Tarsus with two claws (G) ..... Section 4 (p. 35)
   – Tarsus with three claws (H) ..... Section 5 (p. 39)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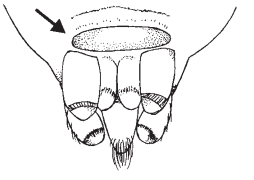
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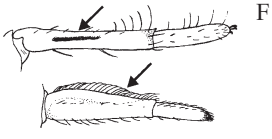
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G


H

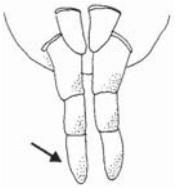
Section 1: Mygalomorphae

1. – Leg tarsi with two claws 2
   – Leg tarsi with three claws 4

2. – Tegument scaly, encrusted with soil; usually twoclaws but legs I and II sometimes with 3-claws; scopula and claw tufts absent or weak ..... PARATROPIDIDAE
   – Tegument not scaly; claw tufts and scopula present, scopula on metatarsi and tarsi usually forming thick pads of iridescent hair surrounding and obscuring paired tarsal claws 3

3. – Leg tarsi with clavate trichobothria over their length (>6) (I); apical segment of posterior spin nerets long and finger-like (J); anterior lobe of endites well-developed; clypeus frequently wide ..... THERAPHOSIDAE
   – Leg tarsi with few (4-6) clavate trichobothria basally or none; apical segment of posterior spinnerets short and dome-shaped (K); anterior lobe of endites not well-developed (L); clypeus not wide ..... BARYCHELIDAE


I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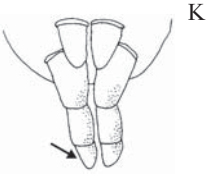
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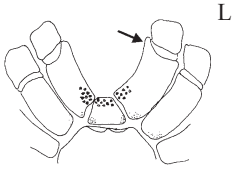

L

4. – Booklung openings small, oval (M); body covered with blunt-tipped or clavate setae (M) .. .. MICROSTIGMATIDAE
   – Booklung openings slit-like (A); body without blunt-tipped or clavate setae 5

5. – Abdomen dorsally with sclerites or scutum (N) 6
   – Abdomen without sclerites 8

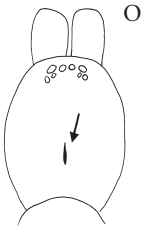
6. – Fovea longitudinal (O); apical segment of posterior spinnerets pseudosegmented .... MECICOBOTHRIIDAE
   – Not as above 7

7. – Endites strongly elongated and curved (P); cephalic region strongly elevated; chelicerae well-developed almost same length as carapace, fangs long (Q) ..... ATYPIDAE
   – Not as above ..... ANTRODIAETIDAE

8. – Fangs short, directed obliquely (R) 9
   – Not as above 10


M


N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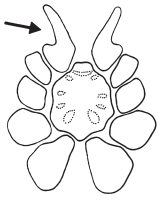
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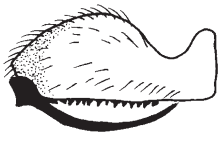
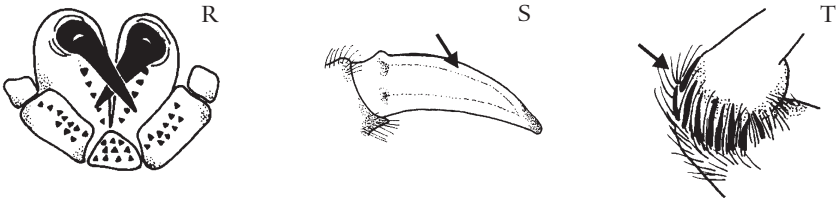
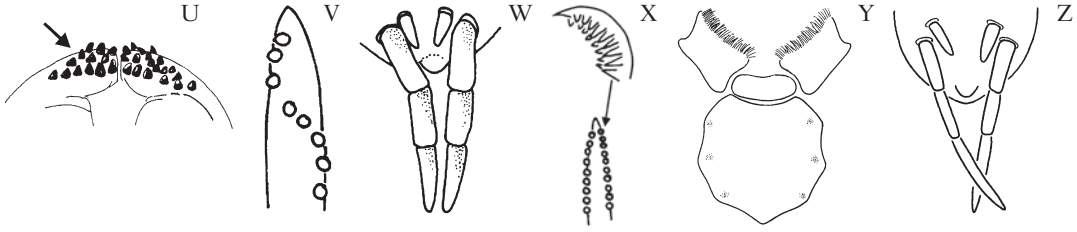

Q

9. – Fangs with longitudinal keels on the outer surface (S); rastellum absent ..... MIGIDAE
– Fangs without keels; rastellum present (T) ..... ACTINOPODIDAE



10. – Rastellum absent or if present weak spines 11
– Rastellum distinct (U) 13

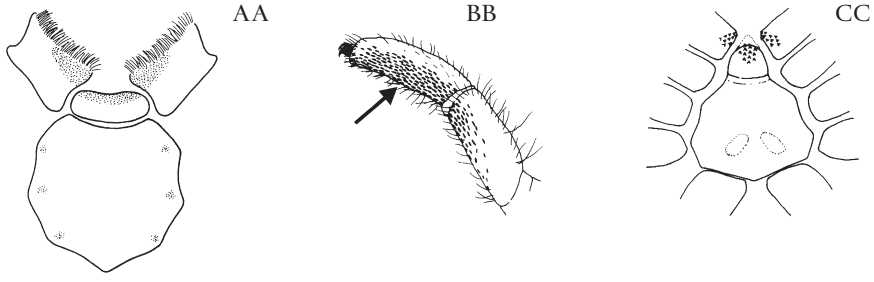
11. – Leg tarsi without scopulae (sometimes present in males); paired tarsal claws with one row of teeth (V); posterior spinnerets usually very long and slender (W) 12
– Leg tarsi with scopulae; paired claw with two rows of teeth (X); posterior spinnerets shorter ..... NEMESIIDAE



12. – Labium without numerous cuspules (Y); posterior spinnerets very long and widely spaced (Z) ..... DIPLURIDAE
– Labium with numerous cuspules (AA); posterior spinnerets long or short but with digitiform apical segment ..... HEXATHELIDAE

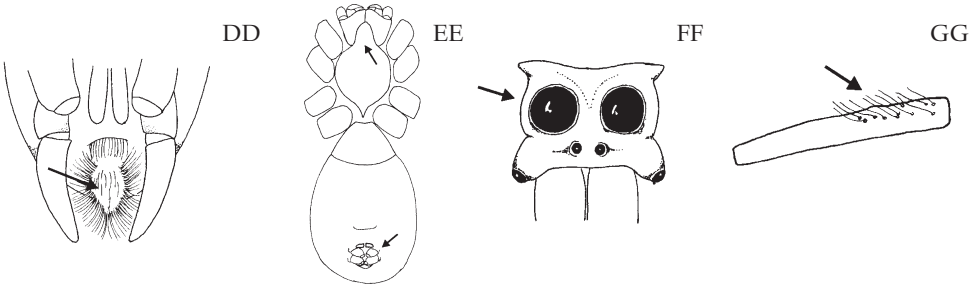
13. – Front legs of female with lateral bands of short thorn-like spines distally (BB); legs short; sternum triangular (CC) ..... CTENIZIDAE
– Not as above 14

14. – Front legs often shorter and thicker than legs IV; anterior paired tarsal claws biserially dentate in females (X), S-shaped in males (V) ..... CYRTAUCHENIIDAE
– Legs different; anterior paired tarsal claws with one medial row of teeth, single row or S-shaped in males ..... IDIOPIDAE



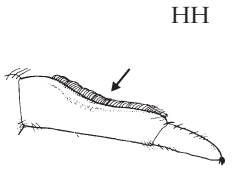
Section 2: Araneomorphae: Cribellates*

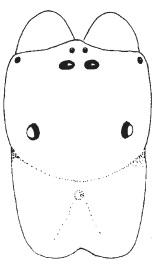
1. – Anal tubercle large, two-jointed with fringe of long curved setae (DD) ..... OECOBIIDAE (in part)
   – Anal tubercle normal, a single segment 2
2. – Labium fused to sternum (EE); eyes in a compact group on a slight hump; spinnerets advanced, located ventrally instead of terminally (EE); carapace narrowed anteriorly; haplogyne ..... FILISTATIDAE
   – Labium not fused to sternum; eyes, spinnerets and carapace not as above; entelegyne 3
3. – Posterior median eyes enlarged, at least two to four times as large as anterior median eyes (FF); anterior leg pairs very long and slender (three or more times body length) ..... DEINOPIDAE
   – Posterior median eyes not greatly enlarged; front legs not as long or only the first pair greatly elongated 4

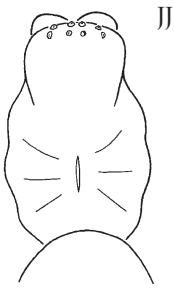


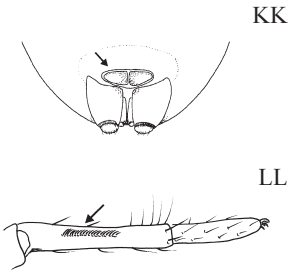
4. – Femora with rows of long trichobothria (GG); metatarsi IV compressed and curved under line of calamistrum (HH); first pair of legs clearly longer than second pair ..... ULOBORIDAE (except *Hyptiotes*)
   – Femora without rows of long trichobothria; metatarsi IV not compressed and curved; first pair of legs not longer 5
5. – Carapace rectangular (II); ocular area long, anterior lateral eyes and posterior lateral eyes more than 4 times their diameter apart ..... ERESIDAE
   – Carapace narrowed in front (JJ); ocular area shorter, anterior lateral eyes and posterior lateral eyes less than 4 times their diameter apart 6
6. – Calamistrum extends over almost entire length of metatarsi IV, which may be slightly curved (HH) 7
   – Calamistrum extends over part of metatarsi IV only (LL) 8
7. – Endites parallel; abdomen dark, patternless or with pale spots; male palp with both pro- and retrolateral apophyses ..... TITANOECIDAE
   – Endites converging; abdomen with dark pattern on a pale background .... DICTYNIDAE
8. – Cribellum divided (KK) 9
   – Cribellum undivided 13

* Miturgidae not included.

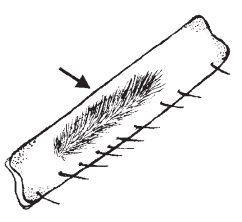


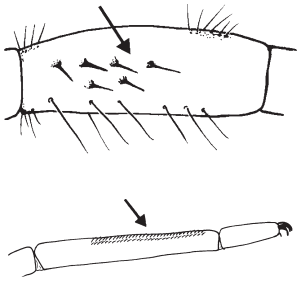


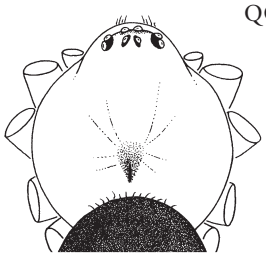




9. – Calamistrum consists of three or four rows of short setae; three tarsal claws and claw tufts ..... PSECHRIDAE
   – Calamistrum one or two rows or a brush of setae 10
10. – Calamistrum an oval brush (NN) 11
    – Calamistrum linear (PP) 12
11. – Three tarsal claws ..... TENGELLIDAE (in part)
    – Two tarsal claws ..... ZOROPSIDAE



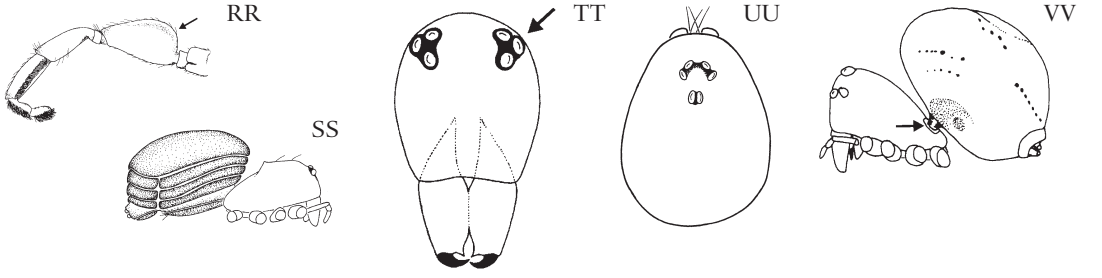




12. – Palpal femora with a group of enlarged and modified setae on prolateral side (OO); metatarsi I of male modified ..... PHYXELIDIDAE
    – Not as above ..... STIPHIDIIDAE and AMPHINECTIDAE
13. – Tarsal claws of anterior legs dissimilar in size ..... GRADUNGULIDAE (in part)
    – Both claws of similar size 14
14. – Calamistrum an oval brush (NN) ..... ZOROPSIDAE and TENGELLIDAE (in part)
    – Calamistrum linear (PP) 15
15. – Calamistrum with two rows of setae (PP); serrula with several rows of teeth ..... HYPOCHILIDAE
    – Calamistrum with one row of setae only; serrula not as above 16
16. – Calamistrum occupying central third of metatarsus IV ..... AUSTROCHILIDAE
    – Calamistrum at base of metatarsus IV 17
17. – Carapace clearly wider than long or rarely as wide as long (QQ); male palpal tibia with dorsal apophysis ..... NICODAMIDAE
    – Carapace longer than wide; male palpal tibia with retrolateral apophysis ..... AMAUROBIIDAE

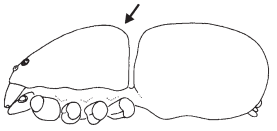
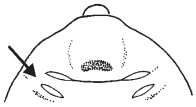
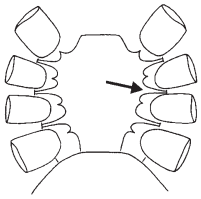
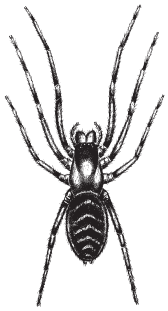
Section 3: Araneomorphae: Ecribellate: less than 8 eyes

1. – Anterior pair of legs much stronger than other legs; metatarsi and tibiae I with strong prolateral scopulae (RR); six eyes ..... PALPIMANIDAE (in part)
   – Anterior pair of legs different 2
2. – Abdomen with a dorsal, several ventral and 3-4 narrow lateral scuta (SS); 2, 4 or 6 eyes .... TETRABLEMMIDAE
   – Abdomen without scuta or only dorsal and ventral scutum 3
3. – Two eyes ..... CAPONIIDAE (in part)
   – Six eyes 4
4. – Eyes in two well separated triads (TT) ..... PHOLCIDAE (in part)
   – Eyes arranged otherwise 5



5. – Eye formula 4.2 (UU); chelicerae with numerous teeth; body ≤3mm ... LEPTONETIDAE
   – Eye formula different; fewer teeth on cheliceral promargin 6
6. – Metatarsi shorter than tarsi; very small spiders 7
   – Metatarsi longer than tarsi 9
7. – Chelicerae fused at least at base; labral spur absent; abdominal scuta absent; eye region not strongly raised; female palp tiny or absent ..... SYMPHYTOGNATHIDAE
   – Chelicerae not fused; male with scutum; carapace strongly raised; female palp present 8
8. – Median anterior labral spur projecting between chelicerae (seen when spread apart); no peg teeth; eye region strongly raised; pedicel originating from foramen in posterior declivity of carapace (VV) ..... ANAPIDAE (in part)
   – No labral spur; chelicerae with peg teeth at least in males; eye region less strongly raised; pedicel originating from under carapace ..... MICROPHOLCOMMATIDAE
9. – Carapace domed towards thoracic region (WW); female epigastric region with anchoring holes ..... SCYTODIDAE
   – Carapace differently shaped 10
10. – Tracheal spiracles distinct, anteriorly positioned, just behind epigastric groove (XX), book-lungs may be replaced by pair of tracheae 11
    – Tracheal spiracle single, inconspicuous, positioned just in front of spinnerets 17
11. – Total body length of adult > 5 mm (a few exceptions in Dysderidae) 12
    – Total body length of adult < 5 mm 14

WW XX YY ZZ

12. – Anterior tarsal claws bipectinate ..... PERIEGOPIDAE
– Anterior tarsal claws with one row of teeth 13

13. – Two tarsal claws; third pair of legs directed backwards; sternum extended around coxae (YY) ..... DYSDERIDAE
– Three tarsal claws; third pair of legs directed forwards (ZZ); sternum normal..... ..... SEGESTRIIDAE

14. – Chelicerae originating from foramen in cephalothorax; cheliceral teeth replaced by pegs... ..... MECYSMAUCHENIIDAE
– Chelicerae not so; no cheliceral peg teeth 15

15. – Booklungs absent, replaced by a pair of tracheal spiracles situated on both sides of epigyne, legs very long and slender > 6 times carapace length ..... TELEMIDAE
– Booklungs present; legs < 2 timesbody length 16

16. – Female palp with claw; abdomen often with dorsal pattern; endites parallel; tarsi with clearly bipectinate claws and spatulated claw tufts (a) ..... ORSOLOBIDAE
– Female palp clawless; abdomen either with scuta or uniformly soft; endites converging; tarsal claws less well developed, without spatulated claw tufts ..... OONOPIDAE

17. – Anterior median eyes clearly larger than other eyes; cheliceral fangs short and thick (b); four spinnerets of which anterior pair large and closely set ..... ZODARIIDAE (*Trygetus*)
– All eyes similar in size; cheliceral fangs long and slender; six spinnerets 18

18. – Tiny (< 2.5 mm); eyes in two rows; male bulbus large and swollen; female copulatory opening extending laterally on abdomen in some genera (c) ..... OCHYROCERATIDAE
– Small to medium sized (> 4-15 mm); eyes in three-diads; male bulbus pyriform as usual in haplogynes; female copulatory opening ventral 19

a b c

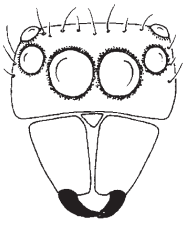
19. – Two claws ..... SICARIIDAE
– Three claws 20

20. – Sternum much longer than wide; chelicerae fused together at base ..... DIGUETDAE
– Sternum heart-shaped; chelicerae free ..... DRYMUSIDAE

Section 4: Araneomorphae: Ecribellate: 8 eyes: 2-claws

1. – Anterior pair of legs much stronger than other legs; distal segments of anterior leg pair with strong prolateral scopulae (RR) 2
   – Legs different 3
2. – Carapace roughly oval; sternum broadly produced and truncated between posterior coxae ..... PALPIMANIDAE (in part)
   – Carapace diamond-shaped with tuberculate tegument; anterior leg pairs with large scopula of spatulate setae on distal segments ..... STENOCHILIDAE
3. – Tarsal claws of anterior legs dissimilar in size ..... GRADUNGULIDAE (in part)
   – Both claws of similar size 4
4. – Eyes in three rows (4.2.2), rarely (2.2.2.2); anterior median eyes very large (d); jumping spiders ..... SALTICIDAE
   – Eyes arranged differently 5

d



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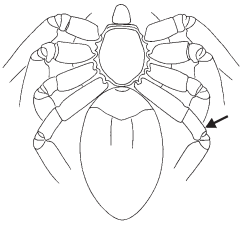

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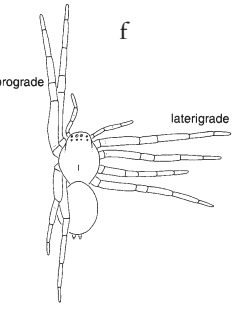

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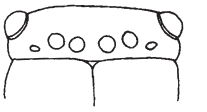
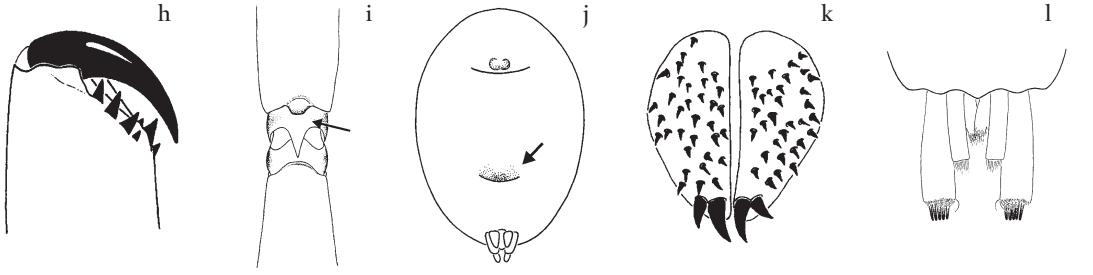


5. – Flat spiders with long trochanters and often extra elongate coxae IV(e); posterior eyes oval ..... TROCHANTERIIDAE
   – Coxae IV not much longer than other coxae 6
6. – Legs laterigrade*, directed towards side (f) 7
   – Legs prograde*, directed forwards (I, II) and backwards (III, IV) 10
7. – Flat spiders with eyes in two rows (6:2) (g) ..... SELENOPIDAE
   – Usually less flat but if so, eyes differently arranged 8
8. – Tarsi and metatarsi without scopulae; legs I and II usually much longer than legs III and IV ..... THOMISIDAE (except Bominae)
   – Tarsi and sometimes metatarsi with scopulae; legs different 9
9. – Small to medium-size spiders (3-16 mm); chelicerae without teeth or at most one on retromargin; tarsus-metatarsus allowing movement in one plane only ..... PHILODROMIDAE
   – Medium-size to large spiders (6-35 mm); chelicerae with at least two teeth (rarely one) on retromargin(h); membranous connection to metatarsus permits free movement of tarsus (i) ..... SPARASSIDAE
10. – Tracheal spiracle about 1/3 abdominal length from spinnerets (j) ..... ANYPHAENIDAE
    – Tracheal spiracle in front of spinnerets 11

* In preserved specimens it may be difficult to decide whether a spider is laterigrade or not; in case of doubt both possibilities should be tried.



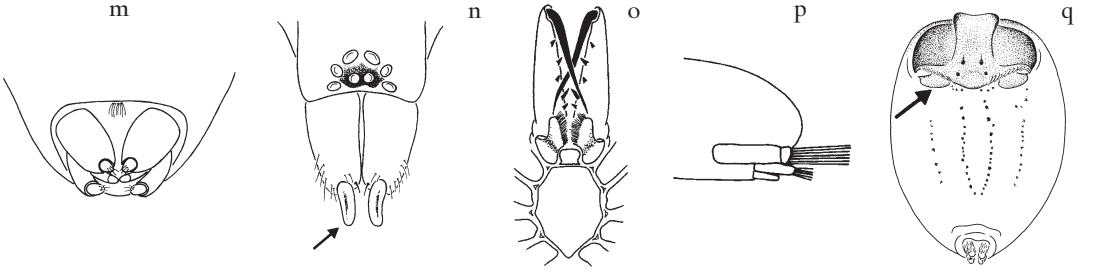
11. – All tarsi clearly curled (in preserved specimens), pseudo-segmented 12
– Tarsi straight, not pseudo-segmented 14

12. – Chelicerae strongly modified, with horn-like projections and many thorn-like setae (k) .... AMMOXENIDAE(*Ammoxenus*)
– Chelicerae normal 13

13. – Spinnerets long and cylindrical, far apart (l) ..... GNAPHOSIDAE(*Megamyrmaekion*)
– Spinnerets conical, not wide apart (m) ..... CITHAERONIDAE

14. – Posterior median eyes flat, without dome-shaped lens; endites obliquely depressed 15
– Posterior median eyes with dome-shaped lens; endites usually not obliquely depressed 19

15. – Claw on female palp smaller than surrounding setae; small (<3mm) African representatives tives (*Rastellus*) with modified chelicerae bearing a rastelliform digging scoop (n) .... AMMOXENIDAE
– Claw on female palp not smaller than surrounding setae; larger spiders; chelicerae not modified 16



16. – Spinnerets conical, not widely separated; anterior spinnerets with small apical segment; chelicerae moderately to greatly elongated (o) ..... GALLIENIELLIDAE
– Anterior spinnerets cylindrical; widely separated; spinnerets without small apical segment; chelicerae not greatly elongated 17

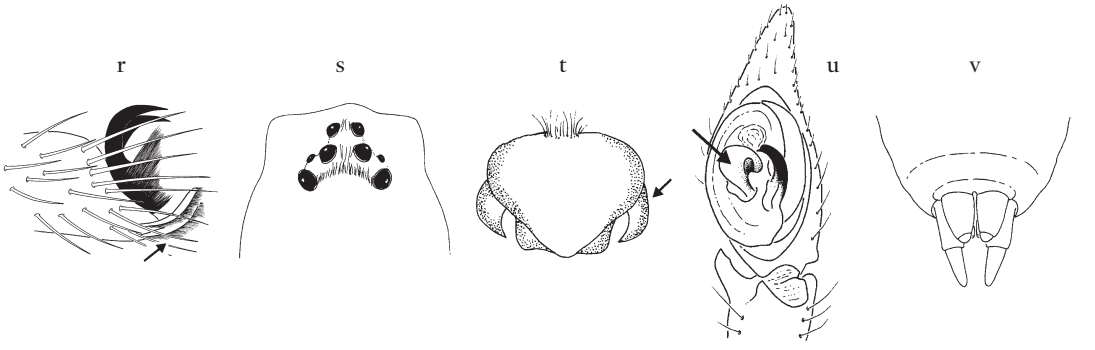
17. – Anterior spinnerets displaced forwards (p); spigots elongated with long plumose setae; eyes in circular arrangement or in two rows ..... PRODIDOMIDAE
– Anterior spinnerets terminal; without long setae on spigots; eyes in two rows 18

18. – Anterior lateral spinnerets one segment with enlarged piriform gland spigots (l); endites without median groove; abdomen without invaginated sclerites behind epigastric furrow .... GNAPHOSIDAE
– Anterior lateral spinnerets with two segments or distal interrupted ring, without modified piriform gland spigots; endites often with median groove; abdomen with invaginated sclerites behind epigastric furrow (q) ..... LAMPONIDAE

19. – Tarsi with auxiliary claws (r); sternum as wide as long, extended between posterior coxae ..... HOMALONYCHIDAE
– Tarsi without auxiliary claws; sternum mostly longer than wide 20

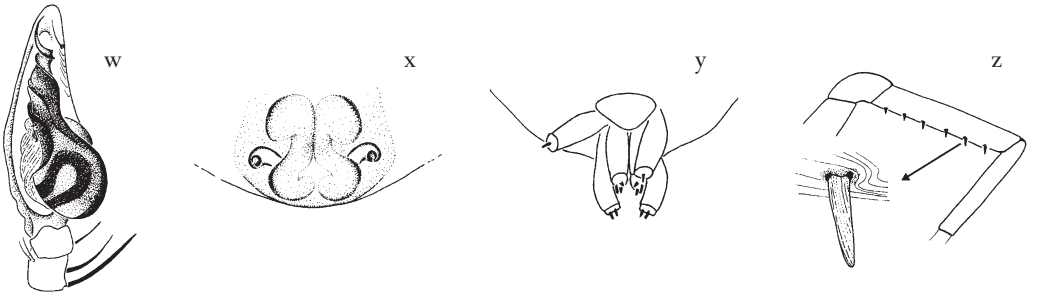
20. – Eyes in three rows (2:4:2); anterior lateral eyes situated just in front of posterior lateral eyes (s); anterior legs with numerous ventral pairs of spines; median apophysis in palp excavated or with basal process 21
– Eyes in two rows (4:4); epigyne without lateral horns; male palp with median apophysis different 22

21. – Epigyne with lateral horns (t); male palp with dorsally concave median apophysis (u) .... CTENIDAE
– Epigyne without lateral horns; retrolateral tibial apophysis of male palp with basal process ..... ZORIDAE



22. – Posterior spinnerets clearly two-segmented with distal segment distinctly conical (v) .... MITURGIDAE (in part Eutichurinae and Miturginae)
– Posterior spinnerets with one segment only or if two-segmented, distal segment rounded 23

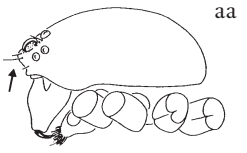
23. – Male palp pear-shaped with short distal embolus, without median apophysis (w); females with square-shaped epigyne with spherical spermathecae and entrance ducts shining through integument (x) ..... CORINNIDAE (in part Castianeirinae)
– Genitalia differently shaped 24



24. – Median spinnerets of female with three, posterior spinnerets with two large cylindrical gland spigots (y) 25
– Median and posterior spinnerets of female without such spigots 26

25. – Front legs at least in male with ventral cusps on frontal tibia and/or metatarsi (z); legs spineless if cusps absent; anterior median eye area not bulging; epigyne and booklung covers usually not united in sclerotized plate ..... CORINNIDAE (in part Trachelinae)
– Legs with spines, front legs without cusps; anterior median eye area often bulging, resulting in retreating or concave clypeus (aa); epigyne and booklung covers often united in single sclerotized plate ..... CORINNIDAE (in part Corinninae)

26. – Median spinnerets of females laterally flattened, with at least one row of large spigots (bb) ..... LIOCRANIDAE
– Median spinnerets of females not flattened, without rows of large spigots (cc) .... CLUBIONIDAE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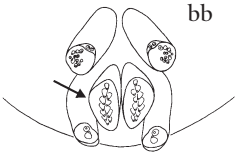
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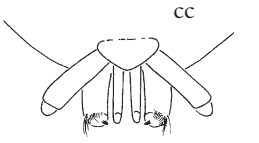
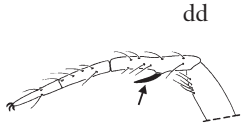

cc

Section 5: Araneomorphae: Ecribellate: 8 eyes: 3-claws*

1. – Carapace with anterior foramen completely surrounding cheliceral bases; chelicerae often with peg teeth 2
   – Carapace not with foramen surrounding chelicerae 5
2. – Foramen completely sclerotized also on ventral side; entelegyne or haplogyne; 2 or 6 spinnerets 3
   – Ventral part of foramen membranous; entelegyne; 2 spinnerets; chelicerae without peg teeth ..... HOLARCHAEIDAE
3. – Cephalic area of carapace strongly drawn out forming a neck; chelicerae with row of small peg teeth; 6 spinnerets; haplogyne ..... ARCHAEIDAE
   – Carapace raised but not drawn out into a neck; chelicerae without long row of small peg teeth 4
4. – Two spinnerets; haplogyne ..... MECYSMAUCHENIIDAE
   – Six spinnerets; entelegyne ..... PARARCHAEIDAE
5. – Tiny spiders, body length less than 2 mm; metatarsi same length or shorter than tarsi ... 6
   – Larger spiders or if tiny, metatarsi longer than tarsi 9



6. – Pedicel originating from circular rimmed cavity on posterior declivity of carapace (VV).... ..... ANAPIDAE (in part)
   – Pedicel originating from below carapace 7
7. – Male with clasping spur (= strong spine) on metatarsus I (dd); anterior femora with circular ventral patch ..... MYSMENIDAE
   – Male without clasping spur; femoral patch absent 8
8. – Chelicerae with toothed keel ..... SYNAPHRIDAE
   – Chelicerae without toothed keel; at least males with peg teeth .... MICROPHOLCOMMATIDAE (in part)
9. – Posterior spinnerets large, situated behind row formed by anterior and median spinnerets (ee); anterior median eyes large, other eyes arranged in semicircle around them (ff) or absent; carapace and legs orange, abdomen pale ..... CAPONIIDAE
   – Spinnerets, eyes and coloration different 10
10. – Haplogyne spiders with endites provided with basal spur; chelicerae connected ventrally over half their length ..... PLECTREURIDAE
    – If haplogyne, then endites without basal spur; chelicerae not joined 11
11. – Tarsi with trichobothria, often in a row 12
    – Tarsi without trichobothria 26

* Not included : ecribellate Stiphidiidae and Tengellidae; only Desis in Desidae.

12. – Eyes either in three to four rows or in three groups 13
– Eyes in two rows 19

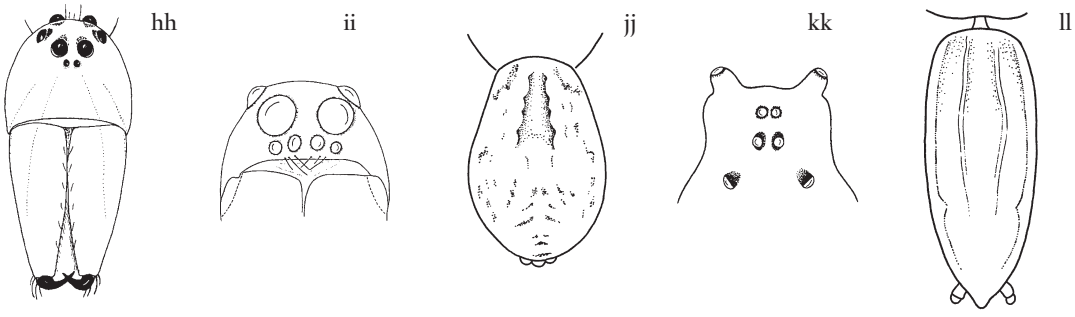
13. – Eyes in three or four rows: 2.2.2.2; 2.4.2; 4.2.2 or 2.2.4 14
– Eyes in three rows 4.2.2; carapace broad, raised towards the back (gg) ..... PISAURIDAE (in part)

14. – Eyes in two or three rows (2.4.2) with posterior eyes much larger than anterior ones ..... CYCLOCTENIDAE
– Eyes in different position or posterior eyes not much larger than anterior ones 15

15. – Eyes 2.2.4; fangs at base almost as thick as long; no serrula; trochanters not notched ..... ZODARIIDAE (in part, Cydrelinae)
– Eyes 2.2.2.2; 4.2.2 or 2.4.2; trochanters notched 16

16. – Clypeus very high; posterior eyes and anterior lateral eyes forming a hexagonal group in front of small anterior median eyes (hh); numerous long spines on legs ..... OXYOPIDAE
– Clypeus not as high; eye position and setae on legs different 17

17. – Eyes sessile, not on tubercles (ii); abdomen oval, smoothly rounded posteriorly (jj); male palpal tibiae without retrolateral apophysis; egg cocoon carried attached to spinnerets; anal tubercle with one segment.....LYCOSIDAE
– At least one pair of eyes on shallow tubercles (kk); abdomen usually elongate, tapered to back (ll); male palpal tibia with retrolateral apophysis; anal tubercle biarticulate 18



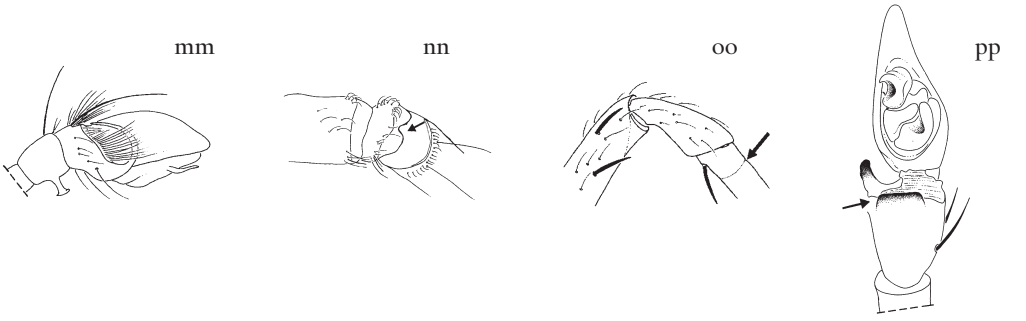
18. – Labium almost twice as long as wide; anterior lateral eyes rudimentary; egg cocoon deposited on substrate ..... SENOCULIDAE
– Labium hardly longer than wide; anterior lateral eyes normal; egg cocoon carried below sternum ..... PISAURIDAE (in part)

19. – Posterior spinnerets long and two-segmented; trochanters not notched 20
– Posterior spinnerets not particularly long or with one segment only; trochanters often notched 21

20. – Spinnerets in a single row; if not so, small spiders (<4mm) with distinct male palpal apophyses (mm) ..... HAHNIIDAE
– Spinnerets in normal arrangement; male palp different ..... AGELENIDAE

21. – Posterior leg pairs often with paired claws only; labium longer than wide, with distal margin notched; trochanters notched (nn); males with obvious crack at base of tibiae (oo)..... MITURGIDAE (in part)
– All legs with three claws; labium rarely longer than wide, distal margin not concave; trochanters may be unnotched; males without crack at base of tibiae 22

22. – Anterior lateral spinnerets closely set, with short dome-shaped distal segment; trochanters not notched ..... ARGYRONETIDAE
– Anterior spinnerets either with one segment or distal segment shaped differently; trochanters may be notched 23



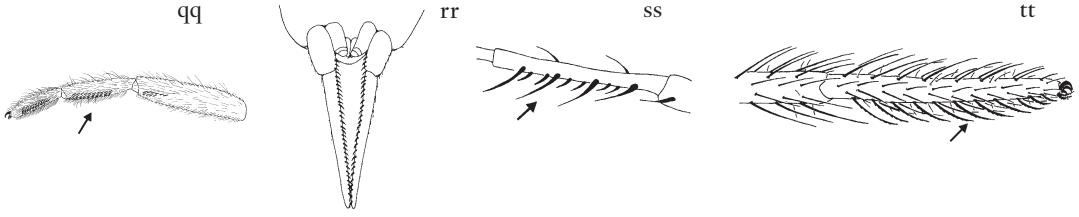
23. – Posterior eye row procurved or straight; no eyes on tubercles; abdomen oval sometimes elongate but widest medially; anterior spinnerets largest 24
– Posterior eye row recurved; some eyes on tubercles; anterior and posterior spinnerets not obviously different in length 25

24. – Small spiders (2.5-3 mm); abdomen with a frontal setose shield; claws with teeth in axis of claws; serrula present ..... CHUMMIDAE
– Usually larger spiders; abdomen without setose shield; claw teeth implanted on side facing opposite claw; serrula absent ..... ZODARIIDAE

25. – Abdomen usually widest near front, tapering towards back; male palpal tibia without ventrodistal refolded rim ..... PISAURIDAE (in part)
– Abdomen usually globose; male palpal tibia with ventrodistal refolded rim ..... TRECHALEIDAE

26. – Anterior pair of legs with prolateral scopulae (RR); uniform dark, red or orange carapace and uniform, paler abdomen 27
– Legs without prolateral scopulae; colour different 28

27. – Anterior legs much stronger than other legs; metatarsi and tibiae with strong prolateral scopulae composed of unmodified hairs ..... PALPIMANIDAE (in part)
– Anterior legs not much stronger than other pairs; prolateral scopulae composed of spatulate hairs (qq) ..... HUTTONIIDAE



28. – Posterior spinnerets long to very long, last segment at least three times longer than wide 29
– Posterior spinnerets not unusually long 30

29. – Anal tubercle very large (DD), with fringe of long hairs; posterior spinnerets curved around it; carapace almost circular ..... OECOBIIDAE (in part)
– Anal tubercle normal; carapace differently shaped; posterior spinnerets with a median row of spigots (rr) ..... HERSILIIDAE

30. – Eyes in three groups, anterior median eyes apart, remainder in two triads; legs thin and long, tarsi pseudosegmented ..... PHOLCIDAE
– Eye pattern and legs different 31

31. – Anterior tibiae and metatarsi with prolateral row of alternating long and short curved spines (ss); chelicerae with peg teeth ..... MIMETIDAE
– Legs without such spines 32

32. – Chelicerae large, parallel, directed forward; legs short andstrong; body and legs with dense cover of short hairs ..... DESIDAE (*Desis*)
– Chelicerae diverging if strongly developed; less hairy spiders 33

33. – Paracymbium a separate sclerite; tarsi usually cylindrical (anteriors sometimes fusiform); chelicerae often with stridulating file 34
– Paracymbium fused to cymbium or rudimentary; no cheliceral stridulating file; tarsi variable 35

34. – Small spiders (1.5-6mm); without dentate process on male palpal cymbium .... LINYPHIIDAE
– Larger spiders (5-12mm); with dentate process on male palpal cymbium ..... PIMOIDAE

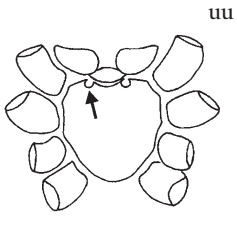
35. – Small spiders with deep alveolations and pair of sulci on carapace; abdomen with ventral unsclerotised area and two small sclerified pits behind epigastric fold .... MALKARIDAE
– No such alveolations, sulci or sclerified pits 36

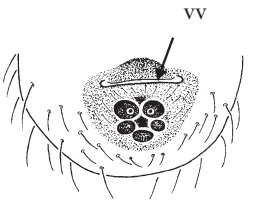
36. – Tarsi IV with ventral comb of serrated hairs (tt) (exceptions); brownish rings around eyes; femora without spines 37
– Tarsi without ventral comb of serrated hairs; eyes without brownish rings 38

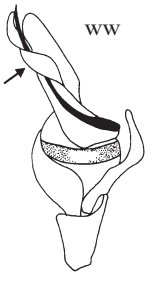
37. – Paracymbium small hook at distal promargin of cymbium; labium not rebordered; male palpal tibia broadened towards extremity with typical fan of widely spaced setae ..... THERIDIIDAE
– Paracymbium large, proximal; labium rebordered: palpal tibia different .... NESTICIDAE

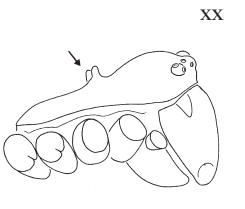
38. – Tiny spiders (<2.6mm); sternum broadly truncated with frontal pit organs (uu); group of trichobothria on tibia III ..... THERIDIOSOMATIDAE
– Sternum not pitted; no group of trichobothria on tibia III 39

39. – Small spiders; male with incised retrolateral cymbial margin; paracymbium excavated; sometimes with spur on palpal tibia or patella; base of femora often thickened ..... SYNOTAXIDAE
– Details of palp different 40









40. – Fairly large spiders; carapace broad; teeth on claws implanted on side facing opposite claw; chelicerae with single promarginal tooth ..... NICODAMIDAE (in part)
– Teeth on paired claws in longitudinal axis; chelicerae usually with more teeth 41

41. – Small spiders (< 3mm); tracheal spiracle wider than spinneret area (vv); tarsi tapered towards extremity; sheet webs; femora without spines ..... CYATHOLIPIDAE
– Larger spiders; tracheal spiracle much narrower than spinneret area; tarsi as thick at tip as at base; orb webs 42

42. – Male palp fairly simple, without median apophysis; conductor wrapping embolus (ww); paracymbium elongate or squat 43
– Male palp complex, with median apophysis; embolus not wrapped by conductor; paracymbium often hook-shaped; chelicerae often swollen but not modified for courtship; epigyne often with scape ..... ARANEIDAE

43. – Carapace with a pair of tubercles(xx); web huge, made of yellow silk .... NEPHILIDAE (in part *Nephila*)
– Carapace without paired tubercles; web colourless 44

44. – Chelicerae usually long or swollen, modified for courtship in males; sexual size dimorphism not pronounced; epigyne usually indistinct; web not appressed against substrate..... ..... TETRAGNATHIDAE
– Chelicerae not long and swollen; epigyne well developed; males much smaller than females (except *Clitaetra*); web close to or appressed against substrate ..... NEPHILIDAE (in part)

Spider webs

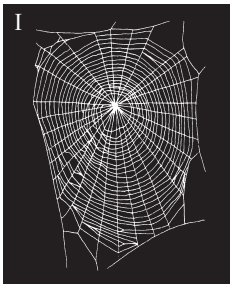
Although there are more hunting spiders than webbing spiders (see the introduction in Dippenaar-Schoeman & Jocqué, 1997), webs are the proverbial symbols of this group of animals. However, the variation of webs is enormous and although it would be an exaggeration to claim that webs are usually species specific, it might well be possible to make a key to genera based on web structure alone. Therefore, the present key only tries to give an idea of the main web types and to link them to the families or genera that construct these particular types. In many families, mainly those belonging to the Orbiculariae, webs vary greatly and different types of orbwebs can be found in one family (see Shear, 1986). Apart from the Araneidae, examples of such a large variety of webs are found in the Theridiidae (Benjamin & Zschokke, 2003) and the Pholcidae. The latter are usually found in so-called space webs, often completed with a prominent sheet, whereas some of them even have gumfooted webs (Briceño, 1985). In those cases, the key will only provide an approximation of the family the webbing spider belongs to. It is hoped that this first trial to create a key to spider webs will be an incentive to produce a more complete key in the future and stimulate observation of spider webs.

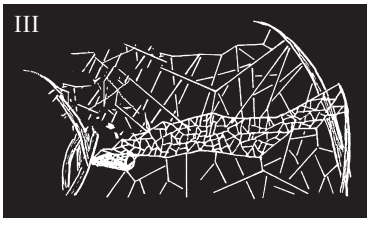
Mygalomorphae are only rarely mentioned as there is a great variation within the families (see Coyle, 1986). Mecysmaucheniidae and Micropholcommatidae are not included.

Key to spider webs

1a. Orbwebs: web roughly rounded, its main part constructed in a single plane; mesh clearly visible (I) 2

Note: Most Araneidae have a vertical web with closed hub, Tetragnathidae often have a horizontal web with open hub (see Zschokke, 1999; Kuntner 2005, 2006 for complete description).





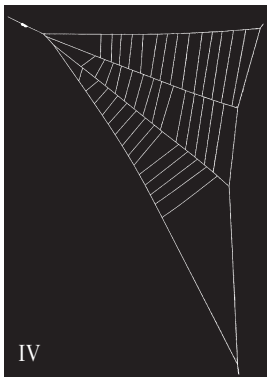
1b. Sheet webs: principal part of web a horizontal sheet which may be domed- or Hammock-shaped (II); mesh hardly visible, so called brushed webs (also check couplet 10) 12

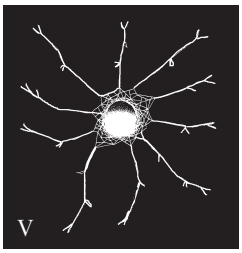
1c. Space webs: web tri-dimensional, lacks an obvious geometric structure although an ill defined sheet often present (III) 18

1d. Reduced webs: web consists of a reduced number of threads which are not appressed against substrate and may be kept in position by spider which is in fact part of web structure (IV) .... 23 (in case of doubt also try 2)

1e. Trip webs: the web consists of a few threads appressed against the substrate (V) usually radiating from a retreat in a hard substrate or a dense tangle 25

1f. Web mesh rectangular and responds to a fractal pattern in which polygons are added and gradually divided with additional strands of silk into smaller meshes (XVII) ..... Synotaxidae

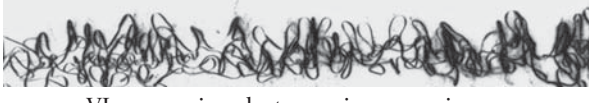




1g. Unusual webs: curtains, modified webs held by spider, webs derived from an orbweb but not looking like a rounded construction, 'lampshades' 27
1h. Communal webs: several similar spiders inhabit same web 34
Note: spiders of large araneomorphs may be inhabited by a number of males as well as numerous smaller kleptoparasitic spiders; these are not communal.
1i. Burrow with a trapdoor: found in Liphistiidae, many Mygalomorphae and only one family of Araneomorphae: Zodariidae.

2. – The web is made of blue-greyish cribellate silk, 'woolly' structure of threads often only visible under high magnification (VIa, VIb), often with central spiralled, rarely linear stabilimentum; number of spiral loops only about half the number of radii ..... Uloboridae
– Web provided with viscid silk and a sticky spiral (tiny drops of glue visible when web is held against a black background and illuminated from side (VII)); number of spiral loops exciding or equal to number of radii 3

3. – Web very large, with a small mesh and made of yellow silk (few exceptions) .... *Nephila* (Nephilidae)
– Silk colourless or very rarely greenish 4

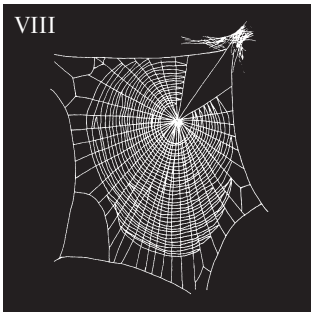


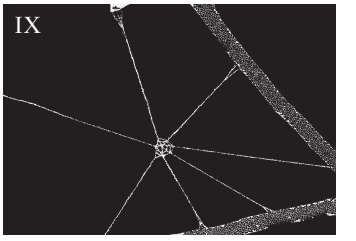
VIa. scanning electron microscope image

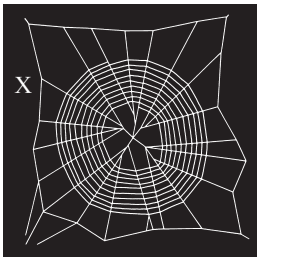
VIb. light micrtoscope image (courtesy S. Zschokke)

4. – Web hangs closely and parallel to a hard surface; hub with a cup and made under a solid shelter ..... Nephilidae (*Clitaetra, Herennia, Nephilengys*)
– Web hangs free, hub different 5

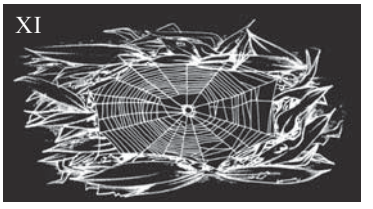
5. – Web lacks one or more sectors or otherwise incomplete..... 6
   – Web complete 7
6. – Web lacks a sector (VIII) ..... *Zygiella* (Araneidae)
   – Star-shaped web restricted to hub and radii (IX) ..... *Wixia* (Araneidae)

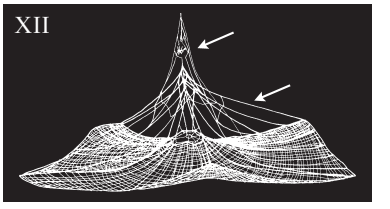


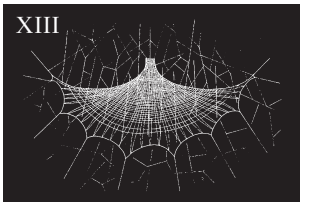




7. – Centre of web with radial anastomosis (radii converge before reaching centre of hub); tiny webs 8
   – Radii converge in centre of web (I) 10
8. – Web horizontal without out of plane radii (XI) ..... Symphytognathidae
   – Web with out of plane radii (XII) 9
9. – Web drawn up in centre and held under tension by owner (XII) .... Anapidae (in part), Theridiosomatidae (in part)
   – Web not drawn up in centre ..... Mysmenidae (in part)



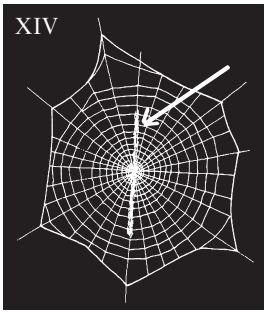


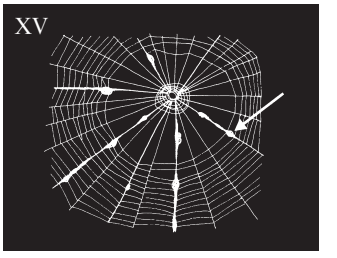


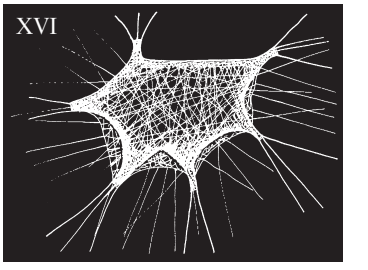
10. – Centre of very complex web a large, horizontal circular sheet with rectangular mesh and with elevated centre (XIII); it further comprises a scaffolding on both sides; spider sits amidst often greenish silk, above centre of sheet, surrounded by egg cocoons .... *Cyrtophora* (Araneidae)
    – Web less complex 11
11. – Web with stabilimentum, a fortification of centre of web with white silk (XIV) .... Araneidae *(Argiope*, *Cyclosa*; exceptions occur for both genera)

    Note: Stabilimenta come in different shapes; some are made of white silk and spiralled, star- or cross-shaped (*Argiope*); some uloborid webs made of cribellate silk have a conspicuous spiralled stabilimentum; others (*Cyclosa*) have a stabilimentum made of debris (leftovers of prey); some araneids (*Nemoscolus)* construct ahorizontal web with stone covered retreat.

    – Web with small whitish silk tufts attached mainly on radii or bridge lines (XV) .... Araneidae (Gasteracanthinae exceptions occur)







12. – Sheet multilayered domed polygone, serving as retreat; inferior sheet extends in all directions into guy lines attached to pylons of stiff silk; construction most often hidden under a stone ..... *Uroctea* (Oecobiidae)

Note: A tiny (<3 cm) one-layered exposed version (XIV) is made by several genera of Oecobiidae e.g. *Oecobius, Paroecobius, Urocoebius.*

– Web usually larger and exposed 13

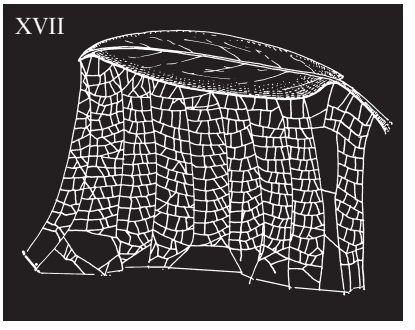
13. – Spider lives on top of web 14
– Spider lives on underside of web 15

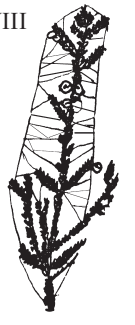
14. – With conspicuous funnel-shaped retreat on one side of web .... Agelenidae, Lycosidae (part), several Mygalomorphae (e.g. Dipluridae)
– No lateral funnel-shaped retreat 16

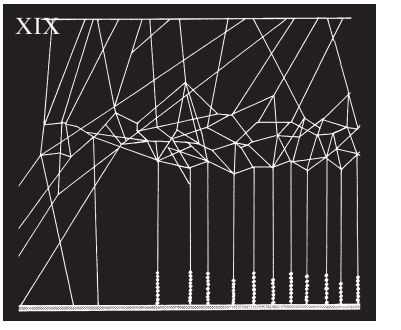
15. – Web very large, mesh quadrangular (fractal) (XVII), with funnel-shaped retreat leading into crevice ..... Austrochilidae
– Cribellate web with unclear mesh, funnel leading into deep tangle ... *Psechrus* (Psechridae)

16. – Web with tubular central retreat ..... Diguetidae, Plectreuridae
– Web without retreat 17

17. – With scaffolding web under and above sheet (II) .... Linyphiidae (Linyphiinae), Cyatholipidae, Theridiidae (in part)
– Web a tiny horizontal sheet .... Linyphiidae (Erigoninae), Hahniidae, Tetrablemmidae, Stiphidiidae (in part)







18. – Adhesive parts of web made of cribellate silk 19
– Web without sticky parts or gluey 20

19. – Web with many stretches of sticky cribellate silk (XVIII), ladder-like in appearance .... Dictynidae, Desidae (in part)
– Web a simple space web ..... Tengellidae, Zoropsidae

20. – Web usually small (diameter <10 cm), almost always with threads running down and provided with sticky droplets near substrate (gumfoot web) (XIX) .... Theridiidae (in part), Nesticidae
– Web usually much larger, without any sticky elements 21

21. – Web large and leading into a tangled funnel-shaped retreat or into holes in ground ..... Pisauridae e.g. *Euprosthenops Euprosthenopsis*
– Size variable but without obvious retreat 22

22. – Web with different layers built from parallel lines ..... Ochyroceratidae
– Typical space web consisting of an apparently unorganised maze of silken strands .... Pholcidae, Leptonetidae

Note: some pholcids may have a sheet in the web, sometimes even gluey drops.

23. – Spider hangs from trapezium web using front legs used to grab prey from air .... Araneidae, e.g. *Pycnacantha, Celaenia, Taczanowskia, Kaira*
– Web is used to catch prey 24

24. – Web kept more or less horizontally between anchoring points (IV) ... Uloboridae (in part)

Note: single-line webs (*Miagrammopes*) and triangular webs (*Hyptiotes*).

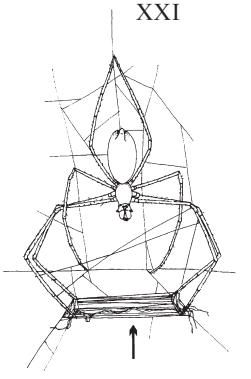
– Web kept vertically with a few gumfooted vertical threads (XX) .... Theridiidae (*Coscinida*, *Episinus, Spintharus*)

25. – Trip webs made of cribellate silk 26
– Trips webs (V): radiating from a hole in substrate; made of non-sticky silk .... Segestriidae

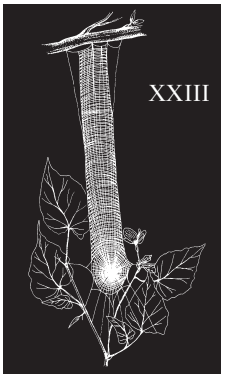
26. Web made in sand, looks like an antelope's hoof print ..... *Seothyra* (Eresidae)
– Trips webs (XXIV) or small sheets radiating from a hole in substrate made of cribellate silk ..... Amaurobiidae, Eresidae, Filistatidae, Phyxelididae, Titanoecidae

27. – Webs held completely by spider 28
– Other unusual web types 29


XX


XXI


XXII


XXIII

28. – Spider holds small web with front legs (XXI) ..... Deinopidae
– Spider swirls a sticky drop on a single thread hanging from second or third leg (XXII) .... 'bolas spiders': (*Cladomelea*, *Mastophora*, *Ordgarius*)

Note: Bolas spiders belong to the Araneidae.

29. – Spider constructs circular curtain of silk incorporated with small pebbles and sand grains under a stone (Plate 11) ..... *Tama, Neotama* (Hersiliidae)
– Web structure differs 30

30. – Web large; main part in shape of a lampshade attached to underside of hard substrate .... *Hypochilus* (Hypochilidae)
– Web structure different 31

31. – Web an ovoid sac of silk constructed near the ground ..... *Paraplectanoides* (Araneidae)
– Web structure different 32

32. – Web long and narrow vertical 'ladder' (XXIII) ..... ladder web
Note: Sticky ladder webs are found in *Scoloderus* (Araneidae) with the hub at the bottom or *Tylorida* with the hub at the top; cribellate ladder webs are found in Gradungulidae.
– Web structure different 33

33. – Spider lives on underside of cone-shaped cribellar web ... *Stiphidion, Tartarus* (Stiphidiidae)
– Web neither cone-shaped nor a ladder; number of radii reduced; sticky elements not part of a spiral but separate line-shaped elements with thick glue drops; webs often horizontal and consisting of only a part of an orb (XXV) ..... spanning thread webs
Note: Spanning thread webs are found in *Cyrtarachne, Paraplectana, Pasilobus* and *Poecilopachys* (Stowe, 1986).

34. – Very large webs often exceeding several m^2 35
– Smaller webs (part of web containing hubs not exceeding 0.5 m) 40

35. – Colony composed of orb webs 36
– Colony not composed of orb webs 37

36. – Colony composed of cribellate orbs ..... *Philoponella republicana* (Uloboridae)
– Colony composed of non cribellate orbs ..... *Metepeira spinipes* (Araneidae)

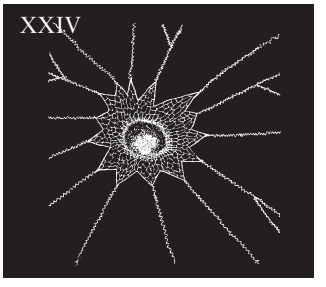
37. – Web with many dry leaves or other debris serving as retreats 38
– Living plants or plant debris not serving as retreats and provided with many holes and funnels 39

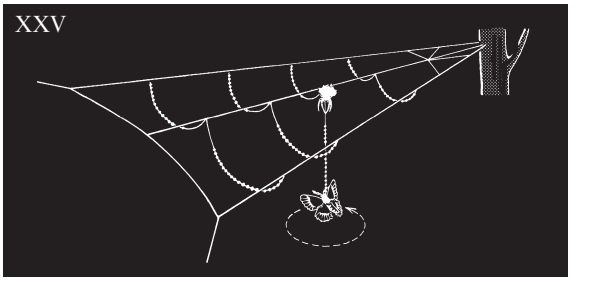
38. – With many dry leaves serving as retreats ..... *Achaearanea disparata, A. wau* (Theridiidae)
– Green leaves of plants embedded in web serve as retreats .... *Anelosimus eximius* (Theridiidae)

39. – Web with sticky surface ..... *Mallos gregalis* (Dictynidae)
– Web more or less lying like a rug over plant substrate; web surface not sticky .... *Agelena consociata, A. republicana* (Agelenidae)

40. – Very dense, cribellate webs; spiders hidden during periods of inactivity 41
– Webs non-cribellate, not as dense, spiders visible also during periods of inactivity .... Theridiidae (*Achaearanea, Anelosimus, Theridion* all in part)

41. – Web chambers more or less globular ..... *Stegodyphus* (Eresidae)
– Web chambers spread out horizontally ..... *Mallos* (Dictynidae)





Phylogeny of spiders

The present tree (figs 4, 5) is mainly based on the cladogram presented by Coddington *et al.* (2004). It is symptomatic that since the publication of that tree, which summarized the analyses that were available at the time, several parts of the tree had to be modified as a result of in-depth studies of certain areas. These results are reflected as much as possible in the underlying tree. It was based on the following analyses: Agnarsson (2004), Coddington *et al.* (2004), Forster & Platnick (1984), Forster *et al.* (1987), Goloboff (1993), Griswold *et al.* (1998, 1999, 2005), Kuntner (2005, 2006), Platnick (1977), Platnick *et al.* (1991), Raven (1985), Raven & Stumkat (2005), Schütt (2000, 2003) and Silva (2003).

The list below refers to the numbers on the branches and provides the main synapomorphies only for the branches ending in more than one terminal. Major clades that are strongly supported by different analyses are in double circles and bold in the text. Since the terminals are families, the synapomorphies for these taxa are given in the text. It should be stressed that a character's state mentioned for one of the inclusive taxa does not necessarily persist throughout the clade and may return to plesiomorphic states as the result of a reversal. The following families are not included: Argyronetidae, Chummidae, Cycloctenidae, Hahniidae, Homalonychidae, Synaphridae and Periegopidae. See the family descriptions for information on their position in the system.

1. **Mesothelae** (Liphistiidae): seven or eight spinnerets, situated in centre of opisthosoma; lateral spinnerets multi-segmented; small round ventral sclerite on pedicel which is the first abdominal sclerite; invagination on coxae IV.
2. **Opisthothelae**: 6 spinnerets, situated at end of the opisthosoma; opisthosomal segmentation lost, spermathecae paired; sternum wide and low.
3. **Mygalomorphae**: anterior median spinnerets absent; anterior lateral spinnerets reduced; three or four segments on posterior lateral spinnerets, sternum with sigilla; labium and endites with cuspules; number of male palpal sclerites reduced.
4. **Atypoidea** (Atypidae + Antrodiaetidae): eyes on a common tubercle, serrula absent; cephalic part elevated; posterior legs with dorsal spines only; tarsal organ low and smooth; tarsal trichobothria reduced.
5. Sister-group of Atypoidea: thorax sloping; eyes sessile; fovea transverse; tarsal organ low; tarsal trichobothria I in straight row; posterior lateral spinnerets long; spinnerets close to anal tubercle.
6. **Avicularoidea**: axis of male palpal bulb orthogonal to cymbial axis or directed towards base; abdomen with dorsal scutum; male palp without conductor; posterior lateral spinnerets close; three articles of posterior lateral spinnerets with spigots; cymbial cavity apically open, incised and membranous.
7. Dipluroidea (Dipluridae + Hexathelidae): maxillary cuspules present and numerous on labium; inferior tarsal claw without teeth; male anterior tibiae with prolateral spine.
8. Crassitarsae: serrula present; posterior lateral spinnerets close; posterior lateral spinnerets short; spigots pumpkin-shaped.
9. Nemesioidea (Nemesiidae + Microstigmatidae): female tarsi without scopula.
10. Theraphosoidina: claw tufts present; superior tarsal claw with one row of minute teeth; tarsi with clavate trichobothria; tarsal trichobothria in two longitudinal lines separated by setae; tibiae in male without apophysis or with theraphosid type spur.
11. Theraphosoidea (Theraphosidae + Paratropididae): labium subquadrate; endites with prolateral lobe extended; numerous labial cuspules; apical article of posterior lateral spinnerets digitiform.
12. Rastelloidina: fovea closed and longitudinal; rastellum present; spines on posterior legs on dorsal surface; palpal coxa elongate; cheliceral fangs short, thick and diagonal.

13. Domiothelina (sister to Cyrtaucheniidae): superior tarsal claws with one tooth only; cheliceral furrow with two rows of teeth; tarsal trichobothria forming a wide band.
14. Migoidea (Actinopodidae + Migidae): ocular quadrangle wide; cheliceral fangs short, thick and diagonal; postlabial sigillum deeply excavated; trichobothrial bases smooth.
15. Idiopoidea (Idiopidae + Ctenizidae): tarsal spines present; female tarsi I and II without scopula; anterior metatarsi and tibiae of female with digging spines.
16. **Araneomorphae**: anterior spinnerets replaced by cribellum or colulus; chelicerae diaxial.
17. **Paleocribellatae** (Hypochilidae): mid-gut diverticula into chelicerae; chelicerae with median concavity; serrula with several rows of teeth on a plate-like structure.
18. **Neocribellate**: serrula a single row of teeth, venom gland extend into cephalothorax; labial and sternum without sigilla; fifth endosternite lost.
19. Austrochiloidea: posterior booklungs transformed into tracheae.
20. Araneoclada: opisthosomal part of mid-gut straight, not M-shaped as in other spiders; three pairs of heart ostia.
21. **Haplogynae**: chelicerae fused at base and provided with lamina; tegulum and subtegulum fused; tartipores lost.
22. Dysderoidea + Caponiidae + Tetrablemmidae: openings of posterior respiratory system just behind those of anterior respiratory system.
23. Dysderoidea + Tetrablemmidae: basal fusion of chelicerae lost; anterior median eyes lost.
24. Dysderoidea: development of second portion of internal female genitalia associated with posterior wall of bursal cavity.
25. Orsolobidae + Oonopidae: tarsal proprioreceptor bristles present; tarsal claws bipectinate.
26. Tracheal spiracles reduced to one; tetrahedral posterior median spinnerets.
27. Pholcidae + Diguetidae + Plectreuridae: posterior median spinnerets with distal ring composed of fused spigot bases.
28. Diguetidae + Plectreuridae (sister to Pholcidae): posterior median spinnerets with anteromedian thick setae arising from bases with thick rim.
29. Scytodoidea: anterior median eyes lost.
30. Scytodidae + Sicariidae + Drymusidae: poorly supported by loss of minor ampullate gland spigots on posterior median spinnerets in females (paralleled in 33).
31. Scytodidae + Drymusidae (sister to Sicariidae): specialised spicules on median surface of posterior median spinnerets.
32. Ochyroceratidae + Telemidae + Leptonetidae: chelicerae not fused at base, posterior median spinnerets with aciniform gland spigots arranged in a line.
33. Telemidae + Leptonetidae (sister to Ochyroceratidae): poorly supported by loss of minor ampullate gland spigots on posterior median spinnerets in females (paralleled in 30).
34. **Entelegynae**: labium and sternum separated; cylindrical gland spigots present; epigyne becomes a flow-through system as a result of the development of fertilization ducts.
35. Eresoidea (Eresidae, Oecobiidae, Hersiliidae): poorly supported group, apparently paraphyletic.
36. Palpimanoidea: elevated cheliceral gland mound; cheliceral peg teeth (inclusion of Micropholcommatidae, Mimetidae, Malkaridae and Pararchaeidae contested by Schütt, 2000).
37. Paurospinata (new name; sister group of Mimetidae + Malkaridae or of canoe tapetum clade in Schütt's (2000) system): strong reduction or absence of leg spination.
38. Higher Palpimanoidea: spatulate hairs on tibiae, metatarsi and tarsi.
39. Palpimanidae + Stenochilidae: spatulate hairs clustered, forming a prolateral scopula; loss of posterior median and lateral spinnerets.
40. Micropalpimanoids: cephalic part of prosoma raised.
41. Archaeoids: prolongation of prosoma around chelicerae.
42. Archaeoids ss: chelicerae surrounded by anterior sclerotized margin of cephalothorax.

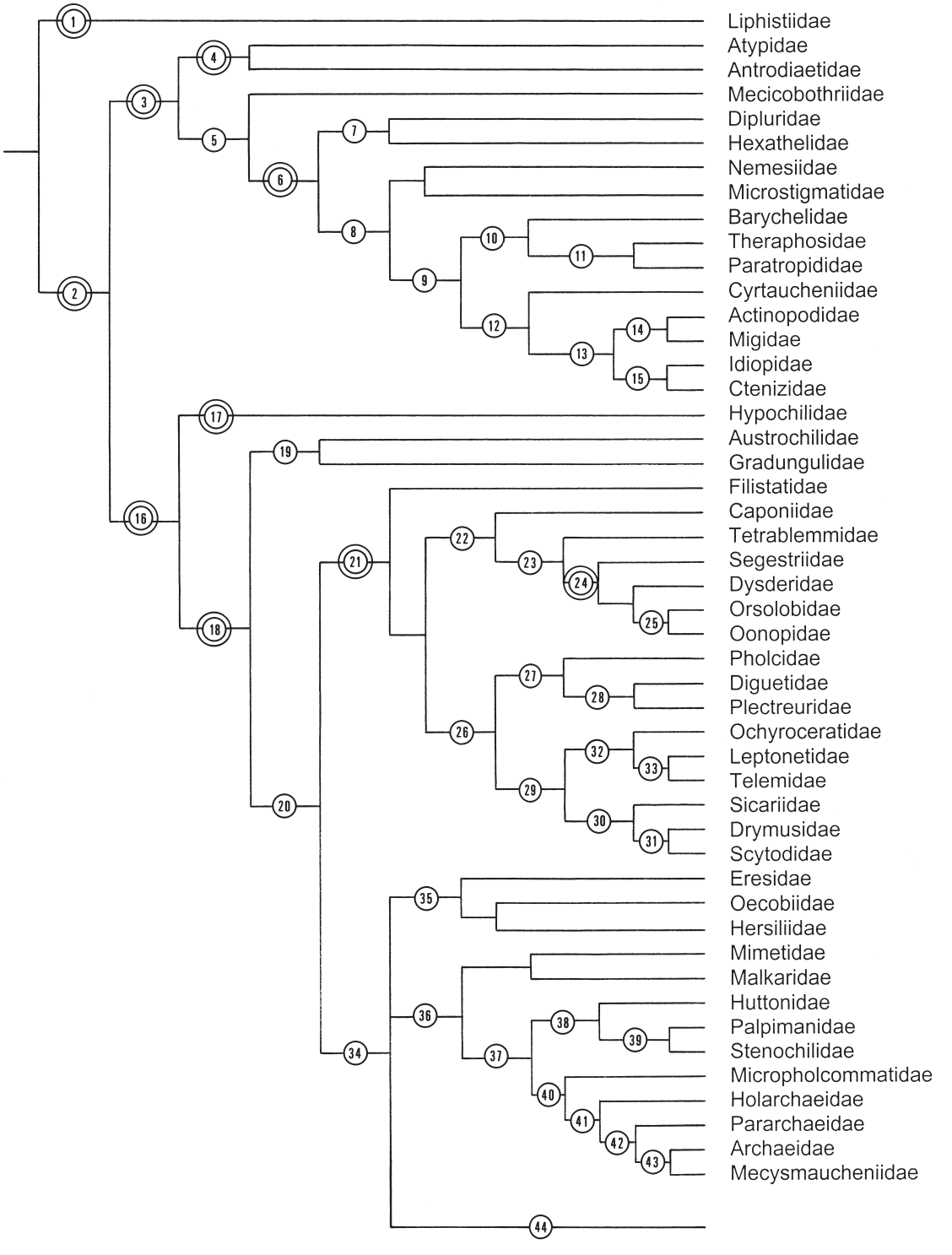


Fig. 4. **Phylogeny of the Araneae** (part 1). Numbers refer to the synapomorphies for the branch mentioned in the text. Double rings indicate well supported, stable clades.

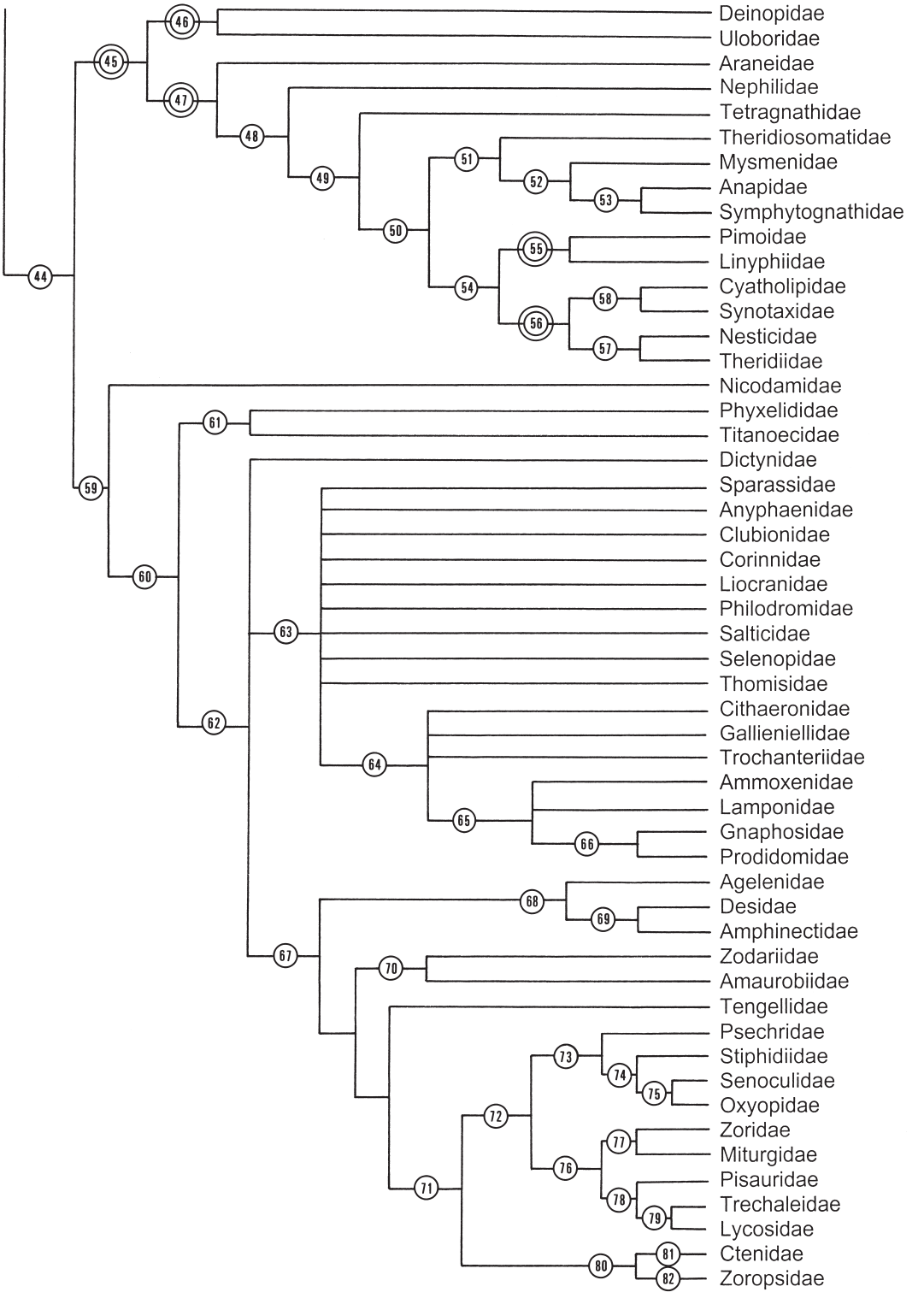


Fig. 5. **Phylogeny of the Araneae** (part 2).

43. Archaeidae + Mecysmaucheniidae: a ring of unsclerotized cuticle near base of tarsi; labrum with two protuberances.
44. Canoe tapetum clade: tapetum of secondary eyes canoe-shaped (evolves to grate-shaped in Lycosoidea).
45. Orbiculariae: construction of orb web; behaviour of web building (see Coddington, 1986 p. 358).
46. Deinopoidea (Deinopidae + Uloboridae): tapeta absent; abdominal tubercles; deinopoid tarsal comb; numerous cylindrical gland spigots on posterior median and lateral spinnerets; metine resting position on web (anterior legs extended).
47. Araneoidea: cribellum lost; posterior lateral spinnerets with two aciniform gland spigots flanking the flagelliform gland spigot; setae serrate; labium short; lateral eyes juxtaposed at least in males.
48. Derived araneoids (sister to Araneidae): aciniform spigot brush on posterior median spinnerets sparse or absent; mesal cylindriform spigot on posterior lateral spinnerets peripheral, prey is bitten before it is wrapped.
49. Extentae, new name (sister group of Nephilidae): leg posture on web: legs I and II extended; hub open means hub loop is abrupt; sustentaculum absent; aggregate gland spigots on posterior median spinnerets apart from flagelliform spigots.
50. Reduced piriform clade (sister to Tetragnathidae): booklung covers smooth; bases of piriform spigots on anterior lateral spinnerets reduced, sticky spiral location during web building by inside of first leg.
51. Symphytognathoids: posterior apex of sternum truncate; female palpal claw absent; orb web frame tridimensional and web with radial anastomosis; hub is replaced after completion of sticky spiral; egg sac attached with two silk stands.
52. Derived Symphytognathoids: paracymbium, median apophysis and conductor lost in male palp; web with accessory radii (radii out of plane of web's orb).
53. Anapidae + Symphytognathidae: anterior median eyes reduced or absent; cheliceral teeth on a mound; female palp reduced or absent; femora spineless.
54. Araneid sheet web weavers: minor ampullate gland spigot on posterior median spinnerets without nubbins; construct a sheet web; anterior lateral and median eyes separated by less than twice their diameter.
55. Linyphioidea (Linyphiidae + Pimoidae): chelicerae with stridulating file; patella tibia autospasy; cylindriform spigot on posterior lateral spinnerets with enlarged base; prey is bitten before it is wrapped.
56. Spineless femur clade: femora without spines; theridiid sticky silk attack.
57. Theridioidea (Theridiidae + Nesticidae): male palp with additional tegular processes; tarsus IV with theridiid comb; aggregate gland spigot on posterior lateral spinnerets very large; gumfoot web.
58. Cyatholipoidea (Cyatholipidae + Synotaxidae): paracymbium cup shaped; median apophysis absent; posterior apex of sternum truncate.
59. Sister group of Orbiculariae: still not known with certainty but probably all other members of 'canoe tapetum clade'.
60. Divided cribellum clade (sister to Nicodamidae): cribellum divided.
61. Titanoecoids (Titanoecidae + Phyxelididae): this clade still poorly defined: lack of tarsal trichobothria (= symplesiomorphy!), dorsal process on male palpal tibia (homology is doubtful as rather prolateral in Titanoecidae).
62. RTA clade: male palp with retrolateral tibial apophysis.
63. Dionycha: a very large, poorly defined and unresolved clade characterized by loss of unpaired tarsal claw.
64. Gnaphosoidea: posterior median eyes flat; endites constricted in middle; minor ampullate gland spigots on both lateral and median posterior spinnerets; clade still largely unresolved

pending discovery of synapomorphies for some families including the Gallieniellidae, Trochanteriidae and Cithaeronidae.

65. Higher gnaphosoids: anterior lateral spinnerets widely separated.
66. Gnaphosidae + Prodidomidae: anterior lateral spinnerets without distal sclerotized ring but with modified piriform gland spigots.
67. Amaurobioids (sister to Dionycha + Dictynidae): posterior eye row recurved; 2 or 3 paracribellar spigots on posterior lateral spinnerets.
68. Fused paracribellar clade (Agelenoids): posterior lateral spinnerets with conical last segment and fused paracribellar spigot shafts; tarsal trichobothria in more than one row and longer towards distal tip; calamistrum oval; posterior median spinnerets with paracribellar spigots present; locking lobes on tegulum and subtegulum.
69. Desidoids (sister group of Agelenidae; Desidae + Amphinectidae): palpal tibial with trichobothria, epiandrous spigots absent.
70. Amaurobiidae + Zodariidae: chilum single; hinged setae present; patellae with alternating longitudinal patches covered with short setae and bald stretches; tibia with apical process.
    Remark: the Zodariidae are here considered the sister group of the Amaurobiidae. The ancestral taxa (mainly Lachesaninae) of the former have many characters in common with Amaurobiidae. The presence of hinged hairs and the unique hair cover on the patellae (see Thaler & Knoflach, 2004), as well as the distal dorsal and prolateral processes on the tibia (as in *Antillorena)* are considered synapomorphies.
71. Lycosoidea (sister to Tengellidae): secondary eyes with grate-shaped tapetum; posterior eye row recurved.
72. Higher Lycosoidea: subtegulum-tegulum interlocking lobes absent; lateral lobes in epigyne on posterior margin; median sector of epigyne not modified.
73. Psechroids: head of spermathecae in epigyne large and spherical; tarsal trichobothria in one row; scopula on first leg absent; trochanter notches broad.
74. Stiphidioids (sister to Psechridae): anterior metatarsi with at least 2 weak pairs of ventral spines; trichobothrial base smooth or finely striated.
75. Senoculidae + Oxyopidae (sister to Stiphidiidae): median sector of epigyne not divided into three longitudinal sections; anterior metatarsi with at least 3 strong pairs of ventral spines; colulus narrow.
76. Lycosoidea ss: embolus flexibly attached to tegulum and with swollen base; median lobe of epigyne swollen and extending to posterior margin; colulus narrow.
77. Zoridae + Miturgidae: basal lobe of embolus absent or smoothly curved; tarsal claw tufts dense obscuring pretarsus; leg I with two claw tufts; female tibia I without lateral spines; four pairs of spines on anterior tibiae in both sexes.
78. **Lycosaeformia**: male palp with distal tegular process; embolus directed counterclockwise on left palp; trichobothrial base smooth or finely striated.
79. Lycosidae + Trechaleidae (sister to Pisauridae): male palp without retrolateral apophysis; median apophysis convex and swollen with two apical lobes; tegulum notched near base thus showing subtegulum; median sector of epigyne with lobe of protuberance; base of spermathecae with pronounced lobe; egg sac carried on spinnerets.
80. Ctenoidea: median apophysis cup-shaped; two tarsal claws; tibial spines on tibia I in female on raised base.
81. Ctenidae and some unplaced genera (sister to Zoropsidae + Acanthocteninae): embolus without basal process; lateral lobes of epigyne tooth-shaped; spermathecae without porose area; female tibia I without lateral spines; a high number (5-7) of ventral spine pairs on tibiae in both sexes; colulus narrow.
82. Zoropsidae + Acanthocteninae: male tibial crack present; cymbium apically truncated; male with abdominal shield; anterior lateral eyes clearly larger than anterior median eyes.

FAMILY DESCRIPTIONS

FAMILY ACTINOPODIDAE Simon, 1892

MOUSE SPIDERS

Fig. 6, pl. 2

Type genus

Actinopus Perty, 1833.

Other genera

Missulena Walckenaer, 1805; *Plesiolena* Goloboff & Platnick, 1987. Represented by 41 species (Platnick, 2005).

Diagnostic characters

Small to medium sized mygalomorph spiders; three tarsal claws; eight eyes; rastellum present; four spinnerets; fovea strongly procurved; endites short and quadrangular; labium elongate; fangs diagonal.

Descriptive characters

- **carapace:** strongly arched (fig. 6c); fovea strongly procurved (fig. 6a); clypeus wide; eye tubercle absent; tegument smooth, glabrous or with some postocular setae.
- **sternum:** oval to heart-shaped; sometimes rebordered in males (*Missulena*); posterior sigilla large, others small, marginal or confluent in middle (fig. 6b).
- **eyes:** eight; two rows; on sloping face, widely spaced, occupying at least half of cephalic width (fig. 6a); median ocular area at least three times as wide as long, usually wider in front than behind or sometimes narrower (*Plesiolena*).
- **chelicerae:** broad, robust; rastellum sometimes on distinct mound (*Actinopus*) (fig. 6b); cheliceral furrow with teeth on both margins; fangs diagonal (fig. 6b), outer surface smooth with outer basal tooth.
- **mouthparts:** endites quadrangular, short with cuspules along entire length or absent; labium much longer than wide with cuspules along apical edge or absent (fig. 6b); chilum small; serrula present.
- **legs:** three claws with variable pectination; legs stout; tarsi without scopula except on legs III and IV of male; tarsi and metatarsi I and II with stout thorn-like or longer spines; tarsi III and IV more spinose; trichobothria in two rows on tibiae, in one row on metatarsi and tarsi.
- **female palp:** unmodified.
- **abdomen:** oval (fig. 6a).
- **spinnerets:** four; with raised basis; posterior spinnerets short with distal segment domed.
- **respiratory system:** four booklungs.
- **genitalia:** males with haematodocha small (*Missulena*) or with apophysis; embolus keeled (*Actinopus*) (fig. 6d).
- **body size:** ± 10 mm.
- **colour:** carapace brownish to red; abdomen grey (*Plesiolena*) or with spectacular bluish or pallid tinges (*Missulena*).

Taxonomic status

According to Raven (1985) the Actinopodidae belong to the Migoidea in the Rastelloidina and are considered the sister group of the Migidae on behalf of the eyes which are spread widely across the carapace.

Distribution

South and Central America (*Actinopus*); Chile (*Plesiolena, Missulena*); Australia (*Missulena*).

Life style

Live in silk-lined burrows that may be as deep as one meter. *Plesiolena* closes burrow with a wafer-type trapdoor; *Missulena* makes two separate openings, sometimes like doors but often only as soft flaps.

Relevant literature

Goloboff & Platnick (1987); Legendre & Calderón (1984); Raven (1985).

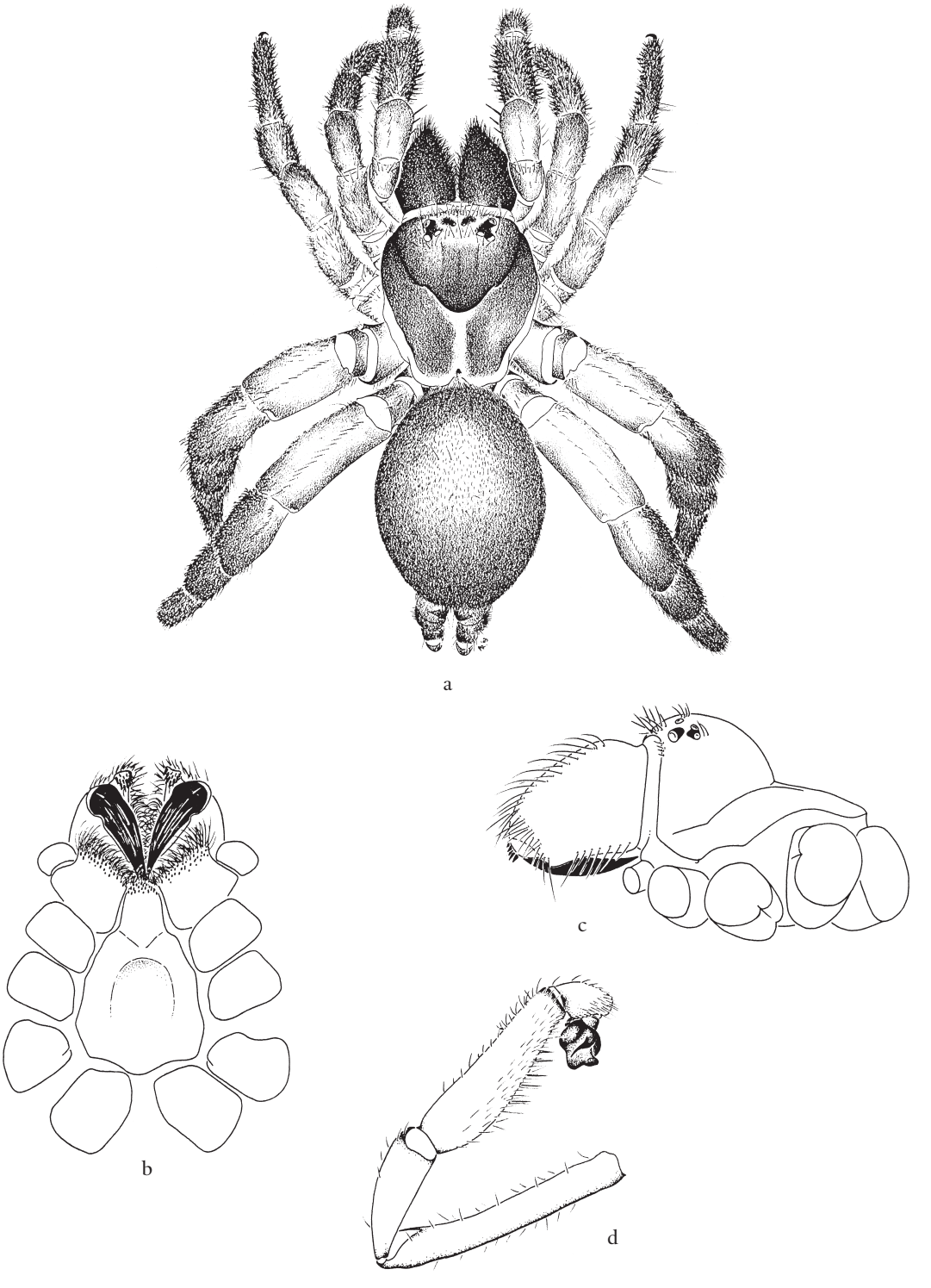


Fig. 6. **Actinopodidae.** *Actinopus robustus* **a.** female habitus (19 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, lateral view; **d.** right male palp, lateral view.

FAMILY AGELENIDAE C. L. Koch, 1837

FUNNELWEB SPIDERS

Fig. 7, pl. 22

Type genus

Agelena Walckenaer, 1805.

Other genera

Represented by 38 genera and about 490 species.

Diagnostic characters

Small to medium size araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; posterior spinnerets two-segmented, long and slender, with apical segment tapering towards tip; tarsi with trichobothria increasing in length towards tip; colulus paired.

> **Note:** New Zealand cribellate Agelenidae differ from this diagnosis; they may be misplaced but there is no alternative at present.

Descriptive characters

- **carapace:** oval, attenuated in front, long and narrow in eye region; fovea longitudinal (fig. 7a).
- **sternum:** wide; heart-shaped.
- **eyes:** eight; in two rows (4:4); equal in size.
- **chelicerae:** promargin with three, retromargin with 2-8 teeth.
- **mouthparts:** labium as wide as long; endites converging slightly.
- **legs:** three claws; legs long, fairly slender and armed with numerous spines; tarsi with trichobothria increasing in length towards tip (fig. 7f); trochanters I and II lacking notches; tarsi without scopula.
- **female palp:** not modified.
- **abdomen:** narrow oval, tapering posteriorly; clothed in often feathery setae; dorsum usually with pattern (fig. 7a).
- **spinnerets:** anterior spinnerets widely separated; posterior spinnerets long and slender; two-segmented with apical segment narrowing towards tip (fig. 7b); colulus paired or simple.
- **respiratory system:** two booklungs; one pair of tubular tracheae close to spinnerets.
- **genitalia:** entelegyne; epigyne variable (fig. 7c); male palp with tibial apophysis (figs 7d, e); patella and femur sometimes with apophysis; embolus usually long; trichobothria absent from cymbium.
- **body size:** 6-12 mm.
- **colour:** various shades of brown and grey, dorsum pattern consisting of a reddish brown folium and a series of pale spots; legs banded.

Taxonomic status

According to Lehtinen (1967), Coddington & Levi (1991) and Coddington *et al.* (2004) the family belongs in the Amaurobioidea.

Distribution

Worldwide.

Lifestyle

Agelenids build flat, slightly concave brushed sheet webs with a funnel-shaped retreat in a variety of habitats usually in grass and low vegetation but also in caves, buildings and other man-made constructions (fig. 7g).

Relevant literature

Bennett & Ubick (2005); Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Lehtinen (1967); Roth (1967); Wunderlich (1992).

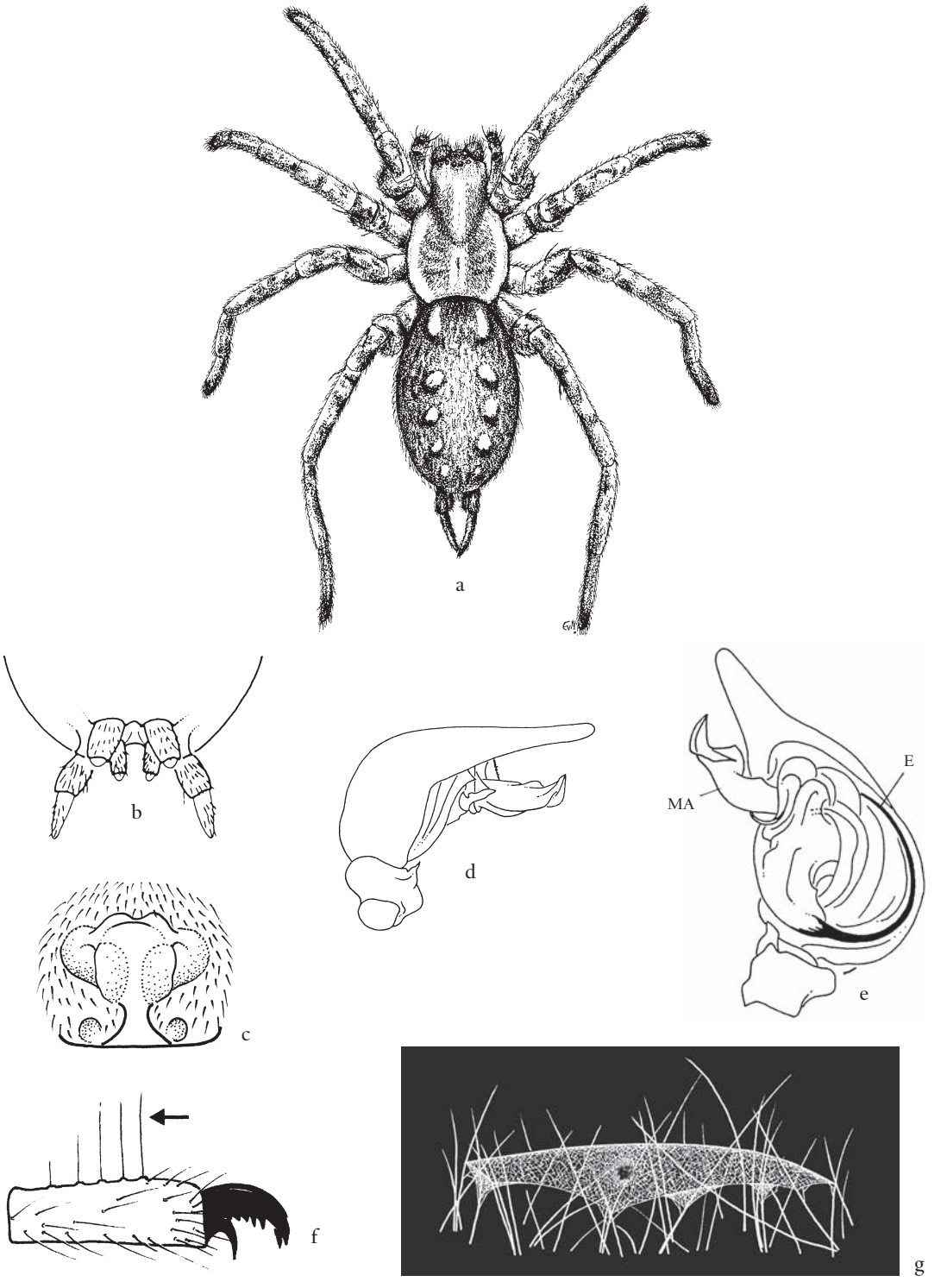


Fig. 7. **Agelenidae.** *Olorunia* sp. **a.** female habitus (11 mm); **b.** spinnerets, ventral view; **c.** epigyne; **d.** male palp, lateral view; **e.** male palp, ventral view. E: embolus; MA: median apophysis.

FAMILY AMAUROBIIDAE Thorell, 1870

MESHWEB WEAVERS

Fig. 8, pl. 25

Type species

Amaurobius C. L. Koch, 1837.

Other genera

Represented by 69 genera and about 640 species in five subfamilies: Altellopsinae, Arctobiinae, Amaurobiinae, Coelotinae, Macrobuninae. Midgeeinae (Davies, 1995a, b) is not retained because of its uncertain placement.

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; cribellate or ecribellate; entelegyne; eight eyes usually all pale in colour; male palp with simple sclerotized retrolateral and dorsal tibial apophyses.

Descriptive characters

- **carapace:** longer than wide; cephalic region only slightly elevated (fig. 8c); moderately narrow in ocular area; fovea varies from longitudinal to a simple depression (fig. 8a).
- **sternum:** oval to shield-shaped (fig. 8d); margin usually sinuous; apex blunt; sparsely covered by setae.
- **eyes:** eight; in two rows (4:4) (fig. 8b); usually all pale in colour.
- **chelicerae:** in males usually longer and more slender than in females; cheliceral teeth arranged in two rows (fig. 8d); cheliceral furrow oblique in Macrobuninae.
- **mouthparts:** labium square to rectangular; endites rectangular, almost parallel (fig. 8d) with anterior scopula; linear serrula present.
- **legs:** three claws; legs moderately long, especially in males; in Macrobuninae trichobothria on metatarsi in two rows, on tarsi in a single row, base with transverse striations; hinged hairs often present; trochanters unnotched; structural modifications can occur on femora II or on coxae in Macrobuninae.
- **female palp:** not modified.
- **abdomen:** oval; with dense layer of fine setae.
- **spinnerets:** six; anterior and posterior spinnerets two-segmented, moderately elongated; colulus absent; spigots often with concentric ridges; anterior lateral spinnerets with one or two major ampullates; cribellate taxa with paracribellar spigots on female posterior median spinnerets.
- **cribellum:** entire or weakly to strongly divided (fig. 8e); cribellum replaced by a colulus in shape of a transverse plate in *Chresiona*; ecribellate (Coelotinae).
- **calamistrum:** median to basal (fig. 8f).
- **respiratory system:** two booklungs; tracheae simple; posterior tracheae open through spiracle situated close to spinnerets.
- **genitalia:** entelegyne: epigyne usually with posterior median lobe separated from lateral lobes by sutures (fig. 8h); male palp with simple, sclerotized retrolateral and dorsal tibial apophyses (fig. 8g); in most species of Macrobuninae male palpal tibia strongly modified, bearing a more or less cup-shaped, latero-apical concavity.
- **body size:** 3-16 mm.
- **colour:** various shades of dark brown or grey; abdomen sometimes with ill-defined pattern; legs of some species with dark annulations.

Taxonomic status

The family is still poorly defined and lacks clear synapomorphies. It is placed in the Amaurobioidea (Coddington & Levi, 1991; Coddington *et al.*, 2004).

Distribution

Worldwide.

Lifestyle

Ground-dwelling, cryptic spiders commonly found in dark and damp places. They build small funnel-like webs with cribellate or ecribellate silk, which may be provided with several retreats beneath objects.

Relevant literature

Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Lehtinen, (1967); Ubick *et al.* (2005); Wang (2000, 2002, 2003).

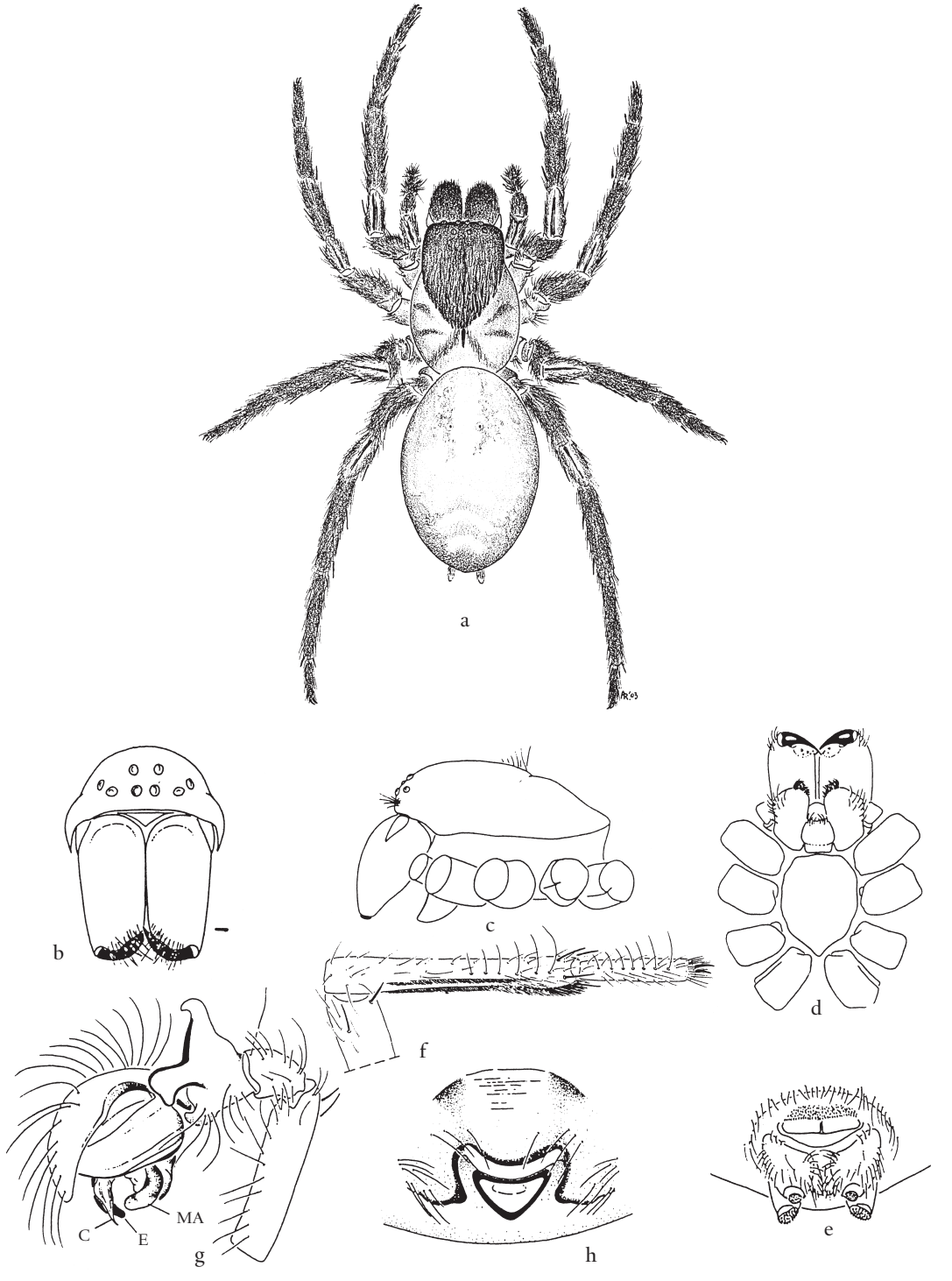


Fig. 8. **Amaurobiidae.** *Amaurobius ferox* **a.** female habitus (14 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, frontal view; **d.** cephalothorax, lateral view; **e.** spinnerets; **f.** tarsus and metatarsus IV showing calamistrum; **g.** left male palp, retrolateral view; **h.** epigyne. C: conductor; E: embolus; MA: median apophysis.

FAMILY AMMOXENIDAE Simon, 1893

TERMITE HUNTERS

Fig. 9, pl. 26

Type genus

Ammoxenus Simon, 1893.

Other genera

Rastellus Platnick & Griffin, 1990; *Austrammo*, Platnick, 2002; *Barrowammo*, Platnick, 2002. Represented by 18 species (Platnick, 2004).

Diagnostic characters

Very small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; anterior lateral spinnerets widely separated due to posterior median spinnerets set slightly forward; female palpal claw greatly reduced, shorter than whorled setae found around the tip in both sexes.

Descriptive characters

- **carapace:** slightly longer than wide (*Ammoxenus*), narrower in eye region (fig. 9a); carapace oval in rest of genera.
- **sternum:** heart-shaped (*Ammoxenus*); shield-like in rest.
- **eyes:** eight; two rows usually procurved; posterior median eyes usually irregular and light; shapes and position vary between genera (figs 9a, b).
- **chelicerae:** modified for digging (*Ammoxenus* with paturon horn-like, forming an extension to clypeus (fig. 9b); *Rastellus* distal, rastelliform digging scoop) (fig. 9d); without digging adaptations (*Austrammo* and *Barrowammo*).
- **mouthparts:** endites usually anteriorly converging; serrula reduced (*Ammoxenus*).
- **legs:** two claws; *Ammoxenus* with legs sturdy, leg formula 4321, tarsi long and flexible, pseudosegmented, curled-up in preserved specimens, tarsi with cluster of spatulate, truncated claw tufts; leg formula 4123, tarsi not pseudosegmented and lacking claw tufts in rest of genera.
- **female palp:** claw greatly reduced; tarsus in both sexes with whorled setae around tip.
- **abdomen:** oval; covered with dense, recumbent, plumose setae (*Ammoxenus*); thickly coated with fine brown setae (*Rastellus*, *Barrowammo*); iridescent, thickly coated with overlapping scales (*Austrammo*); males with dorsal scutum (*Barrowammo*).
- **spinnerets:** anterior lateral spinnerets are widely separated (fig. 9c) due to posterior median spinnerets being anteriorly advanced; advancement either slightly, partly separating anterior lateral spinnerets (*Austrammo*, *Barrowammo* and *Rastellus*), or extensively placing posterior median spinnerets between anterior lateral spinnerets, completely separating them (*Ammoxenus*).
- **respiratory system:** two booklungs; tracheal spiracle single; and situated on posterior third of abdomen, accompanied by wide transverse fold (*Ammoxenus)*; or situated near base of spinnerets in rest of genera.
- **genitalia:** entelegyne; epigyne variable (fig. 9g); usually depression, rimmed with dark sclerotized edge; male palp with long retrolateral tibial apophysis, embolus and conductor long and slender (figs 9e, f).
- **body size:** 1.3-10 mm.
- **colour:** black-brown to yellowish, abdominal pattern varies from pale to shiny brown with pale median band and border, to yellowish with a dark transverse pattern.

Taxonomic status

According to Platnick (1990), Coddington & Levi (1991) and Coddington *et al.* (2004) the family belongs to the superfamily Gnaphosoidea. The placement of the two genera from Australia is still problematic. All genera recently revised and keys are available (Dippenaar & Meyer, 1980; Platnick & Griffin, 1990, and Platnick, 2002).

Distribution

Southern Africa (*Ammoxenus* and *Rastellus*); Australia (*Austrammo* and *Barrowammo*).

Lifestyle

Ammoxenus and *Rastellus* are unique, free-living, termitophagous hunters with a special ability to dive into sand. *Austrammo* and *Barrowammo* are free-living ground dwellers.

Relevant literature

Coddington & Levi (1991); Dippenaar & Meyer (1980); Dippenaar-Schoeman & Jocqué (1997); Platnick (1990, 2002); Platnick & Griffin (1990).

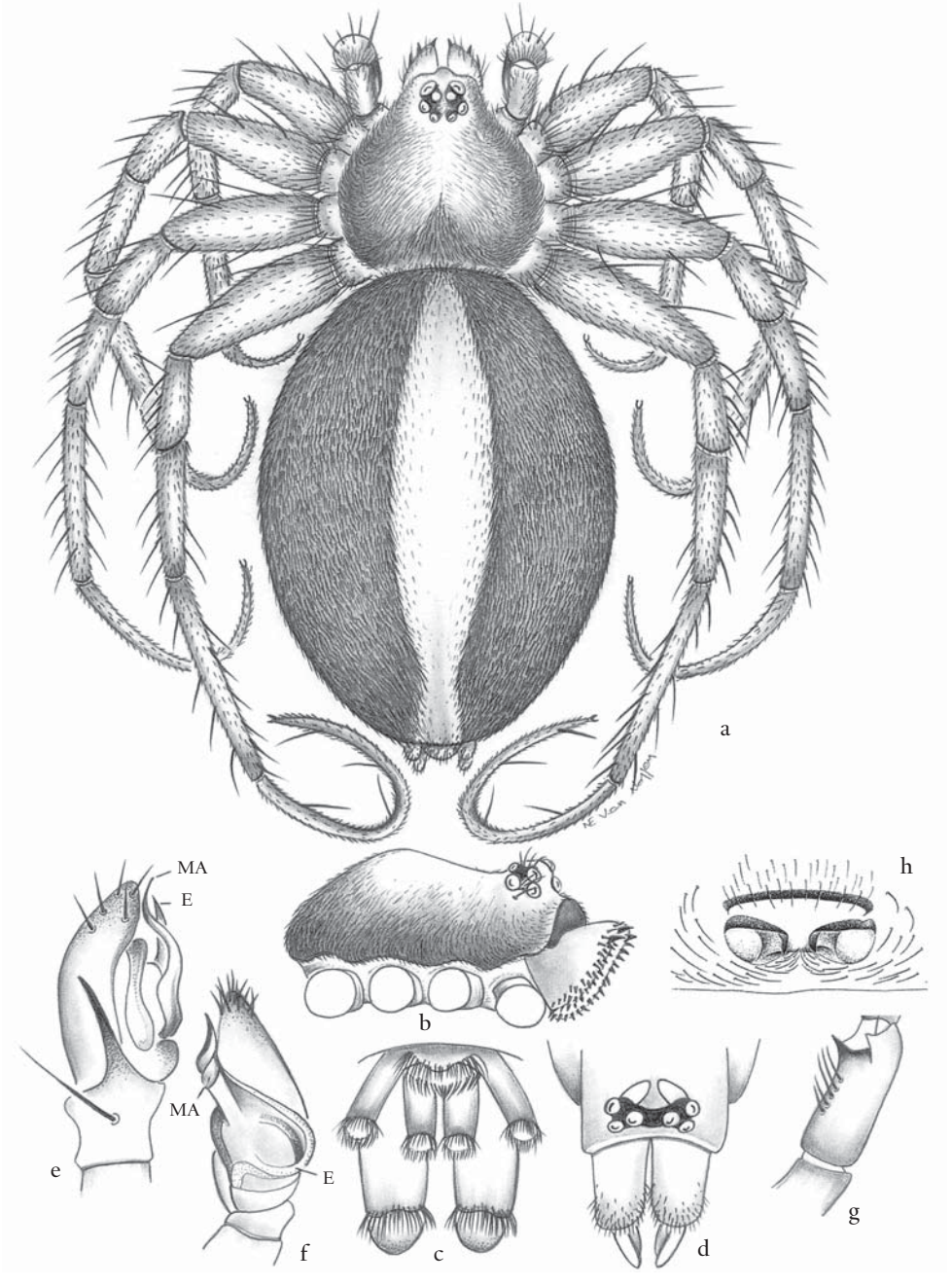


Fig. 9. **Ammoxenidae.** *Ammoxenus* sp. **a.** female habitus (8 mm); **b.** cephalothorax, lateral view showing modified chelicerae; **c.** spinnerets; *Rastellus* sp. **d.** frontal part of cephalothorax, showing modified chelicerae; *Ammoxenus* sp. **e.** right male palp, retrolateral view; **f.** right male palp, ventral view; **g.** right male palpal tibia, prolateral view; **h.** epigyne, ventral view. E: embolus; MA: median apophysis. (a, h: after Benoit, 1972; d-h: after Platnick & Griffin, 1990.)

FAMILY AMPHINECTIDAE Forster & Wilton, 1973

FOREST HUNTERS

Fig. 10, pl. 23

Type genus

Amphinecta Simon, 1898.

Other genera

Represented by 34 genera and about 180 species (Platnick 2005) in three subfamilies: Amphinectinae, Metaltellinae and Tasmarubriinae.

Diagnostic characters

Medium-size araneomorph spiders; three tarsal claws; cribellate or ecribellate; entelegyne; eight eyes; family poorly defined and diagnosed by: 'thoracic patches' on carapace (absent in more derived genera); male cymbium with trichobothria. Members of the family are further characterized by an elongate embolus and convolute entrance ducts.

Descriptive characters

- **carapace:** usually dome-shaped, highest point in front of fovea (figs 10 a-c); not strongly narrowed in front; fovea longitudinal.
- **eyes:** eight; two eye rows usually straight or slightly curved (figs 10 a-c); tapetum canoe-shaped.
- **chelicerae:** vertical; lateral condyle present; cheliceral furrow with 2-10 teeth on promargin; retromargin with 2-6 teeth (fig. 10d).
- **mouthparts:** endites twice as long as wide; sub-parallel; frequently with thick scopula; labium variable as long as wide and notched at base (fig. 10d).
- **sternum:** heart-shaped (fig. 10d).
- **legs:** stout; 1423 or 4123; tarsi with three toothed claws, inferior claw sometimes smooth; two rows of trichobothria on tibiae, one row on metatarsi and tarsi; no claw tufts; sometimes with scopula.
- **female palp:** unmodified.
- **abdomen:** oval long, often twice as long as wide (fig. 10a); sparsely setose.
- **spinnerets:** six, all well developed; anterior lateral spinnerets with two major ampullate gland spigots; posterior lateral spinnerets with domed distal segment; posterior median spinnerets with cylindrical gland spigots; colulus present in ecribellate taxa.
- **cribellum:** divided when present.
- **calamistrum:** in a single row at the base of the metatarsus.
- **respiratory system:** two booklungs; tracheal system with four simple branches limited to the abdomen; spiracle opens in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually strongly sclerotized (fig. 10g), often with a pair of spines; spermathecae variable with fairly simple to long, convoluted ducts; male palp usually with strong retrolateral tibial apophysis; embolus spine-shaped or long and bent or coiled; median apophysis well developed (fig. 10f); cymbium with trichobothria.
- **body size:** 2.5-12 mm.
- **colour:** varies from pale orange-brown to dark reddish brown; carapace frequently with darker thoracic patches; abdomen paler frequently with dorsal pattern; legs frequently banded.

Taxonomic status

The Amphinectidae are considered the sister group of the Desidae in the superfamily Amaurobioidea (Griswold *et al.,* 1999; Davies & Lambkin, 2001; Coddington *et al.,* 2004).

> **Note:** *Neolana* (Forster & Wilton, 1973), the sole genus of the family Neolanidae, is here considered part of the Amphinectidae. The only difference with that family is the absence of cymbial trichobothria and teeth on the epigyne. Yet other differences mentioned in Griswold *et al.* (1999) and Griswold *et al.* (2005) are either highly homoplastic or inverted within the Amphinectidae s.s. (e.g. web posture). *Neolana* species closely resemble representatives of *Dunstania,* which also lack epigynal spines. The only known male has a much more complex palp, but studies of large genera in other families (e.g. *Hortipes* Bosselaers & Ledoux, *Storena* Walckenaer, *Tenedos* O.P.-Cambridge) have shown that palpal complexity may increase dramatically within the same genus.

Distribution

Australia; New Zealand; South America; Tasmania.

Lifestyle

Amphinectids are mostly forest-dwelling spiders. The cribellate genera construct a small sheet that is hardly more than an extension of the retreat. The ecribellate genera (*Amphinecta* and *Mamoea*) are nocturnal hunters.

Relevant literature

Cutler (2005a); Davies (1998, 2002, 2003); Davies & Lambkin (2001); Forster & Wilton (1973); Griswold *et al.* (1999); Lehtinen (1967).

