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First results of a taxonomic revision of the SE Asian Sparassidae (Araneae)

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Summary

Characters of the sparassid subfamilies in SE Asia are described and analysed from material of about 290 described and undescribed species and from literature references of an additional 200 species. Two subfamilies (Heteropodinae, Sparianthinae) have clear synapomorphic characters; the Sparassinae seem to be more heterogeneous. The SE Asian genera included in the subfamilies are listed. Taxa *incertae sedis* are *Clastes* (Clastinae), *Prychia* and *Gnathopalystes* (Palystinae).

Introduction

The Sparassidae are distributed worldwide, with over 80 genera and about 800 described species. The necessity of a revision of the Sparassidae is obvious: for example, in Barrion & Litsinger (1995), nearly half of the described sparassid species were associated with the wrong genera. [Note: the author is preparing a paper concerning the family name with its nomenclatural background. For the present, the older name, Sparassidae Bertkau, 1872, is used.]

During the past 18 months, I have been able to examine specimens of the following genera: *Adrastis* Simon, 1880; *Beregama* Hirst, 1990; *Cebrennus* Simon, 1880; *Cerbalus* Simon, 1897; *Cercetius* Simon, 1902; *Clastes* Walckenaer, 1837; *Damastes* Simon, 1880; *Delena* Walckenaer, 1837; *Eusparassus* Simon, 1903; *Gnathopalystes* Rainbow, 1899; *Heteropoda* Latreille, 1804; *Isopedella* Hirst, 1990; *Macrinus* Simon, 1887; *Micrommata* Latreille, 1804; *Nisueta* Simon, 1880; *Olios* Walckenaer, 1837; *Palystes* L. Koch, 1875; *Panaretidius* Simon, 1906; *Panaretus* Simon, 1880; *Pandercetes* L. Koch, 1875; *Parhedrus* Simon, 1887; *Pleorotus* Simon, 1898; *Polybetes* Simon, 1897; *Prychia* L. Koch, 1875; *Pseudomicrommata* Järvi, 1914; *Pseudosparianthis* Simon, 1887; *Remmius* Simon, 1897; *Rhacocnemis* Simon, 1898; *Rhitymna* Simon, 1897; *Seramba* Thorell, 1887; *Sparianthina* Banks, 1929; *Sparianthis* Simon, 1880; *Spariolenus* Simon, 1880; *Stasina* Simon, 1877; *Stipax* Simon, 1898; *Tentabunda* Fox, 1937; *Thelcticopis* Karsch, 1884; *Torania* Simon, 1886; *Tychicus* Simon, 1880; and *Yiinthi* Davies, 1994.

The following genera are only known by the author from literature references: *Anchonastus* Simon, 1898; *Arandisa* Lawrence, 1938; *Carparachne* Lawrence, 1962; *Chrosioderma* Simon, 1897; *Defectrix* Petrunkevitch, 1925; *Eodelena* Hogg, 1902; *Holconia* Thorell, 1877; *Isopeda* L. Koch, 1875; *Keilira* Hirst, 1989; *Leptosparassus* Järvi, 1914; *Leucorchestris* Lawrence, 1962; *Microrchestris* Lawrence, 1962; *Neosparassus* Hogg, 1903; *Nonianus* Simon, 1885; *Orchestrella* Lawrence, 1965; *Origes* Simon, 1897; *Palystella* Lawrence, 1928; *Panaretella* Lawrence, 1937; *Parapalystes* Croeser, 1996; *Pediana* Simon, 1880; *Pelmopoda* Karsch, 1879; *Sagellula* Strand, 1942; *Sivalicus* Dyal, 1957; *Staianus* Simon, 1889; *Stasinoides* Berland, 1922; *Strandiellum* Kolosváry, 1934; *Streptaedoea* Järvi, 1914; *Typostola* Simon, 1897; *Valonia* Piza, 1939; and *Zachria* L. Koch, 1875.

117 described (76 types) and about 170 unknown species from all continents, but mainly from Asia were examined. An additional 200 species and their diagnoses are known from the literature. In 1996 Dr Christa Deeleman placed an unpublished “Provisional key to the genera of the SE-Asian Heteropodidae” at my disposal, so that I was able to check a number of genera to verify or change this key.

