CHAPTER ONE

INTRODUCTION

Poltys C.L. Koch, 1843 (Araneae: Araneidae) is a rather distinctive genus that can be recognised by a combination of widely separated lateral eyes and a pear-shaped carapace, where the 'stalk' of the pear is an eye tubercle. The Australian species for which some biological information is known are nocturnally active, building finely meshed orb webs at night and removing them around dawn. All the *Poltys* species for which both sexes are known show marked sexual dimorphism in size, with the male carapace length typically less than one third that of the female. Adult males do not make webs and probably have a short life-span. The spiders are cryptically camouflaged and during daylight hours they hide motionless on vegetation with the legs drawn tightly around the carapace and just the median eyes, which are situated on the anterior of the eye tubercle, protruding between the legs (Plate 1.1.a, b). In this position they often resemble part of a dead twig, a gall or a broken piece of wood. This project has found that most Australasian species are rather variable in the shape and colouration of the abdomen. This has formerly led to confusion in the identification of species and inconsistencies in taxonomic descriptions. The review of these Australasian species and an investigation of their biology and behaviour is the subject of this thesis.

1.1. HISTORICAL AND CONTEMPORARY REVIEW

1.1.1. The genus *Poltys*

The type specimen, an adult or subadult female, described as *Poltys illepidus* C.L. Koch came from 'Bintang, Singapore' and was sent to Koch from the collection of

Professor Reich of Berlin (Koch, 1843). The combination of carapace characters seemed so strange that Koch felt justified in creating a new genus, despite the fact that the specimen was incomplete, without an abdomen. Although this description was rather inadequate, at least at the specific level, the epithet soon became associated with a variable species that is distributed from India to the Philippines and Australia (Platnick, 2006) and has a rather tubercled, shield-shaped abdomen. The name 'illepidus' means rude, rough or disagreeable and was probably thought to be appropriate to these rather lumpy and irregularly shaped specimens.

Some other species, which were subsequently described, had tall and sometimes bizarrely shaped abdomens. Others were similar to these, or the assumed *P. illepidus*, but showing variations in shape and colour. All of these types were female, or subadult female. Of the early authors only Simon (1895) described a (juvenile) male from Ceylon (Sri Lanka), although he was unsure as to which species this belonged. [The description was attached to *P. idae* (Ausserer) by Roewer (1942) and followed by Platnick (2006) but apparently this association was not intended by Simon]. More recently, males of some species have been figured in a few works (e.g. Davies, 1988; Chikuni, 1989), but there has been no thorough description for any species.

A total of forty-four *Poltys* species are currently recognised (Platnick 2006) (Fig. 1.1). The genus is recorded from most parts of the old-world tropics and sub-tropics with the greatest number of species described from SE Asia. In Australia nine species of *Poltys* have been described from the Australian mainland (eight species from Queensland, one from Western Australia) and one from Lord Howe Island in the Tasman Sea. Several synonymies previously suggested by Simon (1899) were not

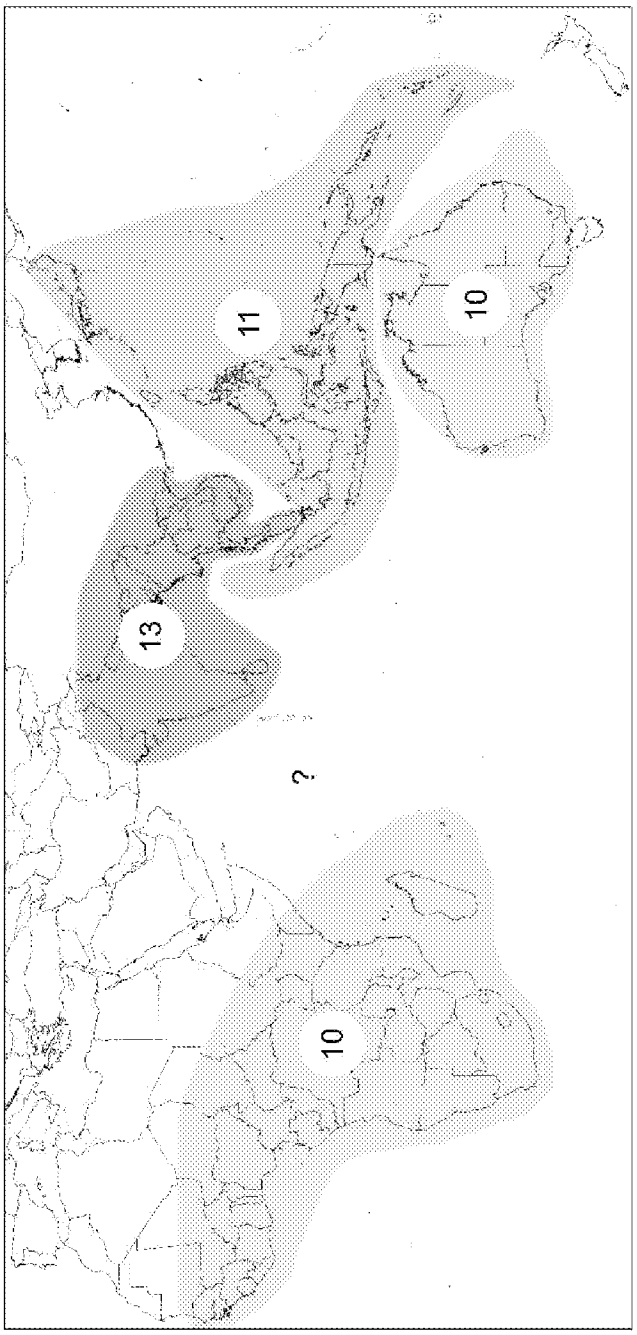

Figure 1.1. The approximate distribution of the genus *Poltys*. Numbers indicate the number of species described from each area (Platnick, 2006).

accepted by Roewer (1942) or Platnick (2006) and they have not been followed in this study.

Close to Australia, three species have been described from New Guinea and one from the Moluccas. Unfortunately, *P. sigillatus* Chrysanthus is the only one of these species that can be positively identified (type examined). The types of *P. dromedarius* (Bradley) and *P. papuensis* (Bradley) from New Guinea, which should be in the Macleay Museum in Sydney, and also of *P. moluccum* (Doleschall) from Amboina, have not been found and the authors' illustrations are not sufficiently detailed to allow a positive identification from the description alone. Except for *P. idae* from Borneo there is then a geographical gap in described species northwards to Singapore, the area from where *P. illepidus* was described. From Sumatra northwards into mainland Asia there are then another 16 described species. Many of these putative species are of relevance to the Australasian fauna and are summarised in a regional checklist at the end of Chapter 2. All of this information and other relevant sections are included in Smith (2006).

1.1.2. Generic affiliations

When *Poltys* was originally described, Koch was uncertain of its relationships and suggested the eye pattern might align the genus with the `Mithraen' (presumably *Mithras* C.L. Koch species, which are now listed under *Hyptiotes* Walckenaer in the family Uloboridae). The strangeness of the features displayed by *Poltys* is also reflected in the number of monotypic genera set up by other authors and subsequently synonymised with *Poltys*, namely *Pleuromma* Doleschall, *Cyphagogus* Günther, *Mastigosoma* Ausserer, *Gerrosoma* Bradley and *Rhyncharachne* Bradley. Doleschall (1859) recognised that *P. moluccum* belonged with orb-weaving spiders because the

specimen was found in a web, but he could not recognise any closer affinities due to the arrangement of the eyes. Whilst Günther (1862) made no comment at all about possible relationships, Ausserer (1871) separated his new genus from *Cyphagogus* by the eye pattern drawn by Günther, which Ausserer interpreted as similar to that of *Tetragnatha* Latreille. Ausserer believed the genus he erected, *Mastigosoma*, was most closely related to *Arachnura* Vinson, which he also based on the eye pattern. To give Ausserer credit, the eye tubercle is far shorter in these two species than in the other *Poltys* species known at that time, and these suggestions are entirely reasonable. Bradley (1876a, b) provisionally placed both of his genera in the *Ruditelariæ*, which was a division erected by L. Koch (1872) for his monogeneric families Celaeniden (genus *Celaenia* Thorell) and Cryptotheliden (*Cryptothele* L. Koch). Thorell (1873), disagreed that a separate taxon was needed for these families and considered them all *Orbitelariæ*, which was also where uloborids were placed at that time. Keyserling (1864) also recognised that *Poltys* should be placed among the 'Eperiden' in the *Orbitelariæ*.

As *Poltys*, and other genera, became better known the understanding of generic relationships also became more refined. Simon (1895) placed *Poltys* into his Argiopidae, first as the nominative member of a subfamily, the Poltyinae, then later in the same work this taxon was demoted to tribal status (the 'Poltyeae') in the Argiopinae (now essentially the family Araneidae). This tribe is here referred to as the Poltyini to conform to the *International Code of Zoological Nomenclature* (International Commission on Zoological Nomenclature (ICZN), 1999).The other genera included in the Poltyini by Simon were *Cyphalonotus* Simon, *Homalopoltys* Simon, *Kaira* O.P.-Cambridge and *Pycnacantha* Blackwall. The genera *Ideocaira* Simon and *Micropoltys*

Kulczyński have since also been considered part of the tribe (Dippenaar-Schoeman and Leroy, 1996).

Although one major phylogenetic study of araneid genera included *Kaira* as the representative of the Poltyini and suggested a placement in the basal araneines (Scharff and Coddington, 1997) it is still unclear whether this genus, or any others in the putative tribe, Poltyini, are really closely related to *Poltys* itself. Even this provisional placement of *Kaira* has been disputed by Levi (2003), who believes it to belong within the broadly defined group of cyrtarachines and mastophorines. Nevertheless, a likely relationship between *Kaira* and *Metepeira* F.O.P.-Cambridge has been demonstrated (Piel and Nutt, 1997).

The placement of *Poltys*, and the other 'Poltyini' taxa for which both sexes were available, is examined in Chapter 3 of this thesis in the modern day context supplied by the work of Scharff and Coddington (1997). A provisional version of this work was presented at the 16th International Congress of Arachnology in Gent in 2004 and was published in the conference proceedings (Smith, 2005).

1.1.3. General biology

The rather enigmatic nature of many *Poltys* species has resulted in comments on the unusualness of the appearance or on behaviour in some species descriptions and the mention or illustration of one or more species in a number of more general publications. Despite this superficial interest, there has been no in-depth investigation of any species to date and most information has remained little more than anecdotal. The published information sources are reviewed in more detail in Chapter 8.

1.1.4. Growth and development

General aspects of spider growth and development are well covered in many textbooks (e.g. Foelix, 1996, Schaefer, 1987). The only work I am aware of that has reported on rearing a *Poltys* species is that of Ogasawara (2000). This is published in Japanese and I have only seen the figures so the rearing techniques used are unknown to me. A number of authors have described techniques for keeping and rearing orb web building spiders (see Chapter 7) but because most studies wish to examine behaviour, they advocate keeping web-building spiders in cages large enough for web-building and feeding them on live prey. This was neither desirable nor feasible in the current study, where I was able to raise spiders to adulthood in small containers and fed on a mix of dead prey and supplements.

The life history of genera, such as *Poltys*, which show pronounced sexual size dimorphism, has been discussed by a number of authors (see Chapter 7). Some taxa have been found to overlap and spread generations, others to have differential rates of growth between males and females. How *Poltys* coordinate maturity between males and females is currently unknown.