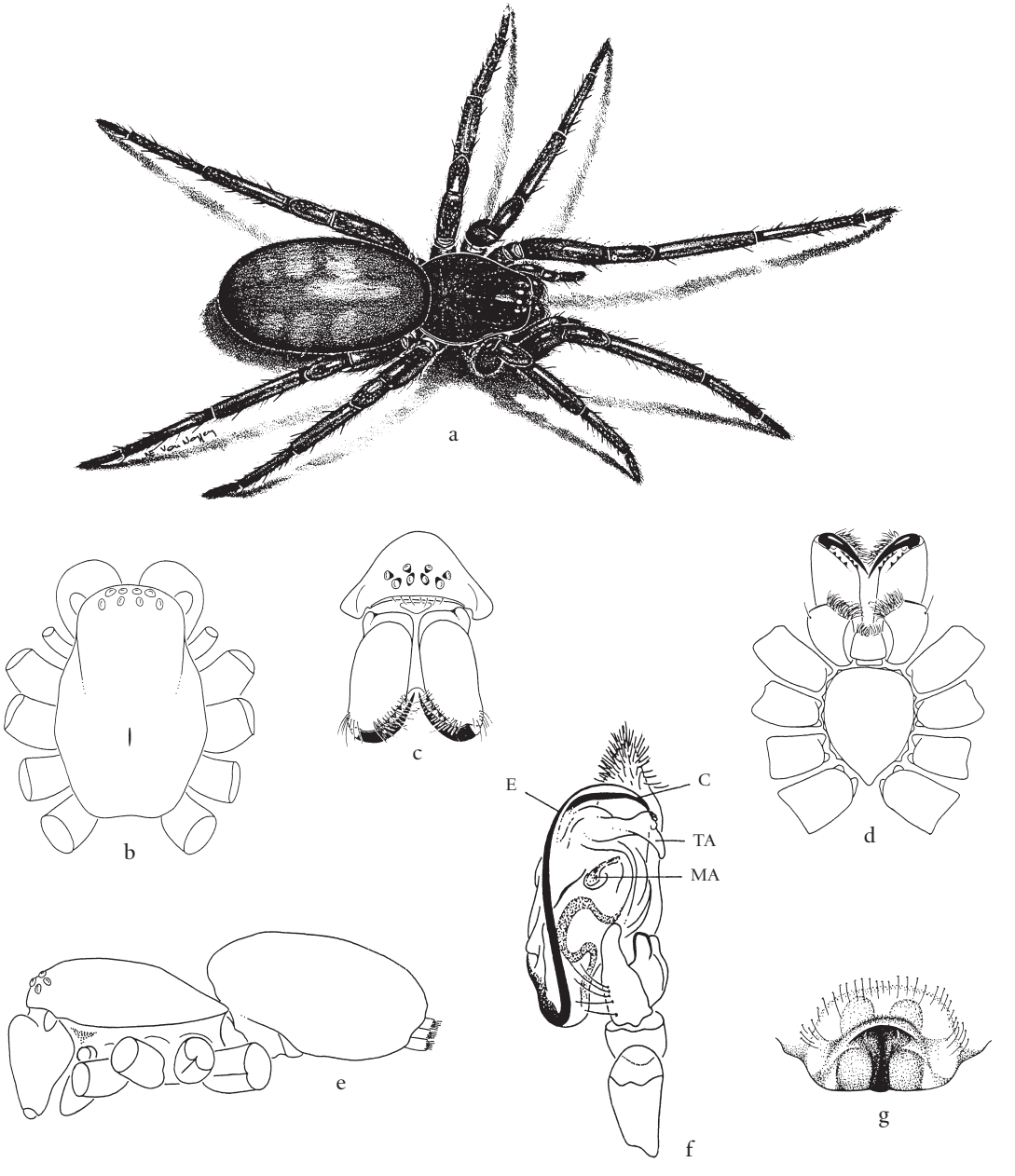


Fig. 10. **Amphinectidae.** *Mamoea rufa* **a.** female, natural posture (19 mm); **b.** cephalothorax, dorsal view; **c.** cephalothorax, frontal view; **d.** cephalothorax, ventral view; **e.** cephalothorax and abdomen, lateral view; **f.** male palp, ventral view; **g.** epigyne. C: conductor; E: embolus; MA: median apophysis; TA: tegular apophysis.

FAMILY ANAPIDAE Simon, 1895

GROUND ORB WEB WEAVERS

Fig. 11, pl. 22

Type genus

Anapis Simon, 1895.

Other genera

Represented by 34 genera and about 140 species.

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; haplogyne (secondary); six or eight eyes; anterior labral spur present; booklungs replaced by anterior tracheae; chelicerae not fused.

Descriptive characters

- **carapace:** modified with ocular region elevated (fig. 11a); pedicel arising from circular, rimmed cavity on posterior declivity (fig. 11b); glandular openings situated in hollow pits on edge of carapace at anterolateral corners (sometimes absent, Schütt, 2000).
- **sternum:** as broad as long, broadly fused to carapace.
- **eyes:** six or eight; anterior median eyes often reduced in size or absent; other eyes arranged in three pairs (fig. 11c).
- **chelicerae:** both margins with teeth.
- **mouthparts:** labrum bears anterior spur that projects forward between chelicerae (discernible when chelicerae are spread apart) (fig. 11c), sometimes reduced to a small crest.
- **legs:** 4123 or 1423; three claws; legs short, without spines; metatarsi shorter than tarsi; femora I of male with a short spine ventrally; tarsal organ capsulate and domed.
- **female palp:** reduced in size or absent; without claw.
- **abdomen:** male with large dorsal scutum, or 2-3 scuta, or dorsal region with scattered small sclerotized areas; ventral scutum surrounding pedicel; female abdomen soft or with small, brown sclerotized ring.
- **spinnerets:** anterior spinnerets small, close together; spinnerets together with colulus usually surrounded by a sclerotized ring; posterior lateral spinnerets with triplet of one flagelliform and two aggregate gland spigots in both sexes; aggregate gland spigot larger than accompanying flagelliform spigot piriform gland spigots with reduced base.
- **respiratory system:** two booklungs present or replaced by anterior tracheae opening through spiracles on both sides of genital opening.
- **genitalia:** haplogyne (fig. 11e); spermathecae well separated; male palp variable, femur and patella sometimes with bristles or apophyses (fig. 11d); embolus varies from spiniform to short and wide.
- **body size:** <2 mm.
- **colour:** various shades of brown, from reddish brown to yellowish brown.

Taxonomic status

Based on their web-building behaviour Coddington (1986) and Eberhard (1987) considered the anapids and mysmenids as sister-groups. They are placed in the superfamily Araneoidea with the 'higher araneids' (Coddington & Levi, 1991, Coddington *et al.*, 2004). Revisions of several genera and regions have been done by Forster & Platnick (1977); Platnick & Forster (1989, 1990); Platnick & Shadab (1978b, 1979). According to Schütt (2003) the family is paraphyletic and should be considered a senior synonym of the Micropholcommatidae. According to Wunderlich (2004) the family should include Mysmenidae, Symphytognathidae and Synaphridae.

Distribution

Worldwide, but are more common in tropical and southern temperate forests.

Lifestyle

Cryptozoic and found in the litter layer and moss usually on the floor of moist forests. Some genera produce small, horizontal orb webs in the litter or above the water surface (fig. 11f).

Relevant literature

Coddington (1986, 2005a); Dippenaar-Schoeman & Jocqué (1997); Eberhard (1982); Forster & Platnick (1977); Platnick & Forster (1989, 1990); Platnick & Shadab (1978b, 1979), Ramírez *et al.* (2004); Schütt (2003).

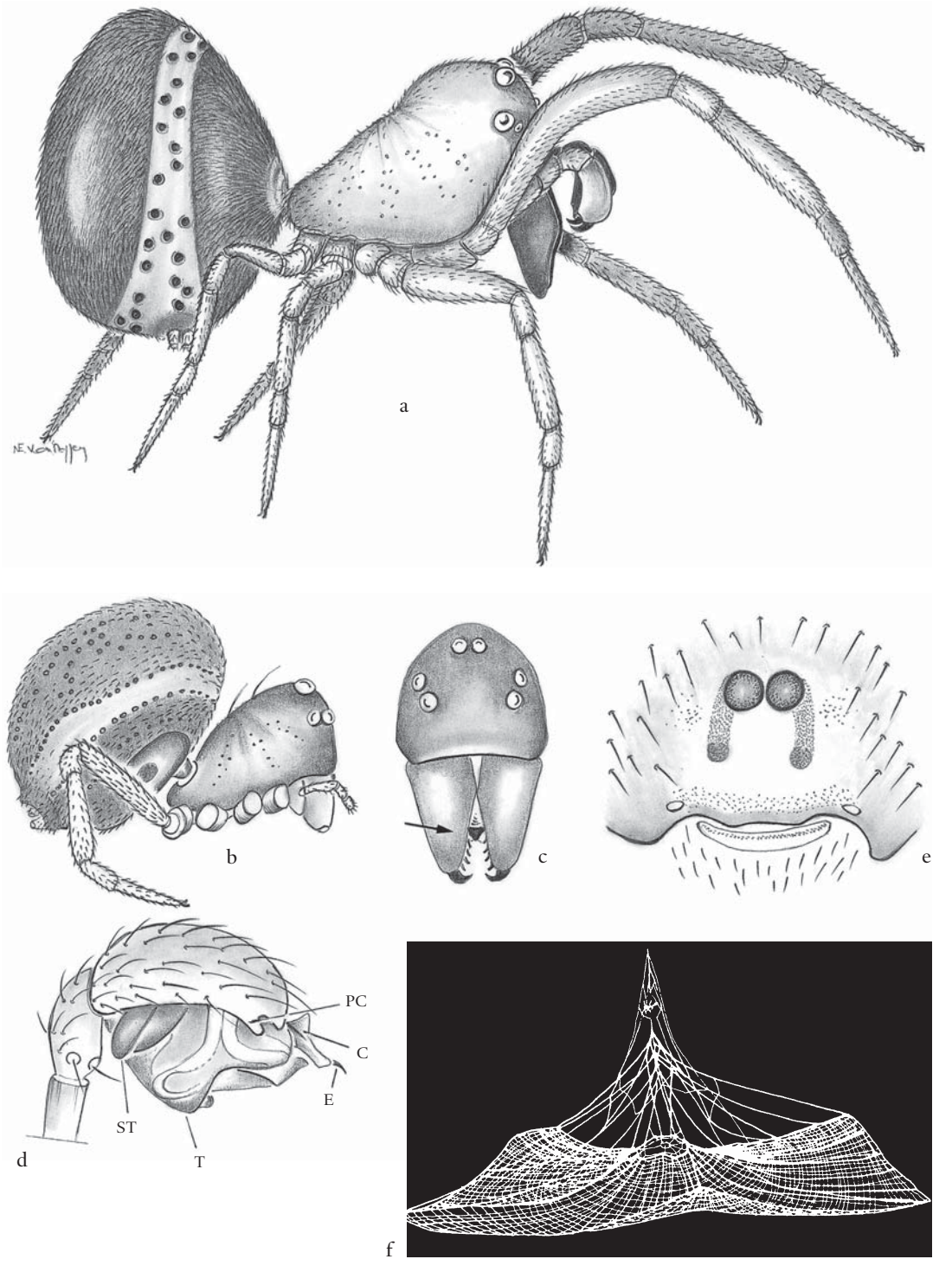


Fig. 11. **Anapidae.** *Pseudanapis* sp. **a.** male, natural posture (1.3 mm); **b.** female, cephalothorax and abdomen, lateral view; **c.** cephalothorax, frontal view; *Comaroma simoni* **d.** right male palp, lateral view; **e.** epigyne, ventral view; **f.** web. C: conductor; E: embolus; PC: paracymbium; ST: subtegulum; T: tegulum. (d, e: after Kropf, 2004 and Roberts, 1998.)

FAMILY ANTRODIAETIDAE Gertsch, 1940

FOLDING-TRAPDOOR SPIDERS

Fig. 12, pl. 2

Type genus

Antrodiaetus Ausserer, 1871.

Other genera

Aliatypus Smith, 1908; *Atypoides* O.P.-Cambridge, 1883. Family represented by 27 species (Platnick, 2005).

Diagnostic characters

Small to medium sized mygalomorph spiders; three tarsal claws; eight eyes; rastellum well developed; six or rarely four spinnerets; fovea pit-like or longitudinal; endites short; distal segment of posterior spinnerets short triangular or digitiform; third claw lacks teeth; abdomen with 1-4 dorsal sclerites.

Descriptive characters

- **carapace:** cephalic region raised higher than thoracic region (fig. 12b); strongly narrowed anteriorly in males; fovea small, pit-like or longitudinal (fig. 12 a, c) to absent; tegument smooth.
- **sternum** (fig. 12d)**:** oval with slightly sinuous sides; excavation lodging labium; three pairs of small to large sigilla.
- **eyes** (fig. 12c)**:** eight; grouped in two short rows on median eye tubercle; anterior row procurved; posterior row recurved (from above); anterior lateral eyes largest; lateral eyes close together.
- **chelicerae:** broad, robust; rastellum well developed in females (fig. 12d); cheliceral furrow narrow with one or two rows of teeth.
- **mouthparts:** endites rectangular, about as wide as long, with small anterior lobes; endites strongly convergent, obliquely truncate without cuspules; labium wider than long, without cuspules; serrula absent.
- **legs:** three claws; paired claws without or with a few short teeth; legs slender, much longer in male than in female; spines generally present but usually absent on tarsi; trichobothria in two rows on tibiae, one on metatarsi, absent on tarsi; scopula absent but males with scopula on tarsi III and IV; legs I of males with group of strong setae on tibiae and modified metatarsi.
- **female palp:** with toothless claw.
- **abdomen:** oval, with one (fig. 12a) to four dorsal sclerites.
- **spinnerets:** anterior spinnerets absent or if present one or two-segmented; median spinnerets with one segment; posterior spinnerets short with three segments, distal one digitiform.
- **respiratory system:** four booklungs.
- **genitalia:** female genital with four spermathecae (fig. 12g); male palp with swollen tibia (fig. 12e); bulbus simple; conductor consists of two sclerites; fused with embolus into a common basal sclerite (fig. 12f).
- **body size:** 6-13 mm.
- **colour:** highly variable; carapace different shades of brown with greyish, orange, yellowish or even greenish tinge; abdomen pale to purplish brown, often with a series of pale chevrons.

Taxonomic status

The family belongs in the superfamily Atypoidea and is considered the sister group of Atypidae by Raven (1985). A key to the genera is provided by Raven (1985).

Distribution

North America (*Aliatypus, Antrodiaetus, Atypoides*); Japan (*Antrodiaetus*).

Lifestyle

Live in fairly deep tubular silk-lined burrows. Entrance sometimes provided with a collar, which is used to close the entrance.

Relevant literature

Coyle (1968, 1971, 1974, 2005a); Raven (1985).

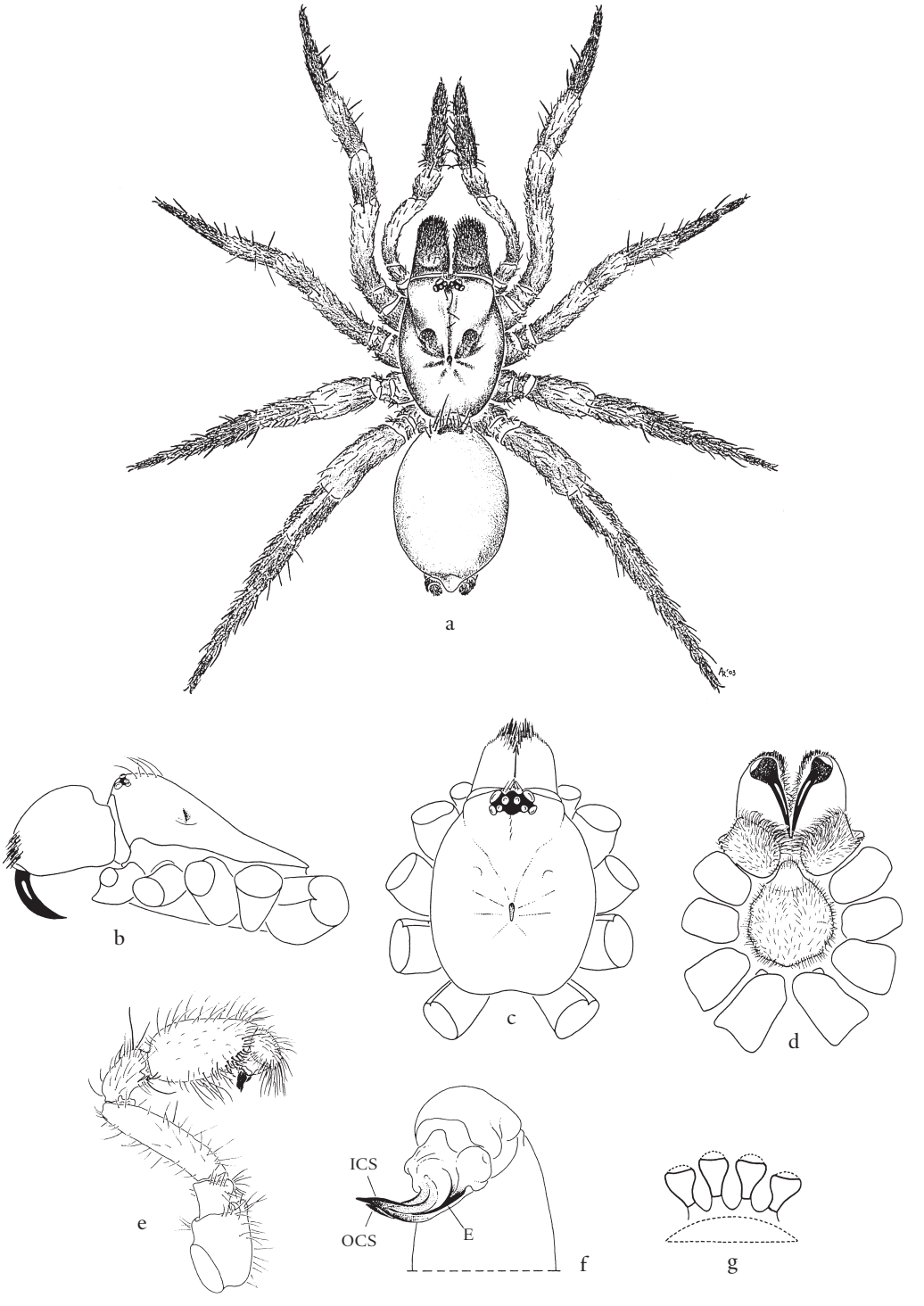


Fig 12. **Antrodiaetidae.** *Antrodiaetus* sp. **a.** female habitus (14 mm); **b.** cephalothorax, lateral view; **c.** cephalothorax, dorsal view; **d.** cephalothorax, ventral view; **e.** male palp, retrolateral view; **f.** male palp, detail of bulbus, ventral view; **g.** female genitalia, internal structure. E: embolus; ICS: inner conductor sclerite; OCS: outer conductor sclerite.

FAMILY ANYPHAENIDAE Bertkau, 1878

TUBE SPIDERS, PHANTOM SPIDERS

Fig. 13, pl. 28

Type genus

Anyphaena Sundevall, 1833.

Other genera

Represented by 56 genera and more than 500 species divided among three subfamilies: Malenellinae, Anyphaeninae and Amaurobiodininae.

Diagnostic characters

Small to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; tracheal spiracle situated about one-third of abdomen length from spinnerets; tarsal claw tufts composed of several rows of lamelliform setae; spinnerets lack cylindrical gland spigots.

Descriptive characters

- **carapace:** ovoid, rounded or rectangular; longer than wide or almost as wide as long; sparsely covered with setae; fovea longitudinal (fig. 13a).
- **sternum:** longer than wide; oval; apex pointed or rounded, anterior margin may be concave (fig. 13b).
- **eyes:** eight; in two rows (4:4), shape of rows and eye position variable.
- **chelicerae:** long and slender; slightly to strongly porrect; furrow with two rows of teeth; fangs strong; condyle prominent; chilum present.
- **mouthparts:** labium oval or anteriorly notched; endites well developed, longer than wide, parallel (fig. 13b), with prolateral scopula; serrula with one row of teeth.
- **legs:** two claws; scopulae dense; claw tufts consisting of several rows of lamelliform setae (fig. 13c); trochanters notched; leg formula 1423 or 4123; precoxal sclerites present; with row of plumose trichobothria on tarsi and metatarsi; base of trichobothria may have one transverse ridge; tarsal organ capsulate.
- **female palp:** claw slender and toothed; tarsus sometimes swollen.
- **abdomen:** oval to narrow elongate; with light covering of short setae as well as scattered, longer dark setae.
- **spinnerets:** close together, anterior spinnerets conical, two-segmented, contiguous at base, conical with many piriform glands and one or two ampullates; median spinnerets well developed, one segmented, with aciniform gland spigots; posterior pair two-segmented, proximal part cylindrical, distal one conical, with aciniform gland spigots; colulus a group of conspicuous setae.
- **respiratory system:** two booklungs; tracheal spiracle broad; situated one-third of abdomen length from spinnerets (fig. 13d); tracheal system complex with median tracheae branched into the cephalothorax.
- **genitalia:** entelegyne; epigyne highly variable, often with large angular plate or a membranous area (fig. 13f), two spermathecae and receptacula; male palp equally variable with very wide range of complexity, often with large tegular extensions (fig. 13e).
- **body size:** 2.5-17 mm.
- **colour:** variable.

Taxonomic status

Anyphaenidae were for years part of the dump-family Clubionidae. Petrunkevitch (1923) separated the Anyphaenidae from Clubionidae and Platnick (1974) supported the placement in a separate family. It was placed in the superfamily Dictynoidea by Forster (1970) but is currently placed in the Dionychae (Ramírez, 1995).

Distribution

Worldwide; very diverse in Neotropical region.

Lifestyle

Active, mainly nocturnal hunters occurring on the foliage of trees and leaf litter. Some species are intertidal. They hide in tubular silk retreats, hence their vernacular name.

Relevant literature

Brescovit (1997); Petrunkevitch (1923); Platnick (1974); Ramírez (1995, 2003); Ubick *et al.* (2005).

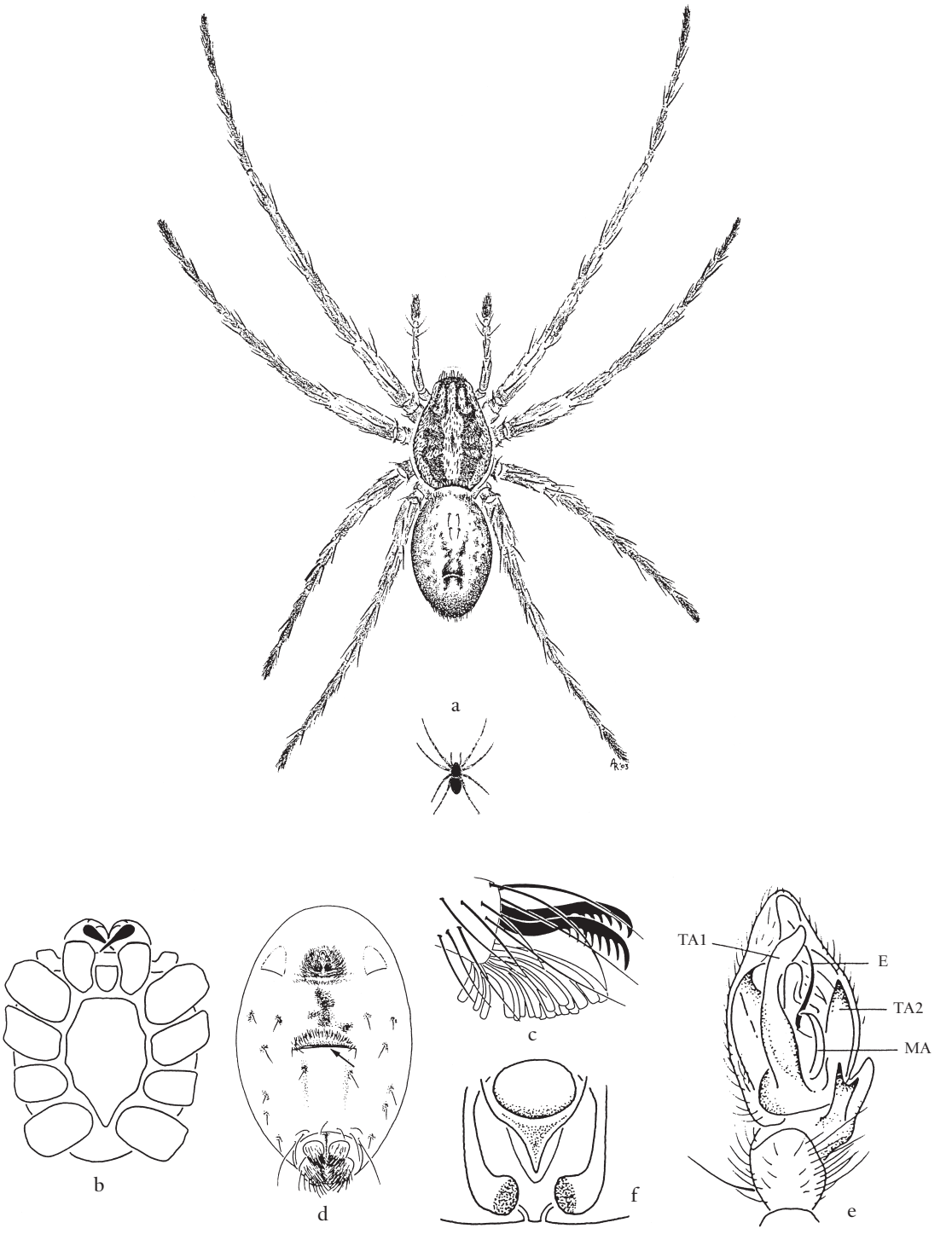


Fig. 13. **Anyphaenidae.** *Anyphaena accentuata* **a.** female habitus (6 mm); **b.** cephalothorax, ventral view; **c.** tip of left tarsus showing spatulate hairs; **d.** abdomen, ventral view showing advanced tracheal spiracle; **e.** male palp, ventral view; **f.** epigyne. E: embolus; MA: median apophysis; TA1: anterior tegular apophysis; TA2 posterior tegular apophysis.

FAMILY ARANEIDAE Simon, 1895

ORB WEB SPIDERS

Figs 14, 15, pl. 15

Diagnostic characters

Small to large araneomorph spiders, three tarsal claws, ecribellate, entelegyne; eight eyes in two rows with lateral eyes widely separated from median eyes; labium rebordered; abdomen globose, overhanging the carapace; legs usually with numerous spines and sustentaculum on tarsus IV; male palp with mesal cymbium, median apophysis and radix in the embolic division; an orb web with a sticky spiral, or a modification of such a web, is constructed.

Type genus

Araneus Clerck, 1757.

Other genera included

The Araneidae is a large family comprising more than 160 genera and 2,800 species. Several subfamilies are recognized: Araneinae, Arciinae, Argiopinae, Chorizopinae, Cyrtarachninae, Cyrtophorinae, Gasteracanthinae and Micratheninae.

Descriptive characters

- **carapace:** frequently flat; cephalic region usually separated from thoracic region by oblique depression; fovea distinct to absent (fig. 14a).
- **sternum:** heart-shaped or triangular.
- **eyes:** eight; in two rows (4:4); lateral eye groups widely separated from median eyes (fig. 14b); tapetum narrow and shifted laterally in posterior median eyes.
- **chelicerae:** strong; vertical with lateral condyle; cheliceral furrow with two rows of teeth.
- **mouthparts:** labium wider than long, thickened anteriorly (rebordered); endites widest anteriorly.
- **legs:** three claws; legs usually furnished with numerous spines; trichobothria present on all leg segments except tarsi; tarsi IV with sustentaculum.
- **abdomen:** varies greatly; usually globose, overhanging carapace; dorsum frequently with distinct pattern and humps (figs 15 a-c); covered with serrated setae; branchial opercula grooved.
- **spinnerets:** simple; with aggregate silk gland spigots; posterior median spinnerets with anterior field of aciniform gland spigots; colulus present.
- **respiratory system:** two booklungs; booklung covers grooved; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne completely or partially sclerotized, frequently with a scapus; epigynal plate with transverse furrows; male palp complex; femur often with basal tubercle (fig. 14d); patella often with two macrosetae (fig. 14e); paracymbium usually a sclerotized hook (fig. 14c); median apophysis present; bulbus rotated within cymbium.
- **body size:** 3-30 mm; sexual dimorphism in many genera, male then much smaller than female (e.g. *Caerostris*; *Gasteracantha* figs 15a, b).
- **colour:** varies between subfamilies, diurnal species usually more brightly coloured than the greyish brown to dark brown nocturnal species.

Taxonomic status

The Araneidae are considered sisters to all other Araneoidea. In a more recent analysis (Kuntner, 2005, 2006), that place is taken by the Nephilidae in the sense that they are positioned between the Araneidae and the rest of the Araneoidea (see fig. 5).

> **Note:** Wunderlich (2004) raised Zygiellinae to family rank as sister to the Tetragnathidae, based on the free sector in the web, a more strongly sclerotized paracymbium, and embolus and terminal apophysis in a distal position. However, the placement of *Zygiella* with the Tetragnathidae was not supported at all in the thorough analysis of Scharff & Coddington (1997). Therefore, we do not accept the family rank for this taxon.

Distribution

The Araneidae occur worldwide.

Lifestyle

Araneids are a diverse group of sticky orb-web weavers (figs 15 d, e) occupying a wide range of habitats. Several genera (Cyrtarachninae) have reduced webs or have entirely abandoned web building.

Relevant literature

Davies (1988); Griswold *et al.* (1998); Levi (2002, 2005a); Scharff & Coddington (1997).

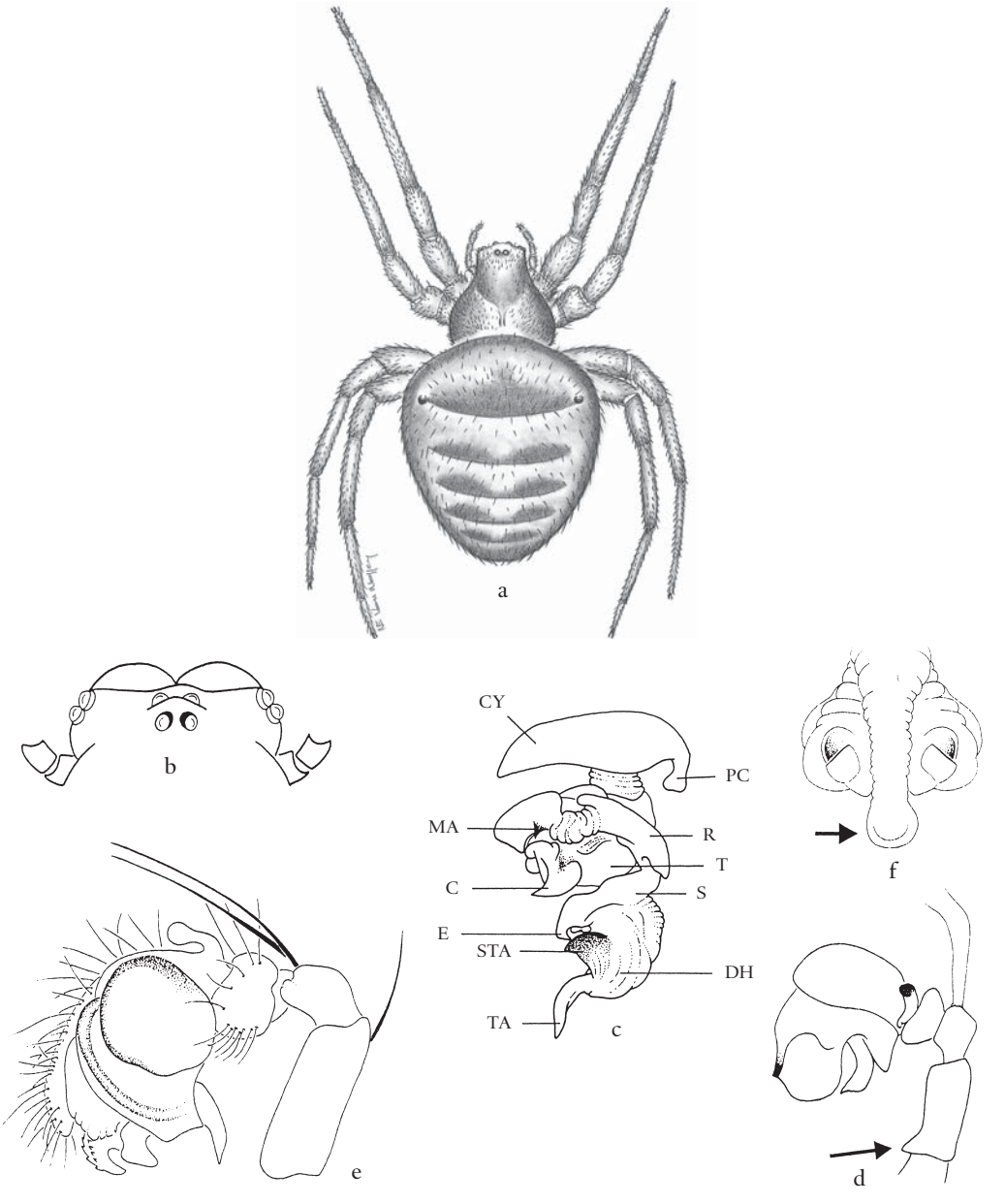


Fig. 14. **Araneidae.** *Neoscona* sp. **a.** female habitus (11 mm); **b.** eye pattern, dorsal view; **c.** male palp, expanded, lateral view; **d.** male palp, ventrolateral view showing femoral tubercle; **e.** male palp, lateral view showing macrosetae on patella; **f.** epigyne showing scapus. C: conductor; CY: cymbium; DH: distal haematodocha; E: embolus; MA: median apophysis; PC: paracymbium; R: radix; T: tegulum; TA: terminal apophysis; S: stipes; STA: subterminal apophysis.

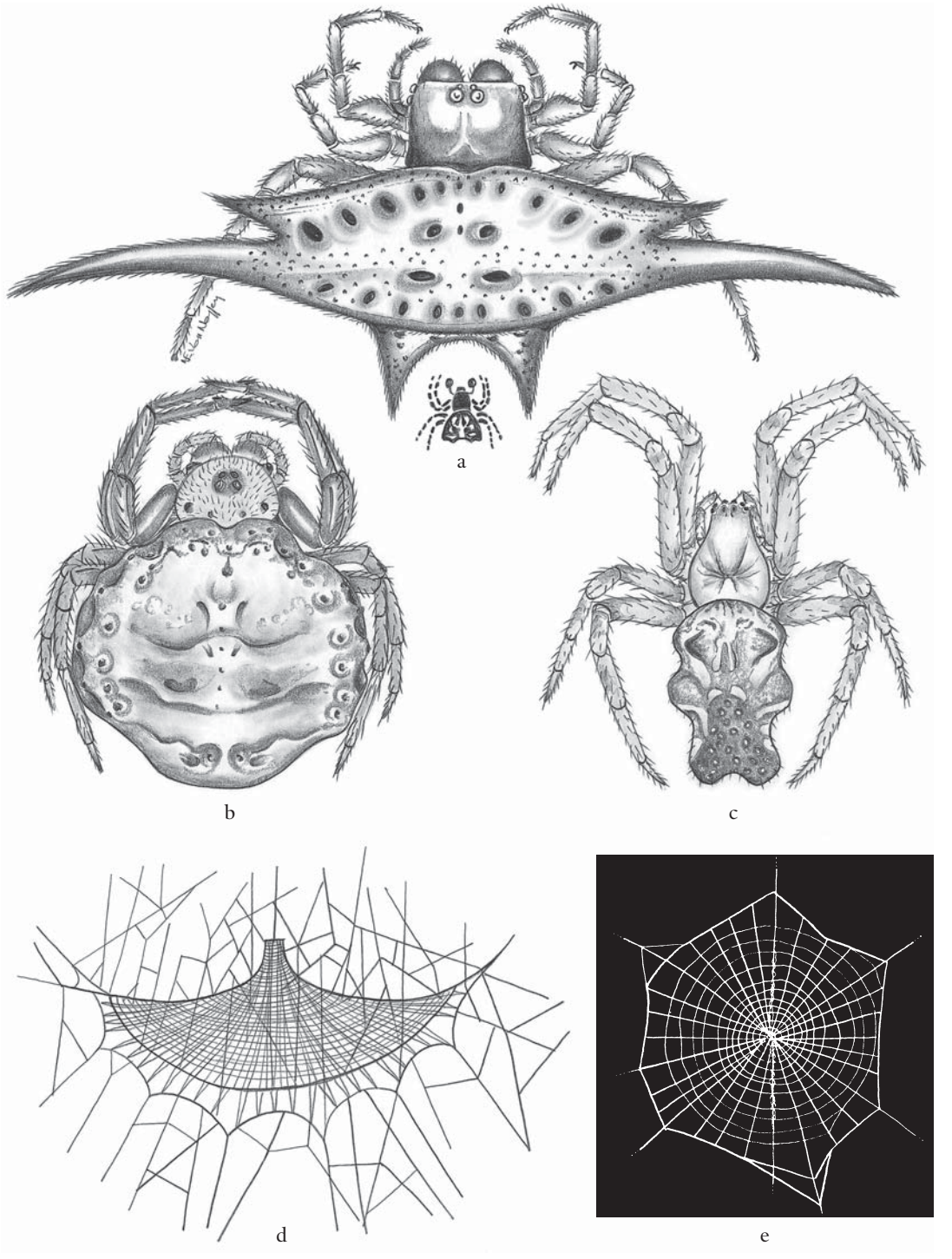


Fig. 15. **Araneidae.** *Gasteracantha* sp. **a.** habitus of female (12 mm) and male (2 mm); *Caerostris* sp. **b.** female habitus (16 mm); *Cyrtophora* sp. **c.** female habitus (13 mm); **d.** web; *Cyclosa* sp. **e.** web.

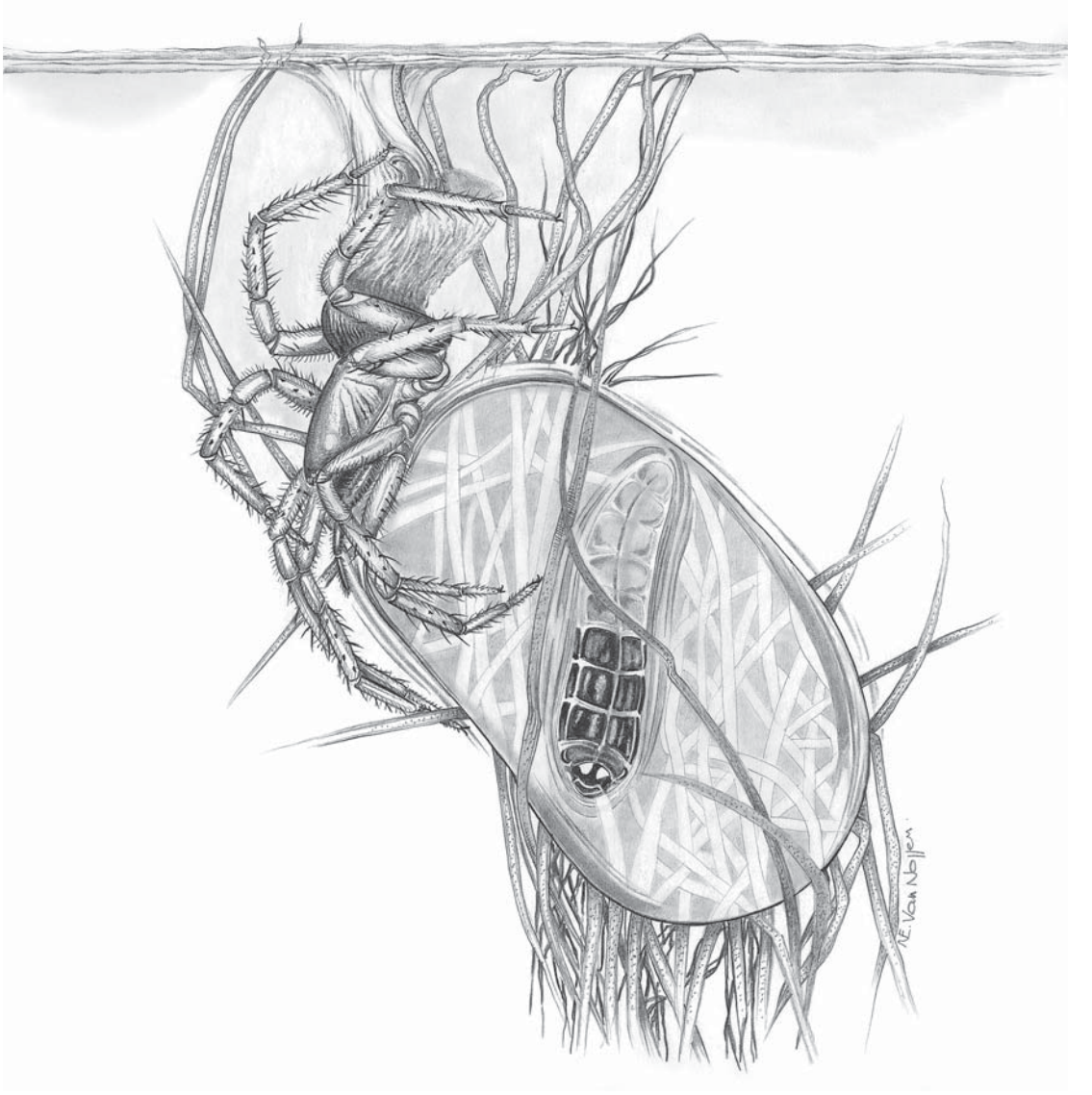


Fig. 15bis. **Argyronetidae** (2). *Argyroneta aquatica*, female (11 mm) with diving clock and prey.

FAMILY ARCHAEIDAE C. L. Koch & Berendt, 1854

LONG-NECKED SPIDERS

Fig. 16, pl. 9

Type genus

Archaea C.L. Koch & Berendt, 1854.

Other genera

Afrarchaea Forster & Platnick, 1984; *Austrarchaea* Forster & Platnick, 1984; *Eriauchenius* O.P.-Cambridge, 1881. Represented by 25 species.

Diagnostic characters

Small araneomorph spiders; three tarsal claws; ecribellate; haplogyne; eight eyes; carapace with a markedly raised cephalic region; chelicerae elongated with peg teeth on promargin; stridulating organ present on chelicerae and in abdomen-pedicel region.

Descriptive characters

- **carapace:** cephalic region greatly elevated above thoracic region and drawn out into a neck (height varies between genera) and (figs 16a, b) rounded and ornamented with small, flattened, granular tubercles, each provided with a short, thick seta; anterior margin sloping steeply.
- **sternum:** distinctly longer than wide; lateral margins produced between coxae.
- **eyes:** eight; in two rows; subequal in size; lateral eyes contiguous, anterior median eyes large and dark, rest smaller and paler (figs 16c, d).
- **chelicerae:** enlarged, long and slender with fangs relatively short and strongly curved; movement both sideways and up-and-down; cheliceral furrow weak, with distinctive peg teeth (fig. 16c); retromargin with conical true teeth; outer surface of chelicerae with faint stridulating ridges (fig. 16d).
- **mouthparts:** labium triangular; endites converging around labium; serrula weakly developed.
- **legs:** three claws on short, distinct, sclerotized onychium; legs long and slender without spines, smooth or with plumose appressed setae; leg I longest, III shortest.
- **female palp:** trochanter elongated (*Afrarchaea godfreyi*).
- **abdomen:** subglobular, soft, with patches of chitinous tissue; covered with setae resembling spines of a sea urchin; chitinous ring surrounds spinnerets and annual tubercle; pedicel with two lateral strips of chitin on either side; males with dorsal scutum on anterior part of abdomen; abdominal setae filiform or subspatulate (figs 16a, b).
- **spinnerets:** anterior spinnerets largest, contiguous with one major ampullate gland spigot and some piriform gland spigots; posterior median spinnerets with minor ampullate gland spigot and cylindrical gland spigots; posterior lateral spinnerets slender, two-segmented with a row of five aciniform gland spigots and cylindrical gland spigots; colulus not well developed.
- **respiratory system:** two booklungs; two minute spiracles well in front of spinnerets.
- **genitalia:** haplogyne; female genitalia with secretory plate anteriorly and a single median membranous sac posteriorly (fig. 16f); male palp with cymbium small, distal portion with process parallel to embolus; embolus conspicuous; varies from tubular to spiniform or filiform (fig. 16e).
- **body size:** 3-6 mm.
- **colour:** cephalothorax and legs usually reddish brown with abdomen yellowish brown or greyish white, with pattern.

Taxonomic status

The Archaeidae, Mecysmaucheniidae, Pararchaeidae and Holarchaeidae apparently constitute a monophyletic group with the closest relatives in the superfamily Palpimanoidea (Forster & Platnick, 1984). All three genera have been revised (Forster & Platnick, 1984; Lotz, 1996, 2003).

Distribution

South Africa (*Eriauchenius, Afrarchaea*); Australia (*Austrachaea);* Madagascar (*Afrarchaea, Eriauchenius*).

Lifestyle

Free-living, cryptozoic hunters usually found on forest floor or on shrubs or tree trunks. The long fangs are sometimes used to impale prey.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1984); Lotz (1996, 2003); Platnick (1991).

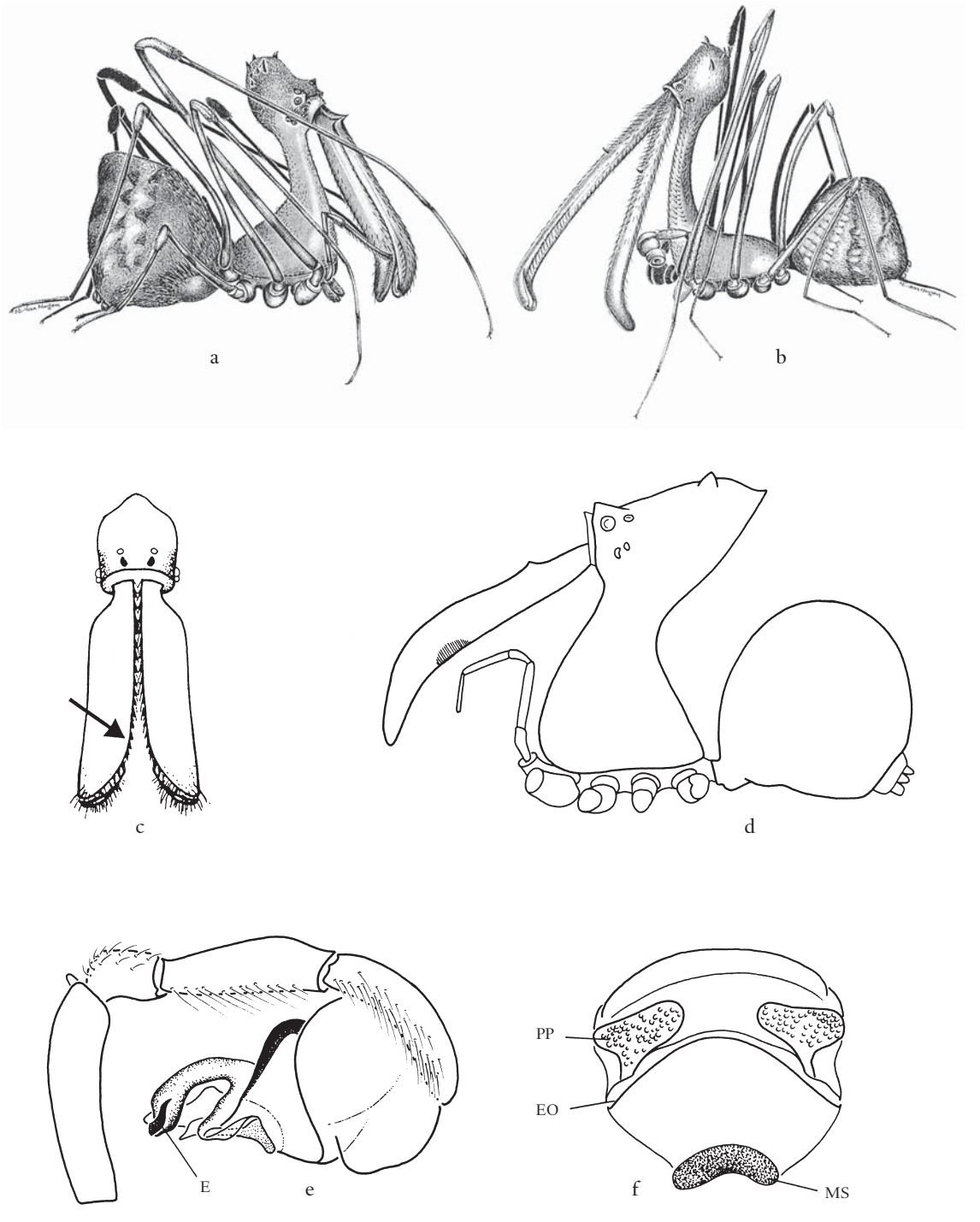


Fig. 16. **Archaeidae.** *Archaea sp.* **a.** female, natural posture (2.5 mm); **b.** *Archaea* sp., male, natural posture (2.4 mm); **c.** cephalothorax, frontal view showing peg teeth; **d.** cephalothorax and abdomen, lateral view, showing cheliceral stridulating file; **e.** right male palp, retrolateral view; **f.** epigyne, ventral view. E: embolus; EO: entrance opening; MS: median sclerotization; PP: pore plate.

FAMILY ARGYRONETIDAE Thorell, 1870

WATER SPIDER, SOFT SPIDERS

Figs 15bis, 17, pl. 22

Type genus

Argyroneta Latreille, 1804.

Other genera

Represented by 12 genera and about 150 species.

Diagnostic characters

Small to very large Araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; diagnosed by closely set anterior spinnerets with short hemispherical distal segment.

Descriptive characters

- **carapace:** as long as or longer than wide; fairly flat or raised in cephalic area; fovea distinct (fig. 17a); clypeus variable.
- **eyes:** eight eyes in two rows (fig. 17b): posterior row recurved or straight, anterior row straight, shorter than posterior row; secondary eyes with canoe-shaped tapetum.
- **chelicerae:** vertical, strongly developed (fig. 17b), with lateral condyle; promargin with three teeth, retromargin with three to five teeth, often with small extra teeth.
- **mouthparts:** endites longer than wide, parallel; serrula present; labium variable.
- **sternum:** shield-shaped; about as wide as long, truncated in front, strongly narrowed posteriorly.
- **legs:** slender; formula variable but III always shortest; coxae notched; tarsi with small extra distal segment; with spines; three toothed claws; one or two rows of trichobothria on tarsi, one row on metatarsi, proximal cluster on tibiae and a few isolated distally.
- **female palp:** with finely toothed claw.
- **abdomen:** oval, low, venter somewhat flattened; sparsely setose or with thick hair cover (*Argyroneta*); often with patch of setae in front of spinnerets.
- **spinnerets:** six; all well developed; anterior and posterior lateral spinnerets conical, two-segmented with short hemispherical distal segment; posterior median spinnerets short, one segment. Colulus present or poorly developed (fig. 17c).
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually strongly sclerotized and fairly complex (fig. 17f); male palp with large retrolateral tibial and often patellar apophysis; subtegulum exposed; embolus with broad base and slender tip, supported by complex apophysis with ventral and dorsal divisions (figs 17d, e); this large retrolateral tegular extension is apparently not homologous with the median apophysis.
- **body size:** 3.5-21 mm.
- **colour:** fairly variable: pale yellow to medium brown.

Taxonomical status

Traditionally this group of spiders, often referred to as Cybaeinae, was considered a subfamily of the Agelenidae. It was transferred to the Dictynidae by Lehtinen (1967) but elevated to family level by Forster (1970), although a sound diagnostic character remains to be found. Cybaeidae Banks, 1892 is junior to Argyronetidae Thorell, 1870 (Grothendieck & Kraus, 1994). Some genera have been recently revised (Marusik & Guseinov, 2003; Song, Zhu & Chen, 1999 (China); Ivie & Ono 2000 (Japan).

Distribution

Argyroneta is known from the palaearctic, while other argyronetids occur in Europe, Asia and North America.

Lifestyle

Argyroneta aquatica (Clerck, 1757) is the only real water spider that is equipped for life under water, where it may pass its entire life cycle (fig. 15bis). Little is known about other Argyronetidae besides the fact that they construct a sheet web.

Relevant literature

Bennett (2005a); Forster (1970); Grothendieck & Kraus (1994); Irie & Ono (2000); Marusik & Guseinov (2003); Song, Zhu & Chen (1999).

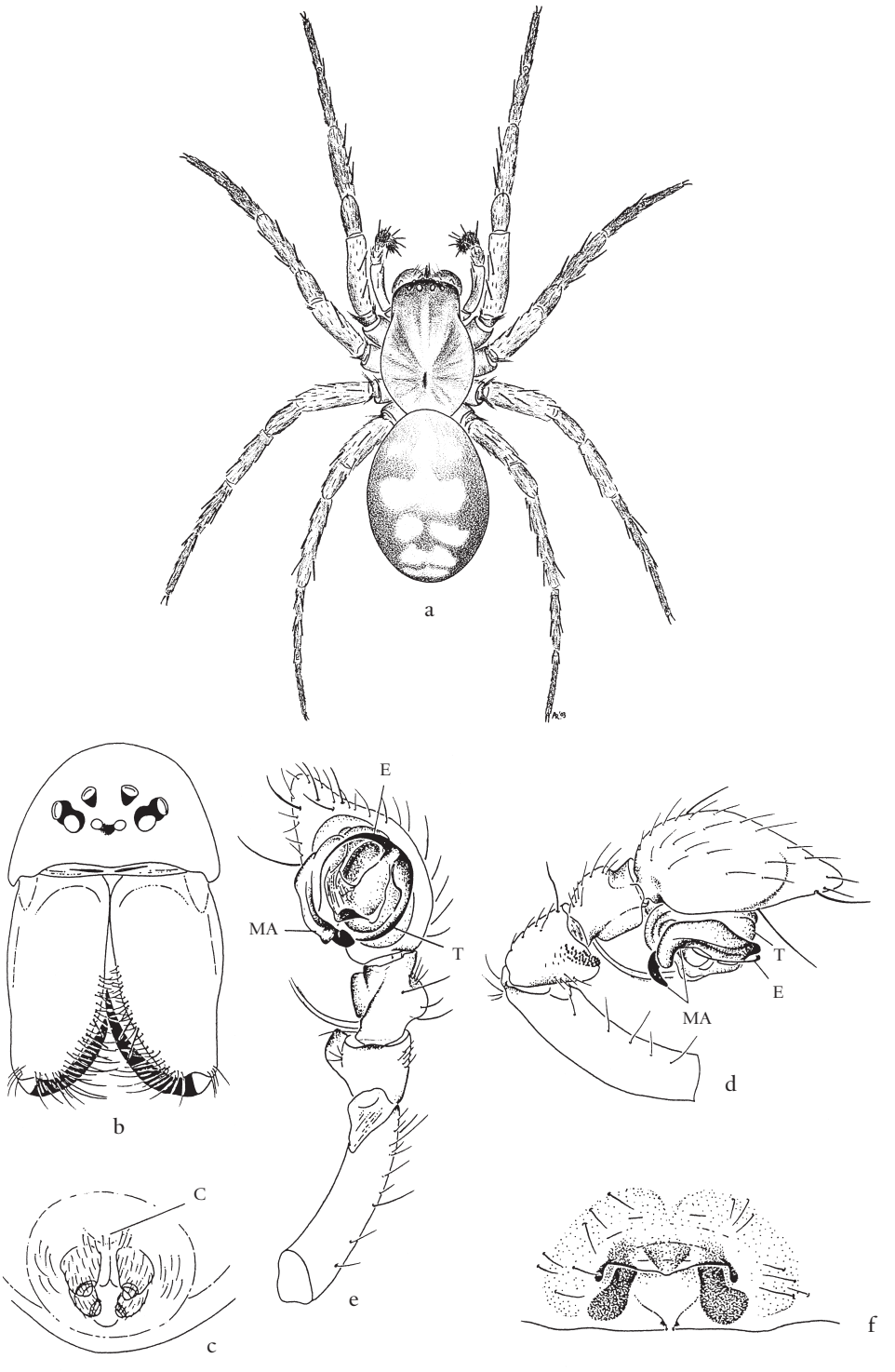


Fig. 17. **Argyronetidae.** *Cybaeus tetricus* **a.** female habitus (8 mm); **b.** cephalothorax, frontal view; **c.** spinnerets, showing colulus; **d.** right male palp, lateral view; **e.** right male palp, ventral view; **f.** epigyne, ventral view. C: colulus; E: embolus; MA: median apophysis; T: tegulum.

FAMILY ATYPIDAE Thorell, 1870

PURSEWEB SPIDERS

Fig. 18, pl. 1

Type genus

Atypus Latreille, 1804.

Other genera

Calommata Lucas, 1837; *Sphodros* Walckenaer, 1835. Represented by 33 species (Platnick, 2005).

Diagnostic characters

Medium-sized to large mygalomorph spiders; three tarsal claws; eight eyes; rastellum absent; six spinnerets; median spinnerets truncated; prolateral side of endites strongly elongated; cephalic region strongly elevated; chelicerae large; fangs long and thin.

Descriptive characters

- **carapace:** glabrous; cephalic region strongly arched; fovea deep and broad or longitudinal (figs 18a, b).
- **sternum:** labiosternal junction a narrow groove; six sigilla (*Calommata*) or eight (*Sphodros*, *Atypus*) (fig. 18d).
- **eyes:** eight; in two rows, rows three times wider than long (*Sphodros*, *Atypus*), or on a compact transverse tubercle near fovea (*Calommata*) (fig. 18c).
- **chelicerae:** broad; rastellum absent; fangs long with two basal teeth (*Sphodros*, *Atypus*) or with transverse ridge (*Calommata*) (fig. 18f); cheliceral furrow with one row of teeth (fig. 18e).
- **mouthparts:** endites broad, rotated forward, with or without cuspules; anterior lobe strongly elongated (fig. 18d); labium wider than long, cuspules present; serrula absent.
- **legs:** three claws; in female short, stout, tarsi and metatarsi front legs with numerous spines (*Sphodros*, *Atypus*), or without (*Calommata*); legs longer and more slender in males; tarsal claws raised, on a common process; tarsal claws in female with row of several long teeth on single process (*Sphodros*, *Atypus*) or with few teeth (*Calommata)*.
- **female palp:** tibiae and tarsi flattened.
- **abdomen:** with an irregularly shaped dorsal scutum.
- **spinnerets:** six; anterior spinnerets small, widely spaced; median spinnerets truncated; posterior spinnerets with three subequal segments, apical segment finger-like (fig. 18g).
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae with two or more paired receptacula with coiled lobes (*Sphodros*) or uncoiled lobes (*Atypus*, *Calommata*); male bulbus with distinct distal haematodocha; embolus short and straight (fig. 18h).
- **body size:** 9-30 mm.
- **colour:** carapace testaceous with darker stains on cephalic region; legs pale testaceous; abdomen; dull greyish brown to yellowish brown.

Taxonomic status

Raven (1985) placed the atypids together with the Antrodiaetidae in the Atypoidina. He provided a key to the three genera (Raven, 1985). Gertsch & Platnick (1980) revised the genus *Sphodros.*

Distribution

Africa (*Calommata*); Oriental Region (*Calommata*, *Atypus*); southern Europe (*Atypus*); Asia (*Atypus*); North America and Mexico (*Sphodros*).

Lifestyle

Live permanently in burrows and cover the entrance with a purse-like web (*Sphodros*, *Atypus*) or flat sheet-like web covering burrow entrance (*Calommata*) (figs 18i, j).

Relevant literature

Coyle (2005b); Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Gertsch & Platnick (1980); Raven (1985).

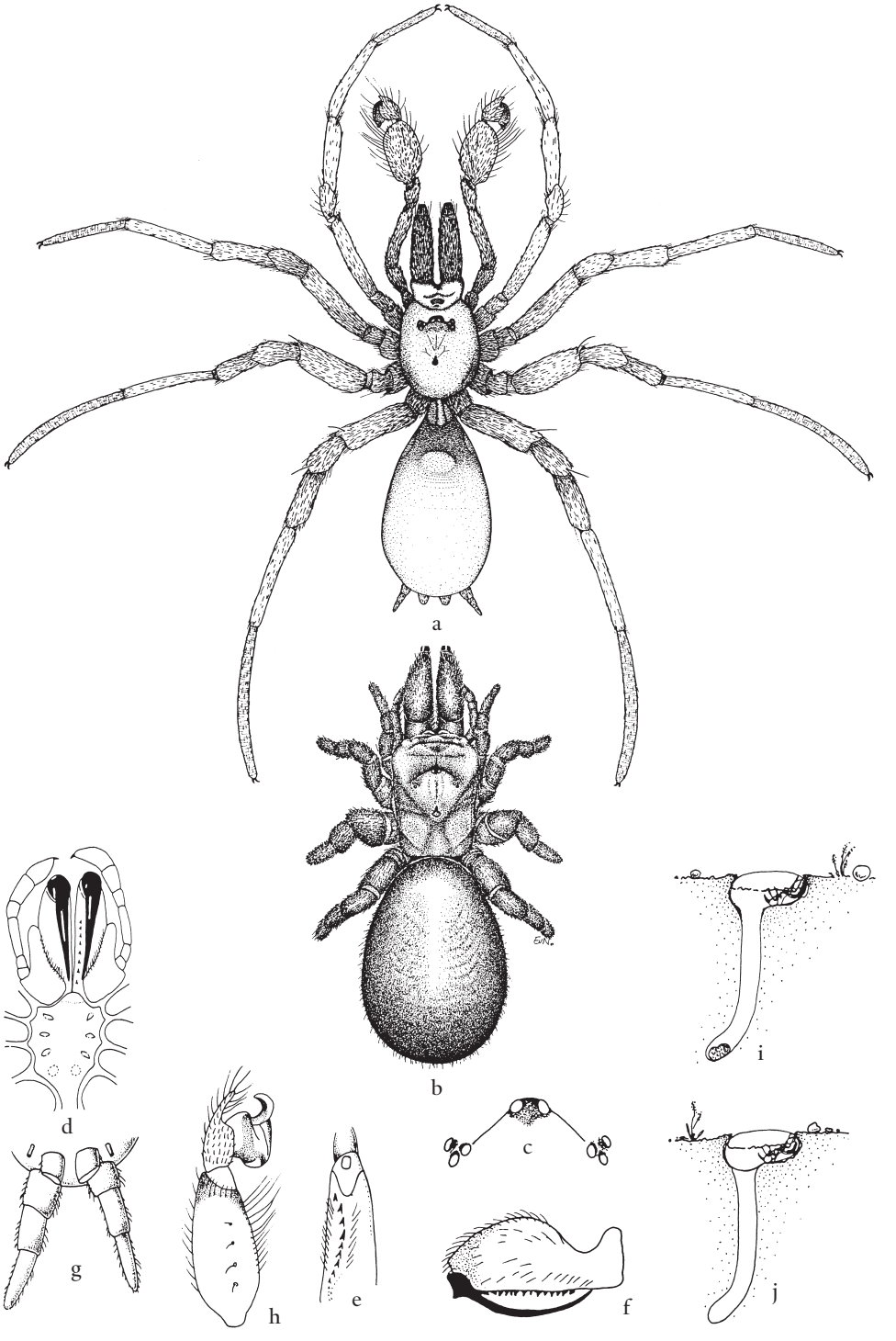


Fig. 18. **Atypidae.** *Calommata simoni*. **a.** male habitus (10 mm); **b.** female habitus (14 mm); **c.** eye pattern dorsal view; **d.** sternum and chelicerae, ventral view; **e.** dentition of left chelicera; **f.** chelicera, lateral view; **g.** spinnerets; **h.** male palp, retrolateral view; **i.** burrow with eggs and ambush chamber; **j.** burrow.

FAMILY AUSTROCHILIDAE Zapfe, 1955

JUNCTION WEB WEAVERS

Fig. 19

Type genus

Austrochilus Gertsch & Zapfe, 1955.

Other genera

Thaida Karsch, 1880; *Hickmania* Gertsch, 1985. Represented by nine species (Platnick, 2005) divided among two subfamilies, Austrochilinae and Hickmaniinae.

Diagnostic characters

Medium to large araneomorph spiders; three tarsal claws; cribellate; haplogyne; eight eyes; female genitalia with separate openings into the anterior and posterior receptacula.

Descriptive characters

- **carapace:** oval with cephalic region distinctly narrowed anteriorly (fig. 19a); cephalic region low (fig. 19b); fovea Y-shaped (*Austrochilus* & *Thaida*) (fig. 19a) or longitudinal groove (*Hickmania*); anterior margin of clypeus extended between chelicera.
- **sternum:** longer than wide; bluntly pointed between coxae IV (fig. 19c).
- **eyes:** eight in two straight or slightly curved rows (dorsal view); anterior median eyes smallest, dark, circular; other eyes pale, circular, subequal.
- **chelicerae:** vertical, not divergent (fig. 19b); without condyle; promargin with group of closely set tiny denticles; with small stridulating file, only in males in *Hickmania*.
- **mouthparts:** endites subquadrangular; distal margin with dense scopula; serrula composed of long single row of teeth; labium variable (fig. 19c).
- **legs:** long and slender, strongly spinose, even on tarsi; tarsi slightly scopulate, with three dentate claws, paired claws equal; trichobothria in double row on tibiae, single subdistal on metatarsi, absent on tarsi; tarsal organ exposed.
- **female palp:** femur with proximal thick setae segments with thickened bristles; tarsus with long pectinate claw.
- **abdomen:** oval, slightly longer than wide; coated with long, erect, dark setae.
- **spinnerets:** six; anterior lateral spinnerets thick, three-segmented, last two segments short, with two major ampullate gland spigots and a field of piriform gland spigots; medians one-segmented, short, narrow with paracribellar and numerous aciniform gland spigots; posterior spinnerets with two segments; with aciniform gland spigots.
- **cribellum:** wide, short, undivided.
- **calamistrum:** one row of setae occupying middle third of metatarsi IV (fig. 19d).
- **respiratory system:** with two pairs of booklungs (*Hickmania*) or posterior pair of interconnected spiracles leading to tracheae (*Austrochilus* & *Thaida*).
- **genitalia:** entelegyne; epigyne (fig. 19f) with two pairs of receptacula with separate openings; male palp: with narrow, elongate cymbium; fairly complex bulbus in which subtegulum and tegulum are fused; massive embolus of variable shape (fig. 19e).
- **body size:** 8-20 mm.
- **colour:** carapace yellowish with darker bands (*Austrochilus* & *Thaida)* or uniform orange (*Hickmania*); abdomen brown with variable pattern.

Taxonomic status

Lehtinen (1967) considered each of the three genera to belong to a separate family but this was not accepted by Forster *et al.* (1987). They speculated that the Austrochilidae with Grandungulidae belong to the superfamily Austrochiloidea, a sister group of the Araneoclada containing all other families of Araneomorphae (Forster *et al.*, 1987).

Distribution

Chile and Argentina (Austrochilinae: *Austrochilus, Thaida*); Tasmania (Hickmaniinae: *Hickmania*).

Lifestyle

Austrochilines build conspicuous horizontally oriented aerial cribellate webs in moist forest; Hickmaniines live in dark cool places where they build a large, sometimes huge horizontal web provided with

a funnel-shaped retreat leading into a rock crevice. The web is a junction or fractal web in which polygons are added and gradually divided with additional strands of silk into smaller meshes.

Relevant literature

Forster *et al.* (1987); Lehtinen (1967); Grismado *et al.* (2003).

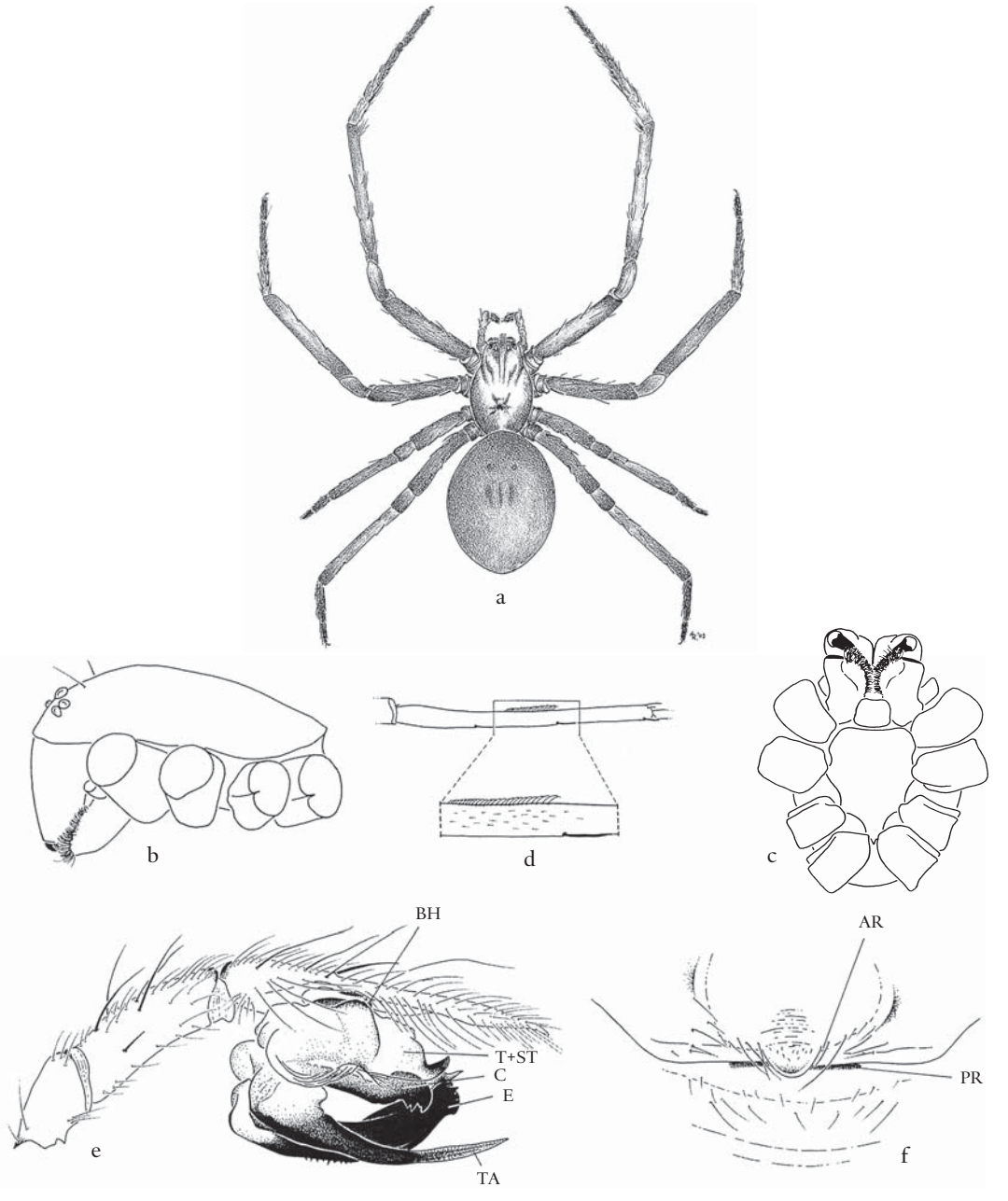


Fig. 19. **Austrochilidae.** *Austrochilus franckei*. **a.** female habitus (10 mm); **b.** cephalothorax, lateral view; **c.** cephalothorax, ventral view; **d.** metatarsus IV showing position of calamistrum; **e.** right male palp, retrolateral view; *Austrochilus melon* **f.** female epigastric fold. AR: opening into anterior receptaculum; BH: basal haematodocha; C: conductor; E: embolus; PR: opening into posterior receptaculum; ST: subtegulum; T: tegulum; TA: tegular apophysis.

FAMILY BARYCHELIDAE Simon, 1889

BRUSH-FOOTED TRAPDOOR SPIDERS

Fig. 20, pl. 2

Type genus

Barychelus Simon, 1889.

Other genera

Represented by 44 genera and 300 species (Platnick, 2005) in the subfamilies Barychelinae, Sasoninae and Trichopelmatinae.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; two tarsal claws; eight eyes; rastellum present or absent; four or two spinnerets; well developed claw tufts on legs; thick iridescent scopula on metatarsi and tarsi I and II; tarsi basally with a few, if any, clavate trichobothria; anterior lobes of endites small; posterior spinnerets short, with apical segment dome-shaped.

Descriptive characters

- **carapace:** ovate; caput gently arched; thoracic region sloping; pilosity varies from almost glabrous to uniformly hirsute; fovea transverse (fig. 20a).
- **sternum:** usually about as long as wide, except in *Idioctis* in which it is narrow; sigilla usually small and marginal (anterior pair indistinct) (fig. 20b); labiosternal suture a distinct groove.
- **eyes:** eight; arranged in rectangular group, two times wider than long or three rows (figs 20c, d); eye tubercle present.
- **chelicerae:** rastellum usually absent but, when present, composed of line or cluster of weak spines, rarely a raised spinose mound.
- **mouthparts:** anterior lobe of endites weak; endites rectangular with or without cuspules (fig. 20b), usually few but may be numerous (Trichopelmatinae); maxillae rarely with stridulatory lyra (*Idiommata, Aurecocrypta),* labium always wider than long, cuspules usually absent except in Sasoninae and female *Monodontium*; serrula absent.
- **legs:** two claws; claw tufts well developed; scopula present on metatarsi and tarsi I and II (fig. 20e); preening comb absent; tarsi with 4-6 clavate trichobothria (if present), confined basally on tarsi; filiform trichobothria on tibiae, metatarsi and tarsi; paired tarsal claws of males biserially dentate or bare and of females bare or with few teeth except *Monodontium* in which both males and females are biserially dentate; leg formula usually 4123; leg I of males usually with distal ventral spur and upper megaspine (fig. 20f).
- **female palp:** tarsal claws edentate, claw tufts present (Barychelinae) or absent.
- **abdomen:** oval; uniformly hirsute, sometimes with pattern.
- **spinnerets:** four or rarely two; posterior spinnerets with apical segment short and domed (fig. 20g).
- **respiratory system:** four booklungs with fringe of hairs across entrance.
- **genitalia:** two entire or subdivided spermathecae; male palp with cymbium bilobate, or one very long lobe in *Pisenor* and *Sipalolasma*; bulbus with small second haematodocha; coniform distal sclerite without a conductor (fig. 20h).
- **body size:** 12-32 mm.
- **colour:** varies from yellowish grey to reddish brown or greyish black; abdomen with pale spots or patches.

Taxonomic status

Placed in the Theraphosoidina together with the Theraphosidae and Paratropididae (Raven, 1985). Raven (1985) provided a key to the genera of the world and in Raven (1994) he revised the barychelids of Australia. Dippenaar-Schoeman (2002) reported on the barychelids of Southern Africa.

Distribution

Pantropical.

Lifestyle

Live in silk-lined burrows or retreats usually closed with a trapdoor (fig. 20i).

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Raven (1985, 1994).

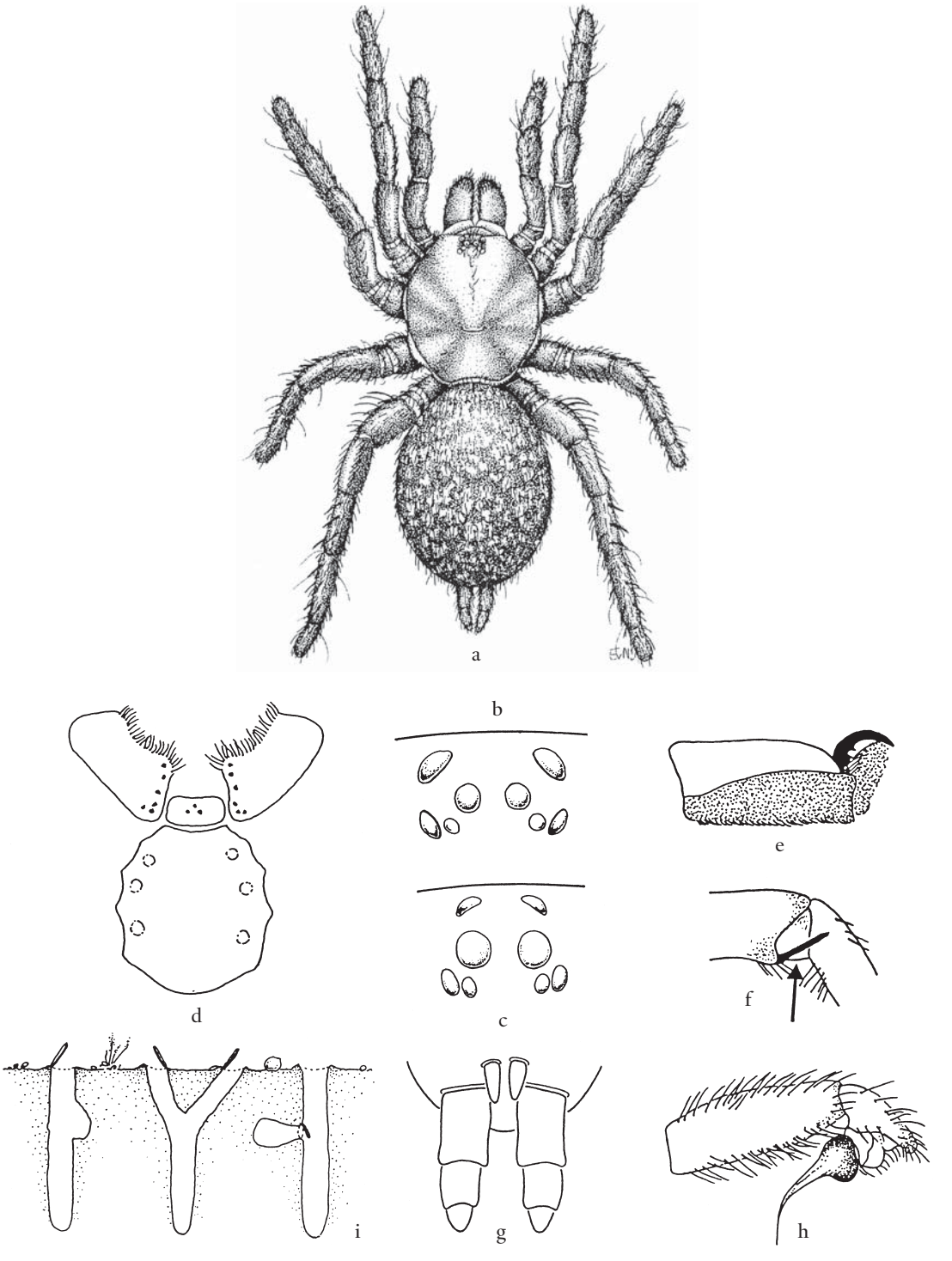


Fig. 20. **Barychelidae.** *Cyphonisia* sp. **a.** female habitus (16 mm); Sasoninae **b.** eye pattern; Barychelinae **c.** eye pattern; **d.** sternum and mouthparts, ventral view; **e.** tarsus with claws and scopula; **f.** male leg I, showing mating spur; **g.** spinnerets, ventral view; **h.** male palp, retrolateral view; **i.** examples of burrow shapes.

FAMILY CAPONIIDAE Simon, 1890

BRIGHT LUNGLESS SPIDERS

Fig. 21, pl. 8

Type genus

Caponia Simon, 1887.

Other genera

Calponia Platnick, 1993; *Caponina* Simon, 1887; *Diploglena* Purcell, 1904; *Nops* MacLeay, 1839; *Nopsides* Chamberlin, 1924; *Notnops* Platnick, 1994; *Orthonops* Chamberlin, 1924; *Taintnops* Platnick, 1994; *Tarsonops* Chamberlin, 1924; *Tisentnops* Platnick, 1994. Represented by about 70 species (Platnick, 2005) and placed in two subfamilies, Nopinae and Caponiinae.

Diagnostic characters

Small to medium sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; with two, three, four, five or eight eyes; chelicerae often with sclerotized lamina; booklungs replaced by two pairs of tracheae; spinnerets modified with median spinnerets situated between anterior spinnerets; tarsi with trichobothria; modifications of distal leg segments.

Descriptive characters

- **carapace:** oval, attenuated anteriorly; lacking a distinct fovea and striation (figs 21a, b); clypeus broad and sloping, sometimes porrect; integument smooth or granulate.
- **sternum:** oval and more or less elongated and flat with a sinuous edge; labium separated from sternum by a shallow depression.
- **eyes:** varies from 2-8; if two-eyed, anterior median eyes retained (fig. 21d); if eight eyes, eyes arranged in compact group around anterior median eyes (fig. 21c).
- **chelicerae:** free; subchelate; with modified lamina; chelicerae small and weak, attenuated and vertical; fangs very long, slender and sharply curved, enlarged at base.
- **mouthparts:** labium flat to slightly depressed, much longer than wide; endites long converging around labium, tips nearly touching (fig. 21e), bearing trichobothria; serrula present.
- **legs:** three claws; legs short and sturdy with coxae and often patellae of leg I much longer than in other legs; leg I, especially femur, frequently stout; legs lacking spines; tarsi devoid of scopula but with trichobothria, sometimes subsegmented; onychium present; paired claws pectinate.
- **female palp:** claw absent; sometimes with dense patch of short setae.
- **abdomen:** oval with sparse covering of dark setae; epigastric region and tracheae often with chitinous strip.
- **spinnerets:** arranged in two transverse rows (fig. 21f) with median spinnerets situated between anterior spinnerets to form a straight or slightly recurved line; posterior spinnerets almost twice as thick as anterior spinnerets; colulus absent.
- **respiratory system:** booklungs absent, replaced by two pairs of tracheae; an anterior pair of sieve tracheae and a posterior pair of tubular tracheae; tracheal spiracles anteriorly positioned (fig. 21h).
- **genitalia:** haplogyne; female with copulatory opening concealed beneath integument; spermathecae paired but reduced; male palp with well-developed tarsus; bulbus simple, inserted in small alveolus; embolus varies from a short spiniform or curled process to extremely long and curved; conductor absent; cymbium with pad of short setae, drawn out into sharp point (fig. 21g).
- **body size:** 6-13 mm.
- **colour:** carapace and legs orange-yellow to orange-red, with a dark spot usually over eye region; abdomen usually uniformly silky grey.

Taxonomic status

Lehtinen (1967) regarded the Caponiidae as a superfamily on its own. Platnick *et al.* (1991), Coddington & Levi (1991) regarded the Tetrablemmidae and Caponiidae together as the sister-group of the Dysderoidea, but Coddington *et al.* (2004) place them as sister to the Dysderoidea, thus including the Tetrablemmidae. Recent revisions of some genera provided by Platnick (1993, 1994a, 1995).

Distribution

USA (*Calponia*); Africa (*Caponia*); South America, Cuba (*Caponina*); Africa (*Diploglena*), South America, Cuba, Jamaica (*Nops*); Mexico (*Nopsides*); South America (*Notnops*); USA, Mexico (*Orthonops*); South America (*Taintnops*); Mexico (*Tarsonops*); South America (*Tisentnops*).

Lifestyle

Caponiids are free-living ground species. They are found under stones and litter, where they make a small silk retreat. Some species prey on other spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Coddington & Levi (1991); Platnick (1993, 1994a, 1995); Platnick *et al.* (1991); Ubick (2005a).

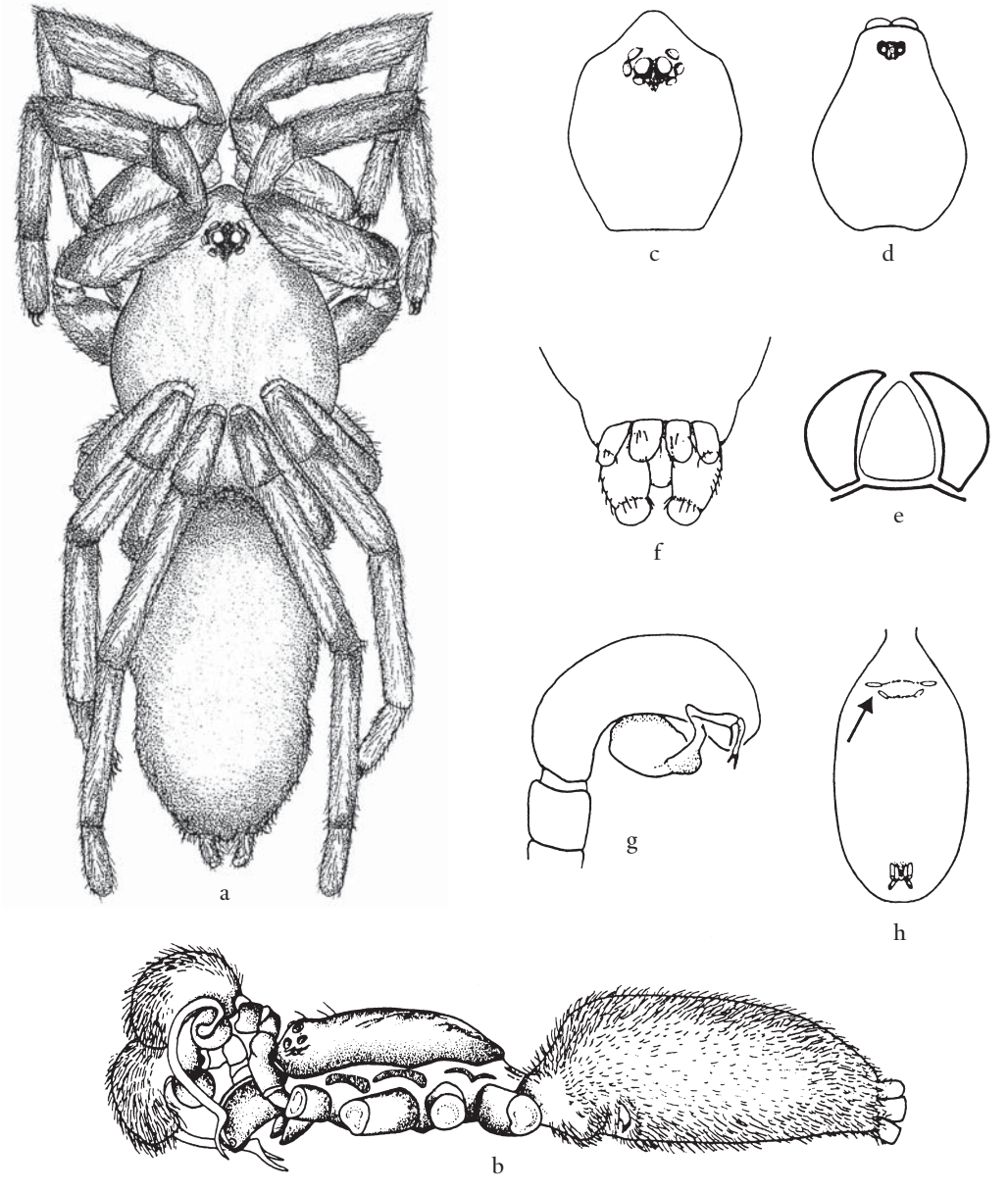


Fig. 21. **Caponiidae.** *Caponia* sp. **a.** female habitus (11 mm); **b.** male lateral view, legs omitted; **c.** cephalothorax, dorsal view; *Diplogena* sp. **d.** cephalothorax, dorsal view; *Caponia* sp. **e.** labium and endites; **f.** spinnerets, ventral view; **g.** male palp, lateral view; **h.** abdomen, ventral view showing tracheal spiracles.

FAMILY CHUMMIDAE Jocqué, 2001

SPINY-BACKED SPIDERS

Fig. 22, pl. 25

Type genus

Chumma Jocqué, 2001.

Other genera

Monogeneric family represented by two species.

Diagnostic characters

Small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; abdomen with frontal field of setae with well developed sockets; strongly reduced spinning apparatus, in females posterior lateral and median spinnerets with two cylindrical gland spigots; fang on the chelicerae surrounded by distal hair basket.

Descriptive characters

- **carapace:** smooth or finely granulate; fairly broad, roughly oval, flat (fig. 22c); strongly narrowed in front, fovea absent (fig. 22a).
- **sternum:** as long as wide, with posterior point protruding between coxae IV (fig. 22d).
- **eyes:** in two rows, both rows procurved as seen from in front, anterior row straight from above; anterior median eyes smallest, remainder subequal (fig. 22b); tapetum of secondary eyes canoe-shaped.
- **chelicerae:** strong (fig. 22b), with weak lateral condyle; two teeth on promargin, three on retromargin, sometimes with accessory tooth in front of promargin; row of long plumose hairs on either side of fang forming hair basket; no stridulating file.
- **mouthparts:** endites broad, slightly converging in front of labium; with short serrula and anteromesal scopula; labium free, twice as wide as long; chilum absent.
- **legs:** three tarsal claws, superior claws with 6-8 teeth, inferior claw with three teeth; legs short; 4123; only one or two spines on femora or spineless; with row of four trichobothria on tarsi and one trichobothrium on metatarsi and tibiae; trichobothria (fig. 22a) simple, with three ridges on each side of central depression; trochanters unnotched.
- **female palp:** with toothless claw.
- **abdomen:** moderately flat with well developed structural dorsal scutum in both sexes; in front with field of stiff setae (fig. 22a) with large sockets; four central sigilla and several smaller lateral ones present; venter membranous with two central rows of small sigilla.
- **spinnerets:** six in female; anterior spinnerets well developed, with piriform gland spigots only; median and posterior spinnerets small, each with two cylindriform gland spigots, absent in males; colulus represented by a wide field of short plumose hairs.
- **respiratory system:** two booklungs; tracheae with double stem originating from the spiracle, each stem divided into three branches in abdomen, at least one of these extending into cephalothorax.
- **genitalia:** entelegyne; epigyne simple with central depression and strongly reticulated lateral protrusion on either side (fig. 22h); cymbium with proximal modification; bulbus with large subtegulum; embolus short, solid, emerging on distal part of tegulum; median apophysis small, poorly sclerotized (figs 22g, h).
- **body size:** 2.5-3 mm.
- **colour:** cephalothorax and scuta reddish or brownish orange, abdomen greyish or cream.

Taxonomic status

Chummidae was described on newly discovered spiders from the Cape region in South Africa. They are supposed to be related to the Zodariidae mainly on the basis of the tracheal system and the structure of the spinnerets (Jocqué, 2001).

Distribution

South Africa (Cape Provinces); Lesotho.

Lifestyle

Hunting spiders without webs or retreats. Living in the litter layer of shrubland of backdunes or temperate forest.

Relevant literature

Jocqué (2001).

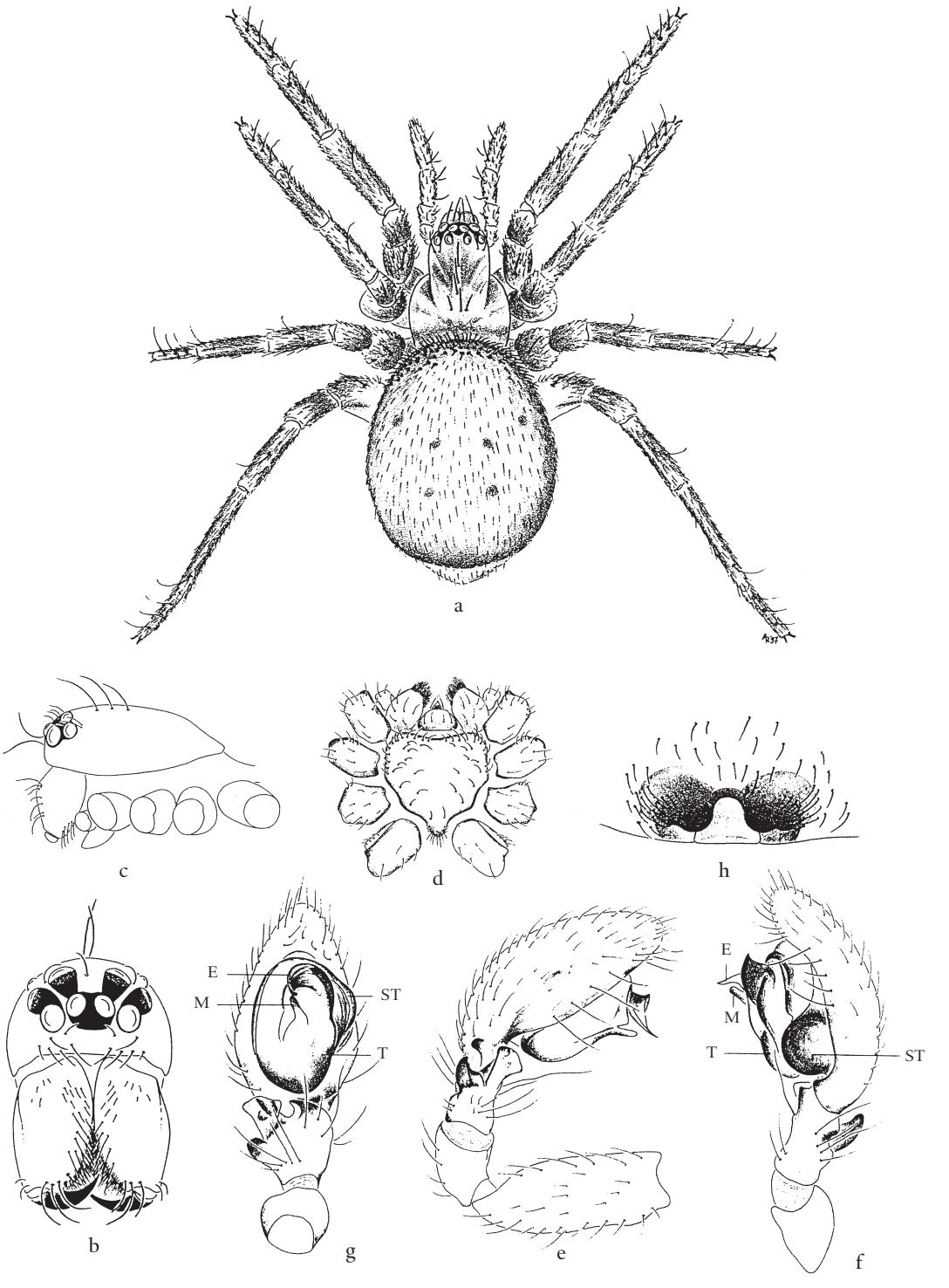


Fig. 22. **Chummidae.** *Chumma inquieta* **a.** female habitus (2.8 mm); **b.** cephalothorax, frontal view; **c.** cephalothorax, lateral view; **d.** cephalothorax, ventral view; **e.** right male palp, prolateral view; **f.** left male palp, retrolateral view; **g.** left male palp, ventral view; **h.** epigyne. E: embolus; M: median apophysis; ST: subtegulum; T: tegulum.

FAMILY CITHAERONIDAE Simon, 1893

SWIFT GROUND SPIDERS / CURLY-LEGGED SPIDERS

Fig. 23

Type genus

Cithaeron O.P.-Cambridge, 1872.

Other genera

Inthaeron Platnick, 1991. Family represented by six species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; anterior spinnerets conical and narrowly separated, bearing a subdistal sclerotized ring and unmodified piriform gland spigots; posterior median eyes flattened or irregular in shape; tarsi pseudosegmented, curled-up in preserved specimens.

Descriptive characters

- **carapace:** rounded in dorsal view; eye region narrowed (fig. 23a); clypeus high, three times diameter of anterior median eyes.
- **sternum:** scutiform; sclerotized laterally with extensions to and between coxae.
- **eyes:** eight; relatively large; in two rows (4:4); both eye rows slightly procurved; posterior median eyes largest, flattened, irregular in shape and pale (fig. 23a).
- **chelicerae:** short and vertical; cheliceral furrow without teeth (unique amongst gnaphosoids); promargin with cluster of stiff setae behind elevated ridge.
- **mouthparts:** endites rectangular, obliquely depressed; labium as wide as long or wider; serrula present.
- **legs:** two claws; tarsi long with two strong dentate claws; claw tufts consisting of a few strong setae; tarsi pseudosegmented, curled-up in preserved specimens (fig. 23c); leg formula 1243 (fig. 23b); legs with few weak setae; trichobothria in a single row on tarsi and metatarsi; trochanters unnotched; preening comb absent.
- **abdomen:** with scattered brown setae on surface; male with long scuta, half the length of abdomen.
- **spinnerets:** anterior spinnerets conical and narrowly separated, bearing a subdistal sclerotized ring and unmodified piriform gland spigots (fig. 23d).
- **respiratory system:** two booklungs with tracheal spiracle near base of spinnerets.
- **genitalia:** entelegyne; epigyne with hood and complex coiled ducts (fig. 23e); male palp with distinct retrolateral tibial apophysis (dorsal apophysis sometimes present), cymbium greatly elongated, embolus variable in length (figs 23f, g).
- **body size:** 3-9 mm.
- **colour:** pale yellow abdomen with or without dark markings.

Taxonomic status

Platnick (1990, 1991) revised the family. It forms part of the superfamily Gnaphosoidea (Coddington & Levi, 1991; Coddington *et al.*, 2004).

Distribution

Africa, Australia, India and Greece (*Cithaeron*); India (*Inthaeron*).

Lifestyle

Cithaeronids are fast running ground spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Platnick (1990, 1991, 2002).

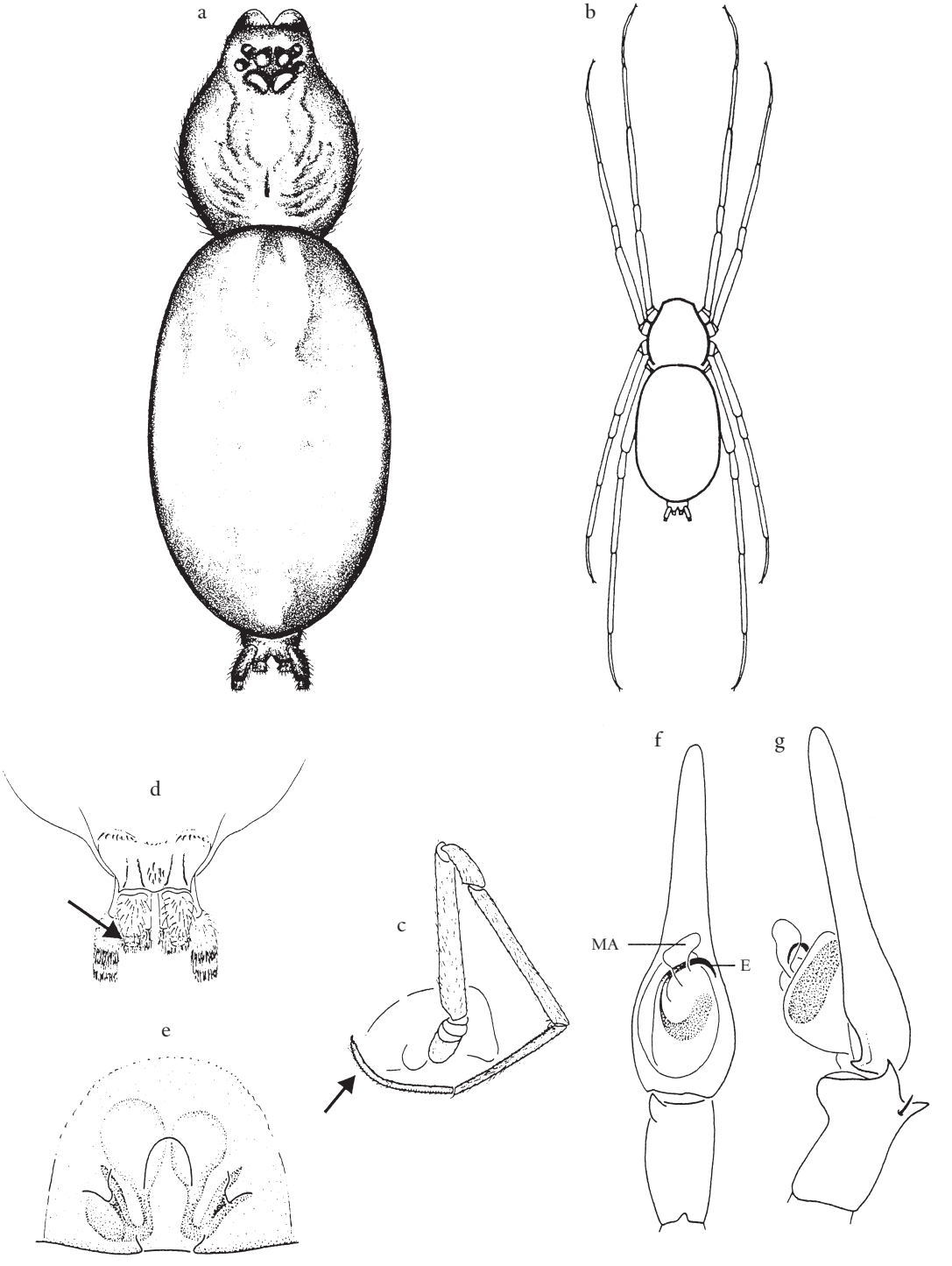


Fig. 23. **Cithaeronidae.** *Cithaeron* sp. **a.** female, dorsal view, appendages omitted (7 mm); **b.** line drawing showing leg length; **c.** leg I, lateral view showing curved tarsus; **d.** spinnerets, ventral view showing anterior lateral spinnerets with subdistal ring; **e.** epigyne; **f.** male palp, ventral view; **g.** male palp, retrolateral view. E: embolus; MA: median apophysis.

FAMILY CLUBIONIDAE Wagner, 1887

SAC SPIDERS

Fig. 24, pl. 28

Type genus

Clubiona Latreille, 1804.

Other genera

Represented by 15 genera and about 530 species (Platnick, 2004).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws with dense claw tufts; ecribellate; entelegyne; eight eyes; anterior spinnerets close together, not heavily sclerotized; median spinnerets cylindrical in both sexes; cylindrical gland spigots absent; anterior lateral spinnerets larger in males than in females with large piriforms.

Descriptive characters

- **carapace:** ovoid, distinctly longer than wide; fovea shallow to absent (fig. 24a).
- **sternum:** ovoid; lightly rimmed.
- **eyes:** eight; in two rows (4:4); small, uniform in size; posterior row slightly longer than anterior row.
- **chelicerae:** rather long, slender or stout; promargin with 2-7 teeth; retromargin with 2-4 small teeth; chelicerae in some species (especially males) strongly developed with a long fang.
- **mouthparts:** endites longer than wide, with oblique indentations medially on lateral side, apex truncated and furnished with scopulae; labium longer than wide.
- **legs:** two claws with dense claw tufts and scopulae (fig. 24b); legs moderately long, prograde; tibiae and metatarsi with one, two or more pairs of macrosetae ventrally; trochanters with or without notches; leg formula 4123 or 1423.
- **abdomen:** oval; males sometimes with small dorsal scutum.
- **spinnerets:** anterior spinnerets conical or cylindrical and contiguous; median spinnerets cylindrical in both sexes; posterior spinnerets two-segmented with apical segment short.
- **respiratory system:** two booklungs; tracheal system limited to abdomen, with spiracles close to spinnerets.
- **genitalia:** entelegyne; epigynal plate convex and sometimes sclerotized (fig. 24e); male palp with retrolateral tibial apophysis variable; embolus of variable length; cymbium sometimes with basal apophysis; median apophysis absent (figs 24c, d).
- **body size:** 5-12 mm.
- **colour:** pale to yellowish white or brownish, with chelicerae and anterior region of eyes usually dark brown; abdomen with distinct heart-shaped mark, often with chevrons and median band or dark ring around spinnerets.

Taxonomic status

Clubionidae is poorly defined and was for a long time the dumping ground for two-clawed spiders with an unmodified eye pattern. As a result the generic composition of the family has drastically changed in the last decades (Bosselaers & Jocqué, 2002). Coddington & Levi (1991) and Coddington *et al.* (2004) recognized that the clubionids belong to the Dionycha clade and form, together with the Salticidae, Anyphaenidae and a number of smaller families, the sister-group of the Gnaphosoidea.

Distribution

Worldwide.

Lifestyle

Clubionids are free-living, nocturnal hunters commonly encountered in sac-like retreats on foliage during the day.

Relevant literature

Bosselaers & Jocqué (2002); Coddington & Levi (1991); Coddington *et al.* (2004); Dippenaar-Schoeman & Jocqué (1997); Richman & Ubick (2005a).

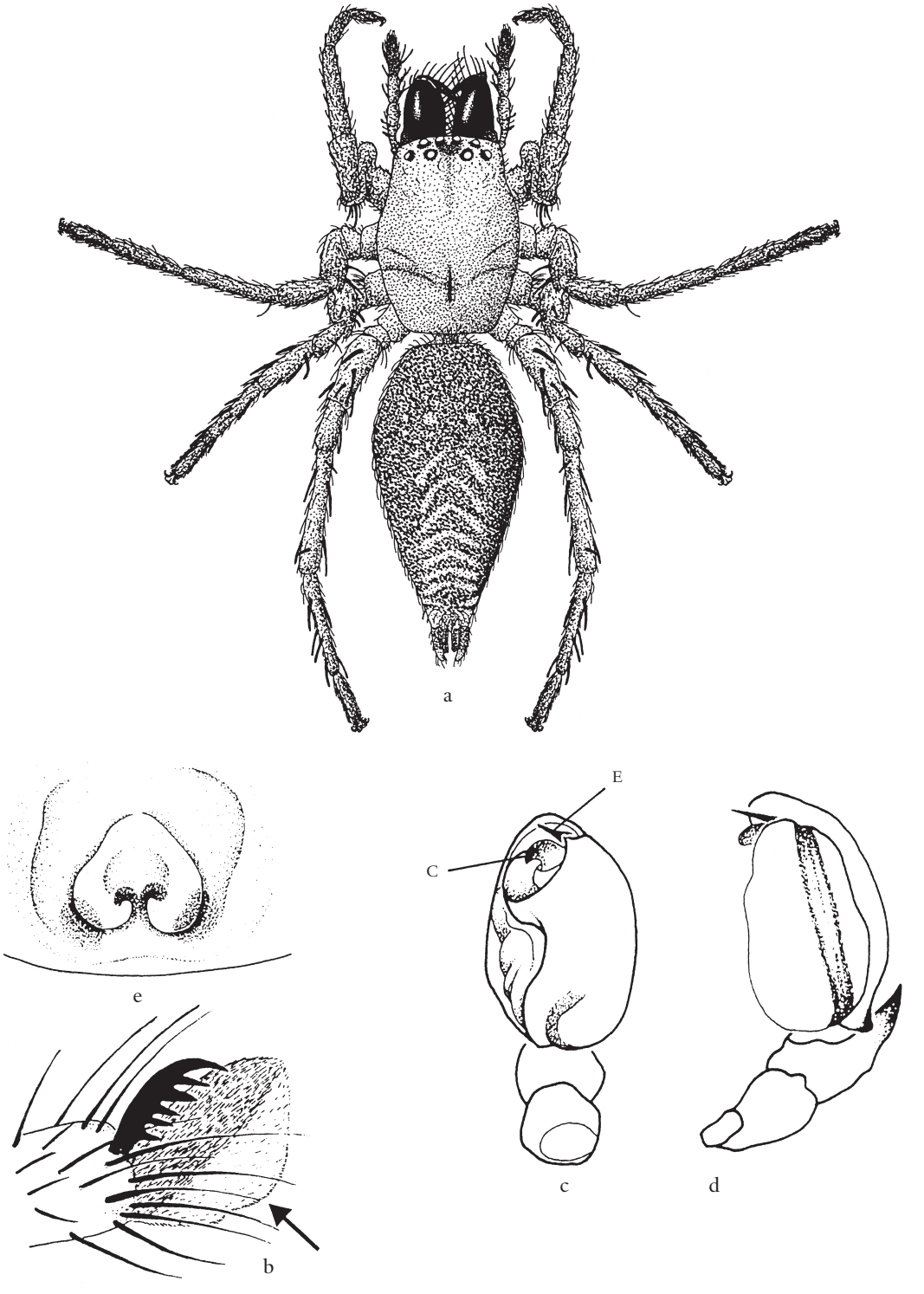


Fig. 24. **Clubionidae.** *Clubiona* sp. **a.** female habitus (8 mm); **b.** tip of tarsus showing claw tuft; **c.** male palp, ventral view; **d.** male palp, retrolateral view; **e.** epigyne. C: conductor; E: embolus. (a: courtesy of Jan Bosselaers).

FAMILY CORINNIDAE Karsch, 1880

DARK SAC SPIDERS / ANT-LIKE SAC SPIDERS

Fig. 25, pl. 29

Type genus

Corinna C.L. Koch, 1841.

Other genera

Represented by 75 genera and about 900 species (Platnick, 2005). The family comprises three subfamilies: Castianeirinae, Corinninae and Trachelinae.

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; with distinct claw tufts; anterior spinnerets close together; median spinnerets of females with three and posterior spinnerets with two large cylindrical gland spigots or a few more in Trachelinae; bulbus of male palp usually without median apophysis; abdomen with a strong tendency towards sclerotization, especially in booklung region; many species are ant-like in appearance.

Descriptive characters

- **carapace:** ovoid in dorsal view (figs 25a, c); sometimes elongated in ant mimics; sometimes heavily sclerotized; clypeus bulging in front of anterior median eyes in Corinninae (figs. 25b, c).
- **sternum:** oval, flat or slightly impressed, apex ends bluntly in front of posterior coxae (fig. 25d); sternum distinctly marginate.
- **eyes:** eight; in two rows (4:4); widely spaced or closely grouped or bulging anteriorly; posterior eye row procurved, recurved or straight.
- **chelicerae:** sturdy, strongly convex; upper edge with strong, curved condyle; cheliceral teeth in two rows.
- **mouthparts:** labium slightly convex, usually depressed transversely; either longer than wide or wider than long; chilum usually in one piece, well developed (fig. 25d).
- **legs:** two claws; legs sturdy with variable setae on front legs; legs long and slender in ant-mimics; claw tufts present, with light scopulae; tarsal trichobothria present; spination well developed except in Trachelinae where number of spines is reduced but with double row of ventral cusps on anterior tibiae.
- **abdomen:** ovoid, elongated in ant-like species, sometimes with scuta or transverse bands or patches of white setae; tendency towards sclerotization of abdomen, especially in booklung region; integument usually with recumbent feathery setae, frequently forming lines or other patterns (Castianeirinae) (fig. 25j).
- **spinnerets:** anterior spinnerets sturdy, contiguous; posterior spinnerets slightly further apart than anterior pair (fig. 25e); median spinnerets with three and posterior spinnerets with two large cylindrical gland spigots or a few more in Trachelinae; colulus triangular in shape, sclerotized.
- **respiratory system:** two booklungs; tracheal system limited to abdomen, with spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable (figs 25k, h); male palp with tegulum tapering gradually towards embolus and without median apophysis in Castianeirinae; sperm duct with a conspicuous loop in proximal part of tegulum; much more complex and variable in Corinninae (figs 25 f, g, i).
- **body size:** 3-10 mm.
- **colour:** some species are dark to metallic (Castianeirinae); others are dark to yellowish brown (Corinninae); most Trachelinae species have a shiny red to red-brown carapace and a pale abdomen.

Taxonomic status

The Corinnidae are still not well-defined and the inclusion of the subfamilies Castianeirinae and Trachelinae remains debatable. Platnick & Ewing (1995) revised the tracheline spiders of the New World and stated that their taxonomy is unsatisfactory. This holds true for most corinnid groups. Coddington & Levi (1991) suggested that the Liocranidae and Corinnidae might be the sister-group of the Gnaphosoidea. This placement is made less explicit in Coddington *et al.* (2004) where they are considered part of the large unresolved Dionycha clade.

Distribution

Worldwide.

Lifestyle

Corinnids are free-living ground spiders frequently encountered in leaf litter in forested areas. Some species imitate ants or mutillid wasps.

Relevant literature

Bosselaers & Jocqué (2000, 2002); Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Platnick & Ewing (1995); Bonaldo (2000); Ramírez, Lopardo & Bonaldo (2001); Ubick & Richman (2005a).

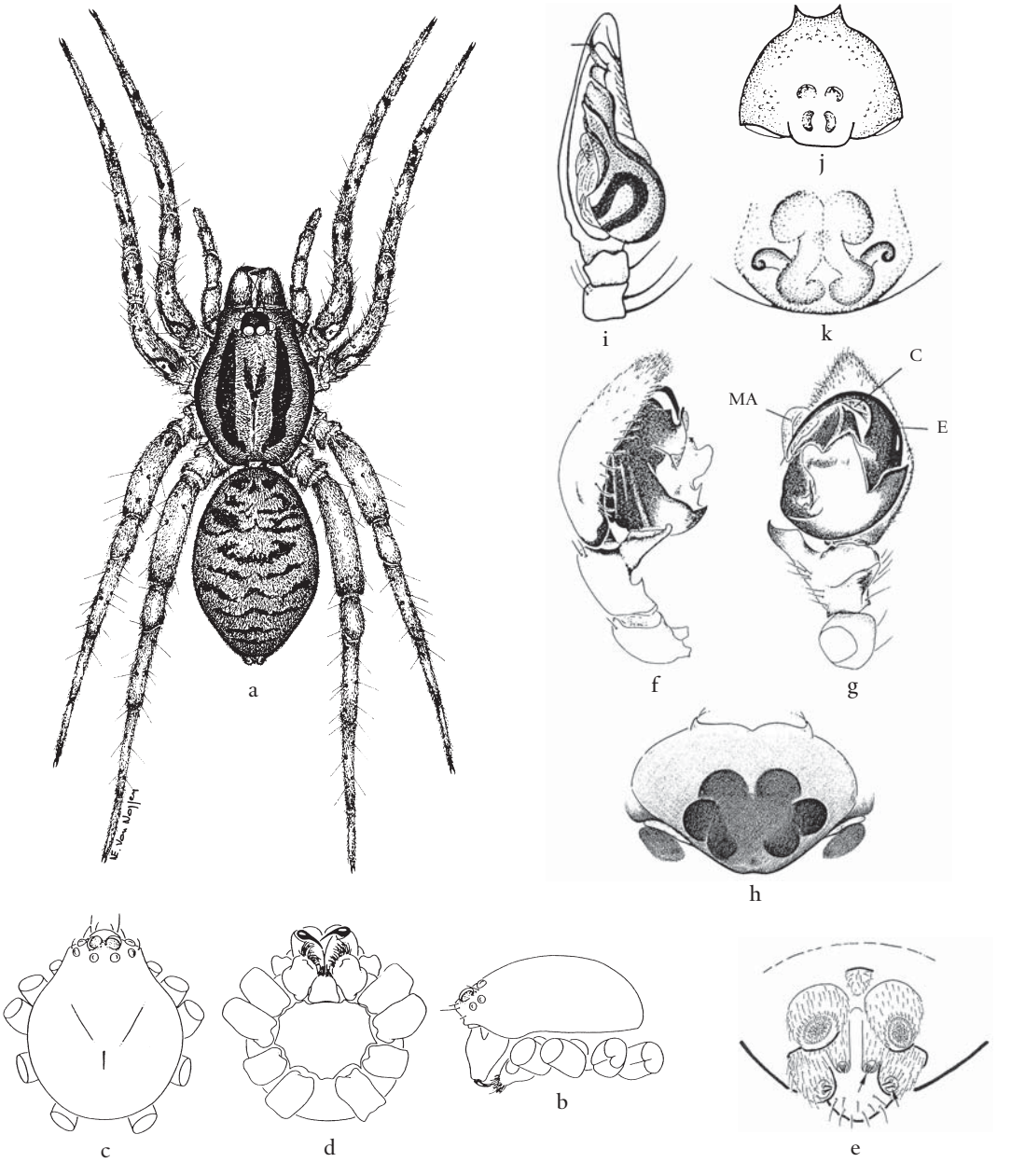


Fig. 25. **Corinnidae.** *Copa* sp. **a.** female habitus (7 mm); *Pseudocorinna* sp. **b.** cephalothorax, lateral view; **c.** cephalothorax, dorsal view; **d.** cephalothorax, lateral view; **e.** spinnerets, ventral view; **f.** right male palp, lateral view; **g.** right male palp, ventral view; **h.** epigyne, ventral view; *Copa* sp. **i.** male palp, ventral view; **j.** anterior part of abdomen, showing sclerotized area; **k.** epigyne, ventral view. C: conductor; E: embolus; MA: median apophysis.

FAMILY CTENIDAE Keyserling, 1877

TROPICAL WOLF SPIDERS

Fig. 26, pl. 19, 21

Type genus

Ctenus Walckenaer, 1805.

Other genera

Represented by 39 genera and more than 450 species in five subfamilies: Acantheinae, Acanthocteninae, Calocteninae, Cteninae and Viridasiinae.

Diagnostic characters

Small to very large araneomorph spiders; two tarsal claws; ecribellate (rarely cribellate); entelegyne; eight eyes; arranged in three rows; trochanters deeply notched; anterior spinnerets conical, not widely separated; epigyne with horns; male palp with dorsally concave median apophysis; very rarely cribellate.

Descriptive characters

- **carapace:** ovoid; with deep depression (Acantheinae); high in region of fovea (Cteninae) (figs 26a, e, f).
- **sternum:** flat, oval to almost round; apex blunt.
- **eyes:** eight; in three rows (2:4:2) (fig. 26c), sometimes (4:2:2) (fig. 26d); anterior lateral eyes between posterior median and posterior lateral eyes; eyes in anterior row small; posterior row strongly recurved; secondary eyes with grate-shaped tapetum.
- **chelicerae:** strong; both margins toothed.
- **mouthparts:** endites converging slightly; apex truncated, entirely clothed in dense setae; labium longer than wide or wider than long, with dense band of long setae.
- **legs:** two claws; legs strong and stout with spines and scopulae; anterior tibiae with numerous pairs of ventral spines; trochanters deeply notched; males often with modified metatarsi IV.
- **abdomen:** ovoid; longer than wide; sometimes with median band, pattern or rows of spots.
- **spinnerets:** anterior spinnerets contiguous; median spinnerets compressed; posterior spinnerets long, more slender than anterior spinnerets, two-segmented.
- **cribellum:** divided, broad.
- **calamistrum:** a broad, poorly delimited group of setae.
- **respiratory system:** two booklungs; tracheal system limited to abdomen, spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne with broad median septum, usually with lateral horns (fig. 26i); male palp with tibial apophyses; median apophysis usually cup-shaped (dorsally concave); cymbium often modified (figs 26 g, h).
- **body size:** 5-40 mm.
- **colour:** brown to fawn, abdomen with pattern or spots.