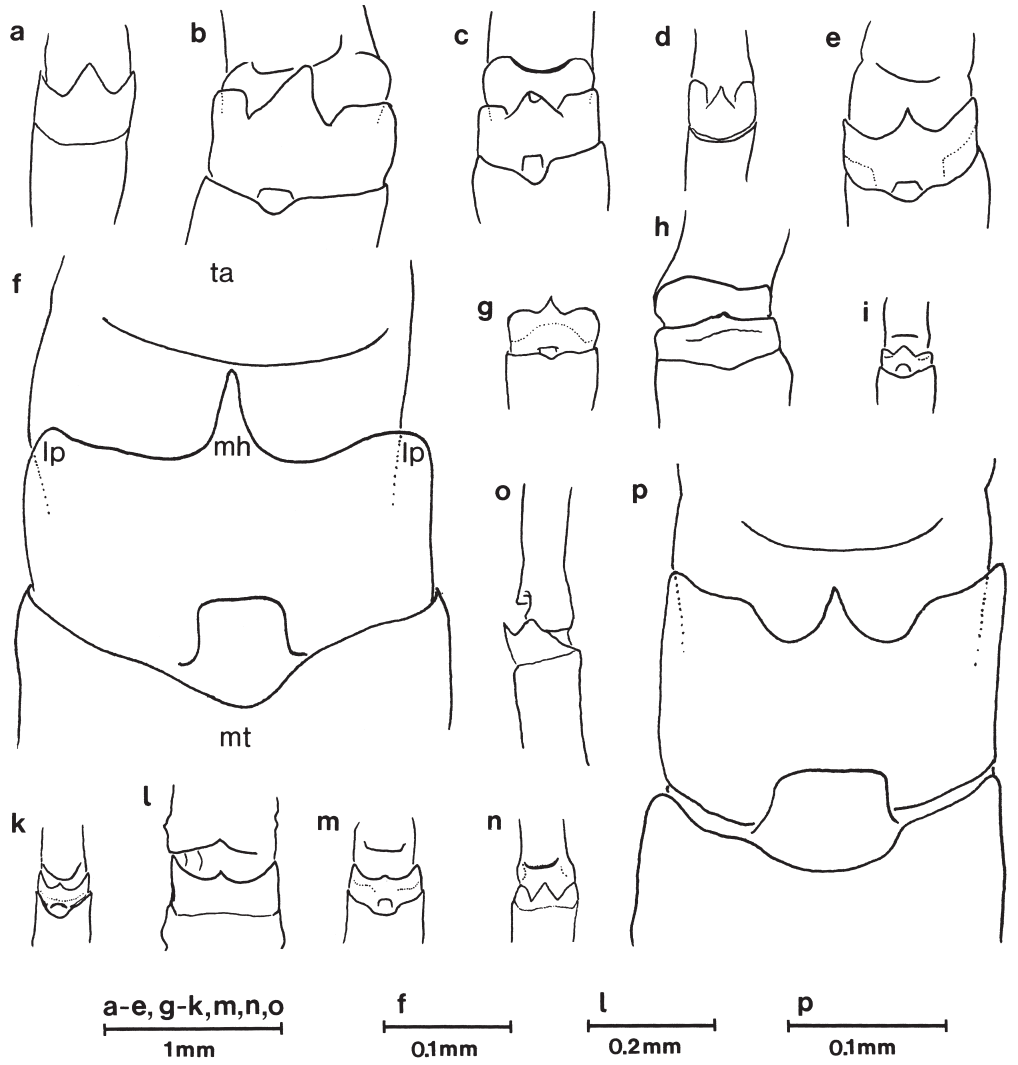

Fig. 1: Various types of trilobate membrane in heteropodids, dorsal view. **a** *Heteropoda venatoria*; **b** *Torania gloriosa* (holotype); **c** *Torania panaretiformis*; **d** *Pandercetes* sp.; **e** *Gnathopalystes kochi*; **f** *Olios argelasius*; **g** *Olios impudicus*; **h** *Cerbalus pulcherrimus* (holotype of *C. sahariensis*); **i** *Micrommata ligurina*; **k** *Seramba salomonum* (holotype); **l** *Pleorotus braueri* (holotype); **m** *Thelcticopis severa*; **n** *Clastes freycineti*; **o** same, lateral view; **p** *Prychia pallidula*. lp = lateral projections of the membrane, mh = median hook of the membrane, mt = metatarsus, ta = tarsus.