1.1.5. Araneid behavioural studies

Orb-weaving spiders are a prominent part of the spider fauna and an enormous amount of behavioural and ecological work has been carried out on them. In particular, web building spiders are of interest as model animals in studies of predator-prey interactions and they have been shown to exhibit a number of behavioural features which make them especially useful in this context.

Not surprisingly, the easily visible diurnal species, especially those of Europe and northern America, have received most attention from researchers. Although many principles examined in these studies (such as web structure and prey caught, the "giving up" principle of optimal foraging theory and intraspecific competition, to name but a few) are equally applicable to nocturnally active spiders, much less research has been focussed on these species. Some aspects of the behaviour of an exposed cryptic taxon, such as *Poltys*, could potentially be quite different to the traits shown by diurnally active spiders which are in webs by day, or even those nocturnal taxa which hide in a day retreat for protection. Nevertheless, little, if any, attention has been focussed on such a species.

1.2. AIMS, RATIONALE AND GENERAL METHODOLOGY

1.2.1. Aims

The primary aim of this study is the taxonomic revision of the Australian members of the genus *Poltys*. Secondary aims are:

(i) to examine the relationships amongst species and test the monophyly of a clade including some Australian species through phylogenetic studies, as far as this is possible when only considering part of a genus;

(ii) to undertake a preliminary examination of the relationship of *Poltys* to other araneid genera, in particular the other genera currently included in the tribe Poltyini;

(iii) to make a useful contribution to the knowledge of ethology and biology of this taxon.

1.2.2. Rationale

Poltys is a genus that has caused much confusion in the past and is barely known, despite the abundance of specimens in many areas. Nocturnal orb-weaving spiders are an important component of terrestrial ecosystems, yet many aspects of their biology have barely been studied, in Australia or elsewhere. *Poltys* also has potential as a rewarding study animal for research into crypsis and cryptic behaviour. All research of this type requires specific identification of the animals under study.

1.2.3. General methodology

The primary aim of taxonomic revision will be addressed by:

- examining morphological characteristics to establish species boundaries and limits of inter and intra-specific variation;
- the use of DNA sequencing to validate findings from morphological characteristics in difficult species;
- rearing males from the egg sacs of known females to establish or confirm male–female pairings.

The generic relationships of *Poltys* and its putative relatives in the tribe Poltyini will be examined utilising a pre-existing data matrix and associated phylogenetic study.

Intra-generic relationships will be examined through the reconstruction of phylogenies based on characters derived from three sources:

- a short sequence from the mitochondrial gene cytochrome c oxidase 1 (COI);
- a nuclear ribosomal non coding sequence, the internally transcribed spacer 2 (ITS2);

- morphological characters.

Biology and behaviour are to be studied through a number of small projects:

- regular transects to establish the persistence of individual spiders at web-sites and provide data on growth rates under natural conditions;
- rearing specimens to examine the number of moults taken by males and females to reach maturity and examine the variation in abdominal shapes between individuals from the same egg sac;
- a study of natural day-time hiding positions with respect to aspect and attitude.

Detailed methodologies are incorporated into their respective chapters.

1.3. A COMMENT ON SCOPE AND FIELDWORK

At the commencement of this study there were few *Poltys* males in museum collections and only one or two females of some species. Little was known about the biology of the genus; only that discussed in Chapter 8. Because of this it was not possible to plan the behavioural component of the study in any detail because too little information was available on the life history, abundance and suitability of the target genus. Instead these studies listed above were allowed to develop as the possibilities became appreciated with increasing knowledge.

Collecting suitable material, as well as carrying out the observations on the behaviour and habitat preferences of the different species has involved a great deal of time in the field. Several collecting trips were arranged specifically for the project, other collections were made on an ad hoc basis during trips for other projects. By undertaking this study on a part-time basis, it has been possible to utilise many more

collecting seasons than would normally be available. This has proven invaluable in obtaining as complete coverage for Australian *Poltys* species as possible.

CHAPTER 2

TAXONOMY OF AUSTRALASIAN *POLTYS*

[Material in this chapter, including the Plates, is reproduced from Smith (2006) courtesy of The Records of the Australian Museum]

2.1. INTRODUCTION, AIMS AND A COMMENT ON METHODOLOGY

Taxonomy is defined as "The theory and practice of classifying organisms" (International Commission on Zoological Nomenclature (ICZN), 1999). In the genus *Poltys*, with no males formally described, many females described without illustration and notable variation apparent in some taxa, it is currently almost impossible to make a reliable identification at the specific level. Thus, the taxonomic revision of the Australasian members of the genus *Poltys* should, for the first time, make it possible to use specific names in a repeatable manner in Australia. This revision is the primary focus of this thesis. With 44 species currently valid in the genus (Platnick, 2006), ranging through the Old World tropics and subtropics, the revision of the Australasian species is only a small beginning. Nevertheless, even starting with a small part of the fauna helps the definition of the genus. Once males can be recognised and the levels of variation are catalogued, the process will become easier for the *Poltys* fauna of other regions.

The methodology and layout of the chapter follow standards accepted by most scientific journals. None of the methodology is new, but has been gleaned from sources too numerous to list individually: from other taxonomic works (particularly those of H.W. Levi on New World taxa), methods suggested by colleagues, through advice and

experience gained by working with Mike Gray at the Australian Museum or self-taught by attempting to emulate the work of others.

2.2. MATERIAL AND METHODS

2.2.1 General

Specimen examinations, measurements and drawings were made using a Wild M5 microscope with graticule and drawing attachment. Half-tone drawings were made on coarse-grade coquille board, using a range of graphite pencils and an ink outline. Stipple drawings are of ink onto drafting film. All figures and plates were made up using Adobe® Photoshop® 5.0 LE, including the addition of white lines on half-tone drawings. Specimen preparations for scanning electron microscopy (SEM) were either air dried from 70% alcohol (legs), air dried from 100% acetone after dehydration through a series of alcohol solutions (more robust male palps and spinnerets) or dried by critical point drying after the acetone/alcohol series (delicate male palps).

Poltys are often awkward to examine and draw as the legs are often tightly bunched and the dorsally extended abdomens may be difficult to handle. In order to damage no more specimens than necessary, the primary figured female specimens of each species group are the ones that have been used for DNA extractions, so 3–4 legs have been removed from one side (sometimes including coxae on smaller specimens). All lateral views are from the left (image reversed if necessary). On dorsal and ventral drawings any missing coxae were copied in from the entire side to balance the drawing. The point of leg excision is representational. Leg I has been manipulated so that a flat lateral view is shown

to illustrate the proportion to the carapace; leg II femur length is in correct proportion to leg I. Legs III and IV are drawn as seen.

The range of variation in abdominal shape is similar in each species within a species group. Variation is therefore illustrated for each group using exemplars drawn from the different species; in addition the abdomen of each holotype is illustrated. The particular abdominal shape shown for any particular species should therefore NOT be considered specifically diagnostic within the group (but see discussion for comments on the *P. columnaris*-group and some other non-Australian species).

Male palpal organs are rather small and details are often difficult to discern under a light microscope. The drawings are intended to convey only the information that can be seen using a standard binocular setup. SEM images are also provided to fill in details. Some palpal characters are rather subtle and the only way to positively identify some species is by direct comparison with other material. To facilitate this, males and females (sourced from reared specimens) of all the species found in each Australian state will be deposited with the major museum of that state, if none already exists in the collections.

To examine the epigyne of a specimen with a tall abdomen, it is useful to have an examination bowl with a deep layer of substrate such as sand or glass beads so that the apex of the abdomen can be gently buried to hold the specimen in position. It is also useful to have a range of small objects to hand that can be used as supports. Sometimes the posterior epigynal face can be seen without surgery, but often, however, the epigynal plate needs to be lifted or removed. For a brief examination, it is often possible to just lift the

epigyne by making a small incision on each side to free it from the epigynal fold. Some epigynes, *P. frenchi* Hogg in particular, are rather delicate and require extreme caution.

2.2.2. Order of treatment of species

Species are arranged in informal species groups based on morphology. The group containing the type species is treated first, followed by the other groups in alphabetical order. Within each group the nominal species is first (if it is dealt with in detail), others are in alphabetical order.

2.2.3. Measurements and Descriptions

Carapace length ranges are taken from Australian specimens only and are based on all records, or a sub-sample of 20–30 individuals for more numerous species. All measurements are given in millimetres. The measurements of the length of the sternum and abdomen are made along the centre line and so, for the sternum they start posterior to the labium and for the abdomen they ignore any humeral tubercles. As far as possible, typical specimens have been selected for descriptions but it should be noted that all species are variable in most characters, especially abdominal shape, carapace shape and eye positions, and leg lengths. Many figure references in descriptions are to the typical specimens that are used for the primary figures and so are not actually the specimens being described (see Section 2.2.1). Eyes increase less than other body parts with growth, so larger specimens tend to have smaller eyes relative to carapace length than smaller ones. For this reason eye

measurements are not given. Species descriptions do not reiterate the generic description unless there is interspecific variation within a character.

2.2.4. Distribution maps and records

Adults only are included except where a juvenile record is the only occurrence for a state or territory or otherwise extends the recorded range of the species. Records with only a country name and no detailed locality are not included on maps unless there are no others from the area. If such records are used the symbol is arbitrarily placed in the centre of the named area. Records are listed ordered by State or Country, then by locality name for each repository (alphabetically on initials). The names of some countries have changed two or three times during the preparation of this thesis. Those used herein are as used in the manuscript accepted for publication in Smith (2006). Type data are given in full, data for other material examined are abridged and only selected records are given for common species (but including any drawn or described specimens). The full list of material examined is shown on maps (exceptions as discussed above). It should be noted that many specimens (both males and females) collected by the author have matured in captivity after the capture date given. Specimens reared from egg sacs are only included in the distribution records if they were used in the description.

2.2.5. Abbreviations

All repository abbreviations and codes and morphological abbreviations are included in the Abbreviations section at the beginning of this thesis.

2.3. TAXONOMY

2.3.1. Genus *Poltys* C.L. Koch

Poltys C.L. Koch, 1843: 97. Type species *Poltys illepidus* C.L. Koch by monotypy. Simon, 1885: 448, 1895: 888; Keyserling, 1886: 123; Pocock, 1900: 235; Rainbow, 1909: 230; Roewer, 1942: 904; Bonnet, 1958: 3746; Barrion and Litsinger, 1995: 579; Platnick, 2006.

Pleuromma Doleschall, 1859: 44. Type species *Pleuromma moluccum* Doleschall. First synonymised by Thorell, 1878: 28.

Cyphagogus Günther, 1862: 2. Type species *Cyphagogus mouhoti* Günther. (Preoccupied in Coleoptera).

Cyphonethis Thorell, 1869: 37. Replacement name for *Cyphagogus*. Not recognised by Simon, 1885: 449, who synonymised *Cyphagogus* with *Poltys*.

Mastigosoma Ausserer, 1871: 817. Type species *Mastigosoma idae* Ausserer. First synonymised by Simon, 1885: 449.

Gerrosoma Bradley, 1876a: 223. Type species *Gerrosoma papense* Bradley. First synonymised by Thorell, 1881: 59, but disputed by Simon, 1885: 449.

Rhyncharachne Bradley, 1876b: 240. Type species *Rhyncharachne dromedaria* Bradley. First synonymised by Thorell, 1881: 59.