Taxonomic status

Griswold (1993) tentatively included the ctenoid complex in the superfamily Lycosoidea until the possible polyphyly of the ctenids is solved. Silva (2003) found the family to be polyphyletic but only one genus (*Trujillina*) falls out of the ctenid clade. Several revisions of genera have recently been completed for Africa, South America and Australia.

Distribution

Worldwide; except New Zealand.

Lifestyle

Ctenids are nocturnal, wandering spiders, hunting their prey on foliage or on the soil surface, rarely higher up. Egg sacs are either carried in the chelicerae (e.g. *Africactenus*), on the spinnerets (*Cupiennius*) or deposited on a solid substrate.

Relevant literature

Barth & Cordes (1998); Brescovit (1996); Dippenaar-Schoeman & Jocqué (1997); Griswold (1993); Jocqué & Steyn (1997); Raven *et al.* (2001); Silva (2003); Simó & Brescovit (2001); Steyn *et al.* (2001); Ubick & Silva (2005).

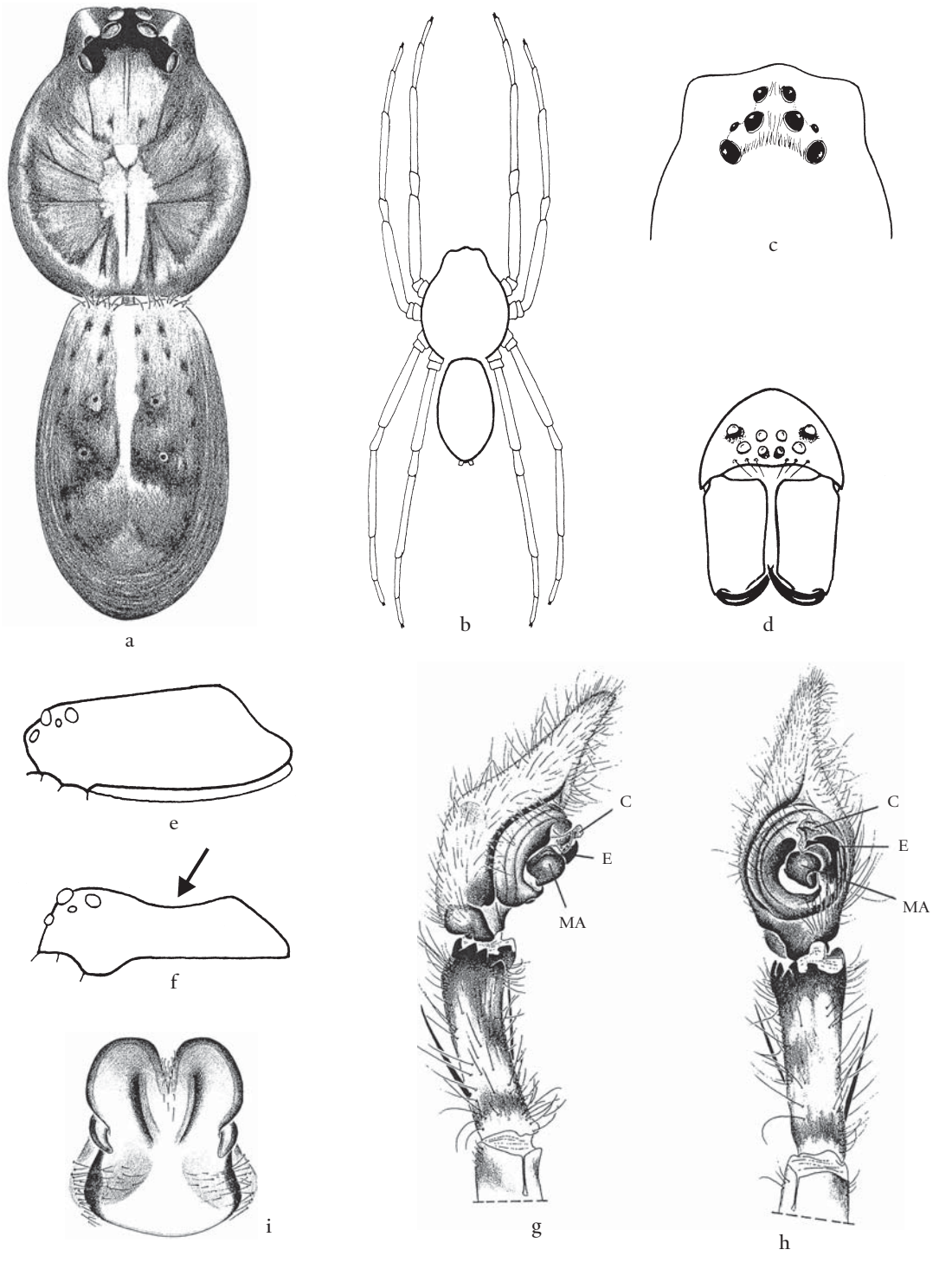


Fig. 26. **Ctenidae.** *Ctenus* sp. **a.** female, dorsal view, appendages omitted (12 mm); **b.** line drawing showing leg length; **c.** eye pattern, dorsal view; Acantheinae **d.** cephalothorax, frontal view; *Ctenus* sp. **e.** carapace, lateral view; *Africactenus monitor* **f.** carapace, lateral view; **g.** right male palp, retrolateral view; **h.** right male palp, ventral view; **i.** epigyne. C: conductor; E: embolus; MA: median apophysis.

FAMILY CTENIZIDAE Thorell, 1887

CORK-LID TRAPDOOR SPIDERS

Fig. 27, pl. 4

Type genus

Cteniza Latreille, 1829.

Other genera

Represented by two subfamilies, nine genera and 118 species (Platnick, 2005).
Ctenizinae: *Bothriocyrtum* Simon, 1891; *Cteniza* Latreille, 1829; *Cyclocosmia* Ausserer, 1871; *Cyrtocarenum* Ausserer, 1871; *Latouchia* Pocock, 1901; *Stasimopus* Simon, 1892.
Pachylomerinae: *Conothele* Thorell, 1878; *Hebestatis* Simon, 1903; *Ummidia* Thorell, 1875.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; three tarsal claws; eight eyes; rastellum present; four spinnerets; distal segments of front legs with lateral bands of short, thorn-like spines in female; cheliceral furrow with two rows of strong teeth; carapace with strongly procurved fovea.

Descriptive characters

- **carapace:** arched**;** glabrous; fovea strongly procurved (fig. 27a).
- **sternum:** triangular; two sigilla, posterior sigilla large and deep or indistinct and shallow (fig. 27b).
- **eyes:** eight; arranged in short eye group of two or three rows; anterior row usually procurved; eye tubercle absent or low (fig. 27c).
- **chelicerae:** rastellum distinct, consisting of thick spines (fig. 27d); cheliceral furrow biserially dentate; fang with outer surface smooth.
- **mouthparts:** labium wider than long, with a few cuspules; endites rectangular or with anterior lobe pronounced, with few to numerous cuspules (fig. 27b); serrula absent.
- **legs:** three claws; short legs; spinose distally on legs I and II; paired claw in female with one long tooth and two smaller teeth, a third claw curved and bare; tibia III cylindrical, with dorsal saddle-shaped depression (Pachylomerinae); distal segments of legs I and II with lateral bands of short, thorn-like spines in female (fig. 27e); scopulae absent on tarsi in females; present on all tarsi of males.
- **female palp:** unmodified.
- **abdomen:** oval; covered with a thin layer of short setae.
- **spinnerets:** four, apical segment of posterior spinnerets domed.
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae multilobular; male palp simple, bulbus with pyriform conical distal sclerite; second haematodocha small (fig. 27f).
- **body size:** 15-43 mm.
- **colour:** varies from brown to reddish black with legs yellowish brown or reddish brown; abdomen usually a pallid or dull colour.

Taxonomic status

Ctenizidae is the only family in the superfamily Ctenizoidina, which forms, together with the superfamily Migoidea (Migidae + Actinopodidae), the sister taxon of the Idiopidae (Raven, 1985). They fall into a division of the Rastelloidina, which also contains the Cyrtaucheniidae. A key to the genera of the world is provided by Raven (1985). Few genera have recently been revised (Decae, 1996).

Distribution

In most of the tropical and subtropical regions of the world.

Lifestyle

Live permanently in silk-lined burrows usually closed with a cork-lid trapdoor (figs 27g-i); some are arboreal (Main, 1985).

Relevant literature

Bond & Hendrixson (2005); Decae (1996); Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Main (1985); Raven (1985).

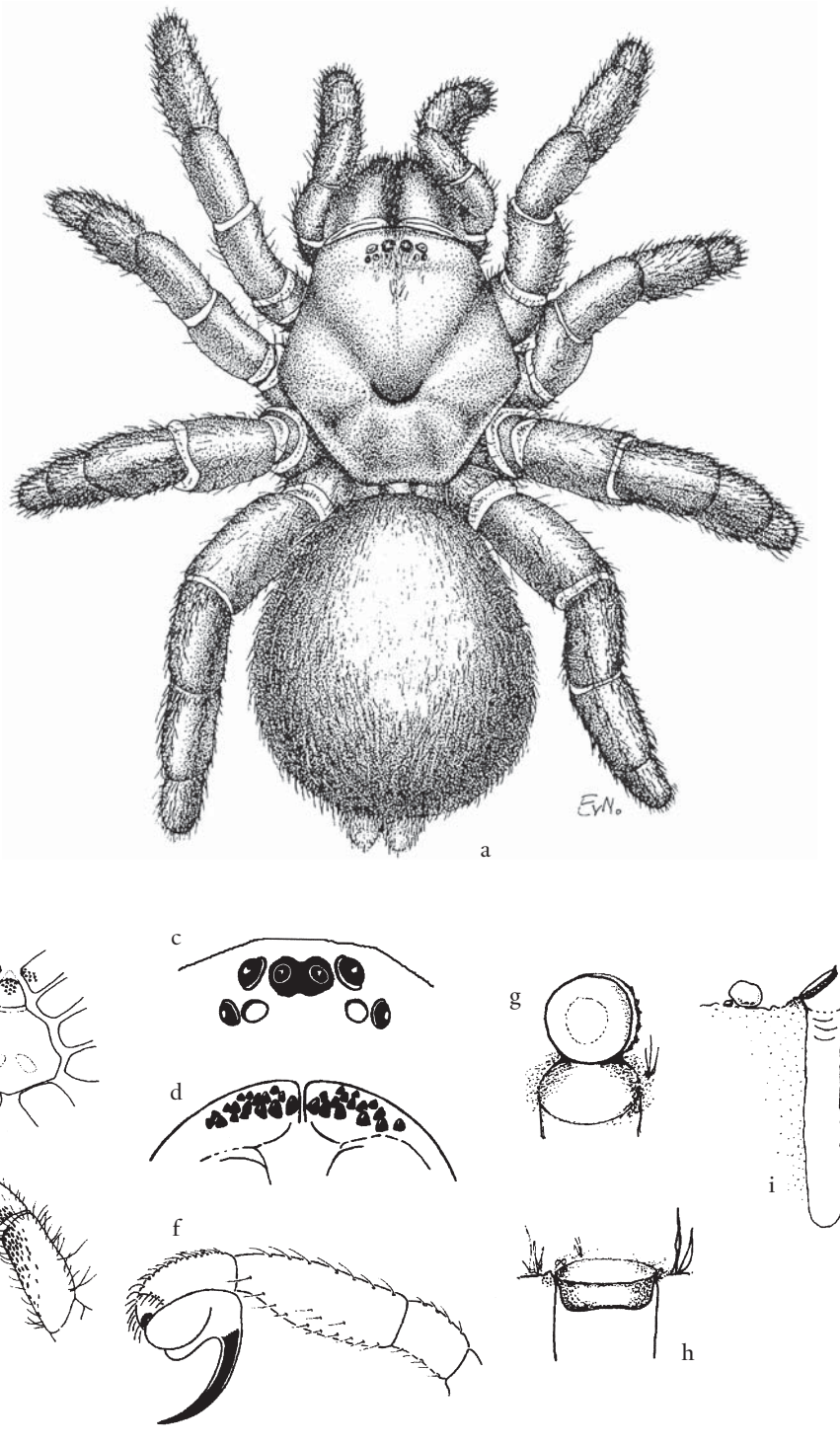


Fig. 27. **Ctenizidae.** *Stasimopus* sp. **a.** female habitus (29 mm); **b.** sternum and mouthparts; **c.** eye pattern, dorsal view; **d.** tip of chelicerae showing rastellum; **e.** leg I of female showing bands of spines; **f.** male palp, retrolateral view; **g.** burrow entrance with trapdoor open; **h.** burrow entrance with trapdoor closed; **i.** burrow.

FAMILY CYATHOLIPIDAE Simon, 1894

TREE SHEETWEB SPIDERS

Fig. 28, pl. 13

Type genus

Cyatholipus Simon, 1894.

Other genera

Represented by 58 species in 23 genera (Platnick, 2005).

Diagnostic characters

Small to very small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; long legs; two widely spaced posterior tracheal spiracles linked externally by a transverse groove sclerotized at each end.

Descriptive characters

- **carapace:** convex, heart-shaped to oval, usually sclerotized; clypeus vertical, level to slightly concave (fig. 28a).
- **sternum:** scutiform, broadly truncated posteriorly; elongated, extending between coxae IV (*Scharffia*).
- **eyes:** eight; in two rows (4:4); situated close to anterior margin; anterior row strongly recurved, posterior row straight to slightly recurved; lateral eyes on low tubercle and contiguous (fig. 28b).
- **chelicerae:** cheliceral furrow with four promarginal and three retromarginal teeth.
- **mouthparts:** labium broad; rebordered.
- **legs:** three claws; legs long and slender with setae and trichobothria; leg I longest (fig. 28a).
- **female palp:** without claw.
- **abdomen:** globular, ovoid or triangular to elongate, extending beyond spinnerets (fig. 28a); some genera with rows of stout bristles on dorso- and posterolateral surfaces; both sexes often with sclerotized area between epigastric fold and pedicel.
- **spinnerets:** anterior lateral spinnerets with one major ampullate gland spigot and piriform gland spigots with reduced bases; triplet on posterior lateral spinnerets present in both sexes; only one cylindrical gland spigot on posterior lateral spinnerets; colulus a triangular fleshy lobe.
- **respiratory system:** two booklungs; two posterior tracheal spiracles widely spaced, connected by a transverse slit, sclerotized at each end (fig. 28c); branchial tracheae pass through pedicel into cephalothorax.
- **genitalia:** entelegyne; epigyne depressed, transverse atrium with scapus at anterior edge or medial lobe (fig. 28f); male palp with basal cup-shaped median process arising from cymbium; bulb with folded apical lobe; median apophysis simple or bipartite; embolus slender, originating at apex and encircling bulb, many species with parembolic process; tibia without apophyses (figs 28d, e).
- **body size:** <4 mm.
- **colour:** carapace reddish brown to dark brown; abdomen varies from white to yellow-white or grey; may be decorated with dorsal markings in the form of large black spots or transverse bands.

Taxonomic status

Coddington & Levi (1991) placed the cyatholipids in the Araneoidea that already contained 10 families. Griswold *et al.* (1998) clarified the placement of the cyatholipids as the sister-group of Synotaxidae. Griswold (2001) published a monograph of the Cyatholipidae of the world with keys to genera and species.

Distribution

Afrotropical Region, Australia and New Zealand.

Lifestyle

Cyatholipids are usually found in cool moist forests. Some species from drier shrub- and grassland. They hang from a horizontal sheetweb often provided with a smaller undersheet, found in litter, humus layer, tree trunks, rock walls or tree foliage. Egg cases are camouflaged and deposited at the edge of the web.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Griswold (1997, 1998, 2001).

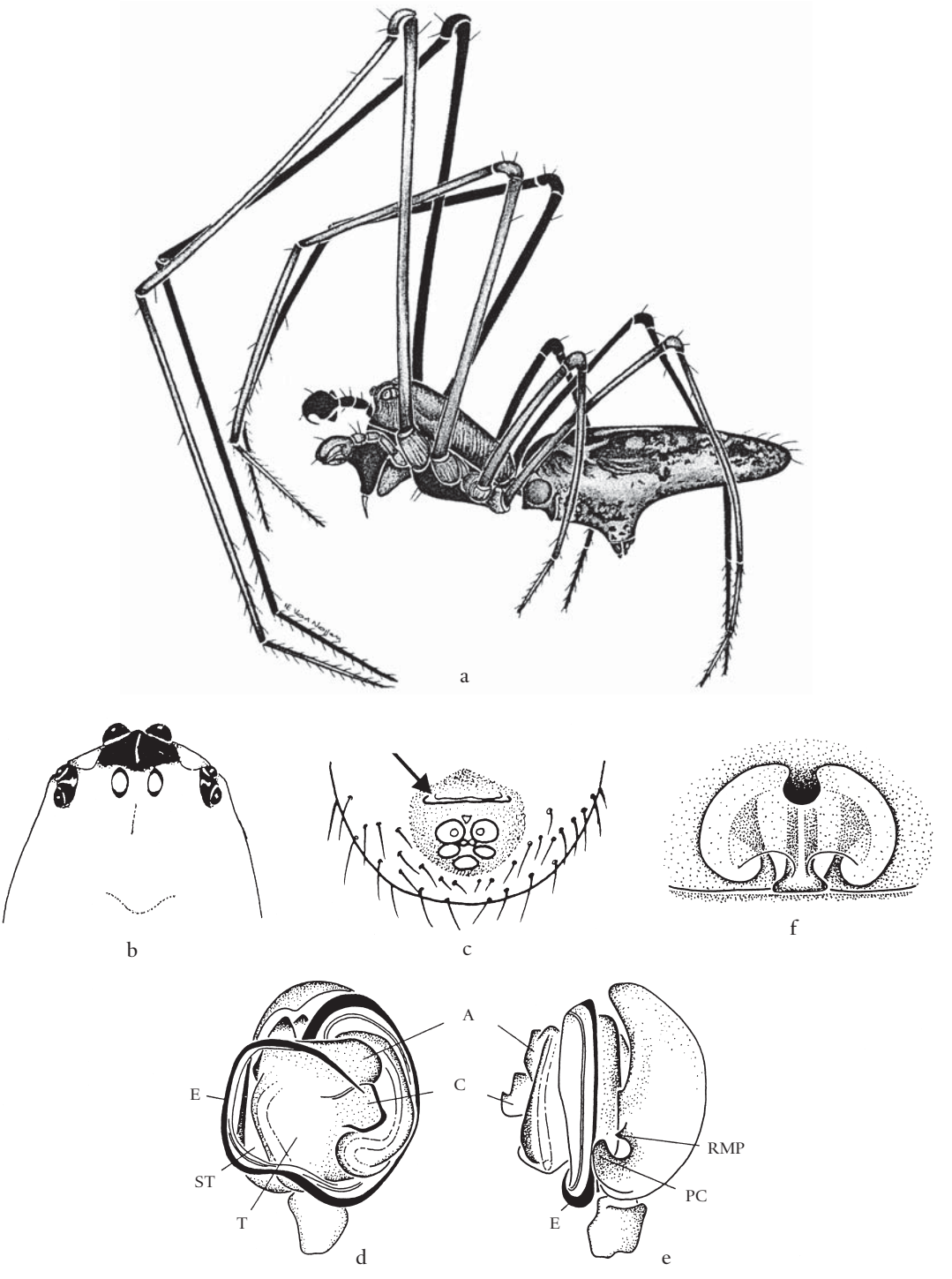


Fig. 28. **Cyatholipidae.** *Vazaha taomasina* **a.** male habitus (2.5 mm); *Ulwembua ranomafana* **b.** eye pattern, dorsal view; **c.** posterior part of abdomen in ventral view, showing tracheal spiracle; **d.** male palp, ventral view; **e.** male palp, retrolateral view; **f.** epigyne. A: apical lobe of tegulum; C: conductor; E: embolus; PC: paracymbium; RMP: retromedian cymbial process; ST: subtegulum; T: tegulum. (a, d, e, f: after Griswold, 2001).

FAMILY CYCLOCTENIDAE Simon, 1898

SCUTTLING SPIDERS

Fig. 29, pl. 24

Type genus

Cycloctenus L. Koch, 1878.

Other genera

Anaua Forster, 1970; *Galliena* Simon, 1898; *Plectophanes* Bryant, 1935; *Toxopsiella* Forster, 1964. Represented by 36 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; eyes ctenid-like in two strongly recurved rows with posterior eyes much larger than anterior ones; absence of claw tufts and scopulae.

Descriptive characters

- **carapace:** variable, short and almost as long as wide with clearly raised and narrowed cephalic area (*Cycloctenus*) or twice as long as wide (*Plectophanes*) or intermediate (*Toxopsiella*); fovea distinct, sometimes with raised margins; clypeus straight or strongly retreating (*Plectophanes*); no plumose setae.
- **sternum:** shield-shaped; as wide as long or wider than long, sometimes twice as long as wide (*Plectophanes*) (fig. 29b).
- **eyes:** eight eyes in two strongly recurved rows sometimes resulting in three rows; posterior eyes much larger than anterior eyes (fig. 29c).
- **chelicerae:** vertical, with strong lateral condyle; promargin with two teeth, retromargin with five teeth (fig. 29b); sometimes only with two teeth on each margin (*Plectophanes*); chilum: single or double, sometimes strongly developed.
- **mouthparts:** endites almost parallel; serrula; labium as wide as long, sometimes with basal notches (fig. 29b).
- **legs:** three claws without claw tufts or scopula; fairly stout; 1423 or 1243; laterigrade (*Cycloctenus*) or prograde (fig. 29a); with double row of spines on tibiae and metatarsi; two rows of trichobothria on tibiae, one or two on metatarsi, one on tarsi; tarsal organ distal with oval or slit opening.
- **female palp:** with well-developed toothed claw.
- **abdomen:** oval, usually longer than wide; no plumose setae.
- **spinnerets:** six; well-developed; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets; tracheal system with four simple branches limited to the abdomen.
- **genitalia:** entelegyne; epigyne variable but most often simple or with median plate or ridge (fig. 29e); internally usually simple with a pair of large spermathecae and short ducts; male palp usually with one or more strong tibial apophyses; embolus strong; median apophysis well-developed; membranous hyaline conductor (absent in *Plectophanes*) (fig. 29d).
- **body size:** 3.5-15.5 mm.
- **colour:** pale cream or reddish to dark brown, with variable pattern.

Taxonomic status

Cycloctenidae are a small but heterogeneous and poorly defined family, which is probably the reason why it was not mentioned by Coddington *et al.* (2004). It was originally placed in Ctenidae but raised to familial level. Forster treated most of the representatives in a family called Toxopidae of which the type genus (*Toxops*) and *Laestrygones* are now placed in the Desidae. Lehtinen (1967) placed it in his Lycosoidea. Homann (1968) was convinced that the family is polyphyletic and split it among Lycosidae (*Galliena*) and Selenopidae (the rest). Forster (1970) included the family in the Amaurobioidea, which is now considered polyphyletic (Griswold *et al.* 1999). Silva (2003) places *Cycloctenus* as the sister taxon for the grate-shaped tapetum clade + Dionycha.

Distribution

Endemic to New Zealand and Australia.

Lifestyle

Most cycloctenids are free-living hunting spiders, but some (*Plectophanes*) hunt from a tunnel-shaped retreat in a twig. Egg sac plano-convex, attached to the underside of stones.

Relevant literature

Forster (1970); Forster & Wilton (1973); Forster (1979); Homann (1968).

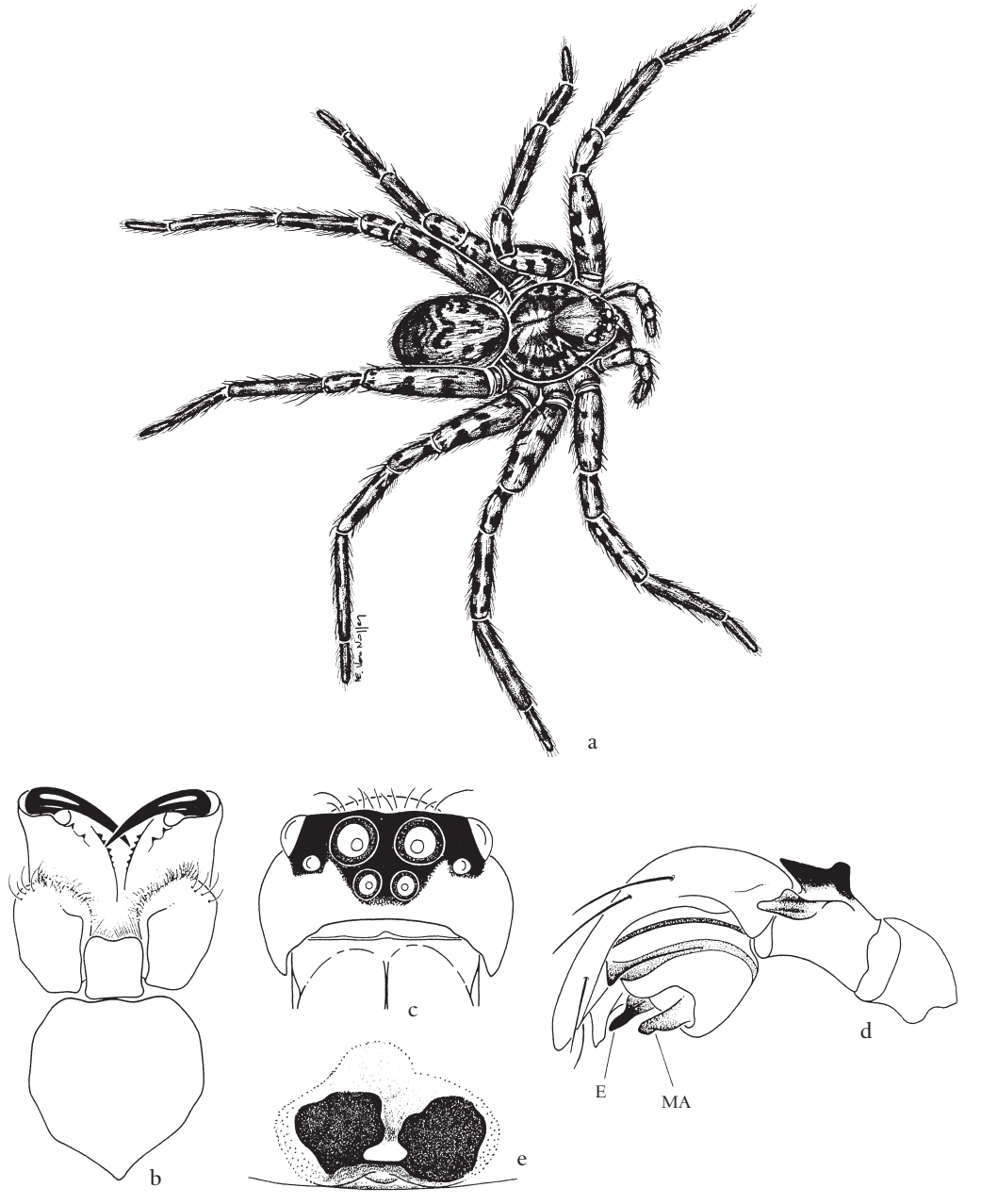


Fig. 29. **Cycloctenidae.** *Cycloctenus sp.* **a.** female, natural posture (12 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, frontal view; **d.** left male palp, retrolateral view; **e.** epigyne, ventral view. E: embolus; MA: median apophysis. (a: after Forster, 1967.)

FAMILY CYRTAUCHENIIDAE Simon, 1892

WAFER-LID TRAPDOOR SPIDERS

Fig. 30, pl. 2

Type genus

Cyrtauchenius Thorell, 1869.

Other genera

Represented by 18 genera and 126 species (Platnick, 2005) in three subfamilies: Aporoptychinae, Cyrtaucheniinae and Euctenizinae.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; three tarsal claws; eight eyes; rastellum present; four spinnerets; paired claws usually biserially dentate in females; tarsi I and II with scopula; front legs often shorter and thicker than leg IV; male palp with distal sclerite an entire cone, with a small median haematodocha.

Descriptive characters

- **carapace:** glabrous; cephalic region raised; fovea broad pro- or recurved (fig. 30a).
- **sternum:** with three pairs of sigilla (fig. 30b).
- **eyes:** eight; in two rows, forming a rectangular group (fig. 30d) or slightly wider behind than in front; eye tubercle present or absent.
- **chelicerae:** cheliceral furrow with teeth on one (fig. 30l) or both margins (fig. 30k); rastellum distinct (fig. 30e), reduced or absent; rastellar mound present in all genera.
- **mouthparts:** endites rectangular or broad with few cuspules; labium either wider than long or as wide as long, with or without cuspules (fig. 30b).
- **legs:** three claws; tarsi I scopulate in females, with few spines; all tarsi scopulate in males, or only sparsely scopulate on tarsi I and II; anterior paired tarsal claw biserially dentate in females (fig. 30j) or with one large bicuspid tooth; teeth arranged in an S-shaped row in males (fig. 30i); front legs often shorter and thicker than leg IV; preening comb on leg IV present (fig. 30f) or absent.
- **female palp:** unmodified.
- **abdomen:** oval; dorsum with pattern in some species.
- **spinnerets:** four, apical segment of posterior spinnerets either domed or triangular (fig. 30c).
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae multilobular; male palp simple; femur sometimes with spur (fig. 30g), bulbus pyriform; medial haematodocha small, without conductor; cymbium simple (fig. 30h).
- **body size:** 9-32 mm.
- **colour:** varies from dark chestnut-brown to reddish yellow.

Taxonomic status

The family belongs to the Rastelloidina and is the sister-group of Domiothelina structured as (((Migidae, Actinopodidae) Ctenizidae) Idiopidae) (Raven, 1985). Raven (1985) provided a key to the genera of the world. Some genera were recently revised (Bond & Opell, 2002; Raven & Schwendinger, 1995).

Distribution

North, Central and South America, southern Europe, Africa, Australia and southeast Asia.

Lifestyle

Live in silk-lined burrows made in the soil and closed with wafer-lid trapdoors (fig. 30m).

Relevant literature

Bond (2005); Bond & Opell (2002); Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Raven (1985); Raven & Schwendinger (1995).

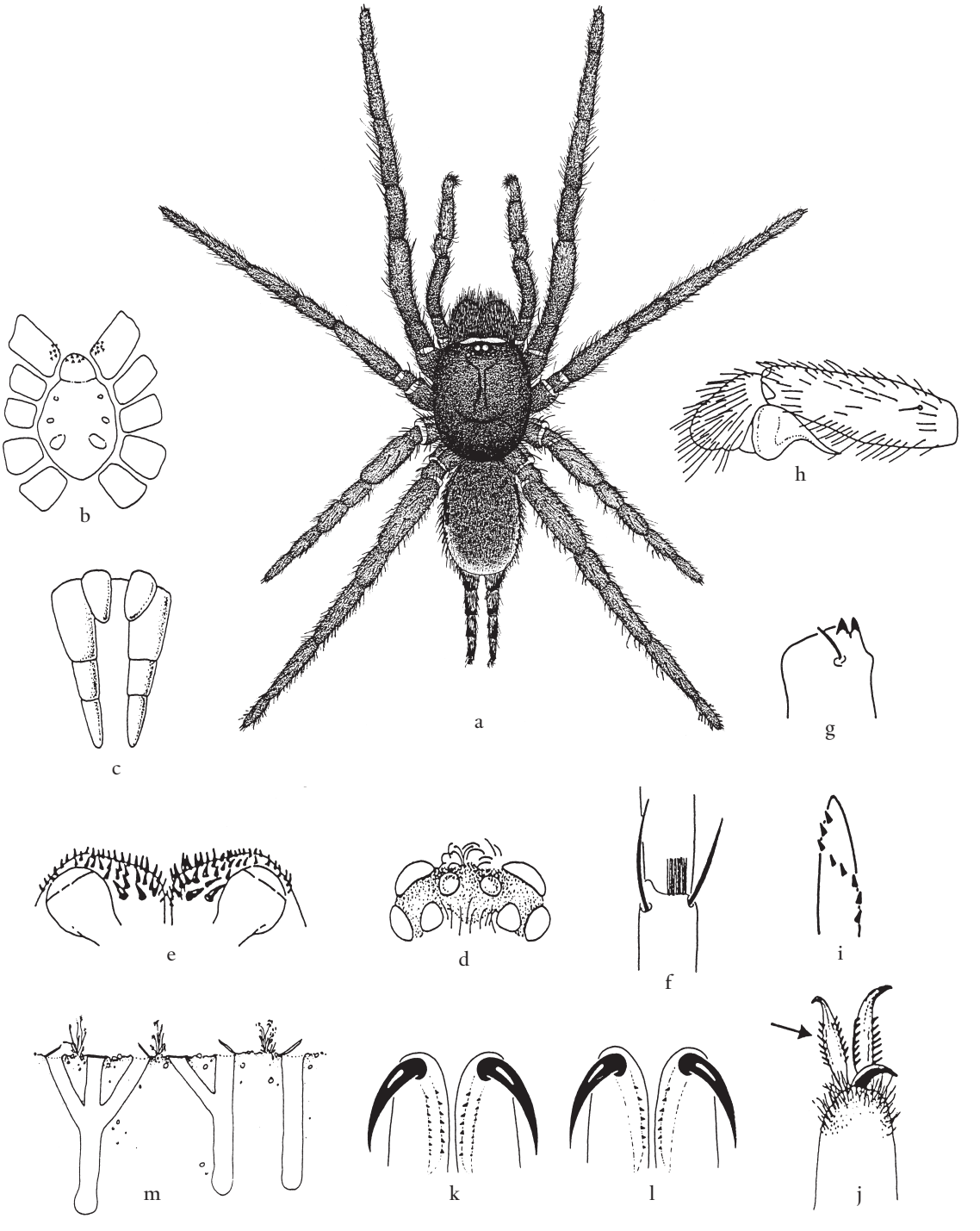


Fig. 30. **Cyrtaucheniidae.** *Acontius* sp. **a.** habitus male (14 mm); **b.** cephalothorax, ventral view; **c.** spinnerets, ventral view; *Ancylotrypa* sp. **d.** eye pattern, dorsal view; **e.** rastellum; **f.** preening comb on leg IV; **g.** femur of male palp, showing apophysis; **h.** male palp; Cyrtaucheniinae **i.** paired tarsal claw of male, ventral view showing position of teeth; **j.** paired tarsal claws of female showing biserial dentation; **k.** chelicerae in ventral view showing two rows of teeth; **l.** chelicerae in ventral view showing two rows of teeth; **m.** examples of burrow shapes.

FAMILY DEINOPIDAE C. L. Koch, 1850

NET-CASTING SPIDERS / OGRE-FACED SPIDERS

Fig. 31, pl. 12

Type genus

Deinopis Macleay, 1839.

Other genera

Avella O.P.-Cambridge, 1877*; Avellopsis* Purcell, 1904; *Menneus* Simon, 1876. Represented by 57 species (Platnick, 2005).

Diagnostic characters

Medium-sized to large araneomorph spiders; three tarsal claws; cribellate; entelegyne; eight eyes arranged in three rows; posterior median eyes enlarged; body usually elongate; front legs long and slender; abdomen with one or two humps; web hold by legs unique.

Descriptive characters

- **carapace:** longer than wide; fovea varies from a deep oval pit to a shallow depression; usually clothed in dense, pseudo-serrated, plumose setae.
- **sternum:** long, oval to triangular.
- **eyes:** eight eyes, in three rows; posterior median eyes enlarged; very large in *Deinopis* (fig. 31b), smaller in other genera (figs 31c, d); anterior median eyes smallest; anterior lateral eyes on small tubercles.
- **chelicerae:** cheliceral furrow with teeth; lateral condyle present.
- **mouthparts:** labium as wide as long; narrowly rebordered.
- **legs:** three claws; front legs long and slender (up to three times or more longer than body) (fig. 31a); leg formula 1234; metatarsi and tarsi IV with macrosetae ventrally.
- **female palp:** unmodified.
- **abdomen:** clothed in a dense layer of plumose setae; long, oval with one or two humps medially, humps vary in shape and size (fig. 31a), reduced in males.
- **spinnerets:** six; anterior pair broad at base, larger than other spinnerets (fig. 31e); with several major ampullate gland spigots; posterior lateral and median spinnerets with numerous cylindriform gland spigots; minor ampullate gland spigot on posterior median spinnerets in median position; no flagelliform or aggregate gland spigots.
- **cribellum:** narrow, undivided; as wide as spinnerets base (fig. 31e).
- **calamistrum:** uniseriate.
- **respiratory system:** two booklungs; posterior tracheal spiracle situated close to spinnerets.
- **genitalia:** entelegyne; epigyne with semicircular to triangular plate (fig. 31h); male palp with spiral embolus (fig. 31f); palpal tibia varies from very long and cylindrical to club-shaped.
- **body size:** 6-20 mm.
- **colour:** various shades of silvery white, grey, brownish black or olive green; abdomen sometimes with dark spots or a distinct folium; males generally darker than females; *Avellopsis* with a distinct white median band of silvery white setae.

Taxonomic status

Coddington & Levi (1991) and Coddington *et al.* (2004) place the deinopids in the Orbiculariae (orb weavers). Together with the Uloboridae they form the superfamily Deinopoidea, sister to the Araneoidea within the Orbiculariae (Griswold *et al.* 1998).

Distribution

Avella (Australia and New Caledonia)*; Deinopis* (tropical and subtropical regions of the world); *Avellopsis* (Africa); *Menneus* (Africa).

Lifestyle

Deinopids live in low vegetation and construct a unique small, expandable web that they hold between the front legs and cast over prey (fig. 31g).

Relevant literature

Coddington (2005b); Coddington & Levi (1991); Coddington *et al.* (2004); Dippenaar-Schoeman & Jocqué (1997); Griswold *et al.* (1998).

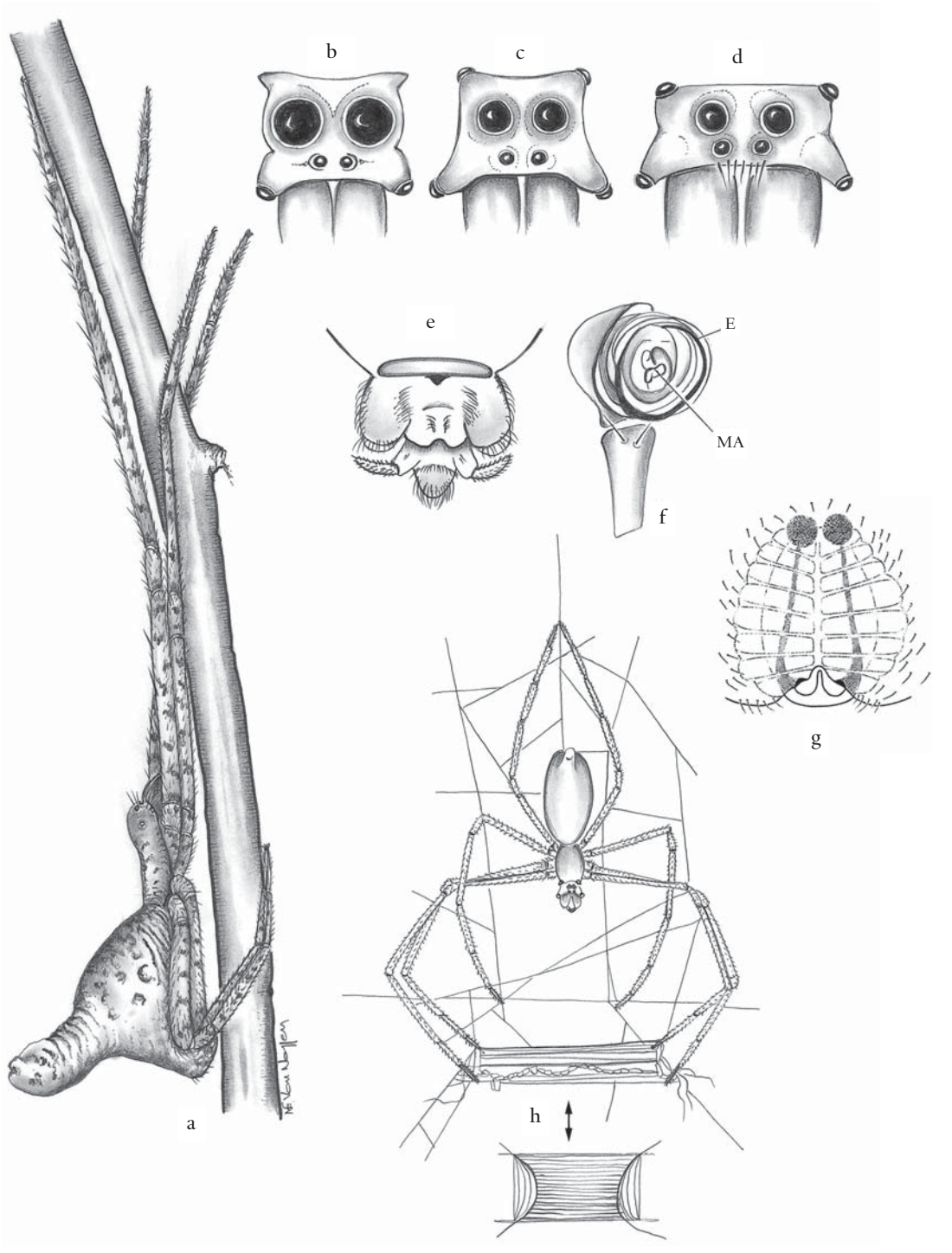


Fig. 31. **Deinopidae.** *Menneus* sp. **a.** female, natural posture (14 mm); *Deinopis* sp. **b.** eye pattern, frontal view; *Avellopsis* sp. **c.** eye pattern, frontal view; *Menneus camelus* **d.** eye pattern, frontal view; **e.** spinnerets, ventral view; **f.** right male palp, retrolateral view; **g.** epigyne, ventral view; **h.** spider holding expandable web. E: embolus; MA: median apophysis. (g, h: after Lehtinen, 1967.)

FAMILY DESIDAE Pocock, 1895

DESIS – LONG-JAWED INTERTIDAL SPIDERS

Fig. 32, pl. 22, 23

Type genus

Desis Walckenaer, 1837.

Other genera

Represented by 38 genera and 180 species (Platnick, 2005), divided among three subfamilies: Desinae, Toxopinae and Myroninae (Forster, 1970).

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; cribellate or ecribellate; entelegyne; eight eyes; inner and outer pair of tracheae branched.

Descriptive characters

- **carapace:** usually longer than wide; fovea distinct.
- **sternum:** scutiform, longer than wide (fig. 32b).
- **eyes:** eight; in more or less straight or strongly curved rows (4:4); occupying little more than half of head width (fig. 32a).
- **chelicerae:** usually small and vertical but may be large and porrect (*Desis, Matachia* and *Notomatachia*) (fig. 32a) in both sexes; in Myroninae the enlargement found only in males; teeth on both margins of cheliceral furrow; usually with well developed cheliceral boss.
- **mouthparts:** labium longer than wide, notched at base; endites long.
- **legs:** three claws; trichobothria usually numerous with double row on tibiae and single row on metatarsi and tarsi (some exceptions); trochanters usually notched; spination generally heavy, with double rows of spines along the ventral surface of tibiae and metatarsi or reduced (*Desis*); tarsal organ capsulate, situated beyond tarsal trichobothria; scopulae and tenant hair present in some genera.
- **female palp:** with toothed claw.
- **abdomen:** ovoid; clothed in short, water-repellent setae (*Desis*).
- **spinnerets:** stout and broad; anterior pair contiguous, biarticulate; colulus usually prominent.
- **cribellum:** when present usually entire, rarely divided.
- **calamistrum:** proximal.
- **respiratory system:** two booklungs; tracheal spiracle broad; situated a short distance in front of spinnerets; tracheal system with inner and outer branches finely divided, restricted to abdomen (Desinae).
- **genitalia:** entelegyne; epigyne distinct but weakly sclerotized (fig. 32c); male palp usually fairly simple, with long, spiniform embolus; with characteristic, sclerotized conductor embracing the embolus; conductor characteristic: sclerotized and embracing embolus; tibiae with apophyses (fig. 32d).
- **body size:** 5-22 mm, including chelicerae.
- **colour:** pale yellow to dark brown or grey.

Taxonomic status

This very heterogeneous family is poorly defined. Its position in the Dictynoidea (Coddington & Levi, 1991) is questionable. According to Forster (1970) it is possible that these spiders should be associated with the Argyronetidae. Griswold (pers. comm.) assumes that they are associated with other austral families (e.g. Amphinectidae). Several genera have been revised by Beatty & Berry (1989); Forster (1970); Forster & Wilton (1973); Gray (1992) and Ledoux (1991).

Distribution

Wide distribution including Australia, New Zealand and surrounding islands, southern part of Afrotropical Region, Antarctic islands. *Paratheuma* is circumpacific and *Badumna* has been introduced into the Americas.

Lifestyle

Ecribellate species free-living ground dwellers. Cribellate species construct simple snares often in holes in branches. Some genera associated with aquatic and marine intertidal habitats (fig. 32e).

Relevant literature

Beatty & Berry (1989); Forster (1970); Forster & Wilton (1973); Forster & Forster (1999); Gray (1992); Ledoux (1991); Ubick (2005b).

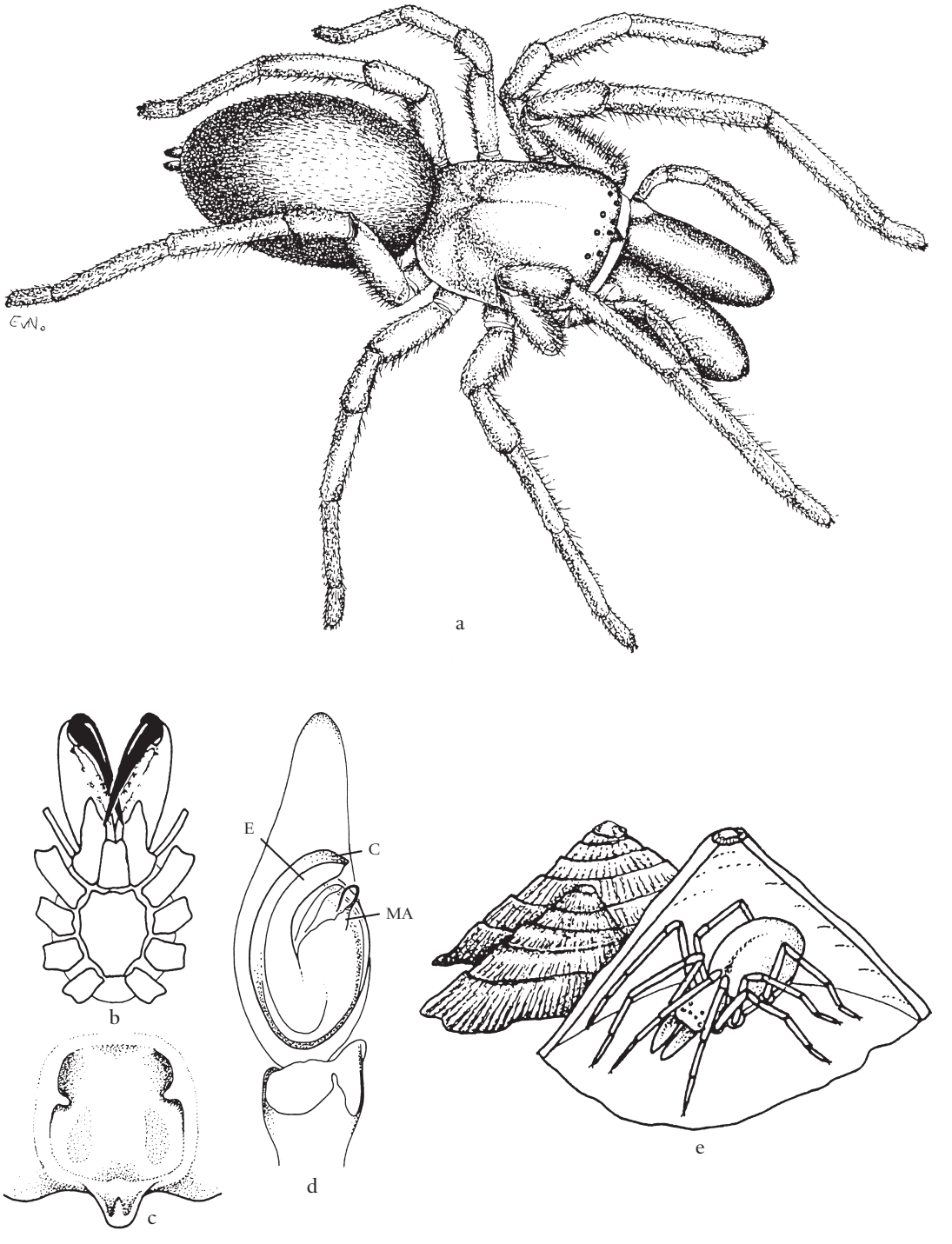


Fig. 32. **Desidae.** *Desis* sp. **a.** female, natural posture (19 mm); **b.** cephalothorax, ventral view; **c.** epigyne; **d.** left male palp, ventral view; **e.** retreat in limpet. C: conductor; E: embolus; MA: median apophysis.

FAMILY DICTYNIDAE O. P.-Cambridge, 1871

MESHWEB SPIDERS

Fig. 33, pl. 24

Type genus

Dictyna Sundevall, 1833.

Other genera

Represented by 48 genera and almost 560 species (Platnick, 2005) grouped into three subfamilies: Cicurininae, Dictyninae, Tricholathysinae.

Diagnostic characters

Small araneomorph spiders; three tarsal claws; cribellate or cribellum reduced; entelegyne; six or eight eyes; calamistrum uniseriate; cribellum wide; endites converging; branched tracheae.

Descriptive characters

- **carapace:** cephalic region usually relatively high (fig. 33c); with longitudinal rows of white setae (Dictyninae) (figs 33a, b); pear-shaped without setae (Tricholathysinae); fovea reduced.
- **sternum:** triangular.
- **eyes:** eight or six (anterior median eyes reduced in Cicurininae); either all, or only anterior median eyes dark.
- **chelicerae:** vertical; modified (curved) in males of some genera (fig. 33d).
- **mouthparts:** endites converging.
- **legs:** three claws; legs of moderate length; tarsi either without or with one or two rows of trichobothria; legs usually without true spines; trichobothria reduced.
- **abdomen:** suboval to oval and elongate (Tricholathysinae); slightly overlapping carapace; bearing dense layer of setae; usually with pattern.
- **spinnerets:** six; cylindrical; anterior and posterior spinnerets two-segmented; distal segments short (fig. 33f).
- **cribellum:** bipartite (fig. 33f) or entire (reduced in Cicurininae).
- **calamistrum:** uniseriate (fig. 33e).
- **respiratory system:** two booklungs; posterior tracheal spiracle broad, open close to spinnerets.
- **genitalia:** entelegyne; epigyne weakly sclerotized (fig. 33h); male palp usually without median apophysis; embolus long and slender; conductor directed backwards; tibial apophyses present (fig. 33g).
- **body size:** <5 mm.
- **colour:** varies from greenish to pale to dark brown or grey; abdomen usually pale with dark pattern.

Taxonomic status

The limits of the family as defined by Simon were modified (Lehtinen, 1967) and the position of certain genera is still provisional. Coddington & Levi (1991) and Coddington *et al.* (2004) placed the Dictynidae in the superfamily Dictynoidea of the 'RTA clade'. However, they stated that the placement of families in the Dictynoidea and Amaurobioidea continues more out of tradition than because of strong synapomorphies.

Lehtinen (1967) provided diagnostic characters for some genera. Chamberlin & Ivie (1941) reviewed the New World *Cicurina*, Chamberlin & Gertsch (1958) revised the cribellate species in North America.

Distribution

Worldwide; more common in temperate regions than in the tropics.

Lifestyle

Life style varies. Dictyninae: plant-dwelling spiders constructing a web with parallel threads crisscrossed with cribellate silk to form a ladder-like structure or mesh-like retreat webs on plants (fig. 33i); some species are kleptoparasites; Cicurininae and Tricholathysinae are ground-dwellers; some species are found in the intertidal zone.

Relevant literature

Bennett (2005b); Chamberlin & Ivie (1940); Chamberlin & Gertsch (1958); Dippenaar-Schoeman & Jocqué (1997); Forster (1970); Gertsch (1992); Lehtinen (1967).

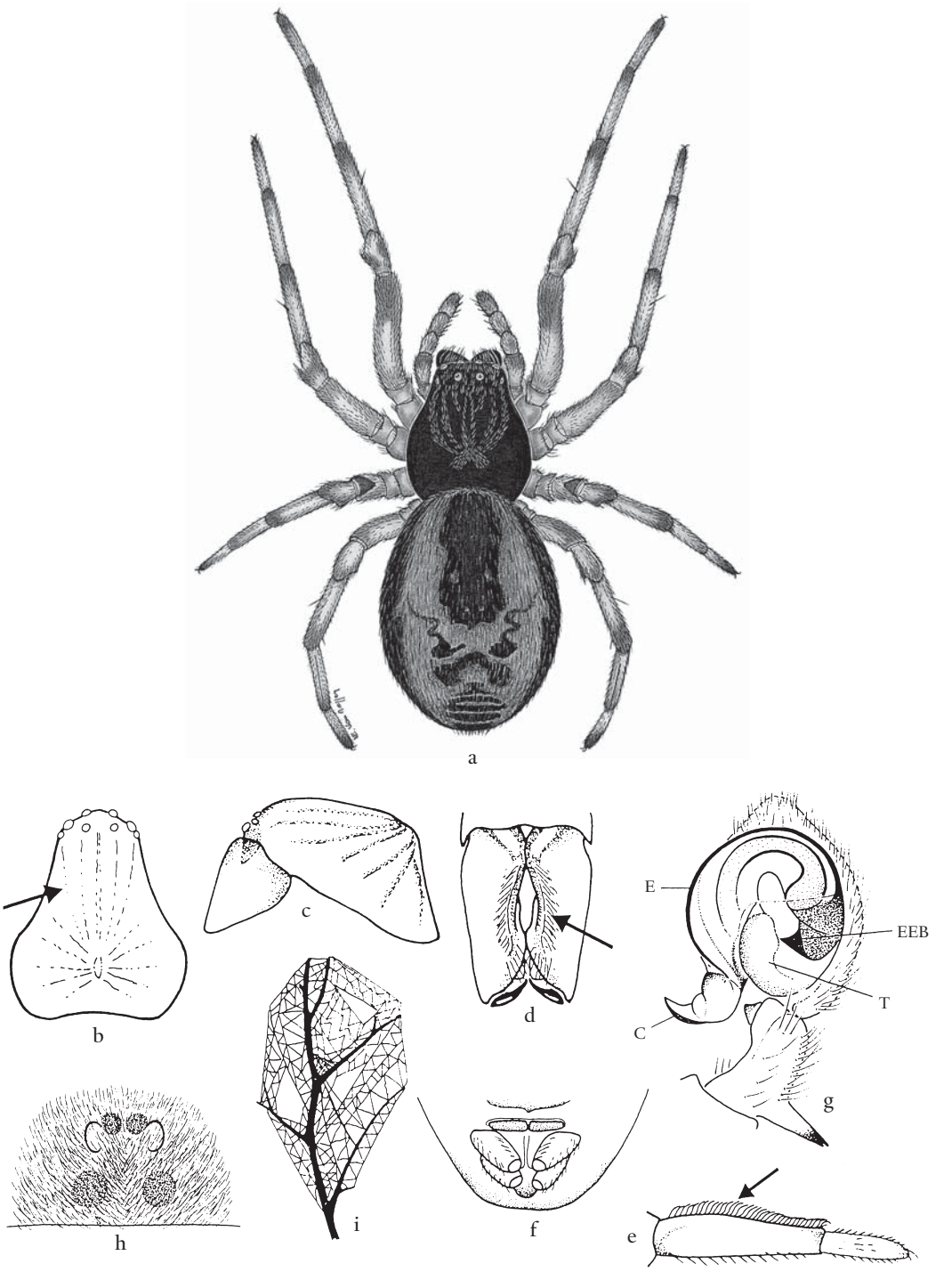


Fig. 33. **Dictynidae.** *Dictyna* sp. **a.** female habitus (3 mm); Dictyninae **b.** carapace, dorsal view showing rows of pale setae; **c.** cephalothorax, lateral view; **d.** chelicerae of male, anterior view showing modification; **e.** metatarsus and tarsus IV, showing calamistrum; **f.** spinnerets, ventral view; **g.** male palp, ventral view; **h.** epigyne; **i.** web. C: conductor; E: embolus; EEB: envelope of embolus base; T: tegulum. (a: after Roberts, 1989.)

FAMILY DIGUETIDAE F. O. P.-Cambridge, 1899

CONEWEB SPIDERS

Fig. 34, pl. 7

Type genus

Diguetia Simon, 1895.

Other genera

Segestrioides Keyserling, 1883. Represented by 15 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes; chelicerae tied together at base, inner margin with transparent lamina; endites long, triangular and strongly converging; no tracheae; male palp with lamellar embolus, female genitalia with large semicircular bursa.

Descriptive characters

- **carapace:** elongate, oval, rather flat with wide, deeply depressed fovea (fig. 34a), cervical grooves poorly indicated; clypeus high.
- **sternum:** much longer than wide; shield-shaped (figs 34b,c).
- **eyes:** six eyes, anterior medians lost; anterior laterals and posterior medians in almost straight line (fig. 34d).
- **chelicerae:** at base soldered together for one-quarter to half their length by conspicuous pale membrane; no teeth but inner margin with transparent lamina; without condyle; fangs short (fig. 34d).
- **mouthparts:** endites triangular to almost diamond shaped, strongly convergent; labium free, as wide as long, bell-shaped with posterior half (fig. 34b).
- **legs:** fairly thick and robust or long and thin; 1423; tarsi with three claws, paired claws with single slightly sinuous row of teeth, unpaired claw with one or two teeth at base; without spines; tarsal organ exposed, flat, with concentric rings (*Segestrioides*) or capsulate (*Diguetia*).
- **female palp:** without claw, terminating in sclerotized point.
- **abdomen:** oval, longer than wide, densely haired.
- **spinnerets:** six; small; anterior and posterior pairs bisegmented; anterior lateral spinnerets with two major ampullate gland spigots; no cylindrical gland spigots; spigot bases of posterior median spinnerets fused to form a distal ring; colulus a small subovate plate (fig. 34c).
- **respiratory system:** a pair of booklungs; tracheal system apparently lost although Gertsch (1958) mentions the presence of a paired tracheal spiracle at a certain distance from the spinnerets.
- **genitalia:** haplogyne; female genitalia with a large transverse bursa copulatrix sometimes with a distinct median receptaculum (fig. 34e); male palp (fig. 34f) simple with short, more or less strongly excavated cymbium bearing a rounded tegulum; embolus lamellar, in *Diguetia* accompanied with short, simple prong.
- **body size:** 4.5-12.0 mm.
- **colour:** tegument of cephalothorax orange to dark brown; legs often annulated; abdomen pale with darker complex pattern.

Taxonomic status

Representatives of Diguetidae have been incorporated for a long time in several haplogyne families, but the family was formally recognised for the first time by Gertsch (1949). The family belongs in the superfamily Scytodoidea and is considered the sister group of the Plectreuridae (Coddington & Levi, 1991; Coddington *et al*., 2004; Platnick *et al*., 1991), where Wunderlich (2004) considers it a subfamily.

Distribution

Confined to the New World. Known from hot deserts in south-western USA, Mexico and South America.

Lifestyle

Diguetia species live in tangled space webs in low vegetation with a cone-like central retreat in which they hide and deposit the eggs. Representatives of *Segestrioides* live under stones where they make flimsy webs and deposit the egg sacs.

Relevant literature

Brescovit & Rheims (2005); Coddington & Levi (1991); Eberhard (1967); Gertsch (1958); Platnick (1989); Platnick *et al.* (1991); Ubick (2005c); Wunderlich (2004).

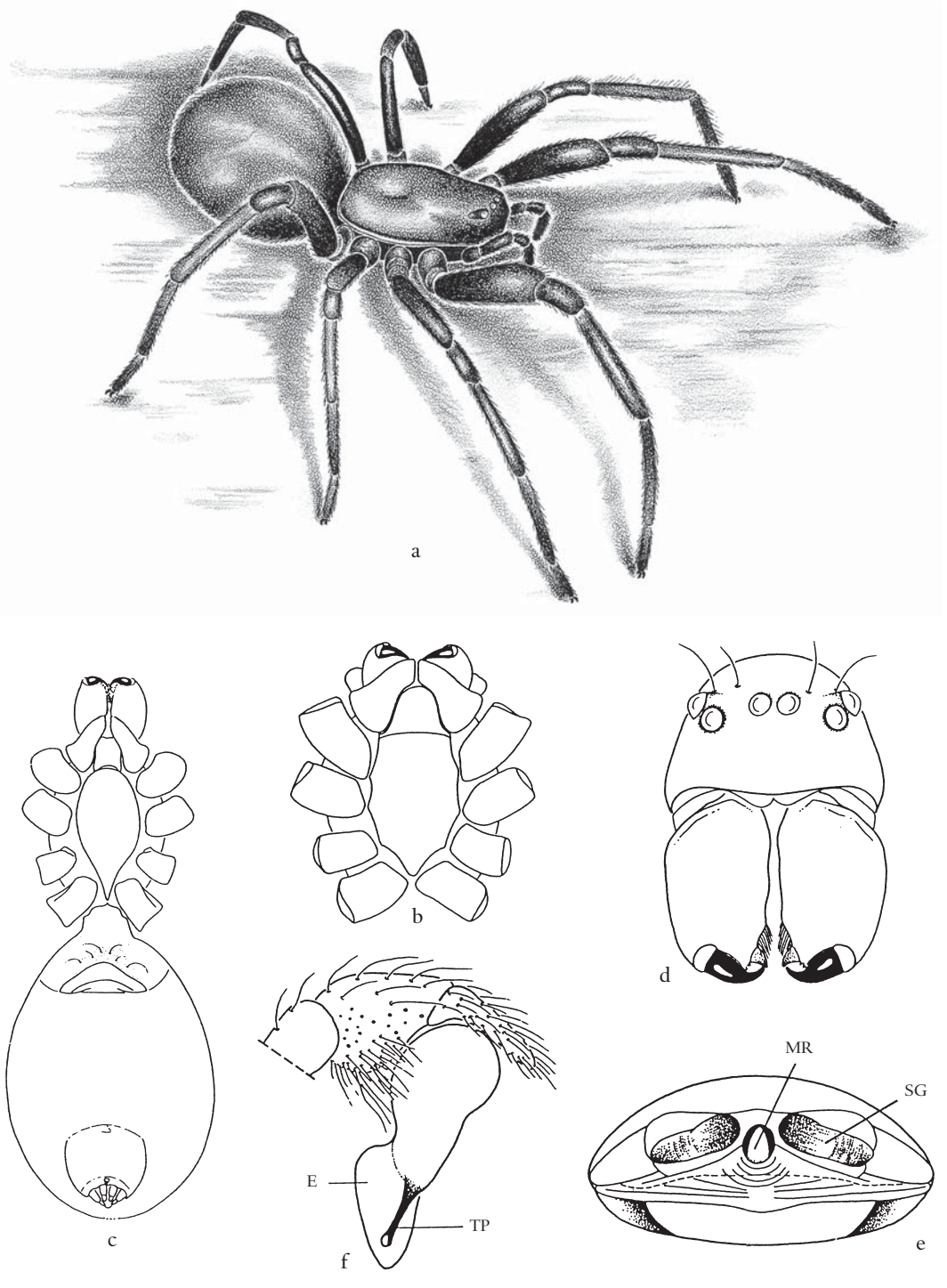


Fig. 34. **Diguetidae.** *Segestrioides bicolor* **a.** female, natural posture (11 mm); **b.** cephalothorax, ventral view; *Diguetia canities* **c.** cephalothorax and abdomen, ventral view; **d.** cephalothorax, frontal view; **e.** female genitalic area; **f.** male palp, retrolateral view. E: embolus; MR: median receptaculum; SG: secretory gland; TP: tegular process. (a: after a photo in Platnick, 1989; f: after Gertsch, 1958.)

FAMILY DIPLURIDAE Simon, 1889

SHEET WEB MYGALOMORPHS

Fig. 35, pl. 4

Type genus

Diplura C.L. Koch, 1850.

Other genera

Represented by 24 genera and 175 species (Platnick, 2005) divided among four subfamilies: Diplurinae, Masteriinae, Euagrinae and Ischnothelinae.

Diagnostic characters

Small to large mygalomorph spiders; three tarsal claws; eight eyes; rastellum present; four spinnerets widely spaced; posterior pair very long; cephalic region low; cheliceral furrow with two rows of strong teeth.

Descriptive characters

- **carapace:** cephalic region low and thoracic region elevated; overall hirsute; fovea small, pit like (fig. 35a); clypeus usually present, absent in Ischnothelinae.
- **sternum:** heart-shaped, narrow or wide; sigilla oval and marginal; labiosternal groove distinct (fig. 35c).
- **eyes:** eight; in a compact rectangular group, twice as wide as long (fig. 35b); eye tubercle present and raised.
- **chelicerae:** porrect; rastellum absent; cheliceral furrow with teeth, either one or rarely two rows; fangs long.
- **mouthparts:** endites short, cuspules present or absent (Euagrinae, Masteriinae); labium wider than long, without cuspules (fig. 35c); serrula distinct.
- **legs:** three claws; paired claws with numerous teeth in one row; scopulae absent; tarsi long and slender; leg I (male) usually with mating spur on tibia and metatarsus (figs 35f, j) and sometimes also on II.
- **female palp:** unmodified.
- **abdomen:** oval; hirsute; frequently with spots or chevron pattern.
- **spinnerets:** long (fig. 35e); four; posterior pair widely spaced, all three segments subequal in length; median spinnerets short and widely spaced (fig. 35d).
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae usually paired (two on each side) (Ischnothelinae), or only two, each spermatheca with one or more sclerotized receptors (*Allothele*) (fig. 35h); male palp with small haematodocha on bulbus; bulbus pyriform, with elongated embolus; cymbium bilobate and embolus spinose (fig. 35k) or embolus long and thin (fig. 35g), and cymbium an elongated lobe.
- **body size:** 5-22 mm.
- **colour:** varies from pale tan to orange-brown or purplish brown or blackish brown with spots or chevron pattern on dorsum.

Taxonomic status

The Dipluridae belong to the Tuberculotae (sensu Raven, 1985). It is the sister-group of the Crassitarsae with which it forms the Quadrithelina (Raven, 1985). According to Goloboff (1993) the family is possibly paraphyletic. Raven (1985) provided a key to the genera of the world. Most of the revisionary work was done by Coyle (1984, 1988, 1995) and Raven (1984a, b, c, 1991).

Distribution

Wide distribution: North, Central and South America, Caribbean Islands, Madagascar, Africa, India, western Eurasia includingTaiwan, New Caledonia and Australia.

Lifestyle

Ground-dwelling spiders that construct capture webs consisting of a sheet web with a funnel-shaped retreat in existing crevices or within the litter (Masteriinae). Egg case deposited on firm substrate (fig. 35i).

Relevant literature

Coyle (1984, 1988, 1995, 2005c); Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Goloboff (1993); Raven (1984a, b, c, 1985, 1991).

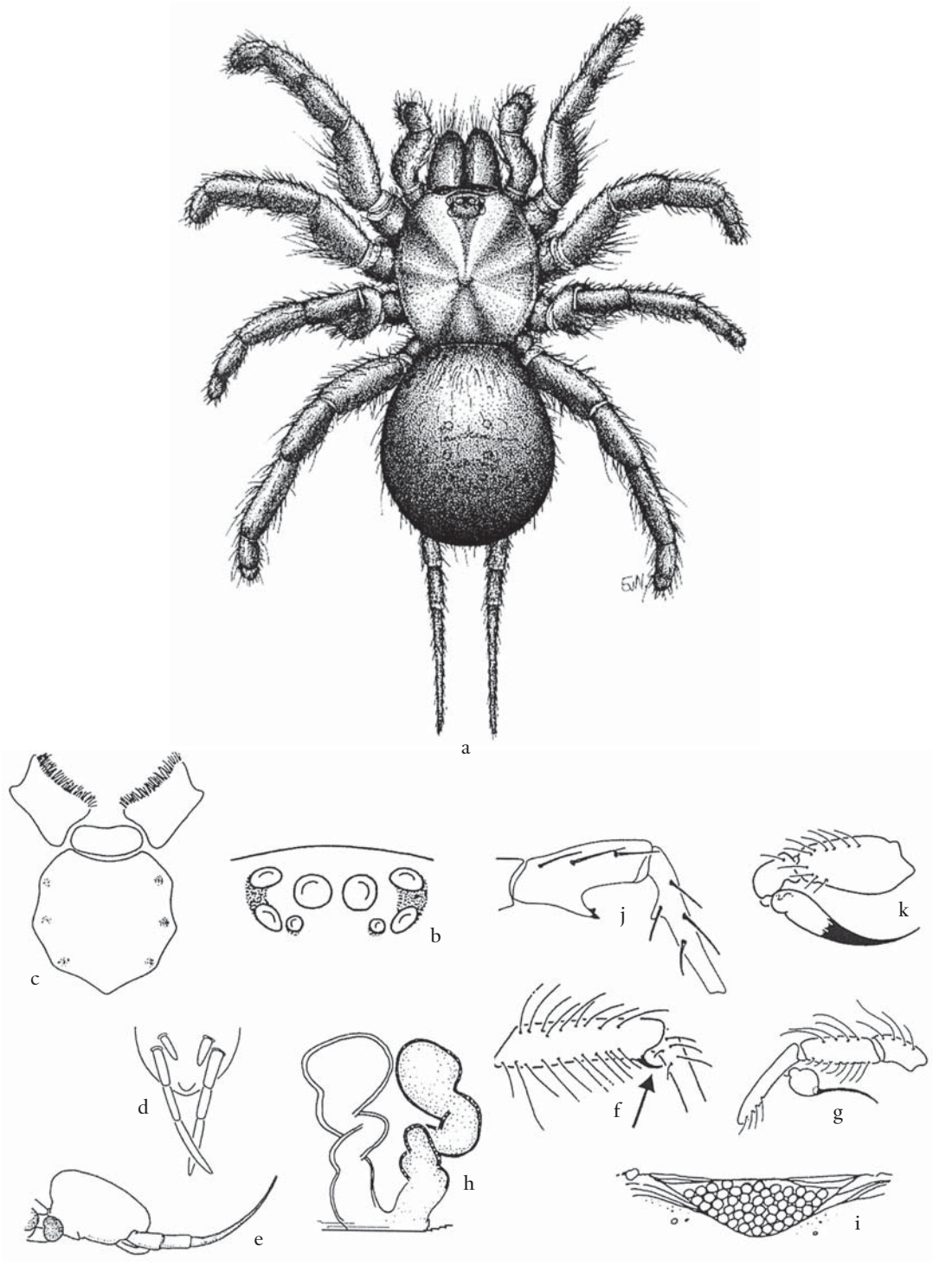


Fig. 35. **Dipluridae.** *Thelechoris* sp. **a.** female habitus (14 mm); **b.** eye pattern, dorsal view; **c.** sternum, labium and endites, ventral view; **d.** spinnerets, ventral view; **e.** abdomen, lateral view; **f.** mating spur on leg I; **g.** male palp; **h.** spermathecae; **i.** egg sac; *Allothele* sp. **j.** mating spur on leg I; **k.** male palp. (b-j: after Coyle, 1984.)

FAMILY DRYMUSIDAE Simon, 1893

FALSE VIOLIN SPIDERS

Fig. 36, pl. 7

Type genus

Drymusa Simon, 1891

Other genera

Only known from type genus represented by ten species (Platnick, 2005).

Diagnostic characters

Medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes in three diads; body slightly depressed; legs long and slender, tarsus with an onychium; median spinnerets with spicules on median surface.

Descriptive characters

- **carapace:** slightly depressed; thoracic region slightly elevated, bearing numerous long, dark setae (more numerous in males) arranged in a V; fovea shallow (fig. 36a).
- **sternum:** heart-shaped.
- **eyes:** six, in three diads; eye rows slightly recurved (fig. 36a).
- **chelicerae:** cheliceral lamina present; fangs short.
- **mouthparts:** labium and endites elongated, almost same length as sternum; endites converging; anterior edge of labium and endites pale.
- **legs:** three claws on onychium (fig. 36c); legs long and slender (fig. 36b); leg formula 1243; legs without spines, with light covering of short setae.
- **female palp:** without claw.
- **abdomen:** round to oval; with light covering of short stiff setae; genital groove long with sclerotized edges in both sexes; booklung slits with chitinous depressions; some species with chitinous plates posterior to genital groove (fig. 36d).
- **spinnerets:** colulus short (inconspicuous in males); anterior median spinnerets with a major ampullate gland spigot and numerous piriform gland spigots; posterior median spinnerets with spicules on median surface and one spigot, probably serving an aciniform gland; similar spigots on posterior lateral spinnerets.
- **respiratory system:** two booklungs; posterior tracheal spiracle open on midventral line near spinnerets.
- **genitalia:** haplogyne; female with paired spermathecae; male with bulbus located at tip of tarsus; embolus slender, spiniform; tibia swollen (fig. 36e).
- **body size:** 7-15 mm (first leg 26.5-35.0 mm, longer in males).
- **colour:** carapace and legs brown with darker patches; abdomen with distinct brown or purple hue; dorsum decorated with pattern of pale chevrons.

Taxonomic status

Lehtinen (1986) recognised the Drymusidae as a separate family in the superfamily Scytoidea, with the Ochyroceratidae as sister-group. Coddington & Levi (1991) and Platnick *et al.* (1991) group them in the same superfamily as those higher haplogynes most closely related to the Scytodidae. No recent revision.

Distribution

Known in South Africa, the Caribbean Region, Costa Rica and Brazil.

Lifestyle

Drymusids are cryptozoic and found under fallen logs or in caves in loose spacewebs.

Relevant literature

Brescovit *et al.* (2004); Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Lehtinen (1986).

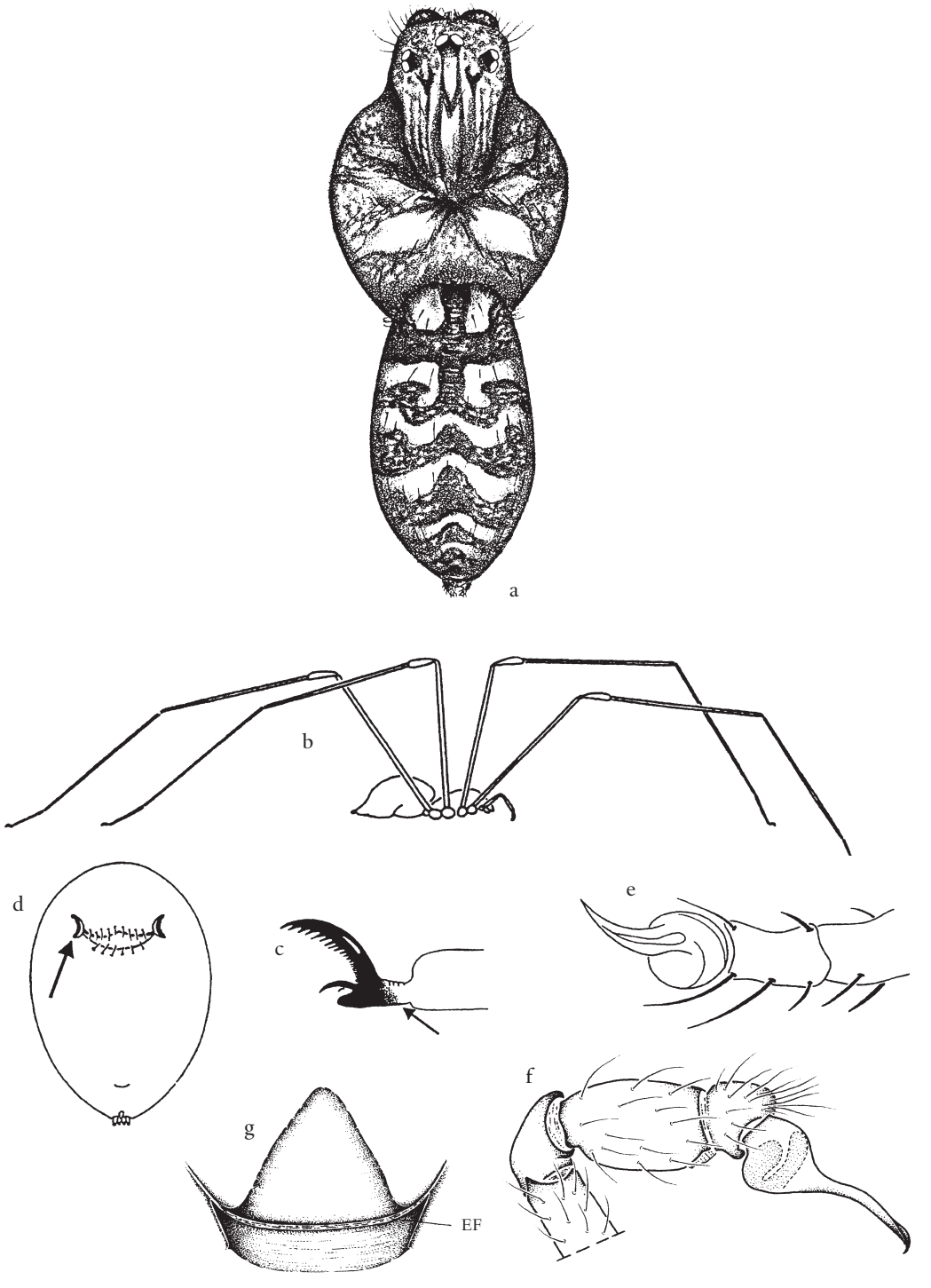


Fig. 36. **Drymusidae.** *Drymusa* sp. **a.** cephalothorax and abdomen, dorsal view (12 mm); **b.** natural posture; **c.** leg tarsus showing onychium; **d.** abdomen, ventral view showing genital groove with sclerotized edges; **e.** male palp, ventral view; *Drymusa canhemabae*; **f.** male palp; retrolateral view; **g.** female genitalic area, ventral view. EF: epigastric fold. (b, d, e: after Valerio, 1971; f-g: after Brescovit, Bonaldo & Rheims 2004.)

FAMILY DYSDERIDAE C. L. Koch, 1837

LONG-FANGED SIX-EYED SPIDERS

Fig. 37, pl. 8

Type genus

Dysdera Latreille, 1804.

Other genera

Represented by 24 genera and 488 species (Platnick, 2005) divided among three subfamilies: Harpacteinae, Rhodinae and Dysderinae.

Diagnostic characters

Medium-sized araneomorph spiders; two or three tarsal claws; ecribellate; haplogyne; six eyes; a distinct pair of tracheal spiracles posterior to booklung slits; female genitalia with posterior spermatheca; sternum joined to carapace by intercoxal sclerites, chelicerae and fangs well developed.

Descriptive characters

- **carapace:** longer than wide (fig. 37a); clypeus narrow; fovea reduced to a longitudinal black stripe; not nested; integument sclerotized, usually with fine granulation.
- **sternum:** joined to carapace by intercoxal sclerites (fig. 37c).
- **eyes:** six; in compact group near clypeal edge (fig. 37b).
- **chelicerae:** free, well-developed; subchelate; cheliceral furrow with 3-5 teeth; fangs well developed; lamina absent.
- **mouthparts:** labium longer than wide (fig. 37d), often with a deep notch at anterior edge; endites parallel.
- **legs:** two or three claws; at least tibiae and metatarsi of hind legs with setae.
- **female palp:** claw present, without teeth.
- **abdomen:** ovoid; usually with sparse cover of short setae.
- **spinnerets:** anterior spinnerets three-segmented, apical segment longest; colulus absent.
- **respiratory system:** two booklungs; two distinct pairs of spiracles: anterior pair leading to booklungs, posterior pair situated behind epigastric groove, leading to tracheae (fig. 37e).
- **genitalia:** haplogyne; female genitalia with anterior and posterior spermathecae and internal sclerite (endogyne); male palp variable; tarsus short or long; bulbus originating medioventrally on cymbium (fig. 37f).
- **body size:** 2.5-20 mm.
- **colour:** carapace and legs brown, black, yellow, orange or red, abdomen usually grey.

Taxonomic status

Forster & Platnick (1985) separated the Segestriinae from the Dysderidae and validated it as a separate family. They recognised the monophyly of the superfamily Dysderoidea, which also comprises the Segestriidae, Orsolobidae and Oonopidae.

Distribution

The Dysderidae is a Western Palearctic family with remarkably small areas of distribution of particular species. *Dysdera crocata* has been introduced worldwide.

Lifestyle

Dysderids are free-living nocturnal wandering spiders of the ground layer or tree trunks. They spend daylight in a silken retreat. Many species are troglobitic. *Dysdera* has a prey specialisation in woodlice.

Relevant literature

Alicata (1964); Arnedo *et al.* (1997, 2000); Arnedo & Ribera (1997, 1999); Cooke (1965); Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1985); Deeleman-Reinhold (1993); Deeleman-Reinhold & Deeleman (1988); Ferrández (1986); Ubick (2005d).

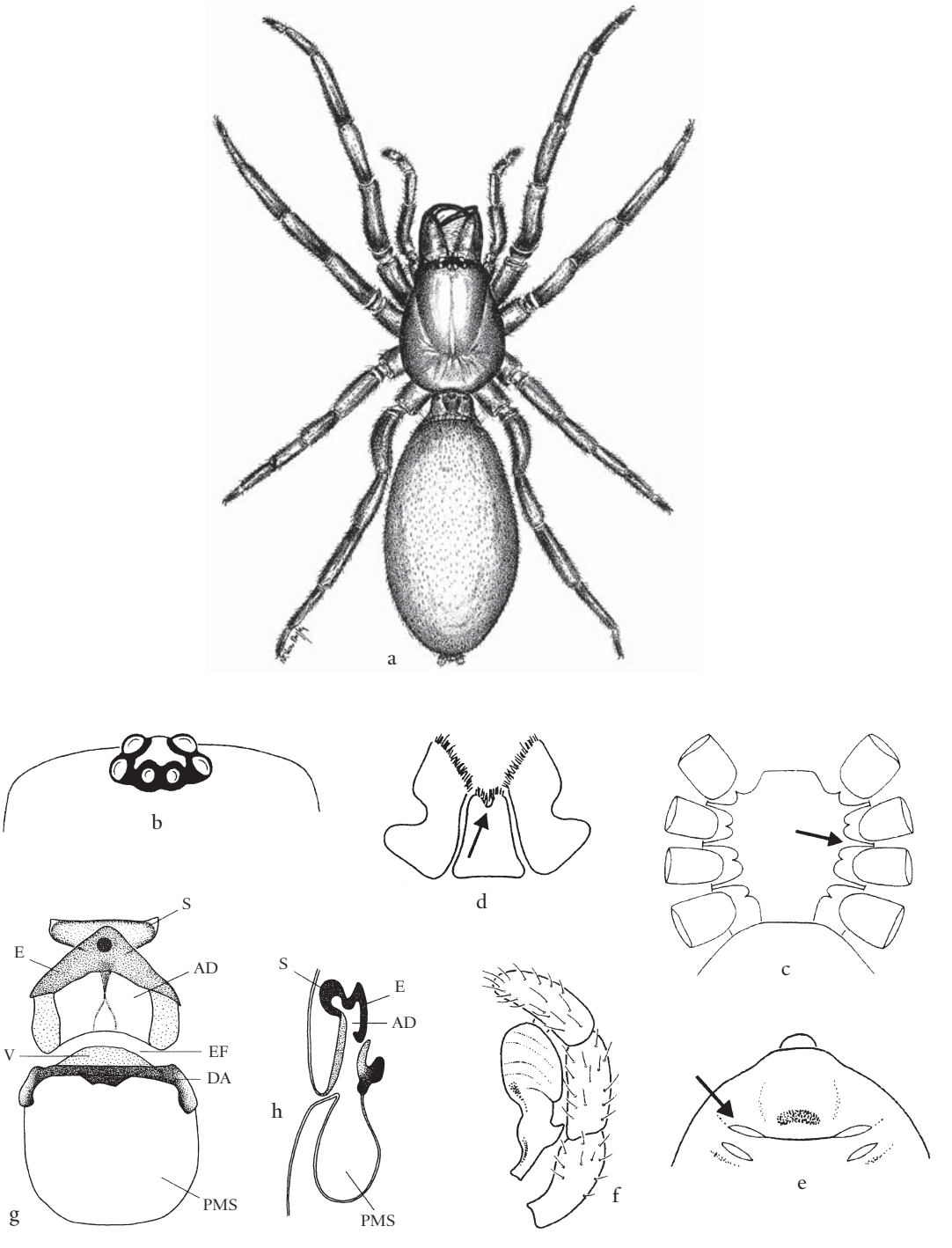


Fig. 37. **Dysderidae**. *Dysdera crocata* **a.** female habitus (12 mm); **b.** eye pattern, dorsal view; **c.** sternum showing intercoxal projections; **d.** mouthparts showing notched labium; **e.** frontal part of abdomen showing tracheal spiracles; **f.** male palp, lateral view; *Dysdera ninnii* **g.** female, internal genitalia, dorsal view; **h.** female internal genitalia, longitudinal section. AD: anterior diverticulum; DA: dorsal arch; E: endogyne; EF: epigastric fold; PMS: posterior membranous sac; S: spermatheca; V: valve. (g-h: after Deeleman-Reinhold & Deeleman 1988.)

FAMILY ERESIDAE C. L. Koch, 1851

VELVET SPIDERS

Fig. 38, pl. 10

Type genus

Eresus Walckenaer, 1805.

Other genera

Adonea Simon, 1873; *Dorceus* C.L. Koch, 1846; *Dresserus* Simon, 1876; *Gandanameno* Lehtinen, 1967; *Paradonea* Lawrence, 1968; *Penestomus* Simon, 1902; *Seothyra* Purcell, 1903; *Stegodyphus* Simon, 1873; *Wajane* Lehtinen, 1967. Known from 102 species (Platnick, 2005) divided between two subfamilies: Eresinae and Penestominae.

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; cribellate; entelegyne; eight eyes; carapace convex, rectangular; median eyes situated close together, with lateral eyes widely spaced; body usually clothed in a dense layer of short plumose setae.

Descriptive characters

- **carapace:** rectangular (figs 38a, e); high in Eresinae, flattened in Penestominae; densely clothed in setae; clypeus protruding centrally; fovea circular but variable in depth; males of *Dresserus* and some *Stegodyphus* with horn-like extensions (fig. 38e) at anterolateral edge of carapace.
- **sternum:** narrowed in front; labiosternal groove distinct.
- **eyes:** eight; both pairs of median eyes close together, with lateral eyes wide apart (figs 38a, e); posterior lateral eyes far back on carapace, closer to the front in Penestominae.
- **chelicerae:** strong; anterior margin of cheliceral furrow armed with a strong chitinous keel (fig. 38c) which may be serrated.
- **mouthparts:** endites with well-developed serrula; labium rounded apically.
- **legs:** three claws; legs usually short and stout; tarsi usually united to metatarsi by almost rigid joints; densely clothed in setae.
- **female palp:** unmodified.
- **abdomen:** rounded to oval (figs 38a, b); densely clothed in plumose setae; frequently with pattern.
- **spinnerets:** anterior spinnerets thick, conical, multi-segmented (figs 38d, f); spinnerets of *Seothyra* and *Dorceus* modified, with only anterior pair well developed.
- **respiratory system:** two booklungs; posterior tracheal spiracle close to spinnerets.
- **cribellum:** well-developed; cribellar plate oval; divided, or 3-4-partite in *Dresserus*; 2-partite in *Gandanameno* and other genera; absent in *Wajane*.
- **calamistrum:** uniseriate, usually along entire length of metatarsi IV in Eresinae; shorter in Penestominae; absent in *Wajane*.
- **genitalia:** epigyne usually simple, usually with a median septum (fig. 38h) and linear depression laterocaudally; internal structure usually simple; male palp short, thick and simple; tibial apophyses absent in Eresinae (fig. 38g); Penestominae with tibial process large, bifurcated and median apophysis complex.
- **body size:** 3-35 mm.
- **colour:** various hues of dark brown, yellowish brown or grey; abdomen sometimes with distinct pattern formed by white, orange, pale blue or red setae, some species are characterized by remarkable sexual dimorphism, where males are of bright aposematic coloration.

Taxonomic status

Platnick *et al.* (1991) considered the oecobiids and eresids to be sister taxa, while Coddington (1990) considered them to be adjacent outgroups for the remaining Entelegynae. Coddington & Levi (1991) and Coddington *et al.* (2004) placed them in the superfamily Eresoidea together with the Oecibiidae and Hersiliidae. Several genera have been revised: *Dorceus* (El-Hennawy, 2002); *Seothyra* (Dippenaar-Schoeman, 1990); *Penestomus* (Dippenaar-Schoeman, 1989); *Stegodyphus* (Kraus & Kraus, 1988); *Wajane* Dippenaar-Schoeman, 1989).

Distribution

Afrotropical and Palearctic Regions with high diversity in Africa and a few species of *Stegodyphus* known in Brazil and the Indomalaisian region.

Lifestyle

Live in a variety of habitats. They construct retreat webs and are found on the ground in burrows or on plants. Three species of *Stegodyphus* are social.

Relevant literature

Coddington (1990); Coddington & Levi (1991); Dippenaar-Schoeman (1989, 1990); Dippenaar-Schoeman & Jocqué (1997); El-Hennawy (2002); Kraus & Kraus (1988); Lehtinen (1967); Platnick (2004); Platnick *et al.* (1991).

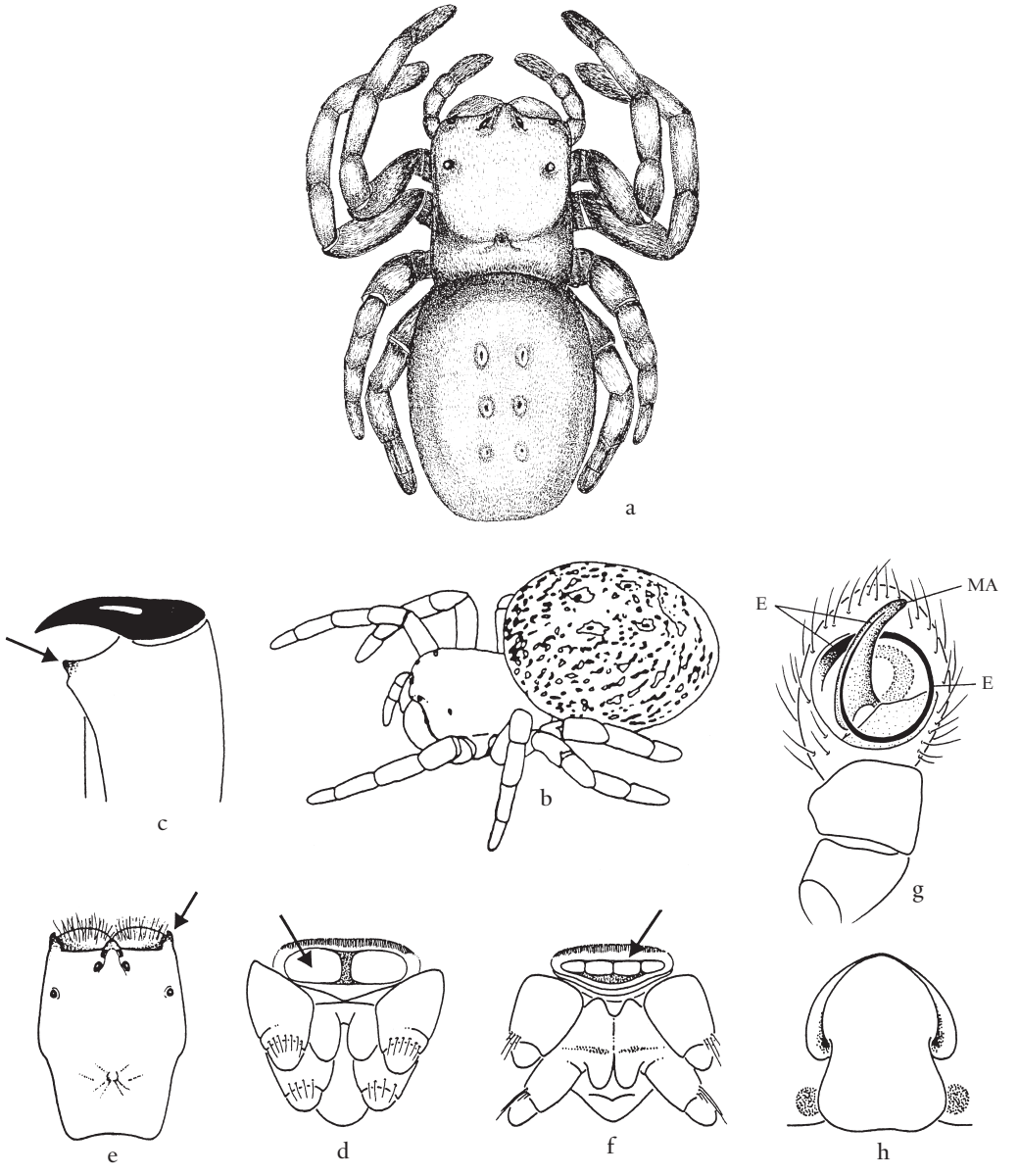


Fig. 38. **Eresidae.** *Gandanameno* sp. **a.** female habitus (16 mm); **b.** natural posture; **c.** chelicera, showing strong chitinous keel; **d.** spinnerets in ventral view showing bipartite cribellum; *Dresserus armatus* **e.** cephalothorax of male, dorsal view showing horn-like lateral extensions; **f.** spinnerets in ventral view showing 4-bipartite cribellum; **g.** right male palp, ventral view; **h.** epigyne, ventral view. E: embolus; MA: median apophysis.

FAMILY FILISTATIDAE Ausserer, 1867

CREVICE WEAVERS

Fig. 39, pl. 5

Type genus

Filistata Latreille, 1810.

Other genera

Represented by 16 genera and 109 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; cribellate; haplogyne; eight eyes; labium fused to sternum; chelicerae basally fused with laminae; cribellum divided, bearing claviform cribellate spigots.

Descriptive characters

- **carapace:** cephalic region distinctly narrowed in front; fovea absent; usually densely covered with fine setae (fig. 39a).
- **sternum:** short, oval or subcircular; deeply indented to accommodate coxae; fused to labium (fig. 39e).
- **eyes:** eight; in a compact group, situated on a small tubercle.
- **chelicerae:** dorsally free but ventrally connected by a thin membrane; fangs short; cheliceral furrow with lamina (fig. 39c).
- **mouthparts:** labium as wide as long and fused to sternum, provided with sigilla; endites strongly converging.
- **legs:** three dentate claws (fig. 39d); legs fairly long, especially in males; with numerous spines, paired setae ventrally on tibiae and metatarsi; autospasy at patella-tibia joint.
- **female palp:** with dentate claw (fig. 39b).
- **abdomen:** oval.
- **respiratory system:** two booklungs; posterior tracheal spiracle situated close to spinnerets.
- **spinnerets:** set slightly forward (fig. 39e); anterior lateral spinnerets with three major ampullate gland spigots; posterior median spinnerets two-segmented with among others, large paracribellar gland spigots.
- **cribellum:** divided; subtriangular to narrowly transverse; inconspicuous; bearing claviform spigots.
- **calamistrum:** rows of disordered setae or biseriate rows with short spiny setae to long soft setae, of which inner row is short and spiny (fig. 39f).
- **genitalia:** haplogyne; internal structure paired, arching, U-shaped, opening into small internal sac into which the ducts also open; male palp with cymbium varying from U-shaped to cylindrical; tegulum fused to subtegulum (fig. 39g).
- **body size:** 3-15 mm.
- **colour:** variable, pale yellow to light brown, dark brown or black.

Taxonomic status

Lehtinen (1986) regarded the filistatids as the closest relatives of the pholcids and the combination as the sister-group of Scytodoidea. Coddington & Levi (1991), Coddington *et al.* (2004) and Platnick *et al.* (1991) considered them to be the sister-group of all ecribellate Haplogynae. Regional revisions have been done by Song *et al.* (1999) for China, Gray (1994) for Australia, Grismado & Ramírez (2000) and Ramírez & Grismado (1997) for South America and Zonstein (1990) for Central Asia.

Distribution

Known in tropical, subtropical and arid regions in southern parts of North America, South America, southern Europe, Australia and the Afrotropical Region.

Lifestyle

Live in silk-lined tubular retreats made in crevices in rocks and walls from where cribellate signal lines emanate in all directions (fig. 39h).

Relevant literature

Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Gray (1994); Grismado & Ramírez (2000); Lehtinen (1986); Ramírez & Grismado (1997); Ubick (2005e); Song *et al.* (1999); Zonstein (1990).

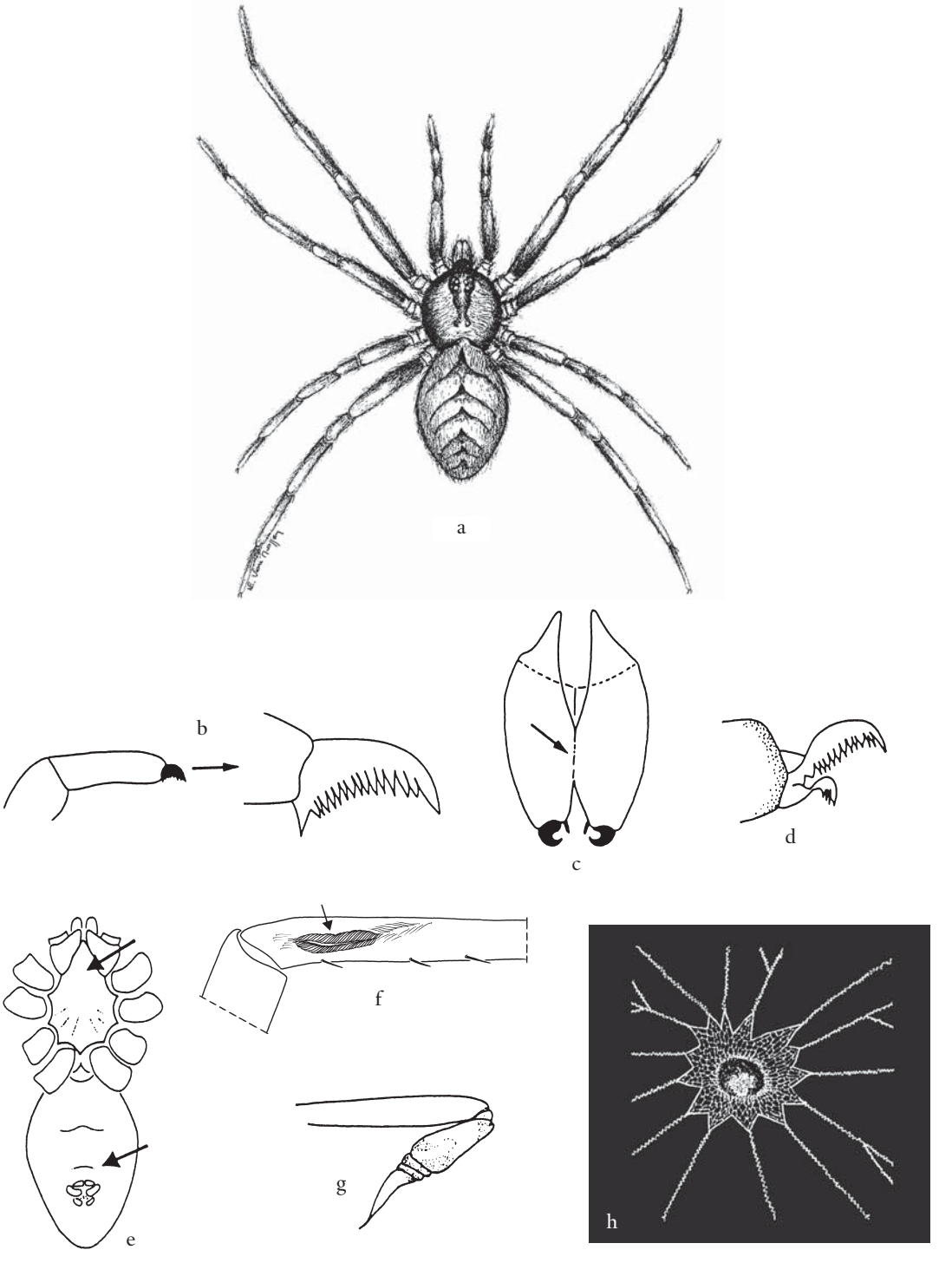


Fig. 39. **Filistatidae.** *Pritha* sp. **a.** female habitus (8 mm); **b.** female palp, showing dentate tarsal claw; **c.** chelicerae, frontal view, showing median fusion; **d.** tarsal claws with teeth on paired and unpaired claws; **e.** cephalothorax and abdomen, ventral view showing fused labium and sternum and position of tracheal spiracle; **f.** calamistrum on metatarsus IV; **g.** male palp, retrolateral view. (g: after Lehtinen, 1967.)

FAMILY GALLIENIELLIDAE Millot, 1947

LONG-JAWED GROUND SPIDERS

Fig. 40

Type genus

Gallieniella Millot, 1947.

Other genera

Drassodella Hewitt, 1916; *Galianoella* Goloboff, 2000; *Legendrena,* Platnick, 1984; *Meedo* Main, 1987; *Neeto* Platnick, 2002; *Orea* Platnick, 2002; *Peeto* Platnick, 2002; *Questo* Platnick, 2002; *Toxoniella* Warui & Jocqué, 2002. Represented by 48 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; anterior spinnerets bearing a small apical segment; devoid of enlarged pyriform gland spigots (except males of *Toxoniella*); chelicerae moderately to greatly elongated and mygalomorph-like, bearing long, longitudinally oriented fangs; posterior median eyes flattened and irregular in shape or oval.

Descriptive characters

- **carapace:** longer than wide; fovea elongated or pit-like; surface finely reticulate (fig. 40a).
- **sternum:** longer than wide; lateral margins rebordered (fig. 40c); some species with small intercoxal sclerites.
- **eyes:** eight; in two rows (4:4); on dark ocular tubercle; posterior median eyes flattened or irregular, anterior lateral and posterior lateral eyes oval.
- **chelicerae:** moderately to greatly elongated, porrect (figs 40a-c); cheliceral furrow with teeth; sometimes greatly elongated and mygalomorph-like, bearing long, longitudinally oriented fangs.
- **mouthparts:** endites obliquely depressed; elongated with thick scopulae anteriolaterally; labium truncated in front; serrula present (fig. 40c).
- **legs:** two claws without claw tufts often composed of lamellar setae; leg formula 4123; trochanters unnotched; metatarsi and tibiae with a single row of trichobothria.
- **female palp:** with dentate claw.
- **abdomen:** elongate-oval; bearing short, dense setae.
- **spinnerets:** anterior spinnerets widely spaced, conical, bearing a small apical segment and multiple rows of cylindrical gland spigots; median spinnerets long and narrow; posterior spinnerets widely spaced; colulus consisting of a few setae.
- **respiratory system:** two booklungs; tracheal system limited to abdomen, spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne with anteromedian rim (fig. 40f); male palpal tibia with at least one apophysis; embolus expanded at base, coiling around retrolateral surface (figs 40d, e).
- **body size:** 3-8 mm.
- **colour:** varies from orange to chestnut or reddish brown; abdomen sometimes with white bands or scattered white spots.

Taxonomic status

The first genus *Gallieniella* was placed in the Clubionidae by Millot (1947). After the description of the first female Legendre (1967) recognised them as a separate family. Platnick (1990), Coddington & Levi (1991) and Coddington *et al.* (2004) place the gallienielids in the superfamily Gnaphosoidea and recognise them as the more plesiomorphic group of gnaphosids. The fauna of Australia has been revised by Platnick (2002), the Afrotropical Region by Platnick (1984) and Warui & Jocqué (2002) and Argentina by Goloboff (2000). The family remains poorly delimited as based on symplesiomorphies (Warui & Jocqué, 2002).

Distribution

South and eastern parts of the Afrotropical Region, Madagascar, Australia and South America (Argentina).

Lifestyle

Fast-moving terrestrial hunters often found in association with ants.

Relevant literature

Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Goloboff (2000); Legendre (1967); Platnick (1984, 1990, 2002); Warui & Jocqué (2002).

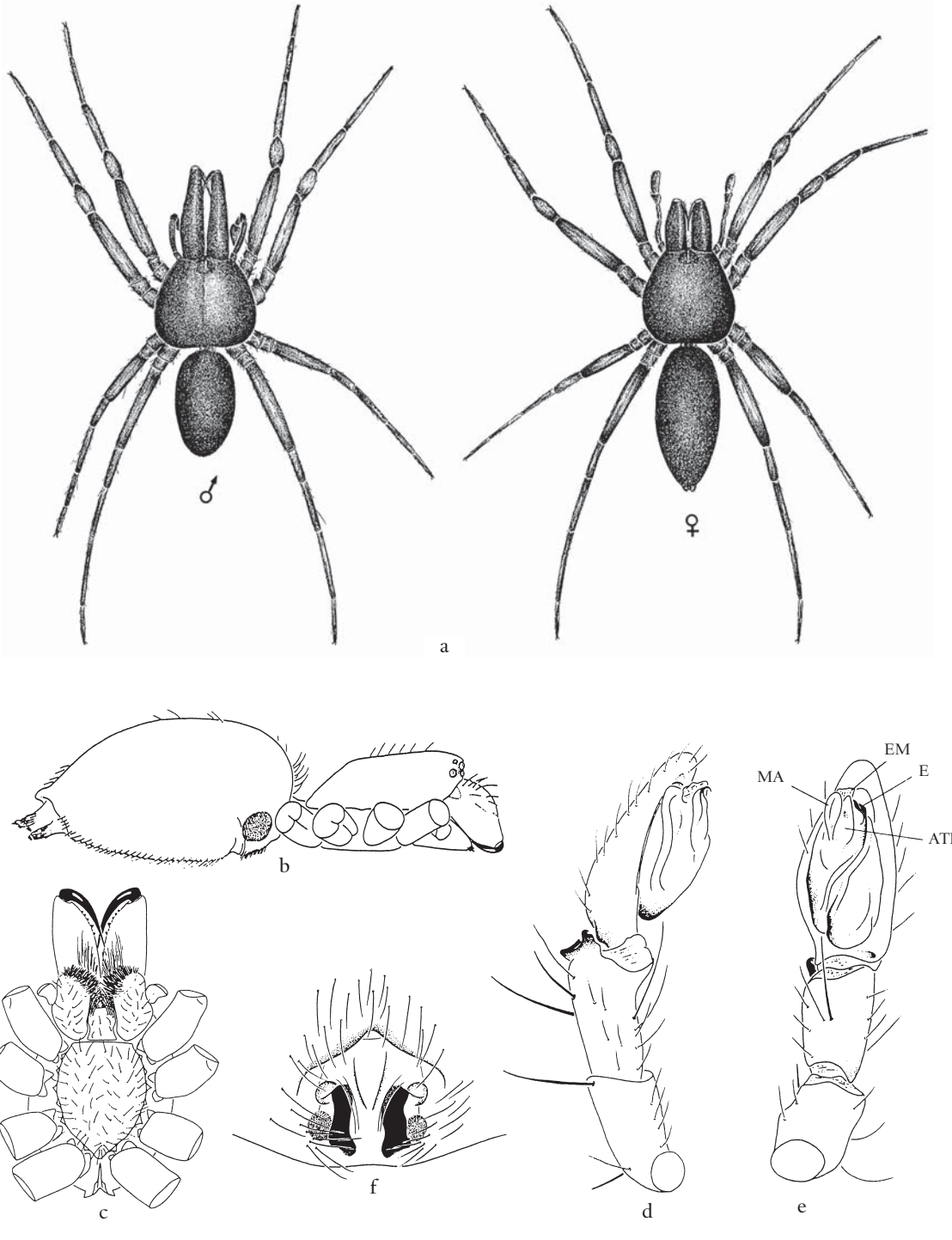


Fig. 40. **Gallieniellidae.** *Gallienella mygaloides* **a.** habitus male (6.1 mm) and female (6.4 mm); *Toxoniella taitensis* **b.** cephalothorax and abdomen, lateral view; **c.** cephalothorax, ventral view; **d.** right male palp lateral view; **e.** right male palp ventral view; **f.** epigyne, ventral view. ATE: anterior tegular extension; C: conductor; E: embolus; EM: embolic membrane.

FAMILY GNAPHOSIDAE Pocock, 1898

FLAT-BELLIED GROUND SPIDERS

Fig. 41, pl. 30

Type genus

Gnaphosa Latreille, 1804.

Other genera

Represented by 114 genera and almost 1,945 species (Platnick, 2005) divided among eight subfamilies: Drassodinae, Echeminae, Gnaphosinae, Hemicloeinae, Herpyllinae, Laroniinae, Micariinae, Zelotinae.

Diagnostic characters

Small to medium sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes, posterior median ones flattened; endites obliquely depressed; anterior spinnerets parallel, large, cylindrical and usually well separated, without distal ring; their piriform gland spigots greatly enlarged, with flattened base and shaft and a slit-like opening.

Descriptive characters

- **carapace:** ovoid, smoothly convex, rather low; usually with distinct fovea (fig. 41a).
- **sternum:** flat, ovoid; apex pointed.
- **eyes:** eight; small, in two rows (4:4) (fig. 41b); anterior eyes round, posterior median eyes conspicuously flattened or irregular in shape; all eyes with silvery sheen except anterior median eyes.
- **chelicerae:** short, robust; cheliceral margins provided with teeth, retromargin with unusual, serrated keel (fig. 41h) or rounded laminae (fig. 41g).
- **mouthparts:** endites obliquely depressed ventrally (fig. 41c); serrula present.
- **legs:** two claws with claw tufts; legs prograde, usually short and stout; tarsi I and II often with dense scopulae; leg formula 4123; preening brush (fig. 41e) or preening comb (fig. 41f) present on metatarsi IV in some subfamilies.
- **female palp:** tarsus spinose with finely toothed claw.
- **abdomen:** elongated to oval; cluster of erect, curved setae present on anterior edge; anterior scuta present in some males; hirsute.
- **spinnerets:** anterior lateral spinnerets parallel, large, cylindrical and usually well separated, distal segment reduced to tiny crescent; piriform gland spigots of anterior spinnerets greatly enlarged, with widened base and shaft and a slit-like opening (fig. 41d).
- **respiratory system:** two booklungs; tracheal system limited to abdomen, spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne with conspicuous cuticular margins (fig. 41k); male palp variable, usually with a stout, pointed, retrolateral tibial apophysis; bulb convex; tegulum large, subtegulum smaller; embolus slender, variable in length (figs 41i, j).
- **body size:** 3-17 mm.
- **colour:** varies from fawnish grey to brown or dark brown; abdomen uniform or decorated with bands or other markings.

Taxonomic status

The Gnaphosidae are considered the sister-group of Prodidomidae with which they form the higher Gnaphosoidea, a grouping of seven families (Coddington & Levi, 1991; Coddington *et al*., 2004, Platnick, 1990) which is part of the large RTA-clade.

Distribution

Worldwide.

Lifestyle

Gnaphosids are free-living spiders found mainly on the soil surface. Egg sacs are most often papery and deposited on a firm underground.

Relevant literature

Coddington & Levi (1991); Dippenaar-Schoeman & Jocqué (1997); Levy (1995); Platnick (1990); Platnick & Murphy (1984); Platnick & Shadab (1976a, b, c, d, e, 1988); Ubick (2005f).

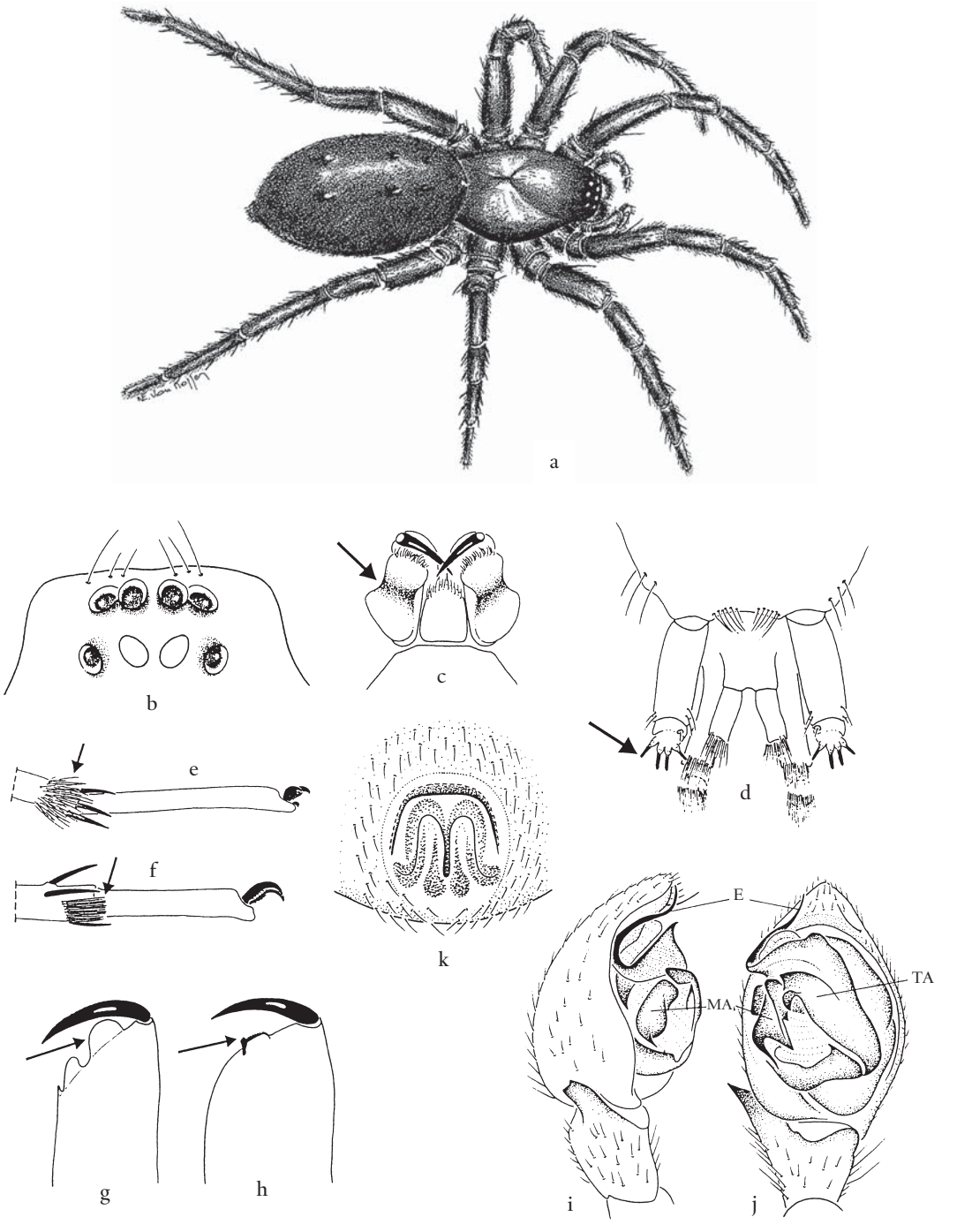


Fig. 41. **Gnaphosidae.** *Minosia* sp. **a.** female, natural posture (8 mm); **b.** eye pattern, dorsal view; **c.** mouthparts, showing obliquely depressed endites; **d.** spinnerets showing modified piriform gland spigots on anterior lateral spinnerets; **e.** metatarsus and tarsus IV showing preening brush; Zelotinae **f.** metatarsus and tarsus IV showing preening comb; Laroninae **g.** chelicerae with laminae on retromargin; Gnaphosinae **h.** chelicerae with serrated keel on retromargin; *Trachyzelotes jaxartensis* **i.** right male palp, retrolateral view; **j.** right male palp, ventral view; **k.** epigyne. E: embolus; MA: median apophysis; TA: tegular apophysis. (i-k: after Platnick & Murphy, 1984).

FAMILY GRADUNGULIDAE Forster, 1955

LONG CLAW SPIDERS

Fig. 42, pl. 5

Type genus

Gradungula Forster, 1955.

Other genera

Kayia Gray, 1987; *Macrogradungula* Gray, 1987; *Pianoa* Forster, 1987; *Progradungula* Forster & Gray, 1979; *Spelungula* Forster, 1987; *Tarlina* Gray, 1987. Represented by 16 species (Platnick, 2005).