This work is intended as the beginning of a revision of the SE Asian Sparassidae, although this first part also deals with genera from other continents, which is necessary to understand the α-taxonomy of this group. "SE Asia" means here the region from Pakistan to Japan in the east and the Solomon Islands in the south.

Material and abbreviations

Material was lent by the following museums (locations of loaned types marked *): American Museum of Natural History, New York (AMNH); *Museo Civico di Storia Naturale, Genoa (MCSN); Museum of Comparative

Zoology, Cambridge, Massachusetts (MCZ); *Muséum National d'Histoire naturelle, Paris (MNHN); *Naturhistorisches Museum, Basel (NHMB); *Naturhistorisches Museum, Vienna (NMW); *Senckenberg Museum, Frankfurt (SMF); Zoological Museum of the University, Moscow (ZMUM). ALE, PME, AME, PLE, ME, LE, AE, PE mean anterior lateral eyes, posterior median eyes, etc.

Examined characters

Trilobate membrane

The synapomorphy of the Sparassidae is a dorsal soft trilobate membrane on the distal part of the metatarsus. Figure 1 shows different states of this character; for a functional analysis, see Clarke (1983). Several categories can be distinguished. In the Sparianthinae (Fig. 1k–m) the lateral projections always extend beyond the median hook. In the Heteropodinae (Fig. 1a–d) all three projections are well developed. In the Sparassinae the middle hook overlaps the laterals (Fig. 1f–h). In one extreme membrane type, that of *Cerbalus pulcherrimus* (Simon, 1880) (Fig. 1h; a similiar form is found in males of *Cebrennus kochi* (O. P.-Cambridge, 1872)), only the median hook is recognizable, the lateral projections being reduced. In this case it is difficult to speak of a trilobate membrane. A similar situation is found in *Thelcticopis severa* (L. Koch, 1875) (Fig. 1m): the median hook is very small and can be overlooked. *Gnathopalystes*, *Micrommata*, *Clastes*, and *Prychia* are not easy to classify.

Eye position

This character was often used by previous authors such as Simon (1897) or Pocock (1985). It is advisable to evaluate this character with care, because there are some exceptions, and to consider it in combination with other characters.

Sparassidae have two rows of four eyes each. A typical character of the SE Asian Heteropodinae is the two recurved rows of eyes in dorsal view in combination with larger ALE than AME. PLE are in most cases prominent and larger than PME (Fig. 2a). The distance between PLE and PME is about 1 (*Heteropoda*) to 2 (*Pandercetes*) diameters of PME. In North Africa there are two genera (*Cebrennus*, *Cerbalus*) which have similar eye position, but the distance of PLE from PME is 2.5 to 4 diameters of PME, the PLE are not prominent and a denticle field is lacking.

Sparianthinae have straight or procurved eye rows (Fig. 2f); the exception is *Sparianthis amazonica* Simon, 1880 from South America. AME are larger than other eyes. A similar eye position is found in some *Rhitymna* and *Damastes* species, but they are separated from the Sparianthinae because the former have larger posterior teeth.

Sparassinae have different eye positions. In *Olios argelasius* (Walckenaer, 1806), and most other species, the eye rows are straight or anterior eyes are slightly recurved and/or posterior eyes are slightly procurved (Fig. 2g). *Micrommata* has a similar eye position (Fig. 2c). Exceptions are the African *Cerbalus* and *Cebrennus* species with strongly recurved posterior eyes, slightly recurved anterior eyes and large AME.

Gnathopalystes has a straight posterior row and a recurved anterior row, while the AME are smaller than ALE as in the Heteropodinae (Fig. 2d). The anterior eyes rise above the anterior margin of the carapace, which is in most cases fully visible in Heteropodinae. *Prychia* has an eye position similar to that of *Gnathopalystes* (Fig. 2b).