Remarks

The generic synonymies listed above have not been questioned in this work. Only two of the type specimens involved (*P. mouhoti* and *P. idae*) have been located (see Table

2.1). Although these females share many *Poltys* characters (Fig. 2.22.e), these taxa cannot be fully evaluated until males are known. Of the others, the original descriptions and figures do not contradict identification with *Poltys*.

A comment on the identity of *Poltys illepidus*. The identity of this species has always been assumed, but is not by any means certain. At least six *Poltys* species are now known to occur in the area around Bintang, the type locality of *P. illepidus* (see Table 2.1). Koch's type specimen, from the collection of Herr Professor Reich of Berlin, has not been located, nor apparently has that of *Atea incerta* C.L. Koch, described from material in the same box, which is now listed as *nomen dubium* under *Araneus* Clerk (Platnick, 2006). Even if the *Poltys* type were found, it might not be possible to identify the species, as the 'female' specimen was missing its abdomen. Despite this, the identity of the genus itself is not in doubt. The combination of carapace shape, size and eye arrangement is distinctive. It is hoped that future work on the Asian *Poltys* species (or rediscovery of the type) will resolve the issue of the identity of the type species. For the time being, the species referred to as *P. illepidus* is that which most people associate with the name *P. illepidus* (e.g., Chrysanthus, 1961; Davies, 1988 (female only)). This is one of the most common and widespread species and has definitely been recorded from the general area of the type locality. Continuing this association would therefore seem prudent unless better evidence becomes available.

Diagnosis

Females. All Australian *Poltys* species are medium to large spiders (carapace length 2.69–8.75) with a distinct eye tubercle and a pear-shaped carapace in dorsal view (Fig. 2.2.d). Viewed laterally, the carapace is doubly-domed (Fig. 2.2.a). The median eyes form an anterior quadrangle on the eye tubercle, ALE are a variable distance posterior to these towards the base. The PLE are well separated from the ALE on the outer radius of the anterior carapace (Fig. 2.2.d). In Asia, some species of the *P. mouhoti*-group have a reduced eye tubercle (as Fig. 2.22.e or shorter), but eye arrangement and carapace shape are still distinctive. *Heurodes* Keyserling (Australian) and *Cyphalonotus* (non Australian) are most frequently confused with *Poltys* but can be separated by the eye positions and genitalia. In *Heurodes*, the lateral eyes are adjacent (the 'normal' araneid arrangement). In *Cyphalonotus,* the eyes may be slightly separated and are sometimes on an eye tubercle, but both lateral eyes are on, or at the base of, the eye tubercle (rather than the PLE being far away on the carapace). In both genera the epigyne has a bulbous basal part with a thinner extended scape. *Micropoltys* (NE Australia and New Guinea) also have separated lateral eyes but the females are as small as males and have no distinct eye tubercle.

Males. Small compared to females (carapace length 0.78–1.41); the lateral eye separation is distinctive when combined with the absence of secondary sexual characters such as endite teeth and coxal hooks (Figs. 2.4.a, d). The eye tubercle is not always clearly differentiated. *Micropoltys* is similar in size and appearance, but *Micropoltys* has a more complex palpal organ with a large TA, plus endite teeth and coxal hooks. Although sometimes misidentified as *Poltys*, *Heurodes* and *Cyphalonotus* males are large (almost the

same size as females) and also have endite teeth and coxal hooks. Males and females of *Cyphalonotus* and *Micropoltys* are illustrated in Chapter 3; *Heurodes* is illustrated in Davies (1988).

Description (Australian species)

Females. *Prosoma*. Carapace pear-shaped in dorsal view, usually convex at coxa I (Fig. 2.2.d) (except *P. frenchi*, Fig. 2.11.e), widest between coxae II and III, longer than wide with a distinct eye tubercle anteriorly. In profile carapace usually highest immediately anterior to fovea, double-domed (Plate 2.3.c); fovea a deep pit; eye tubercle level to distinctly elevated (occasionally higher than thorax), sometimes with small protrusions above PME (Fig. 2.15.d). Eye tubercle and parts of caput hirsute, posterior carapace more or less glabrous (Plate 2.3.c). Chilum two slender curved plates (Fig. 2.11.d). Chelicerae robust with three (*P. laciniosus*-group) or four (most other groups) promarginal teeth, few to several retromarginal teeth and a varying number of denticles in the cheliceral groove (Fig. 2.6.f). Cheliceral fang well developed, quite long, usually with tips crossed in mouth recess between maxillae. Labium wider than long (Figs 2.6.d, 2.11.d), strongly rebordered with white margin. Maxillae robust, with serrula, cupping deeply recessed mouth, medial borders white. Sternum cordate with anterior concavity for labium, tip pointed between coxae IV. Sternum carries sclerotised articulating extensions at bases of posterior legs (and sometimes also leg II, Fig. 2.11.d). *Eyes*. Median eyes in a roughly equilateral quadrangle at or near anterior of eye tubercle, widest at either AME or PME (Figs. 2.2.e, 2.14.e); AME often partially or wholly directed ventrally (Fig. 2.6.d).

ALE on lateral eye tubercle, often partially directed ventrally on small one-sided tubercle; PLE well separated from ALE on lateral anterior carapace, directed posterolaterally. Tapeta in all secondary eyes: PME reduced to a sliver in base of eye-cup, ALE tapetum ca 1/3rd in anterodorsal position in cup, PLE ca 1/4 in anterior cup. *Legs*. 1243. Front femora varying in shape from a normal, slightly broadened cylinder (*P. illepidus*-group, Fig. 2.2.a) to distinctly expanded dorsoventrally, with greatest diameter ½ to 2/3rd distance to apex (e.g., Fig. 2.6.a); femur III fairly robust but short, femur IV longer and slender; few macrosetae on dorsal and prolateral faces of femora. Apical and lateral patellar macrosetae sometimes modified by flattening (Fig. 2.2.f, Plate 2.5.c). Anterior tibiae with characteristic shape: in lateral view sinuously curving towards apex (Fig. 2.2.a), with a 'D' shape in cross-section, in dorsal view also curving laterally (Plate 8.2.c); dorsal surface almost flat with regularly spaced short macrosetae, prolaterally with numerous short and long curved erectile macrosetae that continue to the distal metatarsus (Fig. 2.6.a); tibia ventrally smooth and glabrous (this is usually held close against the femur and cephalothorax when in cryptic day-time resting position, (Plates 1.1.a,b, 8.2.c, 8.3.a, b). Anterior metatarsi gently curved, macrosetal patterns continuing from tarsi but also with paired macrosetae on ventral surface. Tarsi without macrosetae but on legs I and II a prolateral row of slightly stronger setae bear one or more basally notched teeth. One or more nearby hair rows also toothed but these are less specialised. Tarsi III and IV bear similar setae (Plate 2.2.e, example of notched tooth arrowed). Tarsal claws. Main claws pectinate with 6–8 teeth. Toothed accessory hairs near claws (Plate 2.2.c); on retrolateral tarsus IV the accessory hairs are enlarged but untoothed (not examined on legs II and III)

(Plate 2.2.d). Female pedipalps are variable in dimensions, and in development of macrosetae. *Abdomen*. Certain shapes are characteristic of a particular species group but generally variable within and between species. Often with humps and tubercles and smooth and roughly haired patches. Also often with well developed small sclerotised plates ('microsigillae') scattered over the abdominal surface, especially in *P. illepidus*-group and *P. frenchi*-group (e.g. Fig. 2.2.g). The pedicel is situated in the posterior half of the abdomen, so the abdomen is held at a steep angle overhanging the cephalothorax (Figs. 2.2.a, 2.6.a). Book lung covers yellow with approximately nine main grooves. *Spinnerets*. Normal araneid conformation (Coddington, 1989; Scharff and Coddington, 1997; Griswold *et al.*, 1998). ALS: MAP and nubbin medial (Plate 2.1.a, d); piriform field widely distributed, but a large variation between checked species with approximately 225 spigots counted in the illustrated *P. illepidus* (Plate 2.1.b), 95 in *P. laciniosus* Keyserling (Plate 2.1.c), and 80 in *P. milledgei* sp.nov. (Plate 2.1.d). PMS: all spigots on anterior two-thirds of area; mAP + nubbin posterior; aciniform brush relatively sparse, about 14 spigots, grouped in anteromedial corner (Plate 2.2.a). PLS with basally placed cylindrical spigots, closely grouped triad and approximately 30–40 aciniform spigots (Plate 2.2.b). *Epigyne*. Short and broad or a longer triangular or diamond-shaped plate (Figs. 2.1.b, d, f, h). Anterior plate rebordered giving a deep rim around the distal margin and laterally to a varying extent (Figs. 2.3.a, 2.17.g). Most species with a distal bulge at the midline in lateral view (Figs. 2.3.i, 2.17.c), and/or a pair of secondary bulges (Figs. 2.3.b, c) that may appear as lobes (Figs. 2.12.c, d). Posteriorly with a median plate at least basally, reduced to a ridge of variable height away from the base in species with medium–long epigynes (Figs.

2.3.b, 2.17.h); broad and fused with, or closely adjacent to, the lateral plates for much of the length in *P. columnaris*-group (Fig. 2.9.b). Foveal shape diagnostic for most species. Glandular spermathecae lie at the base of epigyne just within the abdomen. Copulatory ducts either lost or appearing as a posterior lobe of the spermathecae in the *P. illepidus*-group, with only pores leading away from the visible external parts of the epigyne (Fig. 2.1.b). In other groups there are short to medium length copulatory ducts along the lines where posterior lateral plates fuse with the median plate (Figs. 2.1.d, f, h). *Colour.* Variable. The only fairly consistent areas of colouration are those that are not involved in cryptic camouflage: most species have at least some black colouration around the secondary eyes, especially on the slightly tubercular lateral eyes; dorsal eye tubercle and adjacent areas of caput usually orange to creamy-yellow, remaining carapace is usually dark in the *P. illepidus*-group and *P. laciniosus*, paler in others; caput hairs always pale, usually appear whitish at least in alcohol specimens; ventral femora of *P. illepidus*-group usually dark with a deep blue refractive shine. The femora of other species groups are pale or yellow–orange contrasting with one or more dark bands, where the blue shine may again be apparent. Green pigments occur in some specimens both on the abdomen and on the legs, most commonly in tropical species but also as paler bluey-green lichen-like patches in southern species. Green pigments quickly break down in alcohol.