Diagnostic characters

Medium to large araneomorph spiders; two tarsal claws; cribellate or ecribellate (*Macrogradungula*; *Progradungula*), haplogyne; eight eyes; characterised by strikingly dissimilar tarsal claws on the anterior leg pairs.

Descriptive characters

- **carapace:** broadly oval with distinctly narrowed cephalic area; fovea oval and shallow (fig. 42a).
- **sternum:** longer than wide; shield-shaped with sinuous sides; posterior margin pointed produced between coxae IV (fig. 42c).
- **eyes:** eight in two more or less straight rows; anterior median eyes smallest (figs 42b, d); lateral eyes contiguous, widely separated from medians.
- **chelicerae:** large, without condyle; promargin with ordinary teeth, retromargin with denticles or few small teeth; retrolateral stridulating file in both sexes.
- **mouthparts:** endites longer than wide, almost parallel; serrula a single row of teeth; labium quadrangular, frontal margin indented (fig. 42c).
- **legs:** tarsi of legs I and II swollen, with numerous strong spines on ventral surface; strongly dissimilar superior claws on leg I and II, the largest called the 'proclaw'; inferior claw spine-shaped pressed against base-plate (fig. 42g); claws of tarsi III and IV unmodified; trichobothria with crenulated base, in double row on tibiae; one trichothrium on metatarsi; tarsal organ exposed; in *Gradungula* with a 'pore hair' on the tarsus; so far the only spiders for which the presence of scent receptive hairs have been demonstrated.
- **female palp:** segments with many spines; tarsus with slender pectinate claw.
- **abdomen:** oval, slightly longer than wide; with dense cover of short recumbent hairs.
- **spinnerets:** six, contiguous, anterior and posterior pairs two-segmented (fig. 42f); spigot assemblage highly variable, e.g. in a juvenile *Marogradungula* female: anteriors with numerous piriform gland spigots and up to eight ampullate gland spigots; posterior medians with single segment, provided aciniform, minor ampullate gland spigots and paracribellar spigots; posterior lateral spinnerets with aciniform gland spigots; ecribellate species sometimes with small colulus.
- **cribellum:** if present undivided.
- **calamistrum:** small, one row, near middle of metatarsus IV.
- **respiratory system:** with two pairs of booklungs; posterior pair situated near spinnerets (fig. 42e).
- **genitalia:** haplogyne; internal structure with several receptacles (fig. 42j); sometimes with membranous median sac; male palp with typical embolic branch bearing appendages; distinct median apophysis; no conductor (fig. 42i).
- **body size:** 7-20 mm.
- **colour:** orange-brown with numerous darker spots.

Taxonomic status

According to Forster *et al.* (1987), the Gradungulidae and the Austrochilidae form the Austrochiloidea. This superfamily is sister to the Palaearchaeidea, which only contains the Hypochilidae. In recent analyses the superfamily is considered the sister-group of all other Noecribellates, which is then sister to the Hypochilidae (Coddington *et al.*, 2004).

Distribution

Australia and New Zealand.

Lifestyle

The cursorial species (ecribellate) are night active and usually live in forested habitats. The cribellate species build a snare provided with a catching ladder of cribellate silk (Gray, 1983). Egg sacs are globular and suspended on a single stalk or laid down in a cavity.

Relevant literature

Forster & Gray (1979); Forster *et al.* (1987); Gray (1983); Platnick *et al.* (1991).

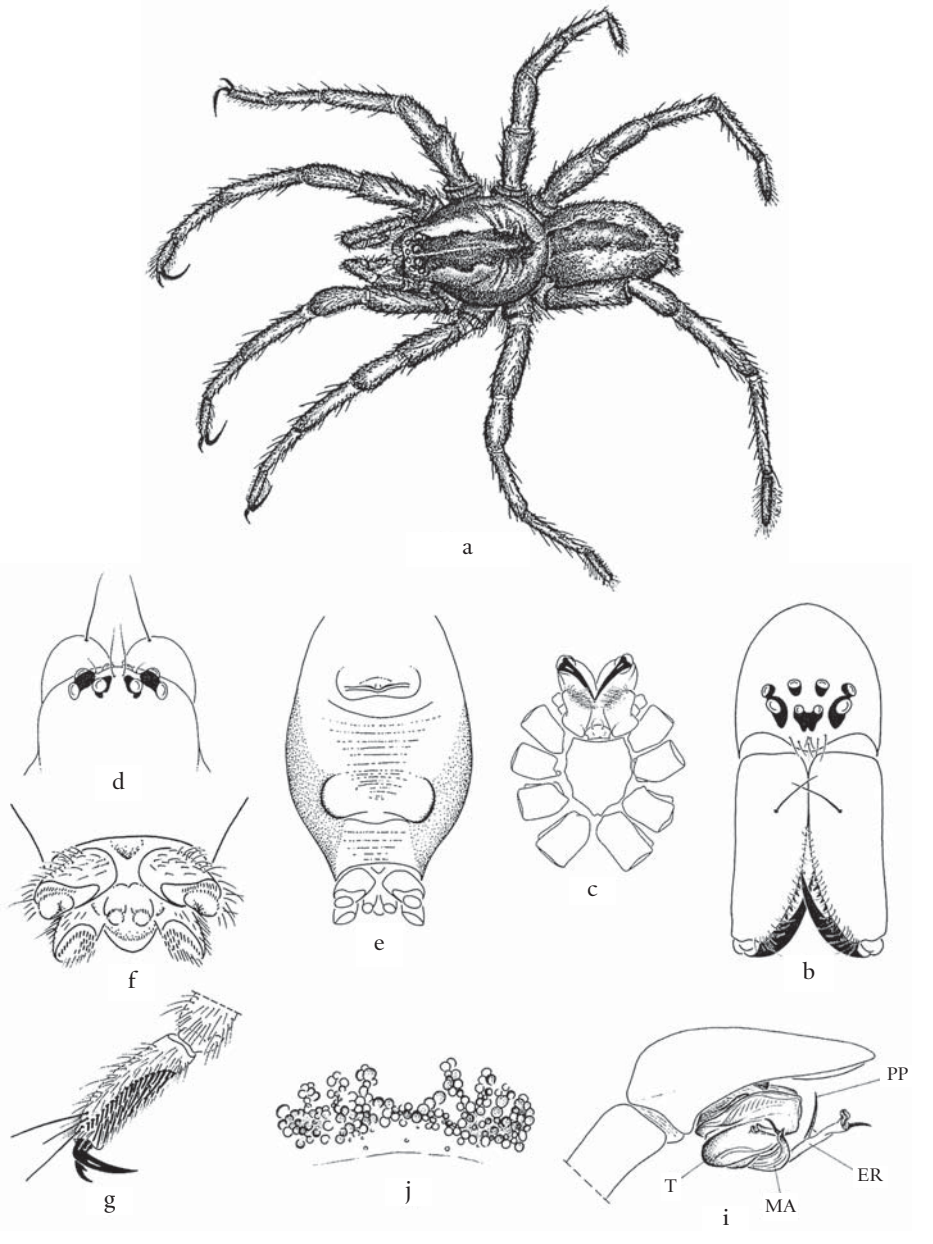


Fig. 42. **Gradungulidae.** *Gradungula sorenseni* sp. **a.** female, natural posture (14 mm); **b.** cephalothorax, frontal view; **c.** cephalothorax, ventral view; **d.** eye pattern, dorsal view; **e.** abdomen, ventral view showing pale areas above posterior booklungs; **f.** spinnerets, ventral view; **g.** frontal leg showing modified tarsus with unequal claws; **i.** male palp, lateral view; **j.** female genitalia. ER: embolic rod; MA: median apophysis; PP: poreplate; T. tegulum.

FAMILY HAHNIIDAE Bertkau, 1878

COMB-TAILED SPIDERS

Fig. 43, pl. 24

Type genus

Hahnia C.L. Koch, 1841.

Other genera

Represented by 26 genera and about 235 species (Platnick, 2005) in three subfamilies: Hahniinae, Cryphoecinae and Cybaeolinae.

Diagnostic characters

Small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; spinnerets situated in a transverse row; tracheal spiracles open midway on abdomen.

Descriptive characters

- **carapace:** longer than wide, narrowed in cephalic region (fig. 43b); fovea short with striae (fig. 43a).
- **sternum:** truncated anteriorly; posterior apex narrowing to a point.
- **eyes:** eight; in two rows (4:4); equal in size; eye rows slightly procurved.
- **chelicerae:** with two teeth on each side of cheliceral furrow; lateral side of chelicerae with a stridulating organ composed of a series of ridges more strongly developed in males.
- **mouthparts:** labium wider than long.
- **legs:** three claws; legs short, robust, with few setae; trichobothria in a row.
- **female palp:** with mostly toothless claw.
- **abdomen:** oval.
- **spinnerets:** in a single transverse row; posterior spinnerets long, two-segmented; colulus paired (fig. 43c).
- **respiratory system:** two booklungs; tracheal spiracle midway between genital opening and base of spinnerets (fig. 43c).
- **genitalia:** entelegyne; epigyne flat and simple (fig. 43f), entrance ducts usually strongly coiled; male palp with tibial apophysis long and curved; patella usually with a basal hook; embolus thin; median apophysis reduced (figs 43d, e).
- **body size:** 3-6 mm.
- **colour:** carapace light to dark brown with dark pattern, margined with black; abdomen usually with a double row of oblique pale markings on a grey background; general appearance often juvenile-like.

Taxonomic status

Hahniidae was established by Bertkau (1878). However, Simon (1897) only recognised it as a subfamily within the Agelenidae. Lehtinen (1967) widened the limits of Hahniidae, recognised three subfamilies, Hahniinae, Cryphoecinae and Cybaeolinae, and placed them within the superfamily Amaurobioidea. However, Coddington & Levi (1991) placed them in the Dictynoidea, but the placement of the family remains doubtful.

Distribution

Worldwide.

Lifestyle

Construct delicate sheet webs near the soil surface. Commonly found in forested areas.

Relevant literature

Bennett (2005c); Dippenaar-Schoeman & Jocqué (1997); Forster (1970); Jocqué & Bosmans (1982); Lehtinen (1967); Opell & Beatty (1976).

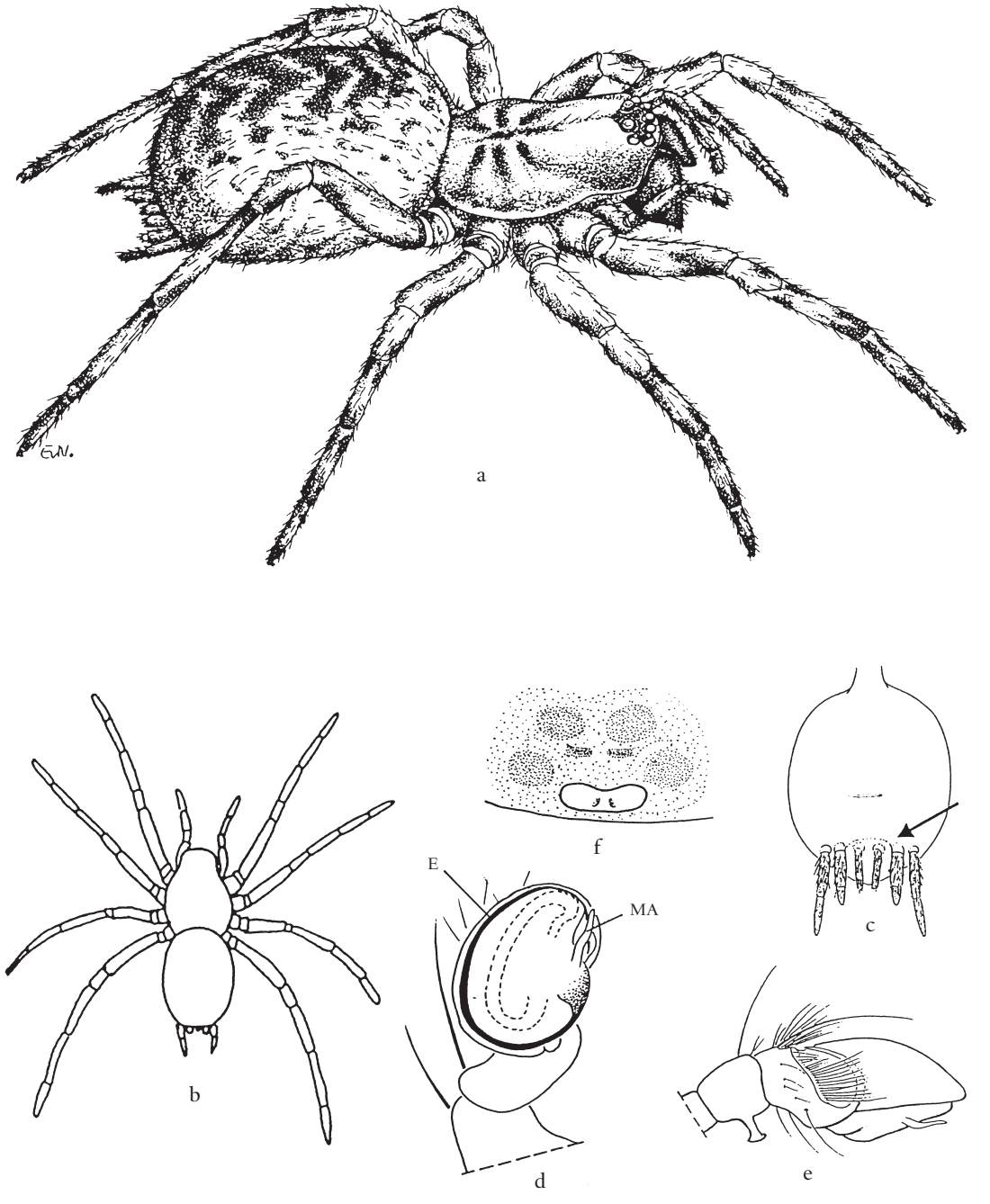


Fig. 43. **Hahniidae.** *Hahnia* sp. **a.** female, natural posture (2.5 mm); **b.** habitus; **c.** abdomen, ventral view, showing spinnerets arranged in a single row; **d.** right male palp, ventral view; **e.** right male palp, lateral view; **f.** epigyne, ventral view. E: embolus; MA: median apophysis.

FAMILY HERSILIIDAE Thorell, 1870

LONG-SPINNERED SPIDERS / TWO-TAILED SPIDERS / WHIRLIGIG SPIDERS

Fig. 44, pl. 11

Type genus

Hersilia Audouin, 1826.

Other genera

Hersiliola Thorell, 1870; *Iviraiva* Rheims & Brescovit, 2004; *Murricia* Simon, 1882; *Neotama* Baehr & Baehr, 1993; *Promurricia* Baehr & Baehr, 1993; *Tama* Simon, 1882; *Tamopsis* Baehr & Baehr, 1987; *Tyrotama* Foord & Dippenaar-Schoeman, 2005; *Yabisi* Rheims & Brescovit, 2004; *Ypypuera* Rheims & Brescovit, 2004. Represented by about 140 species (Platnick, 2004).

Diagnostic characters

Small to medium sized araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; posterior spinnerets long and slender with apical segment strongly tapering; carapace ovoid and flattened; eyes on tubercles.

Descriptive characters

- **carapace:** ovoid and flattened; with narrow longitudinal fovea and radiating striae; densely covered with plumose setae (fig. 44a).
- **sternum:** hearty-shaped; anterior edge straight or slightly concave.
- **eyes:** eight; in two strongly recurved rows; eyes on a large tubercle; anterior median eyes often larger than posterior median eyes (fig. 44b).
- **chelicerae:** unarmed or armed with large and series of minute teeth.
- **mouthparts:** labium free, with rounded tip; endites converging.
- **legs:** three claws on an onychium, unpaired claw simple; legs very long, especially in males; leg III shortest; metatarsi uniarticulate or biarticulate (except III); trichobothria present; legs with few spines; autospasy occurs at patella-tibia joint.
- **female palp:** tarsus with a toothed claw.
- **abdomen:** flat; densely covered with plumose setae; wider behind than in front (fig. 44a).
- **spinnerets:** colulus present; posterior spinnerets as long as abdomen in arboreal genera shorter in ground dwelling species, cylindrical with elongated and tapering apical segments; inner surface with a series of long tubules producing thin silk threads (fig. 44c).
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne with broad central septum (fig. 44f); male palp without tibial apophyses; some species with spines on inner surface; bulb regular, ovoid or circular; conductor filiform and pointed (figs 44d, e).
- **body size:** 5-10 mm.
- **colour:** varies from golden brown to pure white, or almost black and mottled.

Taxonomic status

According to Lehtinen (1967), the hersiliids are related to the Oecobiidae. Coddington & Levi (1991) and Coddington *et al.* (2004) place them in the Eresoidea together with the Oecobiidae and Eresidae.

Distribution

In the tropical and subtropical regions.

Lifestyle

Hersiliids have diverse lifestyles, ranging from wandering tree-trunk-dwellers to ground-dwelling web-builders. The hunters run around their prey while producing a band of silk to enswathe them. The webs on the ground are very peculiar curtains hanging under rocks and enclosing pebbles.

Relevant literature

Baehr & Baehr (1987, 1993, 1998); Cutler (2005b); Dippenaar-Schoeman & Jocqué (1997): Foord & Dippenaar-Schoeman (2005a, b); Lehtinen (1967); Rheims & Brescovit (2004); Song *et al.* (1999).

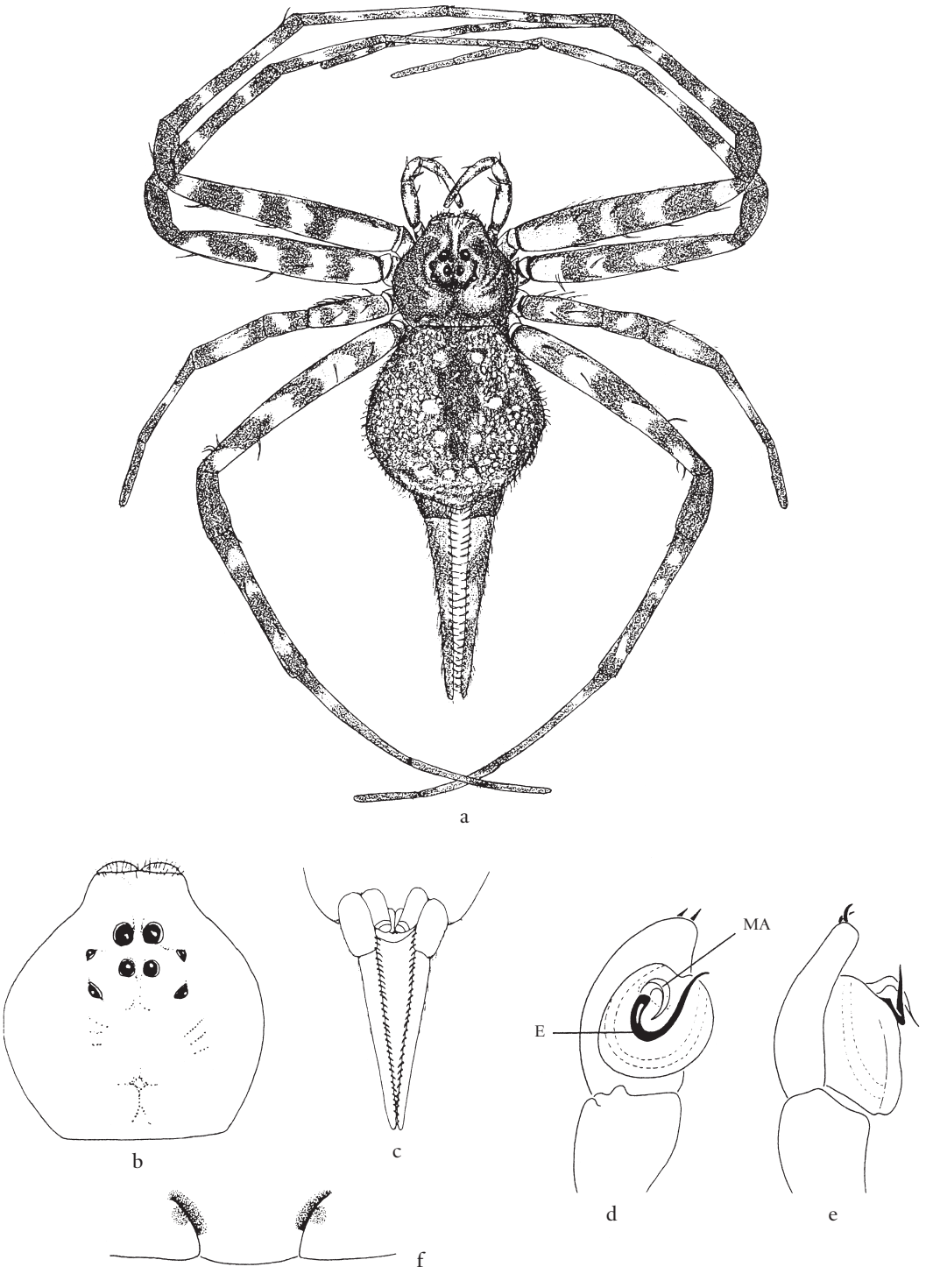


Fig. 44. **Hersiliidae.** *Hersilia* sp. **a.** female habitus (8 mm); **b.** cephalothorax and eye pattern, dorsal view; **c.** spinnerets, ventral view showing lengthened anterior lateral spinnerets; **d.** left male palp, ventral view; **e.** left male palp, lateral view; **f.** epigyne. E: embolus; MA: median apophysis.

FAMILY HEXATHELIDAE Simon, 1892

FUNNEL WEB MYGALOMORPHS

Fig. 45, pl. 3

Type genus

Hexathele Ausserer, 1871.

Other genera

Represented by 11 genera and 85 species (Platnick, 2005) in three subfamilies: Plesiothelinae, Macrothelinae and Hexathelinae.

Diagnostic characters

Medium-sized to large mygalomorph spiders; three tarsal claws; eight eyes; rastellum absent; posterior spinnerets long and slender or short but with digitiform apical segment; labium provided with numerous cuspules, cephalic region raised or low (*Macrothele, Porrhothele*).

Descriptive characters

- **carapace:** cephalic region arched or low; fovea varies from transverse, procurved to pit-like (fig. 45a).
- **sternum:** heart-shaped; six marginal or submarginal sigilla.
- **eyes:** eight; in a close rectangular group; eye tubercle distinct (fig. 45b) or reduced.
- **chelicerae:** porrect; cheliceral furrow with one or two rows of teeth; rastellum absent.
- **mouthparts:** labium wider than long or square usually with numerous cuspules; endites longer than wide, with numerous cuspules (fig. 45c); serrula present.
- **legs:** three tarsal claws; paired claws with one row of teeth; unpaired tarsal claw short and curved, with a few teeth; scopulae absent in females, present or absent in males; tarsi I with few if any spines; tibiae I of male incrassate (*Porrhothele,* fig. 45f) or not; mating spur absent or present; trichobothria with base collariform, in two rows on tibiae.
- **female palp:** tarsal claw well developed with several teeth.
- **abdomen:** oval.
- **spinnerets:** four or six (Hexathelinae); posterior spinnerets long and slender; apical segment of posterior spinnerets digitiform (fig. 45d).
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae with two undivided or divided receptacula; male palp with cymbium short, bilobate and spinose; third haematodocha absent; bulbus whip-like; embolus elongated (fig. 45e).
- **body size:** 14-28 mm.
- **colour:** varied shades of brown or black.

Taxonomic status

Hexathelidae received family status by Raven (1980). According to Raven (1985), this family forms part of the Tuberculotae, and is the sister-group of the Quadrithelina. Coddington *et al.* (2004) combine them with the 'dipluroids' as sister-group of the Crassitarsae. Raven (1985) provided a key to the genera of the world. The fauna of Australia was revised by Raven (1978, 1980, 1985, 2000) and Gray (1988), of New Zealand by Forster (1968) and of China by Song *et al.* (1999).

Distribution

In all tropical and subtropical regions.

Lifestyle

Live in tube or funnel webs made under rocks or in crevices in the ground.

Relevant literature

Gray (1988); Dippenaar-Schoeman & Jocqué (1997); Forster (1968); Raven (1978, 1980, 1985, 2000); Song *et al.* (1999).

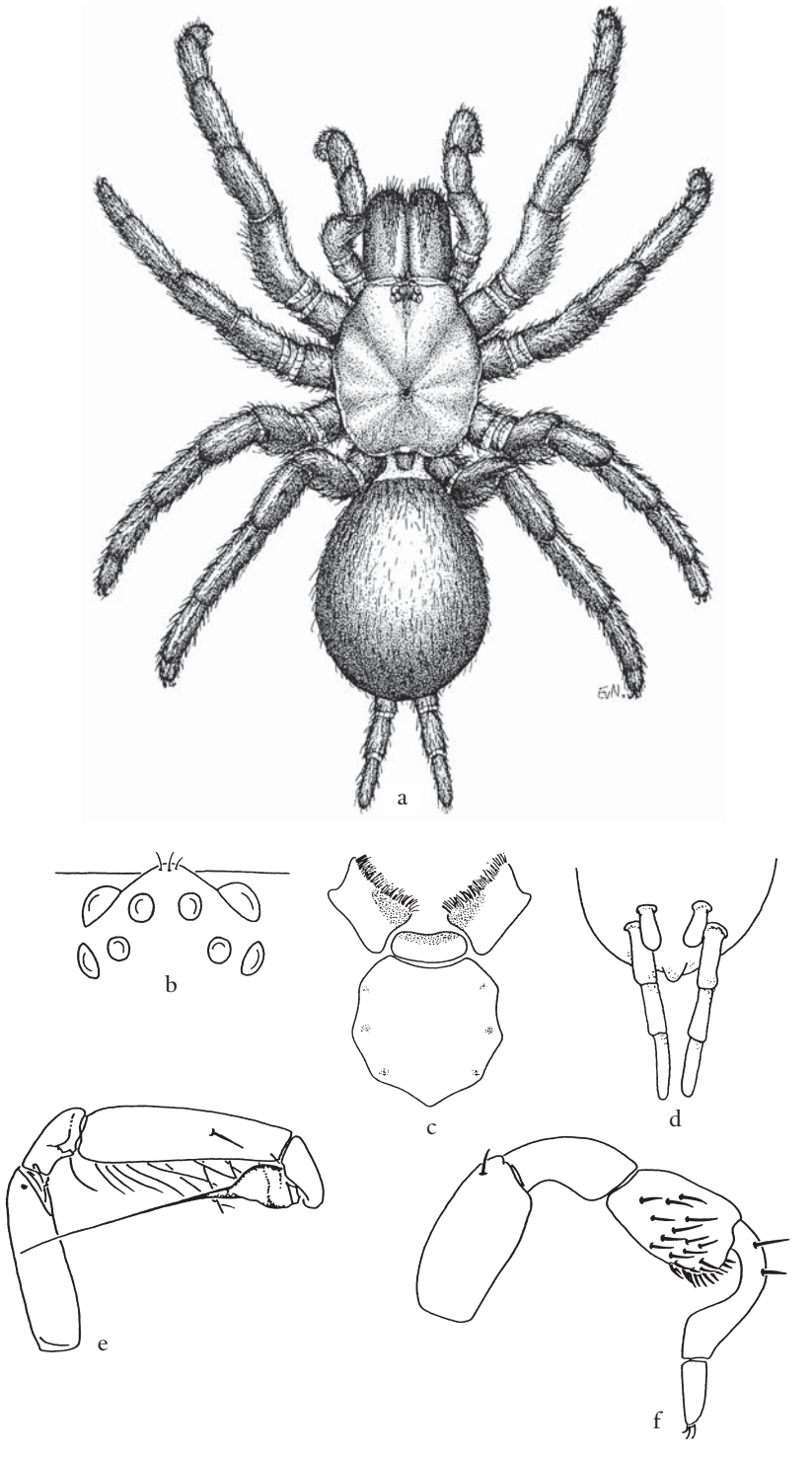


Fig. 45. **Hexathelidae.** *Macrothele* sp. **a.** habitus female (19 mm); **b.** eye pattern, dorsal view; **c.** sternum, labium and endites, ventral view; **d.** spinnerets, ventral view; **e.** male palp, retrolateral view; **f.** male leg I with modified distal segments, retrolateral view.

FAMILY HOLARCHAEIDAE Forster & Platnick, 1984

MINUTE LONG-JAWED SPIDERS

Fig. 46

Type genus

Holarchaea Forster, 1955.

Other genera

Monogeneric, represented by two species (Platnick, 2005).

Diagnostic characters

Minute araneomorph spiders; three tarsal claws (reduced on legs I and II); ecribellate; entelegyne; eight eyes; clypeus swollen; chelicerae originating from a foramen in carapace that is only fully sclerotized dorsally and laterally; peg teeth and venom gland absent; anterior tarsi modified; male pedipalp with modified distal segments, female palp modified.

Descriptive characters

- **carapace:** with cephalic part strongly raised above thoracic region but without cervical constriction (figs 46a,b); anterior margin extended down and connected under base of chelicerae by unsclerotized cuticle (figs 46a, c); finely punctate.
- **sternum:** shield-like, longer than wide; widely truncated posteriorly, separating coxae IV by almost twice their width (fig. 46c).
- **eyes:** eight large eyes in two rows; lateral eyes contiguous, well separated from medians, which are well separated from each other.
- **chelicerae:** long, slender; without peg teeth; promargin with two or three slender teeth; cheliceral gland mound well developed near fang tip; fangs long, at least two thirds length of paturon; no venom gland; without condyle or stridulatory file (figs 46b, c).
- **mouthparts:** endites strongly converging, not meeting at midline; serrula a well developed single row of teeth; labium triangular, wider than long, strongly rebordered (fig. 46c).
- **legs:** slender, tarsi longer than metatarsi; tarsi I and II with modified hairs; clothed with serrate or smooth hairs; no spines; no scopula or claw tufts; claws reduced on tarsi I and II, with three slender, toothless claws on III and IV; two or three trichobothria on tibiae, one on metatarsi; tarsal organ capsulate.
- **female palp:** small; tibia and tarsus partly fused, distally widened; without claw.
- **abdomen:** spherical; abdomen completely unsclerotized except for the female epigyne, with very thin cuticle, without sigilla.
- **spinnerets:** six, well developed; anterior pair contiguous; colulus conical with two hairs.
- **respiratory system:** without posterior spiracle; anterior spiracles leading into a system which should be called intermediate between booklungs and tracheae.
- **genitalia:** entelegyne; epigyne nothing more than a slightly sclerotized swelling of epigastric region (fig. 46e); male palpal tibia with two spiniform processes; cymbium spoon-shaped, with or without modifications; bulbus with strong coiled embolus, encircling tegulum two or three times (fig. 46d).
- **body size:** 0.8-1.5 mm.
- **colour:** usually brown, grey or shiny black.

Taxonomic status

The family was established by Forster & Platnick (1984). Wunderlich (1986) and Eskov (1987) consider it a subfamily of the Archaeidae. Together with the Archaeidae, Mecysmauchenidae and Pararchaeidae it is currently placed in the superfamily Palpimanoidea (Forster & Platnick, 1984).

Distribution

New Zealand, Tasmania.

Lifestyle

Holarchaeids are probably free-living; found in moss, leaf litter and among low-growing ferns in temperate rainforests and microhabitats with high humidity.

Relevant literature

Forster (1949, 1955); Forster & Platnick (1984); Hickman (1981); Rix (2005).

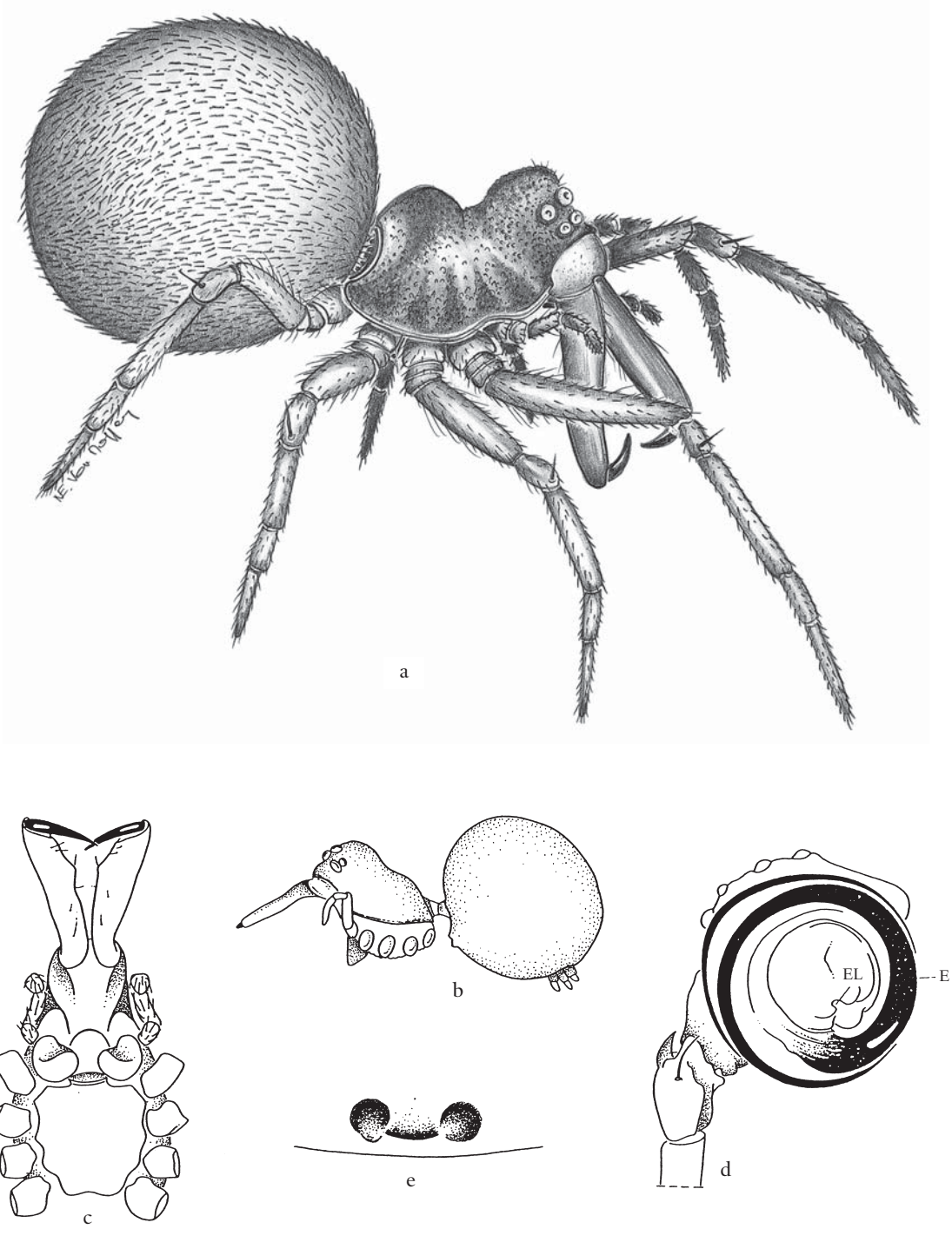


Fig. 46. **Holarchaeidae.** *Holarchaea novaeseelandia* **a.** female, natural posture (1.2 mm); **b.** cephalothorax and abdomen, lateral view; **c.** cephalothorax, ventral view; **d.** male palp, ventral view; **e.** epigyne. E: embolus; EL: lobe at base of embolus. (a-d: after Forster & Platnick, 1984.)

FAMILY HOMALONYCHIDAE Simon, 1893

DESERT SAND SPIDERS

Fig. 47, pl. 26

Type genus

Homalonychus Marx 1891.

Other genera

Monogeneric, represented by three species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; characterised by the combination of convergent endites, absence of serrula and tarsal claws without teeth but with claw tufts and auxiliary claws.

Descriptive characters

- **carapace:** almost as wide as long (fig. 47a); with strongly narrowed cephalic part clearly separated from thoracic part; integument covered with short supple setae, margin with longer spiniform setae.
- **sternum:** slightly longer than wide; truncated in front, narrow and rounded at the back (fig. 47c).
- **eyes:** eight in two rows; anterior row procurved, posterior row strongly recurved; anterior lateral eyes smallest, posterior median eyes largest (fig. 47b); secondary eyes with canoe-shaped tapetum.
- **chelicerae:** narrow and straight; base with spiniform setae, distally finely setose; condyle distinct but poorly developed; without teeth; fangs fairly short.
- **mouthparts:** endites rectangular; strongly convergent; obliquely truncate (fig. 47c); serrula absent; labium wider than long, truncate at tip; chilum absent.
- **legs:** much longer in male than in female; tarsi with two toothless claws (figs 47d, e), with distinct accessory claws and small claw tuft (fig. 47d); trichobothria in one row on tibiae and metatarsi and in two rows on tarsi; trochanters with notch; with numerous spines.
- **female palp:** with toothed claw.
- **abdomen:** oval, slightly longer than wide, densely covered with short spiniform setae (fig. 47a).
- **spinnerets:** six, contiguous, anterior pair longest, cylindrical, two segmented; posterior pair slightly shorter; median spinnerets short; colulus absent.
- **respiratory system:** tracheal spiracle tiny just in front of spinnerets; tracheae confined to abdomen.
- **genitalia:** entelegyne; epigyne large with well developed median plate (fig. 47h); internal structure simple with two rounded spermathecae near posterior margin; male palp with short curved embolus (fig. 47g), median apophysis with membranous base and distal extension of tegulum as conductor (fig. 47f).
- **body size:** 6-13 mm.
- **colour:** tegument orange-brown with numerous darker spots; cover themselves with sand grains.

Taxonomic status

Apart from the fact that it belongs in the RTA-clade, nothing is known about the position of the family, although it has been suggested to be related to the Zodariidae which also lack a serrula (Roth, 1984). There are no other characters that corroborate such a relationship. Domínguez & Jiménez (2005) suggested the family might be placed in the Lycosoidea owing to its mating behaviour.

Distribution

Known only in hot deserts in south-western USA, Mexico (Baja California) (species from India misplaced).

Lifestyle

Cursorial spiders living in sandy deserts where they bury themselves in a sicariid fashion or hide under fallen cacti or stones. The egg sac is deposited on a firm substrate and sand is incorporated in the silk.

Relevant literature

Comstock (1940); Crews (2005a); Roth (1984); Domínguez & Jiménez (2005).

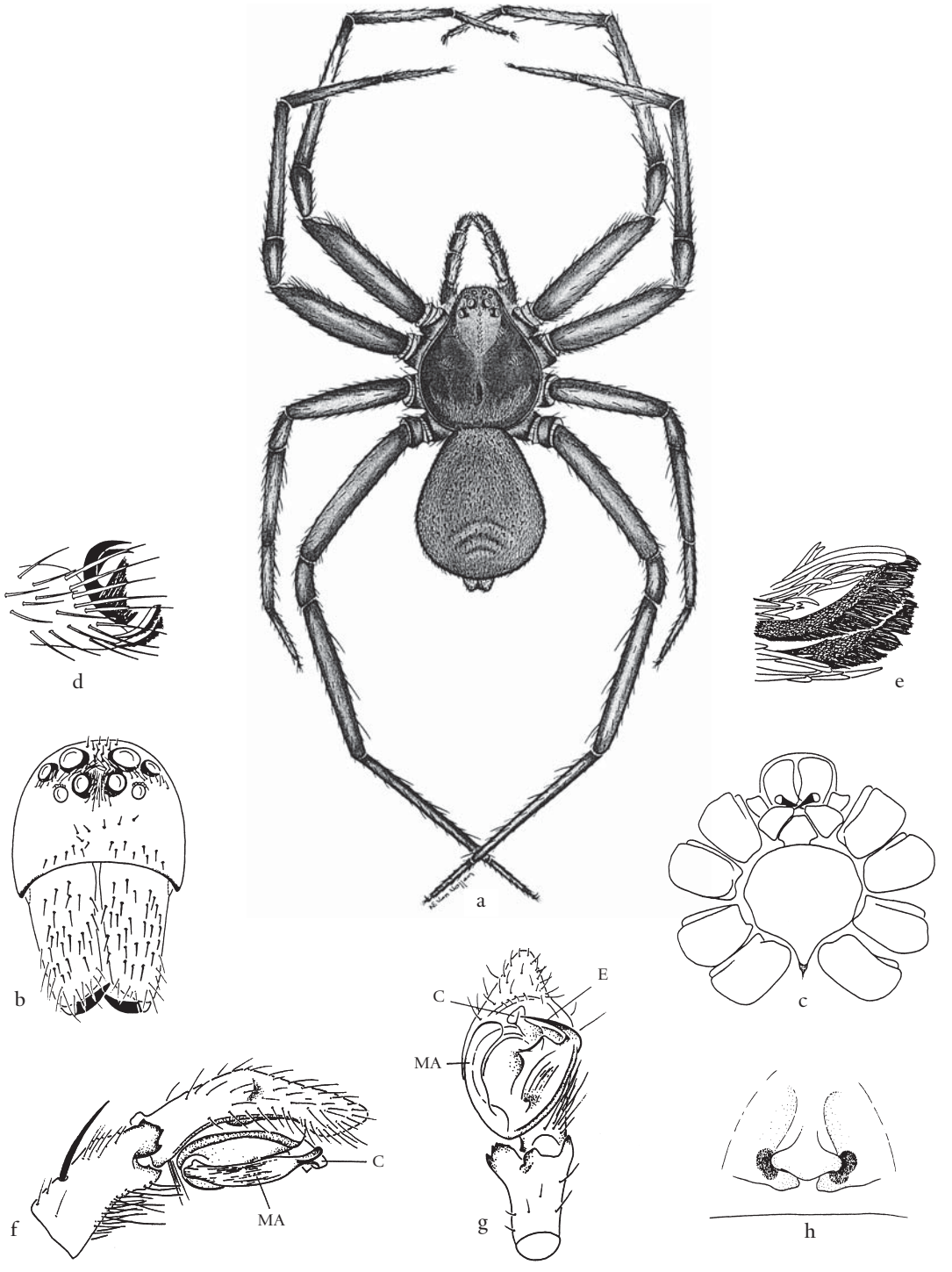


Fig. 47. **Homalonichidae.** *Homalonychus theologus* **a.** habitus (9 mm); **b.** cephalothorax, frontal view; **c.** cephalothorax, ventral view; **d.** tip of leg tarsus showing claw tufts and accessory claw; **e.** detail of previous; **f.** right male palp, lateral view; **g.** right male palp ventral view; **h.** epigyne, ventral view. C: conductor; E: embolus; MA: median apophysis.

FAMILY HUTTONIIDAE Simon, 1893

NEW ZEALAND PALP-FOOTED SPIDERS

Fig. 48, pl. 10

Type genus

Huttonia O.P.-Cambridge 1870.

Other genera

Monogeneric family represented by a single species, *H. palpimanoides* (Platnick, 2005).

Diagnostic characters

Medium-sized araneomorph spiders; three tarsal claws on onychium; ecribellate; haplogyne; eight eyes; thin prolateral scopula of spatulate hairs present on tarsi and metatarsi I and II, six spinnerets; cephalic region not elevated.

Descriptive characters

- **carapace:** smoothly rounded without indication of thoracic and cephalic regions (fig. 48a); fovea absent; clypeus low.
- **sternum:** shield-like; slightly longer than wide; pointed posteriorly; coxae IV widely separated (fig. 48b).
- **eyes:** eight eyes in two rows; anterior row recurved, posterior row procurved (seen from above); laterals distinctly separated (fig. 48c).
- **chelicerae:** short and stout; promargin with peg teeth, true teeth absent; cheliceral gland mound an erect lobe on retromargin near fang tip; stridulatory ridges absent.
- **mouthparts:** serrula a single row of teeth; labium triangular, pointed distally, as long as wide (fig. 48b); chillum poorly defined.
- **legs:** tarsi and metatarsi I and II with prolateral row of spatulate hairs (fig. 48e); preening comb on metatarsus III; tarsi with three claws on small onychium, superior ones with single row of teeth, inferior one with one tooth; clothed with plumose hairs; few spines; one subdistal trichobothrium on metatarsi; few trichobothria on tibiae; tarsal organ: capsulate.
- **female palp:** without claw.
- **abdomen:** ovoid; evenly clothed with plumose hairs; epigastric region covered by sclerotized plate, not encircling petiolus.
- **spinnerets:** six, anterior pair largest; median and posterior pairs reduced to groups of spigots (fig. 48d).
- **respiratory system:** with frontal pair of booklungs and tracheal spiracle situated in advance of spinnerets.
- **genitalia:** haplogyne; internal structure with large, membranous sac associated with a basal sclerotized plate, opening into an atrium; posteriorly with two groups of small receptacula; male palp with spoon-shaped cymbium, bulbus small; embolus inconspicuous, associated with some apophyses (fig. 48f).
- **body size:** 4.0-5.5 mm.
- **colour:** prosoma dark reddish, abdomen grey.

Taxonomic status

Forster & Platnick (1984) erected the family and transferred *Huttonia* from the Zodariidae to its own. It is regarded as the sister group of the Palpimanidae, with which it is placed in the superfamily Palpimanoidea by Coddington & Levi (1991) and Coddington *et al.* (2004). According to Schütt (2000), the superfamily is restricted to these two families.

Distribution

Endemic to New Zealand.

Lifestyle

Ground dwellers.

Relevant literature

Forster & Platnick (1984); Schütt (2000).

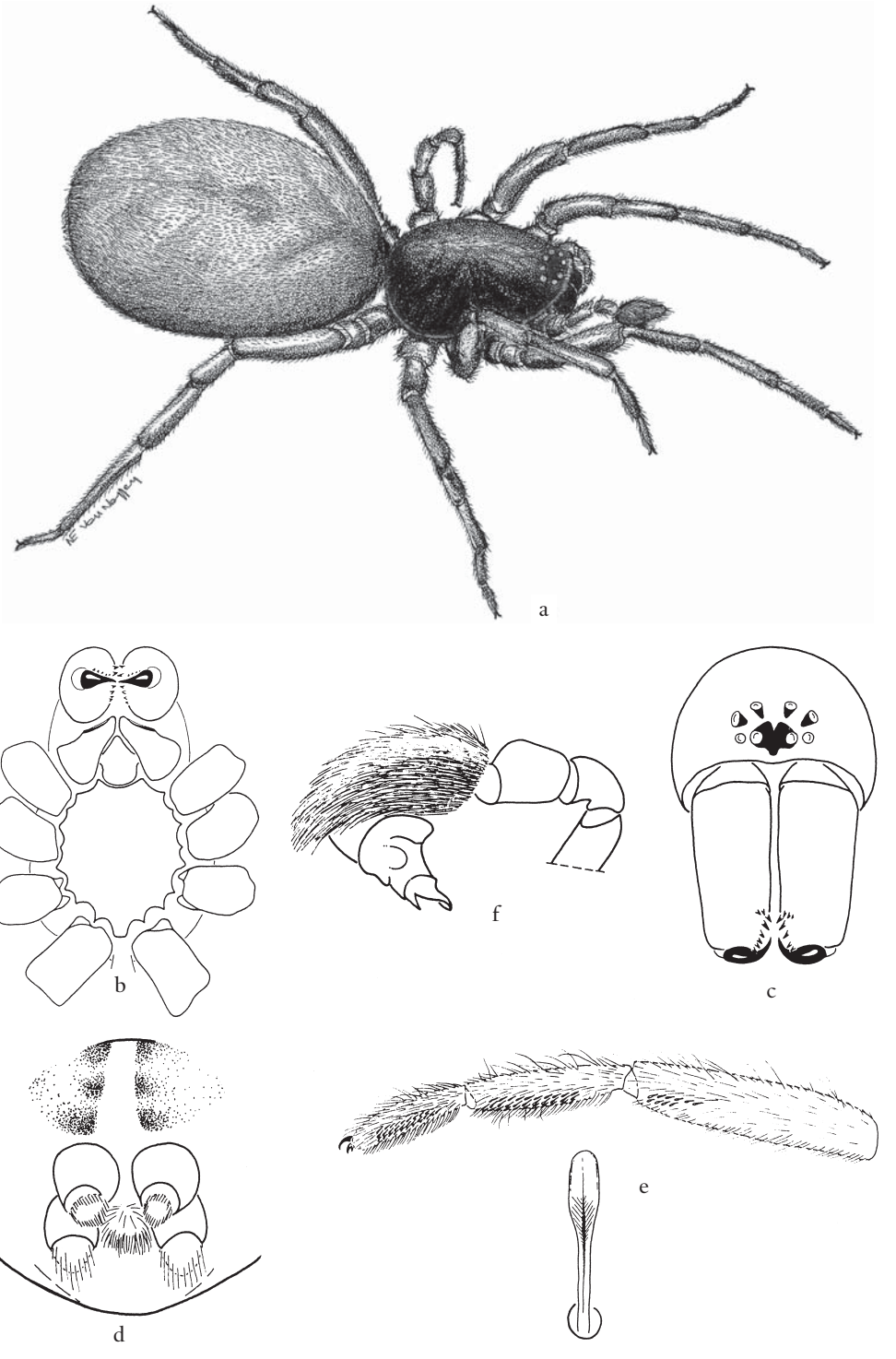


Fig. 48. **Huttoniidae.** *Huttonia palpimanoides* **a.** female, natural posture (4.5 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, frontal view; **d.** spinnerets, ventral view; **e.** tibia, metatarsus and patella I, showing prolateral rows of spatulate hairs and detail; **f.** male palp, lateral view showing dense cymbial scopula.

FAMILY HYPOCHILIDAE Marx, 1888

LAMPSHADE WEB SPIDERS

Fig. 49, pl. 5

Type genus

Hypochilus Marx, 1888.

Other genera

Ectatosticta Simon, 1892. Represented by 11 species (Platnick, 2005).

Diagnostic characters

Medium sized araneomorph spiders; three tarsal claws; cribellate; haplogyne; eight eyes; serrula composed of several rows of teeth.

Descriptive characters

- **carapace:** flattened, oval with distinctly narrowed cephalic area; fovea oval, wide, deep posteriorly (figs 49a, c[D1]).
- **sternum:** much longer than wide; shield-like with sinuous sides; posterior margin rounded, produced between coxae IV for about half their length (fig. 49e); *Ectatosticta* with three pairs of sigilla.
- **eyes:** eight in two recurved rows (dorsal view) (fig. 49c); anterior median eyes smallest, dark, circular, other eyes pale, oval, forming triads in *Hypochilus.*
- **chelicerae:** vertical, not divergent (fig. 49d); without condyle; promargin with large teeth; retromargin with smaller teeth, denticles or few small teeth; no stridulating file; with glabrous depression on median surface.
- **mouthparts:** endites parallel, swollen along median margin; distal margin with dense scopula (fig. 49e); serrula composed of several rows of teeth; labium variable, in *Hypochilus* with three pairs of sigilla.
- **legs:** long and narrow, with or without spines; tarsi flexible, not scopulate, with three dentate claws, superiors equal; trichobothria in double row on tibiae, double row or single subdistal on metatarsi, absent on tarsi; tarsal organ exposed: shallowly excavated disc, with receptor nodes near centre.
- **female palp:** segments with thickened bristles; tarsus with long pectinate claw.
- **abdomen:** oval, slightly longer than wide; coated with long, erect dark setae.
- **spinnerets**: six, anterior spinnerets thick, three-segmented, both the last segments short; medians one-segmented, short, narrow; posteriors with two segments of similar length (fig. 49g).
- **cribellum:** wide, short, undivided.
- **calamistrum:** composed of two rows of setae in proximal quarter of metatarsi IV.
- **respiratory system:** with two pairs of booklungs; posterior pair situated halfway between spinnerets and epigastric fold; connected by external furrow (fig. 49f).
- **genitalia:** haplogyne; internal structure with two pairs of receptacula; male palp with elongate tibia and relatively small, complex bulb attached subdistally; cymbium truncate with spine-bearing paracymbium; embolus spiral, supported by well developed conductor most often directed backwards (fig. 49h).
- **body size:** 7-15 mm.
- **colour:** pale with purplish brown markings.

Taxonomic status

The Hypochilidae is the only family in the Paleocribellatae (sometimes called the Hypochiloidea) considered sister to all other Araneomorphae by Coddington *et al.* (2004). Lehtinen (1967) placed *Ectatosticta* in its own family, but Platnick (1977) argued that Ectatostictidae is a junior synonym of Hypochilidae. *Hypochilus* was revised by Catley (1994), and Song *et al.* (2001) reported on *Ectatosticta.*

Distribution

United States (*Hypochilus*) and China (*Ectatosticta*).

Lifestyle

Hypochilus constructs a so-called lampshade web in wet rocky areas. This fairly complex web is composed of a cribellate network supported by a dry silk frame hung from the ceiling of the rock chamber; the lower part of the web fades out towards a circular frame kept under tension by silk lines attached to the bottom. Prey consists mainly of flying insects.

Relevant literature

Catley (1994); Forster & Forster (1999); Forster *et al.* (1987); Paquin & Hedin (2005a); Platnick (1977); Song *et al.* (2001).

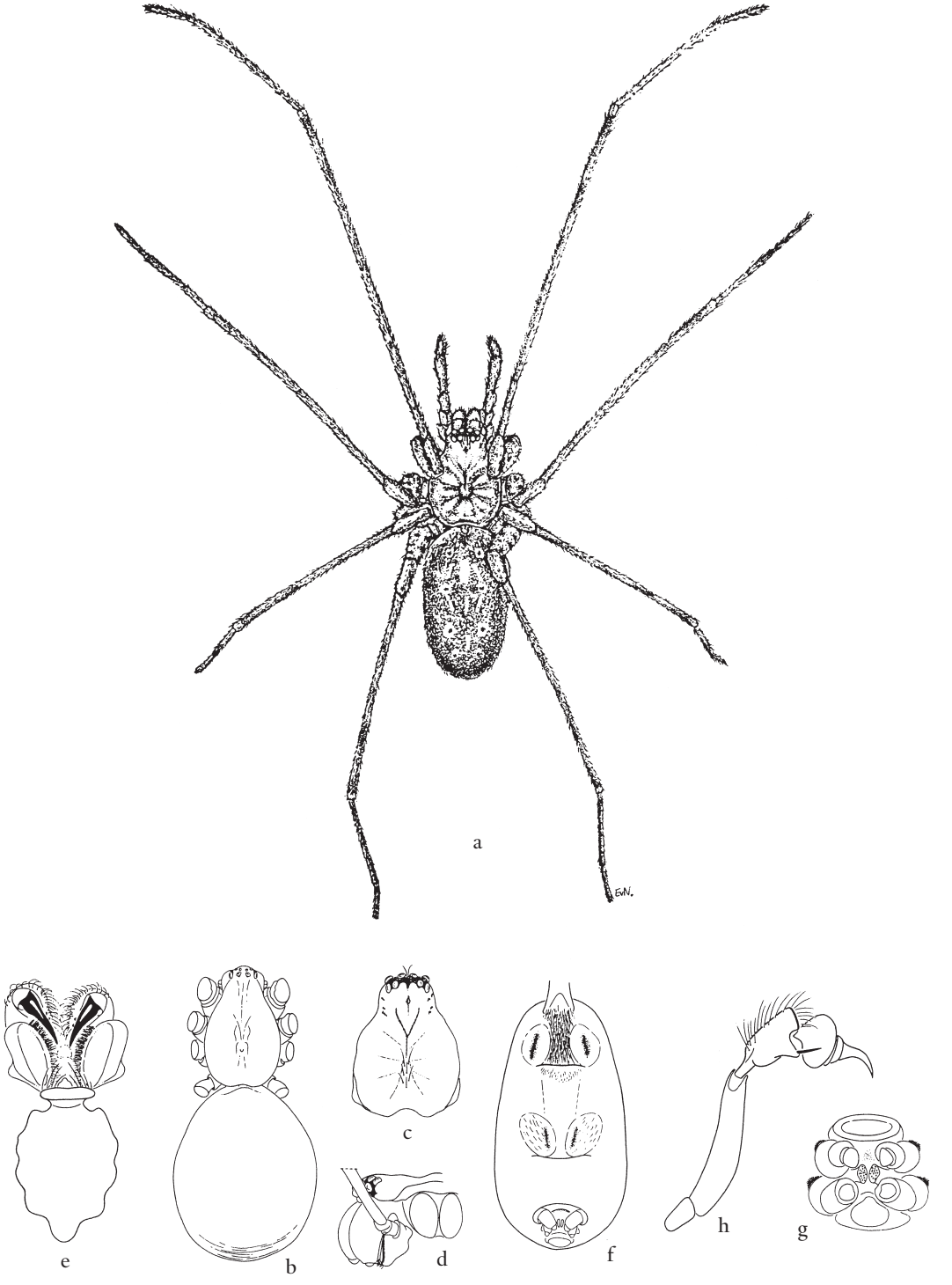


Fig. 49. **Hypochilidae.** *Hypochilus thorelli* **a.** female habitus; *Ectatosticta davidi* **b.** cephalothorax and abdomen, dorsal view; *Hypochilus thorelli* **c.** cephalothorax, dorsal view; **d.** cephalothorax, anterior part, lateral view; **e.** cephalothorax, ventral view; **f.** abdomen, ventral view; **g.** spinnerets, ventral view; **h.** right male palp, lateral view.

FAMILY IDIOPIDAE Simon, 1892

SPURRED TRAPDOOR SPIDERS

Fig. 50, pl. 2

Type genus

Idiops Perty, 1833.

Other genera

Represented by 20 genera and 269 species (Platnick, 2005) in three subfamilies: Arbanitinae, Genysinae and Idiopinae.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; three tarsal claws; eight eyes; rastellum present; bulbus of male palp provided with a distal haematodocha extending almost to tip of embolus; palpal tibia of males usually with a retrolateral excavation and spur, bearing short, thorn-like spines.

Descriptive characters

- **carapace:** glabrous; cephalic region arched; fovea procurved (Idiopinae) (fig. 50a) or broad and recurved (Genysinae) or procurved, straight or recurved (Arbanitinae).
- **sternum:** four (fig. 50f) or six sigilla; sigilla small, oval, subcentral to marginal; posterior sigilla either absent or present; labiosternal groove shallow.
- **eyes:** eight; position varies between subfamilies; anterior lateral eyes advance of either eyes close to clypeal edge (Idiopinae) (fig. 50b); eye group wider than twice its length in Genysinae (fig. 50c); compact in two or three rows (Arbanitinae).
- **chelicerae:** rastellum on distinct mound (fig. 50d) or composed of simple spines or absent; one (*Ctenolophus*) (fig. 50e) or two rows of cheliceral teeth (outer row smaller than inner row) on cheliceral furrow.
- **mouthparts:** labium wider than long, with few or no cuspules (fig. 50f); anterior lobe of endites small with cuspules; serrula absent.
- **legs:** three claws, few teeth in one medial row; front legs with strong setae (Arbanitinae, Idiopinae); lightly scopulate with few tarsal spines (Arbanitinae, Genysinae); paired claws with teeth similar in size and number in female, male with one row of teeth on paired claws (Idiopinae) or S-shaped (Arbanitinae, Genysinae) of teeth; paired mating spurs on tibia I (all subfamilies) or absent.
- **female palp:** unmodified.
- **abdomen:** oval, except in *Galeosoma* and to a lesser extent *Idiosoma* truncated (fig. 50g), with abdominal shield.
- **spinnerets:** four; posterior spinnerets with apical segment domed.
- **respiratory system:** four booklungs with fringe of hairs across entrance (Arbanitinae).
- **genitalia:** female genitalia with two spermathecae (fig. 50j); male palp with distal sclerite open along one side so that second haematodocha extends down bulb almost to tip of embolus; cymbium with one lobe rounded, other lobe acutely pointed, rarely rounded; palpal tibiae with short, thorn-like spines (fig. 50i).
- **body size:** 8-33 mm.
- **colour:** various shades of brown, yellow, red, olive or purplish.

Taxonomic status

According to Raven (1985), Idiopidae is sister to Ctenizoidina, which is composed of the Migidae, Actinopodidae and Ctenizidae. But Goloboff (1993) considers the family sister to Ctenizidae, together forming the sister group of Migidae plus Actinopodidae. Raven (1985) provided a key to the genera of the world. Revisions of the Australian fauna were done by Main (1985, 2000). Dippenaar-Schoeman (2002) reviewed the fauna of Southern Africa.

Distribution

Africa, Australia, India, South-east Asia, Madagascar, New Zealand, South and Central America.

Lifestyle

Idiopids are trapdoor spiders that cover their burrows with a wafer- or cork-type lid (fig. 50k). *Galeosoma* use the hardened posterior part of the abdomen as a false bottom to close burrows (fig. 50h).

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Goloboff (1993); Main (1985, 2000); Raven (1985).

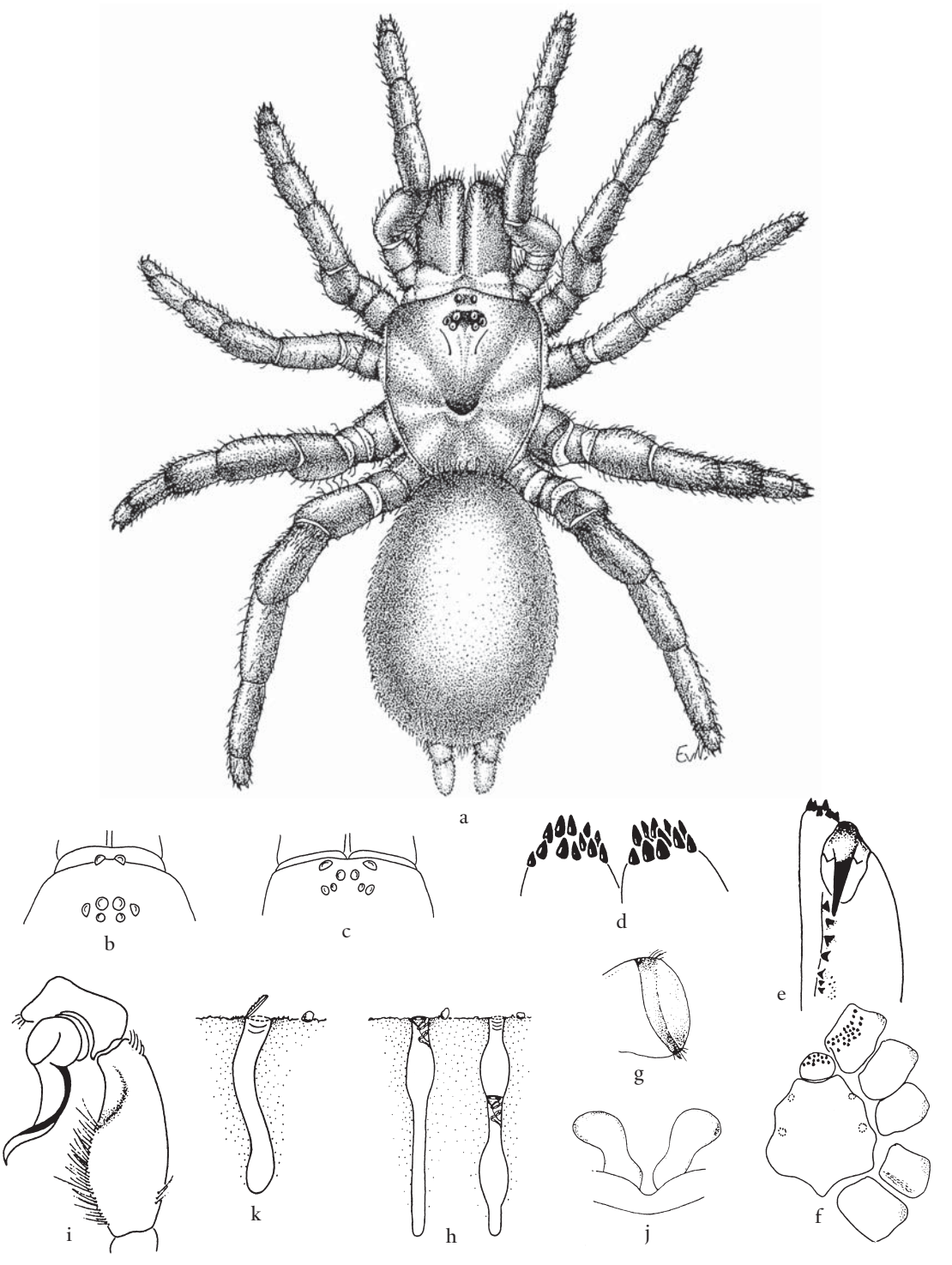


Fig. 50. **Idiopidae.** *Idiops* sp. **a.** female habitus (18 mm); Idiopinae **b.** eye pattern, dorsal view; Genysinae **c.** eye pattern, dorsal view; **d.** tip of chelicerae showing rastellum; *Ctenolophus* sp. **e.** chelicera, ventral view showing fang furrow and rastellum; **f.** sternum; *Galeosoma* sp. **g.** posterior part of abdomen showing shield shaped part used to close burrow; **h.** burrow; *Idiops* sp. **i.** male palp; **j.** spermathecae; **k.** burrow.

FAMILY LAMPONIDAE Simon, 1893

AUSTRALIAN GROUND SPIDERS, WHITE-TAILED SPIDERS

Fig. 51, pl. 30

Type genus

Lampona Thorell, 1869.

Other genera

Represented by 23 genera and about 190 species (Platnick, 2005) divided among three subfamilies: Lamponinae, Centrothelinae and Pseudolamponinae.

Diagnostic characters

Tiny to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes, posterior median ones flattened; anterior spinnerets parallel, large, cylindrical and usually well separated; piriform gland spigots of anterior spinnerets not enlarged; endites obliquely depressed and with conspicuous groove along median margin (not in Pseudolamponinae); a pair of invaginated sclerites just behind epigastric furrow.

Descriptive characters

- **carapace:** ovoid, smoothly convex and rather low (Lamponinae, fig. 51a) or roughly square and fairly high (Centrothelinae, fig. 51e) or elevated (Pseudolamponinae); with distinct fovea.
- **sternum:** ovoid with rounded apex; flat or with steep sides.
- **eyes:** eight; in two rows (4:4); anterior eyes round and dark, posterior median eyes flattened and of variable shape (figs 51a, e, f).
- **chelicerae:** short, robust; anterior cheliceral margin usually with teeth, posterior margin often without; with thick, modified seta at base of fang in many genera; chilum small, triangular, fused to carapace or lost; often accompanied by second narrow posterior chilum.
- **mouthparts:** endites with evenly rectangular (Lamponinae) or uneven outline; obliquely depressed; with conspicuous groove along median margin (not in Pseudolamponinae); serrula present.
- **legs:** leg formula 4123; two toothed claws with claw tufts; legs prograde, usually short and stout; tarsi usually with scopulae, often divided on tarsi I and II; spination often reduced or legs spineless; trochanters unnotched or slightly notched; trichobothria on tarsi and metatarsi; trichobrothrial bases ridged; tarsal organ capsulate.
- **female palp:** tarsus with small claw with few teeth and dorsal patch of chemosensitive setae.
- **abdomen:** elongated to oval; scuta variable, sometimes dorsal and ventral, either present in both sexes, in males only or no scuta present at all; pedicel sometimes tubular; a pair of invaginated sclerites just behind epigastric furrow (fig. 51g).
- **spinnerets:** anterior spinnerets parallel, tubular and usually well separated, distal segment reduced to an incomplete ring (fig. 51b); piriform gland spigots of anterior spinnerets not enlarged; posterior median spinnerets sometimes with three enlarged cylindrical gland spigots (Centrothelinae).
- **respiratory system:** two booklungs; tracheal system poorly developed with small spiracle close to spinnerets and four narrow tracheal tubes.
- **genitalia:** entelegyne; epigyne simple, with two, rarely bipartite spermathecae, sometimes with very long entrance ducts (fig. 51i); male palp with retrolateral tibial apophysis usually well developed; bulb convex; tegulum often expanded; embolus slender, variable in length; median apophysis often absent, conductor usually present (figs 51c, h).
- **body size:** 1.3-18 mm.
- **colour:** carapace from dark reddish black to pale orange; abdomen different shades of grey usually with pale pattern; abdominal scuta pale to dark orange or brown.

Taxonomic status

The Lamponidae have long been considered a subfamily of the Gnaphosidae but were raised to family status by Platnick (1990). The family was thoroughly revised and expanded by Platnick (2000). They are considered the sister group of the combination of Gnaphosidae and Prodidomidae or part of a trichotomy with the Ammoxenidae as third clade (Coddington *et al.*, 2004).

Distribution

Australia, New Zealand, New Guinea, New Caledonia.

Lifestyle

Lamponids are free-living, nocturnal spiders found mainly on the soil surface. Some are specialized spider hunters. Egg sacs are most often disc-shaped and deposited on a firm underground.

Relevant literature

Platnick (1990, 2000).

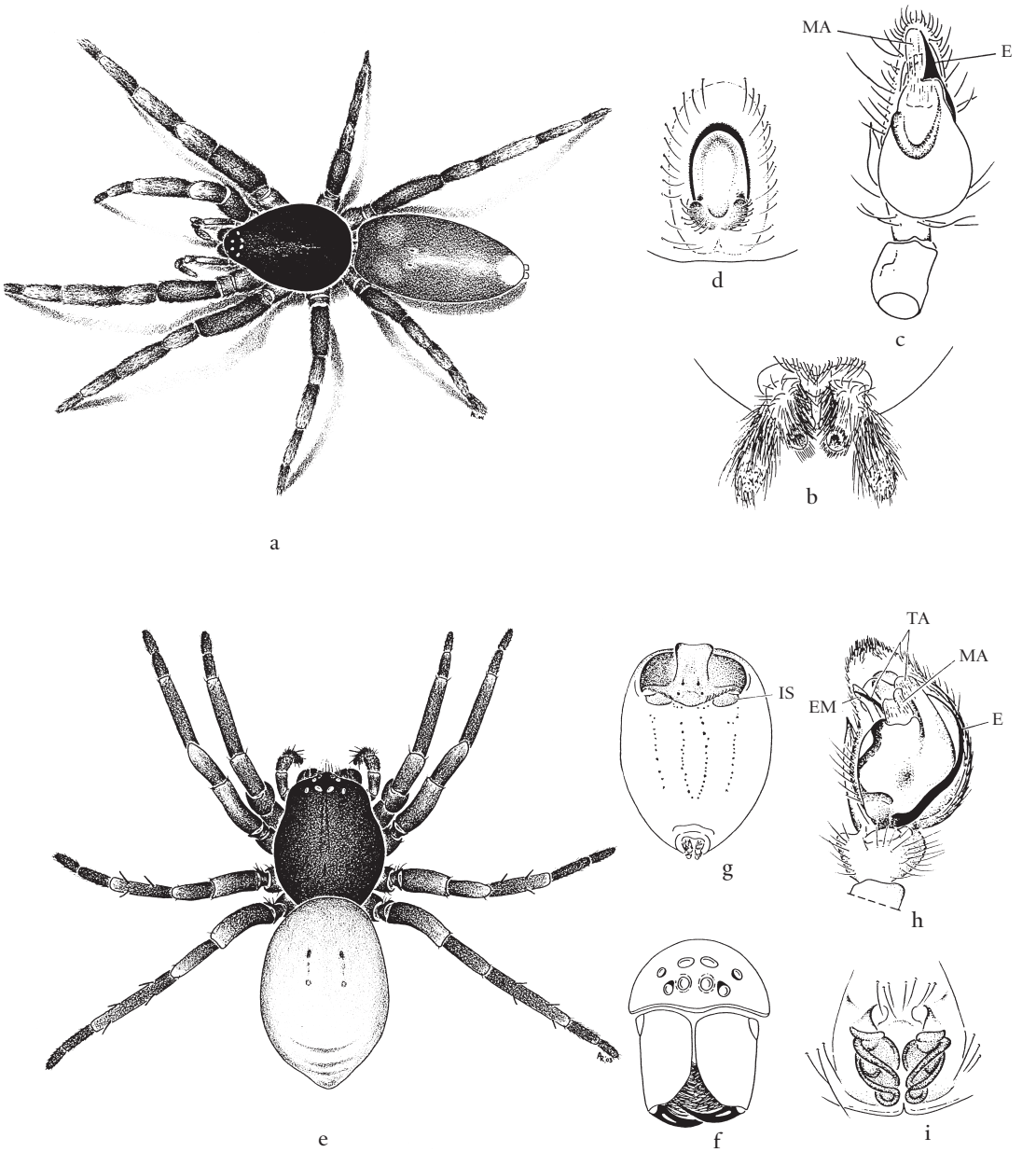


Fig. 51. **Lamponidae.** *Lampona cilindrata* **a.** female habitus (13 mm); **b.** spinnerets, ventral view; **c.** right male palp, lateral view; **d.** epigyne, ventral view; *Asadipus phaleratus* **e.** habitus; **f.** cephalothorax, frontal view; **g.** abdomen, ventral view; **h.** right male palp, ventral view; **i.** epigyne. E: embolus; EM: embolic membrane; MA: median apophysis; IS: invaginated sclerite; TA: tegular apophyses.

FAMILY LEPTONETIDAE Simon, 1890

MIDGET CAVE SPIDERS

Fig. 52, pl. 7

Type genus

Leptoneta Simon, 1872.

Other genera

Represented by 15 genera and about 190 species (Platnick, 2005).

Diagnostic characters

Tiny araneomorph spiders; three tarsal claws; ecribellate; haplogyne; with six eyes in a special arrangement: anterior four in a strongly recurved row and contiguous, posterior two separated from frontal group; chelicerae with numerous teeth on promargin; tibiae and sometimes patellae with glands opening on plates.

Descriptive characters

- **carapace:** broad and raised**;** oval**,** thoracic and cephalic area poorly delimited; fovea shallow; clypeus high (fig. 52d).
- **sternum:** shield-shaped; slightly longer than wide; pointed posteriorly; coxae IV widely separated (fig. 52c).
- **eyes:** six eyes in two rows (fig. 52b); anterior row (4) recurved, eyes contiguous; posterior pair close together on median line some distance from the anterior eyes; in *Archoleptoneta* Gertsch, 1974, there are two eyes in front, four in a posterior row.
- **chelicerae:** fairly long; no lamina; promargin with up to seven teeth; retromargin with a few denticles; fang long (figs 52d, g).
- **mouthparts:** endites: roughly rectangular, broad, slightly constricted in the middle and slightly convergent; labium: rounded distally, as long as wide (fig. 52c).
- **legs:** long and slender (fig. 52a); tarsi with three claws on separate pseudosegment, paired claws with few teeth; few or no spines; tibiae and sometimes patellae with glands opening on flat smooth area (fig. 52e); no trichobothria on tarsi, a distal one on metatarsi; tarsal organ exposed with several lobes.
- **female palp:** with claw.
- **abdomen:** ovoid; colulus present.
- **spinnerets:** six; anterior pair the largest; cylindrical gland spigots present; anterior lateral spinnerets with one major ampullate gland spigot; aciniform gland spigots on posterior median and posterior lateral spinnerets in closely packed line; tartipores present.
- **respiratory system:** frontal pair of booklungs; tracheal spiracle, sometimes paired (Machado, 1945), situated slightly in advance of spinnerets (fig. 52c).
- **genitalia:** haplogyne; internal structure with simple paired spermathecae opening in shallow atrium; male palpal tibia often with modified setae; cymbium spoon-shaped or simply concave; embolus usually short, associated with some apophyses, all situated at distal extremity of small bulbus (figs 52f, h).
- **body size:** 1-3 mm.
- **colour:** entirely pale.

Taxonomic status

Based on the web type, Shear (1986) placed the Leptonetidae and Ochyroceratidae with the pholcids in the superfamily Pholcoidea. Platnick (1986) considers the Leptonetidae the sister-group of Telemidae on the basis of the shared cuticular leg plates, and Platnick *et al.* (1991) placed them in the Scytodoidea with Ochyroceratidae as a sister-group. Coddington *et al.* (2004) adopt the sister relationship with Telemidae.

Distribution

Mediterranean, Central and North America, China, Japan, South-east Asia, New Guinea, northern Australia.

Lifestyle

A family of which most species live in caves or in hollows under stones. They construct irregular and fairly large space-webs. Egg sacs with very few eggs, sometimes only one, are attached to smooth surfaces.

Relevant literature

Gertsch (1974); Ledford (2004): Ledford *et al.* (2005); Murphy & Murphy (2000); Platnick (1986, 1994); Platnick *et al.* (1991); Roth (1984); Shear (1986).

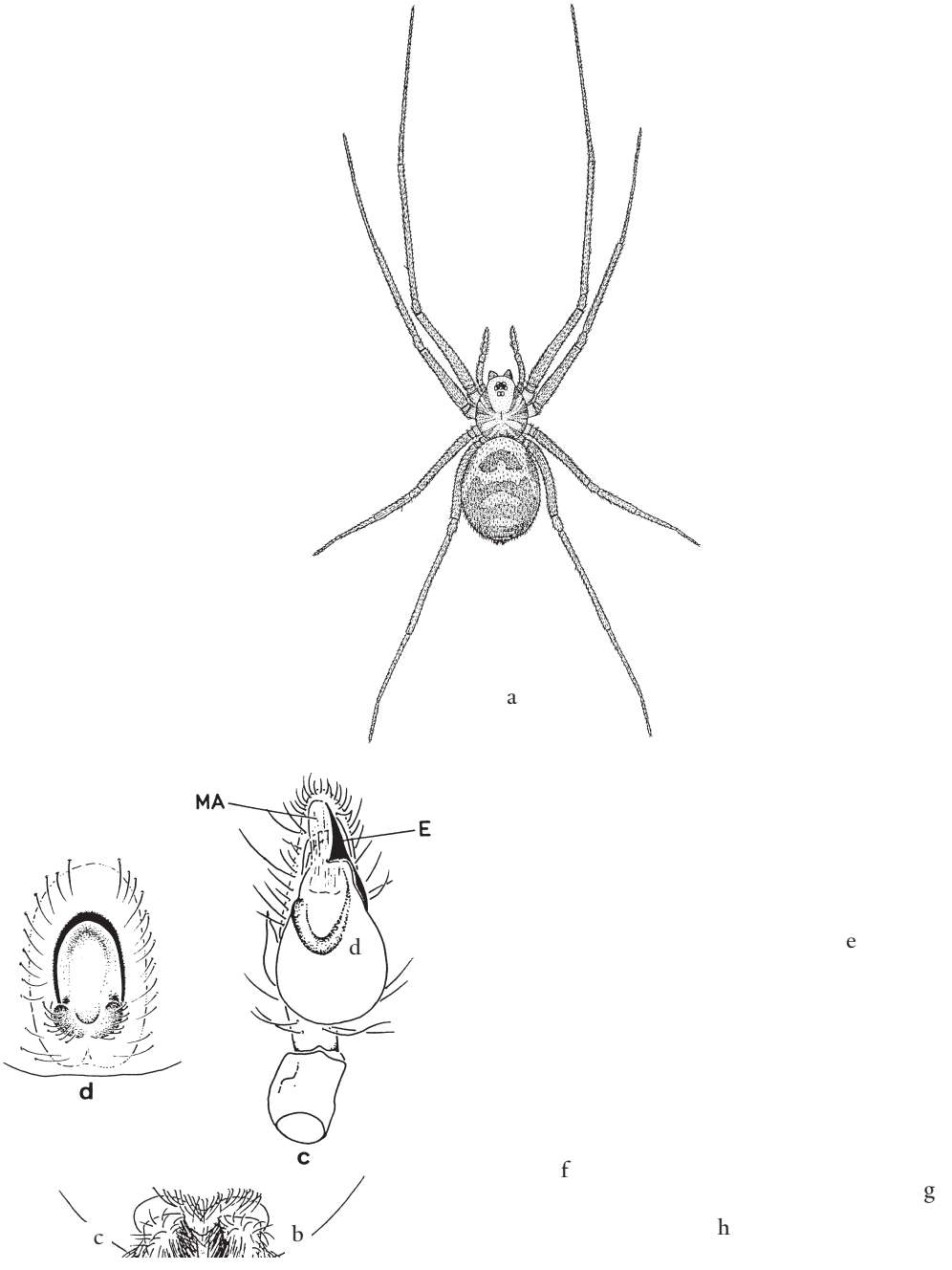


Fig. 52. **Leptonetidae.** *Leptoneta striata* **a.** female habitus (2.1 mm); *Leptoneta infuscata* **b.** cephalothorax, dorsal view; **c.** cephalothorax and abdomen, ventral view; **d.** cephalothorax and abdomen, lateral view; **e.** flat area near tibial gland opening (scale line = 5 µm); **f.** right male palp, lateral view; *Leptoneta comasi* **g.** left chelicera, ventral view; *Sulcia cretica* **h.** right male palp, lateral view. (a: from Murphy & Murphy, 2000; d: after Platnick, 1986; g: after Ribera, 1978.)

FAMILY LINYPHIIDAE Blackwall, 1859

HAMMOCK-WEB SPIDERS / DWARF SPIDERS

Fig. 53, pl. 14

Type genus:

Linyphia Latreille, 1804.

Other genera

Large family with 562 genera and more than 4,300 species (Platnick, 2005), presently divided among four subfamilies: Erigoninae, Linyphiinae, Mynogleninae and Stemonyphantinae.

Diagnostic characters

Very small to small araneomorph spiders; three tarsal claws; ecribellate; entelegyne, eight eyes; recognised by: absence of comb on tarsi IV; slender legs, provided with setae, especially on tibiae and metatarsi; tarsi cylindrical; labium rebordered; chelicerae usually with stridulating file; numerous teeth, mostly three or four, on fang furrow; autospasy at patella/tibia joint; male palp with often U-shaped intersegmental paracymbium.

Descriptive characters

- **carapace:** variable; clypeus height usually exceeding that of median ocular region; Erigoninae with frontal region of male often modified with lobes (fig. 54a), pits or setal field (figs 54c, d); Linyphiinae usually with frontal part of carapace raised (fig. 54b); all stages with subocular clypeal sulci in Mynogleninae (fig. 54e).
- **sternum:** variable but usually heart-shaped; pointed or truncated at the back.
- **eyes:** eight; in two rows (4:4); heterogeneous with anterior median eyes slightly darker.
- **chelicerae:** robust; usually with strong teeth on cheliceral furrow; condyle absent; stridulating files located laterally (fig. 54g).
- **mouthparts:** labium rebordered (fig. 54f); endites usually parallel.
- **legs:** three claws; legs usually slender and provided with setae, especially on tibiae and metatarsi; tarsi usually cylindrical, not tapered (fig. 54h); autospasy at patella-tibia junction.
- **female palp:** claw present except in Erigoninae.
- **abdomen:** usually longer than wide; sometimes with a pattern, or dark and shiny; scutum present in some males.
- **spinnerets:** anterior and posterior spinnerets short, conical, concealing median pair; anterior lateral spinnerets with reduced bases of piriform gland spigots; posterior lateral spinnerets with elongate field of aciniform gland spigots; females with triplet on posterior median spinnerets, also present in males of Erigoninae; base of the basal cylindrical gland spigot enlarged and located near periphery; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets; tracheal system simple (haplotracheate) or complex with finely divided terminals extending into prosoma and appenages (desmitracheate).
- **genitalia:** entelegyne; epigyne variable, often simple with flat surface modified by grooves, pits or notches (Erigoninae); often with scapus (Linyphiinae) (fig. 54i); male: palpal tibia with (Linyphiinae, fig. 54j) or without (fig. 54k) apophyses; with flexibly attached often U-shaped intersegmental paracymbium; bulbus without median apophysis and conductor but with distally grouped apophyses such as embolic membrane, lamella characteristica; radix plus embolus connects to suprategulum by means of column (fig. 54j).
- **body size:** 1.5-6 mm.
- **colour:** usually dark and shiny without abdominal pattern (Erigoninae); abdomen usually with a pattern (Linyphiinae).

Taxonomic status

Coddington & Levi (1991) placed the linyphiids in the superfamily Araneoidea as part of the higher araneoids and sister-group of the Cyatholipidae. Hormiga (1994a, b) and Griswold *et al.* (1994) considered the Linyphiidae and Pimoidae sister-groups. Hormiga (2000) and Miller & Hormiga (2004) studied the higher phylogenetics of the family.

Distribution

The family Linyphiidae occurs worldwide and is particularly well represented in the temperate and cooler regions of the Northern Hemisphere (Van Helsdingen, 1984).

Lifestyle

Linyphiids spin delicate sheet webs, often with tangles above and below the sheet (fig. 54l), between branches of trees or shrubs, in tall herbs and sometimes close to the ground and in litter. Many species appear to have lost web building ability. Egg sacs are usually deposited on smooth surfaces.

Relevant literature

Draney & Buckle (2005); Griswold *et al.* (1994); Hormiga (1994a, 1994b, 2000); Miller & Hormiga (2004); Millidge (1977, 1984).

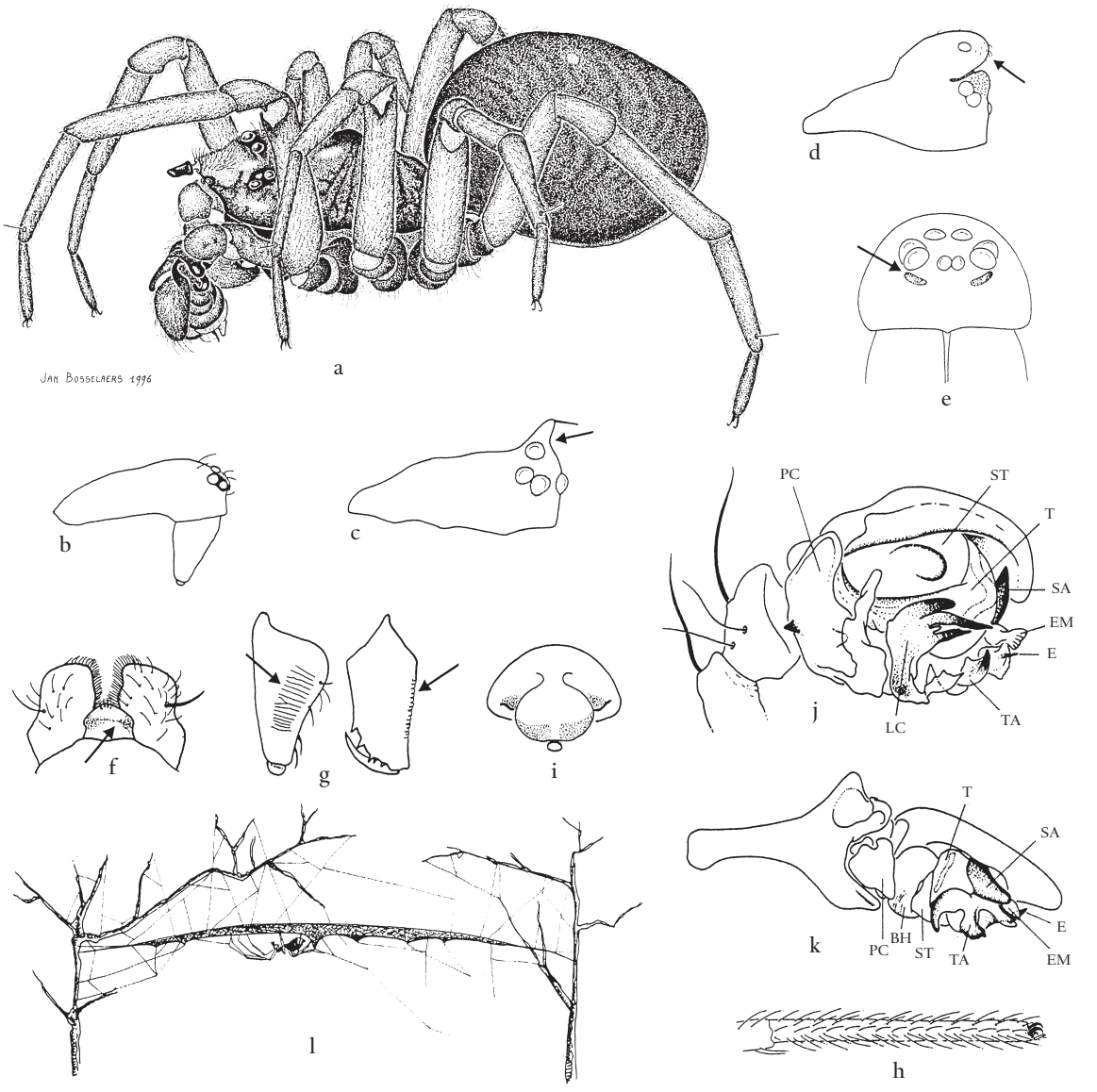


Fig. 53. **Linyphiidae.** *Baryphyma duffeyi* **a.** male, natural posture (2.9 mm); *Lephthyphantes* sp. **b.** cephalothorax typical for Linyphiinae, lateral view; *Proelauna humicola* **c.** cephalothorax, lateral view showing modification; *Callitrichia* sp. **d.** cephalothorax, lateral view, showing modification; *Afroneta* sp. **e.** cephalothorax, frontal view, showing preocular sulci of Mynogleninae; *Lepthyphantes* sp. **f.** mouthparts showing rebordered labium; **g.** chelicerae, lateral and frontal, showing stridulating file; **h.** tarsus IV; **i.** epigyne; **j.** right male palp, lateral view; *Erigone atra* **k.** right male palp, lateral view. *Linyphia* sp. sheetweb in lateral view. BH: basal haematodocha; E: embolus; EM: embolic membrane; LC: lamella characteristica; MA: median apophysis; PC: paracymbium; SA: subtegular apohysis; ST: subtegulum; T: tegulum; TA: tegular apophysis. (a: drawing by Jan Bosselaers.)

FAMILY LIOCRANIDAE Simon, 1897

SPINY-LEGGED SAC SPIDERS

Fig. 54, pl. 28

Type genus

Liocranum L. Koch, 1866.

Other genera

Represented by 30 genera and almost 170 species (Platnick, 2005) from three subfamilies: Cybaeodinae, Liocraninae and Phrurolithinae (Platnick & Baptista, 1995).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes (sometimes reduced); female with posterior median spinnerets flattened; posterior spinnerets with cylindrical gland spigots; male palp with median apophysis.

Descriptive characters

- **carapace:** as wide as long or longer than wide, narrower in eye region (fig. 54a).
- **sternum:** scutiform, rebordered.
- **eyes:** eight; in two rows (4:4); Liocraninae with eyes usually close together, anterior row straight and posterior row procurved or recurved; Phrurolithinae with anterior row procurved; Cybaeodinae (*Andromma*) with anterior median eyes large and their axes divergent given the impression of a split retina (laterally pale, mesally dark), eyes sometime reduced to four.
- **chelicerae:** cheliceral furrow usually with teeth.
- **mouthparts:** labium not or barely longer than wide, not extending beyond middle of endites; endites not narrowed medially.
- **legs:** two claws; tibiae and metatarsi I and II in many taxa armed below with biseriate row of numerous long spines with distinct bases (fig. 54b); tarsi with or without scopulae.
- **abdomen:** oval; dorsal scutum present in Phrurolithinae.
- **spinnerets:** posterior and median spinnerets with cylindrical gland spigots; median spinnerets of females laterally flattened; distal segment of posterior spinnerets distinct and conical; colulus unpaired, with setae (fig. 54c).
- **respiratory system:** two booklungs; trachea restricted to abdomen, spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable (fig. 54f); male palp bulbus usually with median apophysis (figs 54d, e) (absent in Phrurolithinae); embolus variable; tibia with apophyses; male palpal femur with modifications (Phrurolithinae).
- **body size:** 3-15 mm.
- **colour:** varies from pale yellow to brownish with indistinct pattern on abdomen, or uniform reddish yellow, or blackish brown.

Taxonomic status

Coddington & Levi (1991) listed the family in the Dionychae and considered them the sistergroup of the gnaphosoids. In later analyses they are simply put in the unresolved Dionychae clade. According to Platnick & Baptista (1995), the liocranids as a family still lack distinct synapomorphies. This was corroborated by Bosselaers & Jocqué (2002), who questioned the monophyly of the family.

Distribution

Worldwide.

Lifestyle

Liocranids are free-living ground-dwelling spiders inhabiting forest litter; some genera are associated with ants and termites.

Relevant literature

Bosselaers & Jocqué (2002); Dippenaar-Schoeman & Jocqué (1997); Platnick & Baptista (1995); Ubick & Richman (2005b).

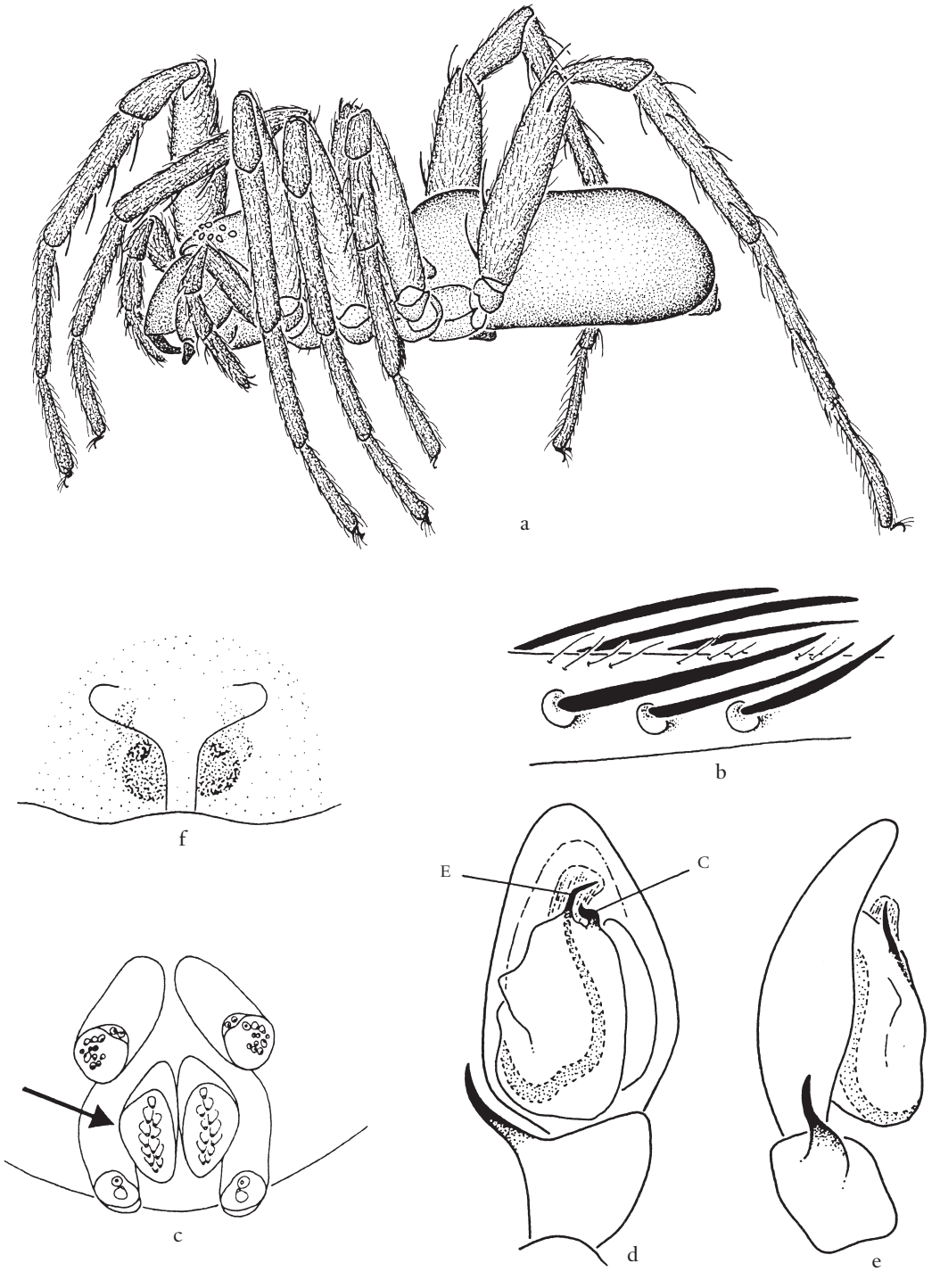


Fig. 54. **Liocranidae**. *Cybaeodes madidus* **a.** habitus (8 mm); Liocranidae indet. **b.** ventral view of tibia of leg I, showing biseriate setae with characteristic base; **c.** spinnerets, ventral view showing flattened posterior median spinnerets with rows of spigots; **d.** right male palp, ventral view; **e.** right male palp, lateral view; **f.** epigyne. C: conductor; E: embolus.

FAMILY LIPHISTIIDAE Thorell, 1869

SEGMENTED SPIDERS

Fig. 55, pl. 1

Type genus

Liphistius Schiödte, 1849.

Other genera included

Heptathele Kishida, 1923; *Nanthela* Haupt, 2003; *Ryuthela* Haupt, 1983; *Songthela* Ono, 2000. Represented by 87 species (Platnick, 2005).

Diagnostic characters

Medium-sized to large Mesothelae spiders; three tarsal claws; tibial I-III with a pair of terminal spurs; six or eight eyes; abdomen provided with 10 tergites (12 segments) and seven or eight spinnerets just behind the epigastric furrow.

Descriptive characters

- **carapace:** cephalic part raised above thoracic part; fovea a deep pit; rounded elevations radiate from fovea towards coxae; clypeus short, slanting forward, with spines medially.
- **sternum:** longer than wide (fig. 55d); central area flat with strong spines; margins weakly spined, sloping steeply; posterior end with elongate tip.
- **eyes:** six or eight; situated on a transverse eye tubercle (fig. 55c); lateral eyes oval, medians circular; anterior lateral eyes largest.
- **chelicerae:** glabrous, lightly coloured proximally; distally dark and with bristles; promargin with row of teeth between rows of pro- and retromarginal bristles; no venom glands (Haupt, 2003).
- **mouthparts:** endites longer than wide; in front with thick scopula; labium wider than long (fig. 55d), fused to sternum; area of serrula roughened.
- **legs:** 4321; femora and distal segments with numerous spines and bristles; three tarsal claws: paired one with few teeth, unpaired toothless; trichobothria in paramedian rows on tibiae, metatarsi and tarsi, clavate trichobothria in median row on tarsi and metatarsi (not in *Heptathele*); tarsal organ a rounded protrusion.
- **female palp:** with spines and trichobothria; dentate claw.
- **abdomen:** longer than wide (fig. 55a); with ten tergites bearing strong spines along posterior margin; cuticle soft with long bristles.
- **spinnerets:** eight (seven in *Heptathele*) situated near centre of abdomen on ventral side (fig. 55e); four lateral spinnerets long, multi-segmented; median spinnerets unisegmented (fig. 55f); spigots inserted laterally on lateral spinnerets, one terminal spigot on median ones.
- **respiratory system:** four booklungs; each pair on distinct sternite.
- **genitalia:** female: internal genitalia with posterior stalk, anterodorsal poreplate and anteroventral receptacular cluster (fig. 55i); male: palp with retrolateral tibial apophysis, which is a subterminal swelling provided with strong spines (not present in *Heptathele*); cymbium large and with many spines; bulbus with three sclerites (figs 55g, h).
- **body size:** 9-37 mm.
- **colour:** carapace and legs usually ranging from pale yellow over orange to pale brown with darker markings; darker orange to brown abdominal sclerites and spinnerets; abdomen grey.

Taxonomic status

The family Liphistiidae, which on its own forms the sub-order Mesothelae, is the sister-group of all the other spiders. In many respects this is a primitive spider family; the presence of eight spinnerets and a segmented abdomen are the main ancestral characters. There is a difference of opinion on whether the Mesothelae are composed of one or two families (Heptathelidae). The outcome of the homology in different palpal sclerites and the polarization for particular other characters will eventually settle the discussion.

Distribution

South-east Asia (*Heptathele*: China, Vietnam, Japan, Ryukyu Islands; *Liphistius*: Burma, Thailand, Malaysia, Sumatra; *Nanthela:* Vietnam; *Ryuthela*: Ryukuya Islands, Okinawa; *Songthela*: China).

Lifestyle

Liphistiids live in tubular burrows closed with a trapdoor and sometimes in some *Liphistius* spp. with 6-8 fishing lines radiating from the trapdoor. Found in earthen banks in forested areas and sometimes in caves. Moult while lying on their dorsal side.

Relevant literature

Haupt (1983, 1984, 2003); Platnick & Sedgwick (1984); Platnick & Goloboff (1985); Raven (1985).

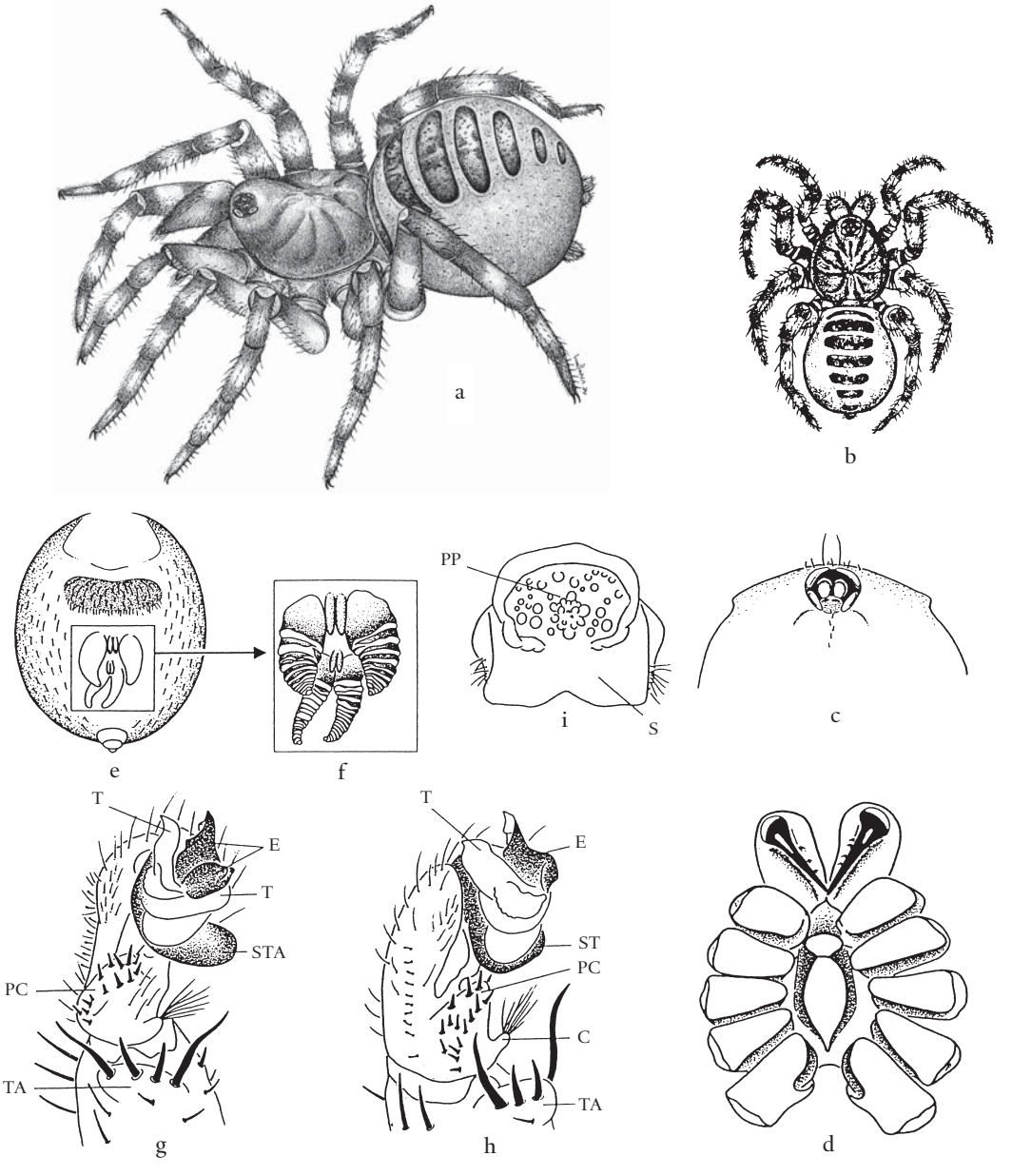


Fig. 55. **Liphistiidae.** *Liphistius lannaianus* **a.** female, natural posture (20 mm); **b.** habitus, dorsal view; **c.** eye pattern, dorsal view; **d.** cephalothorax, ventral view; **e.** abdomen, ventral view; **f.** detail of previous, spinnerets; **g.** male palp, retrolateral view; **h.** prolateral view; **i.** female genitalia. C: cumulus; E: embolus; PC: paracymbium; PP: pore plate; S: stalk; ST: subtegulum; STA: subtegular apophysis; T: tegulum; TA: tibial apophysis. (g-i: after Schwendinger, 1990.)

FAMILY LYCOSIDAE Sundevall, 1833

WOLF SPIDERS

Fig. 56, pl. 18

Type genus

Lycosa Latreille, 1804.

Other genera

Represented by 102 genera and almost 2,300 species (Platnick, 2005) from seven subfamilies: Allocosinae, Evippinae, Lycosinae, Pardosinae, Venoniinae, Wadicosinae and Tricassinae.

Diagnostic characters

Small to very large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eyes in three rows (4:2:2); male palp almost always without retrolateral tibial apophysis; female carries egg-sac attached to spinnerets.

Descriptive characters

- **carapace:** longer than wide, narrower and higher in cephalic region; fovea elongated; carapace covered with dense setae (fig. 56a).
- **sternum:** oval to scutiform.
- **eyes:** eight; in three rows (4:2:2) (fig. 56c); all dark in colour; unequal in size; anterior row with four small eyes; second row with two large eyes and third row with two eyes of intermediate size situated on anterolateral surface of carapace; secondary eyes with grate-shaped tapetum.
- **chelicerae:** strong, with toothed cheliceral furrow; condyle prominent.
- **mouthparts:** labium as wide as long, half the length of endites.
- **legs:** three claws; legs usually with scopula and spines; trochanters notched.
- **abdomen:** oval; covered with dense setae.
- **spinnerets:** six; colulus absent; in females with a pair of major ampullate gland spigots and a pair of minor ampullate gland spigots on resp. anterior lateral and posterior median spinnerets; the secondary spigots are retained in connection with the attachment of the egg cocoon.
- **respiratory system:** two booklungs; one pair of tubular trachea; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne with well-sclerotized median septum, often in the shape of an inverted T (fig. 56g); male: palp without tibial apophyses (except *Allocosa tuberculipalpa,* with large retrolateral tibial apophysis); embolus variable in size and insertion (figs 56d-f).
- **body size:** 3-45 mm. *Hogna ingens* (Blackwall, 1857) is one of the largest Araneomorphae.
- **colour:** cryptic, ranging from dull yellowish brown to grey or almost black with broad bands over cephalothorax; dorsum usually with pattern.

Taxonomic status

The lycosids form part of the superfamily Lycosoidea based on the specialized structure of the tapetum of the lateral and posterior eyes (Coddington & Levi, 1991; Coddington *et al.*, 2004). Griswold (1993) discussed the phylogenetic arrangement of the Lycosoidea and found the Lycosidae to be sister to Trechaleidae with which they form the sister- group of the Pisauridae. The limits of subfamilies and genera within the lycosids are far from clear (Alderweireldt, 1991; Vink *et al.,* 2002).

Distribution

Worldwide.

Lifestyle

Most lycosids are free-living ground-dwelling hunters and are supposed to have coevolved with grasslands. Some live in burrows or make sheet webs provided with a funnel. Egg cocoons are carried, attached to the spinnerets (fig. 56b), and spiderlings spend the first days or weeks of their existence on the abdomen of the mother.

Relevant literature

Alderweireldt (1991); Dippenaar & Jocqué (1997); Dondale (2005a); Griswold (1993); Vink (2002); Vink *et al.* (2002).

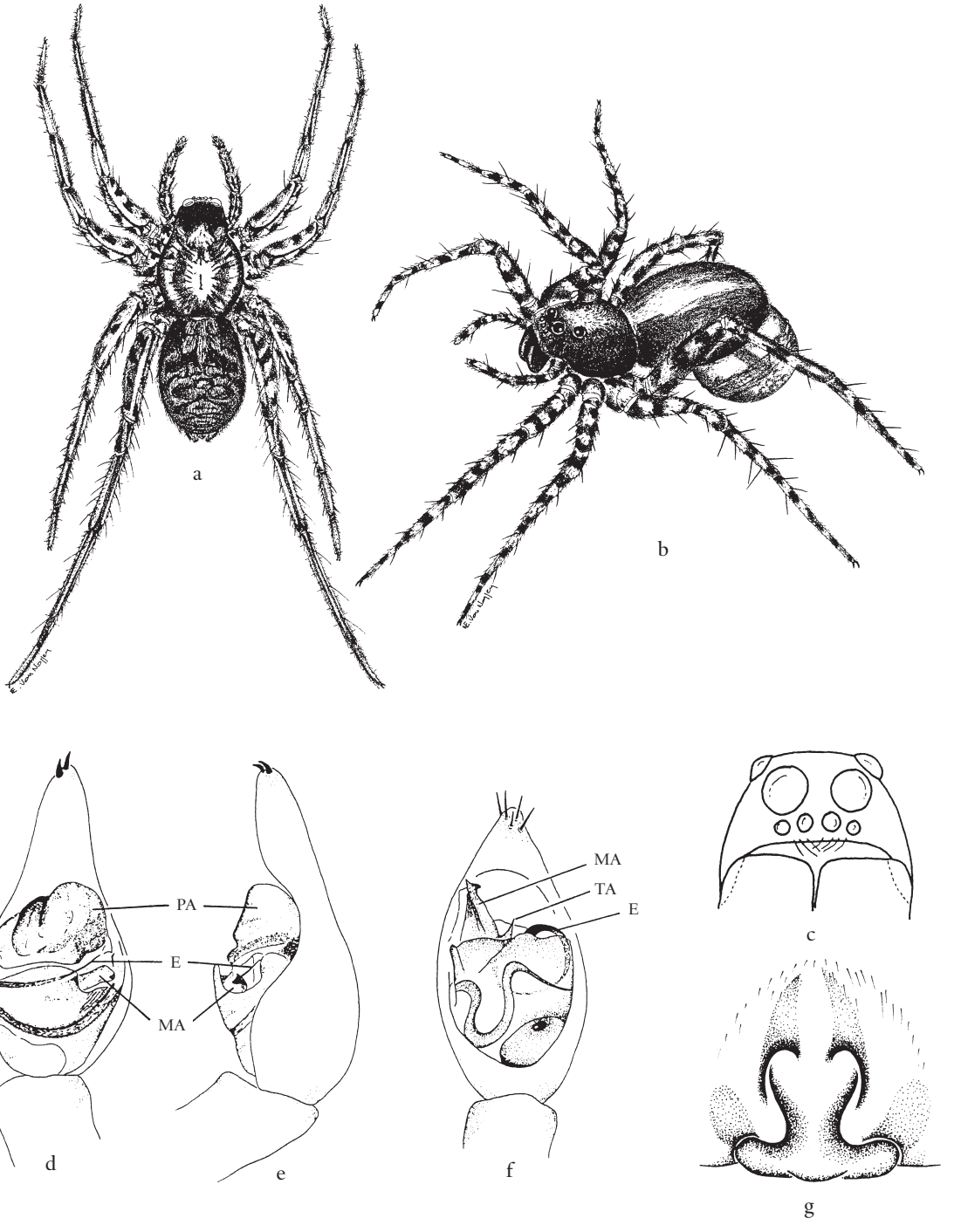


Fig. 56. **Lycosidae.** *Pardosa* sp. **a.** female habitus (7 mm); **b.** female with egg cocoon (7 mm); **c.** eye pattern, frontal view; **d.** left male palp, ventral view; **e.** left male palp, retrolateral view; *Evippa* sp. **f.** left male palp, ventral view; *Trochosa* sp. d. epigyne. E: embolus; MA: median apophysis; PA: palea; TA: terminal apophysis.

FAMILY MALKARIDAE Davies, 1980

PITTED SPIDERS

Fig. 57

Type genus

Malkara Davies, 1980.

Other genera

Malkarinae: only type genus; Sternodinae: *Carathea* Moran, 1986; *Chilenodes* Platnick & Forster, 1987; *Sternodes* Butler, 1929. Represented by 10 species (Platnick, 2005).

Diagnostic characters

Very small to small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; with deep alveolations and a pair of sulci on carapace; male palpal conductor with a large flange wrapping part of bulbus and embolus; abdomen with a ventral unsclerotised area and two small sclerified pits behind the epigastric fold.

Descriptive characters

- **carapace:** longer than wide (fig. 57a); oval; with raised ocular area (Sternodinae) or flat (Malkarinae); often tuberculate and deeply pitted; provided with a pair of sulci on carapace border between palp and leg I; fovea dark elongate line; clypeus high, concave (fig. 57b).
- **sternum:** shield-shaped, slightly longer than wide, enclosing coxae and meeting in line with carapace edge and sometimes fused with it; tuberculate (fig. 57c).
- **eyes:** eight on distinct elevation in two recurved rows (Sternodinae) or posterior row procurved (Malkarinae); subequal; anterior median eyes dark, remainder light (fig. 57a).
- **chelicerae:** slim, vertical; without lateral condyle; promargin with one or two teeth, retromargin with two to four teeth; no stridulating file; fang slender.
- **mouthparts:** endites broad, converging; serrula and scopulae present; labium wider than long, triangular, fused to sternum in adults (fig. 57c).
- **legs:** three toothed claws, superior ones elongated with numerous teeth; legs slender; 1423 or 4123; coxae originating from narrow extensions; no spines or scopulae (Sternodinae); tibiae and metatarsi of legs I and II with prolateral row of spines with setae on small tubercles; no scopulae (Malkarinae); one to several trichobothria on tibiae, one subdistal on metatarsus; tarsal organ capsulate.
- **female palp:** with long and slender claw.
- **abdomen:** oval, with frontal ridged and indented scutum surrounding pedicel and bearing epigastric furrow, genital openings and booklungs; these sometimes connected by a slit running from unsclerotised area behind epigastric furrow, provided with one or two sclerified pits (figs 57a-c).
- **spinnerets:** six; surrounded by sclerotised ring; anterior pair often with median stridulatory ridges; median pair tiny; posterior pair two-segmented; posterior lateral spinnerets lack araneoid triplet; colulus large and sclerotized or absent.
- **respiratory system:** two booklungs; broad tracheal spiracle opens in ring surrounding spinnerets.
- **genitalia:** entelegyne; epigyne simple with one or two openings (figs 57c, f); coiled ducts run forward and back to widely separated spermathecae; male palp: with unmodified segments; paracymbium mid-ectal, bifid (Sternodinae) or proximal (Malkarinae); embolus long and coiled whip-like around bulbus; conductor with greatly enlarged flange, enclosing most of embolus and wrapped around bulbus, its distal end with one or more appendages (figs 57d, e).
- **body size:** 2-4 mm.
- **colour:** orange to deep red; sometimes with darker central pattern.

Taxonomic status

Placed in the Palpimanoidea with Mimetidae as the sister-group (Coddington & Levi, 1991), but according to Schütt (2000) they belong in the Araneoidea as originally conceived.

Distribution

Australia, Tasmania, New Zealand, South America (Chile).

Lifestyle

Malkarids are free-living and have been collected from leaf-litter.

Relevant literature

Davies (1980); Moran (1986); Platnick & Forster (1987); Schütt (2000).