Clastes (Clastinae) has a strongly procurved posterior eye row. Anterior eyes are straight and the AME much smaller than ALE (Fig. 2e).

Clastes, *Micrommata* and *Prychia* have special hairs (Fig. 2c, e) on the dark spots (Fig. 2b) close to the eyes. These hairs, which are easily lost in preserved specimens, are white and flattened as in many salticid species. It is thought that these green and day-active spiders (all?) locate their prey with their eyes and the specialized hairs reflect solar radiation, which would warm up the eye too much or have other negative effects on visual orientation. This character can also be observed in *Gnathopalystes flavidus* (Simon, 1897).

Cheliceral teeth

Sparassidae have two rows of teeth on the chelicerae and in some groups there are smaller median teeth, here called denticles. At the anterior margin there are always two or three teeth and at the posterior, two to six teeth.

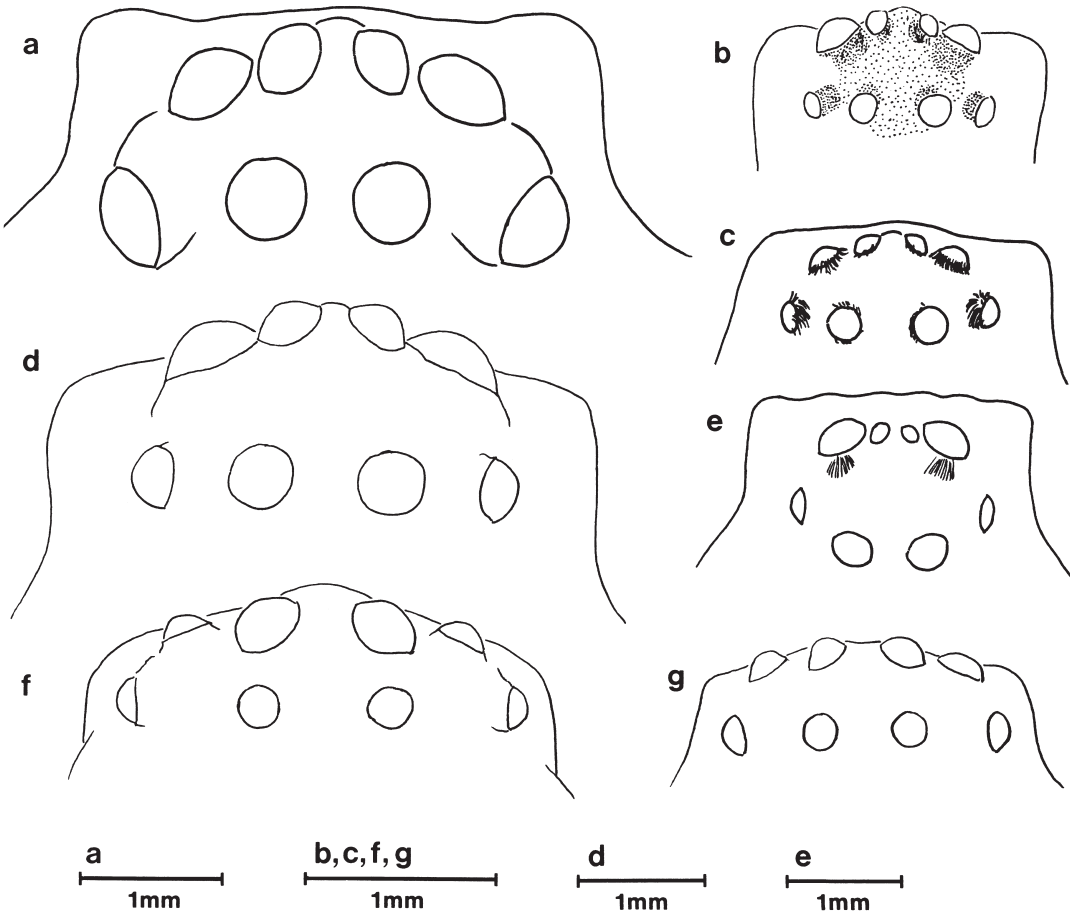

Fig. 2: Various eye positions in the Sparassidae, dorsal view. **a** *Heteropoda venatoria*; **b** *Prychia pallidula*; **c** *Micrommata virescens*; **d** *Gnathopalystes kochi*; **e** *Clastes freycineti*; **f** *Seramba salomonum*; **g** *Olios argelasius*.