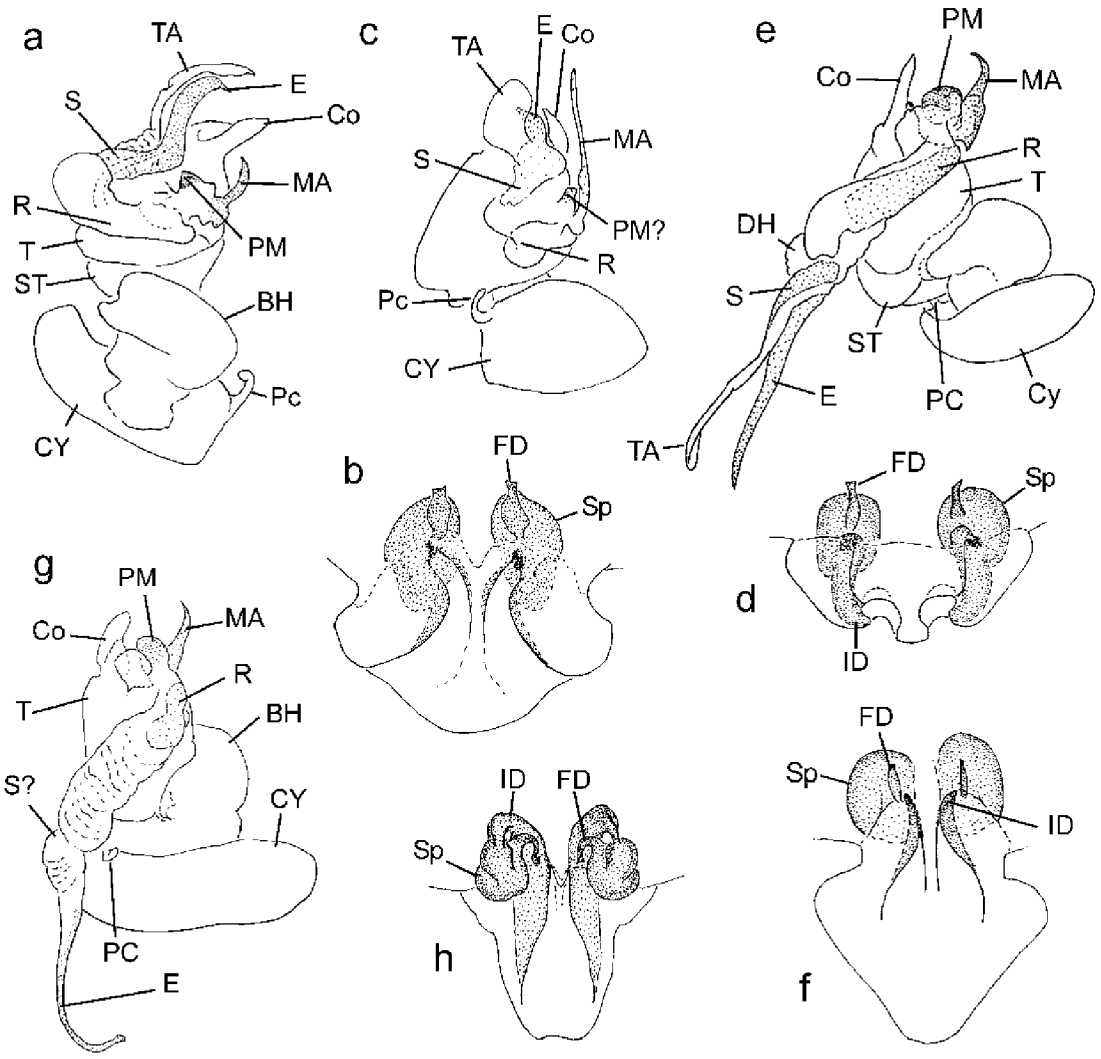

FIGURE 2.1. *Poltys* genitalic characters, expanded male palpus and epigyne internal structure, posterior view. a–b, *P. illepidus*; c–d, *P. milledgei*; e–f, *P. frenchi*; g–h, *P. laciniosus*. Not to scale.

Males. Many features are like juvenile females at a similar stage of development (2–4 moults). In somatic characters, early maturing males can be quite different from late maturing males of the same species (e.g., as shown Figs. 2.18.f–i). *Prosoma.* Carapace usually pear-shaped in dorsal view, widest between coxae II and III, longer than wide with

a poorly to well-defined eye tubercle anteriorly (Figs. 2.4.c, 2.8.d), sometimes with small protrusions above PME (Fig. 2.18.a). In profile (Fig. 2.4.a) carapace +/- level or highest at eye tubercle. Chelicerae similarly proportioned to female. Cheliceral fangs short to medium. Labium and maxillae similar to female with white or pale edges, endite tooth absent (Fig. 2.4.d). Sternum similar shape to that of female but reinforced by sclerotisation that continues around between coxal bases to meet similar continuations from areas dorsal to the coxal bases. *Eyes.* As female but ocular area more compact and eyes relatively larger (Fig. 2.4.d) and rather variable in relative sizes. *Legs.* 1243. No coxal hooks. Femora almost straight in most species, slightly broadened in *P. columnaris*-group (Figs. 2.8.a, f); macrosetae as female. Patellar macrosetae as female. Anterior tibiae almost straight (Fig. 2.4.a); dorsal macrosetae may be flattened as on patellae (Fig. 2.8.e); prolaterally with a few macrosetae. Larger males, which have been through more moults, have a few more macrosetae (Fig. 2.18.j), but juvenile females are developing mature female-like legs with more macrosetae by this stage. Metatarsi also with only a few macrosetae. *Abdomen.* Book lung covers smooth. Abdominal shape similar to females of similar size, i.e. some differentiation of shapes developing but still basically ovoid (Figs. 2.18.b, e). *Palpal organ.* A more or less full complement of typical araneid sclerites is present in most species but some structures (especially TA where present) are rather simplified. Expanded views of the Australian species groups are shown in Figs. 2.1.a, c, e, g. Of the tegular sclerites, all species have a long slender MA with a broad base (Plate 2.3.d, Fig. 2.19.a); a conductor is present that is reduced in the *P. columnaris*-group but is sturdy in others (Plates 2.4.b, 2.6.a); and a third sclerite is labelled here as a paramedian apophysis (PM).

This is closely associated with the base of the MA and is possibly a separated section of that sclerite. The PM is well developed in *P. frenchi* and *P. laciniosus*-groups (Plates 2.5.e, 2.6.b), is smaller in the *P. illepidus*-group (Plate 2.3.d) and extremely small or absent in *P. columnaris*-group (a small sclerotised patch with label 'PM?' on Fig. 2.1.c). This sclerite appears to be homologous between these *Poltys* species-groups, but is not necessarily homologous to the PM of other taxa (see Scharff and Coddington, 1997 for a discussion). In the embolic division all species have a radix; a stipes and distal haematodocha is definitely present in *P. illepidus* and *P. frenchi*, probably also in other species (Figs. 2.1.a, e, Plate 2.3.a); a long, narrow TA that widens to a lamina distally is present in *P. illepidus*-group and *P. frenchi*-group (Figs. 2.1.a, e, Plate 2.5.f), is shorter but broad in *P. columnaris*-group (Figs. 2.1.c, Plate 2.4.b) but absent in *P. laciniosus*-group (Figs. 2.1.g, Plate 2.6.a); the embolus varies between a short, stout rod in *P. columnaris*-group (Plate 2.4.b) to a long, wire-like, grooved structure in *P. laciniosus*-group (Plate 2.6.a). The paracymbium is a well developed hook (Fig. 2.1.a). Femoral tubercles are absent. Macrosetae are absent from the palpal patella. *Colour.* Less variable than females. Most species have at least some black colouration around the secondary eyes. Prosoma and legs mostly pale olive/brown, usually with black markings in centre of carapace and orange or yellow on the dorsal eye tubercle. Distal metatarsi and tarsi usually pale with dark rings. Larger males usually more strongly coloured than smaller specimens. Abdomen with a pattern of brown/grey and black on white.

Distribution

Poltys species are found from equatorial western and southern Africa through southern Asia and south to mainland Australia, north to Japan and on at least some southern Pacific islands (Fig. 1.1). Within Australia half of the species are only present in the far north. No *Poltys* have been recorded from either Tasmania or New Zealand.

Australasian species

The following species of *Poltys* are treated in detail in this thesis:

Poltys illepidus, *P. stygius* Thorell (*Poltys illepidus*-group); *P. jujorum* sp.nov., *P. milledgei* (*P. columnaris*-group); *P. frenchi*, *P. timmeh* sp.nov. (*P. frenchi*-group); *P. laciniosus*, *P. grayi* sp.nov., *P. noblei* sp.nov. (*P. laciniosus*-group).

2.3.2. Key to Australian *Poltys* species

Note that some colouration characters are good for recent specimens in alcohol but may be confusing for older material. Unfortunately, due to intraspecific variation in somatic morphology, most key characters are genitalic.

1a Male 2

1b Female 9

2a (1a) TA present in palp; embolus fairly stout; PM absent–small and does not project dorsally between MA and conductor (Fig. 2.4.f, g), or if PM large then a rounded curved plate (Fig. 2.13.f) 3

2b TA absent from palp; embolus long and thin with groove (Fig. 2.19.b); PM heavily sclerotised and projecting between MA and conductor like a clenched fist (Fig. 2.19.b) 6

3a (2a) TA of palp flanks embolus retrolaterally, both +/- equal length; conductor large (Figs. 2.4.f, 2.13.g). Anterior eye tubercle gently curved between median eyes, not obviously extended to a blunt point (Fig. 2.13.c) 4

3b Visible part of palp TA dorsal to embolus (Fig. 2.9.e); conductor reduced and displaced towards MA, beneath embolus (Fig. 2.9.e). Eye tubercle long and ends in blunt point (accentuated by tufted setae) between median eyes (Fig. 2.8.d) ..... (*P. columnaris*-group) 8

4a (3a) Embolus and TA arise retrolaterally in palp, not obscured by cymbium (Fig. 2.13.g); PM a large curved plate (Fig. 2.13.f). Eye tubercle well defined, narrow at base in lateral view (Fig. 2.13.a); carapace creamy-white with bright yellow–orange eye tubercle; sternum pale with dark border (NE Qld).....*P. frenchi*

4b Embolus and TA origin in palp obscured by cymbium (Fig. 2.4.h); PM an angular sclerotised bump (Figs. 2.4.f, g). Eye tubercle short and broad; carapace and sternum usually olive-brown (usually with some orange on eye tubercle) (Figs. 2.4.a, c).....(*P. illepidus*-group) 5

5a (4b) Embolus sharply curved in prolateral view of palp (Fig. 2.4.f, Plate 2.3.b) (northern Australia).....*P. illepidus*

5b Embolus longer and more openly curved (Figs. 2.4.i, Plate 2.3.d) (far north-east Queensland) .....*P. stygius*

6a (2b) Palpal conductor strongly twisted towards the prolateral (Figs. 2.19.b, Plate 2.6.b); embolus long and strongly curved distally, curve of radius usually outside cymbium in ventral view (Fig. 2.19.b); usually with well-developed protrusions above PME on dorsal eye tubercle (Figs. 2.18.c, d) (most of mainland Australia) .....*P. laciniosus*

6b Palpal conductor less twisted, more or less directed apically; embolus shorter than in 6a and gently curved, radius usually within cymbium in ventral view (Figs. 2.19.e, h); with or without protrusions above PME on dorsal eye tubercle..... 7

7a (6b) Tip of embolus with distinct translucent but strongly light reflective flange (Fig. 2.19.h arrowed, Plate 2.6.c). Protrusions above PME variable (E. coast) .... *P. noblei*

7b Tip of embolus with only a trace of a flange or barb (Figs. 2.19.e, Plate 2.6.e). Without protrusions above PME (Lord Howe Island) ..... *P. grayi*

8a (3b) Eye tubercle massive, over half as long as rest of carapace, clypeus >1x AME (Figs. 2.8.a, d), usually with leaf-shaped macrosetae on distal patellae (Fig. 2.8.e) (NE Qld) ..... *P. jujorum*

8b Eye tubercle less massive, less than half as long as rest of carapace, clypeus <1x AME (Figs. 2.8.f, h); often with elongate flattened macrosetae on distal patella (Fig. 2.8.i) (N NT and Kimberley) ..... *P. milledgei*