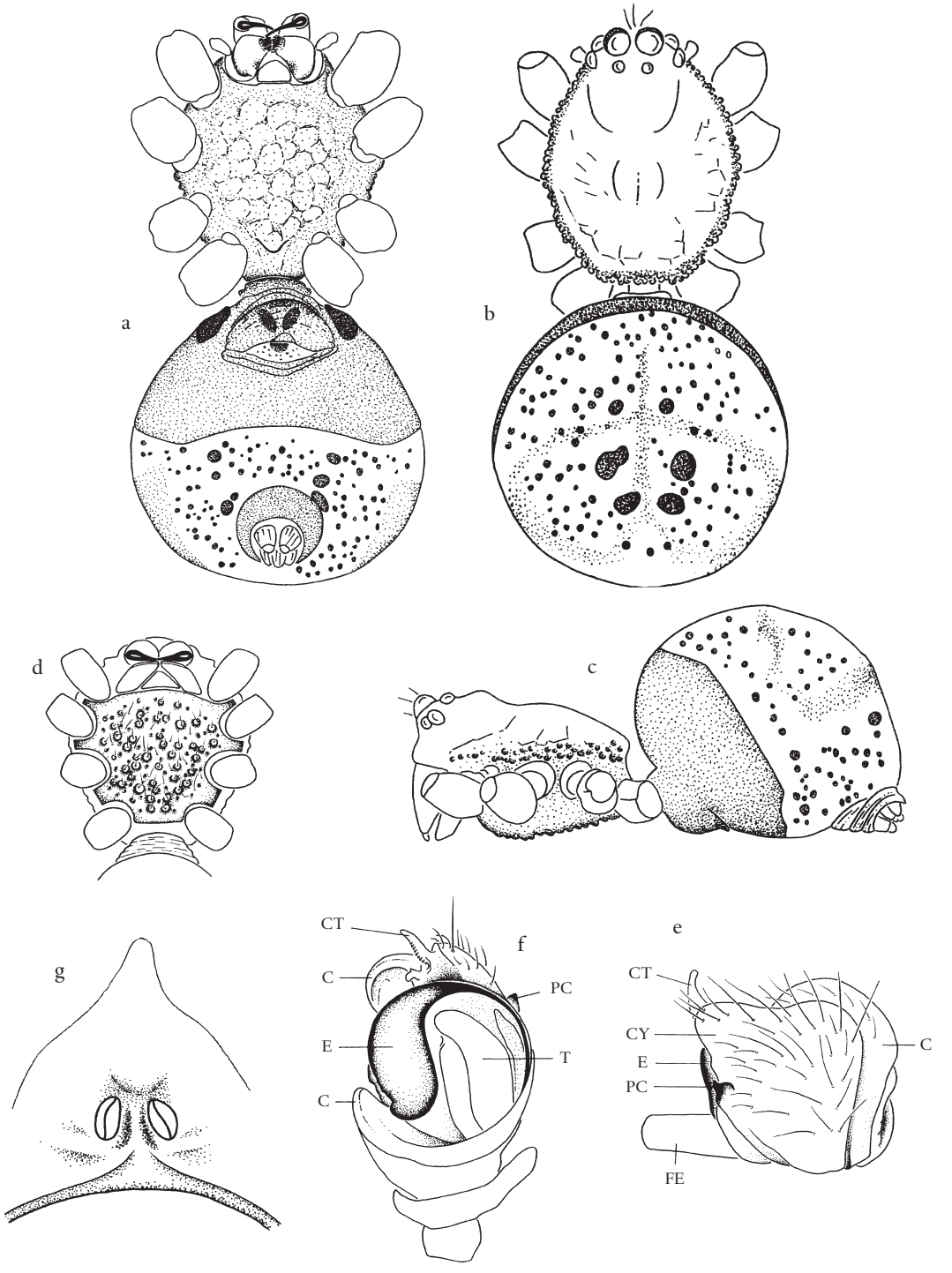


Fig. 57. **Malkaridae.** *Sternodes mullawerringi* **a.** cephalothorax and abdomen, dorsal view (3.7 mm); **b.** lateral view; **c.** ventral view; **d.** cephalothorax, ventral view; **e.** right male palp, ventral view; **f.** male palp, dorsal view; **g.** epigyne. C: conductor; CY: cymbium; CT: conductor tip; E: embolus; FE: femur; PC: paracymbium; T: tegulum; TA: tegular apophysis. (d-f: after Moran, 1986.)

FAMILY MECICOBOTHRIIDAE Holmberg, 1882

MIDGET FUNNEL-WEB TARANTULAS

Fig. 58

Type genus

Mecicobothrium Holmberg, 1882.

Other genera

Megahexura Kaston, 1972; *Hexura* Simon, 1884; *Hexurella* Gertsch & Platnick, 1979. Represented by eight species (Platnick, 2005).

Diagnostic characters

Very small to medium-sized mygalomorph spiders; three tarsal claws; eight eyes; rastellum absent; four or six spinnerets; fovea longitudinal; abdominal sclerites present; apical segment of posterior spinnerets pseudosegmented.

Descriptive characters

- **carapace:** cephalic region not much raised above thoracic part (fig. 58b); distinct eye tubercle; fovea short, longitudinal; tegument smooth (fig. 58a).
- **sternum:** oval; usually with four pairs of small marginal sigilla, frontal pair enlarged, often covering entire width of sternum behind labium (fig. 58d).
- **eyes:** eight, subcontiguous, grouped on transverse raised eye tubercle, in two rows with median eyes separated further from each other than from laterals thus forming two groups of four; curvature of rows variable; anterior lateral eyes largest (fig. 58a).
- **chelicerae:** chelicerae small, laterally compressed (figs 58b, d); in males of *Mecicobothrium* sometimes provided with spiny ridge or apophyses (figs 58a, b, c); no rastellum; cheliceral furrow with one row of teeth and sometimes a group of denticles (fig. 58d).
- **mouthparts:** endites well developed; anterior lobes protruding; serrula with several rows of small teeth; labium much wider than long, separated from sternum by transverse groove; no cuspules on labium and endites (fig. 58d).
- **legs:** moderately slender; with numerous spines on posterior legs; three claws, no claw tufts or scopulae; paired claws with sinuous row of slender teeth, unpaired claw without or with a few teeth; trichobothria in two rows on tibiae, one on tarsi and metatarsi; in some males (except *Hexura*) femora swollen and with brush of heavy spines; tarsi in males of some species pseudosegmented; tarsal organ a slight oval elevation provided with concentric ridges.
- **female palp:** with claw provided with row of fine teeth.
- **abdomen:** oval, with one or two dorsal sclerites, fused to one in *Hexura* (figs 58a, b).
- **spinnerets:** four or six; anterior spinnerets slender, usually two-segmented; median spinnerets fusiform, unsegmented; posterior pair very long, with three segments, distal one long, often pseudosegmented (fig. 58e).
- **respiratory system:** four booklungs.
- **genitalia:** female genitalia variable: two separate bilobed spermathecae or one quadrilobate or four separate spermathecae; male palp with elongate tibia; cymbium spoon-shaped and elongate with bulbus inserted proximally; conductor and embolus close together, often corkscrew-shaped (figs 58g, f).
- **body size:** 2.5-8 mm, rarely larger, except for *Megahexura*, which can grow to 18 mm in length.
- **colour:** pale yellow to brown with darker markings.

Taxonomic status

Placed in the Tuberculotae (Mecicobothrioidina) with the Microstigmatidae as sister-group (Raven, 1985), but according to Goloboff (1993), followed by Coddington *et al.* (2004), the family is sister to all other mygalomorphs except Atypidae and Antrodiaetidae. The family was revised by Gertsch & Platnick (1979) with Raven (1985) providing an overview with a key to the genera.

Distribution

Western parts of North America, South America (Argentina, Mexico, Uruguay).

Lifestyle

Live on top of a funnel web they build in small crevices or deep in the litter layer of forests; their egg cocoons are tiny and contain only a few eggs.

Relevant literature

Coyle (2005d); Gertsch & Platnick (1979); Goloboff (1993); Raven (1985).

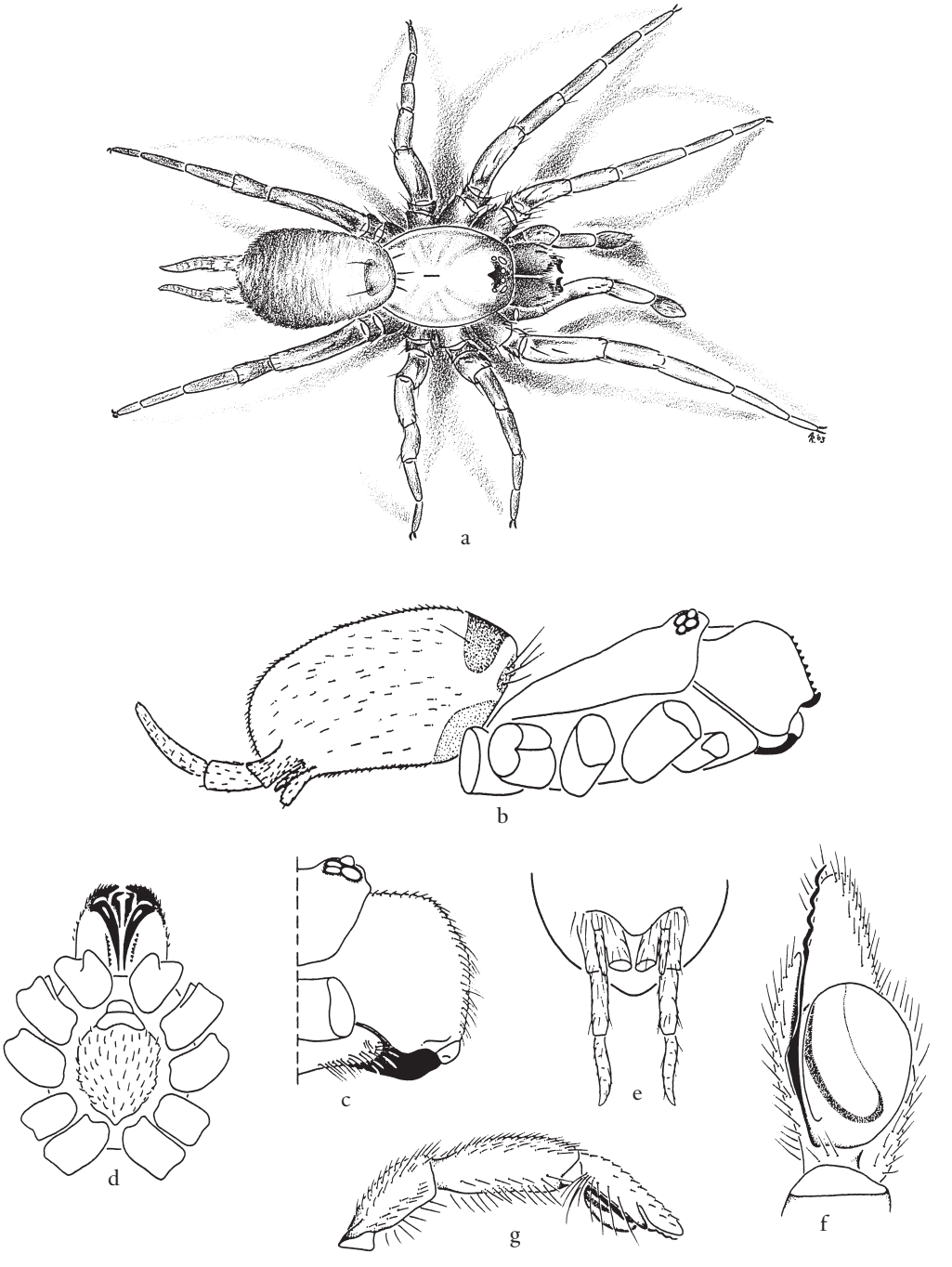


Fig. 58. **Mecicobothriidae.** *Mecicobothrium thorelli* **a.** female habitus (6 mm); **b.** cephalothorax and abdomen, lateral view; **c.** detail of frontal part; **d.** cephalothorax, ventral view; **e.** spinnerets, ventral view; **f.** right male palp, ventral view; **g.** right male palp, lateral view.

FAMILY MECYSMAUCHENIIDAE Simon, 1895

STRIPED LONG-JAWED SPIDERS

Fig. 59, pl. 9

Type genus

Mecysmauchenius Simon, 1884.

Other genera

Mecysmaucheniinae: *Aoteroa* Forster & Platnick, 1984; *Mecysmauchenioides* Forster & Platnick, 1984; *Mesarchaea* Forster & Platnick, 1984; *Semysmauchenius* Forster & Platnick, 1984; Zearchaeinae: *Chilarchaea* Forster & Platnick, 1984; *Zearchaea* Wilton, 1946. Represented by 23 species (Platnick, 2005).

Diagnostic characters

Very small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six or eight eyes; only two spinnerets; chelicerae originating from a foramen in the carapace.

Descriptive characters

- **carapace:** cephalic region raised, when seen in profile it is almost rectangular (figs 59a, b, e); thoracic and cephalic regions not separated by a constriction; anterior part of carapace with a foramen from where chelicerae originate; foramen sometimes with triangular chilum between chelicerae (*Zearchaea*).
- **sternum:** shield-shaped, not much longer than wide; pointed posteriorly; elevations opposite coxae I-III and between coxae IV (fig. 59c).
- **eyes:** six (anterior median eyes lost) or eight in two rows; lateral eyes contiguous and well separated from medians, which are well separated from each other (fig. 59d).
- **chelicerae:** long, stout or slender with one (Zearchaeinae) or two (Mecysmaucheniinae) rows of peg teeth on promargin (fig. 59d); true teeth on retromargin; cheliceral gland opens from distinct mound; fang short.
- **mouthparts:** endites converging almost meeting in midline; serrula strongly developed; labium wider than long (fig. 59c).
- **legs:** slender; spines absent but with plumose hairs; tarsi longer than metatarsi; with three claws, based on week onychium; tarsi with small ring of unsclerotized cuticle; two or three trichobothria on tibiae, one subdistal on metatarsi.
- **female palp:** small, without claw.
- **abdomen:** oval; usually with small sclerotized plate in epigastric region; abdominal hairs short, plumose.
- **spinnerets:** two: posterior median and posterior lateral pairs reduced, replaced by spigots in single line; colulus represented by hairs (fig. 59f).
- **respiratory system:** anterior booklungs and tracheal system originating from small spiracle just in front of spinnerets.
- **genitalia:** haplogyne (fig. 59h); internal structure: consisting of a series of one arched median and several small receptacula leading into bursa by long slender ducts; male palp often with modified tibia; bulbus pyriform, divided by transverse groove; embolus short and inconspicuous; together with other appendages inserted on distal end of tegulum (fig. 59g).
- **body size:** 1.5-7 mm.
- **colour:** variable; carapace pale to reddish brown, sometimes with longitudinal darker bands; abdomen uniform or with clear pattern of purplish chevrons on pale background.

Taxonomic status

Most of the descriptive work has been done by Forster & Platnick (1984). Coddington & Levi (1991) and Coddington *et al.* (2004) list the Mecysmaucheniidae in the subfamily Palpimanoidea with the Archaeidae as sister-group, but Schütt (2000) has argued that the family belongs in the Araneoidea together with other families in the complex of archaeid-like spiders.

Distribution

New Zealand, South America (Argentina, Chile and southern islands, Falkland and Juan Fernandez).

Lifestyle

Free-living, cryptozoic spiders most often found in the litter layer of forests, but occasionally in grass tussocks, moss and tree trunks. They make a flat egg sac, convex on the exposed side.

Relevant literature

Forster & Platnick (1984); Schütt (2000).

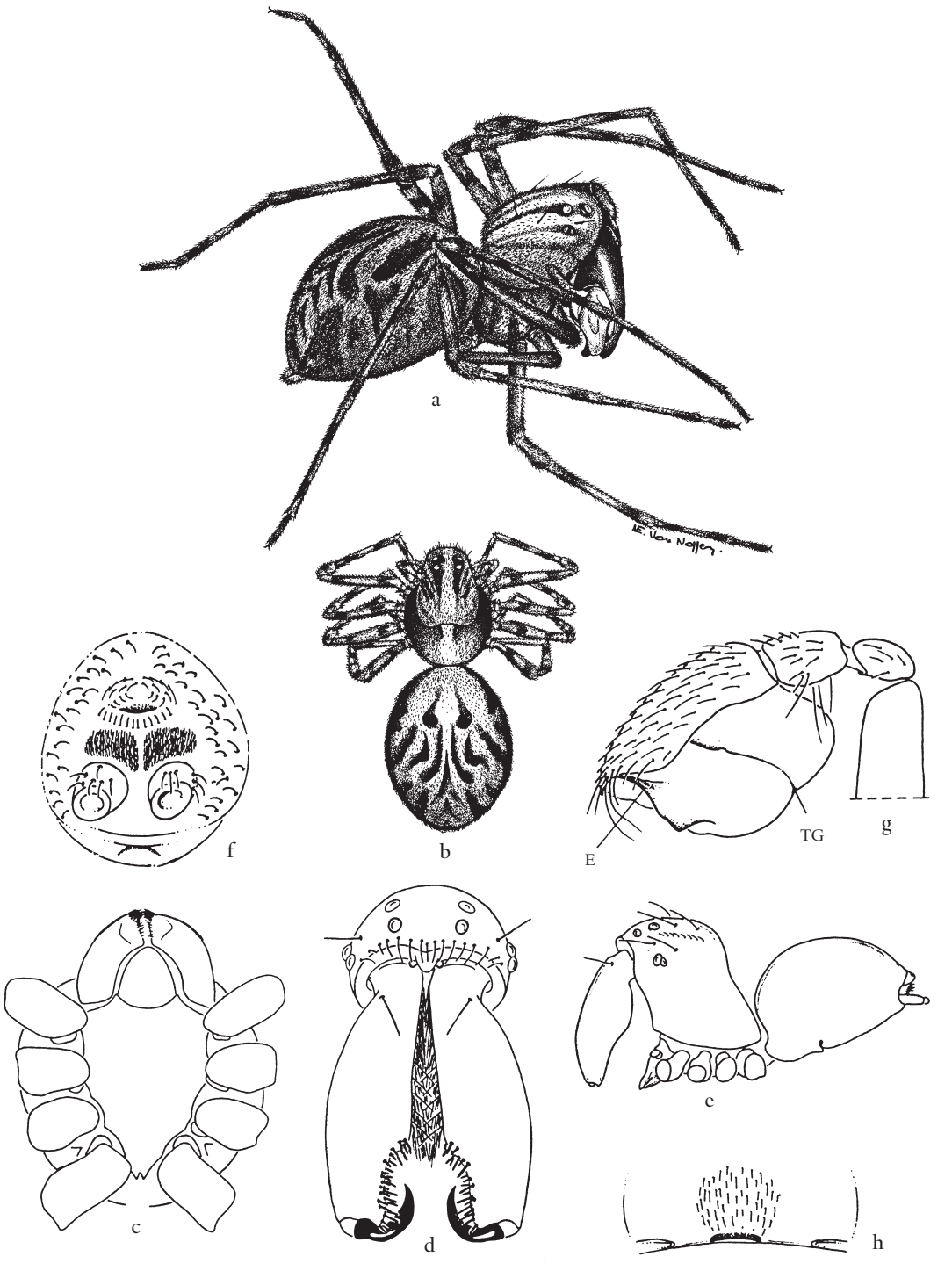


Fig. 59. **Mecysmaucheniidae.** *Aoteroa magna*. **a.** male, natural posture (3 mm); **b.** female, dorsal view; **c.** cephalothorax, ventral view; **d.** cephalothorax, frontal view; **e.** cephalothorax and abdomen, lateral view; **f.** abdomen, ventral view; **g.** left male palp, lateral view; **h.** genital area of female. E: embolus; TG: tegular groove. (a: after a photo in Forster & Platnick, 1984.)

FAMILY MICROPHOLCOMMATIDAE Hickman, 1943

MICRO GONDWANA SPIDERS

Fig. 60

Type genus

Micropholcommata Crosby & Bishop, 1927.

Other genera

Micropholcommatinae: *Eterosonycha* Butler, 1932; *Olgania* Hickman, 1979; *Parapua* Forster, 1959; *Pua* Forster, 1959; *Teutoniella* Brignoli, 1981; Textricellinae: *Textricella* Hickman, 1945; *Tricella* Forster & Platnick, 1989. Represented by 33 species (Platnick, 2005).

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; six or eight eyes; cheliceral gland mound elevated; anterior booklungs reduced to either a few leaves or true tracheae.

Descriptive characters

- **carapace:** strongly raised cephalic region but poorly separated from thoracic region (figs 60a, b); fovea indistinct or absent; integument smooth.
- **sternum:** shield-shaped; as long as wide; bluntly rounded posteriorly (fig. 60d).
- **eyes:** six (anterior median eyes lost) or eight; anterior median eyes smallest; lateral eyes contiguous, well separated from medians (figs 60b, c).
- **chelicerae:** vertical, with teeth on both margins; peg teeth usually present on promargin at least in males; cheliceral gland opens from a small mound with few pores.
- **mouthparts:** endites converging but do not in midline; serrula a single row of denticles; labium subrectangular, as wide as or wider than long (fig. 60d).
- **legs:** tarsi longer than metatarsi; three claws, each with a row of teeth; trichobothria present on tibiae and metatarsi; spines absent but with plumose hairs.
- **female palp:** small, without claw.
- **abdomen:** ovoid; with scutum or coriaceous tegument; often with scuta over epigastric fold.
- **spinnerets:** six, contiguous; triplet present in both sexes; piriform gland spigots with reduced base; aggregate gland spigot larger than accompanying flagelliform spigot; colulus strongly developed.
- **respiratory system:** booklungs replaced by poorly developed frontal tracheal system; without posterior tracheae (Textricellinae); with two tracheal systems of which the posterior one opens through a median spiracle just in front of spinnerets; a more strongly developed frontal one departs from a large atrium; one branch reaches the carapace (Micropholcommatinae).
- **genitalia:** entelegyne; epigyne more or less strongly developed; internal structure with pair of spermathecae (fig. 60f); male palp (fig. 60e) often with strongly modified patella and tibia reduced to a plate pressed against the cymbium; cymbium without modifications; embolus variable: short and tubular or long and coiled, accompanied by a single tegular appendage.
- **body size:** 1-2 mm.
- **colour:** darkish spiders.

Taxonomic status

This family is placed in the superfamily Palpimanoidea (Coddington & Levi, 1991). However, in a recent study by Schütt (2000, 2003), it is suggested the family should be placed in the Araneoidea and be synonymized with the Anapidae.

Distribution

Australia, Chile, Tasmania, New Zealand.

Lifestyle

Little is known about the lifestyle of Micropholcommatidae but there are a few observations of tangled webs comparable to those of Theridiidae.

Relevant literature

Forster & Platnick (1984); Platnick & Forster (1986); Schütt (2000, 2003).

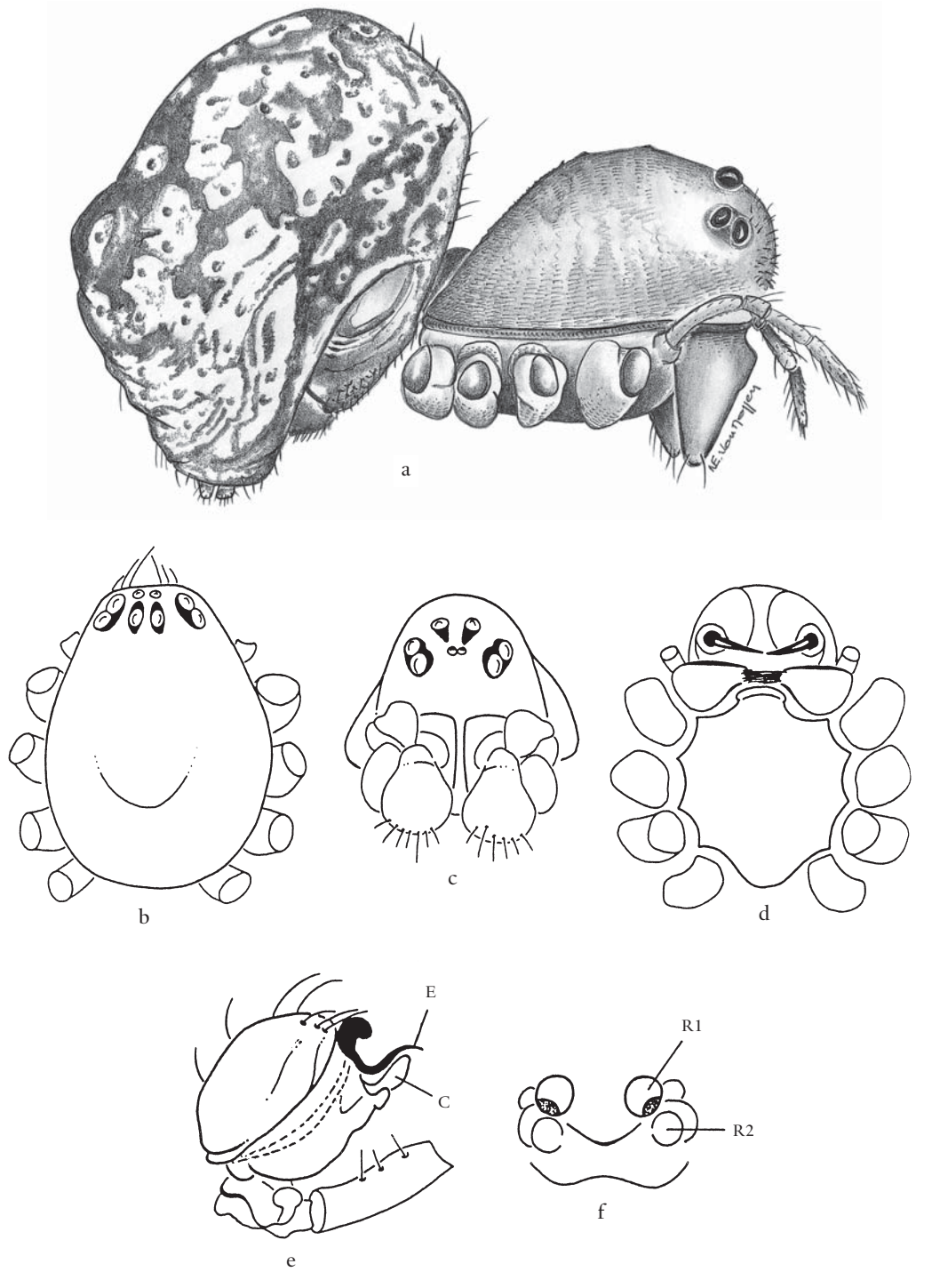


Fig. 60. **Micropholcommatidae.** *Teutoniella cekalovici* **a.** cephalothorax and abdomen, lateral view (1.5 mm); *Textricella vulgaris* **b.** cephalothorax, dorsal view; **c.** frontal view; **d.** ventral view; **e.** right male palp, lateral view; **f.** epigyne. C: conductor; E: embolus; R1: first receptaculum; R2: second receptaculum. (a: after Platnick & Forster, 1986.)

FAMILY MICROSTIGMATIDAE Roewer, 1942

MICRO-MYGALOMORPHS

Fig. 61, pl. 4

Type genus

Microstigmata Strand, 1932.

Other genera

Envia Ott & Höfer, 2003; *Micromygale* Platnick & Forster, 1982; *Microstigmata* Strand, 1932; *Ministigmata* Raven & Platnick, 1987; *Pseudonemesia* Caporiacco, 1955; *Spelocteniza* Gertsch, 1982; *Xenonemesia* Goloboff, 1989. Represented by 13 species in two subfamilies, Micromygalinae and Microstigmatinae.

Diagnostic characters

Small to medium-sized mygalomorph spiders; three tarsal claws; eight eyes (or two); rastellum absent; two, four or six spinnerets; booklung openings small, round; body covered with blunt-tipped or clavate setae; thoracic region elevated behind fovea.

Descriptive characters

- **carapace:** glabrous, covered with blunt-tipped or clavate setae (figs 61a, c); thoracic region as high as cephalic region; fovea straight to slightly recurved, depressed.
- **sternum:** sigilla small, marginal if evident.
- **eyes:** eight or two (*Micromygale*); closely grouped in two rows on a tubercle (fig. 61b).
- **chelicerae:** furrow with 6-13 teeth on promargin; rastellum absent.
- **mouthparts:** labium domed, with cuspules; serrula present and variable or reduced.
- **legs:** three claws; paired claw with two rows of teeth, originating near dorsal surface; tarsal organ protruding above dorsal surface of tarsus; tibia I of male with prolateral spur (figs 61e, f); leg integument with broad scales, fine pustules or clavate setae.
- **female palp:** tarsus with toothed claw; teeth prolaterally inserted in Microstigmatinae.
- **abdomen:** oval; covered with erect, blunt-tipped setae; sometimes with large dorsal scutum (*Micromygale*); booklung openings small and round (fig. 61d).
- **spinnerets:** two, four (*Microstigmata*) or six (*Micromygale*); posterior spinnerets short; apical segment domed.
- **respiratory system:** four booklungs with distinct oval openings (fig. 61d).
- **genitalia:** spermathecae simple (fig. 61h) and simple or branched, chitinous walls with numerous pores; male palp with bulbous pyriform, conductor absent; third haematodocha not discernible (fig. 61g).
- **body size:** 4-13 mm.
- **colour:** various shades of brown.

Taxonomic status

According to Raven (1985), the microstigmatids belong to the microorder Tuberculotae and are the sister-group of the Mecicobothriidae, which form the Mecicobothriodina. Goloboff (1993) placed the family together with the Nemesiidae in a clade containing the Theraphosoidina, far away from the Mecicobothriidae. A key to the genera is available (Raven, 1985). Griswold (1985) revised the microstigmatids of Africa.

Distribution

South Africa (*Microstigmata*), South America (*Envia*, *Pseudonemesia*, *Ministigmata, Spelocteniza, Xenonemesia*), Panama (*Micromygale*).

Lifestyle

Free-living spiders usually encrusted with earth and often found in the undergrowth and under stones in humid forests.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Griswold (1985); Goloboff (1993); Platnick & Forster (1982); Raven & Platnick (1981); Raven (1985).

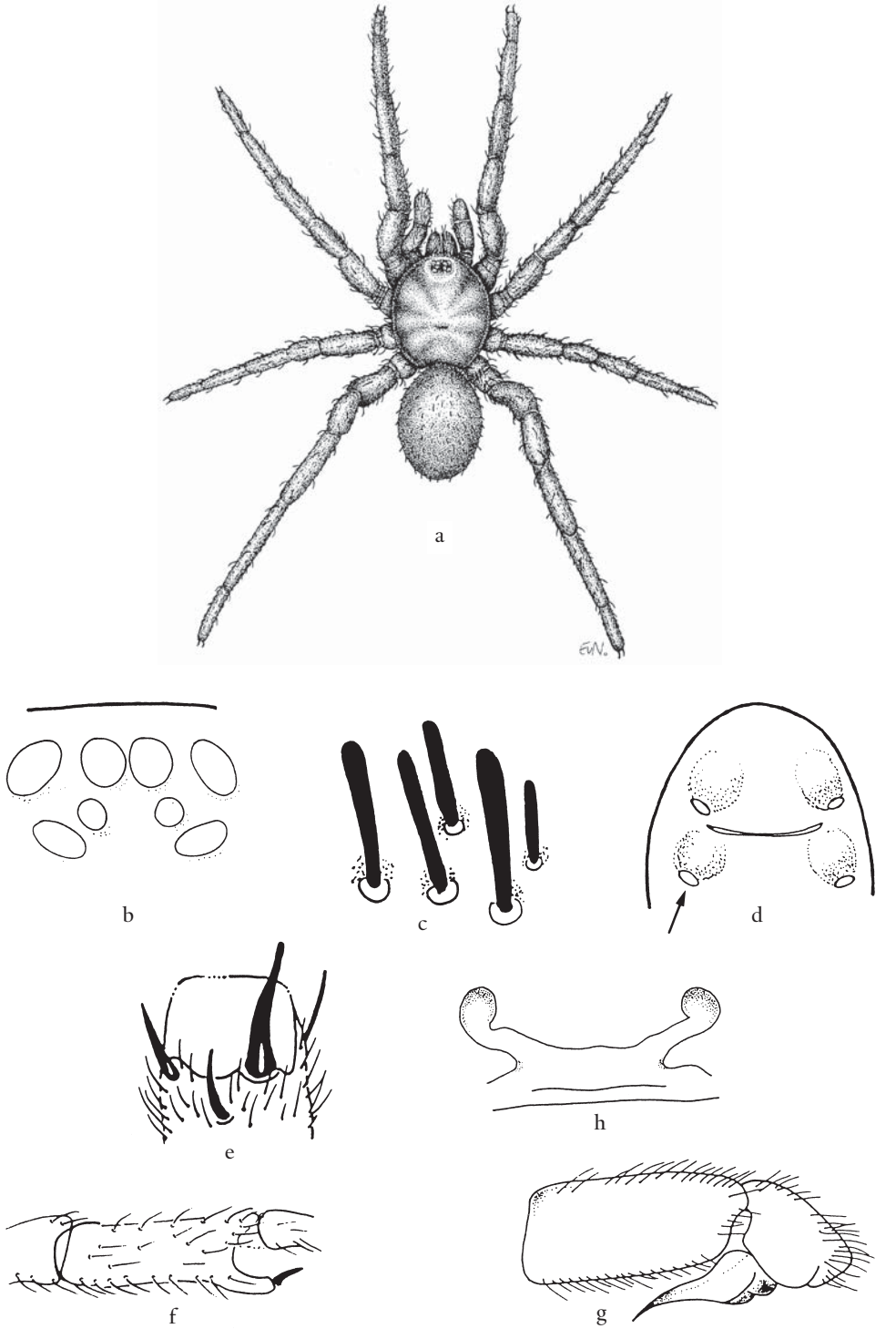


Fig. 61. **Microstigmatidae.** *Microstigmata* sp. **a.** female habitus (10 mm); **b.** eye pattern, dorsal view; **c.** clavate setae; **d.** booklung openings; **e.** tip of male tibia I with clasping spur, ventral view; **f.** male tibia I with apophysis, lateral view; **g.** male palp, retrolateral view; **h.** spermathecae.

FAMILY MIGIDAE Simon, 1892

RIDGEFANGED TRAPDOOR SPIDERS

Fig. 62, pl. 2

Type genus

Migas L. Koch, 1873.

Other genera

Calathotarsus Simon, 1903; *Goloboffia* Griswold & Ledford, 2001; *Heteromigas* Hogg, 1902; *Mallecomigas* Goloboff & Platnick, 1987; *Micromesomma* Pocock, 1895; *Migas* L. Koch, 1873; *Moggridgea* O.P.-Cambridge, 1875; *Paramigas* Pocock, 1895; *Poecilomigas* Simon, 1903; *Thyropoeus* Pocock, 1895. Represented by 91 species (Platnick, 2005) in three subfamilies: Calathotarsinae, Miginae and Paramiginae.

Diagnostic characters

Small to large mygalomorph spiders; three tarsal claws; eight eyes; rastellum absent; four spinnerets; two distinct longitudinal keels on outer surface of cheliceral fang; chelicerae short with fangs directed obliquely (plagiognathy).

Descriptive characters

- **carapace:** fovea recurved, straight or T-shaped (fig. 62a); cephalic region glabrous; thoracic region arched or lower than fovea (fig. 62c); caput arched (Calathotarsinae).
- **sternum:** with one pair of sigilla (fig. 62d).
- **eyes:** eight; in two rows, occupying almost half of head width, group shape rectangular; not on tubercle (fig. 62b).
- **chelicerae:** short; fangs directed obliquely (fig. 62e); outer surface of cheliceral fang with two distinct, longitudinal keels (fig. 62f); small medial tooth on outer fang (Miginae); cheliceral furrow usually with two rows of teeth; serrula absent; rastellum absent.
- **mouthparts:** cuspules present on labium and endites of females (fig. 62e); present or absent in males; serrula absent.
- **legs:** three claws; paired claws with reduced number of teeth in one row; metatarsi I and II with four or more pairs of strong setae or spines (fig. 62g); tibia III with dorsal excavation (Paramiginae) (fig. 62h); preening combs on metatarsi IV present or absent.
- **female palp:** with toothed claw.
- **abdomen:** oval.
- **spinnerets:** four, apical segment of posterior spinnerets domed.
- **respiratory system:** four booklungs.
- **genitalia:** spermathecae paired, simple, unbranched (fig. 62j); male palp with distal haematodocha of bulbus small, distal sclerite conical (fig. 62i).
- **body size:** 5-25 mm.
- **colour:** various shades of brown to black, legs and/or abdomen frequently patterned.

Taxonomic status

Raven (1985) listed the Migidae in the superfamily Migoidea of the Rastelloidina, with the Actinopodidae as a sister-group, a placement corroborated by Goloboff (1993). Goloboff & Platnick (1987) regarded these two families as the most derived representatives of the microorder Fornicephalae. Raven (1985) provided an overview of the Migidae with keys to the genera. Griswold (1987a, b) revised two genera of the Afrotropical Region.

Distribution

Restricted to the continents of the Southern Hemisphere: South America, Australia including Tasmania, New Caledonia, New Zealand, Madagascar and South Africa.

Lifestyle

Migids are arboreal (fig. 62k) and terrestrial trapdoor spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Goloboff (1993); Griswold (1987a, b); Griswold & Ledford (2001); Raven (1985).

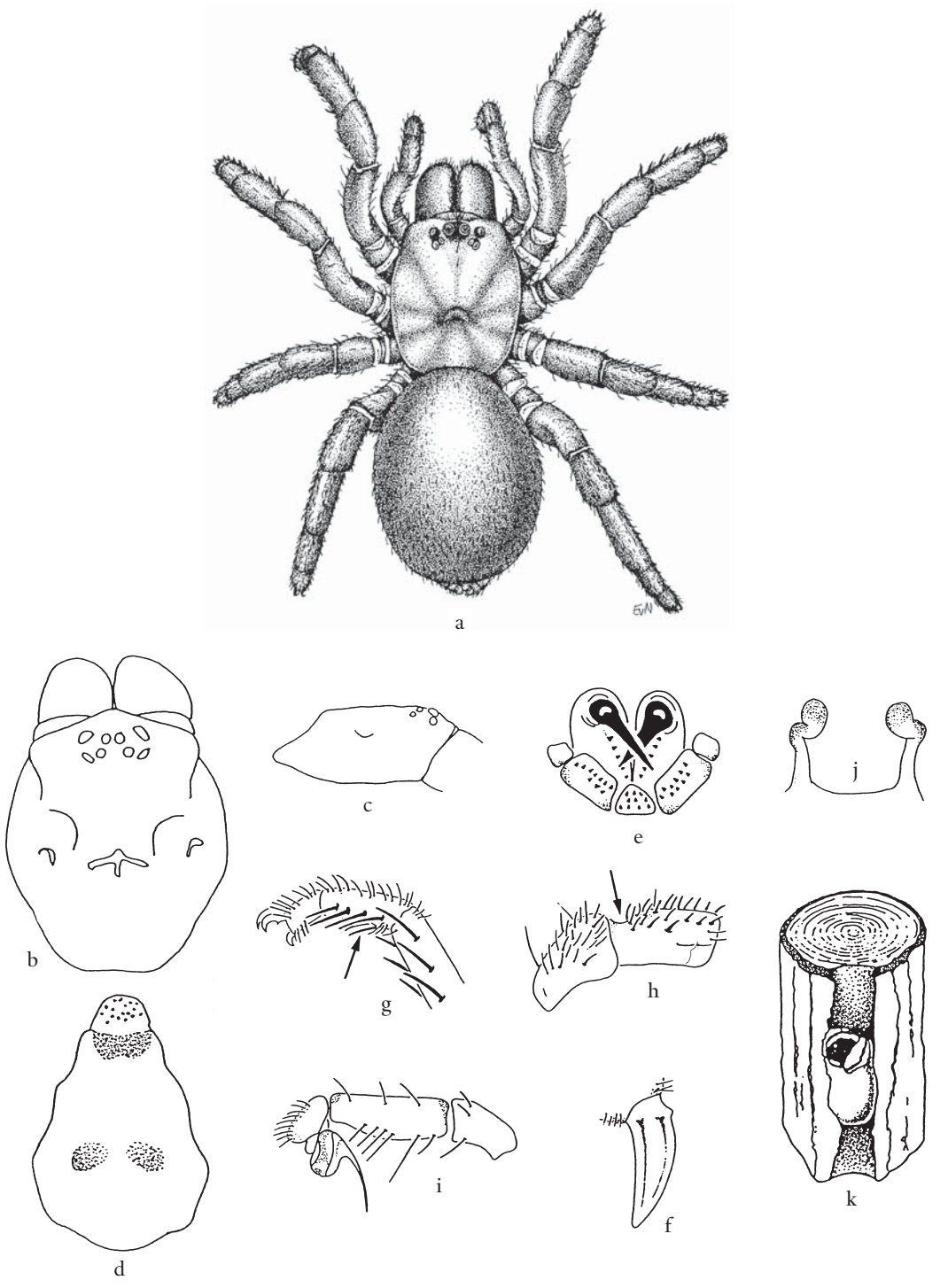


Fig. 62. **Migidae.** *Moggridgea* sp. **a.** habitus female (12 mm); **b.** cephalothorax, dorsal view; **c.** cephalothorax, lateral view; **d.** sternum and labium, ventral view; **e.** chelicerae and mouthparts, ventral view; **f.** cheliceral fang, showing median tooth and longitudinal keels; **g.** leg I, showing paired row of setae on metatarsus and tibia; **h.** tibia III, showing dorsobasal depression; **i.** male palp, retrolateral view; **j.** spermathecae; **k.** retreat on tree trunk.

FAMILY MIMETIDAE Simon, 1881

PIRATE SPIDERS

Fig. 63, pl. 10

Type genus

Mimetus, Hentz, 1832.

Other genera

Represented by 12 genera and 156 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; prolateral spination on tibiae and metatarsi I and II modified; chelicerae with peg teeth.

Descriptive characters

- **carapace:** oval; thoracic region sloping, fovea weakly developed; cephalic region varies from long and attenuated to short and sharply convex near middle; carapace sometimes with rows of long spines.
- **sternum:** scutiform; longer than wide; widely pointed behind.
- **eyes:** eight; anterior median eyes usually largest; lateral eyes equal in size, connate and raised on a small common protuberance; well separated from median eyes; anterior median eyes frequently raised on a small, square protuberance (fig. 63b).
- **chelicerae:** relatively long (especially in some males); directed vertically; fused at base; inner side separated by a narrow, triangular, elongated, membranous fissure; cheliceral promargin with peg teeth (fig. 63c).
- **mouthparts:** labium as wide as long or longer than wide; endites long, almost parallel, ventrally with fairly short submarginal serrula.
- **legs:** long and slender with strong spines; three claws; legs I and II only slightly longer than others or anterior legs much longer; tibiae and metatarsi I and II with modified prolateral spination consisting of series of short spines, interspersed with series of longer, slightly curved spines (fig. 63d); trichobothria on tibiae and metatarsi; tarsal organ capsulate with smooth dome.
- **female palp:** with claw.
- **abdomen:** variable in shape; often broad and angular in front or provided with humeral humps (fig. 63a); or with two apical tubercles or four large humps; integument usually with very strong, isolated setae.
- **spinnerets:** six; with peculiarly enlarged, rounded and incised cylindrical gland spigots; triplet absent; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle single, near base of spinnerets.
- **genitalia:** entelegyne; epigyne distinct, heavily sclerotized but relatively simple (fig. 63f); usually with lobed posterior extension; two thick-walled spermathecae; male palp fairly long, with strongly developed paracymbial process; bulb with strongly curved embolus (fig. 63e).
- **body size:** 3-7 mm.
- **colour:** pale yellowish with dark spots or markings on body; legs frequently banded.

Taxonomic status

Mimetidae have been placed for a long time in the Araneoidea, but Forster & Platnick (1984) transferred them together with the Micropholcommatidae to the Palpimanoidea, on the basis of the presence of cheliceral peg teeth. This placement is followed in Coddington *et al.* (2004). According to Schütt (2000), they should remain in the Araneoidea as sister-group to Malkaridae.

Distribution

Worldwide.

Lifestyle

Most mimetids are araneophagous and lack a web. They are encountered in debris on the ground, in low vegetation or on webs of other spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1984); Schütt (2000).

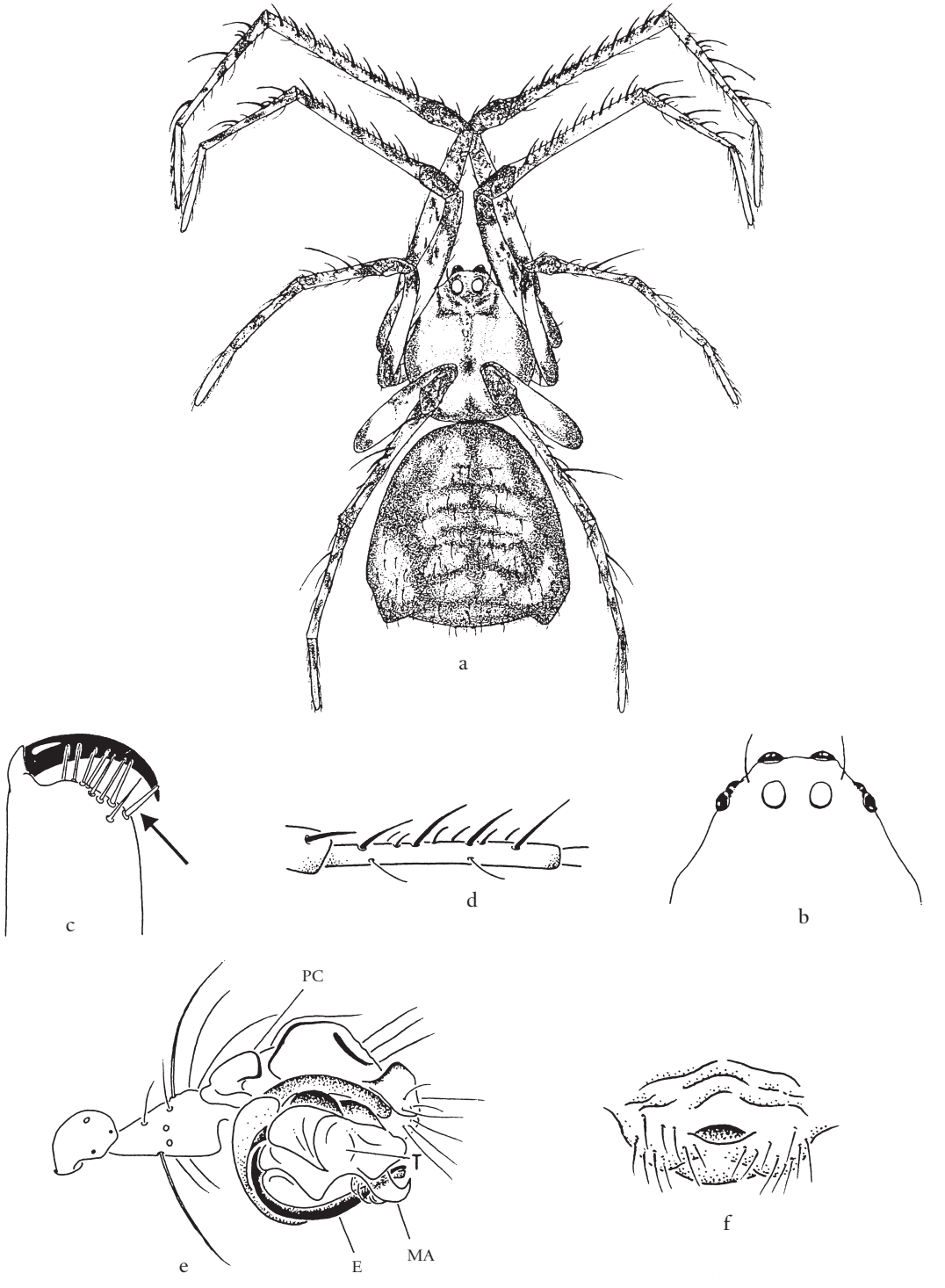


Fig. 63. **Mimetidae.** *Mimetus* sp. **a.** female habitus (6 mm); **b.** eye pattern, dorsal view; **c.** chelicera, frontal view showing peg teeth; **d.** tibia of frontal leg showing spine row with alternating long and short spines; **e.** right male palp, ventral view; **f.** epigyne. E: embolus; MA: median apophysis; T: tegulum; PC: paracymbium.

FAMILY MITURGIDAE Simon, 1885

PROWLING SPIDERS

Fig. 64, pl. 27

Type genus

Miturga Thorell, 1870.

Other genera

Represented by eight genera (*Diaprograpta, Mituliodon, Prochora, Syrisca, Syspira, Teminius, Zealoctenus*) and about 40 species (Raven, pers. comm.) from one subfamily: Miturginae.

Diagnostic characters

Small to very large araneomorph spiders; two tarsal claws; ecribellate; entelegyne, eight eyes; three pairs of weak spines on ventral tibiae I, II of females; posterior spinnerets two-segmented, distal segment long or short; spigots only apical on posterior median spinnerets of females; males lack tibial crack; grate-shaped tapetum.

Descriptive characters

- **carapace:** longer than wide (fig. 64a), often strongly marked.
- **sternum:** oval, flat; apex with obtuse angle.
- **eyes:** eight; in two rows (4:4) (fig. 64b); posterior row procurved or recurved; with grate-shaped tapetum.
- **chelicerae:** sturdy; cheliceral teeth present.
- **mouthparts:** endites enlarged, laterally weakly notched; labium long and usually truncated anteriorly or short.
- **legs:** two claws with or without claw tufts; scopulae present on some tibiae of females or absent, on metatarsi and tarsi I-IV of males and females; two rows of tarsal trichobothria; trochanters deeply notched; tibiae of front legs with three pairs of weak ventral spines; legs long and sturdy in females, longer and more slender in males; male tibiae without subbasal suture (fig. 64c).
- **female palp:** small, with few teeth.
- **abdomen:** ovoid, usually with stripes.
- **spinnerets:** posterior spinnerets two-segmented, distal segment distinctly conical (fig. 64d); apical segment long conical (some *Miturga* species) or short either as long as or shorter than basal segment; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle in front of spinnerets.
- **genitalia:** entelegyne; epigyne with a small median plate (fig. 64f) with anterior extensions and heavily sclerotized internal ducts; male palp (fig. 64e) with distally expanded retrotibial apophysis or with unsclerotized zone (Miturginae); embolus distal; cymbium apically conical, sometimes with weak scopula and spines, some species with retrolateral groove.
- **body size:** 5-28 mm.
- **colour:** various shades of red-brown to dark fawn; abdomen usually with bands, chevrons or spots.

Taxonomic status

The family Miturgidae was established by Lehtinen (1967) who transferred genera from other families but stated that the limits of some subfamilies are unclear and might belong in the Lycosoidea. Here the family is defined according to the definition of Raven & Stumkat (2003), who found that the family is not to be divided into subfamilies. It is very likely that several genera and even subfamilies of this family, as formerly defined, will be redistributed. The inclusion of *Cheiracanthium* and the Eutichurinae as a whole (Ramírez *et al*., 1997) remains doubtful (Deeleman-Reinhold, 2001; Silva, 2003).

Distribution

Middle East, Australia, New Zealand, North and South America.

Lifestyle

Miturgids are free-living, nocturnal, cryptic spiders. Many species hide in sac-like retreats where they guard the egg-case.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Griswold (1993); Raven & Stumkat (2003); Ramírez *et al.* (1997); Silva (2003); Ubick & Richman (2005c).

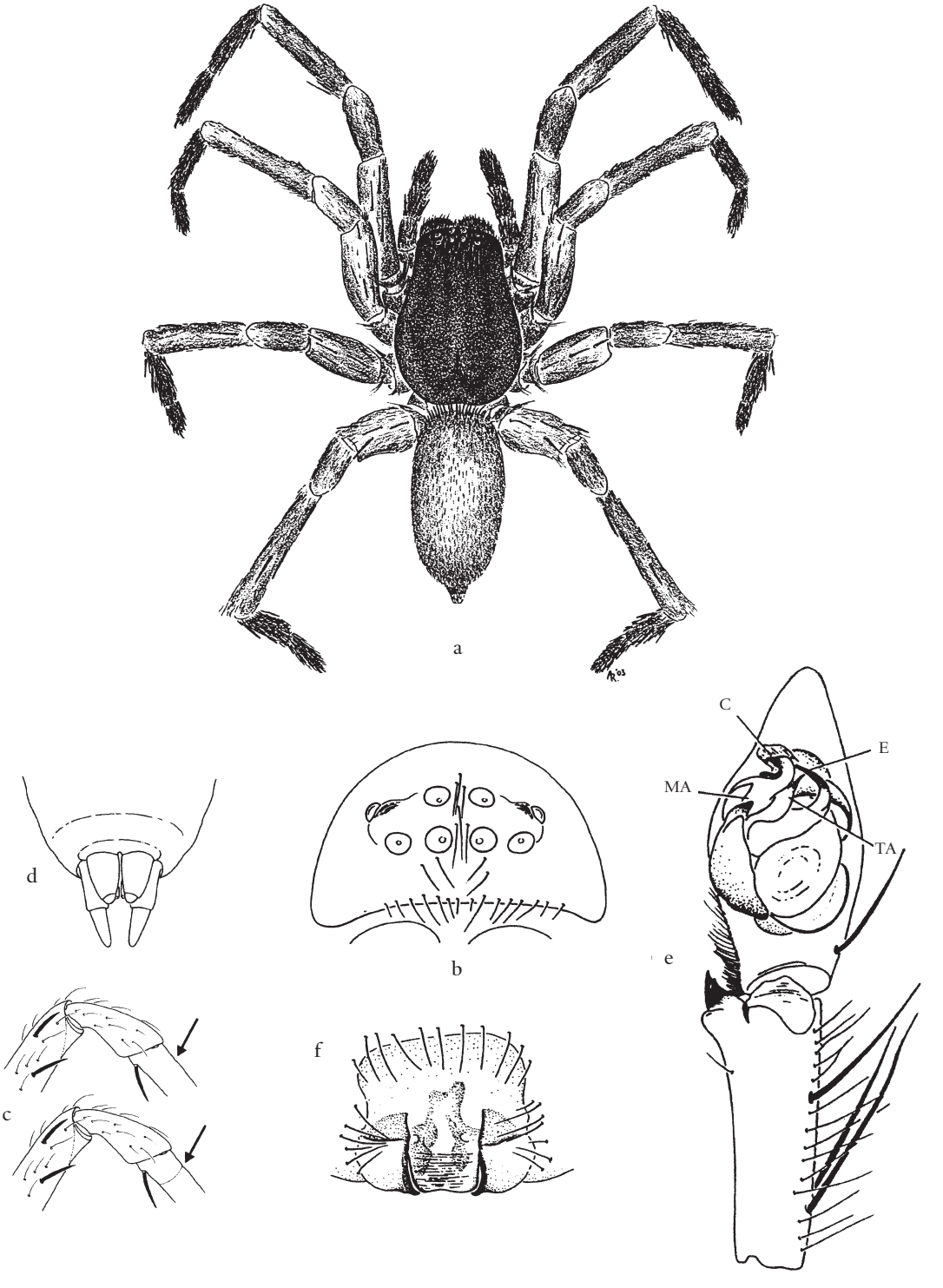


Fig. 64. **Miturgidae.** *Miturga* sp. **a.** female habitus (26 mm); **b.** eye pattern, frontal view; **c.** male tibia showing examples with and without basal suture or crack; **d.** spinnerets, female, ventral view; **e.** right male palp, ventral view; **f.** epigyne. C: conductor; E: embolus; MA: median apophysis; TA: tegular apophysis.

FAMILY MYSMENIDAE Petrunkevitch, 1928

MINUTE CLASPING WEAVERS

Fig. 65, pl. 14

Type genus

Mysmena Simon, 1894.

Other genera

Represented by 22 genera and 91 species (Platnick, 2005).

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; male with mating spine on metatarsus I (sometimes on tibia I as well); cymbium of male palp with lobes or apophyses; female and sometimes males with a sclerotized subdistal ventral spot on anterior femora.

Descriptive characters

- **carapace:** usually high, with highest point behind eyes (fig. 65b), except in *Isela* and *Kilifina* where carapace is flattened.
- **sternum:** truncated, rarely pointed (*Maymena*), between coxae IV.
- **eyes:** eight; in two rows; anterior median eyes usually larger than other eyes; lateral eyes contiguous, situated close to anterior median eyes (fig. 65a).
- **chelicerae:** usually with tiny denticles scattered between cheliceral teeth.
- **mouthparts:** labium rebordered.
- **legs:** three claws; male with mating spine on metatarsi I (fig. 65d); femur I, and sometimes II of female and sometimes male with sclerotized spot ventro-subdistally (fig. 65c); tarsi longer than or equal in length to metatarsi; tarsi IV without serrated setae; tarsal organ capsulate.
- **female palp:** not reduced but lacking a claw.
- **abdomen:** soft; spherical to higher than long; usually bearing scattered, long setae (fig. 65a); scutum sometimes present.
- **spinnerets:** anterior lateral spinnerets with reduced bases of piriform gland spigots; posterior lateral spinnerets with triplet: colulus present.
- **respiratory system:** booklungs usually absent.
- **genitalia:** entelegyne; epigyne usually with simple posterior plate or scapus (fig. 65f); cymbium of male palp with lobes or apophyses (fig. 65e).
- **body size:** < 3 mm.
- **colour:** varies from yellow-brown to grey, sometimes with greenish tinge, abdomen dark grey with pale markings or white spots.

Taxonomic status

After having been considered part of the Theridiidae, Mysmeninae was for some time a subfamily of the Symphytognathidae. Forster & Platnick (1977) accorded the taxon family rank. Coddington & Levi (1991) placed the mysmenids in the Araneoidea and suggested that they are part of the 'higher araneoids', as sister to Symphytognathidae, in a group of families considered to be the sister-group of the Araneidae. Griswold *et al.* (1998), followed by Coddington *et al.* (2004), place the Mysmenidae within the so-called Symphytognathoidea, sister to Anapidae + Symphytognathidae. Schütt (2003) corroborates this placement but claims that the mysmenids must be relimited and the Old World genera transferred to the new family Synaphridae, in accordance with Wunderlich (1986). Wunderlich's (2004) opinion that Anapidae should be widened to include the Mysmenidae is only poorly founded by a 'possible' cladogram.

Distribution

Worldwide.

Lifestyle

Little is known about the behaviour of mysmenids. Some species are kleptoparasites on the webs of other spiders, whereas others spin sheet webs in low vegetation.

Mysmenidae usually inhabit crevices or leaf litter in very humid habitats. Webs are known for a few species and vary from a complex three-dimensional orb with a proliferation of out-of-the-plane radii over a roughly egg-shaped space web to some kind of sheetweb.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1977); Gertsch (1960); Griswold *et al.* (1998); Lopardo & Coddington (2005); Platnick & Shadab (1978a); Schütt (2003); Wunderlich (1986, 2004).

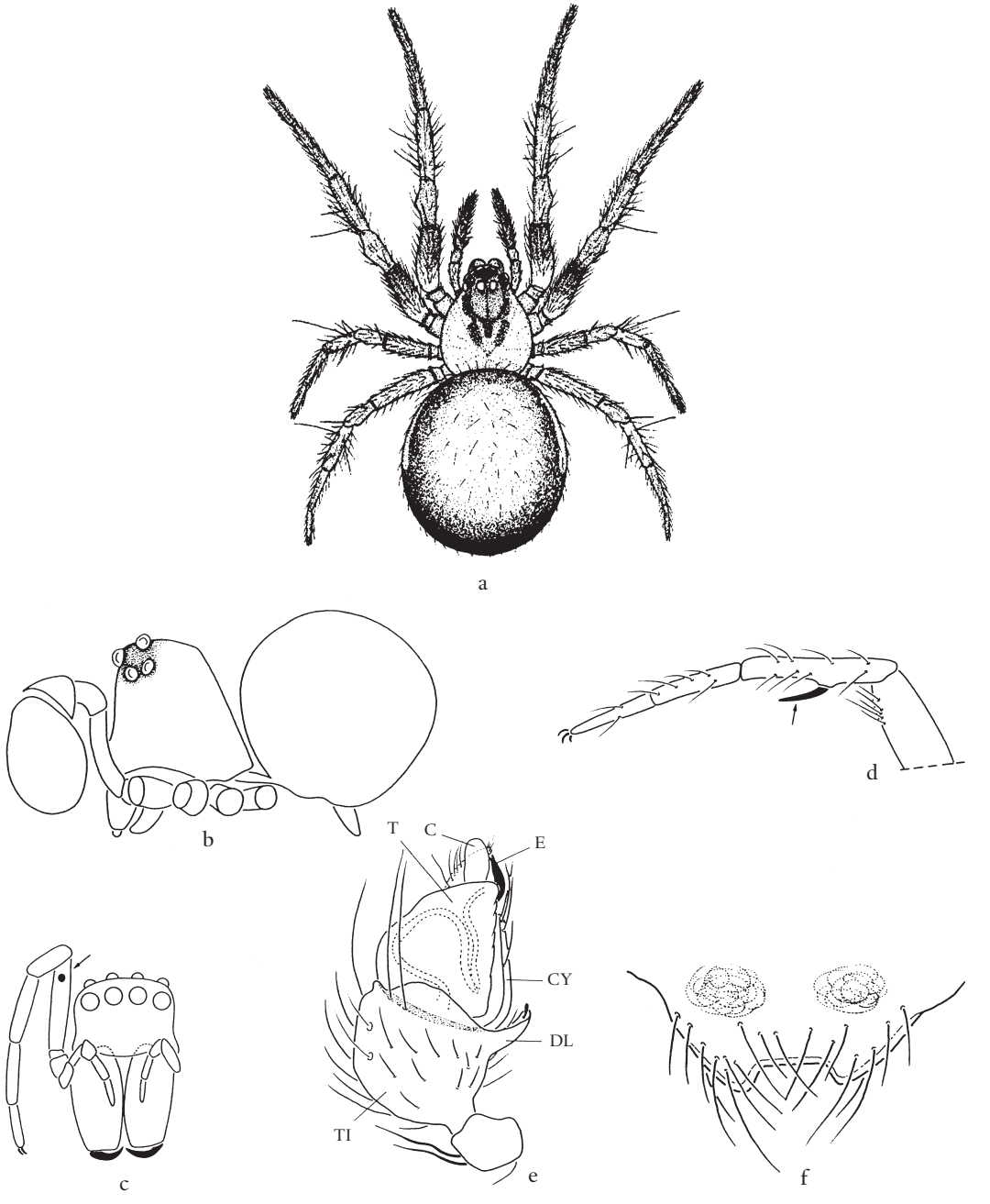


Fig. 65. **Mysmenidae.** *Maymena* sp. **a.** female habitus (1.9 mm); **b.** male cephalothorax and abdomen, lateral view; **c.** female frontal view, showing ventral patch on femur I; **d.** leg I of male, showing tibial spur; *Mysmenopsis viracocha* **e.** male palp; *Mysmenopsis pachacutec* **f.** epigyne. C: conductor; CY: cymbium; DL: distal lobe; E: embolus; TI: tibia. (a: from Murphy & Murphy, 2000; d, e: after Baert, 1990.)

FAMILY NEMESIIDAE Simon, 1892

TUBE-TRAPDOOR SPIDERS, WISHBONE TRAPDOOR SPIDERS

Fig. 66, pl. 4

Type genus

Nemesia Audouin, 1826.

Other genera

Represented by 38 genera and 325 species (Platnick, 2005) in six subfamilies: Anaminae, Ixamatinae, Bemmerinae, Nemesiinae, Diplothelopsinae, Pycnothelinae.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; three tarsal claws or rarely two; eight eyes; four spinnerets; rastellum absent or only weak spines; tarsi with scopulae; paired claws broad, biserially dentate in females; cephalic region low; palpal claw of female with teeth on promargin.

Descriptive characters

- **carapace:** low, with cephalic region slightly arched; fovea short, more or less straight (fig. 66a) or procurved; clypeus narrow; hirsute.
- **sternum:** six sigilla, marginal or subcentral and large posterior sigilla.
- **eyes:** eight; in two rows, about twice as wide as long; on eye tubercle (fig. 66b).
- **chelicerae:** porrect; rastellum absent or, when present, consisting of weak spines on a low mound (fig. 66c); fangs long; cheliceral furrow with teeth on promargin.
- **mouthparts:** labium wider than long, cuspules present or absent, number varies from few to numerous; endites with cuspules (fig. 66i); serrula present or absent.
- **legs:** three claws or rarely two; paired claws broad, biserially dentate (fig. 66e), S-shaped in males of Bemmerinae (fig. 66f); leg formula 4123; tarsi I with weak scopulae; tarsi in males rarely pseudosegmented, tibiae of male with spur on low mound (fig. 66d) or absent; preening combs present or absent.
- **female palp:** claw with row of teeth on promargin.
- **abdomen:** oval; hirsute.
- **spinnerets:** four; long, median spinnerets slightly apart; apical segment of posterior spinnerets digitiform (fig. 66g).
- **respiratory system:** four booklungs.
- **genitalia:** female genitalia with spermathecae either entire or bilobate; male palp with cymbium short, bilobate, spinose; bulbus pyriform with short embolus; embolus broadly flanged, or tapering in Anaminae; conductor absent (fig. 66h).
- **body size:** 13-30 mm.
- **colour:** various shades of brown; variegated dark pattern.

Taxonomic status

Raven (1985) gave the Nemesieae of Simon (1892) family status. However, Goloboff (1995), followed by Coddington *et al.* (2004), reassessed the relationship and considers the nemesiids to be a paraphyletic group in the vicinity of the Microstigmatidae. Raven (1985) provided a key to the genera.

Distribution

Worldwide.

Lifestyle

Live in silk-lined burrows that vary in shape (fig. 66j). Some species close their burrows with lids.

Relevant literature

Ubick & Ledford (2005); Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Goloboff (1995); Raven (1985).

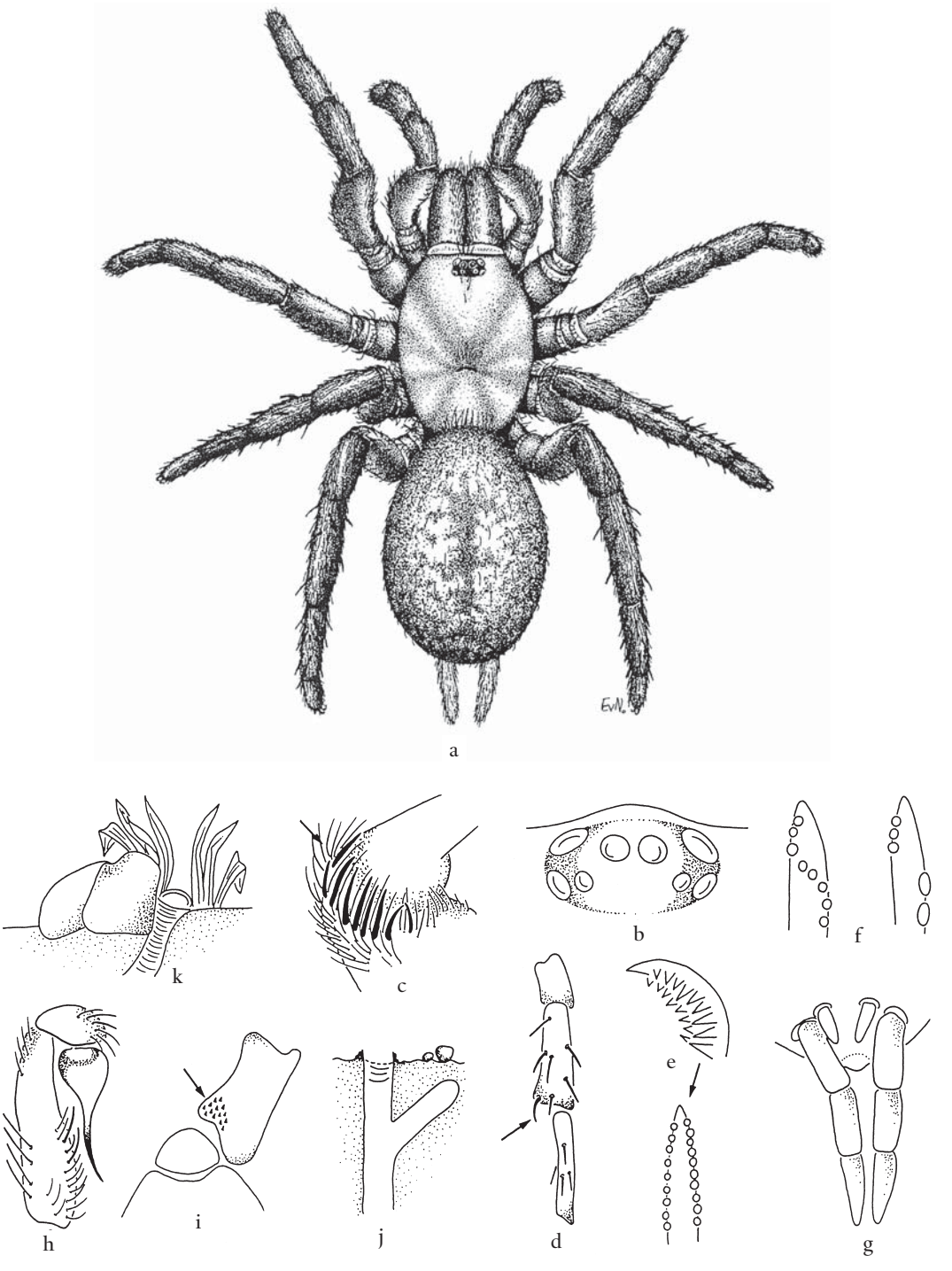


Fig. 66. **Nemesiidae.** *Entypesa* sp. **a.** habitus female (18 mm); **b.** eye pattern, dorsal view; **c.** rastellum consisting of few setae; **d.** leg I of male, showing mating spur; Anaminae **e.** paired tarsal claws in lateral and ventral views, showing position of teeth; Bemmerinae **f.** paired tarsal claws in ventral view, showing variation in position and size of teeth; **g.** spinnerets, ventral view; Anaminae **h.** male palp, lateral view; **i.** endites with produced heel; **j.** burrow with turret; **k.** burrow excavated underneath rocks. (e, f after Griswold, 1984.)

FAMILY NEPHILIDAE Simon, 1894

GIANT ORB WEB SPIDERS, COIN SPIDERS

Fig. 67, pl. 16

Type genus

Nephila Leach, 1815.

Other genera included

The Nephilidae currently contain 36 species in four genera distributed over two subfamilies: Nephilinae: *Nephila* Leach, 1815; *Herennia* Thorell, 1877; *Nephilengys* L. Koch, 1872; and Clitaetrinae: *Clitaetra* Simon, 1889.

Diagnostic characters

Medium to very large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes in two rows with lateral eyes widely separated from median eyes in *Nephila* and less so in other genera; chelicerae with striated boss and denticulate furrow; labium rebordered; abdomen somewhat elongate in *Nephilengys*, more pronounced so in *Nephila*; legs usually with numerous spines and sustentaculum on tarsus IV; male palp with mesal cymbium, without median apophysis and radix, but a complex and long embolic division in which the functional conductor envelops the embolus; an orb web with a sticky spiral, or a modification of such a web, is constructed; non-sticky spiral is retained in finished web.

Descriptive characters

- **carapace:** flat and piriform in *Clitaetra* and *Herennia*, wide with a high head region in *Nephila* and *Nephilengys*; a pair of carapace tubercles present dorsally in most *Nephila* species (fig. 67b).
- **sternum:** wider than long, except in *Herennia*; often with humps.
- **eyes:** eight; in two rows (4:4); tapetum present in *Nephila*, but no tapetum in secondary eyes in other genera.
- **chelicerae:** strong; vertical with finely striated lateral condyle (fig. 67b); cheliceral furrow with two rows of teeth and a number of denticles in between.
- **mouthparts:** labium wider than long, slightly rebordered in front; endites widest anteriorly.
- **legs:** three claws; legs usually furnished with numerous spines; tarsus IV sometimes with sustentaculum; trichobothria present on tibiae only, not on femora.
- **abdomen:** varies greatly; elongate and tapered (fig. 67a), cylindrical or flat, rounded and lobed; often with sigilla; in males with scutum.
- **spinnerets:** short anterior median spinnerets with large major ampullate surrounded by piriform gland spigots; posterior lateral spinnerets with triad, aggregate spigots embrace flagelliform spigot (Nephilinae); posterior median spinnerets with one minor ampullate, cylindrical and several aciniform gland spigots.
- **respiratory system:** two booklungs; branchial opercula often with curved grooves; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne simple, completely or partially sclerotized (fig. 67d); entrance ducts usually short, leading to simple spermathecae; male palp fairly simple: paracymbium usually flat and rectangular; subtegulum well developed; tegulum large and globular; embolus elongate usually with well developed embolic conductor (fig. 67c) both attached to tegulum with membrane; no median apophysis or conductor.
- **body size:** 3-40 mm; sexual dimorphism pronounced (particularly in *Nephila* and *Nephilengys*); male much smaller than female (see Coddington *et al.,* 1997); *Nephila* are the largest web-spiders.
- **colour:** varies greatly; some species with colourful pattern.

Taxonomic status

For a long time, the Nephilidae were considered a subfamily of the Araneidae, but were formally transferred to the Tetragnathidae by Coddington (1990), corroborating a suggestion by Levi (1986). A molecular study of Pan *et al.* (2004) places *Nephila* with araneids. However, according to recent studies by Kuntner (2005, 2006a, b), the Nephilidae are sister to all other Araneoidea apart from the Araneidae.

Distribution

The Nephilidae are pantropical.

Lifestyle

Nephilidae are sticky orbweb weavers occupying a wide range of habitats. The web is characterized by the permanent auxiliary spiral and the cupped hub against the substrate. *Nephila* is famous for its huge aerial yellow webs, but the webs of other nephilids are constructed against a vertical substrate. *Nephilengys* constructs a retreat above the orb, while the webs of *Herennia* and *Clitaetra* resemble a ladder.

Relevant literature

Hormiga *et al.* (1995); Kuntner (2006a, b); Pan *et al.* (2004).

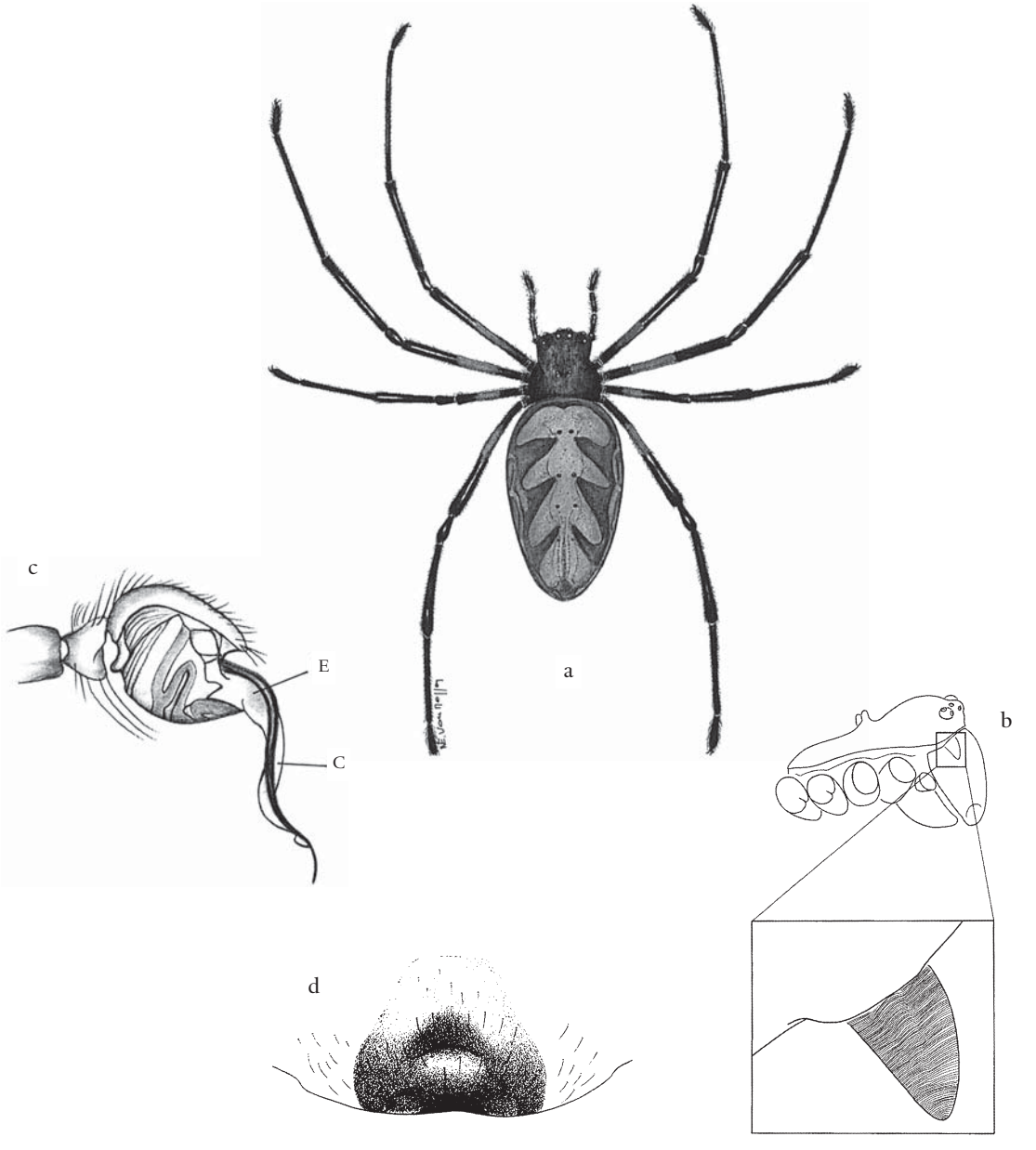


Fig. 67. **Nephilidae.** *Nephila* sp. **a.** habitus female (32 mm); **b.** cephalothorax, lateral view showing finely striated condyle; **c.** epigyne; **d.** male palp. C: conductor; E: embolus.

FAMILY NESTICIDAE Simon, 1894

CAVE COBWEB SPIDERS

Fig. 68, pl. 13

Type genus

Nesticus Thorell, 1869.

Other genera

Represented by more than 200 species in nine genera (Platnick, 2005): *Aituaria* Esyunin & Efimik, 1998; *Canarionesticus* Wunderlich, 1992; *Carpathonesticus* Lehtinen & Saaristo, 1980; *Cyclocarcina* Komatsu, 1942; *Eidmannella* Roewer, 1935; *Gaucelmus* Keyserling, 1884; *Nesticella* Lehtinen & Saaristo, 1980; *Typhlonesticus* Kulczynski, 1914.

Diagnostic characters

Very small to small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; tarsi IV with a row of serrated bristles; labium rebordered; cheliceral fang furrow with teeth.

Descriptive characters

- **carapace:** short, pear-shaped (fig. 68c); fovea a wide depression (fig. 68b).
- **sternum:** scutiform.
- **eyes:** eight; in two rows (4:4) (fig. 68b); anterior median eyes reduced in cavernicolous species.
- **chelicerae:** promargin of cheliceral furrow with 2-3 strong teeth and an irregular group of numerous small denticles; with cheliceral boss.
- **mouthparts:** labium wider than long, rebordered.
- **legs:** three claws; metatarsal trichobothria on basal half of segment; legs without strong spines but with long dorsal setae on tibiae and patellae; tarsi IV with ventral row of serrated bristles (fig. 68d); erect sensory setae on all tarsi and metatarsi (fig. 68a); tarsal organ capsulate.
- **female palp:** with exceptionally long, pectinate claw.
- **abdomen:** globular.
- **spinnerets:** unmodified; piriform field on anterior lateral spinnerets small; posterior median spinnerets with three aciniform gland spigots; colulus well developed (fig. 68e).
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne plate variable; protruding or with a scapus (fig. 68g); internal structure clearly discernible through integument; spermathecae with accessory lobes; male palp: without tibial apophysis; paracymbium large, with two branches, standing off the cymbium; subtegulum with rounded lobe overlying the tegulum; conductor simple, tapering distally; median apophysis fused to tegulum; with complex distal tegular apophysis functioning as conductor; embolus semicircular (fig. 68f).
- **body size:** 2-6 mm.
- **colour:** abdomen decorated with pale symmetrical spots or stripes on a darker background; white guanine and silvery spots lacking; legs sometimes annulated.

Taxonomic status

Nesticids are placed in the superfamily Araneoidea based on their web-spinning behaviour. According to Agnarsson (2003), the Nesticidae are the sister-group of the Theridiidae; the combination of these families forms a sister-group to the cyatholipoids containing the Cyatholipidae and Synotaxidae.

Distribution

Worldwide. Absent from Australia.

Lifestyle

Nesticidae construct irregular so-called cobwebs and produce highly elastic, viscid threads (Coddington & Levi, 1991). They often inhabit dark places and are found in caves.

Relevant literature

Agnarsson (2003, 2004); Dippenaar-Schoeman & Jocqué (1997); Paquin & Hedin (2005b).

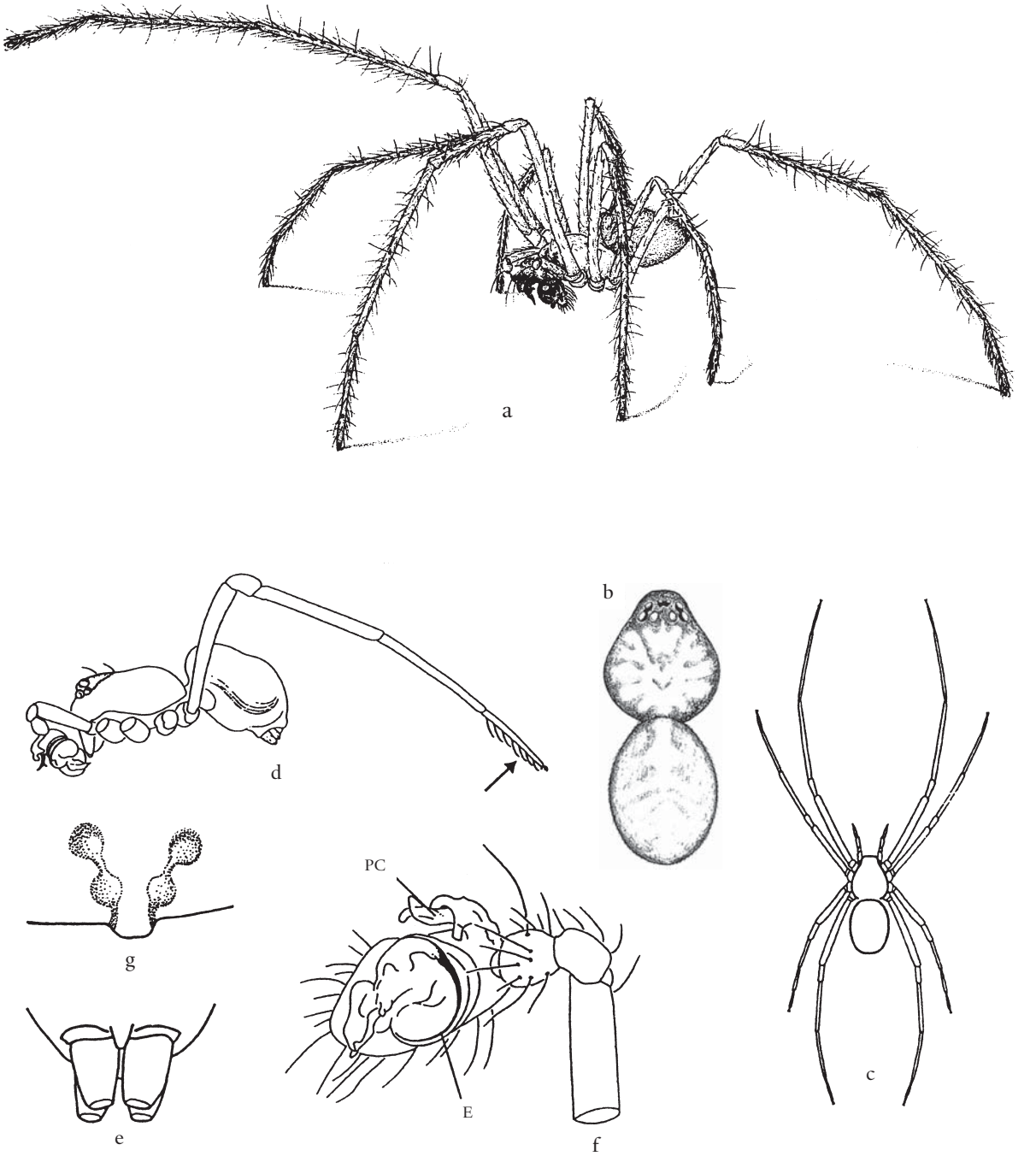


Fig. 68. **Nesticidae.** *Nesticus henderickxi.* **a.** male, natural posture (3 mm); *Nesticus* sp. **b.** female, dorsal view, appendages omitted; **c.** line drawing showing leg lengths; **d.** male, lateral view showing comb of serrated hairs on tarsus IV; **e.** spinnerets and colulus, ventral view; **f.** male palp, lateral view; **g.** epigyne. E: embolus; PC: paracymbium. (a: courtesy Jan Bosselaers.)

FAMILY NICODAMIDAE Simon, 1898

RED-AND-BLACK SPIDERS

Fig. 69, pl. 27

Type genus

Nicodamus Simon, 1887.

Other genera

Represented by 29 species in nine genera (Platnick, 2005) and two subfamilies (Nicodaminae and Megadictyninae): *Ambicodamus* Harvey, 1995; *Dimidamus* Harvey, 1995; *Durodamus* Harvey, 1995; *Forstertyna* Harvey, 1995; *Litodamus* Harvey, 1995; *Megadictyna* Dahl, 1906; *Novodamus* Harvey, 1995; *Oncodamus* Harvey, 1995.

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; cribellate or ecribellate; entelegyne; eight eyes; male palpal tibia with large dorsal apophysis; tarsi and metatarsus IV without trichobothria; chelicerae with one distal tooth on promargin only.

Descriptive characters

- **carapace:** broadly oval (figs 69a, b), wider than long or as long as wide; dorsally flattened (fig. 69c); fovea broad; clypeus high, sloping.
- **eyes:** eight small eyes in two straight rows; secondary eyes with cone-shaped tapetum.
- **chelicerae:** vertical, without lateral condyle; promargin with one distal tooth, retromargin without teeth.
- **mouthparts:** endites converging, meeting at midline; labium wider than long; serrula present (fig. 69d).
- **sternum:** heart-shaped or triangular; without sigilla; posteriorly produced between coxae IV (fig. 69d).
- **legs:** slender; 4123, rarely 1423 or 4213; with spines; with three toothed claws, superior ones with teeth on side facing other claw; coxae not notched; two rows of trichobothria on tibia and subdistally on metatarsi I-III; tarsi and metatarsus IV without trichobothria; tarsal organ: slightly raised, with rounded orifice.
- **female palp:** with toothed claw.
- **abdomen:** oval, with long stiff setae and three pairs of sigilla.
- **spinnerets:** six; anterior pair two-segmented; median spinnerets short, conical; posterior spinnerets long, two-segmented, second segment tapered, large setose colulus in ecribellate taxa (Nicodaminae) (fig. 69e).
- **cribellum:** entire (Megadictyninae).
- **calamistrum:** in a single row occupying half or slightly less of the length of metatarsus IV; on a ridge and with numerous bristles (15-43) in *Megadictyna*.
- **respiratory system:** two booklungs; tracheal spiracle slightly in advance of spinnerets.
- **genitalia:** entelegyne; epigyne simple, strongly sclerotized externally; copulatory ducts usually short and wide; one pair of spermathecae; male palp: with enlarged dorsal tibial apophysis; subdivided into a small basal and a large blunt apophysis; cymbium unmodified; bulbus from base onwards with exposed basal haematodocha; subtegulum and tegulum, a large short embolus, median apophysis and conductor present (figs 69f-g).
- **body size:** 3.5-11 mm (Nicodaminae); 8-13 mm (Megadictyninae).
- **colour:** fairly variable: pale yellow to dark brown or with contrasting red cephalothorax and black abdomen.

Taxonomic status

The Nicodamidae is one of the few spider families for which there is no well supported hypothesis on its position, but Harvey (1995) argues that a sister-group relationship with the Titanoecidae is so far the best hypothesis. Coddington *et al.* (2004) place the family at the base of the 'divided cribellum' clade.

Distribution

Australia, Tasmania, New Guinea (Nicodaminae), New Zealand (Megadictyninae).

Lifestyle

Cribellate members construct a small sheet web. The egg case hangs from a fine strand of silk.

Relevant literature

Harvey (1995).

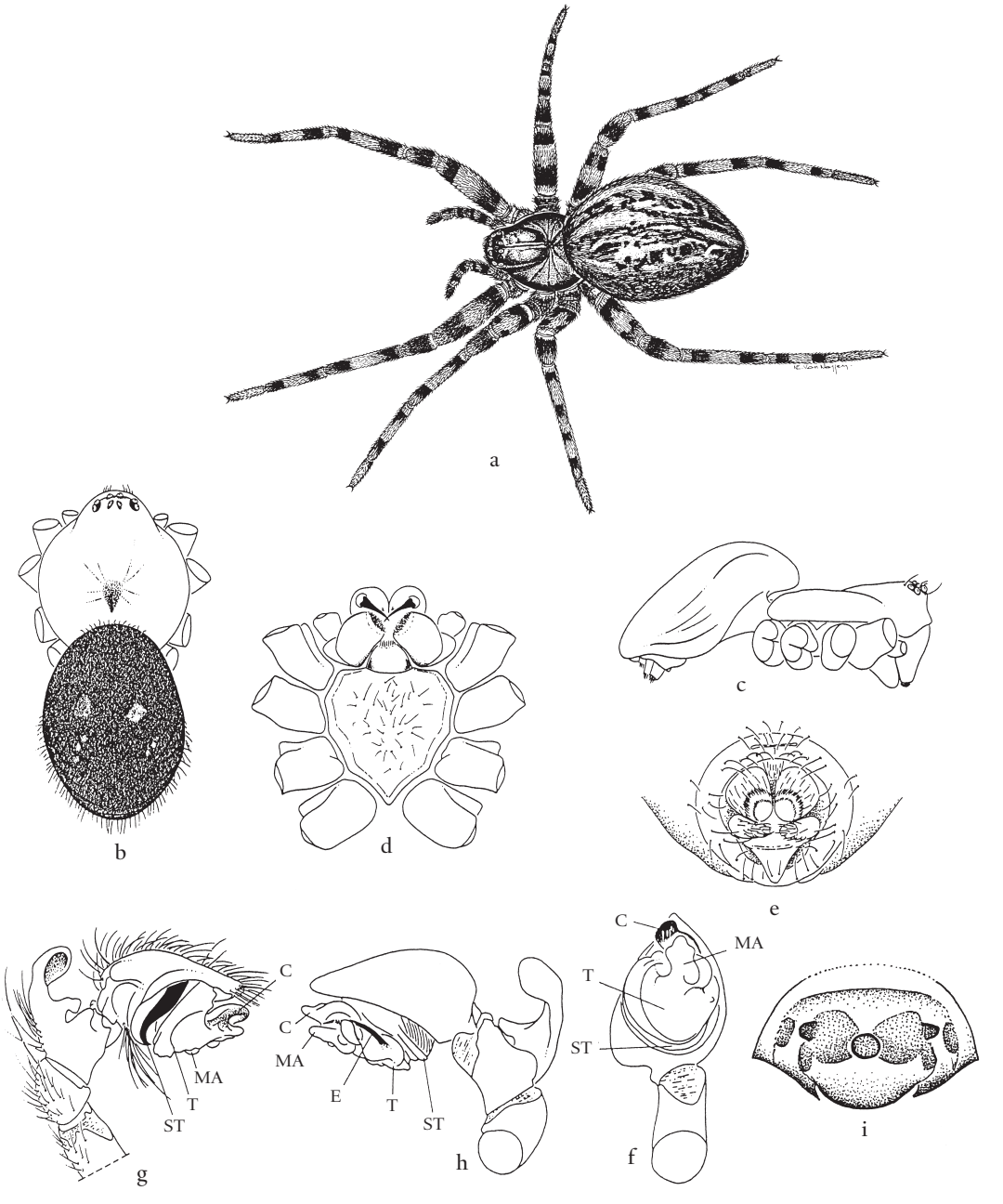


Fig. 69. **Nicodamidae.** *Megadictyna thillenii* **a.** female habitus (11 mm); *Nicodamus mainae* **b.** cephalothorax and abdomen, dorsal view (8 mm); **c.** cephalothorax and abdomen, lateral view; **d.** cephalothorax, ventral view; **e.** spinnerets, ventral view; **f.** right male palp, ventral view; **g.** right male palp, retrolateral view; **h.** right male palp, prolateral view; **i.** epigyne. C: conductor; E: embolus; MA: median apophysis; ST: subtegulum; T: tegulum. (a: after Forster, 1970; i: after Lehtinen, 1976.)

FAMILY OCHYROCERATIDAE Fage, 1912

MIDGET GROUND WEAVERS

Fig. 70

Type genus

Ochyrocera Simon, 1891.

Other genera

Represented by 13 genera and 146 species (Platnick, 2005) in the subfamilies Ochyroceratinae, Psilodercinae and Theotiminae.

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate, haplogyne; six eyes; legs long with three claws on an onychium; chelicerae with a median lamella, often with stridulating grooves; median spinnerets with a single spigot; epigyne with two spermathecae and genital opening extending laterally on abdomen in some genera.

Descriptive characters

- **carapace:** slightly longer than wide, round with large slanting clypeus.
- **sternum:** apex broadly truncated.
- **eyes:** six; anterior eye row with four eyes; posterior row with two widely separated posterior lateral eyes; lateral eyes contiguous (fig. 70b).
- **chelicerae:** free; with a median lamella in proximal half, often with stridulating grooves; promargin with up to three (Psilodercinae) or seven teeth (fig. 70e), retromargin with two teeth, sometimes lacking.
- **mouthparts:** tip of labium notched or rounded (Psilodercinae); endites longer than wide, converging over labium.
- **legs:** three claws; tarsi with onychium (fig. 70c), without trichobothria; one metatarsal trichobothrium, two rows on tibiae; legs often very long and with pseudosegmented tarsi (fig. 70a); few or no spines; tarsal organ capsulate.
- **female palp:** without claw.
- **abdomen:** oval, globular or elongate; in some genera female genital slit extends far and opens on lateral sides of abdomen (fig. 70d).
- **spinnerets:** anterior spinnerets the longest, with short distal segment; median spinnerets with a single spigot; posterior spinnerets with numerous spigots; colulus present, twice as long as wide.
- **respiratory system:** two booklungs in Psilodercinae, replaced by tracheae in both other subfamilies; tracheal spiracle midway between spinnerets and epigastric furrow in the latter two, near spinnerets in the former; tracheae extending into cephalothorax (fig. 70d).
- **genitalia:** haplogyne; spermathecae paired, situated close together, sometimes modified; male palp: segments sometimes with spines or apophyses; bulbus swollen and variable; embolus and accompanying apophyses situated on distal part of tegulum (fig. 70f).
- **body size:** 0.6-3 mm.
- **colour:** various hues of brown, abdomen sometimes with purplish mottling.

Taxonomic status

Platnick *et al.* (1991) placed the ochyroceratids in the Scytodoidea as a sister-group of Leptonetidae and Telemidae.

Distribution

Tropical regions worldwide.

Lifestyle

Cryptozoic, living in wet dark places and constructing an irregular, often layered brushed sheet web. Some species are found in caves, others are parthenogenetic and some carry their egg sac in the chelicerae.

Relevant literature

Deeleman-Reinhold (1995); Dippenaar-Schoeman & Jocqué (1997); Machado (1951); Paquin & Ubick (2005); Platnick *et al.* (1991).

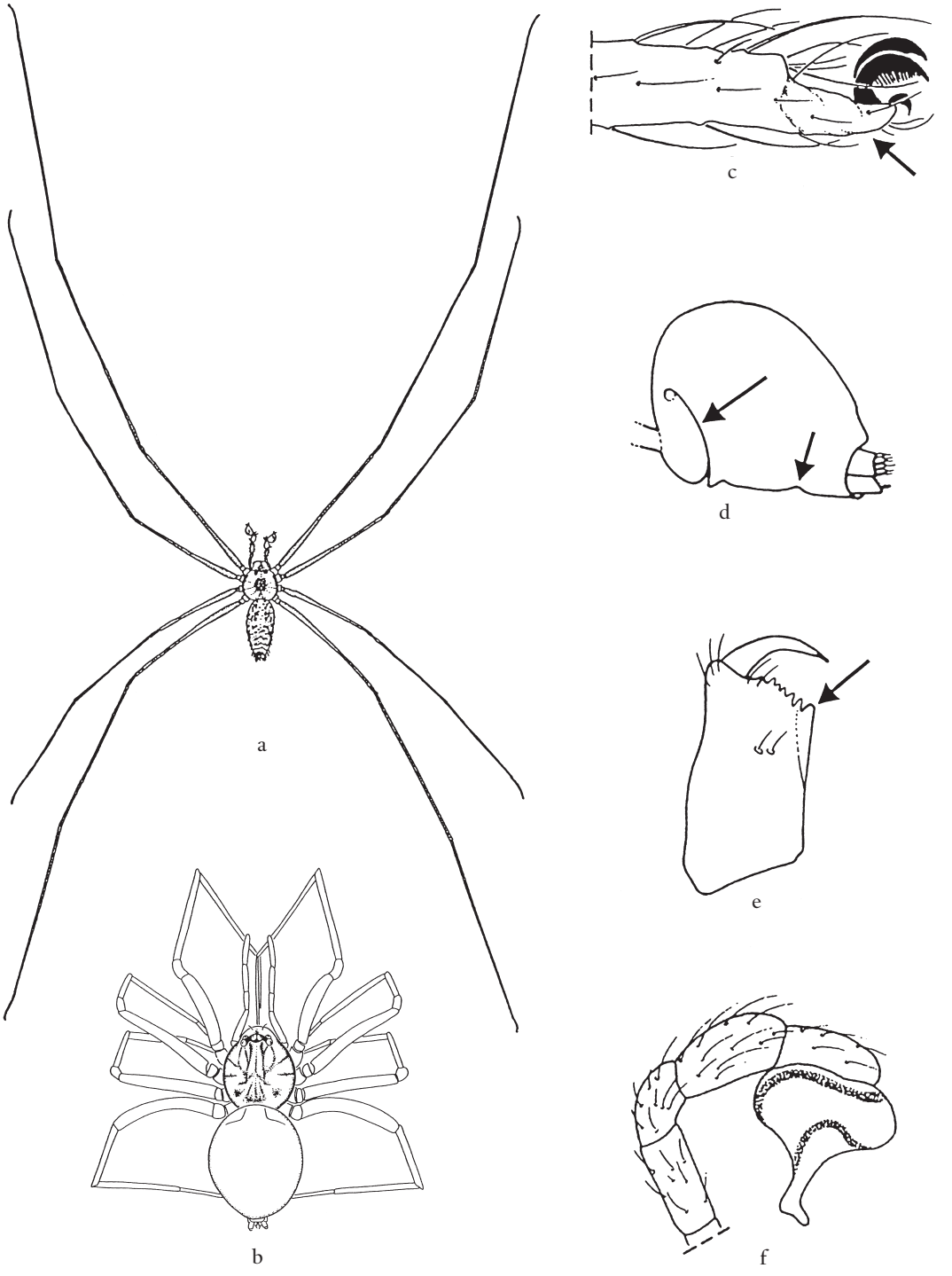


Fig. 70. **Ochyroceratidae.** *Althepus* sp **a.** habitus male (2.3 mm); *Speocera* sp. **b.** habitus female; **c.** leg tarsus showing onychium and claws; **d.** abdomen, lateral view showing extended genital opening and tracheal spiracle; **e.** chelicera showing lamina; **f.** male palp, retrolateral view. (a: from Murphy & Murphy, 2000.)

FAMILY OECOBIIDAE Blackwall, 1862

DWARF ROUND-HEADED SPIDERS / STAR-LEGGED SPIDERS

Fig. 71, pl. 11

Type genus

Oecobius Lucas, 1846.

Other genera

Represented by six genera and 101 species (Platnick, 2005) in three subfamilies: Oecobiinae (the type genus; *Paroecobius* Lamoral, 1981; *Platoecobius* Chamberlin & Ivie, 1935); Urocteinae (*Uroctea* Dufour, 1820); and Uroecobiinae (*Urocteana* Roewer, 1961; *Uroecobius* Kullmann & Zimmermann, 1976).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; cribellate and ecribellate genera; entelegyne; six or eight eyes; anal tubercle large, two-segmented with a double fringe of curved setae.

Descriptive characters

- **carapace:** subcircular; wider than long; fovea absent (figs 71a, c-e); clypeal snout distinct in *Uroctea* (fig. 71 e).
- **sternum:** heart-shaped, wider than long, apex pointed, separating coxae IV; males with fringe of specialized spatulate setae on sternal margin.
- **eyes:** six to eight; arranged in two rows in a compact group near centre of carapace; posterior median eyes variable: circular in Urocteinae (fig. 71e) and subcircular Oecobiinae (fig. 71c), or reduced in Uroecobiinae (fig. 71d).
- **chelicerae:** short, without condyle; fangs short; cheliceral teeth lacking.
- **mouthparts:** labium free, wider than long; endites converging, almost touching.
- **legs:** three claws; legs short, subequal in length; arranged around body in a star-like fashion; with a few or no spines.
- **female palp:** stout, with pectinate claw.
- **abdomen:** more or less flattened; oval to round; slightly overlapping carapace; anal tubercle large, two-segmented, provided with double row of fringed setae.
- **spinnerets:** anterior spinnerets short and domed, two-segmented with distal segment short; posterior spinnerets two-segmented with distal segment long and curved; major ampullate gland spigots dispersed among piriforms on anterior lateral spinnerets; colulus consisting of a large plate, present in Urocteinae and Uroecobiinae (fig. 71b).
- **cribellum:** divided in Oecobiinae; absent in Urocteinae and Uroecobiinae.
- **calamistrum:** biseriate in proximal half (lacking in males).
- **respiratory system:** two booklungs; tracheal spiracle inconspicuous, opening in front of spinnerets.
- **genitalia:** entelegyne; epigyne (fig. 71h) with plate variable, often with caudal notch, sometimes with anterior pit; epigynal region transversely furrowed; male palp with tibia unmodified to globular, without apophyses; embolus short with a hooked or long, curved spine; conductor varies from a complex sclerite to a membranous appendage (figs 71f, g).
- **body size:** 3-15 mm.
- **colour:** smaller species pale with faint, variable, darker patterns with white guanine granules; larger species yellow, orange to dark with pale spots on dorsum.

Taxonomic status

Mainly based on the similarity of attack behaviour, Coddington & Levi (1991) and Coddington *et al.* (2004) place the Oecobiidae together with their sister-group Hersiliidae in the superfamily Eresoidea, also containing the Eresidae.

Distribution

Worldwide.

Lifestyle

Commonly found either under small star-shaped mesh-webs (fig. 71i) or multilayered webs made over cracks or crevices on rocks or walls. Some species synanthropic. Prey immobilized by enswathing it with a band of silk while running around it.

Relevant literature

Craig *et al.* (2005); Dippenaar-Schoeman & Jocqué (1997); Shear (1970); Kullmann & Zimmermann (1976).

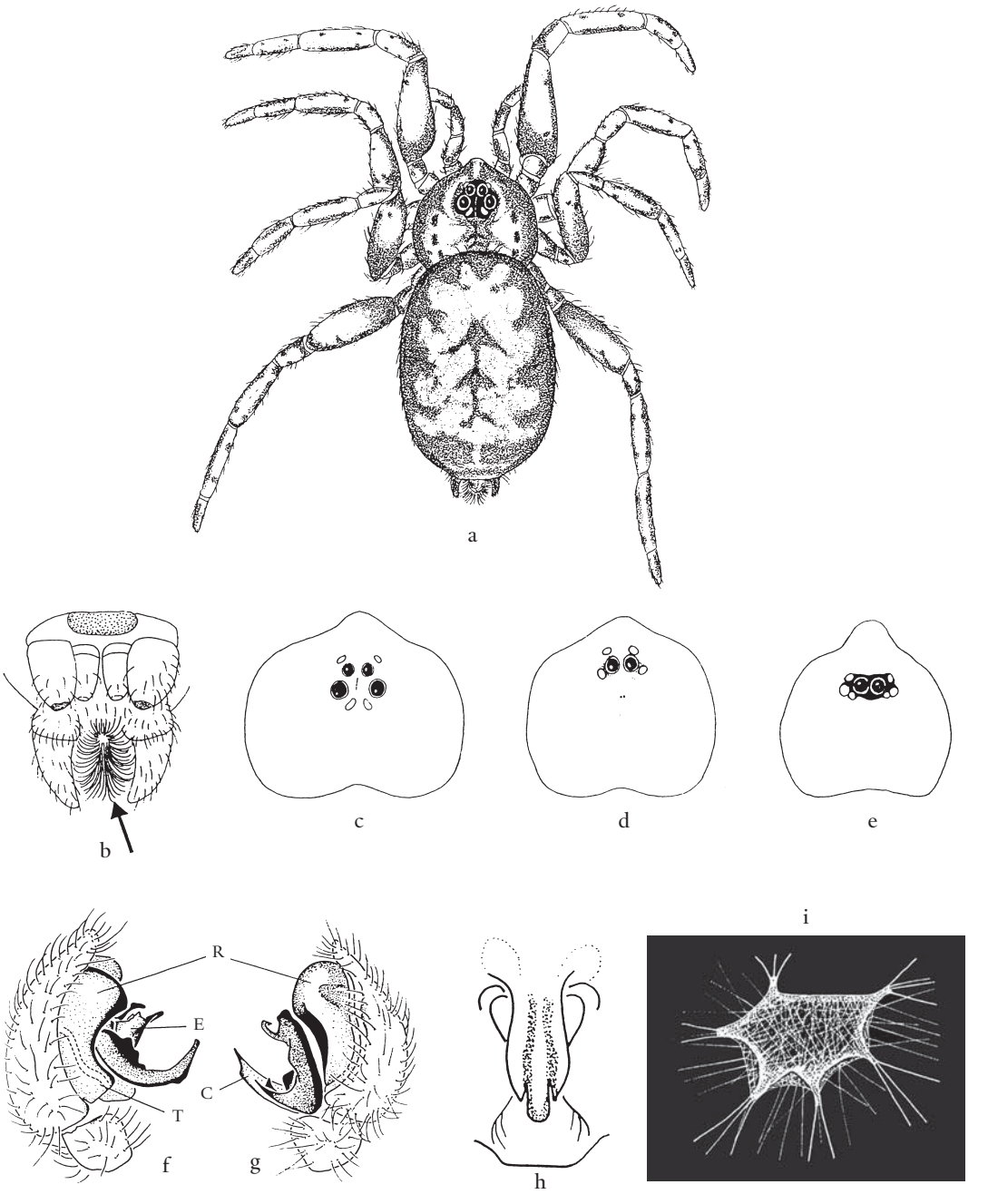


Fig. 71. **Oecobiidae.** *Oecobius* sp. **a.** habitus female (8 mm); **b.** spinnerets showing anal tubercle; **c.** Oecobiinae, eye pattern; **d.** Uroecobiinae, eye pattern; **e.** Urocteinae, eye pattern; *Oecobius cellariorum* **f.** right male palp, prolateral view; **g.** retrolateral view; *Oecobius annulipes* **h.** epigyne; **i.** star-shaped web. C: conductor; E: embolus; R: radix; T: tegulum. (f, g: after Shear, 1970.)

FAMILY OONOPIDAE Simon, 1890

GOBLIN SPIDERS

Fig. 72, pl. 9

Type genus

Oonops Templeton, 1835.

Other genera

Represented by 67 genera and 455 species (Platnick, 2005) in two subfamilies: Gamasomorphinae and Oonopinae.

Diagnostic characters

Very small araneomorph spiders; ecribellate; haplogyne; two claws; six eyes or none; biserially dentate claws on an onychium; posterior tracheae anteriorly positioned; abdomen in some genera with dorsal and ventral scuta; female genital system with two distinct elements associated with anterior and posterior wall of bursa.

Descriptive characters

- **carapace:** convex to flat; no fovea or impressions; markedly narrowed anteriorly (fig. 72b); integument with variable texture; often smooth and shiny, or sometimes granular, finely striolate or punctate.
- **sternum:** broad, oval; apex blunt.
- **eyes:** six; grouped close together (fig. 72b); median eyes large, contiguous with anterior lateral eyes; most species inhabiting termite nests lack eyes.
- **chelicerae:** free, subchelate, without laminae; broad at base but attenuated at tip, usually without teeth; fangs long and arched.
- **mouthparts:** endites broad at base, narrower at tip, often modified in males; labium variable.
- **legs:** usually short and robust; tarsi with two biserially dentate claws; legs devoid of scopulae; tibiae and tarsi I and II with series of paired spines in some species (fig. 72d); tarsi with distinct onychium; trichobothrial bases crenulated; tarsal organ capsulate.
- **female palp:** short, sturdy claw absent.
- **abdomen:** oval; enclosed in dorsal and ventral shield (Gamasomorphinae) (fig. 72a) or soft-bodied (Oonopinae), some genera with an anal plate.
- **spinnerets:** anterior and posterior spinnerets similar in length (fig. 72e); posterior median spinnerets with one minor ampullate gland spigot; colulus absent or replaced by plate with two setae.
- **respiratory system:** booklungs present but reduced; posterior pair of tracheae with spiracles situated behind epigastric fold, leading to well developed tracheae (fig. 72c).
- **genitalia:** haplogyne; female genitalia a sclerotized slit, composed of two distinct elements associated with both the anterior and posterior walls of the bursa as in orsolobids (fig. 73f); male palpal organ small; bulbus pear-shaped or cylindrical with terminal embolus; conductor absent (fig. 72f).
- **body size:** 1-4 mm.
- **colour:** often brightly coloured, orange, yellow, greenish or pink; species without scuta are paler in colour.

Taxonomic status

Platnick *et al.* (1991), Coddington & Levi (1991) and Coddington *et al.* (2004) placed the oonopids in the superfamily Dysderoidea as the sister-group of Orsolobidae.

Distribution

Worldwide; much more common in the tropics.

Lifestyle

Oonopids are free-living, nocturnal ground dwellers, found in a variety of habitats ranging from forests to deserts. Recent research found them to be a regular element in tropical forest canopy (De Bakker, pers. comm.).

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Platnick *et al.* (1991); Saaristo (2001); Ubick (2005g).

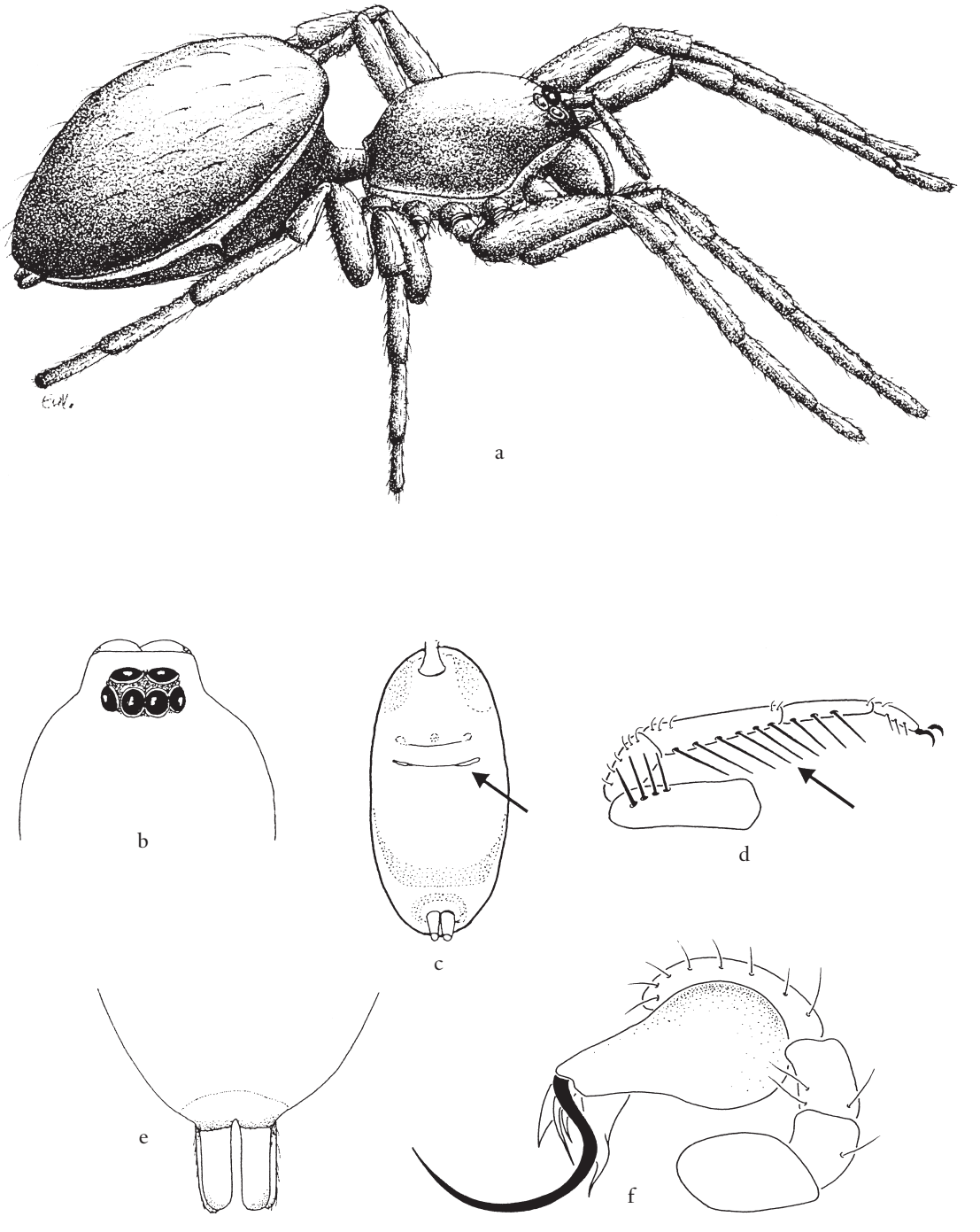


Fig. 72. **Oonopidae.** *Gamasomorpha* sp. **a.** habitus female (2 mm); **b.** eye pattern; **c.** abdomen, ventral view, showing tracheal spiracles and epigastric fold with central atrium of female; **d.** leg I, showing one of two rows of long spines on tibia and metatarsus; **e.** spinnerets, ventral view; **f.** male palp, retrolateral view.

FAMILY ORSOLOBIDAE Cooke, 1965

SIX-EYED GROUND SPIDERS

Fig. 73, pl. 9

Type genus

Orsolobus Simon, 1893.

Other genera

Represented by 28 genera and 178 species (Platnick, 2005).

Diagnostic characters

Small araneomorph spiders; ecribellate; haplogyne; six eyes; two tarsal claws; biserially dentate, with an onychium and spatulate claw tufts; tarsal organ elevated; posterior tracheae anteriorly positioned.

Descriptive characters

- **carapace:** broadly oval; low and narrowed anteriorly (fig. 73a).
- **sternum:** with long triangular extensions and slight elevations (fig. 73b) opposite coxae in some genera, or sternum heart-shaped, not produced at labial border; margin with triangular points directed towards coxae and setose elevations opposite coxae I and II.
- **eyes:** six; anterior row with four eyes; posterior lateral eyes behind anterior lateral eyes, widely spaced (fig. 73a).
- **chelicerae:** free; vertical, usually with two teeth on both margins.
- **mouthparts:** labium as long as or longer than wide; endites well developed, parallel, longer than wide; serrula present.
- **legs:** two biserially dentate claws, usually with tooth-bearing flange on outer margin (fig. 73c); onychium with dense claw tufts of spatulate setae ventrally; legs long and slender, uniformly clothed in ciliate setae; no scopulae; tarsal organ elevated (fig. 73d).
- **female palp:** smooth claw present.
- **abdomen:** oval; sparse covering of short setae; sometimes with chevron markings.
- **spinnerets:** slender, subequal in length; anterior spinnerets three-segmented; colulus small or large and sometimes setose.
- **respiratory system:** two booklungs; posterior tracheal spiracles just behind epigastric furrow; tracheoles reaching into cephalothorax.
- **genitalia:** haplogyne; female genitalia consisting of two sections (fig. 73f): anterior wall of bursa without or with single paired or multiple spermathecae, posterior spermathecae single and large; male palp with bulbus rotund; embolus distinct (fig. 73e).
- **body size:** 2.5-7 mm.
- **colour:** pale yellow to white with purplish pigmentation; abdomen dorsally suffused with purplish pigment interrupted by pale hairline chevrons or uniform without pattern.

Taxonomic status

Orsolobids were given family status by Forster & Platnick (1985) and are listed in the Dysderoidea with Oonopidae as sister-group (Coddington & Levi, 1991; Coddington *et al.*, 2004; Platnick *et al.*, 1991).

Distribution

Southern Hemisphere.

Lifestyle

Free-living ground-dwelling spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1985); Griswold & Platrnick (1987); Platnick *et al.* (1991).