Heteropodinae always have a denticle field, which is more or less well developed (Fig. 3a), comprising three anterior and four to six posterior teeth. Most species have four posterior teeth. The denticle field can be very small (*Panaretidius microphthalmus* Fage, 1929) or larger (*Torania gloriosa* (Simon, 1880)). In some species the field is divided into a basal and an apical part. In all examples most teeth of this field are close to the three anterior teeth.

Sparianthinae are characterized by three anterior and two to seven much smaller posterior teeth without denticles (Fig. 3h–i).

Sparassinae, *Micrommata* and *Clastes* have two anterior, three to six posterior teeth and no denticles (Fig. 3b–c, f). An exception is *Eusparassus walckenaeri* (Audouin, 1827), which has a single row of denticles or an elongated denticle field.

Gnathopalystes have a large denticle field between two anterior and four to six posterior teeth, which extends from proximal teeth to the margin of the non-sclerotized arthrodial membrane (Fig. 3g). One African species was investigated (*Palystes superciliosus* L. Koch, 1875; holotype of *P. s.* var. *fasciiventris* Strand, 1907). It has no denticles and three anterior teeth (Fig. 3d). Croeser (1996) resurrected the genus *Gnathopalystes* Rainbow, 1899 and transferred

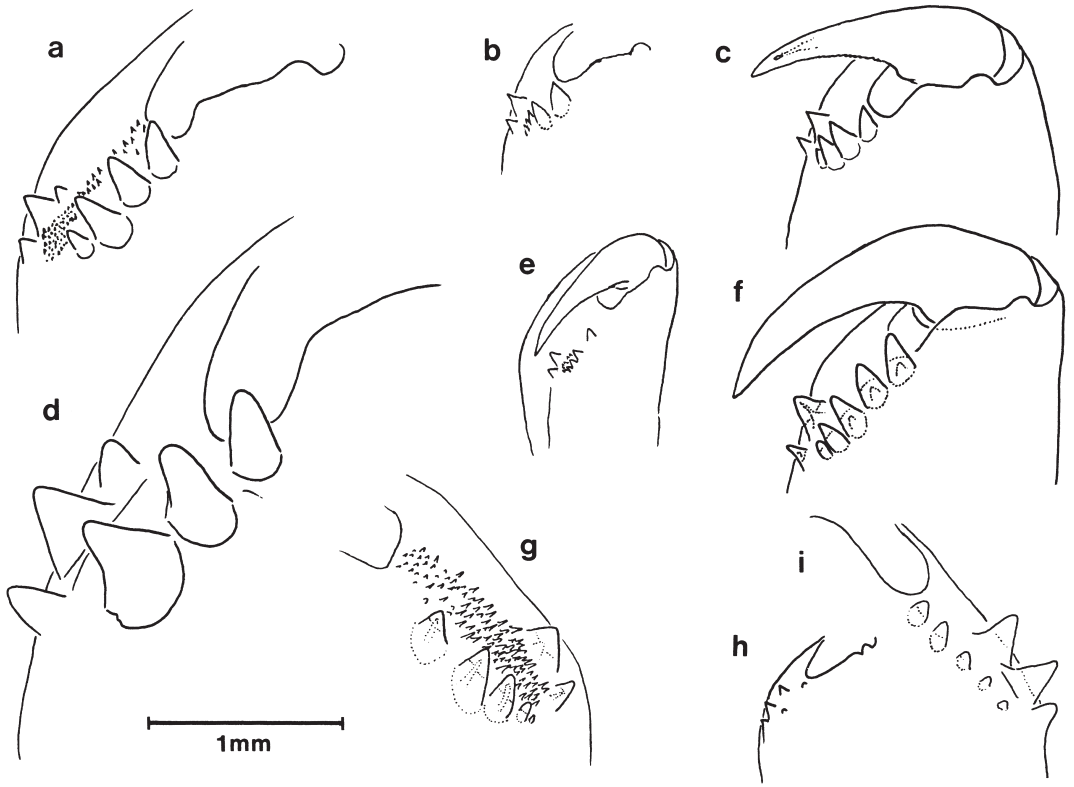

Fig. 3: Cheliceral teeth of Sparassidae, ventral view, slightly from posterior. **a** *Heteropoda venatoria*; **b** *Micrommata virescens*; **c** *Olios argelasius*; **d** *Palystes superciliosus* (holotype of *P. s.* var. *fasciiventris*); **e** *Prychia pallidula*; **f** *Clastes freycineti*; **g** *Gnathopalystes kochi*; **h** *Pleorotus braueri* (holotype); **i** *Thelcticopis severa.*

the Asian species previously listed under *Palystes* to this genus.

Prychia has two anterior and four posterior teeth, and a small number of denticles (Fig. 3e).

Tarsal claws

Sparassidae have two tarsal claws which are more or less toothed. Females have a tarsal claw on the palp, absent in males.

The Heteropodinae are characterized by long toothed palpal claws of the females with three (*Pandercetes*) to nine (*Heteropoda*) long and curved teeth and by the characteristic relation in size of the palpal claw to the claws of legs I–IV (Fig. 4a–c).

In 1989 Hirst described the new genus *Keilira* as a heteropodine genus. He mentioned the missing long-toothed palpal claw in *Keilira* and stated that another Australian sparassine spider, *Olios hermitis* Hogg, 1914, has such long teeth. That was a misunderstanding, because the latter species has been placed into *Heteropoda* by Davies (1994). *Keilira* seems not to belong to the Heteropodinae.

In all other subfamilies the female palpal claw is smaller than the leg claws, and in most cases absolutely smaller, the teeth are shorter and not curved (Fig. 4d–p).

In the Sparianthinae the basal part of the leg claws is more massive (Fig. 4l–m; ratio length/narrowest basal part = 3.7–4.8 (n = 15); other subfamilies 5.4–15.2 (n = 22)).