9a (1b) Epigyne widest point not at base, or if basal, then much wider than long (Figs. 2.3.a, 2.9.a). Four prolateral cheliceral teeth (alternate large small large small—LsLs, Fig. 2.2.m) 10

9b Epigyne widest at base, usually long (Fig. 2.16.a). Usually only three prolateral cheliceral teeth (missing first small tooth—LLs, Fig. 2.14.f) .... (*P. laciniosus*-group) 13

10a (9a) Epigyne much wider than long; foveae rounded pockets (Fig. 2.9.b). Eye tubercle long and ends in blunt point between median eyes (accentuated by tufted setae) (Fig. 2.7.a). Glossy black maculae on dorsal abdomen just anterior to spinnerets (Fig. 2.7.k) .....(*P. columnaris*-group) 15

10b Epigyne as wide as long or up to 2x wider; foveae elongate, +/- open (Figs. 2.3.f, 2.12.b). Anterior eye tubercle gently curved between median eyes, not obviously extended to a blunt point (Fig. 2.11.e). Dorsal abdomen without glossy black maculae 11

11a (10b) Epigyne spade-like (as in cards), often only lightly sclerotised and delicate, widest point at less than half length (Figs. 2.12.a, c); foveae wide and shallow (Figs. 2.12.b, c). Carapace usually pale creamy-grey (Figs. 2.11.a, e) (NE Qld) .....*P. frenchi*

11b Epigyne widest point usually at half length or further, spade to fan-shaped; foveae narrow and angled or wide and deep (Figs. 2.3.a–j). Carapace usually dark (except variable amount of orange–yellow on and posterior to eye tubercle) (Figs. 2.2.a, d) .....(*P. illepidus*-group) 12

12a (11b) Epigynal foveae narrow, greatest width usually much less than distance to lateral exterior angle of epigyne, and often boomerang-shaped; median plate and ridge often quite short (Figs. 2.3.b, d–f) (northern Australia) ..... *P. illepidus*

12b Epigynal foveae wide and deep, greatest width usually subequal to distance to lateral exterior angle of epigyne, often paddle-shaped; median plate and ridge often longer, extending more deeply into epigynal groove (Fig. 2.3.h, j) (far north-east Queensland) ..... *P. stygius*

13a (9b) Epigyne tip broad and bluntly rounded (but rim often translucent and may confuse the outline) (Figs. 2.16.a, c); median ridge strongly reduced away from base (less so in Kimberley specimens), producing a single large fovea (Figs. 2.16.b, d, g). Carapace dark; usually with well-developed protrusions above PME on dorsal eye tubercle (Figs. 2.14.a, 2.15.d) (most of mainland Australia) ... *P. laciniosus*

13b Epigyne tip bluntly to sharply pointed (but some exceptions) (Figs. 2.17.a, g); median plate continues from base as a strong ridge, producing two distinct foveae (Figs. 2.17.d, f). Carapace fuscous to creamy-white; with or without protrusions above PME on dorsal eye tubercle (Figs. 2.15.b, c) 14

14a (13b) Epigyne margins converge almost straight from base to tip, forming neat triangular plate, tip often quite acute (Figs. 2.17.e, g). Protrusions above PME variable (E. coast) ..... *P. noblei*

14b Epigyne margins usually parallel near base before converging towards tip, tip usually a rounded point (Fig. 2.17.a). Without protrusions above PME (Fig. 2.15.e) (Lord Howe Island) ..... *P. grayi*

15a (10a) ALE almost midway between median eyes and PLE (Fig. 2.7.b) (NE Qld) ..... *P. jujorum*

15b ALE distinctly closest to median eyes (Fig. 2.7.g) (N NT and Kimberley) .... *P. milledgei*

2.3.3. The *P. illepidus*-group

Included Australasian species: *Poltys illepidus*, *P. stygius*. Other described species (SE Asia): *Poltys acuminatus*, *P. pannuceus* Thorell, *P. unguifer* Simon.

This group contains the 'typical' species that are most commonly associated with the name *Poltys*. In Australasia at least two identifiable named species are found: *P. illepidus* and *P. stygius*. Both occur from Australia to the Asian mainland and a third, which may belong to this group, *P. pannuceus*, is recorded from Sumatra to Burma (see Table 2.1). The types of the other described species listed above are juveniles and are not uniquely identifiable at the present time. Other species that are unmistakably of this group are found from Africa to Japan and the Caroline Islands (females in BPBM). Female characters that unite the group include a relatively broad abdomen, a low broadly domed carapace with medium to short eye tubercle, long quite slender legs (with less broadening of the femora than is seen in *P. columnaris*-group, for instance), and the epigyne well developed into a broad fan-shaped plate. In the two Australian species, the posterior lateral epigynal plates are relatively flat and there are no obvious copulatory ducts leading off the foveae. The internal epigynal structure of *P. pannuceus* has not been investigated but externally it appears intermediate between these species and the *P. columnaris*-group (Fig. 2.22.h). Males are less easily differentiated from those of some other groups, but the eye tubercle is broad and poorly defined and the palpal organ has a long thick embolus, originating dorsally, and a well developed TA. A male of unknown species, but apparently belonging to the *P. illepidus*-group, has been examined from Genting, Malaysia (19143 JAM.).

The two species that occur in Australia are of similar appearance and can be difficult to separate, even using genitalia, without side-by-side comparison., They are, however, well separated genetically (in the COI gene) and the egg sacs are different in colour.

2.3.3.1. *Poltys illepidus* C.L. Koch

Figs. 2.1.a, b, 2.2.a–j, 2.3.a–f, 2.4.a–h, 2.5.a, Plates 2.1.a, b, 2.7.a–c, 8.1.a, 8.2.a–c, 8.4.b.

Poltys illepidus C. L. Koch, 1843: 97, f. 821. Female(?) holotype, "East India, Singapore, Bintang"; not located. Simon, 1885: 448, 1895: 892. Chrysanthus, 1961: 211. Davies, 1988: 316, female only. The specimens discussed or figured by Pocock, 1900: 236, Chikuni, 1989: 81, Barrion and Litsinger, 1995: 579 and Ogasawara, 2000 require confirmation, see Remarks below.

Poltys coronatus Keyserling, 1886: 128, f. 10. Female holotype from Cape York Queensland, Australia; "in Bradley's collection", not located. NEW SYNONYMY.

Poltys keyserlingi Keyserling, 1886: 129, pl. 10, f. 3. Juvenile holotype from Gayndah, Queensland, Australia; in ZMH, examined. NEW SYNONYMY.

Poltys multituberculatus Rainbow, 1898: 82, pl. 18, f. 2. Female holotype from Cooktown, Australia; in AM, KS8696, examined. Rainbow, 1916: 118. NEW SYNONYMY.

Poltys penicillatus Rainbow, 1920: 249, pl. 29, f. 57. Female holotype from Lord Howe Island, Australia, Dec. 1915–Jan. 1916, A.M. Lea; in SAMA, N1981313, examined. NEW SYNONYMY.

Remarks

Poltys keyserlingi and *P. coronatus* were tentatively synonymised with *P. illepidus* by Simon (1899). Only Bonnet (1958), however, accepted these synonymies so Platnick (2006) has been followed and these are considered new synonymies here. Despite the type of *P. keyserlingi* being a juvenile, only one species in the *P. illepidus*-group has been recorded from SE Queensland, where this specimen was collected, so it seems a reasonable assumption. *Poltys coronatus* also cannot be identified with absolute certainty as Keyserling only figured the anterior view of the epigyne; but it is more likely to be *P. illepidus* than *P. stygius*.

The type of *P. moluccum* has not been located. This species was synonymised with *P. illepidus* by Simon (1885). The figures and the described habit (Doleschall, 1859) suggest it is not *P. illepidus* as described here. (See also under *P. frenchi*).

Females previously identified as *P. illepidus* have been collected from several areas that border the geographical range accepted here. These require males for verification as the epigynes are consistently outside the range of variation seen in areas where males have been checked. For instance, while the specimen redescribed by Barrion and Litsinger (1995) from the Philippines has not been examined, two other specimens from this area (ZMUC, the epigynes of which could be interpreted as the illustration given) are more

likely a separate species. Several specimens from India and Sri Lanka (as discussed by Pocock, 1900) have also been examined and again are most likely different. The Japanese species illustrated by Ogasawara (2000) and identified as *P. illepidus* also does not appear to fit within the species as recognised here, and is probably the same species that is photographically illustrated by Chikuni (1989). Chikuni's male is certainly from the *P. illepidus*-group but the palpal organs are so similar between species it is not possible to ascertain the species without comparing specimens.

Selected material examined

AUSTRALIA: ***New South Wales:*** ♀ S42578, Lismore, 28°49′S 153°16′E, 26 Jun. 1961. ***Norfolk Island:*** ♀ KS33926, Norfolk Island, 29°05′S 168°00′E, 17 Feb. 1938; ♀ KS34803, Point Howe, 29°05′S 168°00′E, 3 Aug. 1992. ***Northern Territory*:** ♂ KS55734, Darwin, East Point, 12°25′S 130°49′E, 21 May 1999; ♀ KS55732, Litchfield NP, Florence Falls, 13°09′S 130°46′E, Aug. 1998; ♀ S42523, West Alligator Mouth, 12°11′S 132°16′E, 22 Jul. 1979; ♀♀ WA98/1985–86, Cahills Crossing, 12°25′S 132°58′E, 29 May 1992. ***Queensland:*** ♀ KS33923, Cairns District; ♀ KS33927, Cooktown, 15°28′S 145°15′E; ♂ KS58019, near Dalrymple NP, 19°49′29″S 146°03′48″E, 12 May 2000; ♀ KS33929, ♂ KS73156, Edmonton, 17°01′S 145°44′E, 14 May 1972 and 20 Sep. 1976; ♀ KS90970, 4.3 km W of junct. Hopevale & Lakefield NP rds, 15°18′26″S 145°00′48″E, 17 May 2000; ♂ KS58028, 9 km S of Ilbilbie, 21°47′05″S 149°22′12″E, 26 May 2000; ♂♀ KS70353–54, 7.8 km E of Lakeland, 15°49′59″S 144°53′41″E, 15 May 2000; ♂ KS58025, N of Marlborough, 22°41′08″S 149°37′20″E, 26 May 2000; ♂ KS58020 nr Mt Elliot NP,