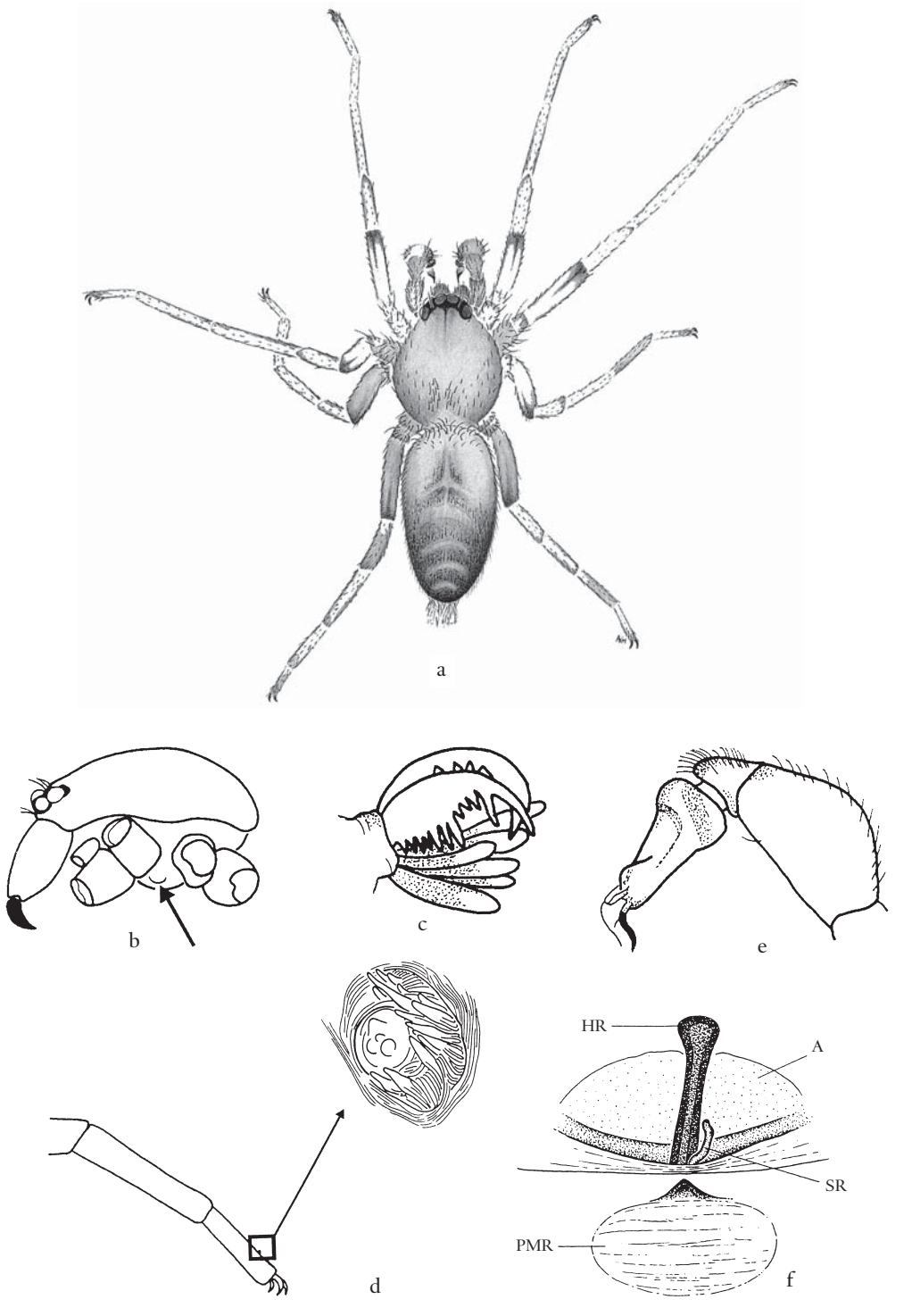


Fig. 73. **Orsolobidae.** *Afrilobus jocquei* **a.** habitus male (3.4 mm); **b.** carapace, lateral view, showing raised areas on sternum; **c.** leg tarsus showing claws with spatulate setae; **d.** leg tarsus showing enlarged tarsal organ; **e.** male palp, retrolateral view; **f.** female internal genitalia. A: atrium; HR: hollow rod; PMR: posterior median receptaculum; SR: submedian receptaculum.

FAMILY OXYOPIDAE Thorell, 1870

LYNX SPIDERS

Fig. 74, pl. 19

Type genus

Oxyopes Latreille, 1804.

Other genera

Hamataliwa Keyserling, 1887; *Hostus* Simon, 1898; *Megullia* Thorell, 1897; *Peucetia* Thorell, 1869; *Pseudohostus* Rainbow, 1915; *Schaenicoscelis* Simon, 1898; *Tapinillus* Simon, 1898; *Tapponia* Simon, 1885. Represented by 405 species (Platnick, 2005).

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; clypeus wide; setae prominent on legs; trochanters notched; tapetum grate-like.

Descriptive characters

- **carapace:** longer than wide, high and convex anteriorly, sloping posteriorly; clypeus wide; usually with conspicuous stripes and spots; integument clothed in thin setae and sometimes in iridescent scales.
- **sternum:** scutiform, tapers between coxae IV.
- **eyes:** eight; occupying small area on edge of carapace; eyes form a hexagon with posterior row slightly procurved and anterior row strongly recurved (fig. 74b); secondary eyes without tapetum (Homann, 1971); *Hamataliwa* frequently with tufts of setae in eye region.
- **chelicerae:** lower furrow smooth or with one tooth (fig. 74b).
- **mouthparts:** labium longer than wide; endites long, converging.
- **legs:** three claws; legs long with prominent spines (fig. 74d); trochanters shallowly notched; tarsal organ capsulate.
- **abdomen:** tapering to a point posteriorly (fig. 74a).
- **spinnerets:** unmodified, middle pair smallest; colulus present (fig. 74c).
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne varies between genera, from a semicircular or U-shaped dark rim surrounding a shallow median depression to a deep pit in front with paired projections or long horn-like processes or median depression with scape-like processes (fig. 74f); male palp variable, usually with tibial apophysis and paracymbium; in *Peucetia* with spoon-shaped median apophysis (fig. 74e).
- **body size:** 5-23 mm.
- **colour:** varies from bright green (*Peucetia*) to yellowish brown or dark brown.

Taxonomic status

Griswold (1993) included the oxyopids in the superfamily Lycosoidea based on the grate-like tapetum. He suggested that, with the Stiphiidae, Psechridae, they form a monophyletic group within the 'higher lycosoids', an opinion shared by Coddington *et al.* (2004).

Distribution

Worldwide.

Behaviour

Free-living plant-dwellers; may jump towards flying prey and catch it in midair; some species spin small webs.

Relevant literature

Brady & Santos (2005); Dippenaar-Schoeman & Jocqué (1997); Griswold (1993).

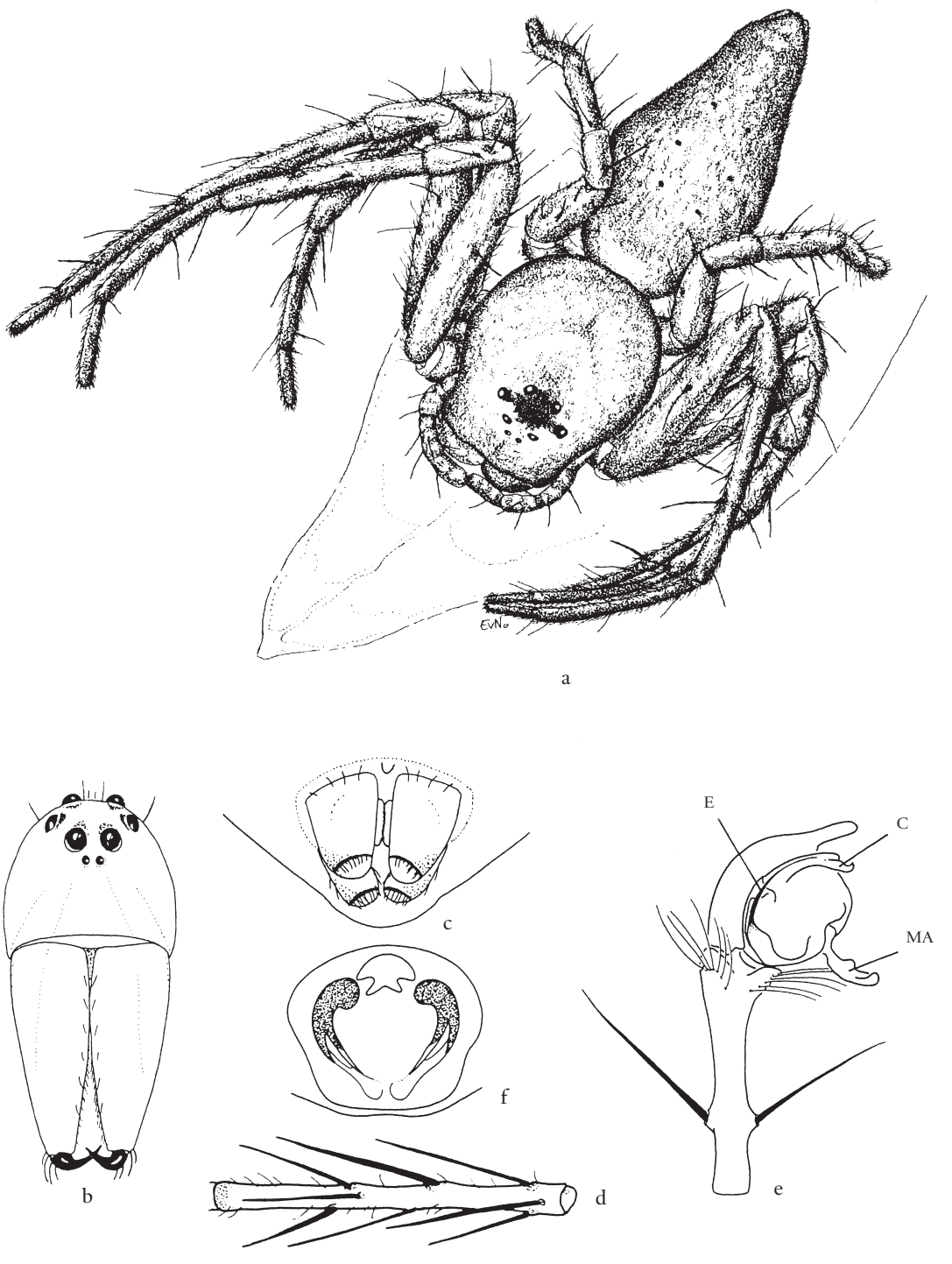


Fig. 74. **Oxyopidae.** *Oxyopes* sp. **a.** habitus, natural posture (9 mm); **b.** cephalothorax, frontal view; **c.** spinnerets, ventral view; **d.** leg segment showing long setae; *Peucetia* sp. **e.** male palp, retrolateral view; **f.** epigyne. C: conductor; E: embolus; MA: median apophysis.

FAMILY PALPIMANIDAE Thorell, 1870

PALP-FOOTED SPIDERS

Fig. 75, pl. 10

Type genus

Palpimanus Dufour, 1820.

Other genera

Represented by 15 genera and 127 species (Platnick, 2005) in three subfamilies: Chediminae, Otiothopinae and Palpimaninae.

Diagnostic characters

Small to medium-sized araneomorph spiders; two or three tarsal claws; ecribellate; entelegyne (with secondary haplogyny); six or eight-eyes; first pair of legs enlarged and stronger than other pairs and with prolateral scopula on distal segments; carapace heavily sclerotized; reduced number of spinnerets.

Descriptive characters

- **carapace:** suboval in outline or anteriorly truncated; cephalic region evenly rounded (figs 75a, b) sloping gently towards thoracic region; fovea usually distinct; covered with a hard, coriaceous granular epidermis.
- **sternum:** scutiform, as wide as long; strongly granular (fig. 75c); with extensions around coxae.
- **eyes:** usually eight; sometimes six; if eight, eyes in two rows, position varies between genera (figs 75d-f); lateral eyes either contiguous (fig. 75d) or widely separated (fig. 75e); posterior median eyes small (fig. 75e) or large and irregular in shape (fig. 75f).
- **chelicerae:** short and stout; cheliceral furrow weakly developed; true teeth may be present on retromargin but never numerous; promargin with peg teeth opposite tip of fang, which is short and stout.
- **mouthparts:** labium triangular; endites converging and almost touching (fig. 75b); serrula strong.
- **legs:** two or three tarsal claws; anterior pair of legs enlarged and much stronger than other three pairs with femur I greatly expanded dorsally; patellae elongated; metatarsi and tarsi reduced in size; thick scopula with spatulate setae distally on prolateral surface of tibia, metatarsi and tarsi; tarsal claws dissimilar in size, anterior tarsi with extremely small claws, larger on posterior legs and directed upwards (fig. 75g).
- **female palp:** without claw; tarsi with thick setae forming a brush.
- **abdomen:** ovate; cuticle of abdomen often coriaceous with epigastric region heavily sclerotized, forming a ring-shaped scutum extending dorsally to encircle pedicel (Palpimaninae); scutum absent in Chediminae; abdomen with sparse cover of short setae.
- **spinnerets:** encircled by sclerotized ring; anterior pair large (fig. 75h) with piriform gland spigots in a linear arrangement; posterior lateral and median pairs reduced to spigots in females, absent in males; colulus absent.
- **respiratory system:** two booklungs; single tracheal spiracle near spinnerets.
- **genitalia:** entelegyne (secondary haplogyne); internal structure simple (fig. 75k); in some cases consisting of two large membranous sacs opening into a common atrium with large secretory glands near base; spermathecae small, laterally connected to atrium by long duct; male palp bears, in addition to embolus, an elaborate conductor and often other terminal accessory sclerites; tibia frequently bulbous (figs 75i, j).
- **body size:** 3-11 mm.
- **colour:** carapace often dark to bright red or bright orange; abdomen fawn, grey to purplish, sometimes with large spots; legs similar in colour to carapace.

Taxonomic status

The Palpimanidae are placed with eight other families in the Palpimanoidea, with either the Huttonidae (Coddington & Levi, 1991) or the Stenochilidae (Coddington *et al*., 2004) as sister-group.

Distribution

Throughout most of the tropical and subtropical regions of the world excluding Australia.

Lifestyle

Palpimanids are free-living ground dwellers, which appear to have a specialized diet consisting of spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Platnick *et al.* (1991, 1999).

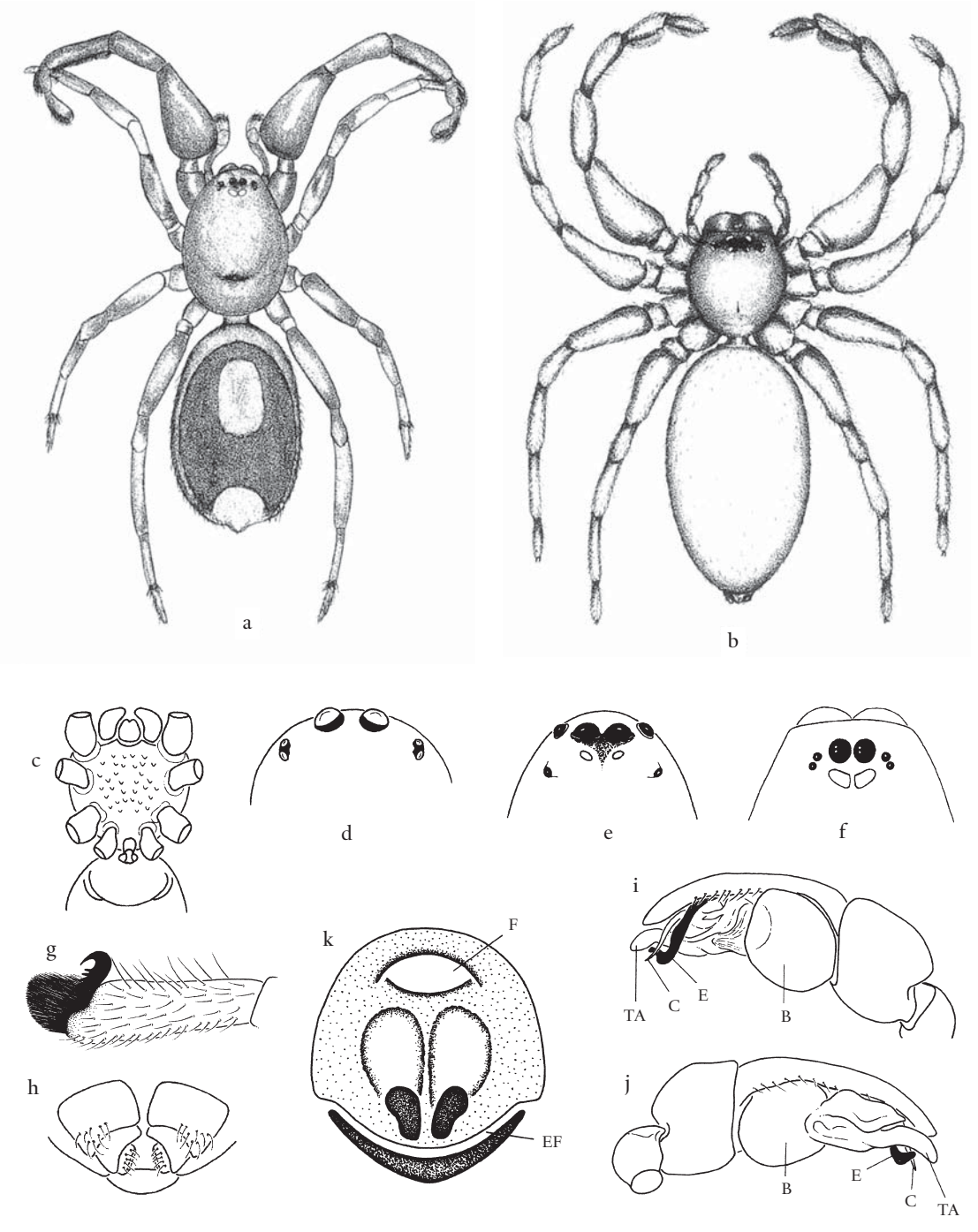


Fig. 75. **Palpimanidae.** *Diaphorocellus* sp. **a.** female habitus; *Boagrius* sp. **b.** female habitus; **c.** cephalothorax, ventral view; *Hybosida* sp. **d.** eye pattern, dorsal view; Palpimaninae **e.** eye pattern, dorsal view; Chediminae **f.** eye pattern, dorsal view; Palpimaninae **g.** tarsus III, typical position of tarsal claws; **h.** spinnerets, ventral view; *Scelidocteus lamottei* **i.** male palp, retrolateral view; **j.** male palp, prolateral view; *Othiothops walckenaeri* **k.** internal female genital organs, dorsal view. B: bulbus; C: conductor; E: embolus; EF: epigastric fold; F: foramen to pedicel; TA: tegular appendage. (k: after Platnick, 1975.)

FAMILY PARARCHAEIDAE Forster & Platnick, 1984

TINY THICK-NECKED SPIDERS

Fig. 76

Type genus

Pararchaea Forster, 1955.

Other genera

A monotypic family, represented by ten species (Rix, 2005).

Diagnostic characters

Small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; chelicerae originating from a completely sclerotized foramen in the carapace.

Descriptive characters

- **carapace:** rhomboidal as seen from the side (fig. 76a); thoracic and cephalic region not separated by constriction; anterior part of carapace with fully sclerotized foramen from where chelicerae originate; tegument squamate.
- **sternum:** shield-shaped, not much longer than wide; truncated between coxae IV which are widely separated (fig. 76c).
- **eyes:** eight in two rows; lateral eyes contiguous, far apart from medians which are well separated from each other (fig. 76b).
- **chelicerae:** long, stout; promargin with peg teeth (fig. 76b); retromargin smooth with pronounced median keel, reaching to near fang; cheliceral gland mound low, opening small; fang short; anterior face often with lateral stridulatory file.
- **mouthparts:** endites strongly converging, almost meeting at midline; serrula one row of teeth; labium triangular, wider than long (fig. 76c).
- **legs:** relatively short; anterior tarsi longer than metatarsi; squamate, clothed with serrate or smooth hairs; without spines or scopulae; three tarsal claws: paired claws with single row of teeth, unpaired with one tooth; tibiae with two to four trichobothria; metatarsi with one; bothria with smooth hood; tarsal organ capsulate.
- **female palp:** well developed; without claw.
- **abdomen:** oval; with coriaceous cuticle and four dorsal and ventral sigilla in both sexes; petiolus usually encircled by sclerotized plate extended on epigastric region.
- **spinnerets:** six; usually well developed; anterior pair contiguous; colulus conical with two setae (fig. 76d).
- **respiratory system:** anterior booklungs; tracheal system originating from distinct spiracle just in front of colulus.
- **genitalia:** female entelegyne; with weakly developed epigyne (fig. 76f); entrance ducts short, ending in thick-walled spermathecae with complex internal structure; male palp with unmodified proximal segments; cymbium with strong paracymbial process; bulbus large and globular; embolus inserted on base of bulbus, ending at complex distal plate (fig. 76e).
- **body size:** 1.0-3.5 mm.
- **colour:** cream, yellow or brown, sometimes with distinct abdominal colour pattern.

Taxonomic status

Considered a subfamily of the Archaeidae by some authors, while others place it in the Mecysmaucheniidae. It was transferred from the Archaeidae and given family status by Forster & Platnick (1984). It is currently placed in the Palpimanoidea as the sister group to the Mecysmaucheniidae and Archaeidae. According to Schütt (2000), the family should be placed in the Araneoidea owing to the presence of a paracymbium, squamate cuticle and serrate bristles.

Distribution

Australia (including Tasmania), New Zealand.

Lifestyle

Free-living spiders usually found in moss and leaf litter.

Relevant literature

Forster (1949); Forster (1955); Forster & Platnick (1984); Rix (2005).

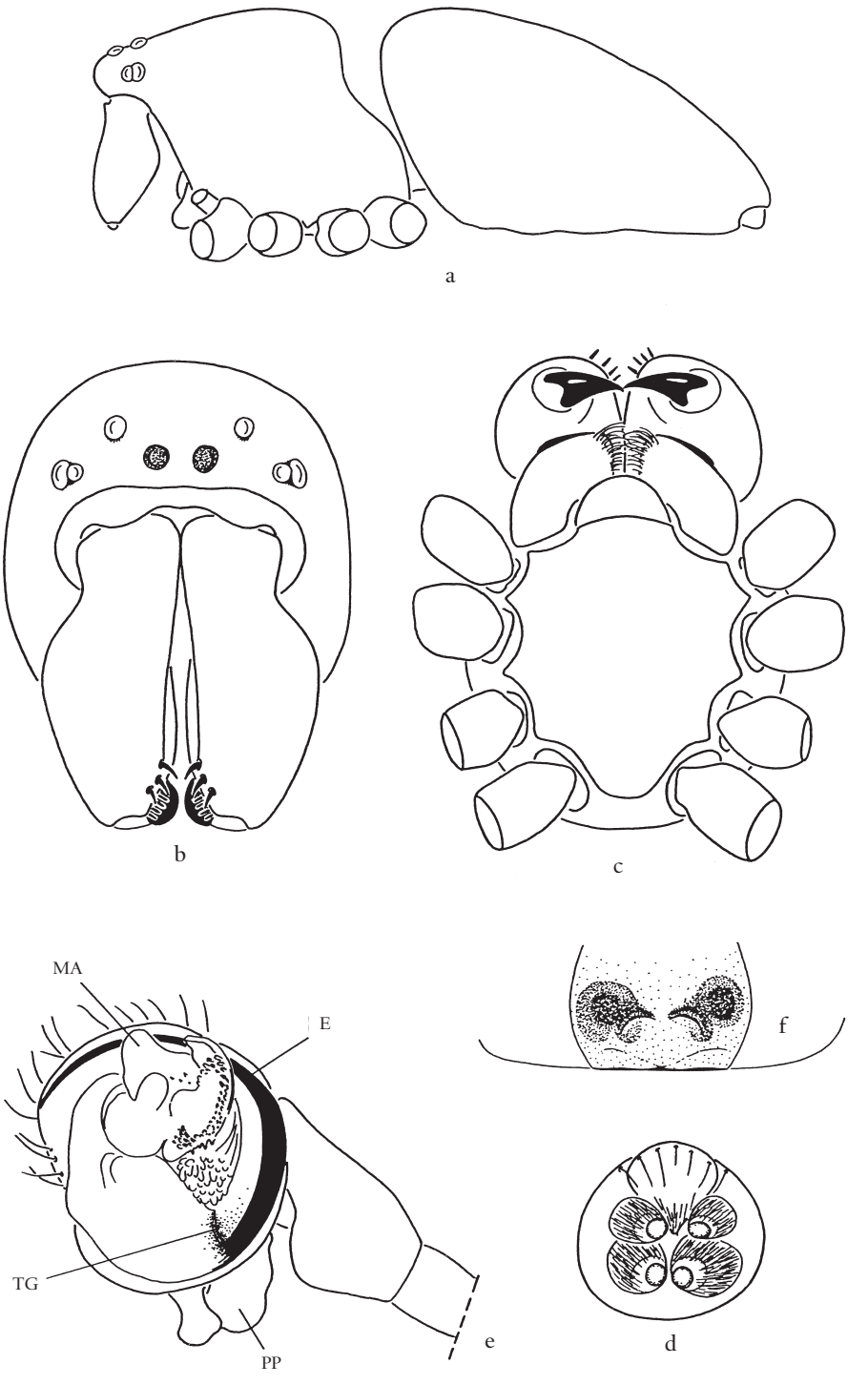


Fig. 76. **Pararchaeidae.** *Pararchaea alba* **a.** female, lateral view; legs omitted (1.4 mm); **b.** eye pattern, frontal view; **c.** cephalothorax, ventral view; **d.** spinnerets, ventral view; **e.** left male palp, retrolateral view; **f.** epigyne. E: embolus; MA: median apophysis; TG: tegular groove; PP: paracymbial projection.

FAMILY PARATROPIDIDAE Simon, 1889

HUNTING MICRO-TARANTULAS

Fig. 77, pl. 4

Type genus

Paratropis Simon, 1889.

Other genera included

Represented by four genera and eight species (Platnick, 2005) in two subfamilies: Paratropidinae: *Anisaspis* Simon, 1891; *Anisaspoides* F.O.P.-Cambridge, 1896; *Paratropis* Simon, 1889; Glabropelmatinae: *Melloina* Brignoli, 1985.

Diagnostic characters

Medium-sized mygalomorph spiders; two or three tarsal claws; eight eyes; rastellum absent; four or two spinnerets; scaly cuticle adapted to adhere soil; claw tufts small and weak if present; scopulae absent.

Descriptive characters

- **carapace:** cephalic region raised, with distinct eye tubercle (fig. 77c); cephalic region separated from thoracic region by transverse open fovea (Paratropidinae) or closed (Glabropelmatinae); tegument scaly, encrusted with soil.
- **sternum:** short, rounded (Paratropidinae) or heart-shaped (Glabropelmatinae); six sigilla increasing in size posteriad, posterior sigilla oval (fig. 77b).
- **eyes:** eight; eye tubercle raised (Paratropidinae) or arched (Glabropelmatinae); anterior median eyes largest; posterior medians smallest, oval.
- **chelicerae:** rastellum absent; fangs slender and smooth; furrow narrow with one row (Glabropelmatinae) or two rows of teeth (Paratropidinae) which may be juxtaposed or diagonally opposed.
- **mouthparts:** endites rectangular, with distinct basal lobe; anterior lobe conical (Paratropidinae) or poorly defined (Glabropelmatinae); serrula absent; anterior half with cuspules; labium wider than long or quadrangular; dense cluster of cuspules on anterior edge; labiosternal suture narrow and poorly indicated (fig. 77b).
- **legs:** with scaly cuticle encrusted with soil; males with bipartite spur on tibia I (Glabropelmatinae) or absent in Paratropidinae; usually two tarsal claws but sometimes third claw present on legs I or I and II; paired claws with one long tooth (Paratropidinae) or three or four shorter teeth (Glabropelmatinae); trichobothria present on tibiae, metatarsi and tarsi; scopulae and claw tufts weak (Glabropelmatinae) or absent (Paratropidinae); tarsal organ a smooth, raised dome.
- **female palp:** with clawless tooth.
- **abdomen:** oval, without dorsal sclerites; provided with spiky setae on shallow tubercles; encrust with soil (fig. 77a).
- **spinnerets:** two or four; anterior spinnerets lacking; median spinnerets small; posterior spinnerets short, distal segment digitiform or triangular (fig. 77d).
- **respiratory system:** four booklungs.
- **genitalia:** female genitalia consisting of elongate undivided spermathecae; male palp simple: tarsi with two short similar lobes; bulbus pyriform; second haematodocha small (fig. 77e).
- **body size:** 8-20 mm.
- **colour:** greyish brown; body frequently encrusted with soil.

Taxonomic status

The Paratropididae is considered the sister-group of the Theraphosidae in the Theraphosoidea (Raven, 1985), a position corroborated by Goloboff (1993). Raven (1985) provided a key to the genera.

Distribution

Anisaspis (St Vincent); *Anisaspoides* (Brazil); *Melloina* (Venezuela, Panama); *Paratropis* (Venezuela, Peru, Brazil).

Lifestyle

Cursorial spiders found in leaf litter.

Relevant literature

Goloboff (1993); Raven (1985).

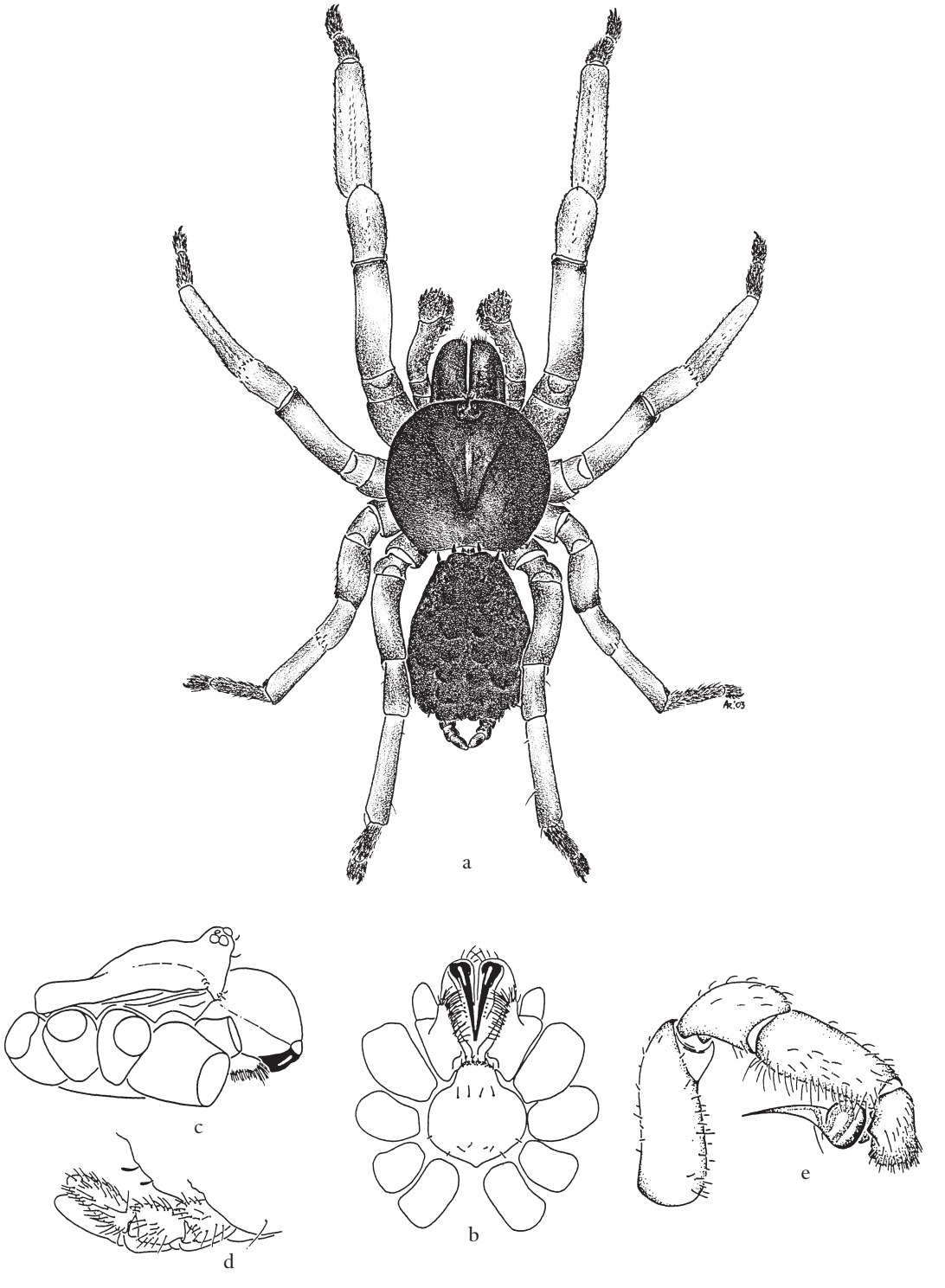


Fig. 77. **Paratropididae.** *Paratropis* sp. **a.** female habitus (18 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, lateral view; **d.** spinnerets, ventral view; **e.** right male palp, retrolateral view.

FAMILY PERIEGOPIDAE Simon, 1893

WIDE-CLAWED SPIDERS

Fig. 78

Type genus

Periegops Simon, 1893.

Other genera

A monogeneric family represented by two species.

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes; fovea absent; anterior paired claws bipectinate; female with a single median genital system.

Descriptive characters

- **carapace:** cephalic area not very narrowed and not separated from thoracic region (figs 78a, c); provided with longitudinal rows of erect serrate setae; fovea absent; clypeus vertical.
- **sternum:** shield-shaped, longer than wide; with small inter- and precoxal sclerites (fig. 78b).
- **eyes:** six (anterior median eyes lost) arranged in three well separated diads (fig. 78a).
- **chelicerae:** fairly short and stout; lamina present; three teeth on promargin; a group of denticles on retromargin; not fused at base; without condyle nor stridulating file.
- **mouthparts:** endites slender, converging and almost meeting in midline; serrula strongly developed; labium free, slightly wider than long (fig. 78b).
- **legs:** three tarsal claws, based on distinct onychium; paired claws of anterior leg pairs bipectinate (fig. 78d); inferior claw with single tooth; 4123; spines absent but with strong bristles, especially on retrolateral surface of male tibiae; three trichobothria on tibiae, one subdistal on metatarsi; tarsal organ: exposed, sensilla not raised.
- **female palp:** small, with claw reduced to distal ridge.
- **abdomen:** oval; densely clothed with short serrate hairs.
- **spinnerets:** six; colulus small, with 6-7 hairs.
- **respiratory system:** anterior booklungs; tracheal system originating from wide groove in advance of the spinnerets, widely separated spiracles lead into single atrium from where tracheae extend forwards.
- **genitalia:** haplogyne; female genitalia simple, consisting of single median poreplate discharging directly into distal portion of oviduct (fig. 78f); male palp small with globose tibia; tarsus small; bulbus pyriform with coiled spermduct and short embolus (fig. 78e).
- **body size:** 6-8 mm.
- **colour:** carapace reddish brown with black lines; abdomen yellowish with dark chevrons.

Taxonomic status

The family belongs in the Scytodoidea but was suggested to be the sister-group of the Drymusidae (Forster, 1995), although it was not yet included in a family level cladistic analysis.

Distribution

New Zealand, Australia.

Lifestyle

Periegopids appear to be free-living in forest areas. They hide in a retreat under stones or logs.

Relevant literature

Forster (1995).

Fig. 78. **Periegopidae.** *Periegops suteri.* **a.** female, dorsal view, appendages omitted (6.3 mm); **b.** cephalothorax, ventral view; **c.** cephalothorax, lateral view; **d.** tarsus I, bipectinate claw; **e.** left male palp, retrolateral view; **f.** female genitalia, internal structure. CY: cymbium; PP: poreplate; TI: tibia.

FAMILY PHILODROMIDAE Thorell, 1870

SMALL HUNTSMAN SPIDERS

Fig. 79, pl. 31

Type genus

Philodromus Walckenaer, 1826.

Other genera

Represented by 29 genera and 514 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; legs laterigrade and slender with distinct claw tufts and scopulae; chelicerae lack teeth; secondary eyes lack a tapetum.

Descriptive characters

- **carapace:** slightly flattened; fovea usually absent; clothed in soft recumbent setae; shape varies from as long as wide to elongate (figs 79a, b).
- **sternum:** shape correlated with carapace form; apex an obtuse point between coxae.
- **eyes:** eight; in two rows (4:4); usually equal in size, sometimes with anterior eyes larger than posterior eyes or with anterior median eyes larger than other eyes; eyes not on large tubercles; both eye rows recurved (fig. 79b), posterior row sometimes strongly recurved; secondary eyes lack a tapetum.
- **chelicerae:** cheliceral furrow usually without teeth.
- **mouthparts:** labium slightly longer than wide.
- **legs:** two claws; laterigrade; legs I, III and IV almost equal in length, leg II usually longer, sometimes much longer; tarsi I and II with claw tufts and scopulae; trochanters with or without notches; anterior tibiae sometimes with a series of long spines.
- **female palp:** with small toothed claw.
- **abdomen:** variable in shape, from heart-shaped to oval or elongate; covered with soft recumbent setae; usually with dark heart mark.
- **spinnerets:** simple; colulus absent (fig. 79c).
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne small, usually with median septum (fig. 79f); male palp with small apophysis on tibia (fig. 79e); embolus variable, usually short (fig. 79d).
- **body size:** 3-16 mm.
- **colour:** varies from white to pale cream and reddish brown or greyish brown; frequently mottled, with longitudinal bands or chevrons.

Taxonomic status

The family was included for a long time in the Thomisidae, but Homann (1975) separated the two based on the tapetum and the leg armature. Coddington & Levi (1991) and Coddington *et al.* (2004) place the philodromids with the Selenopidae and Sparassidae near the Thomisidae in the Dionycha clade.

Distribution

Worldwide.

Lifestyle

Free-living, agile spiders commonly found on plants or on the soil surface.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Wunderlich (2004).

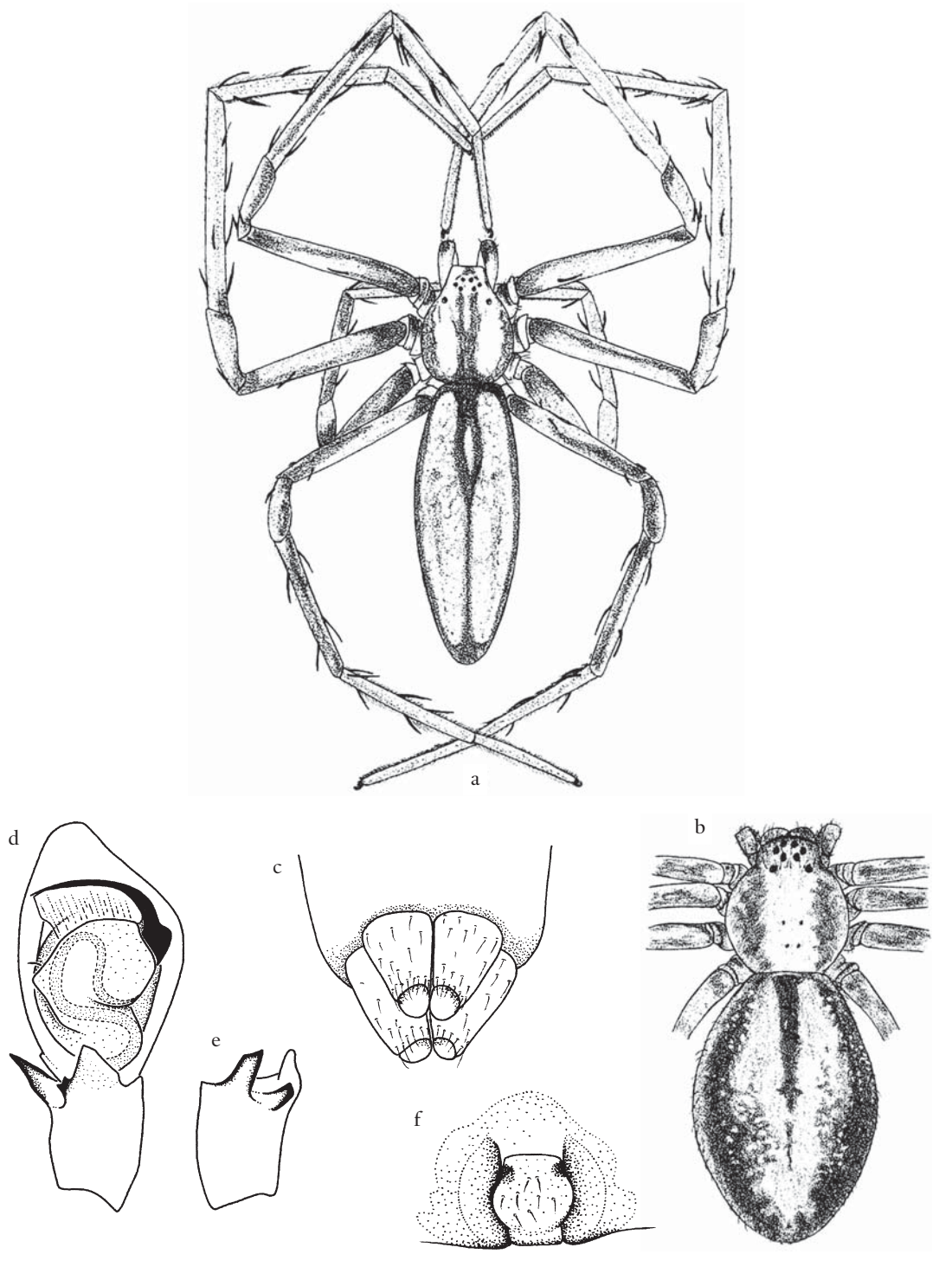


Fig. 79. **Philodromidae.** *Tibellus* sp. **a.** female habitus (10 mm); *Philodromus* sp. **b.** female, cephalothorax and abdomen (6 mm); **c.** spinnerets, ventral view; *Philodromus cespitum* **d.** male palp, ventral view; **e.** male palpal tibia, dorsal view; **f.** epigyne.

FAMILY PHOLCIDAE C. L. Koch, 1851

DADDY-LONG-LEGS SPIDERS

Fig. 80, pl. 7, 32

Type genus

Pholcus Walckenaer, 1805.

Other genera

Represented by 75 genera and about 870 species (Platnick, 2005) in five subfamilies: Holocneminae, Ninetinae; Pholcinae and an unnamed Neotropical clade (Huber, 2000). This subfamily level classification is obsolete (Bruvo-Madaric *et al.*, 2005) but so far no new formal system has been proposed.

Diagnostic characters

Very small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six or eight eyes; clypeus about as high as chelicerae; legs usually very long with pseudosegmented tarsi; chelicerae fused, with lamina, modified in males; male palp with conspicuous procursus (retrolateral paracymbium).

Descriptive characters

- **carapace:** short, broad and almost circular, sometimes reniform; cephalic region usually raised (fig. 80i, g), with deep striae; thoracic region sometimes with deep, longitudinal fovea, except in ninetines and some pholcines (e.g. *Leptopholcus*) in which carapace is depressed and devoid of striae; clypeus about as high as length of chelicerae (fig. 80c), sometimes concave beneath eyes; pedicel dorsally with two chitinous bands, parallel or V-shaped.
- **sternum:** flat or slightly convex; broadly truncated posteriorly.
- **eyes:** six or eight; often occupying entire width of carapace; anterior median eyes smallest or absent, other eyes in two triads (figs 80c, e, f) or on tubercles (fig. 80g).
- **chelicerae:** chelate; weak and cylindrical in shape; joined over greater part of length (fig. 80d); cheliceral margin with transparent lamina, apically thickened and darkened, lobed or tooth-like, in males often with sexual dimorphic modifications (fig. 80j).
- **mouthparts:** labium fused to sternum, wider than long.
- **legs:** three claws with a very short, membranous onychium; legs often extremely long and slender (fig. 80b), rarely short (e.g. ninetines), with flexible tarsi; tarsal organ exposed or capsulate.
- **female palp:** usually small, slender and toothless.
- **abdomen:** shape variable, either globose (fig. 80i) or cylindrical (fig. 80a) to elongate (*Leptopholcus*) (fig. 80h); epigastric region well developed; anal tubercle large, obtusely triangular.
- **spinnerets:** anterior spinnerets thick and cylindrical, slightly separated; posterior spinnerets smaller, conical and compressed; spigots rather unusual with one huge and several smaller piriform gland spigots and major ampullate gland spigot on the anterior lateral spinnerets; distal ring of posterior median spinnerets composed of bases of two spigots (one is the minor ampullate); no spigots on the posterior lateral spinnerets.
- **respiratory system:** two booklungs; tracheal spiracle lacking.
- **genitalia:** haplogyne; but female usually with an epigyne-like sclerotization covering the internal female genitalia (fig. 80l); male with large, complex palpi (fig. 80k); patella very small; tibia large and swollen, either oval or globose; large paracymbium (procursus); bulbus divided into two dissimilar parts: one part vesiculate, other part produced into a long apophysis; cymbium with small alveolus, globose or oval.
- **body size:** 1-10 mm.
- **colour:** varies from cream with a few dark markings to greyish brown with dark chevrons.

Taxonomic status

Coddington & Levi (1991), Coddington *et al.* (2004) and Platnick *et al.* (1991) placed the pholcids in the 'scytodoids' as sister-group of the Diguetidae, Plectreuridae, Scytodidae and Sicariidae, based on the structure of the distal ring of the posterior median spinnerets and reduction of the anterior median eyes. Major revisions by Huber (2000, 2001, 2003a, b, c, 2005b).

Distribution

Worldwide.

Lifestyle

Pholcids construct sheet or spacewebs (fig. 80b) and are found in a wide variety of habitats but frequently in dark places such as caves, under stones and fallen logs. Some species are synanthropic and cosmopolitan as a result.

Relevant literature

Bruvo-Madaric *et al.* (2005), Dippenaar-Schoeman & Jocqué (1997); Huber (2000, 2001, 2003a, b, c, 2005a, b, d, in press).

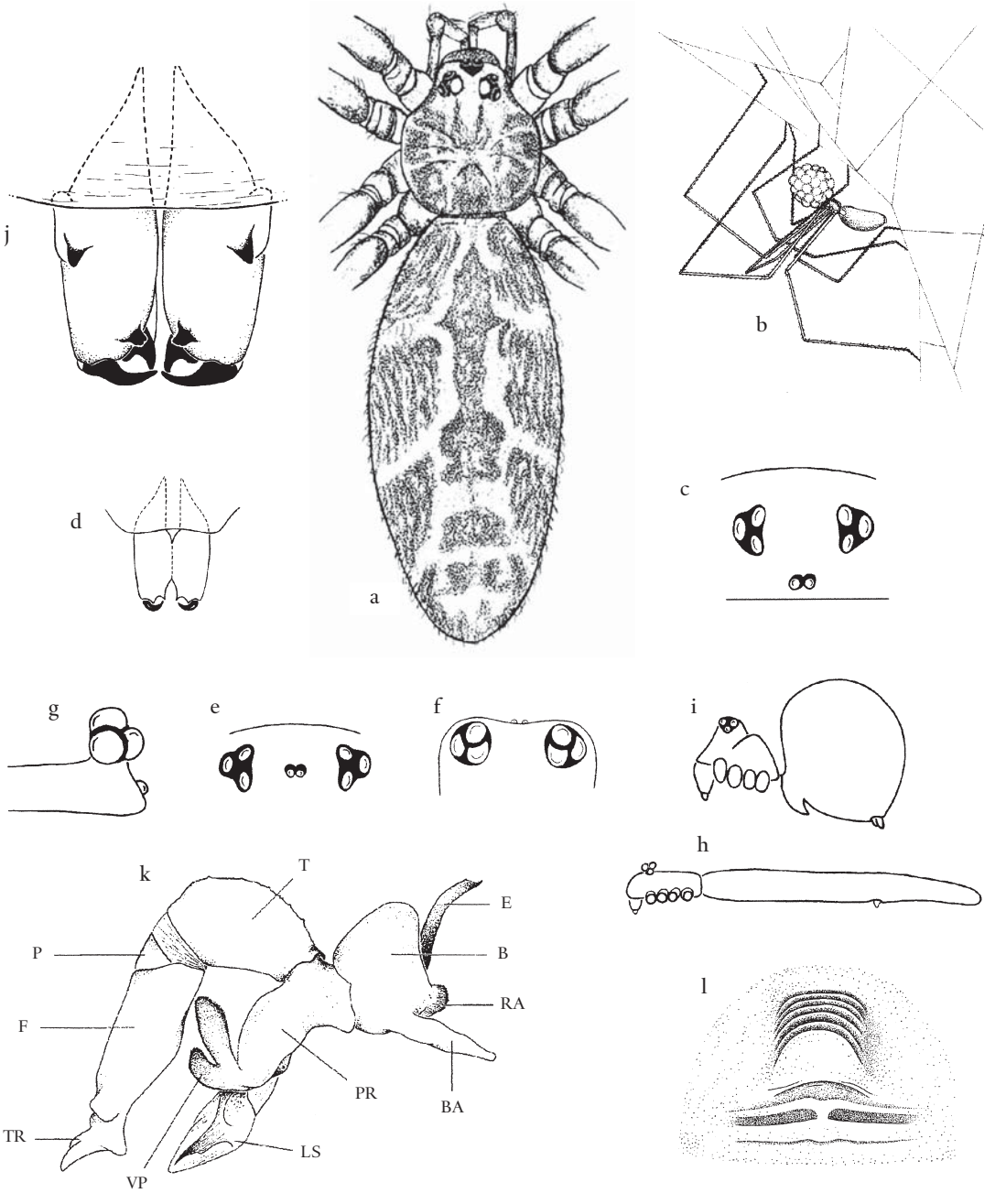


Fig. 80. **Pholcidae.** *Smeringopus* sp. **a.** female, dorsal view (9 mm); **b.** female on web with eggs in chelicerae; **c.** eye pattern, anterior view; **d.** fused chelicerae; *Pholcus* sp. **e.** eye pattern, anterior view; *Lepthopholcus* sp. **f.** eye pattern, anterior view; **g.** anterior part of cephalothorax, lateral view; **h.** body, lateral view; *Spermophora* sp. **i.** body, lateral view; *Spermophora senoculata* **j.** chelicerae showing armature, frontal view; **k.** right male palp, lateral view; **l.** external female genitalia. B: bulbus; BA: bulbal apophysis; E: embolus; F: femur; LS: lateral sclerites; P: patella; PR: procursus = paracymbium; RA: ridged apophysis; T: tibia; TR: trochanters; VP: ventral process. (k: after Dresco & Hubert, 1969.)

FAMILY PHYXELIDIDAE Lehtinen, 1967

HACKLED MESH WEAVERS, LACE WEB WEAVERS

Fig. 81, pl. 25

Type genus

Phyxelida Simon, 1894.

Other genera

Represented by 12 genera and 54 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; cribellate; entelegyne; eight eyes; male palp with simple sclerotized dorsal and rarely retrolateral tibial apophyses; metatarsi I of male strongly modified; palpal femora with group of spurs at base of the median face (both sexes).

Descriptive characters

- **carapace:** longer than wide with cephalic region only slightly elevated; fovea varies from being longitudinal to a simple depression (fig. 81a).
- **sternum:** oval to heart-shaped; margin usually with a wavy edge; apex blunt.
- **eyes:** eight in two rows (4:4) (fig. 81b); usually all pale in colour; tapetum canoe-shaped.
- **chelicerae:** in males usually longer and more slender than in females; cheliceral teeth arranged in two rows.
- **mouthparts:** labium square to rectangular; endites rectangular, nearly parallel; serrula present.
- **legs:** three claws; legs fairly long, especially in males; trichobothria on metatarsi in two rows; trichobothria absent from tarsi and metatarsi with a single long, dorsal trichobothrium; trochanters unnotched; metatarsi I of male strongly modified (fig. 81d).
- **female palp:** femora with group of sinuous spurs at base of the median face (both sexes), probably serves as a kind of stridulatory organ (fig. 81e).
- **abdomen:** oval; with dense layer of fine setae.
- **spinnerets:** six; both anterior and posterior spinnerets two-jointed; large dark setae ectally on posterior lateral spinnerets.
- **cribellum:** weakly to strongly divided (fig. 81c).
- **calamistrum:** simple; median to subapical, relatively short (0.2-0.5 times length of metatarsus IV).
- **respiratory system:** two booklungs and posterior tracheae; tracheae open through spiracle situated close to spinnerets.
- **genitalia:** entelegyne; epigyne of female, usually with posterior median lobe separated from lateral lobes by sutures (fig. 81h); male palp with simple, sclerotized dorsal tibial apophysis (figs 81f, g), rarely a retrolateral tibial apophysis (*Vytfutia*). Embolus often with pars pendula, a poorly sclerotized appendage at the base; conductor and median apophysis usually present.
- **body size:** 3-16 mm.
- **colour:** various shades of dark brown or grey, abdomen sometimes with ill-defined patterns.

Taxonomic status

Phyxelidinae was long considered a subfamily of the Amaurobiidae. In the revision of the taxon, Griswold (1990) discusses the problems concerning the familial placement and sister-group. It was elevated to family rank by Griswold *et al.* (1999) and considered sister to the Titanoecidae in a provisional superfamily called Titanoecoidea.

Distribution

Known mainly from the Afrotropical Region with only a few species recorded from Turkey, Sumatra and Borneo.

Lifestyle

Phyxelididae construct irregular tangled or sheet webs of bluish cribellate silk (fig. 81i), and are typically ground-living, cryptic spiders which live in damp and dark places.

Relevant literature

Griswold (1990); Griswold *et al.* (1999).

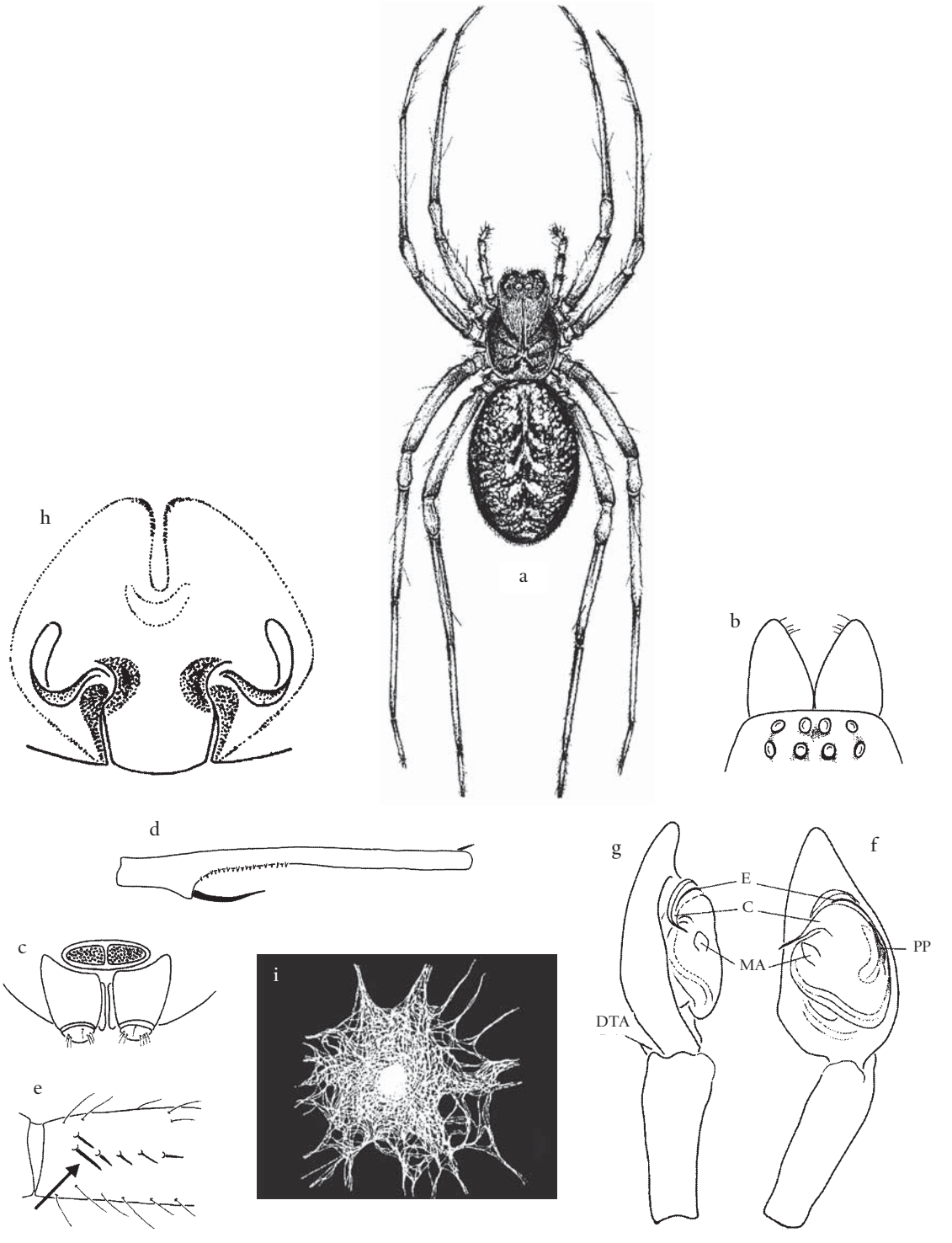


Fig. 81. **Phyxelididae.** *Phyxelida* sp. **a.** female habitus (14 mm); **b.** frontal part of cephalothorax; **c.** spinnerets, ventral view; *Phyxelida kipia* d. male metatarsus I; **e.** palpal femur showing modified setae; *Phyxelida carcharata* **f.** right male palp, ventral view; **g.** lateral view; **h.** epigyne; **i.** web with central funnel. C: conductor; DTA: dorsal tibial apophysis; E: embolus; MA: median apophysis; PP: pars pendula of embolus. (d-h: after Griswold, 1990.)

FAMILY PIMOIDAE Wunderlich, 1986

LARGE HAMMOCK-WEB SPIDERS

Fig. 82, pl. 15

Type genus

Pimoa Chamberlin and Ivie, 1943.

Other genera

Weintrauboa Hormiga, 2003; *Nanoa* Hormiga, Buckle & Scharff, 2005.
Represented by 25 species (Platnick, 2005).

Diagnostic characters

Medium to small araneomorph spiders; ecribellate; entelegyne, eight eyes; three tarsal claws; recognised by the presence of a retrolateral cymbial sclerite (pimoid cymbial sclerite), a dorsoectal cymbial process, and cuspules (modified macrosetae) on either the cymbial process or the dorsal surface of the cymbium and a paracymbium attached to the cymbium on the male palp and an epigyne with a scape with the copulatory openings at the distal end.

Descriptive characters

- **carapace:** longer than wide with elongate conspicuous fovea (fig. 82b).
- **sternum:** longer than wide, projecting between coxae IV.
- **eyes:** eight subequal, in two rows; anterior row recurved, posterior row variable (from above); lateral eyes touching; secondary eyes with canoe-shaped tapetum.
- **chelicerae:** large, promargin with two or three, retromargin with 1-4 teeth; usually with stridulating file.
- **mouthparts:** endites almost rectangular, parallel; labium wider than long.
- **legs:** 1423 (fig. 82a), longer in male than in female; tarsi with three claws; spination variable; usually one trichobothrium on metatarsi; autospasy at patella-tibia junction.
- **female palp:** slender, with numerous spines; tarsal with claw provided with row of minute denticles and basal tooth.
- **abdomen:** oval, slightly longer than wide.
- **spinnerets:** six, all well developed; colulus fairly large with setae; anterior lateral spinnerets with reduced bases of piriform gland spigots; posterior median spinnerets without aciniform gland spigots; posterior lateral spinnerets with two cylindrical gland spigots (base of peripheral cylindrical spigot slightly larger than base of distal one); triplet absent in males.
- **respiratory system:** two booklungs and tracheal spiracle just in front of spinnerets; tracheae haplotracheate.
- **genitalia:** entelegyne; epigyne large with well developed scape-like protrusion (figs 82d, e), consisting of a dorsal and ventral plate, bearing distal copulatory opening; spermathecae spherical; cymbium of male palp (fig. 82c) with alveolus near prolateral margin, provided with a retrolateral sclerite (in some species fused to paracymbium), a dentate dorsal excrescence and modified macrosetae (most often as denticles) on either cymbial process or dorsal surface of cymbium; paracymbium fused to cymbium (intersegmental in *Weintrauboa*); embolus long and filiform, continuous with tegulum, paralleled by a long process (absent in *Nanoa*); tegulum large with membranous conductor and sometimes a median apophysis.
- **body size:** 1.4-12 mm.
- **colour:** carapace often light brown with darker margins; sternum usually dark; abdomen dark grey with lighter chevron pattern.

Taxonomic status

Although a small family, it is difficult to provide a concise definition of it. The Pimoidae are considered the sister-group of the Linyphiidae owing to the cheliceral stridulating file, the tibial autospasy, the cymbial cuspules (modified macrosetae), the retrolateral cymbial sclerite (pimoid cymbial sclerite), and the embolic process (pimoid embolic process, PEP, lost in *Nanoa*) (Hormiga, 1993, 2003; Hormiga *et al.*, 2005). The placement is corroborated in several studies of Orbiculariae, among others by Griswold *et al.* (1998), Scharff & Coddington (1997), Coddington *et al.* (2004), Agnarsson (2004) and Hormiga *et al.* (2005).

Distribution

Western North America, Alps and Apennines, Cantabrian Mountains (northern Spain), Himalayas, Japan and adjacent islands.

Lifestyle

Pimoids live on the underside of a fairly large sheet web, most often in wet, shady habitats, including caves.

Relevant literature

Griswold *et al.* (1999); Hormiga (1993, 1994a, 2003); Hormiga *et al.* (2005); Hormiga & Lew (2005).

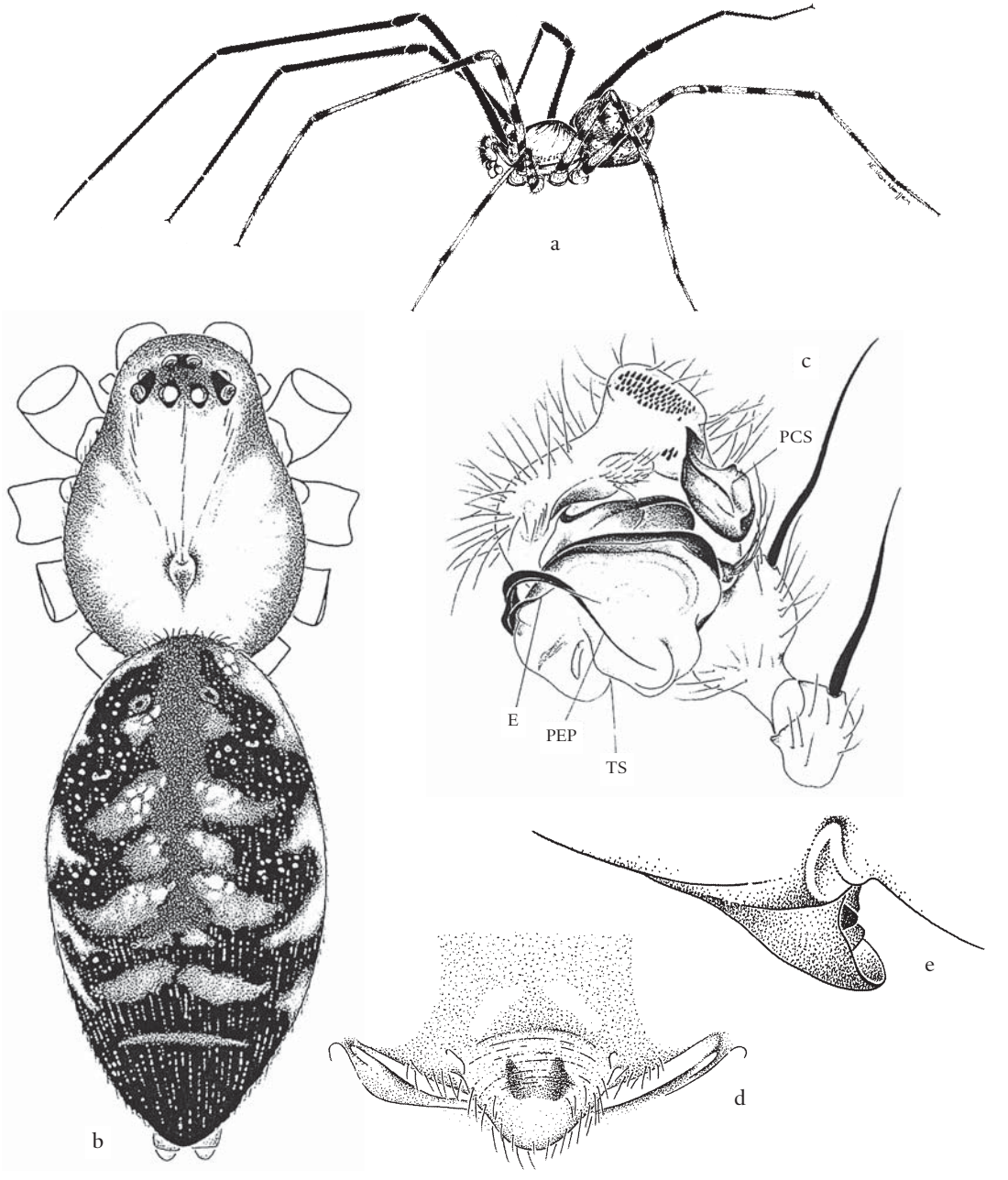


Fig. 82. **Pimoidae.** *Pimoa* sp. **a.** female, natural posture (11 mm); **b.** cephalothorax and abdomen, dorsal view; **c.** male palp, retrolateral view; **d.** epigyne, ventral view; **e.** epigyne, lateral view. E: embolus; PCS: pimoid cymbial sclerite; PEP: pimoid embolic-tegular process; TS: tegular suture.

FAMILY PISAURIDAE Simon, 1890

NURSERY WEB SPIDERS / FISH-EATING SPIDERS

Fig. 83, pl. 17

Type genus

Pisaura Simon, 1885.

Other genera

Represented by 52 genera and more than 520 species (Platnick, 2005).

Diagnostic characters

Medium-sized to very large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes some of which on shallow tubercles; abdomen elongated, tapering towards back; tarsi with pseudo-segment; trochanters deeply notched. Egg-case carried in the chelicerae.

Descriptive characters

- **carapace:** longer than wide; clypeus in some genera with blunt tubercles on anterolateral edge; clothed in plumose setae.
- **sternum:** longer than wide; apex blunt.
- **eyes:** eight; in two (4:4), three (4:2:2) (fig. 83d) or four (2:2:2:2) rows (fig. 83f); at least one pair of eyes on shallow tubercles; secondary eyes with grate-shaped tapetum.
- **chelicerae:** cheliceral furrow with teeth, number varies between genera.
- **mouthparts:** labium longer than wide.
- **legs:** three claws; legs relatively long, sometimes slightly laterigrade (fig. 83a); with setae on patellae, femora, tibiae and metatarsi; tarsi with trichobothria in two rows, or scattered; trochanters deeply notched; tarsi with pseudosegment; unpaired claws with 2-3 teeth.
- **female palp:** tarsus long with well developed toothed claw.
- **abdomen:** elongated, tapering towards back (fig. 83a), rarely oval (fig. 83c); usually with plumose setae.
- **spinnerets:** anterior and posterior spinnerets similar in size.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne consists of two integumental folds, forming two lateral elevations with a median area; internal structure complex, consisting of a base with enlarged lumen and a stalk leading to spermathecae (fig. 83e); male palp with tibial apophysis usually present; cymbium usually elongated anteriorly; bulbus oval, longitudinal axis frequently inclined; median apophysis present, often with several extra tegular appendages; embolus varies from simple and short to long and curved (figs 83g, h).
- **body size:** 8-30 mm.
- **colour:** cryptic; carapace frequently decorated with white longitudinal bands or symmetrical patterns of black on a brown or grey background; abdomen with longitudinal bands, folium or spots.

Taxonomic status

Griswold (1991) found that the Lycosidae, Trechaleidae and Pisauridae form a monophyletic group in the Lycosoidea.

> **Note:** The family Halidae is here considered as a part of the Pisauridae. After the erection of the Halidae (Jocqué, 1994), it was found that all Pisauridae possess one of the main characters on which the family was diagnosed: tarsi with pseudo-segment. Field observations of 'Halidae' carrying the egg-sac in the chelicerae (Griswold, Silva, pers. comm.) corroborate the placement of *Tolma* Jocqué, 1994 and *Hala* Jocqué, 1994 in the Pisauridae. The shape of the abdomen is exceptional but does not justify the separation.

Distribution

Worldwide.

Lifestyle

Pisaurids are either free-living or web-bound. The web is a sheet with a large funnel often leading into the ground. They occupy various habitats and are found on the ground, on plants or in association with water. The egg-case is carried in the chelicerae underneath the stenum (fig. 83b). Females construct a nursery web to accommodate the spiderlings.

Relevant literature

Carico (2005a); Dippenaar-Schoeman & Jocqué (1997); Jocqué (1994), Sierwald (1989, 1990, 1993, 1997).

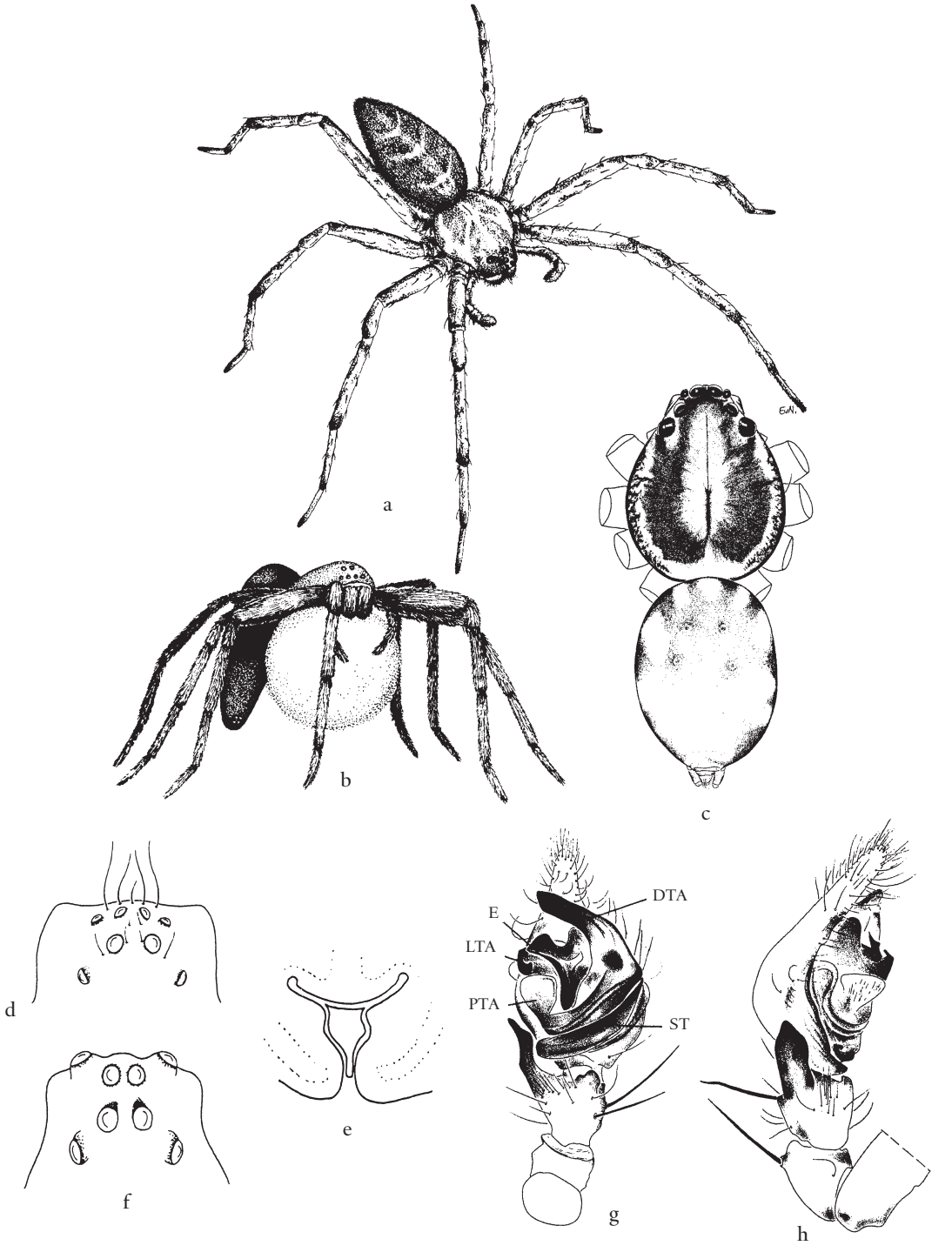


Fig. 83. **Pisauridae.** *Rothus* sp. **a.** female, natural posture (14 mm); **b.** female with egg sac; *Afropisaura* sp. **c.** eye pattern dorsal view; *Tetragonophthalma* sp. **d.** eye pattern, dorsal view; **e.** epigyne; *Hala paulyi* **f.** cephalothorax and abdomen, dorsal view; **g.** right male palp, ventral view; **h.** retrolateral view. DTA: distal tegular apophysis; E: embolus; LTA: lateral tegular apophysis; PTA: proximal tegular apophysis; ST: subtegulum.

FAMILY PLECTREURIDAE Simon, 1893

SPUR-LIPPED SPIDERS

Fig. 84, pl. 7

Type genus

Plectreurys Simon, 1893.

Other genus

Kibramoa Chamberlin, 1924; the family is represented by 30 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; eight eyes; chelicerae connected ventrally over half their length by a membrane and provided with a distal, dorsal lamella; endites with a basal spur.

Descriptive characters

- **carapace:** ovoid; longer than wide, fairly broad in front; fovea faint or absent; clypeus fairly high, straight (fig. 84d).
- **eyes:** eight in two rows; posterior row variable, anterior row procurved or straight; lateral eyes on a shallow tubercle; anterior median eyes smallest, remainder subequal; median ocular quadrangle wider than long and narrowed in front (figs 84a, b).
- **chelicerae:** vertical, short and stout; without lateral condyle; ventrally connected by white membrane over half their length; promargin with two teeth, retromargin with three basal teeth; side with stridulating file.
- **mouthparts:** endites narrow, longer than wide, strongly converging and touching in front of labium; base with a strong spur; labium slightly longer than wide; subtriangular (fig. 84c).
- **sternum:** ovoid; slightly longer than wide; truncated in front, bluntly pointed behind (fig. 84c); coxae IV subcontiguous.
- **legs:** three tarsal claws, paired claws with about eight teeth, unpaired claw with one tooth; 1423; stout (*Plectreurys*) or slender (*Kibramoa*); tarsi with small extra distal segment (fig. 84e); with spines; less numerous on male leg I; male anterior tarsi and metatarsi modified; tarsal organ exposed.
- **female palp:** without claw but with pointed sclerotized extremity; femur with small basal stridulating pin.
- **abdomen:** oval.
- **spinnerets:** six; anterior and posterior spinnerets two-segmented with small conical distal segment; anterior lateral spinnerets with lateral tegument extended into a hook; posterior lateral spinnerets without spigots; spigot bases of posterior median spinnerets fused to form a distal ring; colulus a small plaque with two setae (fig. 84f).
- **respiratory system:** two booklungs; tracheal spiracle small, in advance of spinnerets.
- **genitalia:** haplogyne; genital groove with slightly swollen and sclerotized margins (fig. 84g), sometimes with specific emarginations or lobes; male palpal femur with basal stridulating spur; tarsus simple, bulbus inserted ventrally; without haematodocha nor apophyses; embolus usually long and thin or, rarely, a short spur (fig. 84h).
- **body size:** 4-17 mm.
- **colour:** fairly variable: carapace usually brownish, legs variable, abdomen greyish.

Taxonomic status

Coddington & Levi (1991), Coddington *et al.* (2004) and Platnick *et al.* (1991) place them with the Diguetidae as sister-group to the "Scytodoids" in the higher Haplogynes. Wunderlich (2004) considers the Diguetidae a subfamily of Plectreuridae.

Distribution

Mainly in arid areas of the USA, Mexico and Cuba.

Lifestyle

Plectreuridae are primitive nocturnal hunters living in a variety of dark places. They construct a tubular retreat, provided with a narrow entrance, rimmed with silk.

Relevant literature

Gertsch (1958); Platnick *et al.* (1991); Ubick (2005h); Wunderlich (2004).

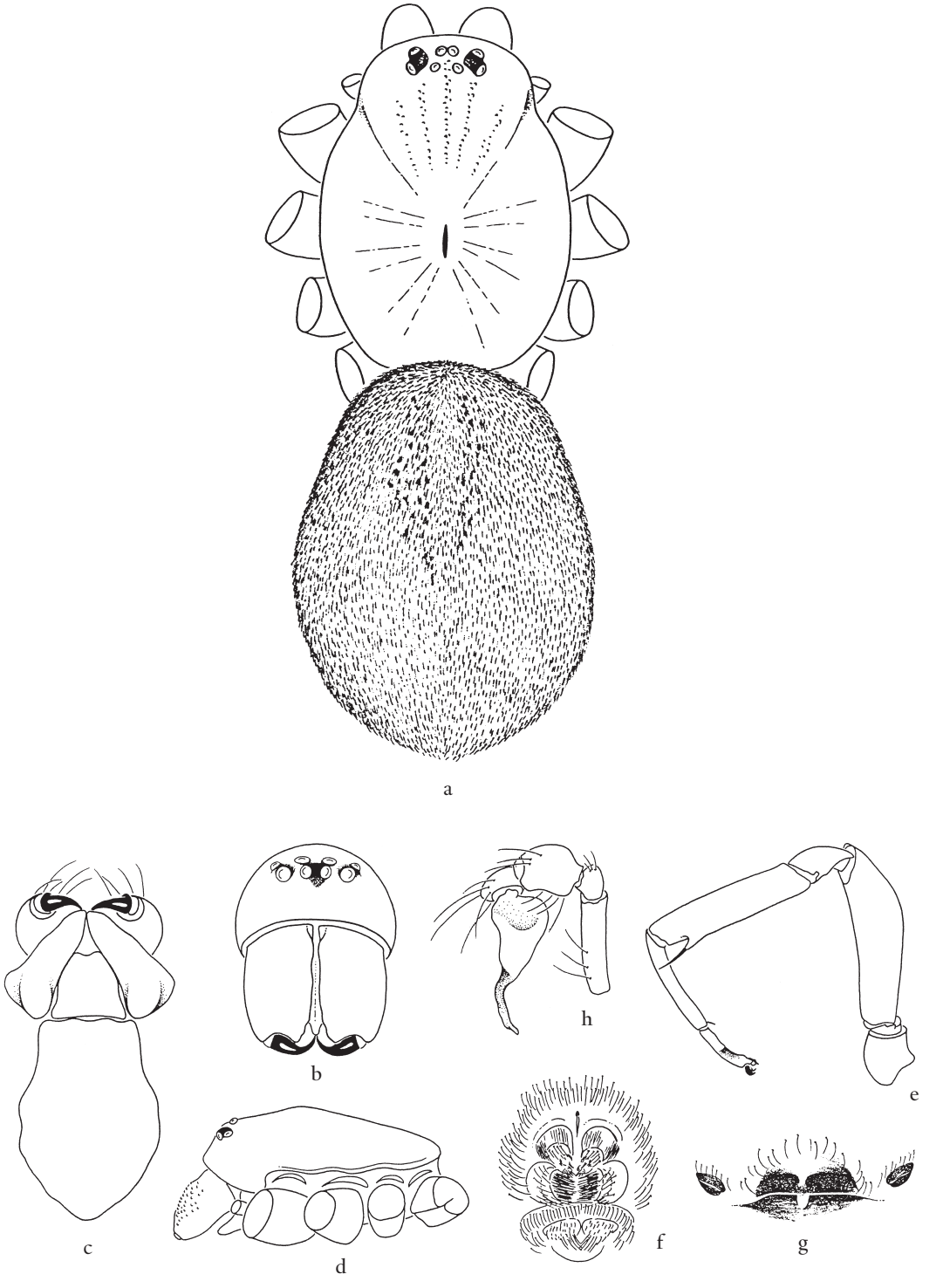


Fig. 84. **Plectreuridae.** *Plectreuris tristis* **a.** male, cephalothorax and abdomen, dorsal view (11 mm); **b.** male cephalothorax, frontal view; **c.** male cephalothorax, ventral view; **d.** cephalothorax, lateral view; **e.** male leg I; **f.** female spinnerets; **g.** epigyne; **h.** left male palp, lateral view.

FAMILY PRODIDOMIDAE Simon, 1884

LONG-SPINNERED GROUND SPIDERS / PRODIDOMID GROUND SPIDERS

Fig. 85, pl. 30

Type genus

Prodidomus Hentz, 1847.

Other genera

Represented by 26 genera and 160 species (Platnick, 2005) divided into four subfamilies: Anagraphinae, Molycriinae, Prodidominae and Zimirinae.

Diagnostic characters

Very small to medium-sized araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; anterior spinnerets farther forward than in typical gnaphosids; piriform gland spigots with greatly elongated bases bearing long, plumose setae.

Descriptive characters

- **carapace:** oval, rather flat; fovea absent in some genera (fig. 85a).
- **sternum:** broad, oval; apex often projecting between coxae IV.
- **eyes:** usually eight in two rows (4:4); eyes lacking in some genera; Prodidominae with eyes in circular arrangement, posterior eye row strongly procurved (fig. 85c); Anagraphinae with eyes in two rows, posterior row recurved.
- **chelicerae:** well developed, projecting forwards; cheliceral furrow with teeth; fangs long (fig. 85c).
- **mouthparts:** endites and labium fairly long.
- **legs:** two claws; prograde; moderately long; bearing setae and spines.
- **female palp:** tarsus often truncated, clawless.
- **abdomen:** narrowly oblong, large relative to carapace; with dark recumbent setae.
- **spinnerets:** anterior spinnerets well developed, sometimes far in front (Molycriinae, some Zimirinae) (fig. 85b); piriform gland spigots with greatly elongated bases bearing long plumose setae (figs 85b, d); minor ampullate gland spigots on posterior median spinnerets with shaft a needle-like extension of the base.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne simple (figs 85e, f); male palp simple; embolus long, curving around bulb, retrolateral apophysis long in Anagraphinae; embolus short in Prodidominae (figs 85g, h).
- **body size:** 1.5-9 mm.
- **colour:** carapace uniform, yellow-cream to yellow-brown or dark brown, sometimes with darker pattern; abdomen pinkish or reddish brown.

Taxonomic status

They form part of the superfamily Gnaphosoidea, with the Gnaphosidae as sister- group (Coddington & Levi, 1991; Platnick, 1990).

Distribution

Worldwide in tropical and subtropical regions.

Lifestyle

Prodidomids are free-living, nocturnal ground-dwelling spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Cooke (1964); Platnick (1990); Platnick & Baehr (2006); Ubick (2005i).

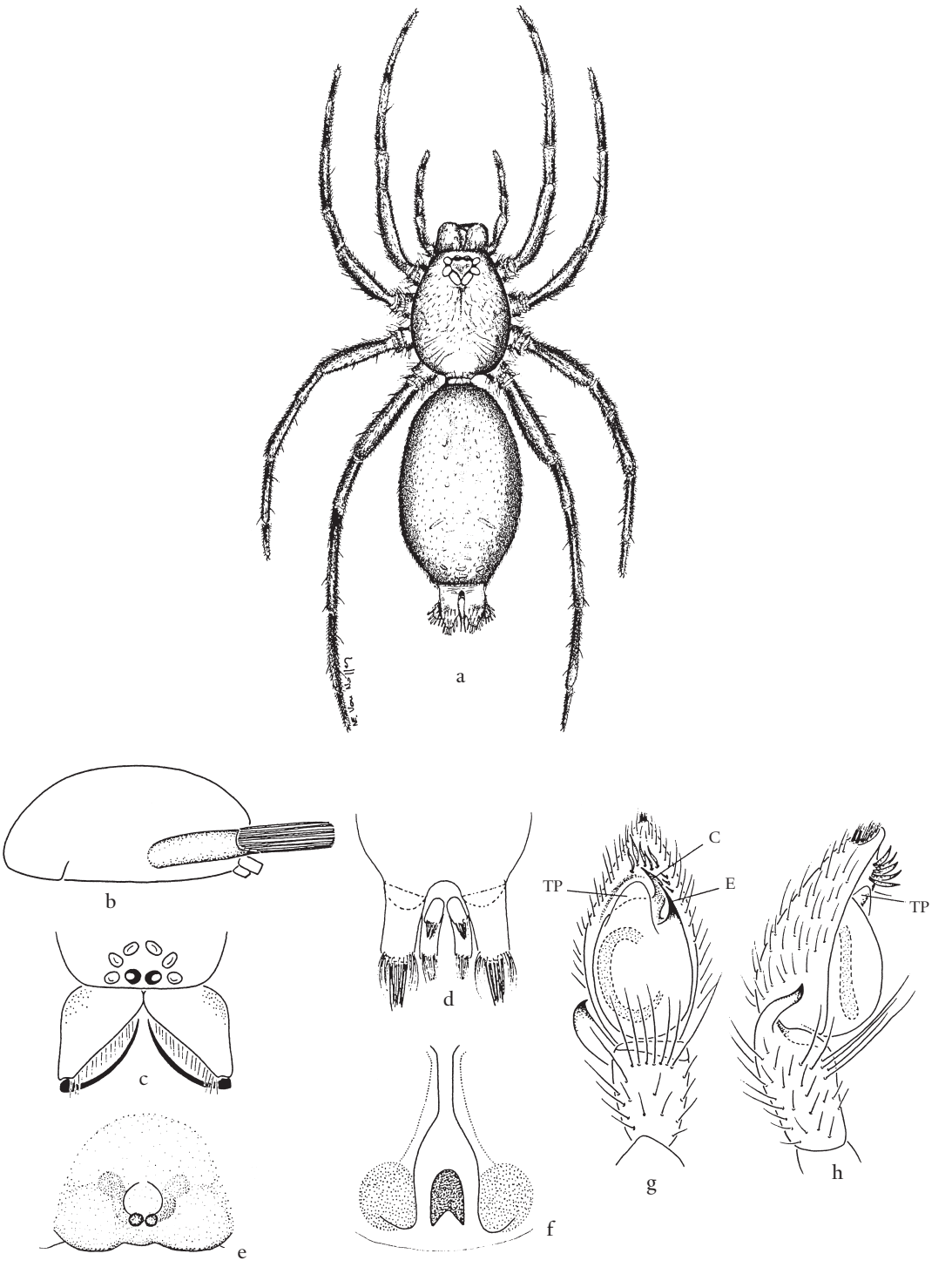


Fig. 85. **Prodidomidae.** *Prodidomus* sp. **a.** female habitus (4 mm); **b.** lateral view of abdomen showing advanced anterior lateral spinnerets; Prodidominae **c.** eye pattern, dorsal view; **d.** spinnerets, ventral view; **e.** epigyne; Anagraphinae **f.** epigyne; *Zimiris doriae* **g.** right male palp, ventral view; **h.** right male palp, lateral view. C: conductor; E: embolus; TP: tegular process. (g, h: after Platnick & Penney, 2004.)

FAMILY PSECHRIDAE Simon, 1890

CRIBELLATE SHEETWEB SPIDERS

Fig. 86, pl. 21

Type genus

Psechrus Thorell, 1878.

Other genus

Fecenia Simon, 1887. Represented by 24 species (Platnick, 2005).

Diagnostic characters

Medium to large araneomorph spiders; three tarsal claws and claw tufts; cribellate; entelegyne; eight eyes; secondary eyes with grate-shaped tapetum; tarsi widened towards the tip.

Descriptive characters

- **carapace:** pear-shaped, with strongly narrowed cephalic part clearly separated from thoracic part (fig. 86a).
- **sternum:** oval, almost as wide as long, with sinuous sides; truncated in front; rounded at the back (fig. 86b).
- **eyes:** eight in two rows; both rows strongly procurved (from above); posterior eye row wider than anterior one; secondary eyes with grate-shaped tapetum.
- **chelicerae:** strong, with distinct lateral condyle; promargin with three, retromargin with four strong teeth; a longitudinal brush of thin setae in front of promarginal teeth.
- **mouthparts:** endites elongate, narrowed in middle; parallel; serrula present; labium wider than long (fig. 86b).
- **legs:** long, 1423; longer in male; tarsi wider towards the tip; with three toothed claws and a claw tuft; tarsi with a row of trichobothria; no scopula; first coxae of male often with short macrosetae; tarsal organ capsulate.
- **female palp:** with claw.
- **abdomen:** elongate, cylindrical; covered with setae, denser in dark area (fig. 86a).
- **spinnerets:** six, contiguous, two-segmented: posterior pair the longest (fig. 86c).
- **cribellum:** narrow, divided (fig. 86c).
- **calamistrum:** consists of three or four rows of equal, short, distally bent setae (fig. 86d).
- **respiratory system:** two booklungs, small tracheal spiracle just in front of cribellum.
- **genitalia:** entelegyne; epigyne simple with median plate near posterior margin (fig. 86f); internal structure simple with short ducts leading to paired spermathecae; male palp usually with femoral modification; tibia with apophysis or with modified setae; cymbium with dorsal scopula; bulbus with embolus, median apophysis and conductor inserted on distal part of tegulum (fig. 86e).
- **body size:** 10-22 mm.
- **colour:** tegument greyish brown, abdomen dark grey with pale lines or spots.

Taxonomic status

The systematic position is still unstable. They were placed with the Stiphidiidae Senoculidae and Oxyopidae as sister-groups in the Deinopoidea (Coddington & Levi, 1991), but, according to Griswold *et al.* (1999), they belong in the Lycosoidea as the sister of Ctenidae plus Miturgidae. Coddington *et al.* (2004) placed them in the higher lycosoids as sister to a clade containing Senoculidae and Oxyopidae. Raven & Stumkat (2005) add the Stiphidiidae to the latter grouping.

Distribution

South East Asia to Australia.

Lifestyle

Psechrus construct a horizontal sheetweb provided with a funnel-shaped retreat. They move on the underside of the web and the females carry the egg sac in pisaurid fashion. *Fecenia* makes a pseudo-orb web provided with a curled leaf retreat in the center of the web.

Relevant literature

Griswold *et al.* (1999); Levi (1982), Murphy (1986), Murphy & Murphy (2000).

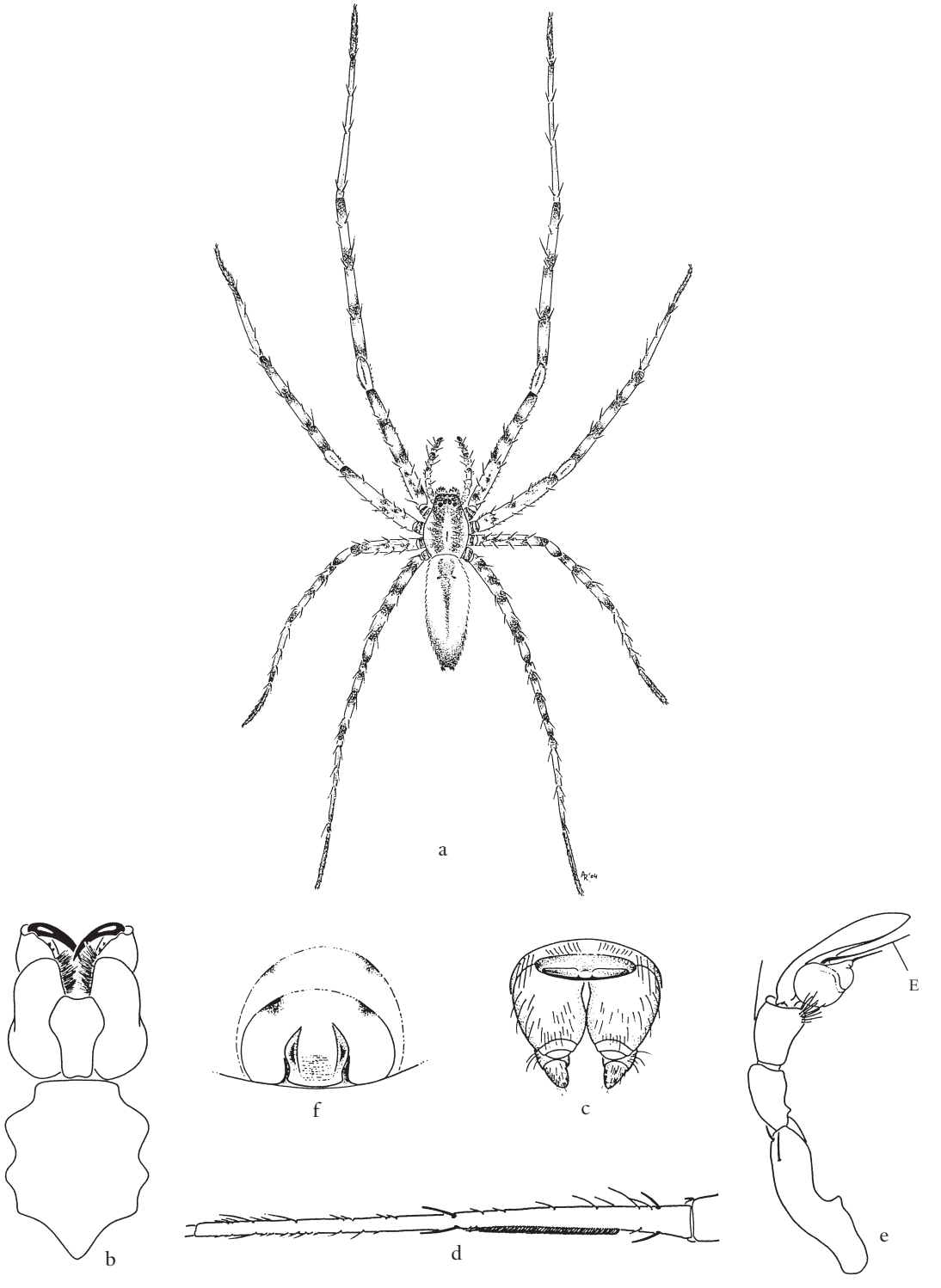


Fig. 86. **Psechridae.** *Psechrus singaporensis*. **a.** female habitus (12 mm); **b.** cephalothorax, ventral view; **c.** spinnerets, ventral view; **d.** metatarsus of left leg IV, dorsal view; **e.** right male palp, retrolateral view; **f.** epigyne. E: embolus.

FAMILY SALTICIDAE Blackwall, 1841

JUMPING SPIDERS

Fig. 87, pl. 32

Type genus

Salticus Latreille, 1804.

Other genera

Represented by 550 genera and 5026 species (Platnick, 2005) arranged in 16 subfamilies.

Diagnostic characters

Small to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; carapace square-fronted with four, forwardly directed eyes of which the anterior median eyes are very large.

Descriptive characters

- **carapace:** square-fronted; length varies from short to long (figs 87a-e); cephalic region high in some genera; eye region frequently decorated with clusters of long setae.
- **sternum:** shape variable, sometimes narrower in front.
- **eyes:** eight; in three or four (Lyssomaninae) rows (fig. 87d); eyes occupying entire width of carapace; anterior median eyes very large, anterior lateral eyes slightly smaller, both pairs directed forward; other eyes directed to the sides or backward (fig. 87a).
- **chelicerae:** inner margin with one tooth (unidentate) (fig. 87g), several teeth (pluridentate) (fig. 87j) or a split tooth (fissidentate) (fig. 87h); chelicerae sometimes enlarged and porrect in males.
- **mouthparts:** labium rectangular or rounded and narrowed in front; endites fairly long, broadened distally with well developed scopula and serrula.
- **legs:** two claws usually with claw tufts; rather short; anterior pair in some genera longer or stronger than other legs, frequently decorated with tufts of setae.
- **female palp:** tarsus without claw.
- **abdomen:** variable, short to oblong or elongated in some genera.
- **spinnerets:** short, anterior and posterior pairs similar in length; without cylindrical glands and spigots.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable (figs 87q, s); male palp with tibial apophyses, sometimes also with femoral protuberance; embolus variable in shape (figs 87j-p, r).
- **body size:** 3-17 mm.
- **colour:** sometimes with bright, attractive colouration consisting of bands, stripes or speckles; body sometimes bearing special setae, sometimes iridescent.

Taxonomic status

The position of the Salticidae remains problematic. Coddington & Levi (1991) and Coddington *et al.* (2004) group them in the Dionycha based on the absence of cylindrical gland spigots.

Distribution

Worldwide.

Lifestyle

Diurnal, cursorial hunting spiders with well developed vision. They occur in a wide variety of habitats.

Relevant literature

Davies & Zabka (1989); Dippenaar-Schoeman & Jocqué (1997); Maddison & Hedin (2003); Prószynski (2003, 2006); Richman *et al.* (2005); Zabka (1985, 1988).

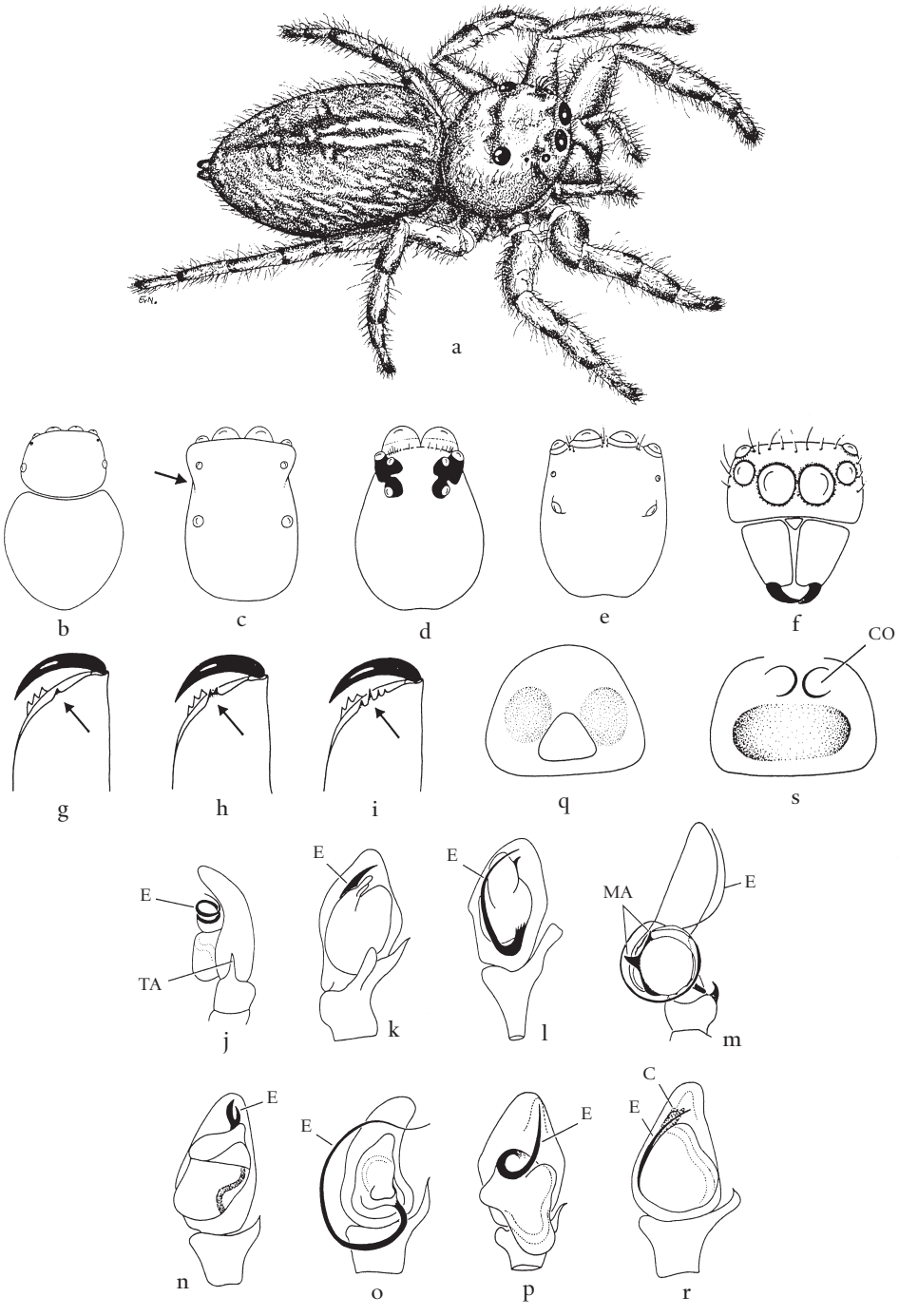


Fig. 87. **Salticidae.** *Thyene* sp. **a.** female, natural posture (7 mm); *Pachyballus* sp. **b.** cephalothorax and abdomen, dorsal view; Massagrinae **c.** carapace in dorsal view showing constriction; Lyssomaninae **d.** carapace in dorsal view; Salticidae **e.** carapace, dorsal view; **f.** eye pattern, anterior view; **g.** chelicerae, showing unidentate; **h.** fissidentate, and **i.** pluridentate inner margin; Marenginae **j.** left male palp, lateral view; Spartaeinae **k.** left male palp, ventral view; Holcolaetinae **l.** left male palp, ventral view; *Bacelarella* **m.** left male palp, ventral view; Dendryphantinae **n.** left male palp, ventral view; Mogrinae **o.** left male palp, ventral view; Euophrydinae **p.** left male palp, ventral view; **q.** epigyne; Hylinae **r.** left male palp, ventral view; **s.** epigyne. C: conductor; CO: copulatory opening; E: embolus; MA: median apophysis; TA: tibial apophysis.

FAMILY SCYTODIDAE Blackwall, 1864

SPITTING SPIDERS

Fig. 88, pl. 7

Type genus

Scytodes Latreille, 1804.

Other genera

Dictis L. Koch, 1872; *Scyloxes* Dunin, 1992; *Soeuria* Saaristo, 1997; *Stedocys* Ono, 1995. Represented by 158 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes in three diads; domed thoracic region contains prosomal glands that produce gluey silk; legs long and slender; body decorated with symmetrical dark pattern.

Descriptive characters

- **carapace:** domed towards thoracic region to accommodate the large glue-producing glands; fovea absent (figs 88a, b).
- **sternum:** oval, with sclerotized edge; apex blunt (fig. 88d).
- **eyes:** six, small, arranged in three widely spaced diads, eyes in each pair contiguous (fig. 88c).
- **chelicerae:** chelate and basally fused; fangs very short; conspicuous chitinous lamina on outer margin of basal element.
- **mouthparts:** labium as wide as long, fused to sternum, with slightly concave anterior margin; endites converging.
- **legs:** three claws with onychium; metatarsi Ionger than tarsi; legs long and slender; light covering of setae; spines absent.
- **female palp:** claws present.
- **abdomen:** broad, oval; with light covering of dark setae; venter with chitinous depressions behind genital groove.
- **spinnerets:** colulus large, pointed, with numerous setae; anterior spinnerets contiguous, slightly larger than other spinnerets, with one major ampullate and several piriform gland spigots; posterior median and lateral spinnerets each with one aciniform gland spigot.
- **respiratory system:** two booklungs; posterior spiracle close to spinnerets.
- **genitalia:** haplogyne; female genitalia simple, with two clasping holes behind epigastric fold (fig. 88d); no bursa copulatrix; vulva paired with multiple spermathecae and scattered glands; male palp with tarsi variable; bulbus large or small, lacking basal haematodocha; embolus basally slender (fig. 88e).
- **body size:** 4-11 mm.
- **colour:** pale yellow to brown, carapace with dark stripes or spots joined to form symmetrical pattern on carapace and abdomen.

Taxonomic status

Lehtinen (1967) relimited the Scytodoidea to include the Sicariidae, Loxoscelidae, Scytodidae, Drymusidae and Ochyroceratidae. Coddington & Levi (1991), Coddington *et al.* (2004) and Platnick *et al.* (1991) placed them in the 'scytodoids' with the Drymusidae as sister-group.

Distribution

Pantropical with three cosmopolitan species.

Lifestyle

Wandering spiders found in diverse habitats. Overpower prey by spurting glue on it. Egg sac carried in chelicerae.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Paquin & Dupérré (2003); Platnick *et al.* (1991); Ubick (2005j).

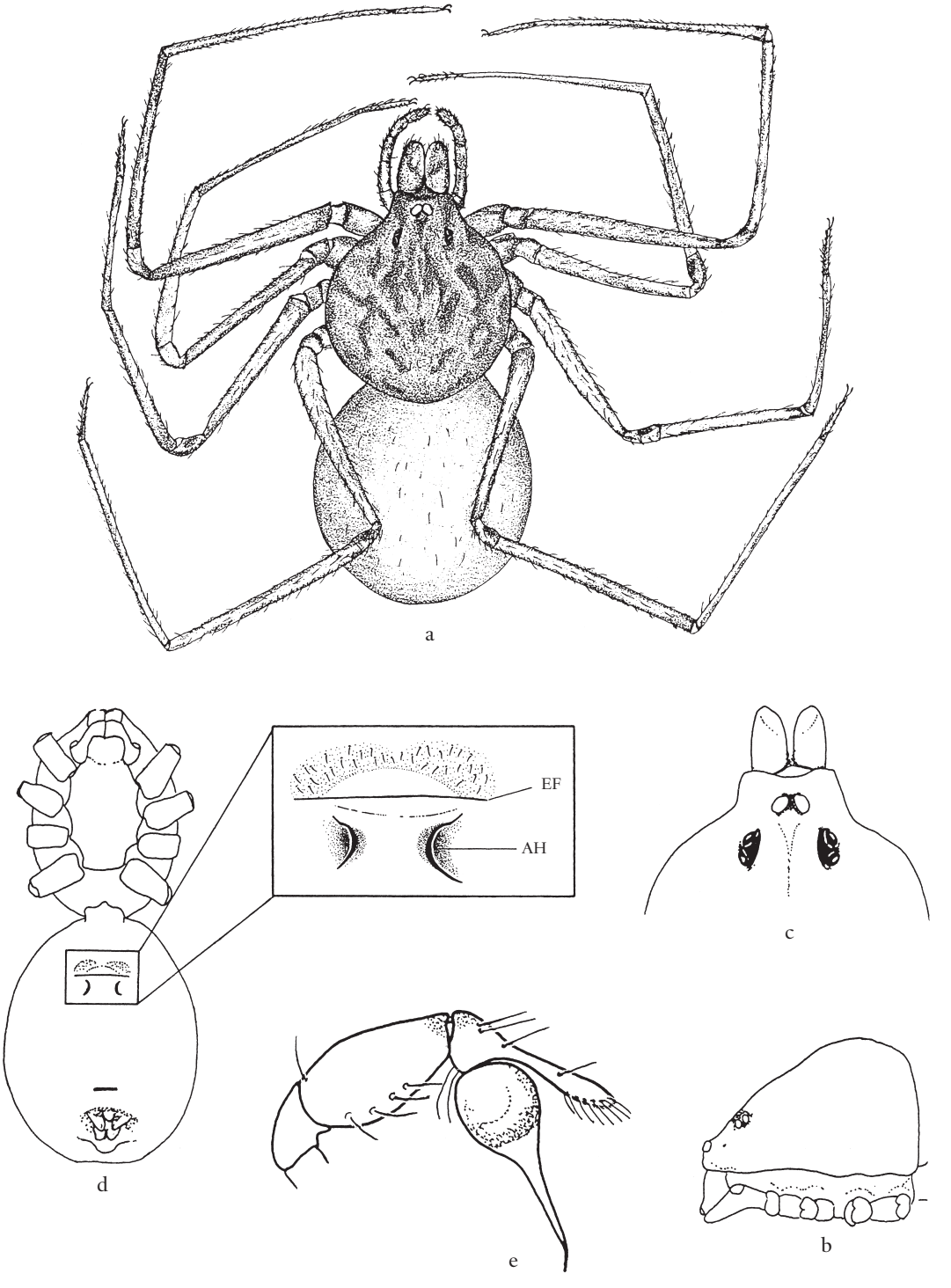


Fig. 88. **Scytodidae.** *Scytodes* sp. **a.** female habitus (7 mm); **b.** carapace lateral view; **c.** eye pattern, dorsal view; **d.** cephalothorax and abdomen, ventral view with detail of genitalic region; **e.** right male palp, retrolateral view; **f.** epigyne. AH: anchoring hole; EF: epigastric fold.

FAMILY SEGESTRIIDAE Simon, 1893

TUBEWEB SPIDERS

Fig. 89, pl. 8

Type genus

Segestria Latreille, 1804.

Other genera

Ariadna Audouin, 1826; *Gippsicola* Hogg, 1900. Represented by 106 species (Platnick, 2005).

Diagnostic characters

Medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes; third pair of legs directed forwards; posterior tracheal spiracles far in front, just behind booklung slits; female palpal claw turned inwards over almost 90°.

Descriptive characters

- **carapace:** longer than wide; fovea a small depression; hirsute to glabrous (fig. 89a).
- **sternum:** oval; without intercoxal sclerites (fig. 89c).
- **eyes:** six; in two rows; lateral eyes contiguous; posterior median eyes closely grouped; eyes pale in colour; close to clypeal edge (fig. 89b).
- **chelicerae:** free, long and slender; fangs small; cheliceral furrow with few teeth.
- **mouthparts:** endites longer than wide, well developed; labium much longer than wide; serrula well developed, in a single row (fig. 89c).
- **legs:** three claws; paired claws strongly curved, with series of 6-8 teeth; third pair of legs directed forward along with legs I and II (fig. 89a); tibiae and metatarsi I with double row of spines ventrally (fig. 89d); legs II and IV either short and stout or longer and more slender; leg IV with few spines or numerous spines.
- **female palp:** tarsus spinose, with toothless claw turned inward over almost 90°.
- **abdomen:** longer than wide, cylindrical; hirsute; without pattern, or with pattern consisting of transverse bars or dark median, longitudinal stripes (fig. 89a).
- **spinnerets:** short; anterior spinnerets contiguous.
- **respiratory system:** two booklungs and two pairs of anteriorly positioned tracheae opening through distinct spiracles situated behind epigastric groove.
- **genitalia:** haplogyne; female genitalia composed of two parts, one associated with anterior wall of bursa and the other with posterior wall; male palp with bulbus simple, inserted medially, or inserted over most of the basal third of tarsi; embolus varies from elongated to short.
- **body size:** 6-15 mm.
- **colour:** variable, yellowish brown to reddish or purplish black, abdomen often with chevrons.

Taxonomic status

Segestriidae are closely related to Dysderidae and have often been treated as part of that family. They are now considered to be sister-groups. Together with the Orsolobidae and Oonopidae, they form the superfamily Dysderoidea (Coddington & Levi, 1991; Coddington *et al.*, 2004; Platnick *et al.*, 1991).

Distribution

Worldwide.

Lifestyle

Segestriidae live in a variety of habitats; they hide in silk-lined tubular retreats with trip-lines radiating form the opening (fig. 89f).

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Murphy & Murphy (2000); Platnick *et al.* (1991); Ubick (2005k).

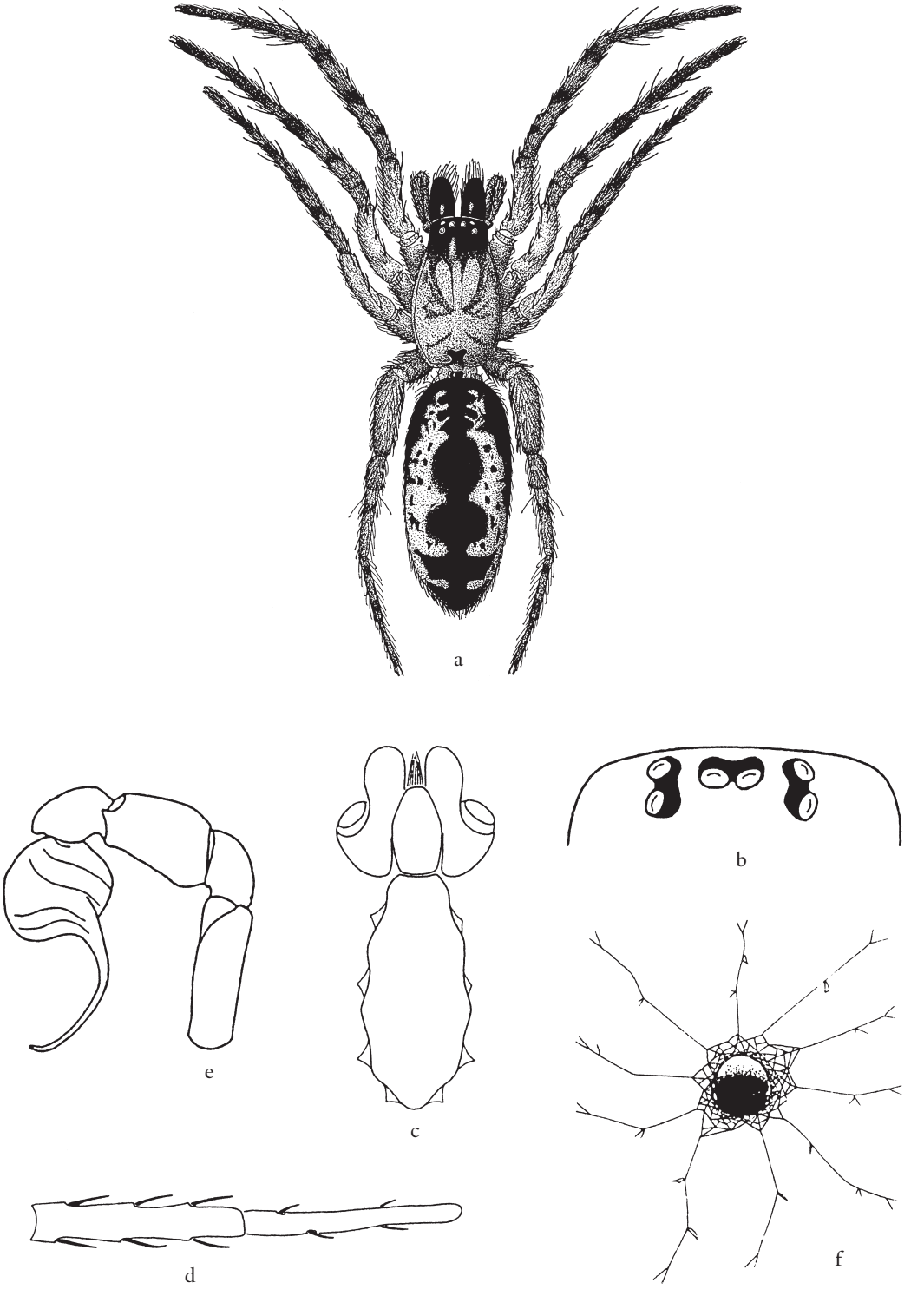


Fig. 89. **Segestriidae.** *Segestria senoculata* **a.** female habitus (8 mm); **b.** eye pattern, dorsal view; **c.** cephalothorax, ventral view; **d.** leg I, ventral view; **e.** left male palp, lateral view; **f.** radiating tubeweb. (a: by Jan Bosselaers.)

FAMILY SELENOPIDAE Simon, 1897

FLATTIES / WALL SPIDERS

Fig. 90, pl. 30

Type genus

Selenops Latreille, 1819.

Other genera

Anyphops Benoit, 1968; *Garcorops* Corronca, 2003; *Hovops* Benoit, 1968. Represented by 178 species (Platnick, 2005).

Diagnostic characters

Small to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eye pattern distinct: eight eyes in two rows (6:2); legs laterigrade; body flattened.

Descriptive characters

- **carapace:** flattened; subcircular (figs 90a, b); clypeus very low.
- **sternum:** rounded; apex pointed, with a slight notch.
- **eyes:** eight; in two rows (6:2); anterior row wide with six eyes near edge of carapace, posterior row with two fairly large eyes, one on each side (figs 90c-e).
- **chelicerae:** both margins toothed.
- **mouthparts:** endites straight with dense scopula and fine serrula; labium usually wider than long.
- **legs:** two claws with claw tufts and scopulae; laterigrade; anterior legs provided with strong, paired setae on tibiae and metatarsi I and II; tarsal claw smooth.
- **female palp:** tarsus spinose with thin claw with numerous minute teeth.
- **abdomen:** flattened, round to oval; clothed in dense setae.
- **spinnerets:** short, in compact group; colulus absent.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable, with central septum or central cavity lined with white membrane (fig. 90h); male palp with distinct tibial apophysis, conductor rigid, embolus short (figs 90f, g).
- **body size:** 6-23 mm.
- **colour:** creamish brown or grey, mottled with black, brown and grey; legs sometimes banded.

Taxonomic status

Coddington & Levi (1991) and Coddington *et al.* (2004) group the selenopids in the large unresolved clade of the Dionycha.

Distribution

Three of the genera are known only from Africa. *Selenops* has a wide distribution with representatives on most continents. Some species are synanthropic.

Lifestyle

Free-living, wandering spiders found under stones, rocks and on tree trunks or on walls.

Relevant literature

Crews (2005b); Dippenaar-Schoeman & Jocqué (1997); Corronca (1998, 2002).