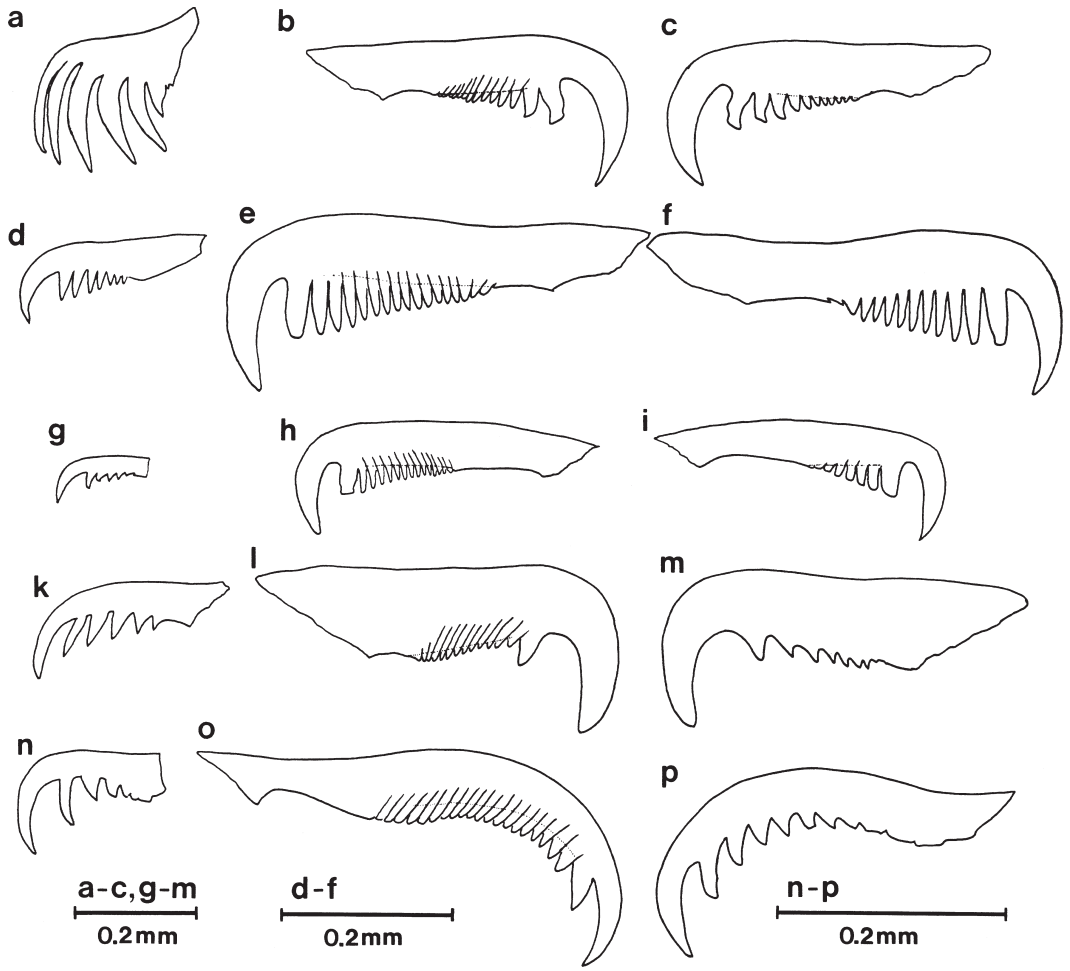

Fig. 4: Tarsal claws of ♀ Sparassidae on the palp (retrolateral view) and leg I (prolateral and retrolateral view of two claws). **a–c** *Heteropoda venatoria*; **d–f** *Olios argelasius*; **g–i** *Clastes freycineti*; **k–m** *Thelcticopis severa*; **n–p** *Prychia pallidula*.

Discussion

Three subfamilies of Sparassidae are currently distinguished. Only SE Asian genera are included.

1. Heteropodinae, with *Adrastis* (probably synonymous with *Pandercetes*), *Heteropoda*, *Panaretidius*, *Panaretus*, *Pandercetes*, *Parhedrus*, *Spariolenus*, *Torania*, *Yiinthi*, are characterized by the denticle field between cheliceral teeth, the long-toothed female palpal claw and the two recurved rows of eyes. Usually LE are larger than ME.

2. Sparianthinae, with *Seramba* and *Thelcticopis*, are characterized by smaller cheliceral teeth at the retromargin and the overlapping lateral projections of the trilobate membrane. AME are mostly larger than others.

3. Sparassinae, with *Beregama*, *Isopedella*, *Micrommata*, *Olios*, *Rhitymna, Eusparassus*. No synapomorphic characters have yet been found. Hence the characters listed here are found

currently in all Sparassinae. There are two cheliceral teeth on the promargin. The PE are straight or slightly procurved, mostly equidistant and equal (exceptions: the African *Cebrennus* and *Cerbalus*).

Taxa *incertae sedis* are *Clastes* (Clastinae), *Prychia*, *Gnathopalystes* (Palystinae); *genera invisa* are *Geminia* and *Tychicus*.

Two former subfamilies (Simon, 1897) with the genera they include are doubted: Palystinae (*Micrommata, Palystes, Tychicus*) and Clastinae (*Clastes, Prychia*). *Prychia* seems not to be a member of the Clastinae. *Clastes* has genital organs similiar to those of many Australian Sparassinae. *Gnathopalystes* is more closely related to Heteropodinae (denticle field, AE), but has more primitive male genital organs. Some species of the Palystinae (*Palystes ellioti*, *P. superciliosus*, etc.) have genital organs similar to those of Australian species (*Zachria*, *Eodelena*, etc.). They probably belong with the genera *Keilira* and *Prychia* in one group. Also dubious is Järvi's (1912, 1914) tribe "Micrommateae", which includes *Micrommata*, *Olios* and others. It remains to be investigated whether *Micrommata* belongs to a subfamily of its own.

Further type material has to be examined in order to draw final conclusions about different subfamilies. In future research I shall concentrate on genera, their synonymization and the species they comprise.

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