19°23′50″S 147°00′54″E, 25 May 2000; ♀ KS90971, Rockhampton, Kershaw Gardens, 23°21′36″S 150°31′02″E, 27 May 2000; ♂♀ KS58034–35, Rockhampton, Naughton St, 23°22′08″S 150°29′11″E, 26 May 2000; ♀♂ KS75537–38, Trinity Park, track to Earl Hill via Reed Rd, 16°47′59″S 145°42′33″E, 6 Jan. 2002; ♀ KS86258, ♂ KS86253, Trinity Park, 16°48′S 145°42′E, 17–18 Sep. 2003; ♀ (MMUS), Caloundra, 26°48′S 153°08′E, 15 Jun. 1941; Beaudesert, 27°59′S 152°59′E, 29 Jun. 1980; ♀ S20786, Chelmer, Brisbane, 27°30′S 152°58′E, 2 Dec. 1992; ♀ S42575, Bundaberg, 24°52′S 152°21′E, 11 May 1962; ♀ S25387, Deepwater NP, 24°18′S 151°56′E, 26 Sep. 1992; ♀ S42530, Flinders Is, 14°10′S 144°15′E, 18 Aug. 1979; ♀ S42572, Hammond Is, Torres Strait, 10°32′S 142°12′E, 8 Jul. 1974; ♀ S42623, Jardine River, Cape York, 11°18′S 142°37′E, 28 Aug. 1985; ♀ S42549, Magnetic Island, 19°08′S 146°50′E, Jun. 1965; ♀ S42568, Mt Cook, NEQ, 15°30′S 145°16′E, 12 Nov. 1975; ♀ S42563, Port Stewart, 14°04′S 143°01′E, 23 May 1973; ♀ S42602, Stradbroke Is, 27°36′S 153°27′E; ♀ S42538, Taringa, 27°29′S 152°59′E, 19 Oct. 1923; ♀ S42573, Terry Beach, Prince of Wales Island, 10°41′S 142°04′E, 2 Jul. 1976; ♀ S42531, Toowoomba, 27°33′S 151°57′E, 26 Mar. 1980. ***Western Australia*:** ♀ KS55746, King Leopold Range, Silent Grove camp site, 17°04′S 125°14′E, 5 Jun. 1999; ♀ NN12182, Cape Wellington, 15°09′S 124°50′E, 17 Jul. 1999; ♀ NN12181, Careening Bay, 15°06′S 125°00′E, 22 Jul. 1999; ♀ NN12184, Roebuck Bay, Broome, 17°58′34″S 122°13′50″E, 10 Jul. 1998; ♀ WA99/244, Barrow Island, Mattress Point, 20°44′43″S 116°28′27″E, 29 Oct. 1998; ♀ WA99/243, Derby, 17°18′S 123°37′E, 17 Sep. 1998; ♀ WA98/1969, Theda Pass campsite, 14°47′S 126°38′E, 13 Jun. 1992. INDONESIA: ***West Papua*:** ♀ (HNHM), Enarotali, 13 Jul. 1962; ♀♀ 8180 (RMNH), Merauke, 1956–57 (illustrated by

Chrysanthus, 1961). ***Java*:** ♀ 6087 (MNHNP), "Savu"; ?♀ 192/1025 (NHRM), Sindanglaya; ♀♀ 20.305 (NHMW) Krakatau: Lang Island; ♀♀ (3) (RMNH), Surabaya, 1933–38. ***Lombok*:** ♂♀ (RMNH ex coll. CLD), Kute, 12–14 Jan. 1990 & 8–19 Feb. 1990. ***Sumatra*:** ♀ 20.304 (NHMW), Medan. MALAYSIA: ***Pinang*:** ♂ 8313 (JAM), Penang, 13–16 Aug. 1979. PAPUA NEW GUINEA: ***Central*:** ♀ 20.303 (NHMW), Yule Island. ***East Sepik*:** ♀ KS8015, Kairiru Island, near lake, 3°20′S 143°33′E, 23 May 1976. ***Morobe*:** ♀♀ N1998780–81, Lae, 6°45′S 147°00′E, Jul. & Aug. 1954. SOLOMON ISLANDS: ***Central*:** ♀ (BMNH), Tulagi. THAILAND: ♀ 1968.2.20.3 (BMNH), Thailand, 17 Apr. 1961; ♀ 7615 (MNHNP) "Bankok".

Reared specimens deposited in Australian museums: ex ♀ KS86257, QLD, Trinity Park, N side of Moores Gully, 'The Haul' Rd, 16°48'S 145°42'E, 17 Sep 2003, M&S: ♂ to SAMA NN21923; ♂ to WAM T62876; ex ♀ KS86259, QLD, Trinity Park, S side of Moores Gully 16°48'S 145°42'E, 18 Sep 2003, M&S: ♂ to QM S66571; ♂♀ to NTM; ex ♀ KS58036, QLD, Rockhampton, Kershaw Gardens, 23°21'S 150°31'E, 27 May 2000, M&S: ♂ to QM S66572.

Diagnosis

Females. From other species groups by fan-shaped epigyne (Fig. 2.3.a), broad, low, darkly coloured carapace (Figs. 2.2.d, e), no or little broadening of front femora (Fig. 2.2.a) and relatively broad, rounded abdomen (Figs. 2.2.c, g–j). From *P. stygius*: epigynal foveae relatively narrow and often boomerang-shaped (Figs. 2.3.d–f); posterior lobes of

spermathecae often visible level with or distal to the margin of the epigynal furrow in posterior view (Figs. 2.3.b, d, e).

Males. From other species groups except some *P. laciniosus*-group specimens by short, poorly defined eye tubercle (Figs. 2.4.a, c), from *P. laciniosus*-group by presence of TA in palpal organ (Fig. 2.4.g). From *P. stygius*: difficult without direct comparison, but *P. illepidus* have a shorter, more sharply curved embolus and a shorter conductor (Figs. 2.4.f–h, Plate 2.3.b).

Description

Female. Carapace length range 4.17–8.75. As commented above, the holotype has not been located. The figured female is used as an exemplar. *Drawn specimens*. Figs. 2.1.b, KS33929; Figs. 2.2.a, c–e, KS86258 (male Fig. 2.2.b from Fig. 2.4.a); Fig. 2.2.f, AM juvenile ex Cooktown; Figs. 2.2.g, h, KS33929; Figs. 2.2.i, j, KS33923; Figs. 2.3.a, b, S20786; Fig. 2.3.c, KS75537; Fig. 2.3.d, KS90970 (DNA spec.); Fig. 2.3.e, KS55732 (DNA spec.); Fig. 2.3.f, N1981313 (type of *P. penicillatus*).

Female KS86258. *Prosoma.* Carapace: length 7.33, width 5.83, height 1.92; dome broad and low (Fig. 2.2.e); eye tubercle distinct but broad basally both in dorsal and lateral views (Figs. 2.2.a, d). Chelicerae: paturon with 4 promarginal teeth (as *P. stygius*, Fig. 2.2.m). Labium: length 0.86, width 1.27. Sternum: length 2.86, width 2.98; deeply indented anteriorly for labium; sternal extensions at bases of legs II–IV. *Eyes.* (Figs. 2.2.a, e), AME > PME = PLE ≥ ALE; ALE ca 1 x its own diameter from AME, ventral margin of ALE is level with mid point of AME. *Legs.* (Figs. 2.2.a). P+TL I: 11.50, II: 10.50, III:

6.83, IV: 8.42; front femora only slightly broadened and usually at greatest diameter at, or basal to, mid-point of length; patellal and tibial macrosetae not flattened (but may be in juveniles, e.g., Fig. 2.2.f, and adult females from SE Asia). *Abdomen.* (Figs. 2.2.a, c). Length 13.33, width 10.42; equally broad at humeral and posterior tubercles; 'microsigillae' well developed. *Epigyne.* A broad fan-shaped plate, widest point at about half length (Fig. 2.3.a); foveae form narrow–medium width grooves, partly covered basally, separated by a strong median ridge (Fig. 2.3.b); rim well formed on distal margin of anterior plate, distinct to the broadest point, expanding posteriorly into bulges near distal tip (Figs. 2.3.a–c); posterior lobe of spermathecae visible through posterior cuticle level with the external edge of the epigynal groove (Fig. 2.3.b); no copulatory ducts visible (Fig. 2.1.b); spermathecae separated by half a spermatheca width or less. *Colour in alcohol.* Carapace mostly rich dark brown with red pro-foveal suture; dorsal caput, eye tubercle and patches anterior to PLE orange; caput hairs golden. Chelicerae with basal yellow patch, rest brown, darkening distally. Labium and maxillae orange-brown. Sternum yellow anteriorly, otherwise brown. Pedipalps yellow with black markings. Femora I and IV mostly black–brown with orange patches and a strong blue shine on glabrous areas; femur II slightly lighter; III mostly yellow with dark distal band; all distal legs mottled orange-brown–black. Abdomen ventrally black around pedicel, ringed by white then dorsal colouration; dorsally a rich tapestry of browns, yellow–orange and black; patterns accentuated by tufts of coloured setae.

Male. Carapace length range 1.00–1.27. *Drawn specimens*. Fig. 2.1.a, KS58033; Figs. 2.4.a–h, KS86253.

Male KS86253. *Prosoma.* Carapace: length 1.14, width 0.84, height 0.39; eye tubercle poorly defined, broad and almost without any dip between caput and eye tubercle in lateral view (Figs. 2.4.a, c, d). Labium: length 0.10, width 0.19. Sternum: length 0.53, width 0.49. *Eyes*. (Figs. 2.4.a, d). AME ≥ PME > PLE ≥ ALE; ALE ca 1/3 x its own diameter from AME; ventral margin of ALE is at mid point of AME. *Legs*. (Fig. 2.4.a). P+TL I: 1.35, II: 1.25, III: 0.69, IV: 0.94; distal patellal and tibial macrosetae of legs I and II flattened into leaf-like blades (Fig. 2.4.e). *Abdomen*. (Figs. 2.4.a, b) Length 1.57, width 1.12; a rather skewed ellipsoid, widest point near apex. *Palpal organ*. Radix–stipes joint retrolateral, almost all of stipes hidden by cymbium; embolus and TA arise dorsally (normally obscured by cymbium, Fig. 2.4.h); embolus a stout, sharply curved rod, tapering to a point after the curve (Fig. 2.4.f, Plate 2.3.b); TA narrow at base, flanking the embolus, broadens to a lamina and free of embolus apically (Plate 2.3.a); PM a pointed sclerotised bump (Fig. 2.4.e, f, Plate 2.3.b). *Colour in alcohol*. Carapace olive-grey with black median markings; dorsal eye tubercle yellow-orange. Chelicerae as carapace with fuscous markings. Labium, maxillae and sternum olive-grey. All femora pale basally to dark distally; distal legs mottled fuscous turning into distinct dark banding on distal metatarsi and tarsi; underside of patella–metatarsus III and IV with large black spots that merge together. Abdomen ventrally dark with white patches posterior to book lung covers; dorsally with dark pattern on a white ground. Palpal cymbium mottled black apically and

down dorsal centre-line, rest olive-grey; apicodorsal points of tibia, patella and, to a lesser extent, femur mottled black, rest lighter mottling to creamy-white on femur.

Variation

As well as the variation in female abdominal shape shown (Figs. 2.2.a, c, g–j, also with taller humeral tubercles and as shown for *P. stygius*, Figs. 2.2.k, l, n), there is considerable variation in features such as relative leg lengths, length of eye tubercle, epigyne shape (Figs. 2.3.b, d–f) and development of macrosetae. One feature, which seems to be geographically linked, is the presence of dark, flattened macrosetae on some patellae and front tibiae. In the north-west (Northern Territory and Western Australia), all juvenile and male specimens show this feature (Figs. 2.2.f, 2.4.e). In north-east Queensland specimens, however, these flattened macrosetae are sometimes small or absent on one or more legs, and they become progressively less frequent moving southwards. No individuals with strongly developed flattened macrosetae were found anywhere south of Edmonton (17°S). In Australia, the flattened macrosetae do not persist in adult females, but elsewhere some females have been recorded with genitalia consistent with *P. illepidus* but bearing varying numbers of large flattened macrosetae. Presence of similar macrosetae also appears to be variable in *P. stygius*.