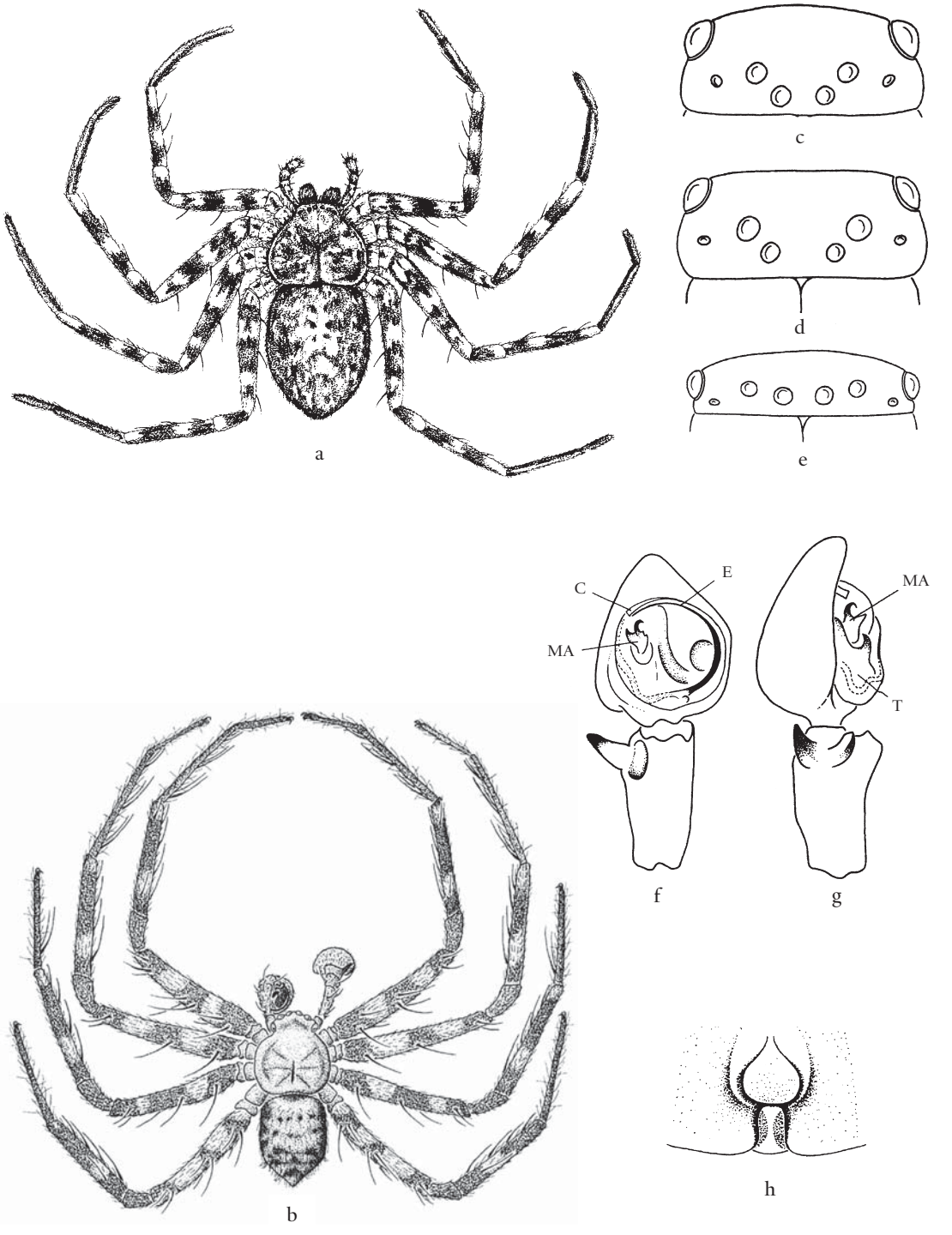


Fig. 90. **Selenopidae.** *Anyphops* sp. **a.** female habitus (7 mm); *Garcorops jadis* **b.** female habitus; *Hovops* sp. **c.** eye pattern, frontal view; *Anyphops* **d.** eye pattern, frontal view; *Selenops* sp. **e.** eye pattern, frontal view; **f.** right male palp, ventral view; **g.** right male palp, retrolateral view; **h.** epigyne. C: conductor; E: embolus; MA: median apophysis; T. tegulum. (b: by Jan Bosselaers.)

FAMILY SENOCULIDAE Simon, 1890

BARK HUNTERS

Fig. 91, pl. 17

Type genus

Senoculus Taczanowski, 1875.

Other genera

Monogeneric, represented by 31 species (Platnick, 2005).

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes on tubercles in two strongly recurved rows; tarsi with pseudosegment; anal tubercle large and biarticulate.

Descriptive characters

- **carapace:** as long as wide; thoracic part rounded, cephalic part rectangular; fairly flat (fig. 91e); fovea distinct; clypeus variable (figs 91a-c).
- **eyes:** eight eyes in three rows (2:4:2): anterior lateral eyes sometimes poorly developed; anterior medians far in front; anterior laterals just in front of posterior laterals (figs 91b, c); secondary eyes with grate shaped tapetum.
- **chelicerae:** vertical (fig. 91 c), with lateral condyle; both margins with three teeth.
- **mouthparts:** endites longer than wide, almost parallel; serrula present; labium almost twice as long as wide (fig. 91d).
- **sternum:** rounded; about as wide as long, truncated in front, strongly narrowed to sharp point produced between coxae IV (fig. 91d).
- **legs:** slender with numerous strong spines (fig. 91a); 1243; coxae notched; tarsi with trichobothria in two rows; tarsi with small extra distal segment; three toothed tarsal claws.
- **female palp:** with finely toothed claw.
- **abdomen:** elongate, tapered towards the back; anal tubercle large, biarticulate, distal segment triangular.
- **spinnerets:** six; all well developed, biarticulate; colulus, small, triangular.
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually with a strongly sclerotized lobe on either side (fig. 91i); copulatory openings in front, copulatory ducts curved backwards; male palp (figs 91f-h) with apophysis on tibia, sometimes also on patella; enlarged retrolateral tibial apophysis and characteristic ventrodistal rim; cymbium elongate; subtegulum exposed; tegulum with basal membrane; embolus with broad base ending in groove of distal tegular apophysis subdivided into ventral and dorsal division serving as conductor; median apophysis present.
- **body size:** 5.5-20 mm.
- **colour:** pale yellow to medium brown; sometimes with iridescent setae.

Taxonomic status

Senoculidae are placed in the Lycosoidea with the Oxyopidae as sister-group (Griswold, 1993; Coddington & Levi, 1991; Coddington *et al.*, 2004).

> **Note:** Senoculidae are probably strongly derived Pisauridae like *Euprosthenops* in which the cephalic area is somewhat elongate. All diagnostic characters on which the family is based (biarticulate anal tubercle; pseudosegmented tarsi; tuberculate eyes) also occur in pisaurids. Griswold's (1993) placement of the taxon as sister of the Oxyopidae is based mainly on the length of the labium and the conformation of the genitalia. The latter character set was shown by Scharff & Coddington (1997) to be less reliable than somatic characters. The deposition of the egg-sac on a substrate must be regarded as a reversal as it is the case in many Ctenidae.

Distribution

Central America and Northern part of South America.

Lifestyle

Free-living in the shrub layer; resting in tetragnathid fashion with legs stretched on small twigs (pl. 17a); egg-sac deposited on foliage.

Relevant literature

Chickering (1941); Griswold (1993); Simon (1898).

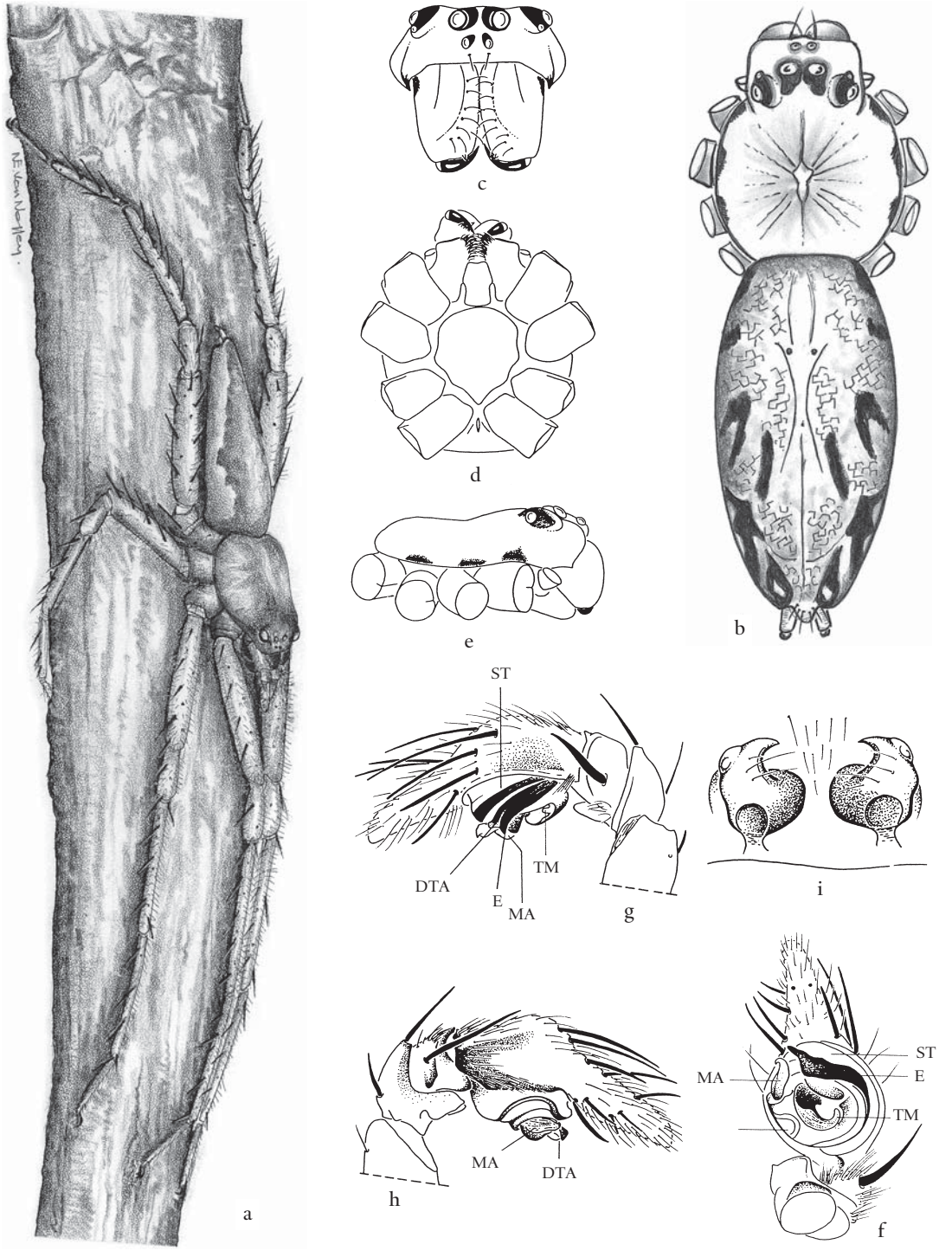


Fig. 91. **Senoculidae.** *Senoculus* sp. **a.** natural posture (14 mm); **b.** cephalothorax and abdomen, dorsal view; **c.** eye pattern, frontal view; **d.** cephalothorax, ventral view; **e.** cephalothorax, ventral view; **f.** right male palp, ventral view; **g.** right male palp, prolateral view; **h.** right male palp, retrolateral view; **i.** epigyne. DTA: distal tegular apophysis; E: embolus; MA: median apophysis; ST: subtegulum; T: tegulum; TM: tegular membrane.

FAMILY SICARIIDAE Keyserling, 1880

SIX-EYED SAND SPIDERS, VIOLIN SPIDERS

Fig. 92, pl. 6

Type genus

Sicarius Walckenaer, 1847.

Other genus

Loxosceles Heinecken & Lowe, 1835. Placed in two subfamilies, Loxoscelinae and Sicariinae, and represented by 122 species (Platnick, 2005).

Diagnostic characters

Medium-sized to large araneomorph spiders; two tarsal claws; ecribellate; haplogyne; six eyes in three diads; semichelate chelicerae provided with a stridulating files.

Descriptive characters

- **carapace:** flat, as wide as long; integument hard, coriaceous (*Sicarius*) (fig. 92a); or longer than wide with a conspicuous, deeply impressed fovea and porrect clypeus (*Loxosceles*) (fig. 92b).
- **sternum:** wider than long (*Sicarius*) or longer than wide (*Loxosceles*).
- **eyes:** six; arranged in three diads in a recurved row.
- **chelicerae:** joined basally; laminate (fig. 92e); semichelate; without condyle; outer surface with stridulating file (fig. 92c) which is scraped by peg-like processes on inner surface of palpal femora (fig. 92d); fangs short, more or less transverse.
- **mouthparts:** labium longer than wide; endites long, converging around labium.
- **legs:** two claws with several serrated bristles borne on a small onychium; legs clothed in sickle-shaped setae; legs long and slender in *Loxosceles*, stouter and shorter in *Sicarius*; *Sicarius* with distinct setae of femora, varying in shape between species.
- **female palp:** without claw.
- **abdomen:** markedly depressed, especially in *Sicarius*; clothed in sickle-shaped setae (*Sicarius*) or barbed spine-like setae (*Loxosceles*).
- **spinnerets:** colulus conspicuous, pointed, bearing setae (fig. 92f); spinnerets medium-sized, contiguous; anterior and posterior pairs long, two-segmented; very hairy in *Sicarius*; *Loxosceles* with single, ridged, major ampullate gland spigot on anterior lateral spinnerets; a row of modified setae on posterior lateral spinnerets in both sexes.
- **respiratory system:** two booklungs; posterior respiratory organs open through single transverse spiracle in front of spinnerets.
- **genitalia:** haplogyne; female genitalia with single broad opening (*Loxosceles*) or spermathecae opening directly into epigastric furrow (*Sicarius*) (fig. 92h); vulva paired; male palp with tarsus and bulb small; embolus with conical base, slender and spiniform distally; no conductor (fig. 92g).
- **body size:** 8-19 mm.
- **colour:** yellowish or reddish brown with contrasting darker markings.

Taxonomic status

Placed in the superfamily Scytodoidea with nine other families as sister-group of Scytodidae and Drymusidae (Platnick *et al*., 1991; Coddington & Levi, 1991) plus Periegopidae (Coddington *et al*., 2004).

Distribution

From temperate Southern Africa to the Mediterranean Region, southern Europe and tropical zones in both North and South America.

Lifestyle

Both genera comprise ground-dwelling, wandering spiders.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Gertsch & Ennik (1983); Platnick *et al.* (1991); Ubick (2005l).

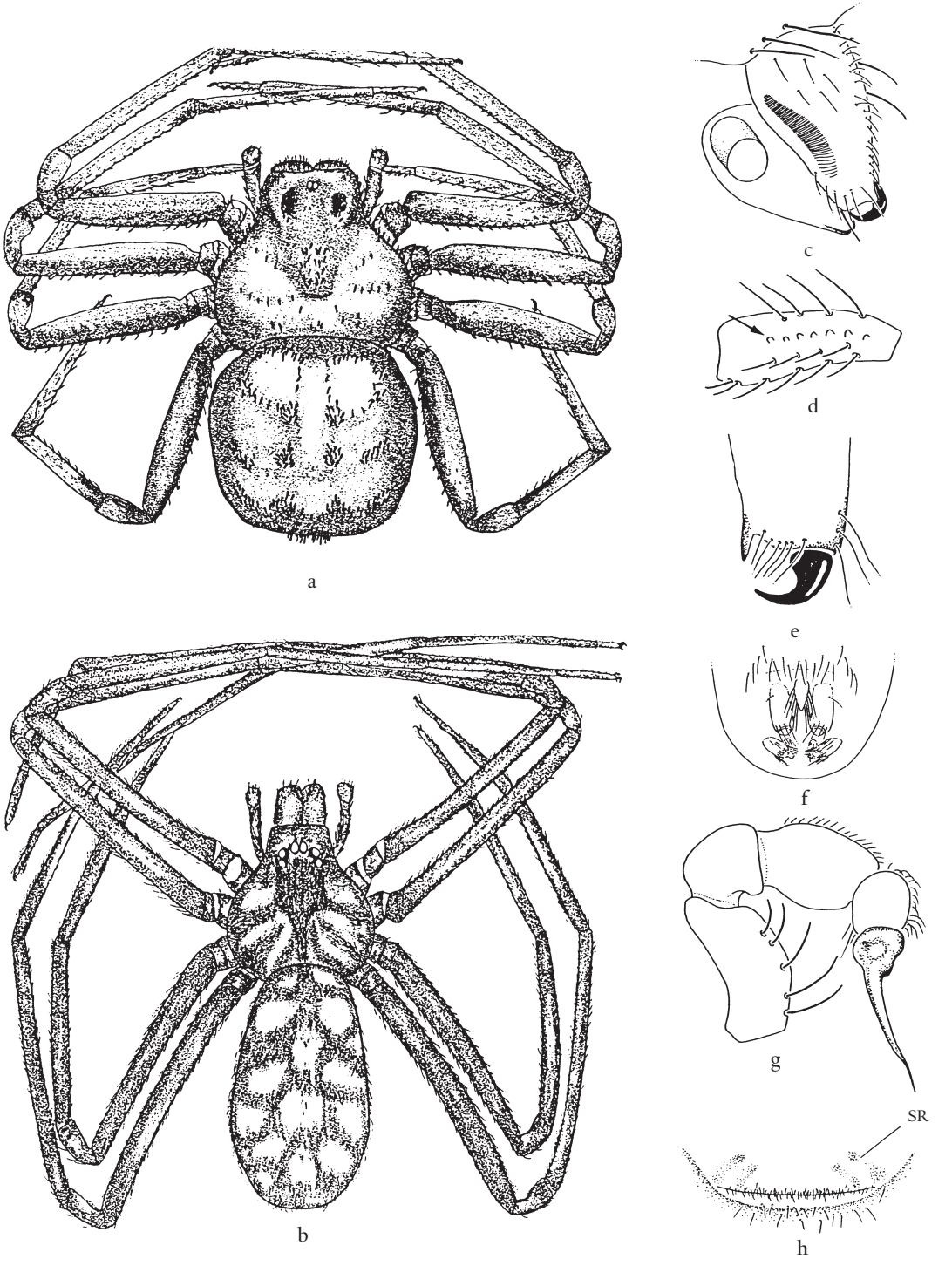


Fig. 92. **Sicariidae.** *Sicarius* sp. **a.** female habitus (12 mm); *Loxosceles* sp. **b.** female habitus; *Sicarius* sp. **c.** chelicera, lateral view, showing stridulating file; **d.** palpal femur, showing peg-like processes; **e.** chelicera, ventral view, showing lamellar process; **f.** female spinnerets; **g.** male palp, retrolateral view; **h.** female genitalia showing secondary receptacula in transparency. SR: secondary receptaculum.

FAMILY SPARASSIDAE Bertkau, 1872

HUNTSMAN SPIDERS

Fig. 93, pl. 31

Type genus

Micrommata Latreille, 1804.

Other genera

Comprising 83 genera and almost 1,000 species (Platnick, 2005). Subfamily division in study.

Diagnostic characters

Medium-sized to very large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; laterigrade legs; soft trilobate membranes at apex of metatarsi; cheliceral margin with teeth.

Descriptive characters

- **carapace:** broadly oval, as wide as long or longer than wide; narrower in eye region (figs 93a, b); fovea present; covered with a dense layer of fine setae.
- **sternum:** longer than wide to almost circular (length/width = 0.8-1.2); apex pointed.
- **eyes:** eight; in two rows (4:4); posterior eye row evenly spaced (except *Chrosioderma*), posterior eyes usually equal in size; size of eyes in anterior row varies between genera (figs 93d-e) median eyes usually largest, sometimes anterior lateral eyes larger than anterior median eyes(e.g. in Heteropodinae, Palystinae).
- **chelicerae:** free; with two rows of teeth (1-4 anterior teeth, 1-9 posterior teeth), some groups with denticles in cheliceral furrow; condyle.
- **mouthparts:** labium free, short, never more than half length of endites (except *Berlandina*), rebordered distally; endites with thick scopulae; serrula rake-like.
- **legs:** two claws; legs long (usually 2143), laterigrade (fig. 93b), held at right angle to body, not always conspicuous in foliage or grass-living species; trochanters notched; claw tufts dense; metatarsi and tarsi with scopulae; apex of metatarsi with soft trilobate membrane (fig. 93f), allowing hypermobility of tarsi; spination fairly sparse.
- **female palp:** with claw, carrying 3-10 teeth.
- **abdomen:** round to oval, rarely elongate, often with dark, folium-like dorsal pattern; covered in dense layer of fine setae.
- **spinnerets:** colulus absent.
- **respiratory system:** two booklungs with posterior tracheae restricted to abdomen; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne sclerotized and conspicuous (fig. 93i); male palp with strong tibial apophysis (figs 93g, h); tegulum with embolus, conductor and in several taxa with additional apophysis.
- **body size:** 6-40 mm.
- **colour:** cream, fawn to dark brown or grey, often with darker stripes and mottled pattern; some species green or white, with yellow or red marks.

Taxonomic status

The family has been part of the 'Clubionidae' for a long time. Apart from the fact that it belongs in the Dionycha (Coddington *et al.*, 2004), the taxonomic position of the family is still unclear.

Distribution

Worldwide between 40° N and 40° S, except for the Palaearctic *Micrommata*.

Lifestyle

Nocturnal, wandering spiders found on plants, on the soil surface or in caves. The desert species inhabit burrows in the sand.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Jäger (1999); Jäger & Kunz (2005); Lew (2005).

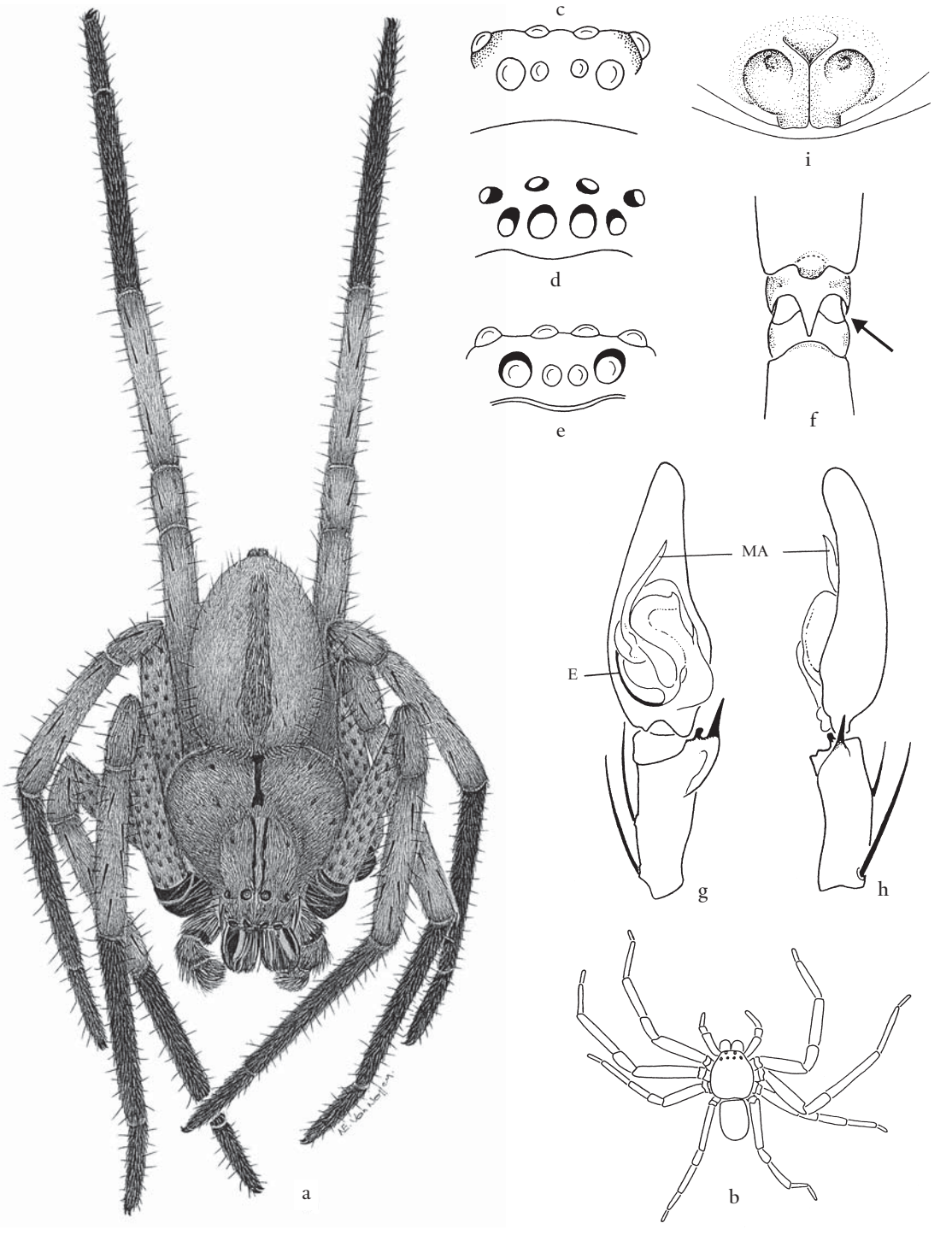


Fig. 93. **Sparassidae.** *Palystes castaneus* **a.** female, natural posture (22 mm); **b.** line drawing showing laterigrade posture; *Heteropoda* sp. **c.** eye pattern, frontal view; *Olios* sp. **d.** eye pattern, frontal view; *Palystes* sp. **e.** eye pattern, frontal view; **f.** metatarsus-tarsus joint trilobate membrane; *Olios* sp. **g.** male palp, ventral view; **h.** retrolateral view; **i.** epigyne. E: embolus; MA: median apophysis. (a: after a photograph by R. Jocqué.)

FAMILY STENOCHILIDAE Thorell, 1873

DIAMOND-SHAPED SPIDERS

Fig. 94

Type genus

Stenochilus O.P.-Cambridge, 1870.

Other genus

Colopea Simon, 1893. Represented by 12 species (Platnick, 2005).

Diagnostic characters

Medium-sized araneomorph spiders; two tarsal claws; ecribellate; haplogyne; eight eyes; carapace diamond-shaped with tuberculate tegument and a constricted fovea; labium fused to sternum; metatarsi and distal end of tibiae of anterior leg pairs with large scopula of spatulate setae; only anterior pair of spinnerets well developed.

Descriptive characters

- **carapace:** diamond-shaped**;** cephalic hardly separated from thoracic part; fovea long and deep, constricted in middle; cuticle strongly tuberculate (fig. 94a).
- **sternum:** oval; longer than wide; strongly granulate; with sclerotized extensions surrounding coxae (fig. 94b).
- **eyes:** eight large eyes; close together; lateral eyes well separated ; posterior median eyes usually larger than anterior median eyes (figs 94a, d).
- **chelicerae:** short and stout; without teeth; with basal lamella (fig. 94f); cheliceral gland mound a well developed slender lobe; with retrolateral stridulating file.
- **mouthparts:** endites large, triangular, convergent, meeting at midline (fig. 94b); serrula a single row of teeth; labium longer than wide, fused to sternum.
- **legs:** two tarsal claws; first two pairs modified and much larger than posterior pairs; setae on tarsi, metatarsi and distal end of tibiae of anterior leg pairs with large scopula of spatulate setae (fig. 94c); trichobothria present on tibiae and metatarsi; tarsal organ exposed but not raised above surface, surrounded by low ridges.
- **female palp:** without claw.
- **abdomen:** ovoid; evenly clothed with plumose hairs; epigastric region covered by sclerotized plate, petiolus not encircled.
- **spinnerets:** six, anterior pair largest; median and posterior pairs reduced to groups of spigots in females, rudimentary in males (fig. 94e).
- **respiratory system:** with frontal pair of booklungs and tracheal spiracle situated in advance of spinnerets.
- **genitalia:** haplogyne; internal structure with large, membranous sac associated with a basal sclerotized plate; median receptacle not divided; posteriorly with two groups of small receptacula with short connecting ducts (fig. 94i); male palp with spoon-shaped cymbium, bulbus small, without haematodocha; embolus inconspicuous, associated with some apophyses (figs 94g, h).
- **body size:** 3.5-10 mm
- **colour:** prosoma reddish to brown; abdomen pale.

Taxonomic status

Stenochilidae have long been considered a part of the Palpimanidae. They were given family status by Platnick & Shadab (1974) and are currently regarded as the sister-group of the Palpimanidae in the Palpimanoidea (Coddington *et al*., 2004).

Distribution

South-east Asia, New Guinea, northern Australia.

Lifestyle

Free-living spiders.

Relevant literature

Forster & Platnick (1984); Lehtinen (1982); Platnick & Shadab (1974).

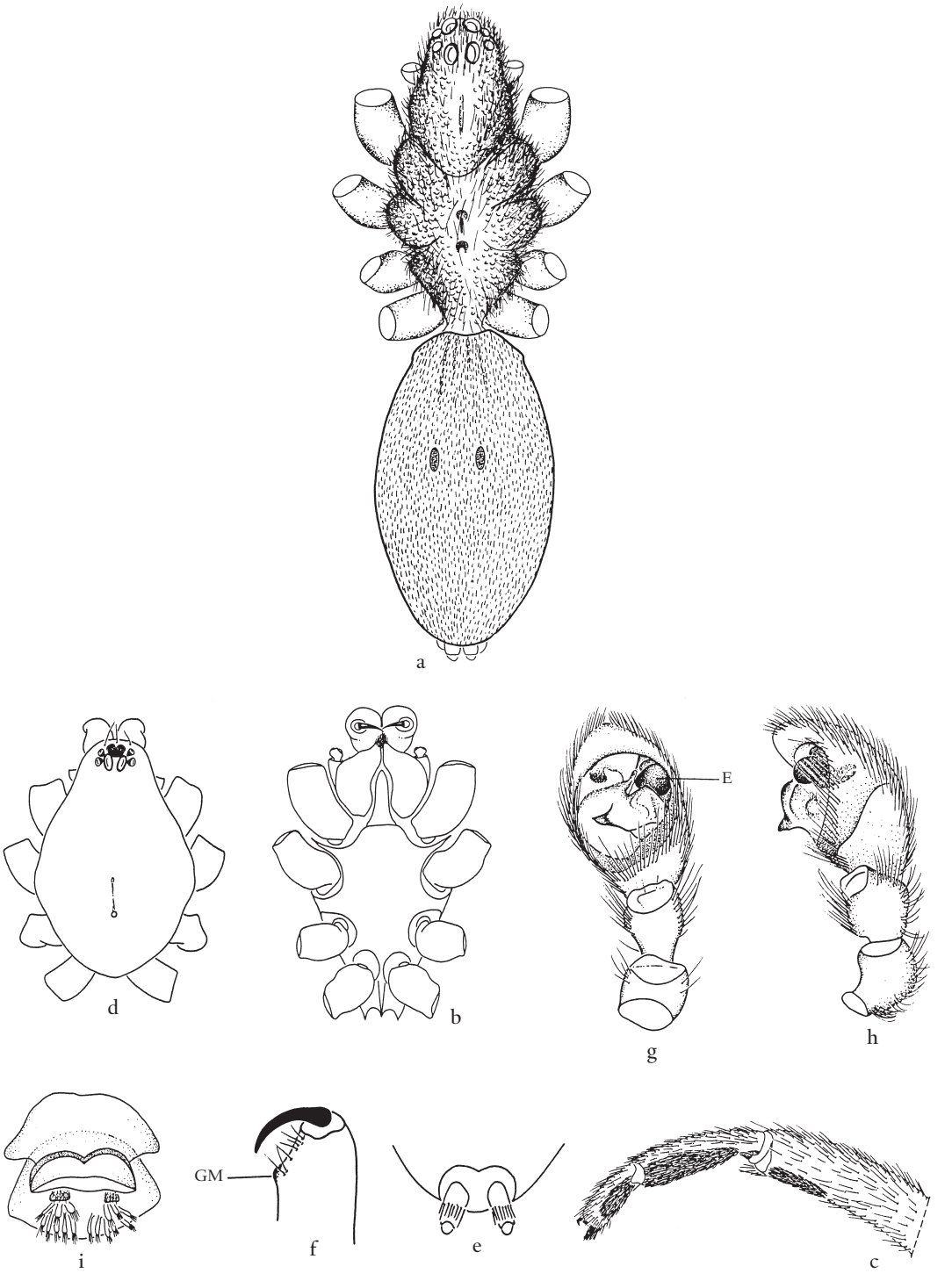


Fig. 94. **Stenochilidae.** *Stenochilus crocatus* **a.** female habitus (7.5 mm); **b.** cephalothorax, ventral view; **c.** leg I, retrolateral view; *Colopaea malayanus* **d.** female carapace, dorsal view; **e.** spinnerets; **f.** chelicera, ventral view, showing gland mound; *Stenochilus hobsoni* **g.** male palp, ventral view; **h.** male palp, retrolateral view; **i.** female genitalia, internal structure. E: embolus; GM: gland mound. (i: after Forster & Platnick, 1984.)

FAMILY STIPHIDIIDAE Dalmas, 1917

CONE WEB SPIDERS

Fig. 95, pl. 19

Type genus

Stiphidion Simon, 1902.

Other genera

Represented by 13 genera and 94 species (Platnick, 2005).

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; cribellate or ecribellate; entelegyne; eight eyes; poorly defined and a core group of taxa might be diagnosed mainly by the form of the snare and the following combination of characters: chilum single, tapetum grate-shaped, presence of feathery hairs and trichobothrium on palpal tibia.

Descriptive characters

- **carapace:** most often flat with head region distinct; fovea well delimited (figs 95a, b).
- **eyes:** eight eyes in two rows: curvature of rows variable; anterior median eyes variable in size; secondary eyes with sometimes with grate-shaped tapetum.
- **chelicerae:** vertical, with lateral condyle; promargin usually with three teeth, retromargin with two teeth.
- **mouthparts:** endites broad, slightly converging or parallel (fig. 95c); serrula present; labium almost rectangular, frontal margin often slightly indented; chilum variable but most often single or absent.
- **sternum:** shield-shaped, usually with pointed extension between coxae IV.
- **legs:** slender; 1423 or 1243 (*Ischalea*); tarsi with three toothed claws, superior ones strongly pectinate, inferior one with few teeth; two, sometimes three rows of trichobothria on tibiae, one row on metatarsi and tarsi; no claw tufts nor scopulae; tarsal organ capsulate.
- **female palp:** tarsus spinose; claw with many teeth.
- **abdomen:** oval, or elongate (*Ischalea*); sparsely setose.
- **spinnerets:** six; all well developed (fig. 95d); anterior and posterior lateral two-segmented; posterior median one-segmented; posterior pair sometimes much longer and more slender than remainder (*Stiphidion*); former with major ampullate gland spigots; posterior lateral spinnerets with cylindrical, paracribellar and long and short aciniform gland spigots; posterior median spinnerets with one minor ampullate, cylindrical and paracribellar gland spigots; colulus large and flat in ecribellate taxa.
- **cribellum:** bipartite.
- **calamistrum:** in a single row, slightly less than half the length of metatarsus.
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets; tracheal system with four simple branches limited to the abdomen.
- **genitalia:** entelegyne; epigyne characterised by median ridge or plate sometimes reduced to small protuberance (fig. 95f); internal structure usually with short ducts and massive receptacula; male palp often elongate with small tibial apophysis; embolus spine-shaped or slender and straight or curved; sometimes with median apophysis and conductor (fig. 95e).
- **body size:** 4.5-20 mm.
- **colour:** variable, abdomen often with intricate pattern.

Taxonomic status

The family is very poorly defined and not a single non reversed autapomorphy has been found for this taxon. The type genus (*Stiphidion*) is quite different from most other taxa currently placed in the family and has no tapetum in the posterior eyes. Coddington & Levi (1991) placed them in the Lycosoidea. According to Griswold *et al.* (1999) and Coddington *et al.* (2004), they belong in their own superfamily, Stiphidoids, together with the Neolanidae. The most recent analysis of Raven & Stumkat (2005) places them in the Lycosoidea as sister of Senoculidae + Oxyopidae.

Distribution

New Zealand, Australia, New Caledonia, Mauritius; possibly Madagascar.

Lifestyle

Cribellate representatives live in a typical snare: an inverted cone attached with guy threads in which the spider lives upside down (*Stiphidion* and *Tartarus*). Others live on the underside of a sheet web, whereas *Ischalea* is free-living.

Relevant literature

Blest & Vink (2000); Davies (2003); Forster & Wilton (1973); Gray (1981, 1992); Gray & Smith (2002, 2004); Raven & Stumkat (2005).

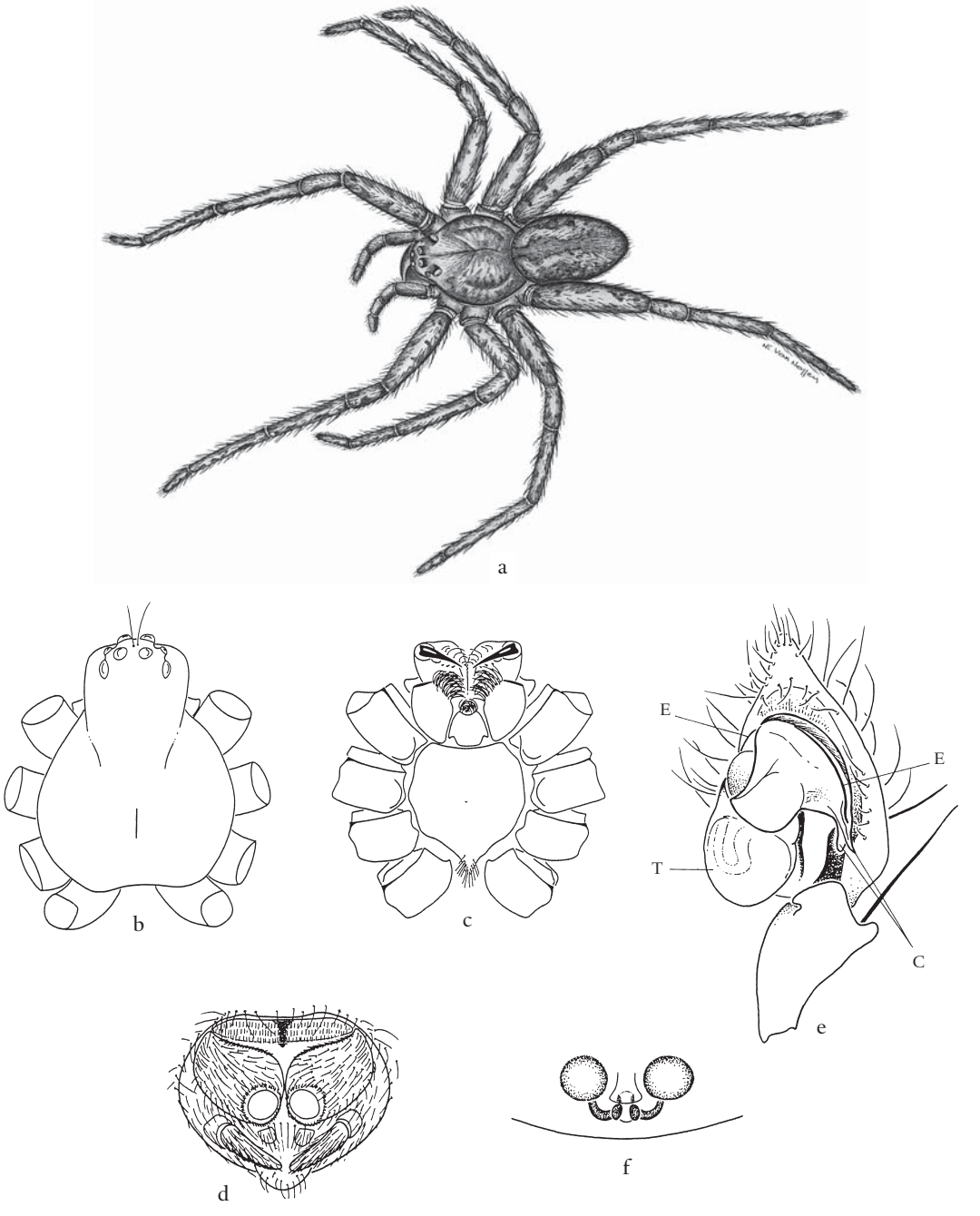


Fig. 95. **Stiphidiidae.** *Stiphidium facetum* **a.** female, natural posture (6.5 mm); **b.** cephalothorax, dorsal view; **c.** cephalothorax, ventral view; **d.** spinnerets, ventral view; **e.** male palp, ventral view; **f.** epigyne. C: conductor; E: embolus; T: tegulum. (a: after a photo in Forster & Wilton, 1973.)

FAMILY SYMPHYTOGNATHIDAE Hickman, 1931

DWARF ORB-WEAVERS

Fig. 96

Type genus

Symphytognatha Hickman, 1931.

Other genera

Anapistula Gertsch, 1941; *Anapogonia* Simon, 1905; *Curimagua* Forster & Platnick, 1977; *Globignatha* Balogh & Loksa, 1968; *Patu* Marples, 1951. Represented by 42 species (Platnick, 2005).

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; four or six eyes; lungless; chelicerae fused; sternum broadly truncated posteriorly; female palp reduced.

Descriptive characters

- **carapace:** clypeus and cephalic region high (figs 96a, c), fovea absent.
- **sternum:** broadly truncated posteriorly (fig. 96d).
- **eyes:** four or six; anterior medians absent; if four, arranged in two diads; if six, arranged in three diads (fig. 96b).
- **chelicerae:** fused over most of their length or only near base; promargin with raised and toothed mound; fangs short (fig. 96b).
- **mouthparts:** labium sometimes fused to sternum, at least three times as wide as long; endites converging (fig. 96b).
- **legs:** 4123 or 1423; three claws; legs sometimes with erect setae; spines absent; paired claws sometimes long and multidentate; tarsi shorter than metatarsi; no tarsal trichobothria; tarsal organ capsulate and flat.
- **female palp:** reduced to an unsegmented lobe or absent (fig. 96a).
- **abdomen:** soft and globose without scuta; usually with long, grey setae.
- **spinnerets:** simple; triplet present in both sexes; colulus small or absent.
- **respiratory system:** booklungs absent, replaced by anterior pair of sieve tracheae (spiracle in some genera in front of spinnerets).
- **genitalia:** entelegyne; epigyne simple, copulatory opening single or absent (!); copulatory ducts vary from short and curved (fig. 96f) to coiled; spermathecae usually widely spaced, fertilization ducts absent; male palpal tibia without apophysis; cymbium shifted to ventral or prolateral ventral position (fig. 96e); no paracymbium; embolus short and wrapped by conductor which may be bipartite.
- **body size:** < 2 mm. This family contains the smallest spiders known: *Patu digua* Forster & Platnick, 1977 has the smallest male and *Anapistula caecula* Baert & Jocqué, 1993 the smallest female.
- **colour:** white, with long grey setae or pale grey sometimes white with spots.

Taxonomic status

Coddington & Levi (1991) and Coddington *et al.* (2004) place them in the 'higher araneoids' with the Anapidae, Mysmenidae and Theridiosomatidae as part of the Symphytognathoid families. According to Schütt (2002), they are sister to Mysmenidae; these taxa are attributed subfamily rank by Wunderlich (2004).

Distribution

Widespread in the tropics of the southern hemisphere.

Lifestyle

Construct small orb webs usually made in the litter layer of forests (fig. 96g).

Relevant literature

Coddington (2005c); Dippenaar-Schoeman & Jocqué (1997); Forster & Platnick (1977); Schütt (2002); Wunderlich (2004).

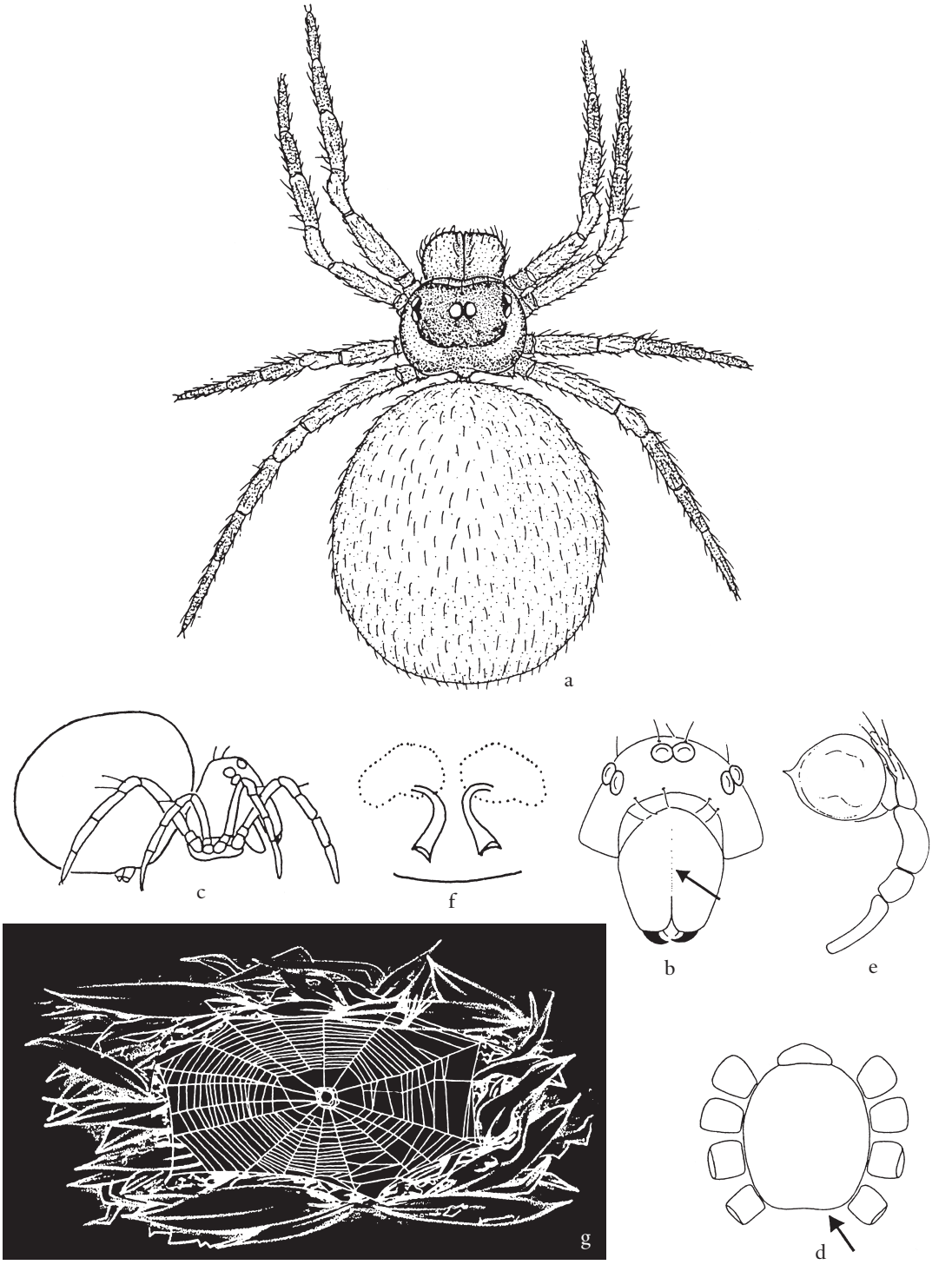


Fig. 96. **Symphytognathidae. a.** female habitus (1.2 mm), remark absence of palps; **b.** cephalothorax, frontal view showing fused chelicerae; **c.** habitus, lateral view; **d.** cephalothorax, ventral view showing broadly truncated sternum; **e.** male palp, retrolateral view; **f.** epigyne; **g.** orb web in leaf litter. (a: from Murphy & Murphy, 2000.)

FAMILY SYNAPHRIDAE Wunderlich, 1986

MIDGET SPIDERS

Fig. 97

Type genus

Synaphris Simon, 1894.

Other genus

Cepheia Simon, 1894. Represented by seven species (Platnick, 2005).

Diagnostic characters

Small araneomorph spiders; three tarsal claws; ecribellate; secondary haplogyne; eight eyes; toothed cheliceral keel replacing the usual cheliceral teeth; central notch in the tibial trichobothrium base; absence of a ventral femoral patch.

Descriptive characters

- **carapace:** smooth or finely granulate, circular with distinctly narrowed cephalic area (fig. 97a); fairly high, highest point behind eyes (fig. 97c); fovea poorly indicated or absent.
- **sternum:** fairly broad, sometimes wider than broad; shield-shaped with sinuous sides; posteriorly truncated; produced between coxae IV separating these by more than their diameter (fig. 97d).
- **eyes:** eight in two almost straight rows (dorsal view); anterior median eyes smallest (fig. 97b).
- **chelicerae:** vertical, not divergent; without condyle; without teeth but with a cheliceral keel ending in a tooth-like tip; no stridulating file (fig. 97c).
- **mouthparts:** endites strongly converging (fig. 97d); (not so in *Cepheia*? see Schütt 2003, character 26); serrula present; labium roughly triangular.
- **legs:** tarsi longer than metatarsi or subequal; leg formula 1423; femur with macrosetae; tarsi with three dentate claws, superiors equal; trichobothria in double row on tibiae, double row or single subdistal on metatarsi, absent on tarsi; tarsus IV with strongly serrate ventral bristles.
- **female palp:** fully developed, no claw.
- **abdomen:** globular, with long setae.
- **spinnerets:** six, long and cylindrical; median spinnerets small; colulus tubiform.
- **respiratory system:** no booklungs; tracheal spiracle present, as broad as field of spinnerets; details of tracheal system unknown.
- **genitalia:** secondarily haplogyne, without epigyne; with a pair of receptacula (fig. 97g); male palp with retrolateral basal paracymbium, cymbium narrow and stripe-like (*Cepheia*) or complicated, composed of two parts (*Synaphris*); bulbus elongate; median apophysis present; embolus long and thin, originating from rounded base (figs 97e, f).
- **body size:** 2-3 mm.
- **colour:** pale brownish.

Taxonomic status

The Synaphridae were defined as a separate subfamily by Wunderlich (1986). Marusik & Lehtinen (2003) gave the taxon family rank and restricted it to the two genera mentioned, contrary to Schütt (2003) who includes four genera and considers them sister of either the Anapidae or Symphytognathidae.

Distribution

Mediterranean, Canary Islands, Central Asia, Namibia.

Lifestyle

Virtually nothing is known about the behaviour of these spiders; even the type of web they construct, if any, is not documented.

Relevant literature

Marusik & Lehtinen (2003); Schütt (2003); Wunderlich (1986).

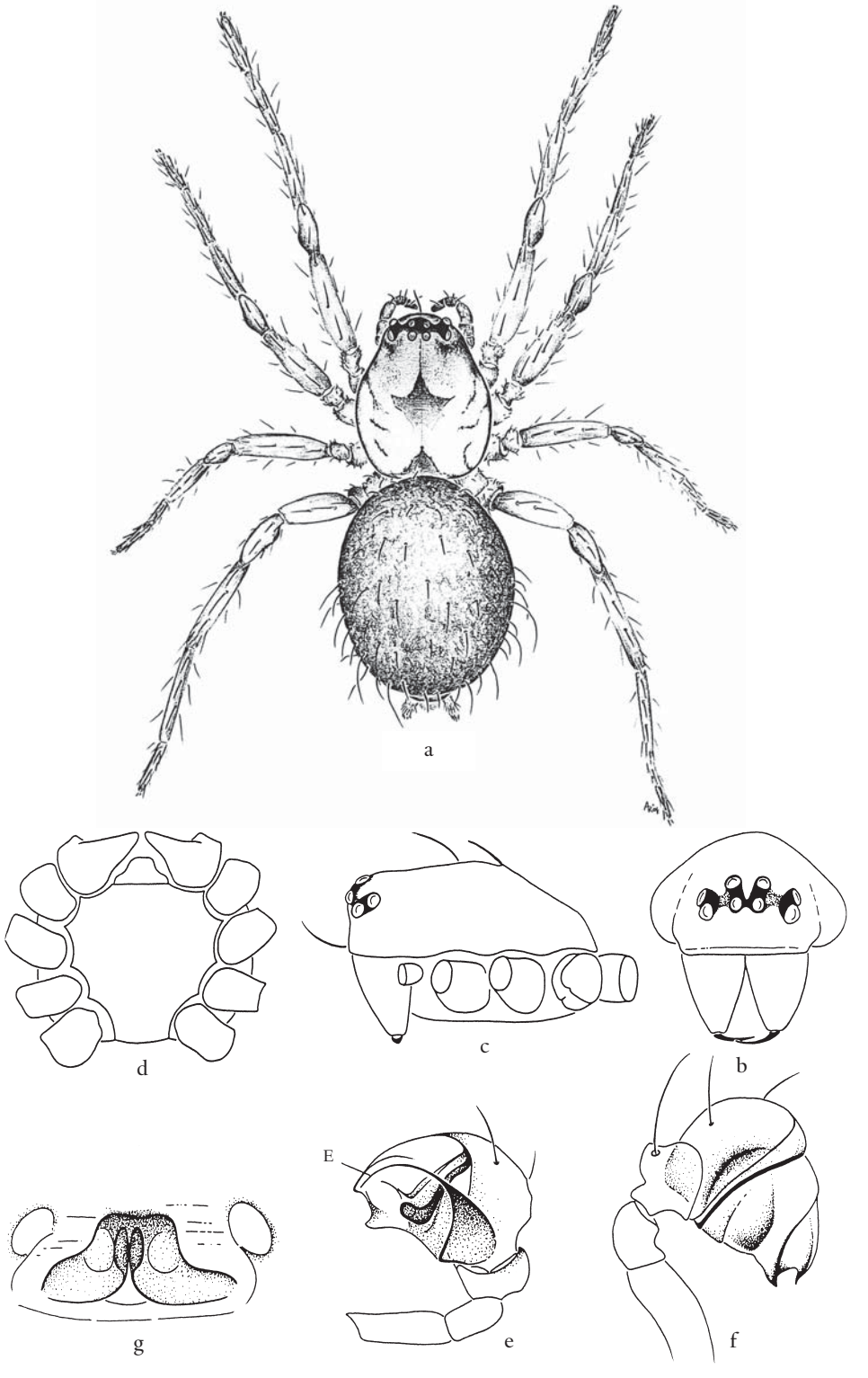


Fig. 97. **Synaphridae.** *Synaphris* sp. **a.** female habitus (2.5 mm); **b.** cephalothorax, frontal view; **c.** cephalothorax, lateral view; **d.** cephalothorax, ventral view; **e.** left male palp, prolateral view; **f.** right male palp, retrolateral view; **g.** epigyne. E: embolus.

FAMILY SYNOTAXIDAE Simon, 1894

CHICKEN-WIREWEB SPIDERS

Fig. 98, pl. 12

Type genus

Synotaxus Simon, 1894.

Other genera

Represented by 13 genera and 64 species (Platnick, 2005) placed in three subfamilies: Pahorinae, Physogleninae and Synotaxinae.

Diagnostic characters

Very small to small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; paracymbium small, basal, dorsally excavate; cymbium with a longitudinal incision on retrolateral margin; male palp with thickened macrosetae dorsally on femur and sometimes patella and tibia; femora basally thickened.

Descriptive characters

- **carapace:** slightly longer than wide with strongly narrowed cephalic part; fovea a shallow depression or a transverse furrow or a differently shaped depression; clypeus vertical or concave (fig. 98c) sometimes with glandular pores.
- **eyes:** eight eyes, size and position variable.
- **chelicerae:** vertical, without condyle; promargin with several teeth, dentition of retromargin variable; furrow with row or patch of denticles (fig. 98b).
- **mouthparts:** endites 1.5 times to twice as long as wide, converging, sometimes meeting at midline (fig. 98d); serrula present; labium not rebordered, about twice as wide as long.
- **sternum:** longer than wide; shape variable: triangular or strongly clavate behind; sometimes tuberculate (fig. 98d).
- **legs:** 1243 or 1423; first pair much longer than others; usually without spines; coxae not notched; with three claws, paired ones toothed; inferior one slender with or without tooth; two rows of trichobothria on tibiae sometimes one on metatarsi; tarsi without comb; accessory claws present; tarsal organ an evenly rounded dome.
- **female palp:** long with toothed or smooth claw.
- **abdomen:** variable in shape, sometimes with strong sexual dimorphism: females with oval, males with elongate abdomen extending far beyond spinnerets; in the latter anterior part of abdomen with strong sclerotizations associated with expanded, strongly sclerotized pedicel or with stridulating file in combination with pick on posterior margin of carapace.
- **spinnerets:** six; aggregate gland spigots not flattened; anterior lateral spinnerets with reduced bases of piriform gland spigots; cylindrical gland spigot base on posterior median spinnerets distinct; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually poorly developed but sometimes with lobe; ducts usually complex and with 2 or 4 lobes (fig. 98e); fertilization duct with sclerotized part called accessory sack; male palp sometimes with macrosetae on patella and tibia; tibia not broadened distally; cymbium with a longitudinal incision on retrolateral margin; paracymbium a small, basal, dorsally concave lobe; embolus spiniform or long and coiled; appendages of tegulum variable but often with strongly developed and excavated terminal tegular apophysis; no conductor (figs 98f, g).
- **body size:** 1.5-5.5 mm.
- **colour:** fairly variable.

Taxonomic status

Synotaxidae have often been regarded as part of the Theridiidae, more precisely a sister-group of the Argyrodinae. They were placed in the Araneoidea in the 'higher Araneoids' with closest relatives the Nesticidae and Theridiidae (Coddington & Levi, 1991; Coddington *et al.*, 2004). Agnarsson (2003) proposed the superfamily Cyatholipoidea containing the Cyatholipidae and Synotaxidae, which together are the sister-group of the Theridiidae.

Distribution

New Zealand, Australia, Tasmania, South and Central America.

Lifestyle

Construct webs that vary in shape from an irregular sheet to an inverted bowl to a lattice-like structure (fig. 98h). Egg sac carried in chelicerae by female in some species (fig. 98a).

Relevant literature

Agnarsson (2003); Exline & Levi (1965); Forster *et al.* (1990).

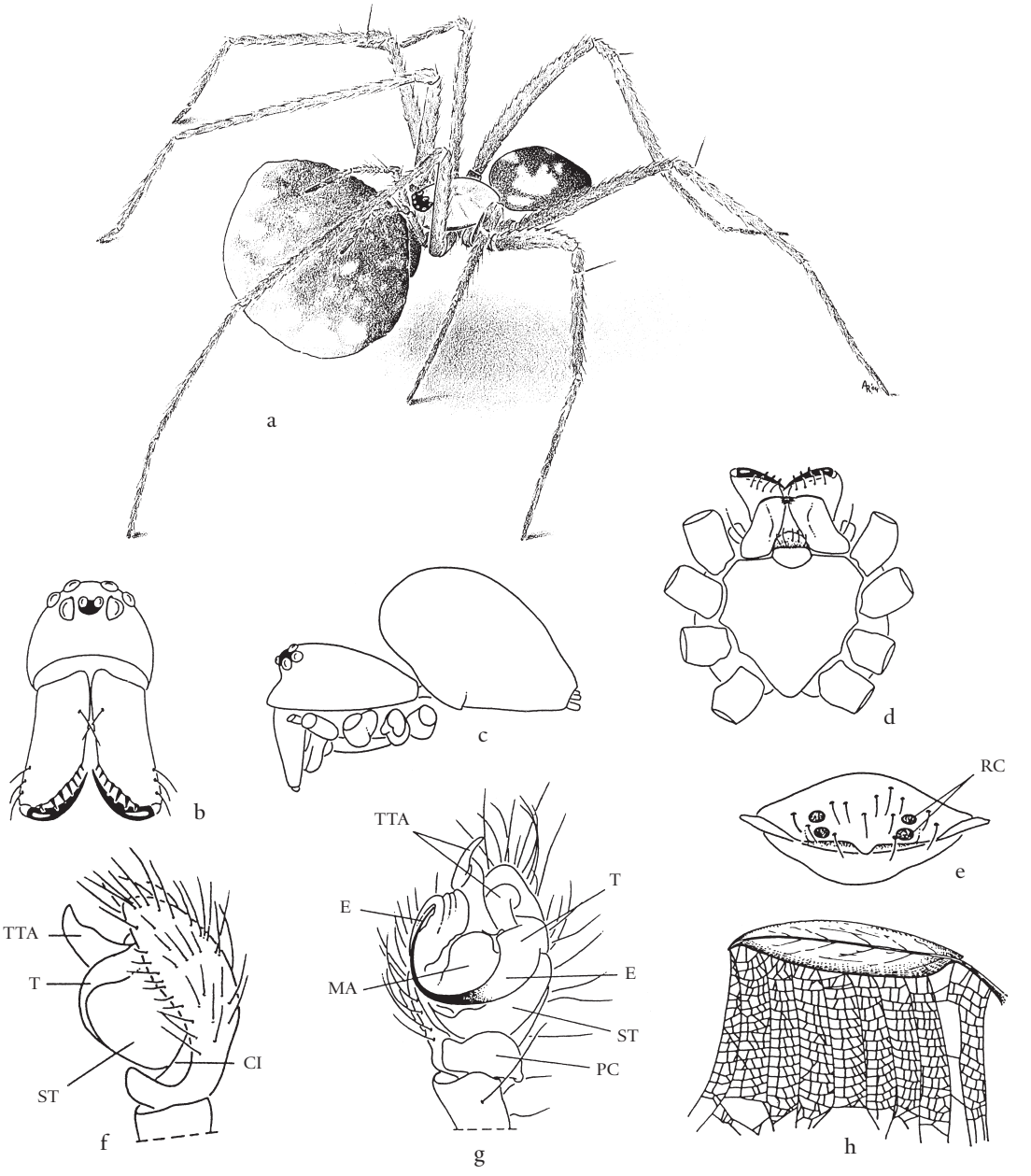


Fig. 98. **Synotaxidae.** *Mangua gunni* **a.** female with egg case (3.5 mm); *Mangua makarora* **b.** cephalothorax, frontal view; **c.** cephalothorax and abdomen, lateral view; **d.** cephalothorax, ventral view; **e.** epigyne; *Synotaxus monoceros* **f.** left male palp, ventral view; **g.** left male palp, retrolateral view. CI: cymbial incision; E: embolus; MA: median apophysis; PC: paracymbium; RC: receptacula; ST: subtegulum; T. tegulum; TTA: theridioid tegular apophysis. (a: after a photo in Forster et al., 1990; f, g: after Agnarsson, 2003.)

FAMILY TELEMIDAE Fage, 1913

LONG-LEGGED CAVE SPIDERS

Fig. 99

Type genus

Telema Simon, 1882.

Other genera

Apneumonella Fage, 1921; *Cangoderces* Harington, 1951; *Jocquella* Baert, 1980; *Seychellia* Saaristo, 1978; *Telemofila* Wunderlich, 1995; *Usofila* Keyserling, 1891. Represented by 22 species (Platnick, 2005).

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes or none; abdomen anterodorsally with zigzag ridge; legs long; booklungs absent; labium rebordered.

Descriptive characters

- **carapace:** slightly wider than long (fig. 99a).
- **sternum:** fused to labium or with T-shaped suture.
- **eyes:** six eyes or none; usually in three diads (fig. 99b).
- **chelicerae:** inner cheliceral margin without lamina; both cheliceral furrows toothed.
- **mouthparts:** labium rebordered.
- **legs:** three claws; legs long and slender with few spines; tarsi without trichobothria; tibia with mid-dorsal integumental glands opening onto cuticular plates (cf. fig. 52e).
- **female palp:** without claw.
- **abdomen:** slightly elongated (fig. 99c), with sclerotized zigzag ridge above pedicel (fig. 99b), more distinct in males.
- **spinnerets:** large rhomboidal colulus (fig. 99e); anterior spinnerets two-segmented; posterior median spinnerets tetrahedral; strong sexual dimorphism in spigot armature; cylindrical gland spigots present.
- **respiratory system:** booklungs absent; two pairs of tracheae, posterior pair near middle of abdomen.
- **genitalia:** haplogyne; female genitalia with a single large spermathecae (fig. 99g); male palp with a ribbon-like spermatophore; bulb simple, attached basally to the cymbium (fig. 99f).
- **body size:** < 2 mm.
- **colour:** brown, usually with purplish blue sheen.

Taxonomic status

The telemids were included in the Leptonetidae until Petrunkevitch (1923) attributed them family rank. Coddington & Levi (1991), Coddington *et al.* (2004) and Platnick *et al.* (1991) considered them to be the sister-group of the Leptonetidae and both families the sister-group of the Ochyroceratidae in the Scytodoidea.

Distribution

Africa, China, France, Japan, Malaysia, New Guinea, Spain, Sumatra, USA.

Lifestyle

Mainly cave-dwelling, apparently free-living spiders; some species are also found in litter.

Relevant literature

Bennett & Ledford (2005); Dippenaar-Schoeman & Jocqué (1997); Platnick *et al.* (1991).

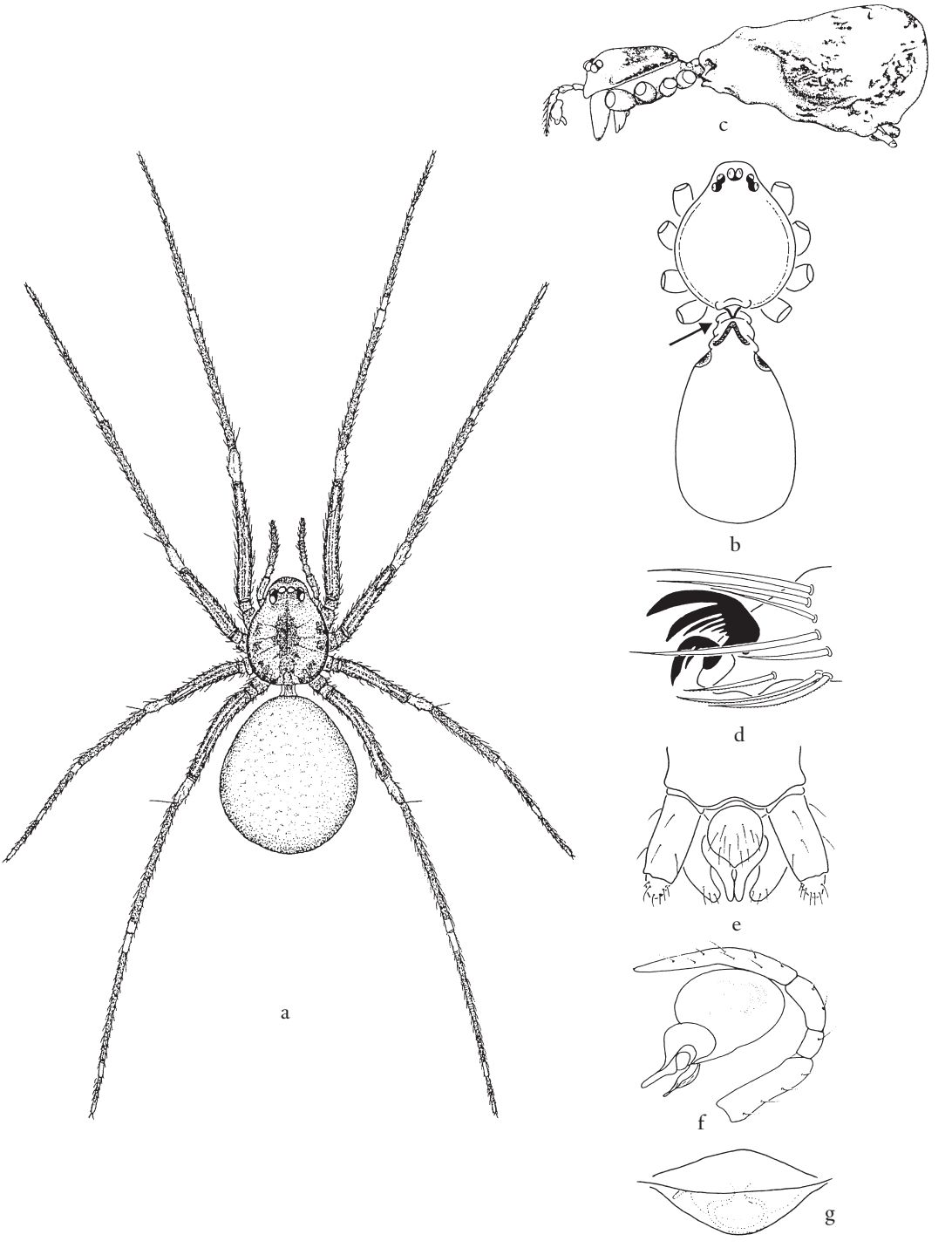


Fig. 99. **Telemidae.** *Jocquella* sp. **a.** female habitus (1 mm); *Cangoderces* sp. **b.** cephalothorax and abdomen, dorsal view showing eye pattern and pedicel; **c.** cephalothorax and abdomen, lateral view; **d.** leg tarsus with claws; **e.** spinnerets, ventral view; **f.** male palp, retrolateral view; **g.** female genitalia. (a: from Murphy & Murphy, 2000; d, e, g: after Harington, 1951; f: after Brignoli, 1978.)

FAMILY TENGELLIDAE Dahl, 1908

HOST SPIDERS

Fig. 100, pl. 27

Type genus

Tengella Dahl, 1901.

Other genera

Anachemmis Chamberlin, 1919; *Calamistrula* Dahl, 1901; *Haurokoa* Forster & Wilton, 1973; *Lauricius* Simon, 1888; *Liocranoides* Keyserling, 1881; *Socalchemmis* Platnick & Ubick, 2001; *Titiotus* Simon, 1897. Represented by 32 species (Platnick, 2005).

Diagnostic characters

Very poorly defined family, as diagnostic characters do not match for all genera. Medium to large araneomorph spiders; three tarsal claws sometimes with claw tufts; cribellate or ecribellate; entelegyne; eight eyes; labium distally notched; two rows of similarly sized trichobothria on tarsi; male palp with interlocking lobes on tegulum and subtegulum; hyaline conductor.

Descriptive characters

- **carapace:** broadly oval with distinct cephalic area; fovea well defined (figs 100a, f). *Lauricius* is laterigrade.
- **sternum:** shield-shaped or rounded without lateral extensions (fig. 100c).
- **eyes:** eight in two slightly recurved rows (three rows in *Haurokoa*); anterior median eyes smallest (largest in *Tengella*); tapetum canoe-shaped; clypeus fairly low (fig. 100b).
- **chelicerae:** large, with condyle; both margins with three teeth (3/2 of 4/2 in *Haurokoa*) (fig. 100c).
- **mouthparts:** endites rectangular, parallel or distally convergent; serrula a single row of small teeth; labium markedly shorter than endites, rebordered in front, distally notched; at an angle of 90° relative to sternum (fig. 100c).
- **legs:** 4123 (1423 or 1243 in *Haurokoa*); tarsi with scopula (fig. 100g) and two rows of similarly sized trichobothria; superior tarsal claws dentate; dense claw tuft in ecribellate genera; two rows of ventral spines on tibiae and metatarsi; tibiae I of male without tibial crack; trochanters notched; tarsal organ capsulate.
- **female palp:** with sometimes very long dentate claw.
- **abdomen:** oval, longer than wide; with dense cover of short recumbent hairs.
- **spinnerets:** six; ecribellates with biarticulate anterior lateral and posterior lateral spinnerets and uniarticulate posterior median ones; the former with two major ampullate gland spigots and some piriforms; posterior median spinnerets in female with three cylindrical gland spigots; colulus composed of a few setae.
- **cribellum:** in *Tengella* narrow bipartite; entire but small in *Haurokoa* females, tiny or absent in males.
- **calamistrum:** brush-shaped, situated at base of metatarsus IV in *Tengella*, a single row in *Haurokoa*; absent in some males.
- **respiratory system:** with a pair of booklungs; tracheal spiracle just in front of spinnerets opening into two simple straight tracheae.
- **genitalia:** entelegyne; epigyne variable, flat or with anterior hood (fig. 100i); male palpal tibia with retrolateral apophysis; cymbium with dorsal scopulate patch; embolus usually short but shape varies; distinct hooked median apophysis and membranous conductor (figs 100d, e).
- **body size:** 3-24 mm.
- **colour:** yellowish to dark often with reddish or orange hairs; abdomen often with chevron-pattern.

Taxonomic status

The composition of Tengellidae is still subject to debate. Some genera currently in Tengellidae, including *Tengella* itself, have been placed in many different families. Platnick (1999) placed the family as the sister-group of Zorocratidae plus Lycosoidea, mainly on the basis of the interlocking lobes on the male palp. Presently, the family is considered sister to all other Lycosoidea (Coddington *et al.*, 2004; Raven & Stumkat, 2005).

Distribution

Neotropics, New Zealand, North America.

Lifestyle

Tengella builds large irregular cribellate webs inhabited by a variety of insect and spider symbionts. The other species, including the cribellate *Haurokoa,* are free living hunters.

Relevant literature

Platnick (1999); Platnick & Ubick (2001); Ubick & Richman (2005d); Wolff (1977).

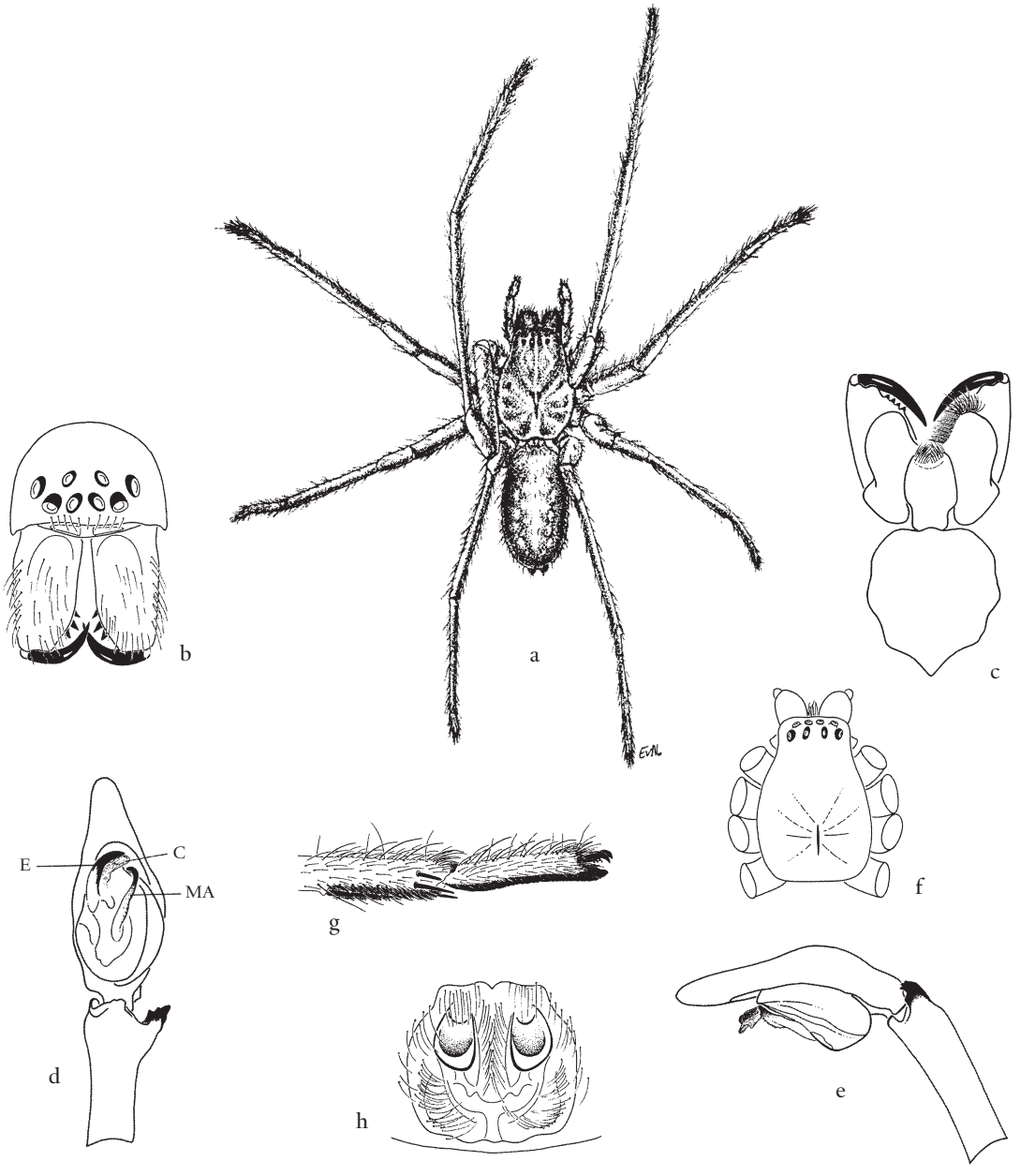


Fig. 100. **Tengellidae**. *Tengella radiata* **a.** female habitus (19 mm); **b.** cephalothorax, frontal view; **c.** cephalothorax, ventral view (endite scopula omitted on one side); **d.** left male palp, ventral view; **e.** left male palp, retrolateral view; *Lauricius cooki* **f.** female cephalothorax, dorsal view; **g.** leg I, tarsus and metatarsus; **h.** epigyne. C: conductor; E: embolus; MA: median apophysis.

FAMILY TETRABLEMMIDAE O. P.-Cambridge, 1873

ARMOURED SPIDERS

Fig. 101, pl. 8

Type genus

Tetrablemma O.P.-Cambridge, 1873.

Other genera

Represented by 30 genera and 124 species (Platnick, 2005) placed in two subfamilies: Pacullinae and Tetrablemminae.

Diagnostic characters

Very small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; haplogyne; six eyes or none; tarsal claws on onychium; abdomen provided with dorsal, ventral and lateral scuta; cheliceral lamina well developed.

Descriptive characters

- **carapace:** pear-shaped, oval or circular in females, with modifications in males (fig. 101b); integument rugose and pitted.
- **sternum:** wide, posteriorly truncated or concave; reticulate or pitted; with modifications in males.
- **eyes:** vary in number from six to none; when six, in three diads (fig. 101c) or in compact group (fig. 101d).
- **chelicerae:** cheliceral lamina well developed (fig. 101f); anterior face usually with tooth or condyle; chelicerae of male with modifications.
- **mouthparts:** endites distally pointed with parallel median margins.
- **legs:** three claws; tarsi with large onychium; legs without spines, except leg I, which may have specialized spines; sometimes with modifications in males.
- **female palp:** present, without claw.
- **abdomen:** with complex scutal patterns (fig. 101a): one large dorsal scutum, subcircular to oval; 3-4 scuta ventrally, 3-4 narrow ones laterally and posteriorly; scutal patterns differ in males (fig. 101e).
- **spinnerets:** unmodified; spigot armature still tentative: anterior median spinnerets with two major ampullate and a few piriform gland spigots; posterior median spinnerets with one minor ampullate and one aciniform gland spigot; the posterior lateral without spigots; colulus a small knob with few setae, or reduced.
- **respiratory system:** booklungs reduced in minute species; tracheae absent, simple, or reduced.
- **genitalia:** haplogyne; female genitalia with copulatory opening unpaired, sometimes large; vulva with paired, soft spermathecae; male bulb subglobular to pyriform, embolus thin (fig. 101g).
- **body size:** < 2 mm (Tetrablemminae); 3-13mm (Pacullinae).
- **colour:** uniformly yellow to dark reddish brown.

Taxonomic status

Platnick *et al.* (1991), Coddington & Levi (1991) and Coddington *et al.* (2004) consider the Tetrablemmidae the sister-group of the superfamily Dysderoidea; the combination of these groups itself being sister to Caponiidae. According to Ramírez (2000), the family belongs in the Scytodoidea and is sister to the combination of Pholcidae, Digeutidae, Plectreuridae, Scytodidae and Sicariidae.

Distribution

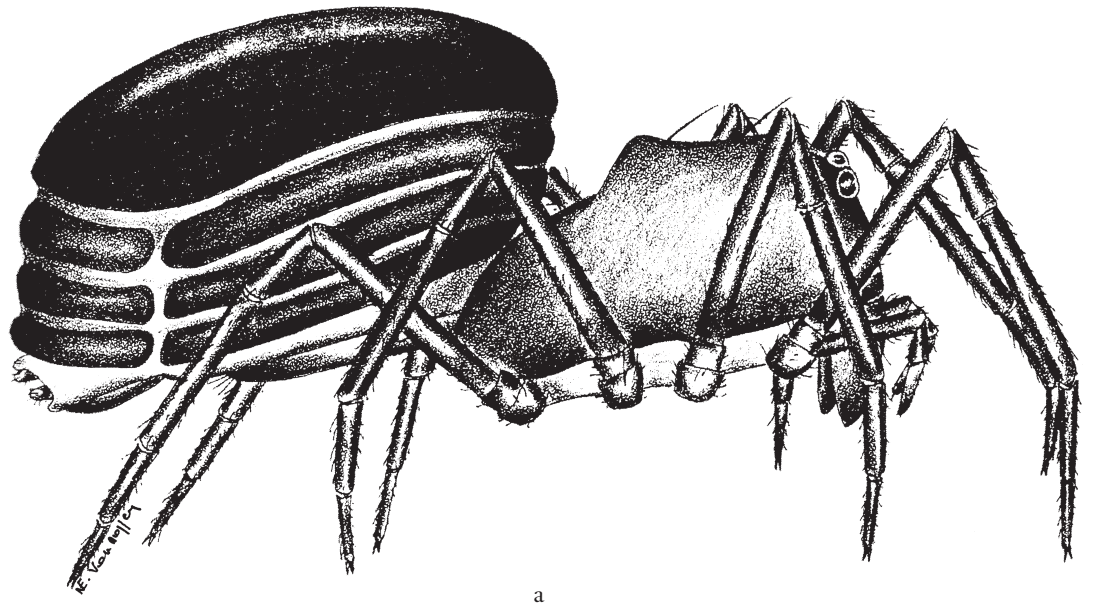
Tropical and subtropical regions.

Lifestyle

Cryptozoic, living in the litter layer and under bark in forested areas; some construct a sheet web in the center of which the egg-sac is attached.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Lehtinen (1981); Platnick *et al.* (1991); Wunderlich (2004).



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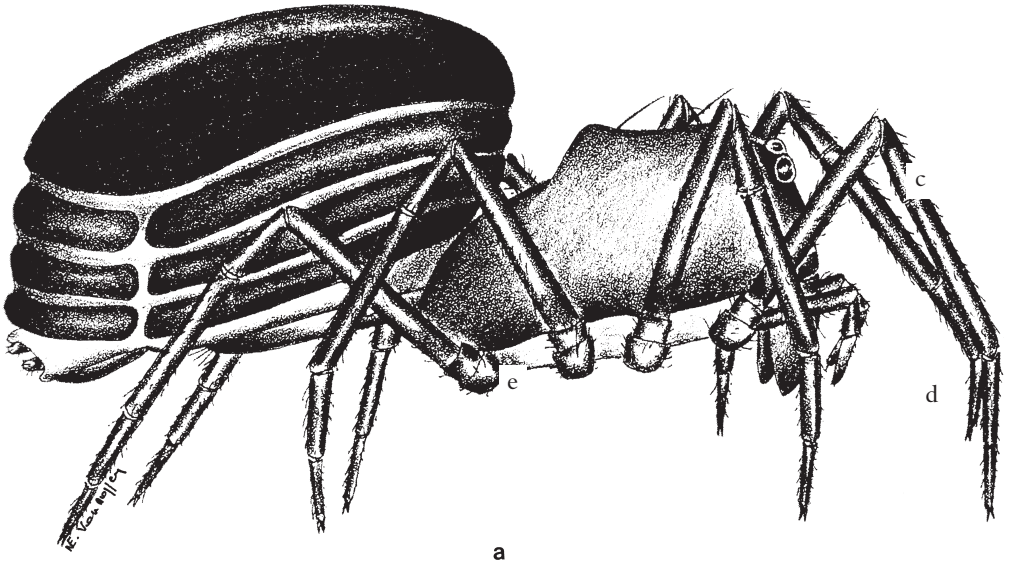

b

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a

g

f

Fig. 101. **Tetrablemmidae.** *Tetrablemma* sp. **a.** female habitus (2.5 mm); **b.** male, dorsal view, legs omitted, showing eye bearing tubercle; **c.** abdomen, ventral view; *Shearella* sp. **d.** eye pattern, dorsal view; *Afroblemma* sp. **e.** eye pattern, dorsal view; **f.** chelicerae, frontal view; **g.** male palp, retrolateral view. (d-g: after Lehtinen, 1981.)

FAMILY TETRAGNATHIDAE Menge, 1866

WATER ORB-WEAVERS

Fig. 102, pl. 16

Type genus

Tetragnatha Latreille, 1804.

Other genera

Represented by 56 genera and 1,021 species (Platnick, 2005) placed in four subfamilies: Dolichognathinae, Leucauginae, Metainae and Tetragnathinae.

Diagnostic characters

Small to very large araneomorph spiders; three tarsal claws; ecribellate; entelegyne or secondary haplogyne; eight eyes; male genitalia comparatively simple, with large paracymbium and often several cymbial processes, conductor and embolus coiled apically; median apophysis absent.

Descriptive characters

- **carapace:** longer than wide (fig. 102a).
- **sternum:** longer than wide, pointed posteriorly or produced between posterior coxae; with pleural bars between coxae or sternocoxal tubercles in *Pachygnatha*.
- **eyes:** eight (4:4); lateral eyes contiguous or apart, sometimes on tubercle; tapetum absent in secondary eyes in *Tetragnatha* and a few other genera.
- **chelicerae:** variable: short and stout or long and well developed (fig. 102b), with rows of large teeth and strong projecting spurs, which are markedly elongated in males in Tetragnathinae and Leucauginae (fig. 1021d), or long and stout at base in Metinae.
- **mouthparts:** variable: endites parallel or converging over labium; labium variable, rebordered (fig. 102d).
- **legs:** three claws; legs long and slender, with or without spines (fig. 102a); femora with dorsal trichobothria; femora often with dorsal trichobothria; posterior femora with double fringe of trichobothria on prolateral surface of basal half (Leucauginae) (fig. 102h); row of straight trichobothria on tibiae of all legs; trichobothria often branched.
- **abdomen:** variable: elongated and cylindrical or round to ovoid, sometimes with tubercles (*Dolichognatha*); in some species extending caudally beyond spinnerets (figs 101c, e, f, g); epigastic furrow nearly straight.
- **female palp:** tarsus spinose, with well developed toothed claw.
- **spinnerets:** typical of araneoids; anterior and posterior pairs similar in size; anterior lateral spinnerets with several to more than 100 piriform gland spigots; aggregate and flagelliform spigots of triplet (absent in *Pachygnatha*) on posterior lateral spinnerets separate; few aciniform gland spigots on posterior median spinnerets.
- **respiratory system:** two booklungs, booklung covers grooved; tracheal spiracle near spinnerets or halfway between spinnerets and epigynal plate (*Dyschiriognatha, Glenognatha*) (fig. 101e); tracheal system an atrium and two unbranched trunks; medial trunks rarely branched (*Glenognatha*).
- **genitalia:** entelegyne; epigyne with genital plate unsclerotized in some Tetragnathinae (fig. 102e); spermathecae oval; male palpal tibia broadened distally; cymbial alveolus central (figs 102i, j); paracymbium separate and movable, fused to cymbium or digitiform shape typical for family; spherical tegulum with coiled embolus wrapped by conductor at distal tip; sperm duct often enlarged with numerous coils in tegulum; median apophysis absent; embolus-tegulum membrane present.
- **body size:** 2-23 mm.μ
- **colour:** general colour fawn to dull brown or grey with silvery markings; sometimes with grey and silver folium or distinct green, silver, white and bronze pattern.

Taxonomic status

Listed in the 'Higher Araneoids' (Coddington & Levi,1991; Coddington *et al.* 2004) and together with the Araneidae sister to the other Orbiculariae (Hormiga *et al.* 1995; Griswold *et al.* 1998; Kuntner 2006). The delimitation of the subfamilies is subject to debate (Wunderlich, 2004). According to results of recent analyses (Kuntner 2005, 2006), the Nephilinae should receive family status as sister to all other Orbiculariae except the Araneidae. Inclusion of the genera *Phononognatha* and *Deliochus* in the analysis reveals the Tetragnathidae to be paraphyletic.

Distribution

Worldwide.

Lifestyle

Tetragnathids are orb web weavers occupying a variety of habitats. Webs of some genera often horizontal above water.

Relevant literature

Coddington (1990); Dippenaar-Schoeman & Jocqué (1997); Griswold *et al.* (1998); Hormiga *et al.* (1995); Kuntner (2005, 2006); Levi (1980, 1981, 2005b); Wunderlich (2004).

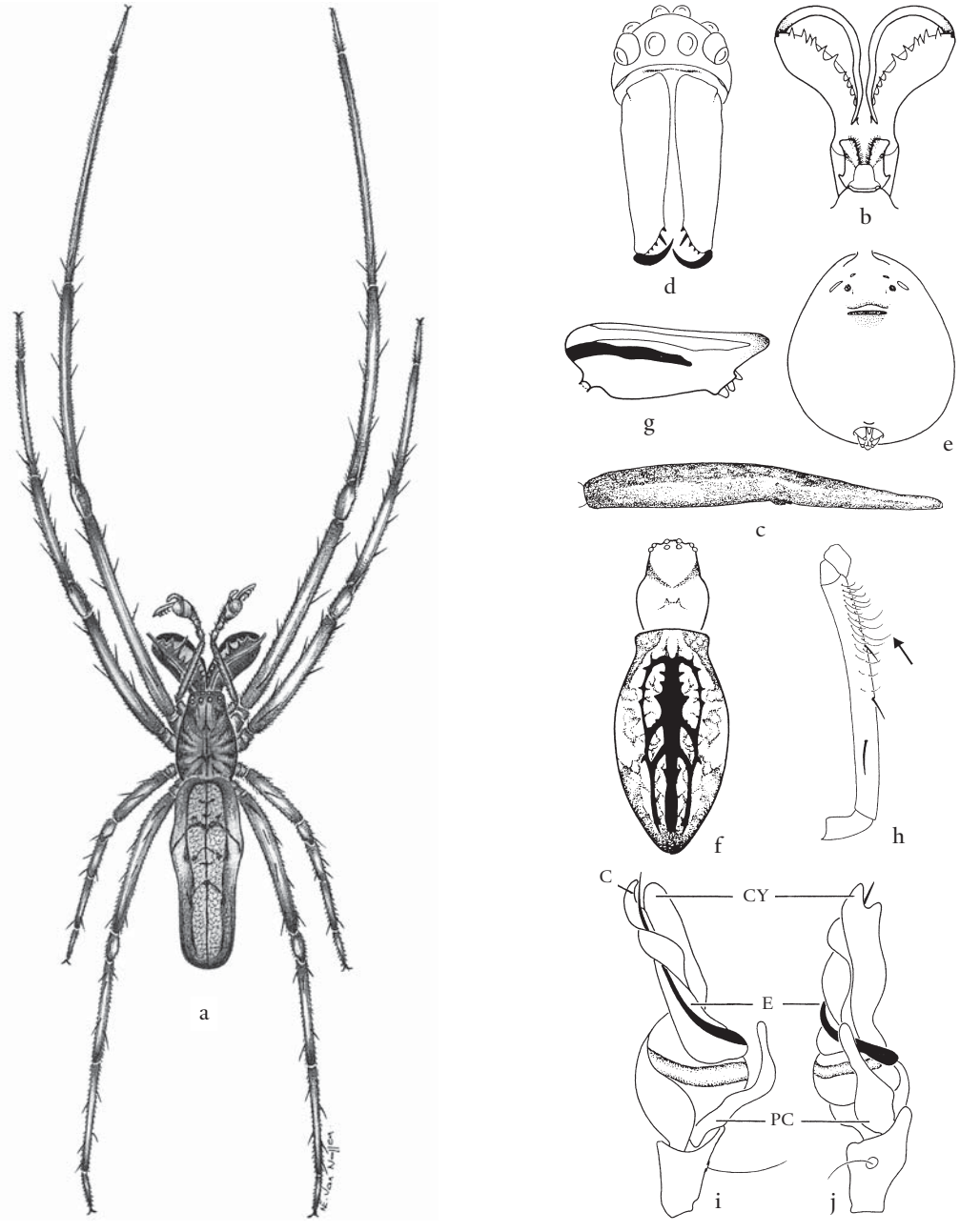

Fig. 102. **Tetragnathidae.** *Tetragnatha* sp. **a.** female habitus (9 mm); **b.** chelicerae, ventral view; **c.** abdomen, lateral view; *Dolichognatha* sp. **d.** cephalothorax, frontal view; *Pachygnatha* sp. **e.** abdomen, ventral view; *Leucauge* sp. **f.** cephalothorax and abdomen, dorsal view; **g.** abdomen, lateral view; **h.** femur IV, showing row of trichobothria; *Tetragnatha* sp. **i.** male palp, ventral view; **j.** male palp, lateral view. C: conductor; CY: cymbium; E: embolus; PC: paracymbium.

FAMILY THERAPHOSIDAE Thorell, 1870

BABOON SPIDERS / TARANTULAS

Fig. 103, pl. 4

Type genus

Theraphosa Thorell, 1870.

Other general

Represented by 111 genera and 883 species (Platnick, 2005), listed in ten subfamilies: Avicullariinae, Eumenophorinae, Harpactirinae, Ischnocolinae, Ornithoctoninae, Selenocosmiinae, Selenogyrinae, Stromatopelminae, Theraphosinae and Thrigmopoeinae.

Diagnostic characters

Medium-sized to very large mygalomorph spiders; two or rarely three tarsal claws; eight eyes; four spinnerets; rastellum absent; well developed scopulae and iridescent claw tufts on legs tarsi and female palpal tarsi; tarsi with clavate trichobothria along their length; labium and endites with numerous cuspules; anterior lobe on endite developed; distal segment of posterior spinnerets digitiform.

Descriptive characters

- **carapace:** clypeus absent or wide; fovea short, varies from straight to procurved or recurved or provided with a distinct horn-like process or depression in *Ceratogyrus* (fig. 103a); hirsute.
- **sternum:** with moderately small, oval, marginal to subcentral posterior sigilla.
- **eyes:** eight; in two rows forming small rectangular group; eye tubercle present (fig. 103b).
- **chelicerae:** outer face of chelicerae hirsute, or with dense scopulae (fig. 103g) in Ornithoctoninae and Harpactirinae (except *Harpactirella* and *Brachionopus*) or stridulating organs (fig. 103i) (Ornithoctoninae, Selenocosmiinae); inner face with peg setae; rastellum absent or lateral (*Euphrictus*).
- **mouthparts:** anterior lobe of endites developed into conical process (fig. 103c); labium and endites with numerous cuspules, rarely none on labium; serrula absent or rarely present.
- **legs:** hirsute; tarsi with two or rarely three claws, scopulae and tufts; spination on legs III-IV reduced in arboricolous species, dense in ground species, except Selenocosminae; paired tarsal claws most often with only one row of teeth, but claws with two rows and bare claws occur; clavate trichobothria along length of coxa I (fig. 103f) maxillae (Selenecosminae) or coxa II (Eumenophorinae) with long paddle-shaped setae as part of stridulation organ; femur IV sometimes with scopula on retrolateral face (Theraphosinae); tarsi as broad or broader than metatarsi (Avicullariinae).
- **abdomen:** oval; hirsute; with urticating hairs in Theraphosinae and Avicullariinae.
- **spinnerets:** four; apical segment of posterior spinnerets long and digitiform (fig. 103d).
- **respiratory system:** four booklungs or book lungs, as elsewhere.
- **genitalia:** spermathecae paired and simple, unbranched or branched at distal end; male palp with a small second haematodocha and coniform distal sclerite (fig. 103j); subtegulum sometimes wide (Theraphosinae); embolus broad and acuminate or long and thin.
- **body size:** 13-90 mm. The largest spider, *Theraphosa blondi* (Latreille, 1804), belongs to this family.
- **colour:** various hues of brown, blue, orange, yellow and from pale grey to black; abdomen with variegated pattern.

Taxonomic status

Theraphosidae is considered the sister-group of Paratropididae with which it forms the Theraphosoidea, itself the sister of Barychelidae and together forming the Theraphosoidina (Raven, 1985; Goloboff, 1995). Raven (1985) provided keys to the subfamilies and genera and Smith (1990, 1995) to species of Africa and America.

Distribution

Pantropical distribution. Subfamilies endemic as follows: Avicullariinae, Theraphosinae (South America); Eumenophorinae, Harpactirinae, Selenogyrinae, Stromatopelminae (Africa); Ischnocolinae, Ornithoctoninae (India and Oriental); Thrigmopoeinae (Oriental Region).

Lifestyle

Free-living spiders inhabiting terrestrial, silk-lined burrows, arboreal retreats or retreats made under rocks or in holes under bark or under epiphytes (fig. 103k).

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dippenaar-Schoeman (2002); Raven (1985, 1994); Gallon (2003); Goloboff (1995); Prentice (2005); Smith (1990, 1995).

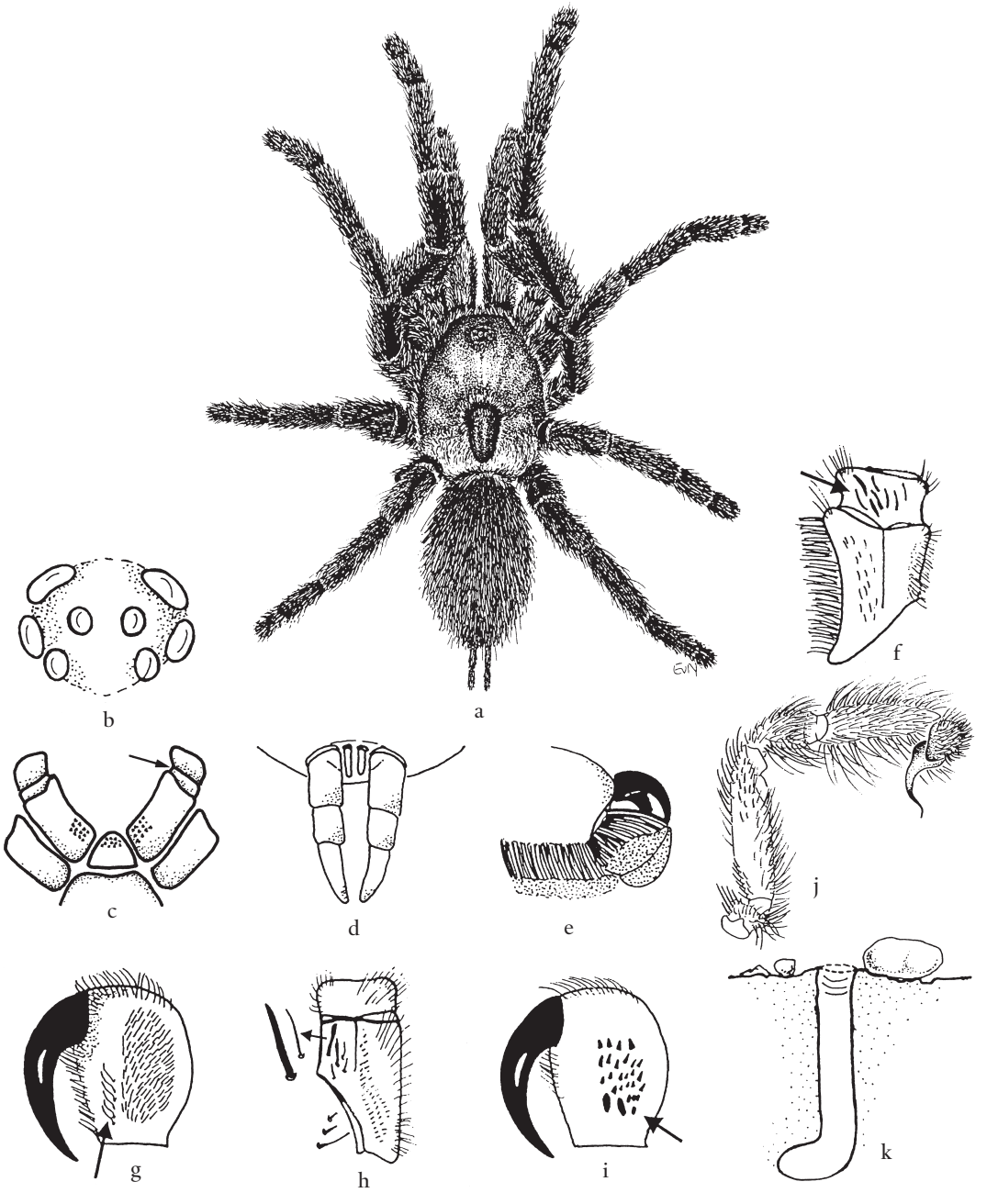

Fig. 103. **Theraphosidae.** *Ceratogyrus* sp. **a.** habitus female (45 mm); **b.** eye pattern, dorsal view; **c.** mouthparts showing extended anterior lobe; **d.** spinnerets, ventral view; **e.** tarsus with claw tuft and scopula; Eumenophorinae **f.** coxa I, showing long, paddle-shaped setae; Harpactirinae **g.** chelicera, retrolateral view showing pad of plumose setae on outside; **h.** coxa of palp, showing stridulating nodes; Selenogirinae **i.** stridulating organ on inside of chelicera; *Yamia bundokalbo* **j.** male palp, retrolateral view; **k.** burrow. (f-i: after Smith, 1990; j: after Barrion & Litsinger, 1995.)

FAMILY THERIDIIDAE Sundevall, 1833

COB WEB SPIDERS, GUMFOOT WEB SPIDERS

Fig. 104, pl. 13

Type genus

Theridion Walckenaer, 1805.

Other genera

Represented by 81 genera and more than 2,200 species (Platnick, 2005) in six subfamilies: Argyrodinae; Hadrotarsinae; Latrodectinae; Pholcommatinae; Spintharinae; Theridiinae (Agnarsson, 2004).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; tarsi IV with a row of lightly curved, serrated bristles; labium not rebordered; legs with no or few spines; modified, aggregate silk glands present; male palpal tibia distally widened; no paracymbium; sticky silk is used to wrap prey.

Descriptive characters

- **carapace:** variable in profile from flat to high; clypeus varies in length; in some genera frontal region of carapace with modifications, especially in males (figs 104e-g).
- **sternum:** scutiform to triangular; attenuated posteriorly.
- **eyes:** eight; in two rows; eyes usually encircled by brownish ring (fig. 104b).
- **chelicerae:** variable: sometimes very long, especially in males of some genera; cheliceral teeth absent or few in number.
- **mouthparts:** labium not rebordered; endites variable, usually converging slightly (fig. 104d).
- **legs:** three claws; tarsus IV with a row of slightly curved, serrated bristles forming a comb (fig. 104c) (sometimes reduced or difficult to discern in smaller species and males); legs moderately long to very long; with no or few spines, none on femora, tibiae and metatarsi; tarsi usually tapering towards tip; tarsal organ often enlarged.
- **female palp:** with a claw; sometimes palmate (Hadrotarsinae) (fig. 104h).
- **abdomen:** variable in shape from oval to round (fig. 104a) and high to elongated, extending beyond spinnerets; some species with dorsal stridulating plates near pedicel.
- **spinnerets:** anterior lateral spinnerets with one major ampullate gland spigot, and piriforms with reduced bases; often with median ridges; triplet of aggregate and flagelliform gland spigots on posterior lateral spinnerets often absent in males; number of aciniform gland spigots on posterior median spinnerets reduced, never more than four; colulus either large and setose, either represented by a few setae, or absent (figs 104h-j).
- **respiratory system:** two booklungs; tracheal spiracle a fairly wide slit with poorly sclerotized rim, just in front of spinnerets.
- **genitalia:** entelegyne; epigyne variable; internal structure with one or two (Hadrotarsinae) pairs of spermathecae (fig. 104k); male palp with tibia and patella without apophysis; no paracymbium but a hook on distal margin of cymbium forming a lock mechanism; alveolus of cymbium on prolateral margin; median apophysis usually present and containing loop of spermduct (fig. 104l); tegulum with a typical theridiid tegular apophysis (the latter three characters are reversed in *Achaearanea*).
- **body size:** 2-15 mm.
- **colour:** variable, from pitch black to bright yellow; many species are cryptic, with darker patterns on a brownish grey background.

Taxonomic status

Placed in the 'Higher Araneoids' with the Nesticidae as sister-group (Coddington & Levi, 1991; Coddington *et al.*, 2004; Griswold *et al.*, 1998) a situation corroborated by the thorough analysis of Agnarsson (2003) and Arnedo *et al.* (2004). Both provide a phylogeny of the family, the former on morphological, the latter on molecular grounds.

Distribution

Worldwide.

Lifestyle

Construct irregular space webs, also known as cob webs or gumfoot webs (fig. 104m), with threads radiating in different directions. Prey is overpowered in a wrap-bite attack involving sticky silk.

Relevant literature

Agnarsson (2004); Arnedo *et al.* (2004); Dippenaar-Schoeman & Jocqué (1997); Griswold *et al.* (1998); Levi (2005c); Levi & Levi (1962).
(Electronic key to genera of Theridiidae available at http://www.gwu.edu/~spiders/framesKeys.htm)

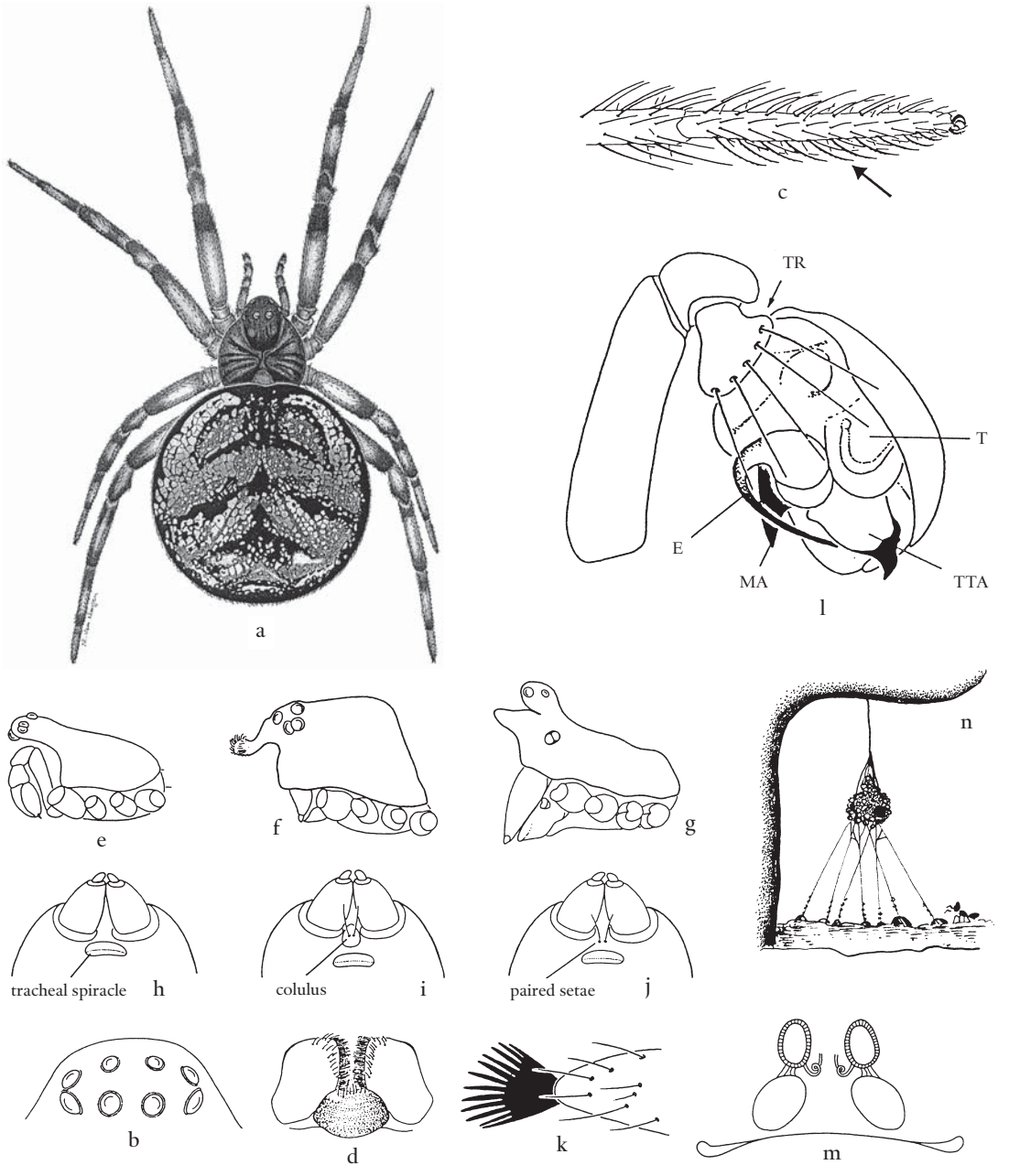

Fig. 104. **Theridion** sp. **a.** female habitus (4 mm); **b.** eye pattern, dorsal view; **c.** tarsus IV showing comb with serrated setae; **d.** mouthparts, ventral view; *Phoroncidia* sp. **e.** cephalothorax, lateral view; *Proboscidula* **f.** cephalothorax, lateral view; *Argyrodes* sp. **g.** cephalothorax, lateral view; Theridiidae **h.** posterior part of abdomen ventral view showing absence of colulus; **i.** presence of colulus; **j.** colulus replaced by two setae; Hadrotarsinae **k.** tip of female palp; **l.** right male palp, retrolateral view; *Theridion* sp. **m.** epigyne, showing four spermathecae; *Achaearanea globispira* **n.** web with pebble-covered retreat and gum-footed capturing threads. E: embolus; MA: median apophysis; T: tegulum; TR: tibial rim; TTA: theridioid tegular apophysis. (n: after Henschel & Jocqué, 1994.)

FAMILY THERIDIOSOMATIDAE Simon, 1881

RAY SPIDERS

Fig. 105, pl. 13

Type genus

Theridiosoma O.P.-Cambridge, 1879.

Other genera

Represented by 12 genera and 72 species (Platnick, 2005) placed in four subfamilies: Epeirotypinae, Ogulniinae, Platoninae and Theridiosomatinae.

Diagnostic characters

Very small araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes; pit organs present on prolateral margin of sternum in both sexes; long trichobothria on dorsal side of tibiae III and IV, usually 2-4 times as long as diameter of tibia; spermathecae connate.

Descriptive characters

- **carapace:** pear-shaped; glabrous or with a few scattered setae; clypeus relatively low (fig. 105a).
- **sternum:** as wide as long; with pit organs on promargin in both sexes (fig. 105b).
- **eyes:** eight; in two rows; posterior eye row straight or procurved; anterior row recurved (fig. 105a).
- **chelicerae:** robust; without lateral condyle; number of teeth on cheliceral furrow variable.
- **mouthparts:** labium indistinctly rebordered; endites converging (fig. 105c).
- **legs:** three claws, with unpaired claw elongated; tibiae I-IV with trichobothria, but more numerous and conspicuous on dorsal side of tibiae III and IV, trichobothria usually 2-4 times longer than diameter of tibia (figs 105a, b); leg formula 1243; legs in males longer and more slender than in females; tarsal organ capsulate, in basal position.
- **female palp:** without claw.
- **abdomen:** smoothly ovoid or with tubercles in variable positions, abdomens usually higher than long (fig. 105b); scutum absent.
- **spinnerets:** anterior lateral spinnerets with reduced bases of piriform gland spigots; colulus large, fleshy, bearing setae.
- **respiratory system:** two booklungs; tracheal spiracle single, in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually flat or a domed sclerotized plate (fig. 105d); spermathecae fused along the midline; male palp varies from small to very large; no paracymbium but a simple hook at base on lateral margin of cymbium; median apophysis varies from a thin lamina to a sclerotized curved spur; embolus a single long, robust sclerite (figs 105e, f).
- **body size:** < 3 mm.
- **colour:** uniform or with transverse silvery or white bands or mottled blotches, sometimes forming chevrons.

Taxonomic status

According to Coddington (1986), the taxonomy of the theridiosomatids is in disarray owing to a lack of objective characters. Coddington & Levi (1991) and Coddington *et al.* (2004) list them in the 'Higher Araneoids' related to the symphytognathoid families. Griswold *et al.* (1998) place them at the base of the Symphytognathoidea including Anapidae, Mysmenidae and Symphytognathidae.

Distribution

Worldwide.

Lifestyle

Construct webs of variable shape in dark, shaded humid areas. The spider sits away from the web and pulls it into the shape of a hollow dome by means of a taut thread attached to the centre of the hub from which the spiral is cut out (fig. 105g).

Relevant literature

Coddington (1986, 2005d); Dippenaar-Schoeman & Jocqué (1997); Griswold *et al.* (1998); Wunderlich (2004).

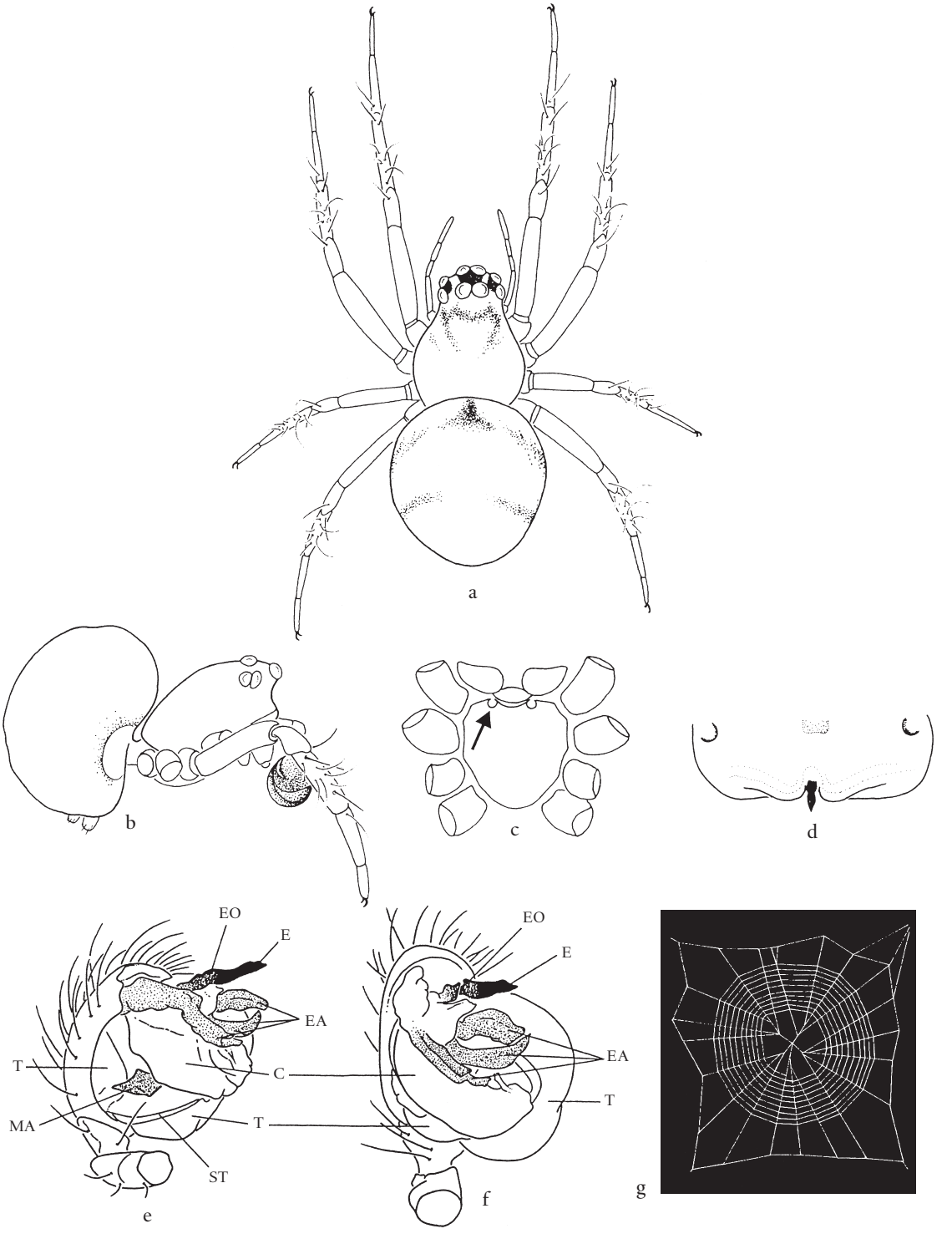

Fig. 105. **Theridiosomatidae.** Undescribed genus. **a.** female habitus (1.8 mm); **b.** male, lateral view; **c.** cephalothorax, ventral view showing pitorgans on sternum; **d.** epigyne; *Baalzebub baubo* **e.** male palp, ventrolateral view; **f.** male palp, ventral view; **g.** orb web with radial anastomosis. C: conductor; E: embolus; EA: embolic apophysis; EO: embolic opening; MA: median apophysis; ST: subtegulum; T: tegulum. (e, f: after Coddington, 1986.)

FAMILY THOMISIDAE Sundevall, 1833

CRAB SPIDERS

Fig. 106, pl. 32

Type genus

Thomisus Walckenaer, 1805.

Other genera

Represented by 164 genera and 2031 species (Platnick, 2005) listed in seven subfamilies: Aphantochilinae, Bominae, Dietinae, Stephanopinae, Strophiinae, Stiphropodinae and Thomisinae.

Diagnostic characters

Small to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; legs laterigrade with I and II usually longer than III and IV (except Bominae); lateral eyes usually on tubercles; morphologically a very diverse group.

Descriptive characters

- **carapace:** variable; varies from semicircular, ovoid to elongated; usually with simple, erect setae; some species with strong protuberances or eye tubercles figs 106a-d).
- **sternum:** heart-shaped.
- **eyes:** eight; in two rows (4:4); lateral eyes usually on tubercles, which vary from rounded to distinct; lateral eyes usually larger than other eyes (figs 106c, d),
- **chelicerae:** cheliceral teeth absent except in Stephanopinae; cusps or small denticles sometimes on promargin.
- **mouthparts:** endites and labium usually longer than wide; greatly elongated and pointed in Strophiinae.
- **legs:** two claws; laterigrade; legs I and II longer than III and IV (except Bominae); anterior tarsi without scopulae; claw tufts absent or, if present, consisting of spatulate setae; anterior legs frequently with series of strong spines on tibiae and metatarsi.
- **abdomen:** variable in shape, from round to ovoid or elongated, extending caudally beyond spinnerets; usually with scattered simple setae (figs 105a, b, d).
- **spinnerets:** anterior spinnerets short, conical and narrowly separated; colulus present.
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable, usually with hook; guide pockets or atrium bordered (fig. 106g); tibia of male palp with ventral and retrolateral apophyses; tegulum disc-like; embolus variable (figs 106e-f).
- **body size:** 2-23 mm.
- **colour:** variable, from brightly coloured (pink, green, yellow) to dark brown or grey and mottled; abdomen frequently patterned.

Taxonomic status

The relationships of the Thomisidae are still unclear. Levi (1982) placed them in a superfamily along with the aphantochilids now incorporated in the family but Loerboks (1984) found similarities between the palps of thomisids and salticids. According to Coddington & Levi (1991), their place in the Dionycha is not clear and the monophyly of that group has not yet been proven.

> **Note:** Wunderlich (2004) erected the family Borboropactidae for the genus *Borboropactus* Simon, 1884 mainly based on the presence of an albeit remarkable, glandular organ on the tarsi. It would seem, though, that *Borboropactus* must be incorporated in the Thomisidae as the sister-group of the other members of the family since Wunderlich (2004: p.1739) himself argues that the taxon has characters in common with the most plesiomorphic taxa in the family.

Distribution

Worldwide.

Lifestyle

Wandering spiders found mainly on foliage, with only a few genera living on the ground.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Dondale (2005c); Lehtinen (2004); Millot (1942); Ono (1988); Wunderlich (2004).

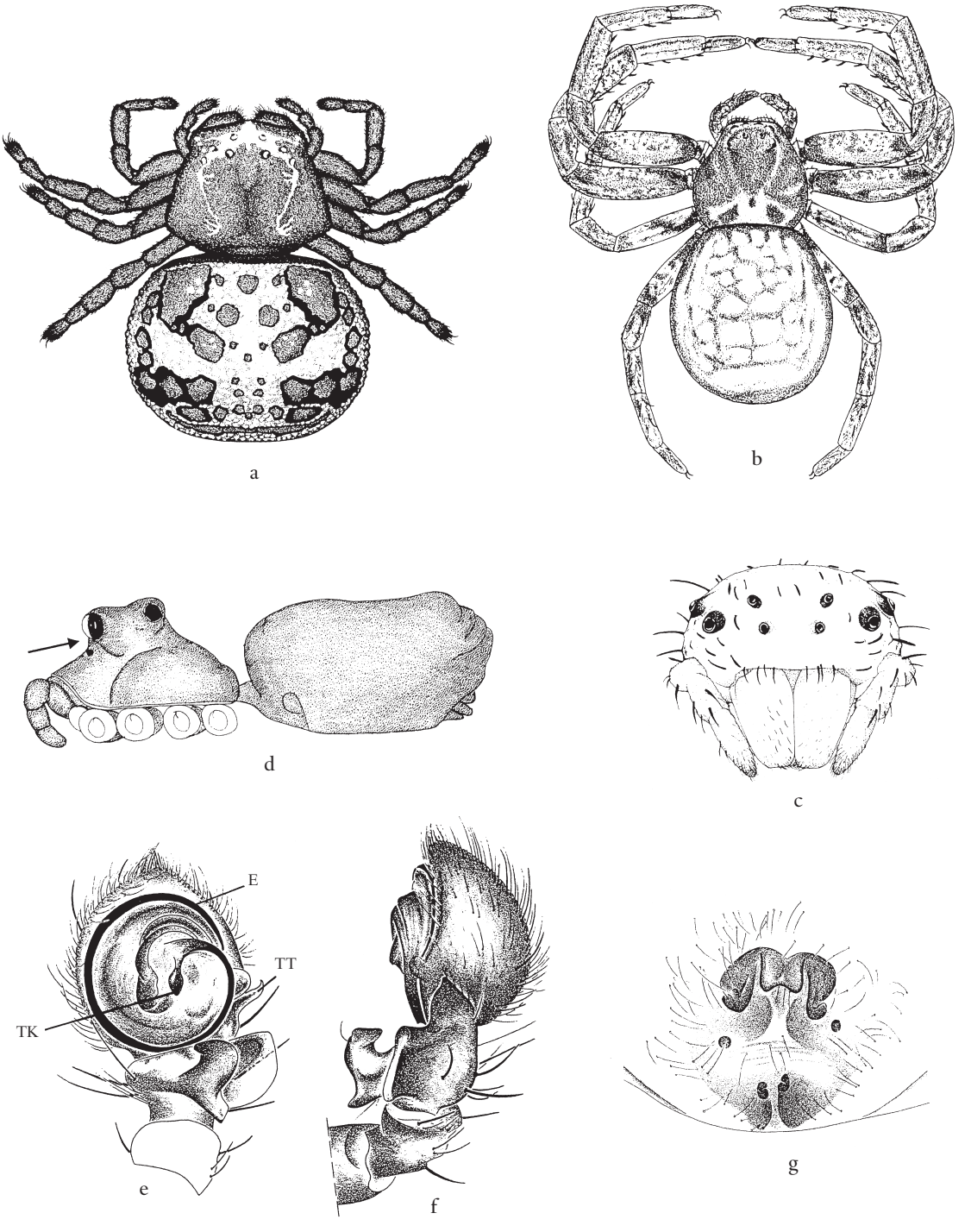

Fig. 106. **Thomisidae.** *Thomisops pupa*. **a.** female habitus (5 mm); *Xysticus* sp. **b.** female habitus (7 mm); **c.** cephalothorax, anterior view; *Pherecydes* sp. **d.** cephalothorax and abdomen, lateral view showing eye tubercle; *Xysticus fienae* **e.** male palp, ventral view; **f.** male palp, retrolateral view; **g.** epigyne. E: embolus; TK: tegular knob; TT: tutaculum. (e-g: after Jocqué, 1993.)

FAMILY TITANOECIDAE Lehtinen, 1967

ROCK WEAVERS

Fig. 107, pl. 25

Type genus

Titanoeca Thorell, 1869.

Other genera

Anuvinda Lehtinen, 1967; *Goeldia* Keyserling, 1891; *Nurscia* Simon, 1874; *Pandava* Lehtinen, 1967. Represented by 46 species (Platnick, 2005).

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; cribellate; entelegyne; eight eyes; calamistrum long, uniseriate; endites parallel; male palpal tibia complex, with pro- and retrolateral apophyses.

Descriptive characters

- **carapace:** roughly rectangular with anterior margin straight; fovea poorly defined, a shallow, oval to rectangular depression (fig. 107a).
- **sternum:** oval.
- **eyes:** eight; in two slightly procurved rows; posterior eye row broader than anterior eye row; posterior eyes with canoe-shaped tapetum.
- **chelicerae:** fairly long; swollen at base; both margins with two or three teeth; chilum well developed.
- **mouthparts:** labium subcircular to rectangular; endites rectangular, wide, almost parallel.
- **legs:** three claws; metatarsi each with one long subapical trichobothrium; tarsi without trichobothria.
- **female palp:** with claw.
- **abdomen:** short, oval.
- **spinnerets:** anterior pair (fig. 107b) broadened at base with short, dome-shaped second segment; posterior pair cylindrical with very short second segment; spigots with concentric ridges.
- **cribellum:** divided; as wide as base of spinnerets.
- **calamistrum:** uniseriate, long, extending over almost entire length of metatarsus (fig. 107c).
- **respiratory system:** two booklungs; tracheal spiracle close to spinnerets; tracheae four simple tubes.
- **genitalia:** entelegyne; epigyne with longitudinal membranous areas (fig. 107g); male palp usually complex: tibia with pro- and retrolateral apophyses; often with patellar and cymbial apophyses (figs 107d-f).
- **body size:** 3-12 mm.
- **colour:** carapace varies from yellowish brown to orange; abdomen uniformly dark or with two rows of pale spots.

Taxonomic status

Coddington & Levi (1991) placed the Titanoecidae in the Dictynoidea. Harvey (1995) proposed the Nicodamidae as a possible sister-group. Coddington *et al.* (2004) consider them the sister group of Phyxelididae with which they form the Titanoecoidea, sister to the RTA-clade.

Distribution

Titanoecidae are widely distributed in Arctic as well as tropical regions (Indian Ocean Coast in Africa, not in Australia or New Zealand) but tend to be more common in the Northern Hemisphere.

Lifestyle

Ground-dwelling spiders, making flimsy webs under stones (fig. 107h) or cribellate space webs.

Relevant literature

Cutler (2005c); Dippenaar-Schoeman & Jocqué (1997); Harvey (1995); Szlep (1966).

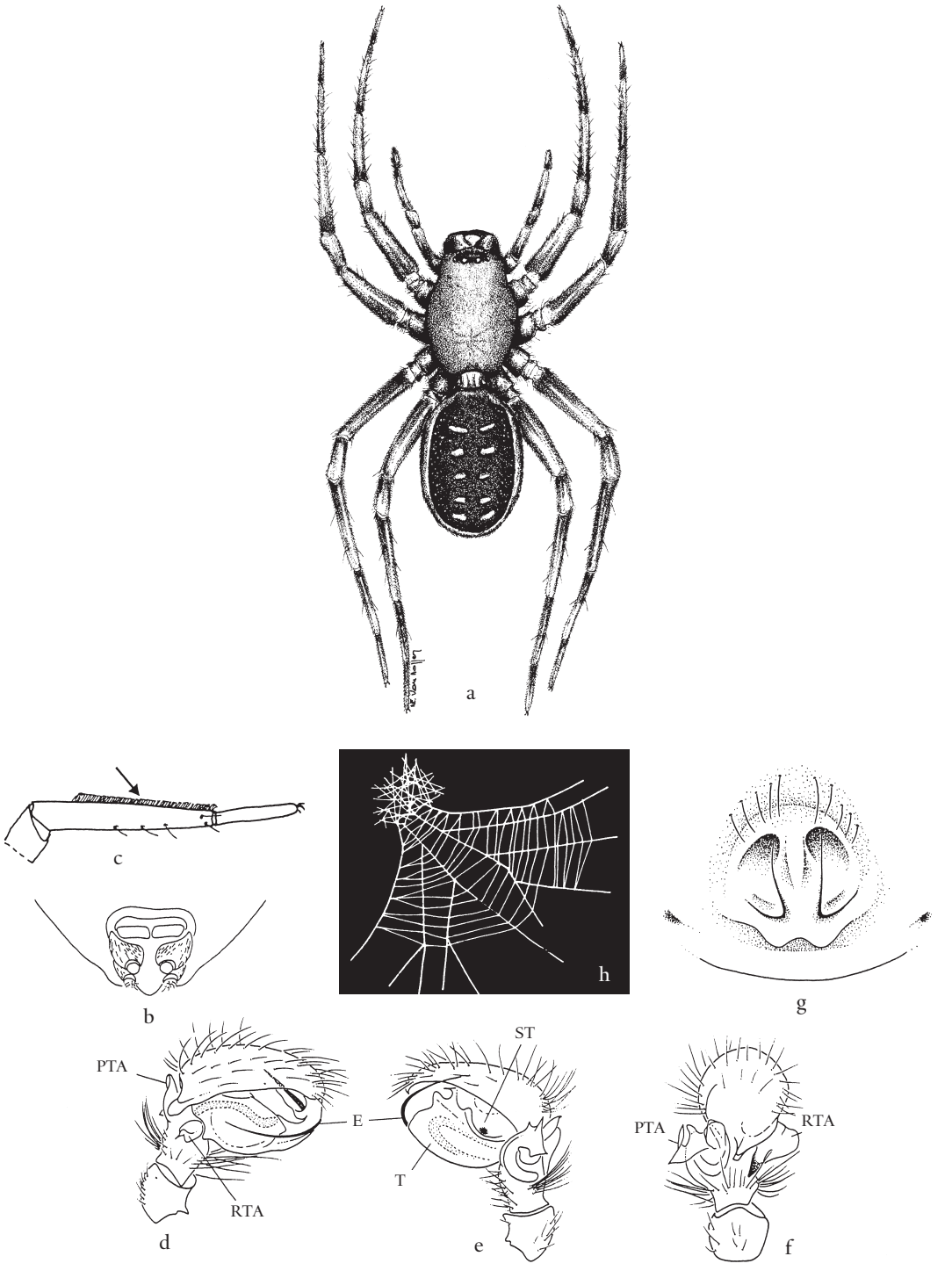

Fig. 107. **Titanoecidae.** *Titanoeca* sp. **a.** female habitus (7 mm); **b.** spinnerets, ventral view; **c.** tarsus and metatarsus IV, showing calamistrum; **d.** right male, retrolateral view; **e.** prolateral view; **f.** dorsal view; **g.** epigyne, ventral view; **h.** web. E: embolus; PTA: prolateral tibia apophysis; RTA: retrolateral tibial apophysis; ST: subtegulum; T: tegulum. (h: after Szlep, 1966.)

FAMILY TRECHALEIDAE Simon, 1890

LEAF HUNTERS

Fig. 108, pl. 17

Type genus

Trechalea Thorell, 1870.

Other genera

Represented by 13 genera and 72 species (Platnick, 2005).

Diagnostic characters

Small to large araneomorph spiders; three tarsal claws; ecribellate; entelegyne; eight eyes in two rows with posterior row recurved; tarsi with an additional segment, male palpal tibia with ventrodistal refolded rim and retrolateral apophysis; egg-sac with 'skirt', carried attached to spinnerets.

Descriptive characters

- **carapace:** as long as wide; fairly flat; fovea distinct (fig. 108a); clypeus variable (fig. 108b).
- **eyes:** eight eyes in two rows: posterior row recurved, anterior row straight, smaller than posterior row (fig. 108b); secondary eyes with grate-shaped tapetum.
- **chelicerae:** vertical, with lateral condyle and sometimes with lateral ridge (fig. 108c); promargin with three teeth, retromargin with three to five teeth.
- **mouthparts:** endites longer than wide, parallel; serrula present; labium variable.
- **sternum:** shield-shaped; about as wide as long, truncated in front, strongly narrowed posteriorly.
- **legs:** slender; formula variable but III always shortest; coxae notched; tarsi with small extra distal segment; with spines; with three toothed claws; two rows of trichobothria on tarsi, one row on metatarsi, proximal cluster on tibiae and a few isolated distally; less than five spines pro- and retrolaterally on femur.
- **female palp:** with toothed claw.
- **abdomen:** oval, low, venter somewhat flattened; sparsely setose; often with patch of setae in front of spinnerets.
- **spinnerets:** six; all well developed; no data on spigots; colulus undivided.
- **respiratory system:** two booklungs; tracheal spiracle just in front of spinnerets.
- **genitalia:** entelegyne; epigyne usually strongly sclerotized and complex (fig. 108f); copulatory openings in front, copulatory ducts curved backwards and connected to spermathecae by a long stalk provided with a copulatory duct diverticulum at its distal end just before the fertilisation duct; male palp with enlarged retrolateral tibial apophysis and characteristic ventrodistal membranous rim; cymbium elongate; subtegulum exposed; tegulum with probasal notch and complex median apophysis subdivided into a ventral division and a dorsal division carrying the broad-based embolus in a groove (figs 108d, e).
- **body size:** 3.5-21mm.
- **colour:** fairly variable: pale yellow to medium brown.

Taxonomic status

Placed in the Lycosoidea with Lycosidae as the sister-group (Coddington & Levi, 1991; Coddington *et al.*, 2004; Griswold, 1993; Sierwald, 1993).

Distribution

North America (southern USA) to northern Argentina.

Lifestyle

Free-living, cursorial spiders found mostly in the vicinity of bodies of freshwater. Egg-sac carried attached to the spinnerets.

Relevant literature

Carico (1993, 2005b); Griswold (1993); Sierwald (1993); Wunderlich (2004).

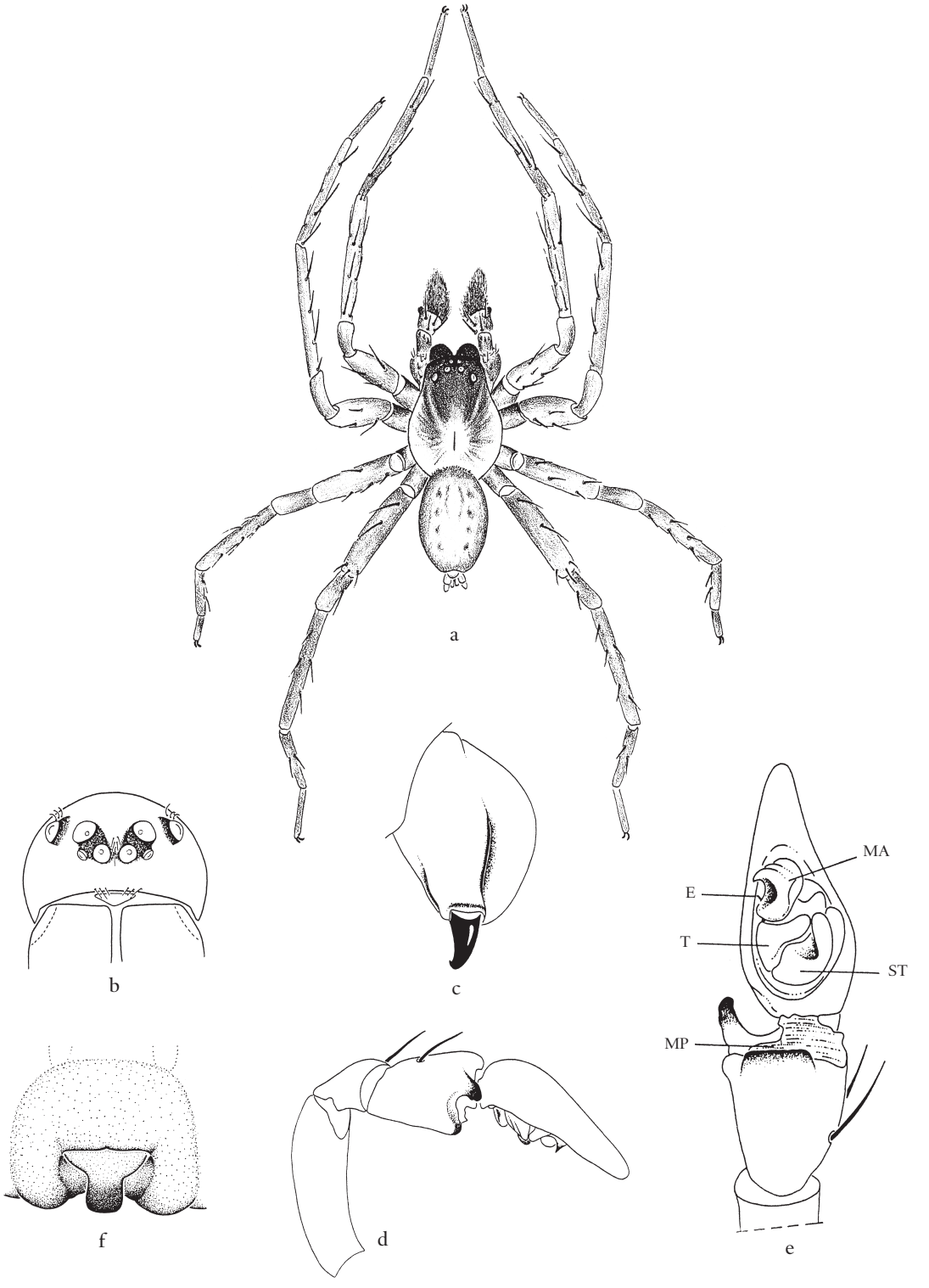

Fig. 108. **Trechaleidae.** *Enna* sp. **a.** male habitus (8 mm); **b.** cephalothorax, frontal view; **c.** chelicera, lateral view showing lateral ridge; **d.** right male palp, retrolateral view; **e.** right male palp, ventral view; *Trechalea* sp. **f.** epigyne. E: embolus; MA: median apophysis; MP: membranous patch; ST: subtegulum; T: tegulum. (f: after Sierwald, 1993.)

FAMILY TROCHANTERIIDAE Karsch, 1879

SCORPION SPIDERS

Fig. 109, pl. 26

Type genus

Trochanteria Karsch, 1878.

Other genera

Represented by 18 genera and 146 species (Platnick, 2005) in the subfamilies Morebilinae, Trachycosminae and Trochanteriinae.

Diagnostic characters

Small to large araneomorph spiders; two tarsal claws; ecribellate; entelegyne; eight eyes; body flattened; legs laterigrade with more or less elongate trochanters; with anterior row of ventral tibial bristles only; posterior median eyes oval; anterior spinnerets with sclerotized subdistal ring.

Descriptive characters

- **carapace:** flattened (fig. 109b); longer than wide; widest over coxae II and III (fig. 109a); strongly narrowed in ocular area; in Trochanteriinae with carina parallel to posterior margin.
- **sternum:** slightly longer than wide; strongly rebordered (fig. 109c).
- **eyes:** eight; in two rows (4:4); posterior row wider than anterior row, both rows almost straight; posterior median eyes flattened; irregular; all eyes except posterior median eyes, encircled with black pigment.
- **chelicerae:** enlarged; often with constriction at base; laterally divergent, porrect; with long, curved fangs; dentition variable.
- **mouthparts:** labium as wide as long; narrowed and rebordered distally; endites obliquely depressed, often strongly curved and diverging; serrula absent or present (fig. 109c).
- **legs:** laterigrade; in *Platyoides* and *Trochanteria* the fourth trochanters are elongated, and the legs fold over the body as in scorpions, hence the common name 'scorpion spiders'; tarsi with two claws; claw tufts highly variable ranging from poorly developed to the presence of two large pads; scopulation and preening brushes variable; coxae often elongated; trochanters unnotched or with slight notch; legs often with long setae and then without spines or with fairly few spines; no tarsal cracks.
- **female palp:** claw smooth or with a few denticles.
- **abdomen:** flattened, ovoid (figs 109a, b).
- **spinnerets:** anterior spinnerets sclerotized, conical, widely separated at base; anterior spinnerets with sclerotized subdistal ring; common features of spigot armature are the unmodified piriform gland spigots and two major ampullate gland spigots on the anterior lateral spinnerets; female with two parallel rows of cylindrical gland spigots on posterior median spinnerets and two more such spigots on posterior lateral spinnerets; colulus consists of a few setae.
- **respiratory system:** two booklungs, covers sometimes ridged; tracheal spiracle close to spinnerets.
- **genitalia:** entelegyne; epigyne variable (fig. 109f); atrium often with dark rim; male palp (figs 109e, g) with retrolateral apophysis; embolus of variable length.
- **body size:** 2-24 mm.
- **colour:** pale, grey or dark brown, abdomen uniform or with pale markings, some species with longitudinal bands.

Taxonomic status

The family is part of the superfamily Gnaphosoidea and considered the sister group of the Gallieniellidae (Platnick, 2002) or part of an unresolved grouping at the base of the superfamily (Coddington *et al.*, 2004).

Distribution

Pantropical.

Lifestyle

Free-living wanderers, commonly found under bark or stones.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Platnick (1985, 1990, 2002); Wunderlich (2004).

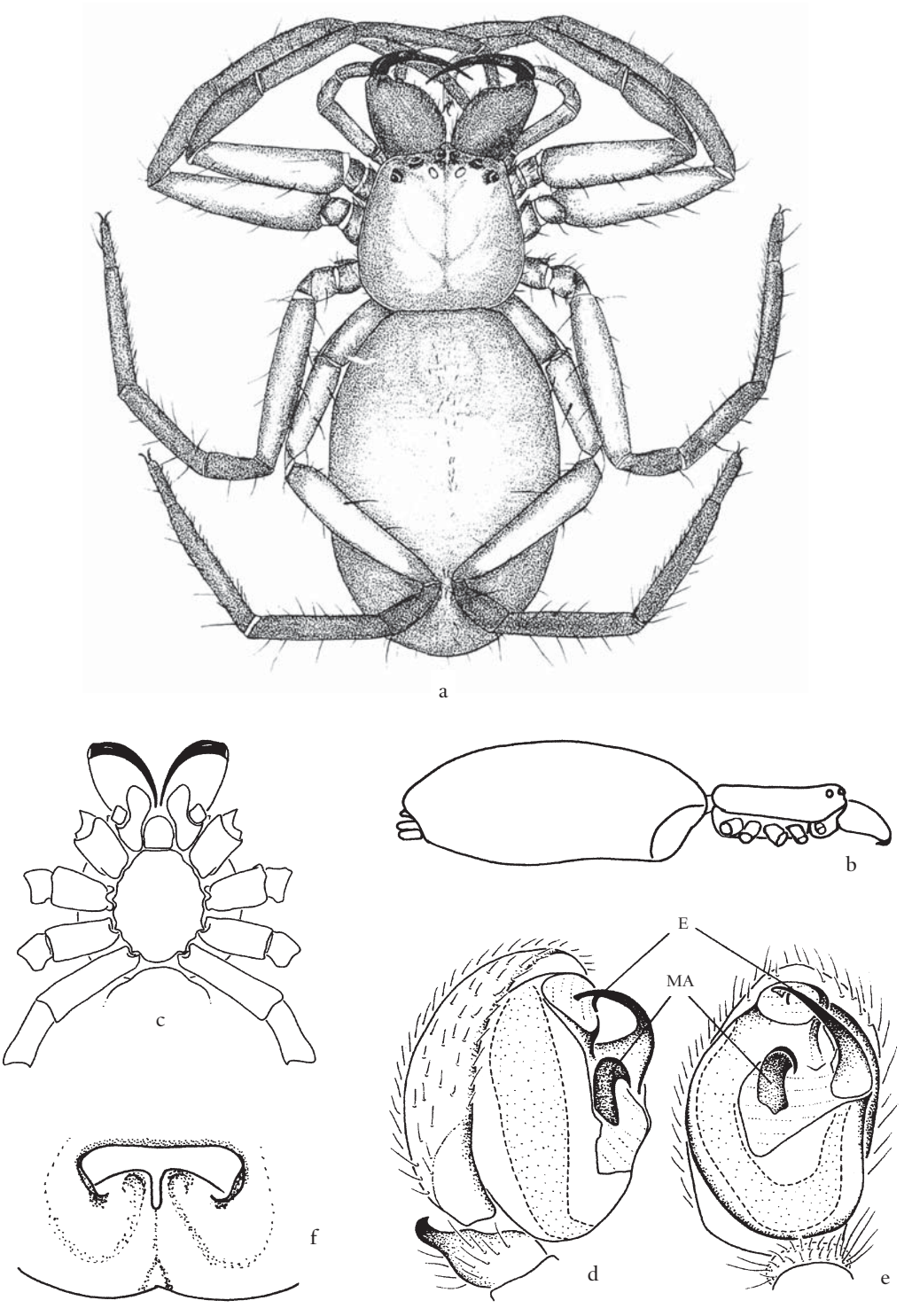

Fig. 109. **Trochanteriidae.** *Platyoides walteri* **a.** female habitus (9 mm); **b.** cephalothorax and abdomen, lateral view; **c.** cephalothorax, ventral view, showing elongate coxae and trochanters IV; **d.** right male palp, retrolateral view; **e.** right male palp, ventral view; **f.** epigyne. E: embolus; MA: median apophysis. (d-f: after Platnick, 2002.)

FAMILY ULOBORIDAE Thorell, 1869

HACKLED-ORB WEB SPIDERS, TRIANGLE-WEB SPIDERS, SINGLE-LINE WEB SPIDERS

Fig. 110, pl. 12

Type genus

Uloborus Latreille, 1806.

Other genera

Represented by 18 genera and more than 240 species (Platnick, 2005) placed in four subfamilies: Miagrammopinae, Hyptiotinae, Tangaroinae and Uloborinae.

Diagnostic characters

Small to medium-sized araneomorph spiders; three tarsal claws; cribellate; entelegyne; four or eight eyes; metatarsi IV dorsally compressed and curved under uniseriate calamistrum; femora with rows of long trichobothria; venom glands absent; male palp with two apical setae.

Descriptive characters

- **carapace:** variable; with a pair of lateral swellings posterior or median to posterior lateral eyes; long and narrow in Miagrammopinae (fig. 110c); pear-shaped in Uloborinae (fig. 110e) and more triangular in Hyptiotinae (fig. 110j); clothed in feathery setae (absent in Uloborinae).
- **sternum:** two separate sternites with coxae II and III surrounded by a sternal plate in Miagrammopinae (fig. 110b); other genera with sternum long, oval to triangular but undivided.
- **eyes:** eight (4:4) in Uloborinae and Hyptiotinae (figs 110e, j) or four (one row) with anterior eye row reduced in Miagrammopinae (fig. 110c); posterior lateral eyes on tubercles in *Hyptiotes*.
- **chelicerae:** without prominent condyle; cheliceral furrow with cluster of small teeth or with one or more large teeth; venom glands absent.
- **mouthparts:** labium semicircular in Uloborinae and Hyptiotinae, labium and endites long and distally pointed in Miagrammopinae.
- **legs:** three claws; femora with rows of long trichobothria (fig. 110g); metatarsi IV ventrally with straight, long setae, used as a comb to draw silk from cribellum (fig. 110h); legs I and IV longer than other legs in both Uloborinae and Miagrammopinae, legs shorter and stouter in Hyptiotinae; tibiae I with brush of long setae in Uloborinae.
- **female palp:** with dentate claw.
- **abdomen:** slender or with one or two humps (Hyptiotinae and Uloborinae) (fig. 110d); or very narrow and elongated, sometimes extending beyond spinnerets (Miagrammopinae) (fig. 110a); anal tubercles usually large, two-segmented.
- **spinnerets:** anterior spinnerets three-segmented with second segment very short and ring-shaped, third segment domed (fig. 110f); provided with a single major ampullate gland spigot and numerous piriforms; posterior median spinnerets unsegmented; posterior lateral spinnerets with two cylindrical segments; posterior lateral and median spinnerets with numerous cylindriform gland spigots; minor ampullate gland spigot on posterior median spinnerets in median position; no flagelliform or aggregate gland spigots.
- **cribellum:** undivided; often absent in males (fig. 110f).
- **calamistrum:** metatarsus IV curved, with uniseriate calamistrum; not as distinctly curved in *Hyptiotes* and *Philoponella* (fig. 110k); often absent in males.
- **respiratory system:** two booklungs; posterior tracheae with single median spiracle in front of cribellum.
- **genitalia:** entelegyne; epigyne of female with paired or unpaired caudal projections (fig. 110i); male palp (fig. 110l) with palpal tibia modified, short, disc-like to conical; embolus thin, circular, coiled or a short, curved spine; cymbium with two apical setae.
- **body size:** 3-10 mm.
- **colour:** usually dull, shades of cream, grey or brown.

Taxonomic status

Coddington & Levi (1991), Coddington *et al.* (2004) and Griswold *et al.* (1998) consider the Uloboridae the sister-group of the Deinopidae with which they form the superfamily Deinopoidea, itself the sister-group of the Araneoidea in the Orbiculariae. Opell (1979) revised the family at genus level.

Distribution

Worldwide, attaining greatest diversity in tropical and subtropical regions.

Lifestyle

Construct complete orb webs or reduced orb webs ranging from a section of an orb (fig. 110m) to a single line (fig. 110n) using cribellate silk.

Relevant literature

Dippenaar-Schoeman & Jocqué (1997); Griswold *et al.* (1998); Lehtinen (1967); Opell (1979, 2005).

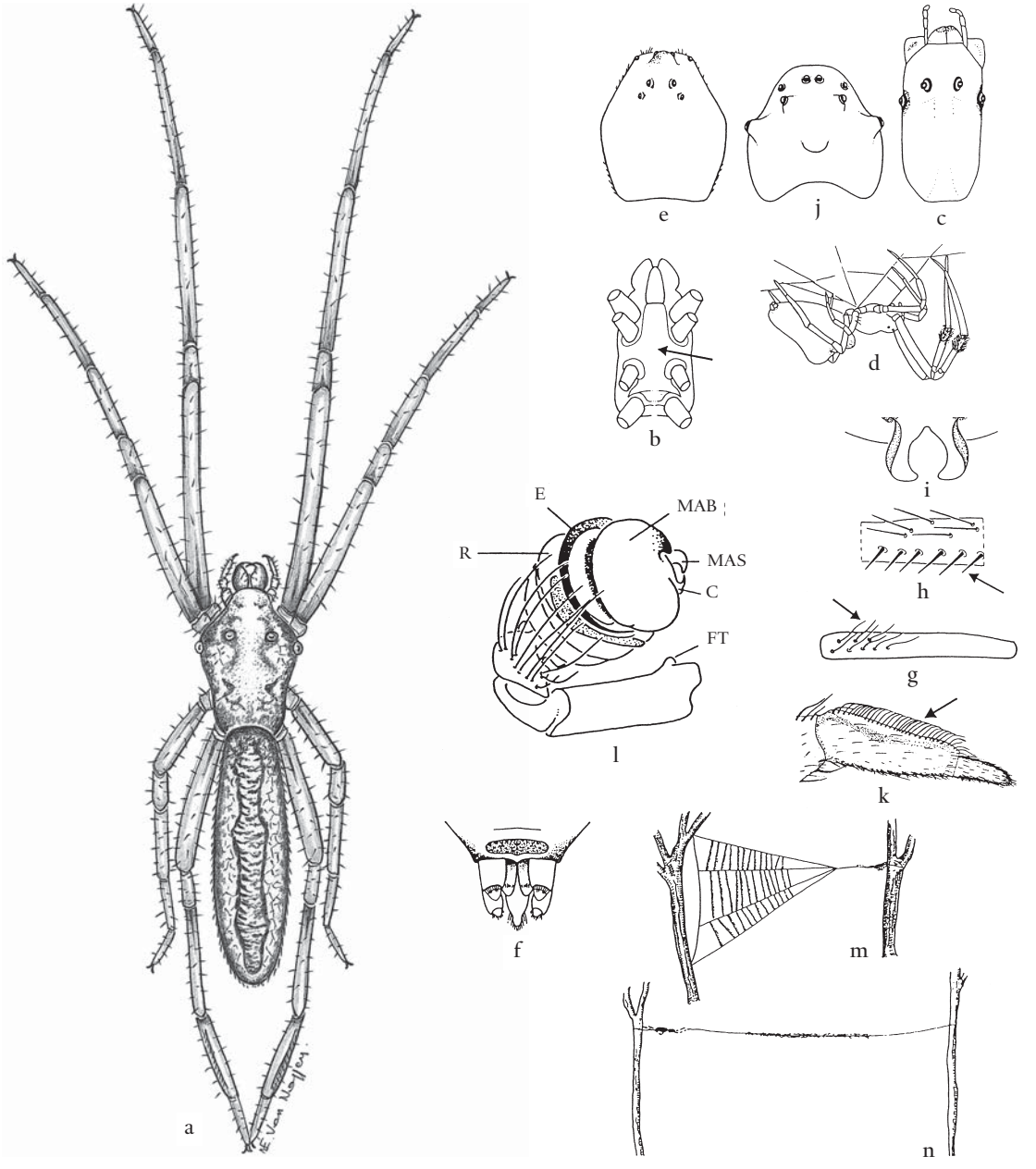

Fig. 110. **Uloboridae.** *Miagrammopes* sp. **a.** female habitus (5 mm); **b.** cephalothorax, ventral view showing sternal plate; **c.** cephalothorax, dorsal view; *Uloborus* sp. **d.** female, natural posture (5 mm); **e.** cephalothorax, dorsal view; **f.** spinnerets, ventral view; **g.** femur, showing trichobothria; **h.** metatarsus IV, showing strong ventral setae; **i.** epigyne; *Hyptiotes* sp. **j.** cephalothorax, dorsal view; **k.** metatarsus IV, showing calamistrum; **l.** right male palp; **m.** triangular web; **n.** single-line web. C: conductor; E: embolus; FT: femoral tubercle; MAB: median apophysis bulb; MAS: median apophysis spur; R: radix. (b: after Davies, 1988a; h, l: after Opell, 1979.)

FAMILY ZODARIIDAE Thorell, 1881

BURROWING SPIDERS, ANT-EATING SPIDERS

Fig. 111, pl. 29

Type genus

Zodarion Walckenaer, 1826.

Other genera

Represented by 69 genera and more than 800 species placed in five subfamilies: Cyriocteinae, Cydrelinae, Lachesaninae, Storenomorphinae and Zodariinae.

Diagnostic characters

Small to large araneomorph spiders with an enormous variation of shapes; three tarsal claws with teeth on paired tarsal claws implanted on lateral side facing opposing claw; ecribellate; entelegyne; six or eight eyes; serrula absent; cheliceral fangs very short; anterior lateral spinnerets long; posterior spinnerets reduced.

Descriptive characters

- **carapace:** highly variable in shape; in general oval, narrowed anteriorly (more so in males) (fig. 111a); fovea varies from well developed and deep to poorly developed or absent; integument varies from entirely smooth to densely granulate or with tiny perforations; row of strong setae in ocular area in *Cyrioctea* and *Leprolochus*.
- **sternum:** usually oval or shield-shaped; in some genera with triangular extensions corresponding to slight concavities in coxae or intercoxal or precoxal sclerites; sternum sometimes rebordered.
- **eyes:** six (*Trygetus*) or eight; eye size and arrangement variable: in two or three rows (2:4:2 or 2:2:4) (figs 111e, f); secondary eyes with canoe-shaped tapetum.
- **chelicerae:** strong with a well developed lateral condyle; sometimes fused or separated by a membranous inter-cheliceral triangle; fangs usually short and thick at base (fig. 111b); cheliceral teeth present, few or absent.
- **mouthparts:** endites converging strongly; serrula absent; anteromesal scopula present.
- **legs:** three claws, rarely two (*Hermippus*); unpaired claw often situated on onychium; paired claw with numerous teeth inserted on lateral side facing opposing claw (fig. 111c) (in the axis in *Cyrioctea*); leg formula 4123 or 4132; spination usually well developed; digging species usually with numerous strong spines on posterior legs; trichobothria in rows; scopulae replaced by dense short spines in many species; femoral gland present in derived Zodariinae.
- **female palp:** palpal tarsus varies in shape between genera; tarsal claw usually finely toothed to well developed and toothless; claw tends to turn inward 30-90°.
- **abdomen:** usually ovoid, sometimes twice as long as wide, or higher at back than in front; scutum present in males in some genera (fig. 111d).
- **spinnerets:** median and posterior spinnerets reduced or absent; in most genera of Zodariinae anterior spinnerets on a common base (fig. 111d), retractile in some genera; anterior median spinnerets usually with one or two major ampullate gland spigots surrounded by piriform gland spigots; posterior median and lateral spinnerets in female often with a few large cylindrical gland spigots; colulus reduced to a setose field.
- **respiratory system:** two booklungs; tracheal spiracle relatively narrow, often with sclerotized rim, situated just in front of spinnerets; leading into four tiny tracheae or two large ones extended into cephalothorax.
- **genitalia:** entelegyne; epigyne variable, often a central plate with copulatory ducts originating medially; tibia of male palp with one or several dorsolateral apophyses; cymbium oval; subtegulum present and tegulum complex, with several apophyses.
- **body size:** 2-21 mm.
- **colour:** highly variable; pale to dark brown; abdomen usually decorated with simple pattern (spots, blotches or chevrons); sometimes with metallic lustre.

Taxonomic status

Zodariidae is one of the problematic families as far as their placement is concerned. Although Coddington *et al.* (2004) place them without argumentation in a trichotomy with Dionycha and Amaurobioidea, we consider the family part of the Amaurobioidea owing to the presence of alternating longitudinal bald and hairy patches on the patellae (Thaler & Knoflach, 2004) and of hinged hairs on some leg joints (Jocqué, 1991).

Note: According to Wunderlich (2004), the Homalonychidae and Cryptothelidae are part of the Zodariidae and form their own subfamilies. The former does not have a single morphological character

to support this placement. *Cryptothele,* on the other hand, is most probably a member of the subfamily Cydrelinae (eye position, basolateral extension of endites), which will then become the Cryptothelinae.

Distribution

Tropical and subtropical regions; few genera in Palaearctic.

Lifestyle

Free-living ground-dwellers or tree-living (Storenomorphinae); many species have a specialized diet consisting of ants or termites.

Relevant literature

Baehr (2004); Dippenaar-Schoeman & Jocqué (1997); Jocqué (1991); Ubick & Craig (2005c); Wunderlich (2004).

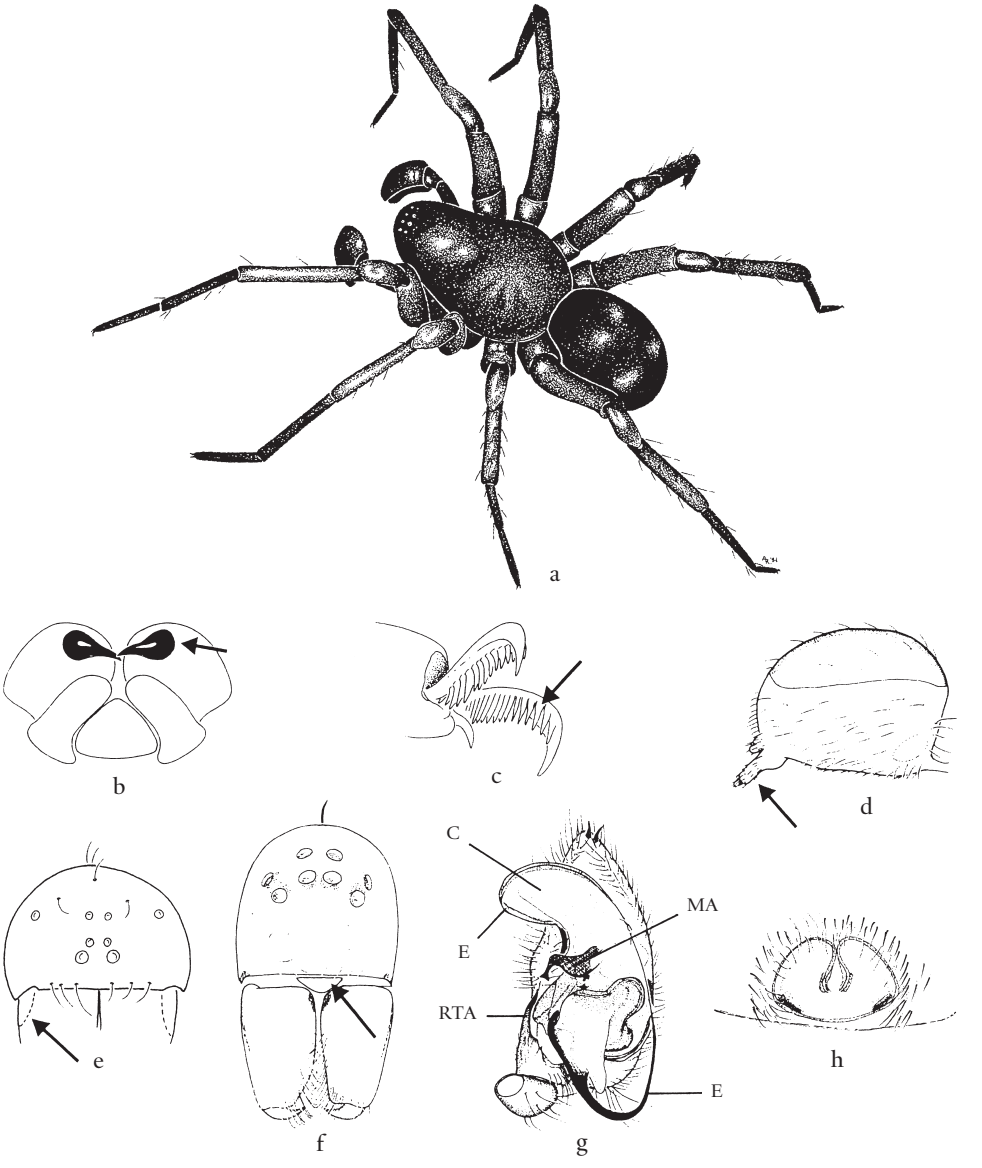

Fig. 111. **Zodariidae.** *Storena* sp. **a.** male habitus (13 mm); **b.** chelicerae, ventral view, showing short fangs; **c.** tarsal claw showing teeth with lateral implantation; **d.** abdomen, lateral view showing anterior spinnerets on common base; Cydrelinae **e.** cephalothorax, frontal view; *Mallinella* sp. **f.** cephalothorax, frontal view showing chilum; *Diores* sp. **g.** right male palp; **h.** epigyne. C: conductor; E: embolus; MA: median apophysis; RTA: retrolateral tibial apophysis. (a: after Jocqué & Baehr, 1992.)

FAMILY ZORIDAE F. O. P.-Cambridge, 1893

SPINY LEG SPIDERS

Fig. 112, pl. 21

Type genus

Zora Simon, 1878.

Other genera

Argoctenus L. Koch, 1878; *Elassoctenus* Simon, 1909; *Hestimodema* Simon, 1909; *Hoedillus* Simon, 1898; *Israzorides* Levy, 2003; *Odo* Keyserling, 1887; *Simonus* Ritsema, 1881; *Thasyraea* L. Koch, 1878; *Xenoctenus* Mello-Leitão, 1938; *Zoroides* Berland, 1924. The family is represented by 65 species.

Diagnostic characters

Small to medium-sized araneomorph spiders; two tarsal claws and claw tufts; ecribellate; entelegyne; eight eyes in three rows; anterior legs with numerous ventral pairs of spines; retrolateral tibial apophysis of male palp with basal process.

Descriptive characters

- **carapace:** oval, strongly narrowed in front with distinct cephalic area; fovea well defined (fig. 112a); sometimes with hair tufts near eyes.
- **sternum:** shield-shaped or rounded without lateral extensions (fig. 112c).
- **eyes:** eight; in two recurved rows (fig. 112b) or in three rows; then anterior lateral eyes adjacent to posterior median eyes very much as in Ctenidae; anterior lateral eyes the smallest; secondary eyes without tapetum (*Zora*) or with canoe-shaped tapetum; clypeus fairly low.
- **chelicerae:** with small condyle; both margins with several teeth, most often three on promargin, two on retromargin.
- **mouthparts:** endites rectangular, parallel; serrula a single row of small teeth; labium markedly shorter than endites, swollen in front, distally straight (fig. 112c).
- **legs:** 4123; tarsi with two dentate claws, dense claw tuft and scopula usually continued on distal part of metatarsi, sometimes reaching their base; tarsi with double row of trichobothria; four to eight pairs of ventral spines on tibiae and one to three pairs on metatarsi; trochanters deeply notched; tarsal organ capsulate.
- **female palp:** with small claw, smooth (*Zora*) or dentate.
- **abdomen:** oval, longer than wide; with sparse cover of short recumbent hairs.
- **spinnerets:** six; with biarticulate anterior median and posterior lateral spinnerets and uniarticulate posterior median ones; the former with major ampullate gland spigot and few (*Zora*) or numerous piriforms; cylindrical gland spigots on posterior median spinnerets in female with tubular (*Zora*) or swollen base.
- **respiratory system:** with a pair of booklungs; tracheal spiracle just in front of spinnerets, leading into unbranched tracheae; median tracheae sometimes slightly branched (*Argoctenus, Zora*).
- **genitalia:** entelegyne; epigyne variable, usually with large lateral lobes divided by central groove (fig. 112e); male palpal tibia with retrolateral apophysis provided with basal process (*Zora*); embolus usually short; distinct hooked median apophysis and membranous conductor (fig. 112d).
- **body size:** 3.5-19 mm.
- **colour:** yellowish with darker stripes; abdomen yellow or greyish often with pattern of longitudinal stripes.

Taxonomic status

The Zoridae have long been part of the Clubionidae. The composition of the family is subject to debate, as it is apparently not monophyletic (Silva, 2003). According to that study, *Zora, Argoctenus, Elassoctenus* and *Hestimodema* form the Zoridae, sister to the Miturgidae, whereas *Odo* and a few allies constitute the sister-group of (Miturgidae Zoridae (Ctenidae)).

> **Note:** *Voraptus tenellus* (Simon, 1893) the type species of *Voraptus* Simon, 1898 and known only from the Seychelles (Benoit, 1978), belongs to the Pisauridae in which it was initially described. It has three tarsal claws and no claw tufts. The other species from the African continent are not congeneric but also belong to the Pisauridae.

Distribution

Palaearctic, Australia, New Zealand, tropical America.

Lifestyle

Zorids are active ground dwelling hunters that live in relatively dry areas. The egg cocoon is deposited on the underside of logs and stones.

Relevant literature

Bennett (2005d); Silva (2003).

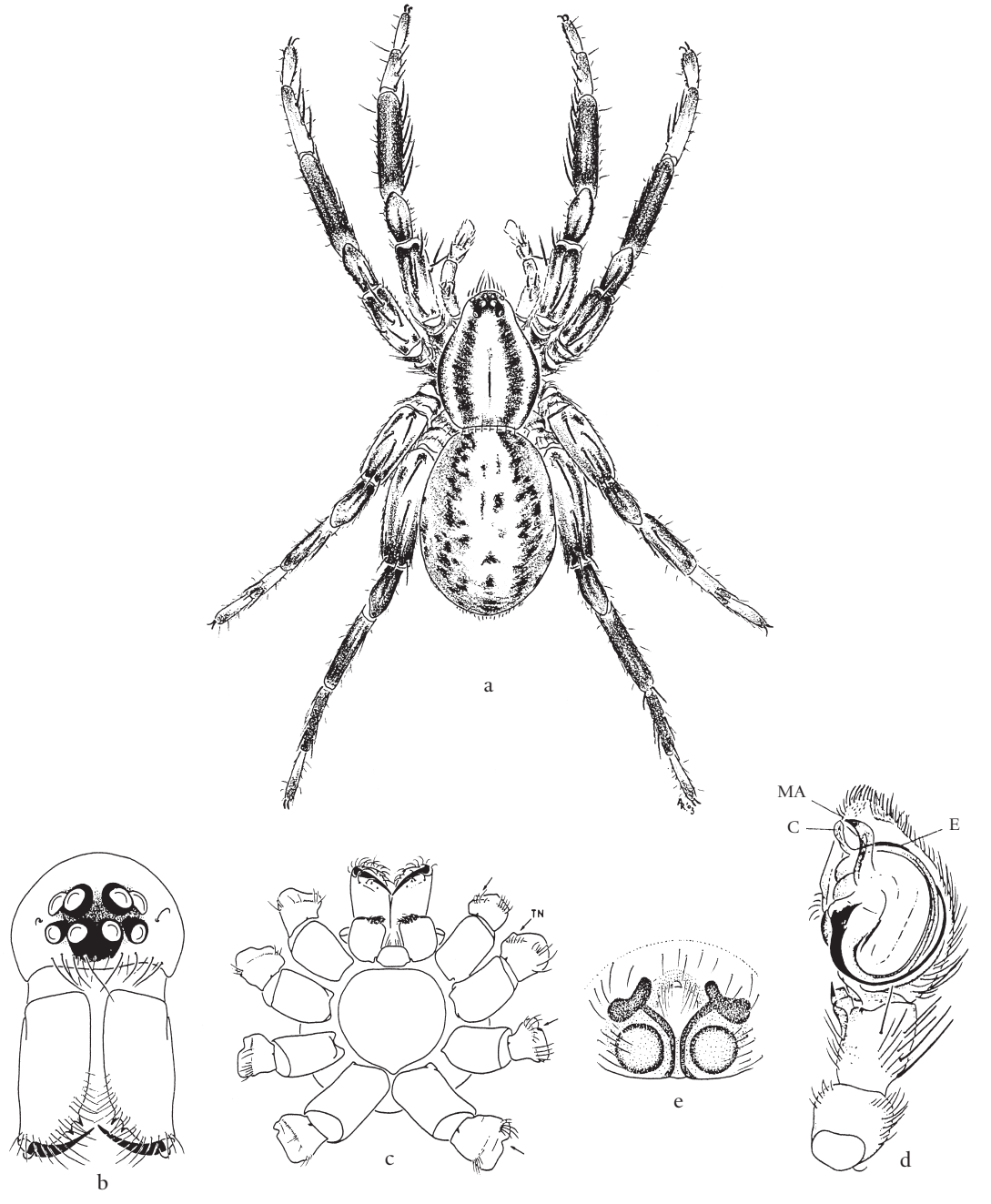

Fig. 112. **Zoridae.** *Zora spinimana* **a.** female habitus (6 mm); **b.** cephalothorax frontal view; **c.** cephalothorax, central view; **d.** right male palp, ventral view; **e.** epigyne. C: conductor; E: embolus; MA: median apophysis.

FAMILY ZOROPSIDAE Bertkau 1882

GROUND SPIDERS

Figs 113-115, pl. 20

Type genus

Zoropsis Simon, 1878.

Other genera

Akamasia Bosselaers, 2002; *Campostichomma* Karsch, 1891; *Huntia* Gray & Thompson, 2001; *Kilyana* Raven & Stumkat, 2005; *Megateg* Raven & Stumkat, 2005; *Raecius* Simon, 1898; *Takeoa* Lehtinen, 1967; *Uduba* Simon, 1880; *Uliodon* L. Koch, 1873; *Zorocrates* Simon, 1888; *Zorodictyna* Simon, 1907. Represented by 67 species (Platnick, 2005; Raven & Stumkat, 2005).

The family will be divided into several subfamilies of which Zoropsinae, Griswoldiinae and Zorocratinae have been defined earlier.

Diagnostic characters

Medium to large araneomorph spiders; two tarsal claws, strong claw tufts present or absent (*Uliodon*); cribellate or ecribellate; entelegyne; eight eyes; female with 4-6 pairs of strong, paired spines on raised bases on tibiae; male palpal cymbium with dense scopula; subbasal tibial suture present in males; subtegulum/tegulum lock present (*Huntia*).

Descriptive characters

- **carapace:** broadly oval with distinct cephalic area; fovea well defined (fig. 113a).
- **sternum:** shield-shaped (fig. 115b) or rounded without lateral extensions.
- **eyes:** eight in two rows; anterior straight, posterior one recurved from above (figs 113b, 114b); anterior median eyes smallest; tapetum of secondary eyes grate-shaped; clypeus fairly low.
- **chelicerae:** large, with condyle; both margins with 2-4 teeth.
- **mouthparts:** endites rectangular, parallel; serrula a single row of small teeth; labium markedly shorter than endites, swollen in front, distally rounded or slightly notched.
- **legs:** 4123; tarsi with scopula and a row of trichobothria; tarsal claws dentate; dense claw tufts or absent; two rows of four to eight ventral spines on tibiae and metatarsi, in females on raised bases; tibiae I of male often with crack (fig. 64c[D1]); trochanters not or weakly notched; tarsal organ capsulate.
- **female palp:** with sometimes finely dentate claw.
- **abdomen:** oval, longer than wide; with sparse cover of short recumbent hairs.
- **spinnerets:** six; with biarticulate anterior median and posterior lateral spinnerets and uniarticulate posterior median ones (fig. 113d) last segment of posterior lateral spinnerets usually coniform; the former with two major ampullate gland spigots and some piriforms; posterior median spinnerets in female with many cylindrical gland spigots, usually with spigots in line dorsally.
- **cribellum:** bipartite or absent (figs 113d, 114c).
- **calamistrum:** oval, brush-shaped, situated at base of the metatarsus (figs 113e, 114e).
- **respiratory system:** with a pair of booklungs; tracheal spiracle just in front of spinnerets opening into two simple straight tracheae.
- **genitalia:** entelegyne; epigyne variable, usually with large central scape flanked by lateral lobes (figs 113g, 114f, 115f); male palpal tibia with retrolateral apophysis; cymbium with dorsal scopulate patch; embolus usually short; distinct hooked median apophysis and membranous conductor (figs 113e, f, 114d, 115c-e).
- **body size:** 6-28 mm.
- **colour:** yellowish to dark often with orange tinge; abdomen greyish often with chevron-pattern.

Taxonomic status

The Zoropsidae is a poorly defined family and we accepted the suggestions to redefine the family (Silva, 2003) and to include the Zorocratidae and the genera *Devendra* Lehtinen, 1967, *Griswoldia* Dippenaar-Schoeman & Jocqué, 1997 and *Phanotea* Simon, 1896 (Raven & Stumkat, 2005). This is not in accordance with previous analyses (Griswold *et al*., 1999, followed by Coddington *et al*., 2004; Bosselaers, 2002), but these were less inclusive than the more recent ones mentioned.

Distribution

Worldwide.

Lifestyle

Zoropsis is common in semiarid areas, where it spins extensive cribellate webs under stones. Australian and New Zealand ecribellate zoropsids are found in the leaf litter of rainforests.

Relevant literature

Bosselaers (2002); Griswold *et al.* (1999); Raven & Stumkat (2003, 2005); Richman & Ubick (2005b); Silva (2003); Ubick (2005m).

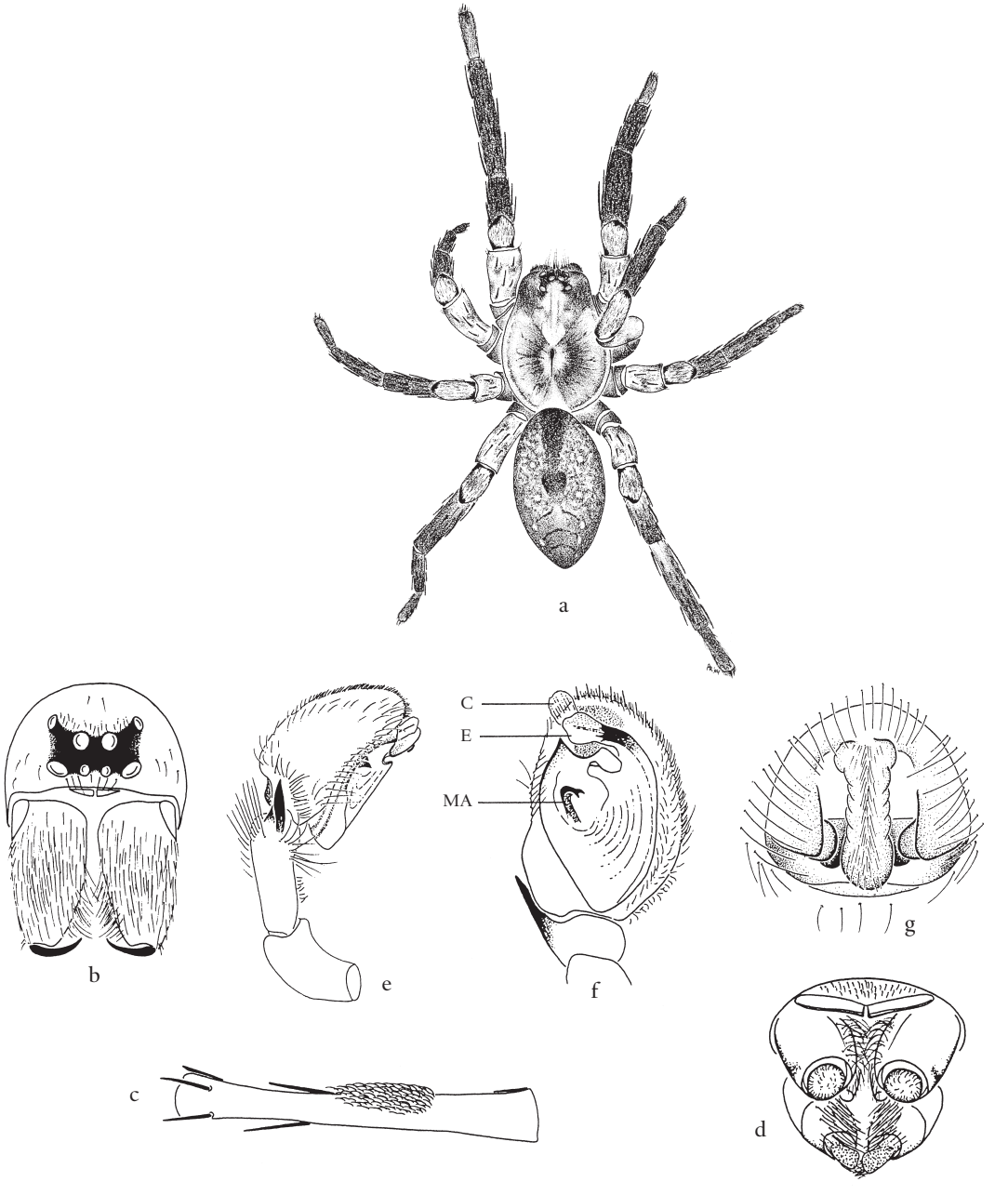

Fig. 113. **Zoropsidae 1.** *Zoropsis media* **a.** female habitus (16 mm); **b.** cephalothorax frontal view; **c.** metatarsus IV showing calamistrum; **d.** spinnerets, ventral view; **e.** right male palp, lateral view; **f.** male palp, ventral view; **g.** epigyne. C: conductor; E: embolus; MA: median apophysis.

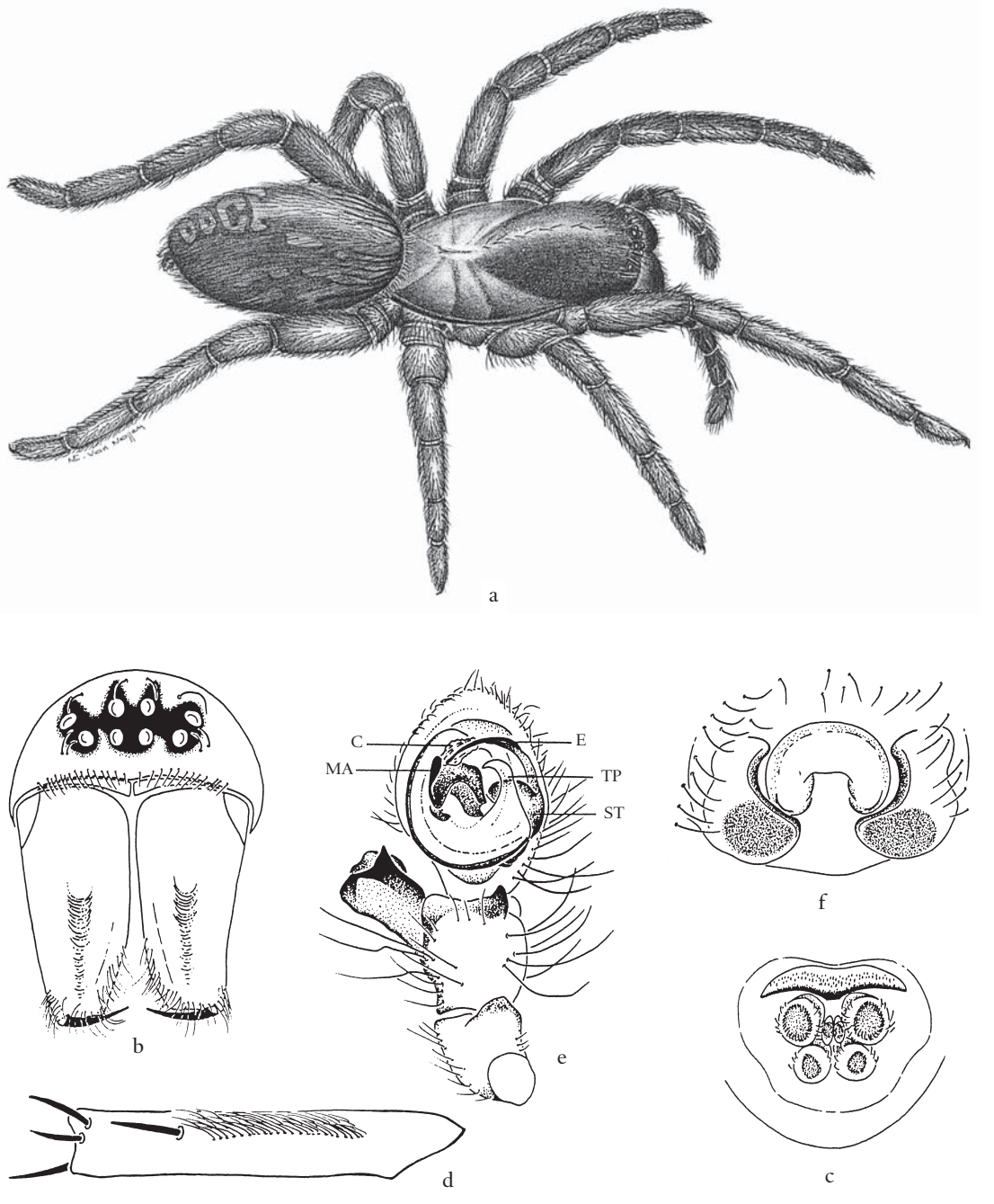

Fig. 114. **Zoropsidae 2.** *Raecius jocquei* **a.** female, dorsolateral view, natural posture (9 mm); **b.** cephalothorax, frontal view; **c.** spinnerets; ventral view; **d.** metatarsus IV, showing calamistrum; **e.** right male palp, ventral view; **f.** epigyne. C: conductor; E: embolus; MA: median apophysis; TP: tegular process; ST: subtegulum.

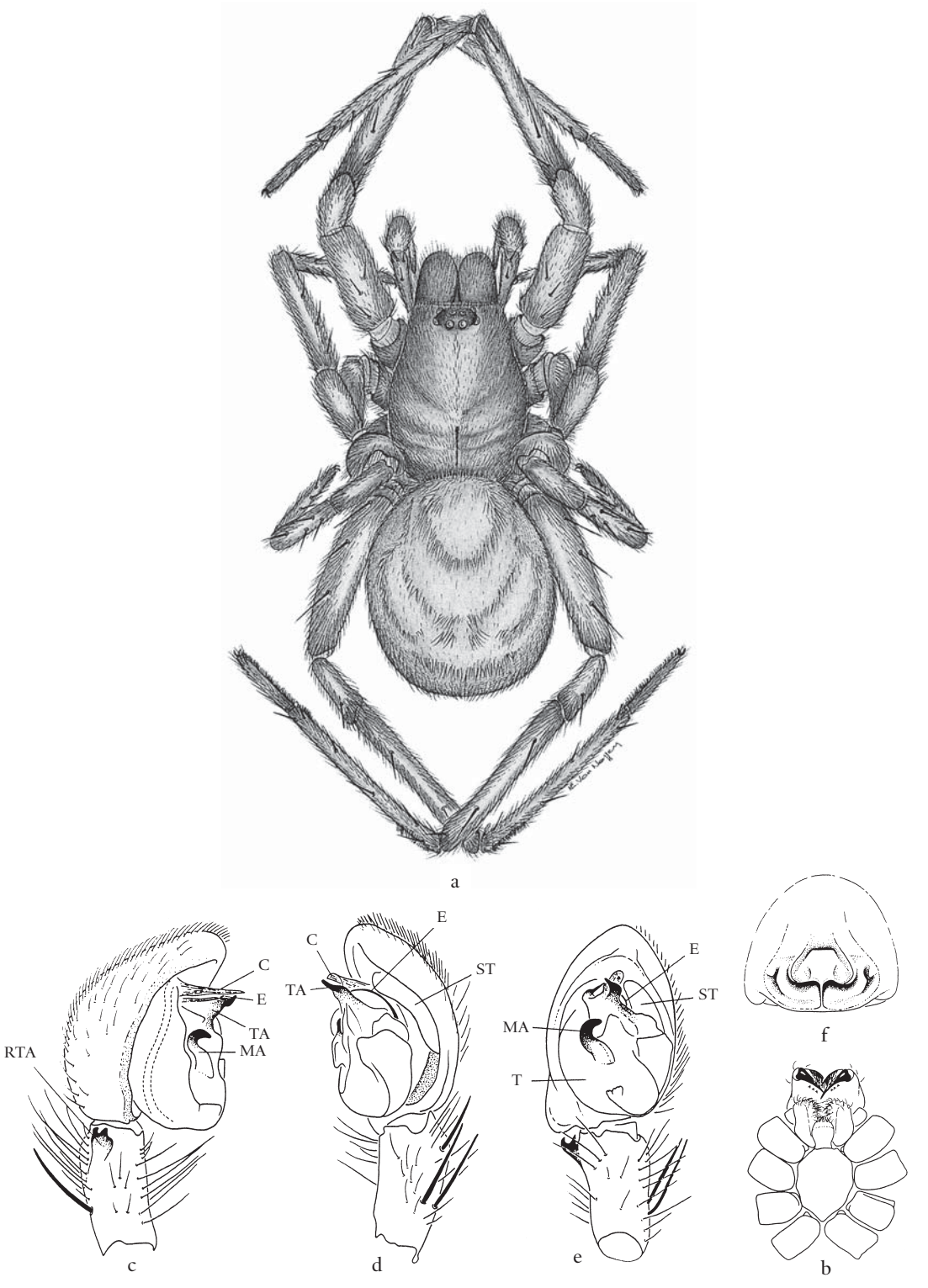

Fig. 115. **Zoropsidae 3.** *Zorocrates fuscus* **a.** female habitus (9 mm); **b.** cephalothorax, ventral view; **c.** right male palp, retrolateral view; **d.** ventral view; **e.** prolateral view; **f.** epigyne. C: conductor; E: embolus; MA: median apophysis; RTA: retrolateral tibial apophysis; TA: tegular apophysis; ST: subtegulum.

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Legend to colour photographs

Plate 1

a-c. **Liphistiidae**: *Liphistius sumatranus* (Sumatra) a. trapdoor shut; b. trapdoor open; *Liphistius desultor* (Malaysia) c. frontal view (F. Murphy).

d-e. **Atypidae**: *Atypus affinis* (England) d. male, lateral view; e. tube (F. Murphy).

Plate 2

a. **Antrodiaetidae**: *Antrodiaetus pacificus* juvenile (Canada) (J. Cokendolpher).

b. **Actinopodidae**: *Actinopus robustus* female in alcohol (Panama) (R. Jocqué).

c. **Migidae**: female (New Zealand) (F. Murphy).

d. **Idiopidae**: *Misgolas* sp. female (New Zealand) (F. Murphy).

e. **Cyrtaucheniidae**: *Ancylotrypa* sp. female (South Africa) (N. Larsen).

f. **Barychelidae**: *Idioctis intertidalis* female with trapdoor (Mayotte) (M. Decleer).

Plate 3

a-b. **Hexathelidae**: *Macrothele calpeiana* a. female (Spain) (F. Murphy); *Atrax robustus* b. female in web (Australia) (J. Cokendolpher).

Plate 4

a. **Nemesiidae**: *Stanwellia* sp. a. female (Australia) (J. Cokendolpher).

b. **Paratropididae**: *Paratropis* sp., female in alcohol (Venezuela) (R. Jocqué).

c. **Dipluridae**: *Euagrus chisoseus* male approaching female in retreat (New Mexico, USA) (J. Cokendolpher).

d. **Theraphosidae**: *Annandaliella* sp. Female (India) (S. Ambalaparambil).

e-f. **Ctenizidae**: *Hebestatis theveneti* e. female (California, USA); *Ummidia* sp. f. male (Mississippi, USA) (J. Cokendolpher).

g-h. **Microstigmatidae**: *Microstigmata* sp. female (South Africa) (J. Bond).

Plate 5

a-d. **Hypochilidae**: *Hypochilus pococki* a. female (Tennessee, USA); *Hypochilus thorelli* b. female (N. Carolina, USA); c. male, frontal view showing palp; *Hypochilus gertschi* d. female with prey (West Virginia, USA) (a: J. Cokendolpher; b-d: F. Murphy).

e. **Gradungulidae**: *Gradungula sorenseni*, female (New Zealand) (F. Murphy).

f. **Filistatidae**: *Filistata* sp. (Arizona, USA) (F. Murphy).

Plate 6

a-b. **Sicariidae**: *Loxosceles reclusa* a. male and female (Texas, USA); *Sicarius rugosus* b. female (Costa Rica) (a: J. Cokendolpher; b: F. Murphy).

Plate 7

a-b. **Scytodidae**: *Scytodes thoracica*, a. female with egg sac (England) (F. Murphy); b. *Scytodes* sp., b. tracks of glue produced by captive scytodid impregnated with sand grains, scale line = 1 cm (South Africa) (R. Jocqué).

c. **Pholcidae**: *Physocyclus* sp., male and female (Texas, USA) (J. Cokendolpher).

d. **Drymusidae**: *Drymusa silvicola*, female with prey (Cape Town, South Africa) (N. Larsen).

e. **Leptonetidae**: *Leptoneta infuscata*, female (Pyrenees, France) (F. Murphy).

f. **Plectreuridae**: *Plectreurys* sp., female (California, USA) (F. Murphy).

g. **Diguetidae**: *Diguetia canities*, female (Oklahoma, USA) (J. Cokendolpher).

PLATE 8

a. **Caponiidae**: *Nops* sp., female (Costa Rica) (F. Murphy).
b, d. **Tetrablemmidae**: b. unidentified tetrablemmid, female (Kenya); d. *Paculla* sp. (F. Murphy).
c, e. **Segestriidae**: *Segestria florentina*, female in web (Spain) (F. Murphy); *Ariadna bicolor*, male at female web (Texas, USA) (J. Cokendolpher).
f. **Dysderidae**: *Dysdera* sp. female (New Mexico, USA) (J. Cokendolpher).

PLATE 9

a-b. **Oonopidae**: *Gamasomorpha camellina* a. female (Singapore); b. unidentified oonopid, female (Malaysia) (F. Murphy).
c. **Orsolobidae**: *Wiltonia* sp., female (New Zealand) (F. Murphy).
d. **Archaeidae**: *Afroarchaea* sp. female (South Africa) (H. Henderickx).
e. **Mecysmaucheniidae**: *Aoteroa magna*, male and female in copula (New Zealand) (F. Murphy).

PLATE 10

a. **Huttoniidae**: *Huttonia palpimanoides*, female (New Zealand) (F. Murphy).
b. **Palpimanidae**: *Palpimanus gibbulus*, male and female (Crete, Greece) (F. Murphy).
c-d. **Mimetidae**: c. unidentified mimetid, juvenile (New Zealand). (F. Murphy); *Mimetus* sp. d. female (Taxas, USA) (J. Cokendolpher).
e-g. **Eresidae**: *Stegodyphus africanus*. e. female (South Africa) (L. Oates); *Gandanameno* sp. f. female (South Africa) (L. Oates); *Eresus* sp. g. male, (Spain) (R. Jocqué).

PLATE 11

a-b. **Oecobiidae**: *Oecobius cellariorum* a. female (Texas, USA) (J. Cokendolpher); *Oecobius* sp. b. web (Kenya) (F. Murphy).
c-f. **Hersiliidae**: *Hersilia* sp. c. female with egg case (Mayotte, Comoros) (R. Jocqué); *Hersilia* sp. d. female (Kenya) (F. Murphy); *Tama* sp. e. curtain web turned upside down; f. same photographed from below (South Africa) (R. Jocqué).

PLATE 12

a-b. **Deinopidae**: *Avella* sp. a. female (Australia); *Deinopis* sp. b. female (Kenya) (F. Murphy).
c-d. **Uloboridae**: *Uloborus* sp. c. female with egg sac; (South Africa) (L. Oates); *Miagrammopes* sp. d. female (Malaysia) (F. Murphy).
e-g. **Synotaxidae**: *Mangua* sp. e. female with egg sac (New Zealand); *Runga* sp. f. female; g. male (New Zealand) (F. Murphy).

PLATE 13

a. **Nesticidae**: *Eidmanella rostrata*, female with spiderlings (Texas, USA) (J. Cokendolpher).
b. **Cyatholipidae**: *Tekelloides* sp. male (New Zealand) (F. Murphy).
c-d. **Theridiidae**: *Latrodectus hasselti* c. female (Oman); *Phoroncidia lygeana* d. female (Malaysia) (F. Murphy).
e-f. **Theridiosomatidae**: *Theridiosoma* sp. e. and f. female (Tennessee, USA) (J. Cokendolpher).

PLATE 14

a-b. **Mysmenidae**: *Mysmenopis* sp. a. and b. female (Malaysia) (F. Murphy).
c-g. **Linyphiidae**: *Frontinellina* sp. c. web (Arizona, USA) (W.B. Peck); d. female (Arizona, USA) (F. Murphy); *Walckenaera acuminata* e. female (England) (F. Murphy); *Tenuiphantes tenuis* f. female (England) (F. Murphy); *Walckenaeria acuminata* g. male (Belgium) (M. Alderweireldt).

PLATE 15

a-e. **Araneidae**: *Araneus* sp. a. female (South Africa); *Argiope australis* b. female (South Africa); *Gasteracantha milvoides* c. female (South Africa); *Acusilas malaccensis* d. female; *Micrathena clypeata* e. female (Panama) (a-c: L. Oates, d-f: F. Murphy).

f. **Pimoidae**: *Pimoa laurae* f. male (California) (G. Hormiga).

PLATE 16

a-d. **Nephilidae**: *Nephila inaurata* a. female and male (Mayotte) (R. Jocqué); b. couple (Grande Comore) (D. Meirte); *Clitaetra episinoides* c. female in web (Mayotte) (R. Jocqué); *Nephilengys cruentata* d. moulted female in copula (Ivory Coast) (R. Jocqué).

e. **Tetragnathidae**: *Leucauge festiva* e. female (South Africa) (L. Oates).

PLATE 17

a. **Senoculidae**: *Senoculus* sp. a. female (Costa Rica) (Coville).

b-c. **Pisauridae**: *Euprosthenops* sp. b. female (Namibia) (R. Jocqué); *Thalassius* sp. c. female with egg case (South Africa) (J. Leroy).

PLATE 18

a-c. **Lycosidae**: *Lycosa* sp. a. subadult male (Spain); *Donacosa merlini* b. male; c. female with egg case and spiderlings (Spain) (R. Jocqué).

d-e. **Trechaleidae**: *Enna* (?) sp. d. male; e. hunting from hole in leaf (Costa Rica) (F. Murphy).

PLATE 19

a-c. **Oxyopidae**: *Peucetia madagascariensis* a. female showing aeronautic behaviour (Mayotte) (M. Decleer); *Oxyopes shweta* b. female (Kerala, India) (S. Ambalaparambil); *Peucetia longipes* c. male and female, courting (Ivory Coast) (R. Jocqué).

d-f. **Ctenidae**: *Ctenus pergulanus* d. female; *Africactenus decorosus* e. female (Ivory Coast); *Ctenus kingsleyi* f. female (Ivory Coast) (R. Jocqué).

PLATE 20

a-c. **Stiphidiidae**: a. *Cambridgea* sp. a. male; b. web (New Zealand); *Stiphidion facetum* c. female (New Zealand).

d-e. **Zoropsidae**: *Zoropsis bilineata* d. female (Corsica); *Zoropsis* sp. e. female and spiderlings in web (Spain) (F. Murphy).

PLATE 21

a. **Psechridae**: *Psechrus* sp. female (Malaysia) (F. Murphy).

b. **Zoridae**: *Zora spinimana*, female (Belgium) (A. Verbruggen).

c-e. **Ctenidae**: *Leptoctenus byrrhus* c. female, (Texas, USA) (J. Cokendolpher); *Petaloctenus bossema* d. female (Ivory Coast); unknown ctenid e. female (Ivory Coast) (R. Jocqué).

PLATE 22

a. **Agelenidae**: *Agelenopis* sp. a. female (Texas, USA) (J. Cokendolpher).

b. **Anapidae**: Anapid web (Australia) (R. Raven).

c-d. **Argyronetidae**: *Argyroneta aquatica* c. female under water; d. diving bell (England) (F. Murphy).

e-f. **Desidae**: *Desis formidabilis* e. female (South Africa) (L. Oates); *Paramatachia* f. web (Australia) (F. Murphy).

PLATE 23.
a-b. **Desidae**: *Matachia* sp. a. female (New Zealand); b. web (F. Murphy).
c-e. **Amphinectidae**: *Aorangia* sp. c. female (New Zealand); *Mamoea rufa* (New Zealand) d. female (New Zealand) (F. Murphy); *Neolana* sp. e. female (New Zealand) (H. Wood).

PLATE 24
a. **Cycloctenidae**: unidentified cycloctenid, female (New Zealand) (F. Murphy).
b. **Hahniidae**: *Hahnia* sp., female (England) (F. Murphy).
c-d. **Dictynidae**: *Dictyna* sp. c. female (Texas, USA) (F. Murphy); d. blind troglobitic species of *Cicurina* (Texas, USA) (J. Cokendolpher).

PLATE 25
a-b. **Amaurobiidae**: *Callobius severus* a. female (British Columbia, Canada) (J. Cokendolpher); *Amaurobius ferox* b. female (England) (F. Murphy).
c. **Phyxelididae**: unididentified phyxelidid, female (Kenya) (F. Murphy).
d-e. **Titanoecidae**: *Titanoeca obscura* d. male; e. female in web (Croatia) (F. Murphy).
f. **Chummidae**: *Chumma inquieta* f. female (South Africa) (J. Miller).

PLATE 26
a-b. **Ammoxenidae**: *Ammoxenus amphalodes* a. and b. female (South Africa) (L. Oates).
c-d. **Homalonychidae**: *Homalonychus theologus* c. and d. female (California, USA) (J. Cokendolpher).
e-f. **Trochanteriidae**: *Platyoides pictus* e. female; *Platyoides walteri* f. female (South Africa) (L. Oates).

PLATE 27
a. **Nicodamidae**: *Nicodamus* sp., female (Australia) (F. Murphy).
b-d. **Tengellidae**: *Lauricius hooki* b. female (New Mexico, USA) (J. Cokendolpher); *Tengella radiata* c. web; d. female (Costa Rica) (F. Murphy).
e-f. **Miturgidae**: *Syspira* sp. e. male (California, USA); *Teminius affinis* f. female (Texas, USA) (J. Cokendolpher).

PLATE 28
a-b. **Anyphaenidae**: *Hibana* sp. a. male (Texas, USA) (J. Cokendolpher); *Anyphaena accentuata* b. female (France) (F. Murphy).
c. **Liocranidae**: unidentified liocranid (South Africa) (L. Oates).
d. **Clubionidae**: unidentified clubionid with egg case (Malaysia) (F. Murphy).
e. **Corinnidae**: *Supunna picta*, female (New Zealanda) (F. Murphy).

PLATE 29
a-b. **Corinnidae**: *Copa* sp. a. female (Tanzania) (R. Jocqué); *Hortipes merwei* b. female (South Africa) (H. Henderickx).
c-f. **Zodariidae**: *Psammorygma* sp. c. female (South Africa) (C. Haddad); *Storenomorpha* sp. d. female (Thailand) (R. Jocqué); *Caesetius* sp. e. female with cocoon (South Africa) (R. Jocqué); *Cyrioctea* sp. f. female (Chile) (J. Cokendolpher).

PLATE 30
a-c. **Gnaphosidae**: *Setaphis arcus* a. female (South Africa) (L. Oates); *Zelotes rusticus* b. female (New York, USA) (F. Murphy); *Xerophaeus* sp. c. female (South Africa) (L. Oates).
d. **Prodidomidae**: *Prodidomus rufus* female (Texas, USA) (J. Cockendolpher).
e. **Lamponidae**: *Lampona cylindrata* female (Australia) (R. Raven, modified).
f. **Selenopidae:** *Selenops* sp. f. female (South Africa) (N. Larsen).

PLATE 31

a-c. **Sparassidae**: *Palystes castaneus* a. female (South Africa); *Anchonastus caudatus* b. female camouflaged; c. same spider in action (Ivory Coast) (R. Jocqué).

e-f. **Philodromidae**: *Philodromus cespitum* e. female guarding egg case (Belgium) (R. Jocqué); *Philodromus* sp. f. female (South Africa) (L. Oates).

PLATE 32

a-c. **Thomisidae**: *Borboropactus* sp. a. female (Malaysia) (F. Murphy); *Runcinia flavida* b. female (South Africa); *Thomisus daradioides* c. female (South Africa) (L. Oates).

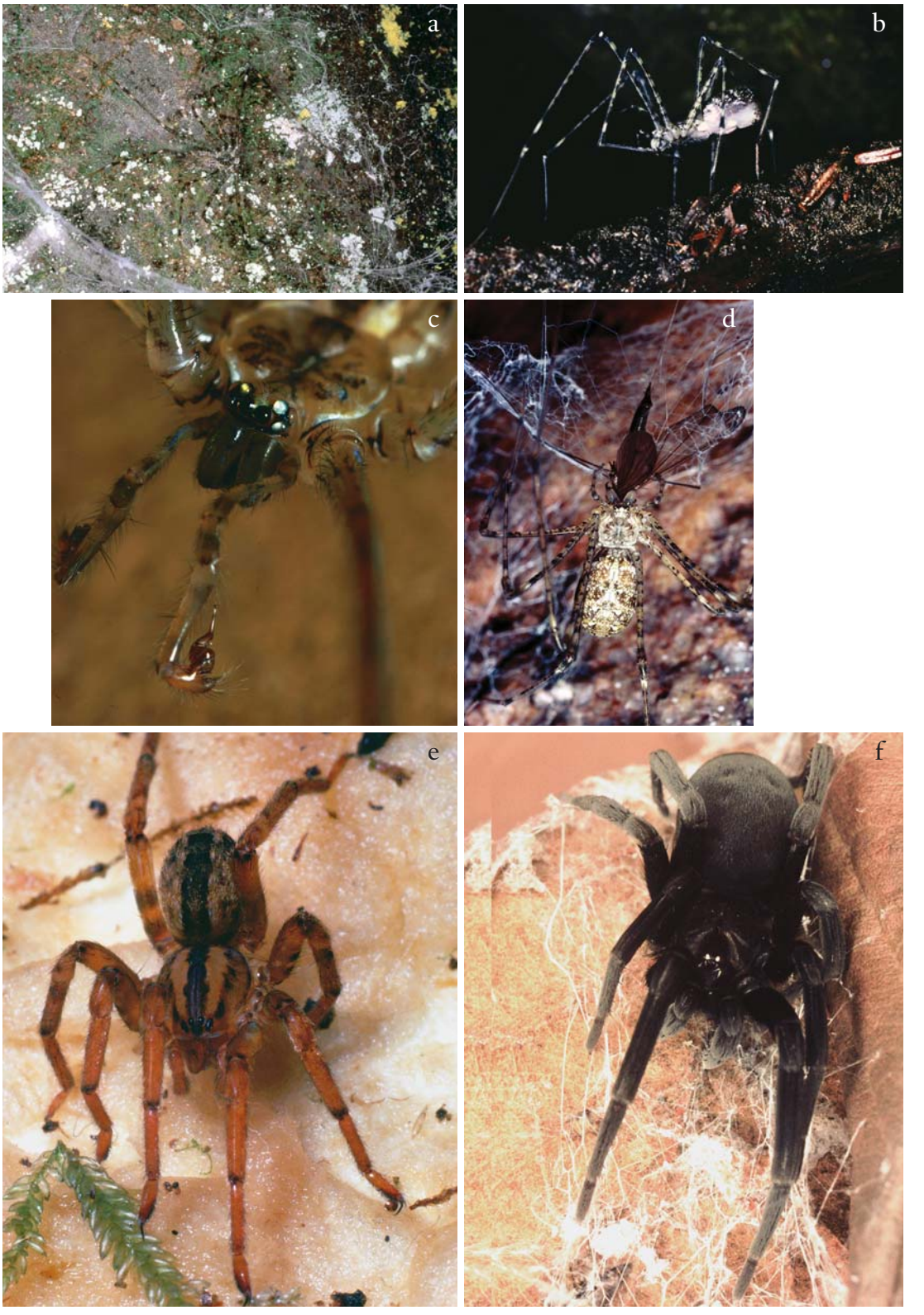
d-g. **Salticidae**: *Orsima* sp. d. female mimicking dipteran (Malaysia) (F. Murphy); *Viciria pavesii* e. male (Malaysia) (F. Murphy); *Salticus scenicus* f. female preying on *Pholcus phalangioides* (Belgium); unidentified salticid g. male (Ivory Coast) (R. Jocqué).

a-c. **Liphistiidae**: a-b. *Liphistius sumatranus*; c. *Liphistius desultor*; d-e. **Atypidae**: *Atypus affinis.* (full legend p. 295).

a. **Antrodiaetidae**: *Antrodiaetus pacificus*; b. **Actinopodidae**: *Actinopus robustus*; c. **Migidae**; d. **Idiopidae**: *Misgolas*; e. **Cyrtaucheniidae**; f. **Barychelidae**: *Idioctis intertidalis.* (full legend p. 295).

Hexathelidae: a. *Macrothele calpeiana*; b. *Atrax robustus.* (full legend p. 295).

a. **Nemesiidae**: *Stanwellia*; b. **Paratropididae**: *Paratropis* sp.; c. **Dipluridae**: *Euagrus chisoseus*; d. **Theraphosidae**: *Annandaliella* sp.; e-f: **Ctenizidae**: e. *Hebestatis theveneti*; f. *Ummidia* sp.; g-h. **Microstigmatidae**: *Microstigmata* sp. (full legend p. 295).



a-d. **Hypochilidae**: a. *Hypochilus pococki*; b-c. *Hypochilus thorelli*; d. *Hypochilus gertschi*; e. **Gradungulidae**: *Gradungula sorenseni*; f. **Filistatidae**: *Filistata* sp. (full legend p. 295).

Sicariidae: a. *Loxosceles reclusa*; b. *Sicarius rugosus.* (full legend p. 295).

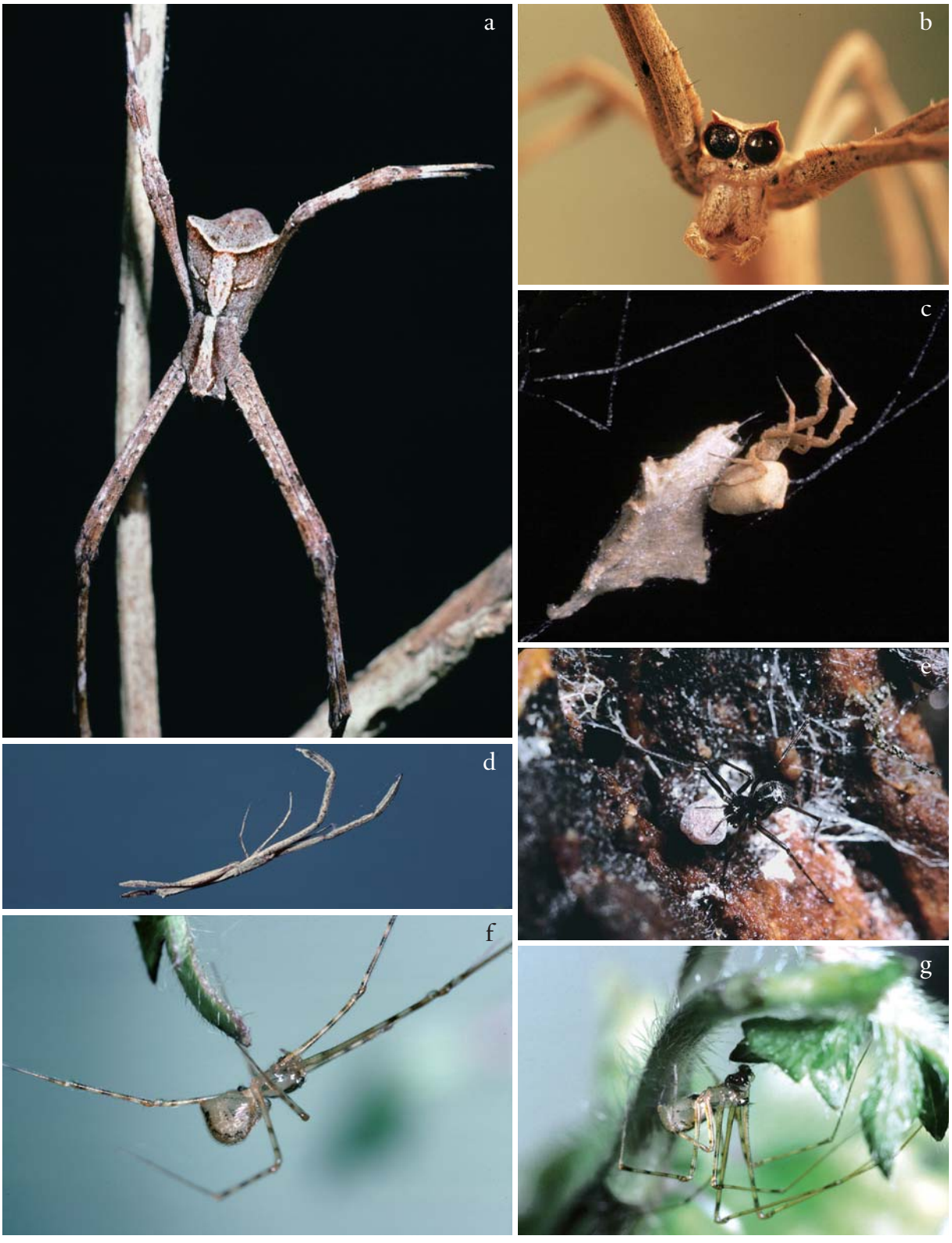
a-b. **Scytodidae**: a. *Scytodes thoracica*; b. *Scytodes* sp.; c. **Pholcidae**: *Physocyclus* sp.; d. **Drymusidae**: *Drymusa silvicola*; e. **Leptonetidae**: *Leptoneta infuscata*; f. **Plectreuridae**: *Plectreurys* sp.; g. **Diguetidae**: *Diguetia canities*. (full legend p. 295).

a. **Caponiidae**: *Nops* sp.; b, d. **Tetrablemmidae**: b. gen. sp.; d. *Paculla* sp.; c, e. **Segestriidae**: c. *Segestria florentina*; e. *Ariadna bicolor*; f. **Dysderidae**: *Dysdera* sp. (full legend p. 296).

a-b. **Oonopidae**: *Gamasomorpha camellina*; b. gen. sp.; c. **Orsolobidae**: *Wiltonia*; d. **Archaeidae**: *Afroarchaea* sp.; e. **Mecysmaucheniidae**: *Aoteroa magna*. (full legend p. 296).

a. **Huttoniidae**: *Huttonia palpimanoides*; b. **Palpimanidae**: *Palpimanus gibbulus*; c-d. **Mimetidae**: c. gen. sp.; d. *Mimetus* sp.; e-g. **Eresidae**: e. *Seothyra* sp.; f. *Gandanameno* sp.; g. *Eresus* sp. (full legend p. 296)

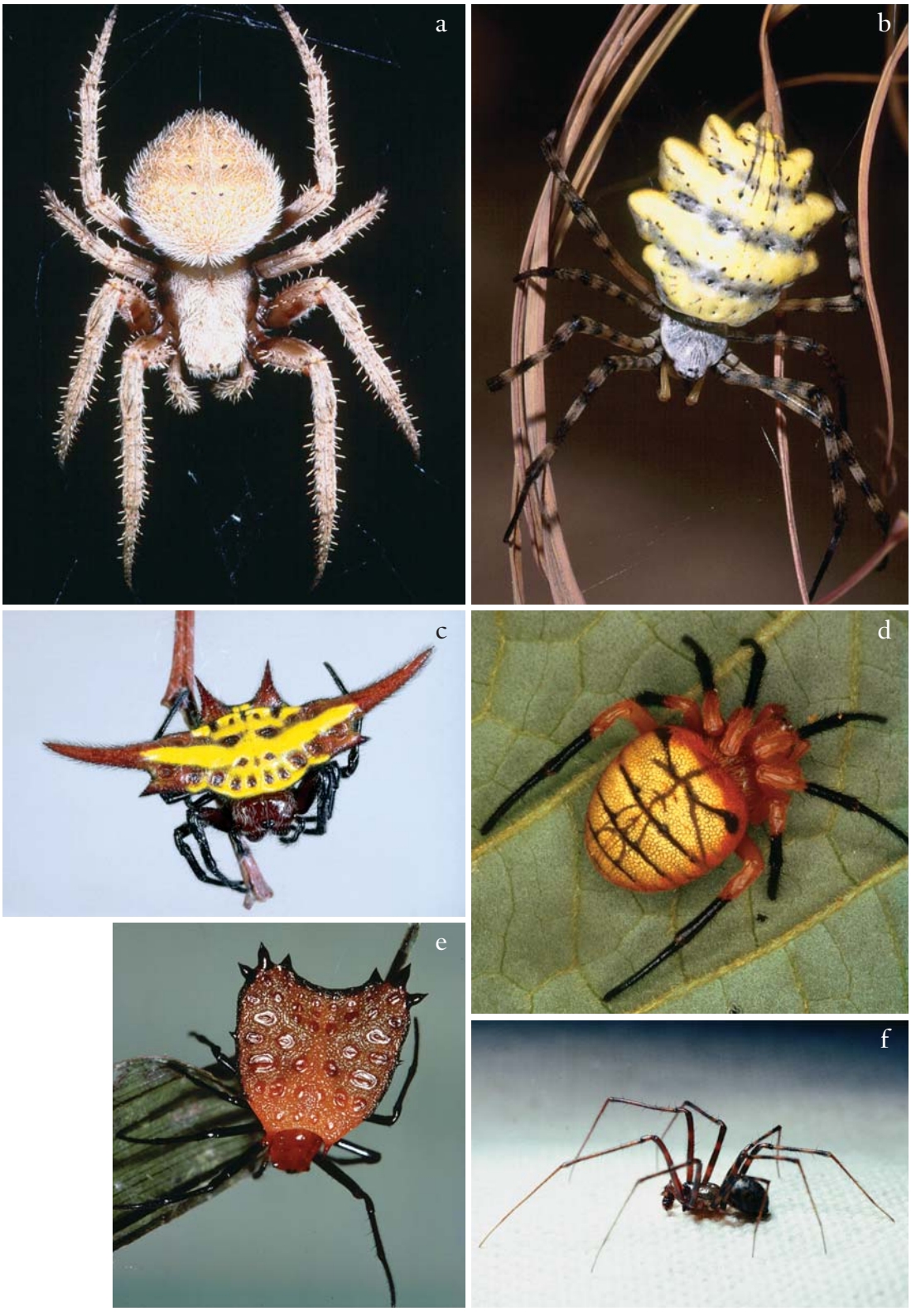
Oecobiidae: a. *Oecobius cellariorum*; b. *Oecobius* sp.; c-f. **Hersiliidae**: c-d. *Hersilia* sp.; e-f. *Tama* sp. (full legend p. 296).



a-b. **Deinopidae**: a. *Avella* sp.; b. *Deinopis* sp.; c-d. **Uloboridae**: c. *Uloborus* sp.; d. *Miagrammopes* sp.; e-g. **Synotaxidae**: e. *Mangua* sp.; f-g. *Runga* sp. (full legend p. 296).

a. **Nesticidae**: *Eidmanella rostrata*; b. **Cyatholipidae**: *Tekelloides* sp.; c-d. **Theridiidae**: c. *Latrodectus hasselti*; d. *Phoroncidia lygeana*; e-f. **Theridiosomatidae**: e-f. *Theridiosoma* sp. (full legend p. 296).

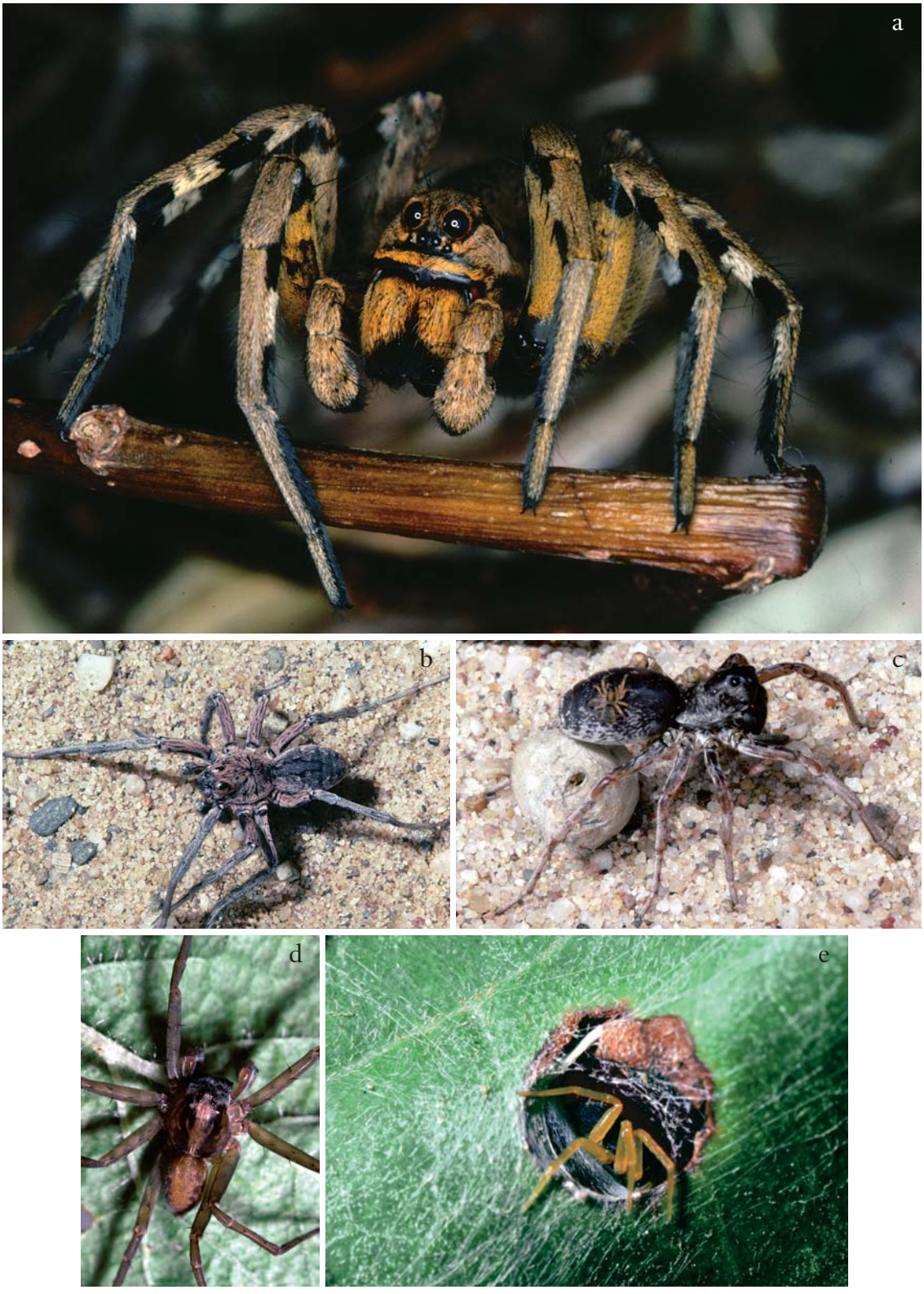
a-b. **Mysmenidae**: *Mysmenopis* sp.; c-e. **Linyphiidae**: c-d. *Frontinellina* sp.; e. *Walckenaera acuminata*; f. *Tenuiphantes tenuis*; g. *Walckenaeria acuminata*. (full legend p. 296).



a-e. **Araneidae**: a. *Araneus*; b. *Argiope australis*; c. *Gasteracantha milvoides*; d. *Acusilas malaccensis*; e. *Micrathena clypeata*; f. **Pimoidae:** *Pimoa laurae*. (full legend p. 297).

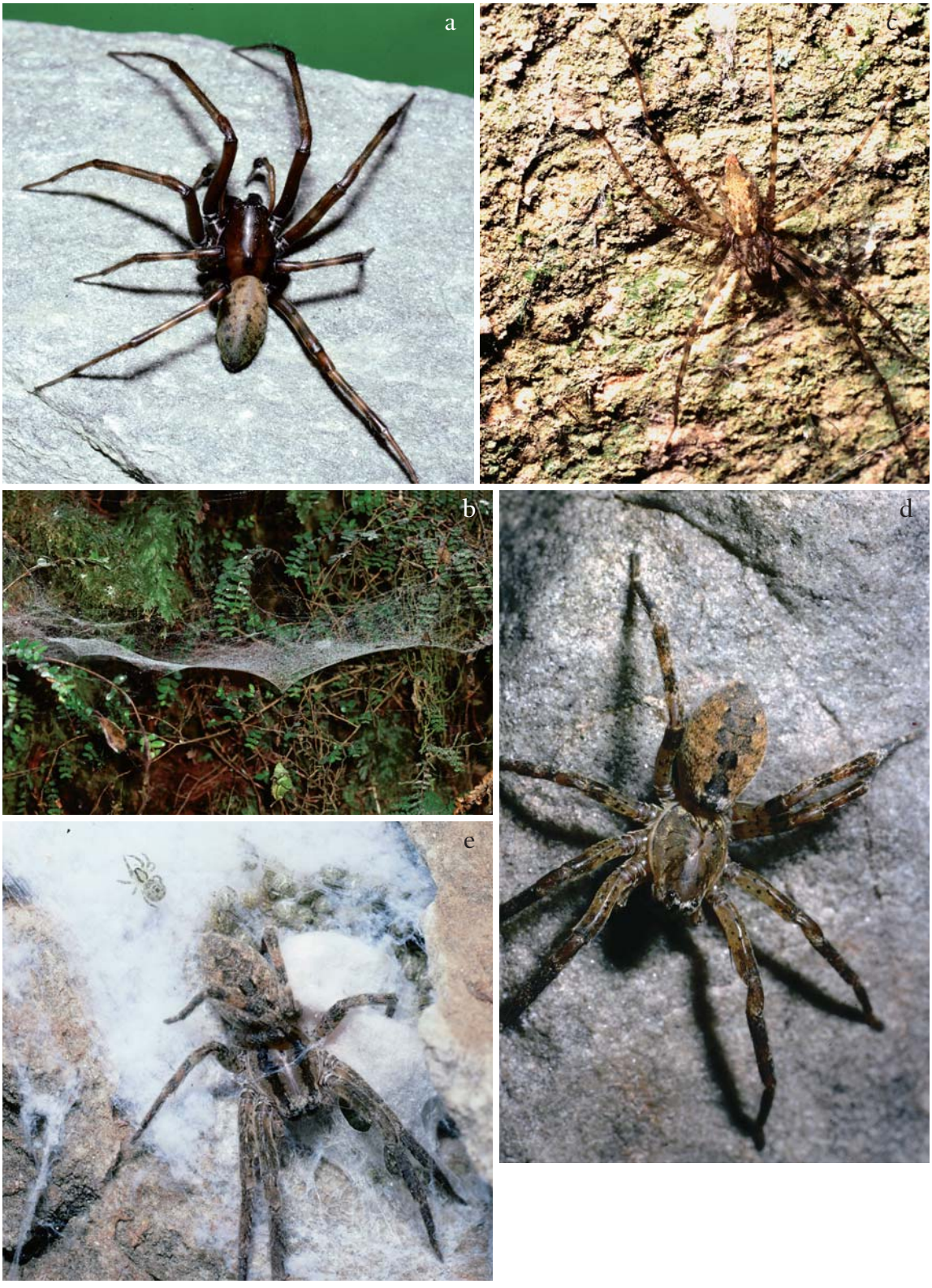
a-d. **Nephilidae**: a-b. *Nephila inaurata*; c. *Clitaetra episinoides*; d. *Nephilengys cruentata*; e. **Tetragnathidae**: *Leucauge festiva* (full legend p. 297).

a. **Senoculidae**: *Senoculus* sp.; b-c: **Pisauridae**: *Euprosthenops* sp.; c. *Thalassius* sp. (full legend p. 297).



a-c. **Lycosidae**: *Lycosa* sp.; b-c. *Donacosa merlini*; d-e. **Trechaleidae**: d-e. *Enna* (?) sp. (full legend p. 297).

a-c. **Oxyopidae**: a. *Peucetia madagascariensis*; b. *Oxyopes shweta*; c. *Peucetia longipes*; d-f. **Ctenidae**: d. *Ctenus pergulanus*; e. *Africactenus decorosus*; f. *Ctenus kingsleyi*. (full legend p. 297).



a-c. **Stiphidiidae**: a-b. *Cambridgea* sp.; c. *Stiphidion facetum*; d-e. **Zoropsidae**: d. *Zoropsis bilineata*; e. *Zoropsis* sp. (full legend p. 297).

a. **Psechridae**: *Psechrus* sp.; b. **Zoridae**: *Zora spinimana*; c-e. **Ctenidae**: c. *Leptoctenus byrrhus*; d. *Petaloctenus bossema*; e. unknown ctenid. (full legend p. 297).

a. **Agelenidae**: *Agelenopis* sp.; b. **Anapidae**: gen. sp.; c-d. **Argyronetidae**: *Argyroneta aquatica*; e-f. **Desidae**: e. *Desis formidabilis*; f. *Paramatachia*. (full legend p. 297).

a-b. **Desidae**: *Matachia* sp.; c-e. **Amphinectidae**: c. *Aorangia* sp.; d. *Mamoea rufa*; e. *Neolana* sp. (full legend p. 298).

a. **Cycloctenidae**: gen. sp.; b. **Hahniidae**: *Hahnia* sp.; c-d. **Dictynidae**: c. *Dictyna* sp.; d. *Cicurina* sp. (full legend p. 298).

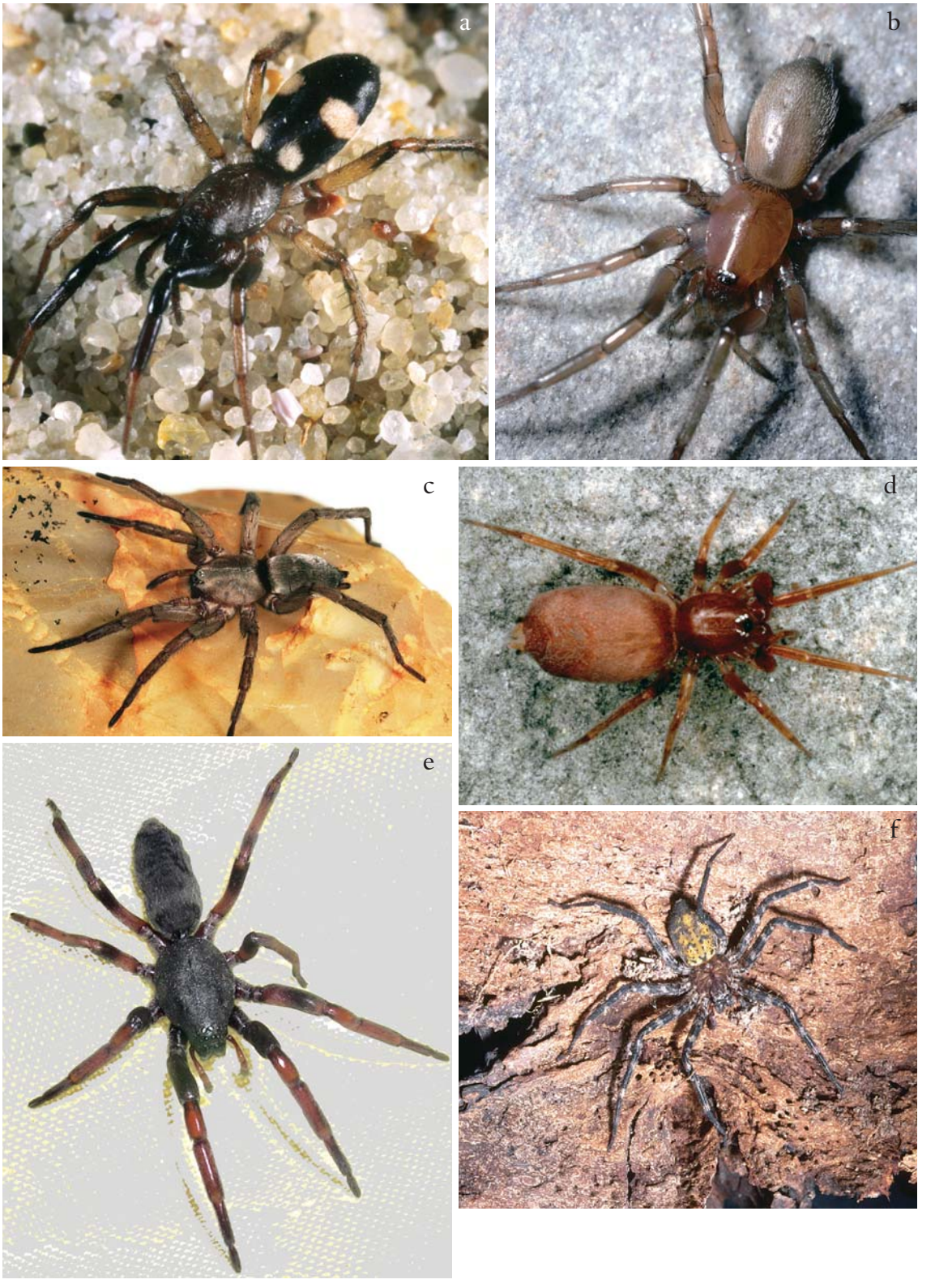
a-b. **Amaurobiidae**: a. *Callobius severus*; b. *Amaurobius ferox*; c. **Phyxelididae**: gen. sp.; d-e. **Titanoecidae**: *Titanoeca obscura*; f. **Chummidae:** *Chumma inquieta*. (full legend p. 298).

a-b. **Ammoxenidae**: *Ammoxenus amphalodes*; c-d. **Homalonychidae**: *Homalonychus theologus*; e-f. **Trochanteriidae**: e. *Platyoides pictus*; f. *Platyoides walteri.* (full legend p. 298).

a. **Nicodamidae**: *Nicodamus* sp., b-d. **Tengellidae**: b. *Lauricius hooki*; c-d. *Tengella radiata*; e-f. **Miturgidae**: e. *Syspira* sp.; f. *Teminius affinis.* (full legend p. 298).

a-b. **Anyphaenidae**: a. *Hibana* sp.; b. *Anyphaena accentuata*; c. **Liocranidae**: gen. sp.; d. **Clubionidae**: gen. sp.; e. **Corinnidae**: *Supunna picta* (full legend p. 298).

a-b. **Corinnidae**: a. *Copa* sp.; b. *Hortipes merwei*; c-f. **Zodariidae**: c. *Psammorygma* sp.; d. *Storenomorpha* sp.; e. *Caesetius* sp.; f. *Cyrioctea* sp. (full legend p. 298).



a-c. **Gnaphosidae**: a. *Setaphis arcus*; b. *Zelotes rusticus*; c. *Xerophaeus* sp.; d. **Prodidomidae**: *Prodidomus rufus*; e: **Lamponidae**: *Lampona cylindrata*; f: **Selenopidae:** *Selenops* sp. (full legend p. 298).

a-c. **Sparassidae**: a. *Palystes castaneus*; b-c. *Anchonastus caudatus*; e-f. **Philodromidae**: e. *Philodromus cespitum*; f. *Philodromus* sp. (full legend p. 299).

a-c. **Thomisidae**: a. *Borboropactus* sp.; b. *Runcinia flavida*; c. *Thomisus daradioides*; d-f. **Salticidae**: d. *Orsima* sp.; e. *Viciria pavesii*; f. *Salticus scenicus*; g. gen. sp. (full legend p. 299).

Index

Numbers refer to pages where the particular family or subfamily is mentioned. The page number of the family description is in **bold**. Plate numbers are underlined.

Spiders are of major importance in ecosystems and are recognized as effective natural control agents in agroecology. Nearly 40,000 species of spiders have been described but the actual number of species is expected to be many times higher.

This book provides a concise overview and descriptions of the 107 spider families that are presently recognized. It contains identification keys to the families and to the different kinds of spider webs, and shortcuts to remarkable types of spiders. The book fills a gap that has existed for a long time since the previous such overview dates back from more than a century.

Both authors of this book are professional arachnologists who have devoted most of their careers to the study of spiders, both from a biological/agroecological and a taxonomic perspective.

Dr Rudy Jocqué is head of the Invertebrates (non-insects) Section in the department of Zoology at the Royal Museum for Central Africa, Tervuren, Belgium.

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