The northern and more southerly eastern Australian populations show a consistent genetic differentiation in the examined fragment of the COI gene (see Chapter 4). No consistent morphological differences could be found, but with only three females tested from each population and the inherent variability within *Poltys* species, there may not be

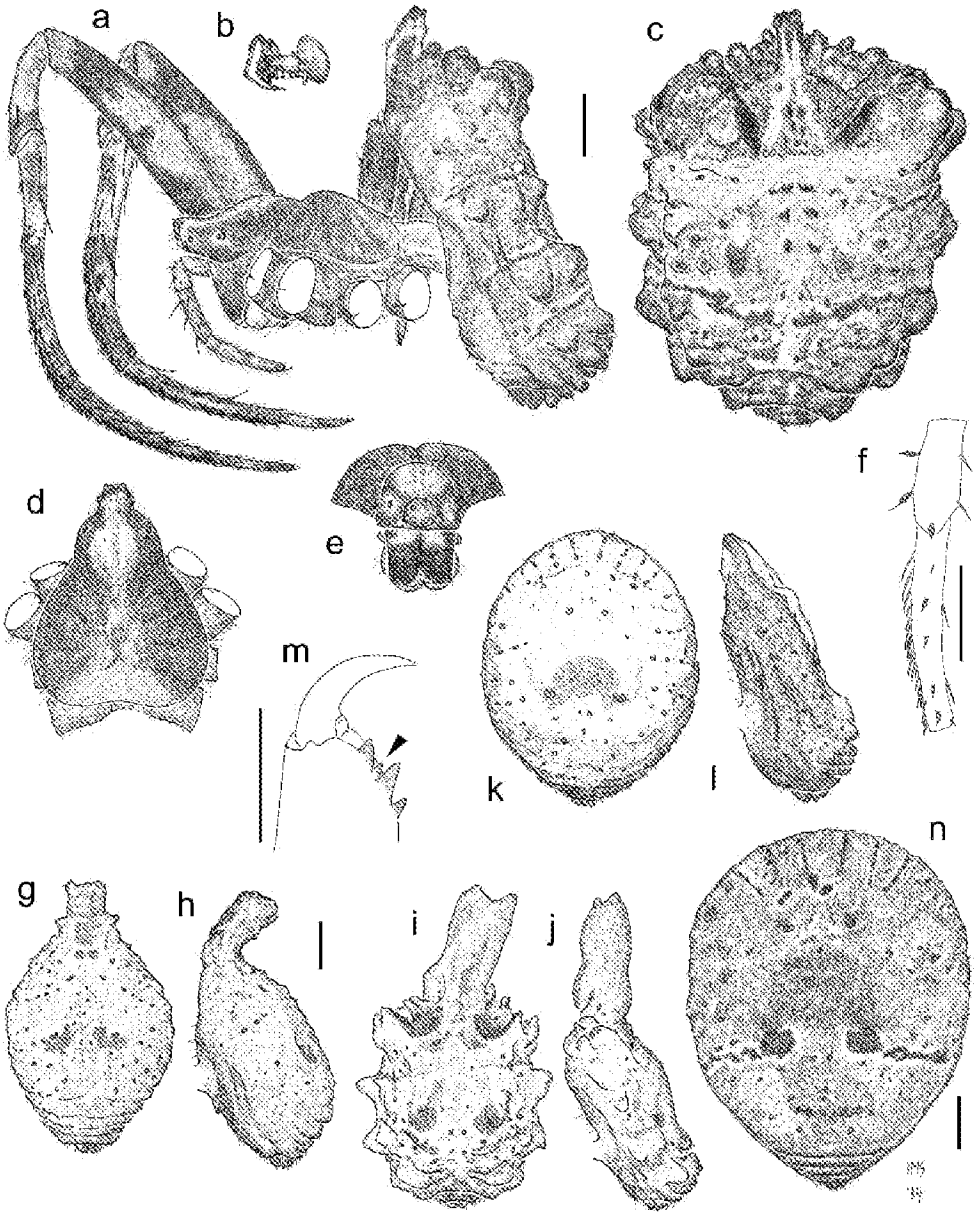

FIGURE 2.2. *Poltys illepidus*-group, female characters. a–j, *P. illepidus*, k–n, *P. stygius*. a, female general lateral view; b, male at same scale; c. abdomen, dorsal; d, carapace and coxae, dorsal; e, frontal carapace and chelicerae; f, left patella and tibia I of a juvenile female showing flattened macrosetae; g–l, examples of variation in abdominal shape seen in *P. illepidus-group*, dorsal and lateral; m, left chelicera and fang, prolateral. n, *P. stygius*, dorsal abdomen of holotype. Scale lines: a–e, g–l, n, 2 mm; f, 1 mm; m, 0.5 mm.

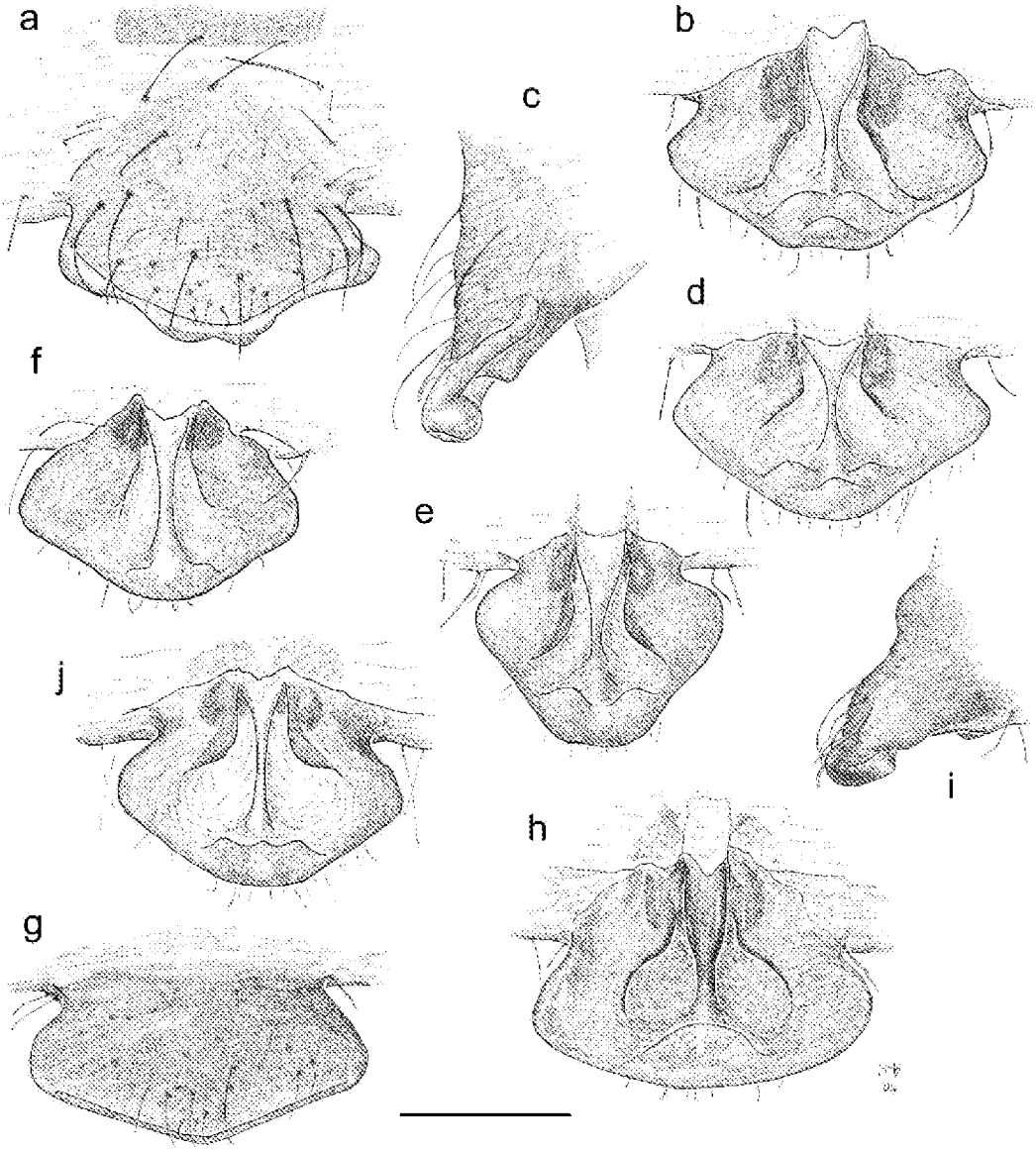

FIGURE 2.3. *Poltys illepidus*-group epigyna. a–f, *P. illepidus*: a–c, anterior, posterior, lateral; d–f, examples of variation, posterior views (f, type of *P. penicillatus*). g–j, *P. stygius*: g–i, holotype, epigyne anterior, posterior and lateral; j, variant, posterior. Scale line: 0.5 mm.

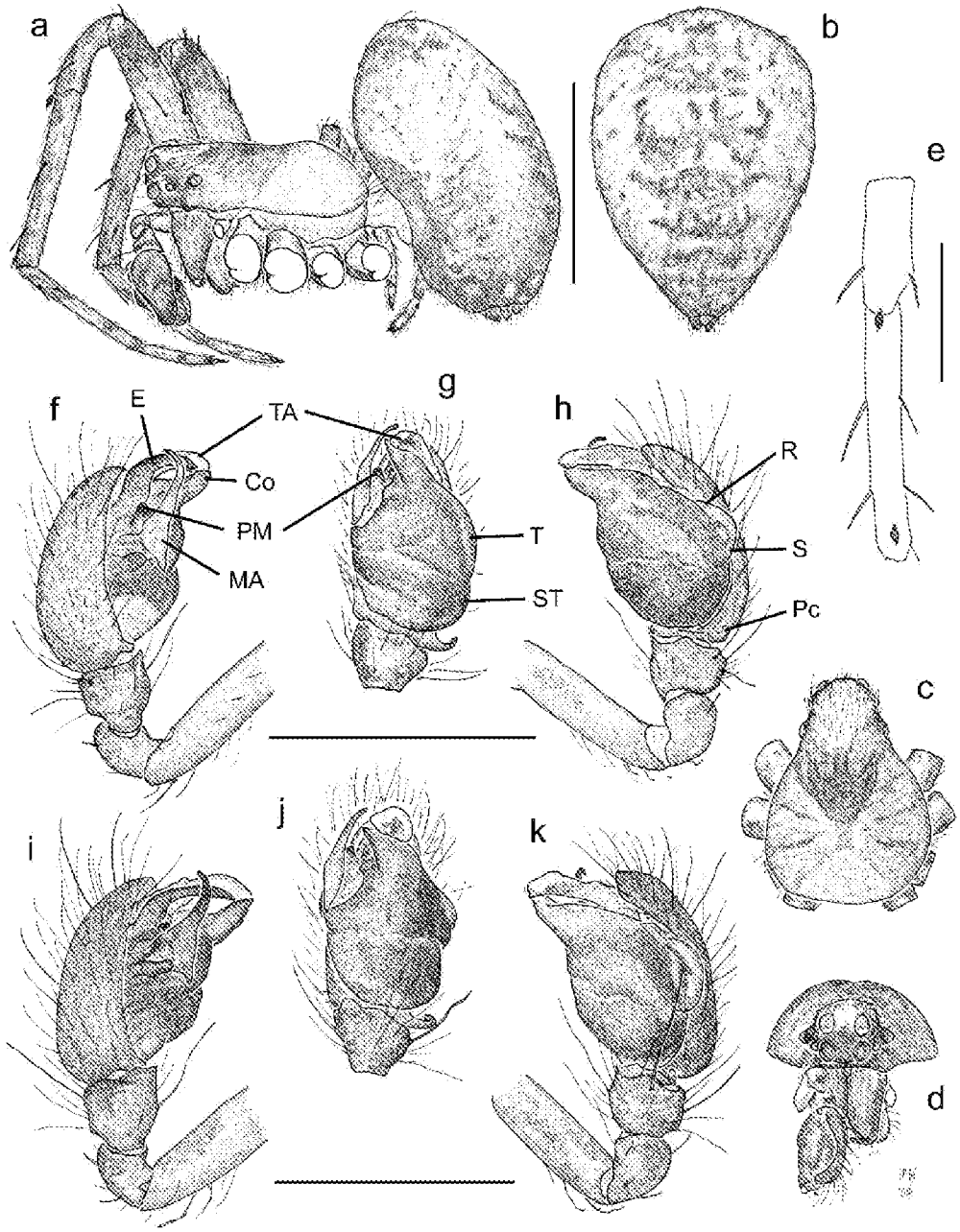

FIGURE 2.4. *Poltys illepidus*-group males. a–h, *P. illepidus*: a, general lateral view; b. abdomen, dorsal; c, carapace and coxae, dorsal; d, frontal carapace, right palpus and chelicerae; e, left patella and tibia I, showing flattened macrosetae; f–h, male palpus, prolateral, ventral, retrolateral. i–k, *P. stygius*, male palpus, views as previous. Scale lines: 1 mm for a–d; 0.5 mm for e & f–k. Abbreviations in material and methods.

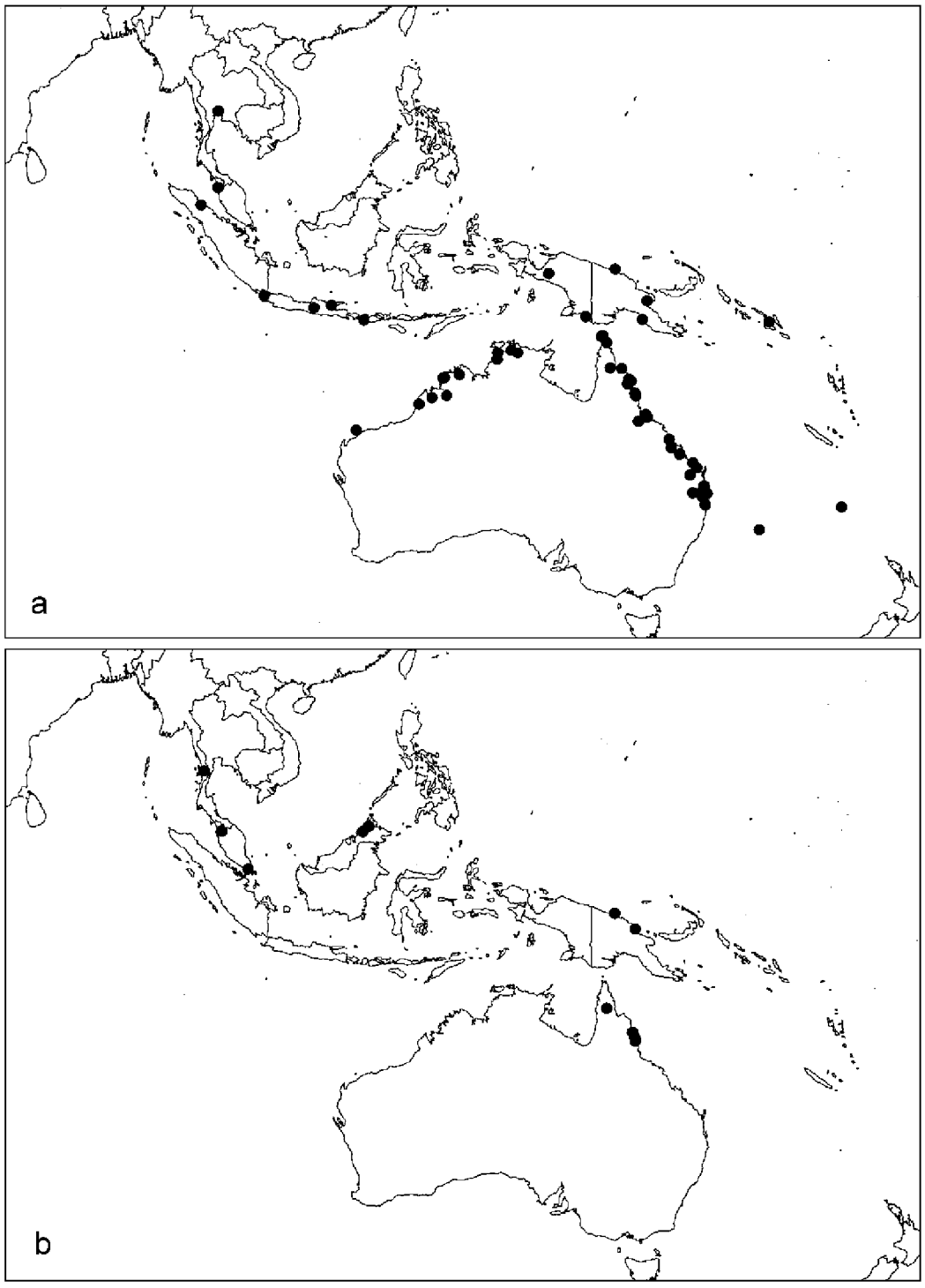

FIGURE 2.5. Distribution of *Poltys illepidus*-group. a, *P. illepidus*; b, *P. stygius*.

enough data available to find patterns in the few known specimens. Except for spination, no differences were found in males from the two areas. This differentiation may represent two separate species but, at present, both the morphology and the lack of differentiation in the ITS2 gene suggest that this is not the case. If these populations are ever separated at the specific level, the types of both *P. keyserlingi* and *P. penicillatus* will require re-examination.

Only two males of *P. illepidus* from outside of Australia have been examined (from Penang in Malaysia and Lombok, Indonesia) but these both match the northern Australian males well.

Remarks

Intensive searching in 2000–2001 only recorded one species of *Poltys* on Lord Howe Island (*P. grayi*). If *P. illepidus* currently occurs there, it is rare. It is also possible that the specimen Rainbow described (as *P. penicillatus*) was mislabelled. Lea, the collector, also visited Norfolk Island on the same collecting trip and there *P. illepidus* appears to be established.

Distribution

Specimens which I regard to be conspecific have been recorded from northern Australia, New Guinea and SE Asia at least as far north as Thailand (Fig. 2.5.a). Also recorded from Norfolk and Lord Howe Islands to the east of Australia and probably also present on New Caledonia (juvenile of this species group seen in HNHM material).

Published records from outside of this area such as Sri Lanka, India, the Philippines and Japan require examination of males for verification.

2.3.3.2. *Poltys stygius* Thorell

Figures 2.2.k–n, 2.3.g–j, 2.4.i–k, 2.5.b, Plates 2.3.d, 8.2.d.

Poltys stygius Thorell, 1898: 344. Female holotype from Malewoon, Tenasserim, Burma, L. Fea; in MSNG, examined.

Poltys microtuberculatus Rainbow, 1916: 118, pl. 22, f.44. Juvenile holotype from Gordonvale, Queensland; in AM KS8693, examined. NEW SYNONYMY.

Remarks

Rainbow's type is a juvenile and cannot be said to be this species (rather than *P. illepidus*) with complete confidence. It has, however, the combination of physical features that are particularly common in this species and *P. stygius* is frequent today in this geographical area.

Other material examined

AUSTRALIA: ***Queensland*:** ♂♂ KS86247–8, Cape Kimberley, track to lookout W of caravan park, 16°16′28″S 145°28′05″E, 21 Sep. 2003; ♀♀ KS33937, KS33934, KS33916, KS33842, KS86261, Edmonton, 17°01′S 145°44′E, 14 & 16 May 1972, Dec. 1969, 29 Aug. 1970, 18 Sep. 2003; ♂ KS58024, ♀ KS70357, Goldsborough Valley SF, side track to quarry, 17°12′43″S 145°44′56″E, 22 May 2000; ♀ S42529, Rokeby Stn, Cape

York, 13°40′S 142°40′E, 31 May 1973; ♂ KS73155, Trinity Park, track to Earl Hill via Reed Rd, 16°47′59″S 145°42′33″E, 21 May 2000; ♂ KS75631, ♀ KS86260, ♂ KS86092, Trinity Park, 16°48′17″S 145°42′04″E, 7 Jan. 2002, 16 & 18 Sep. 2003; ♀ KS90969, Trinity Park, *Melaleuca* swamp, 16°48′12″S 145°42′04″E, 14 May 2000; ♀ (MMUS) Cairns, N Queensland. INDONESIA: ***Sumatra*:** ♀ ex 21303 (MNHNP) Sumatra. MALAYSIA: ***Pinang*:** ♀ (BMNH), Penang, Glugor Estate, Banyan Lepas, 25 Jun. 1960. ***Sabah*:** ♂ (RMNH ex coll. CLD, 2000-704), Mt Kinabalu NP, Poring Hot Springs, 6°02′N 116°50′E, 22 Mar. 1996; ♂ (RMNH ex coll. CLD, 2000-704), Crocker Range, 5°26′N 116°08′E, 19 Feb. 2001. PAPUA NEW GUINEA: ***East Sepik*:** ♀ KS8065, Kairiru Island near waterfall, 3°20′S 143°33′E, 12 Jun. 1976. ***Madang*:** ♂♂ (RBIN) Baiteta forest, 5°01′S, 145°45′E, 21 Apr. 1994 & 13 Jul. 1996. SINGAPORE: ♂ 20982 (JAM), Kranji, Singapore, 7 July 1992. COUNTRY UNSTATED: (RMNH) China Sea Islands, May 1894.

Reared specimens deposited in other institutions: ex ♀ KS86260: ♂ to QM S66573, ♂ to MSNG.

Diagnosis

Female. As *P. illepidus* (Figs. 2.2.a–n) but with deep and wide foveae that are often distinctly paddle shaped (Figs. 2.3.h, j); posterior epigyne long, extending into the epigynal fold; posterior lobes of spermathecae usually visible entirely dorsal to the margin of the epigynal furrow in posterior view.

Male. As *P. illepidus* (Figs. 2.4.a–e), but with a longer, gently curving embolus and correspondingly longer conductor (Figs. 2.4.i, k, Plate 2.3.d).

Description

Female. Carapace length range 6.25–7.50. *Drawn specimens*. Figs. 2.2.k, l KS86260; Figs. 2.2.m, 2.3.j, KS70357; Figs. 2.2.n, 2.3.g–i, MSNG (holotype). General characters see *P. illepidus*.

Female MSNG (holotype). *Prosoma*. Carapace: length 7.08, width 5.92, height 1.92; broad and low; eye tubercle distinct but short, broad basally both in dorsal and lateral views. Chelicerae: paturon with 4 promarginal teeth (Fig. 2.2.m). Labium: length 0.90, width 1.35. Sternum: length 2.86, width 2.98; deeply indented anteriorly for labium; sternal extensions at bases of legs II–IV. *Eyes*. AME > PME ≥ PLE > ALE; ALE ca 1 x its own diameter from AME; ventral margin of ALE is ventral of mid point of AME. *Legs*. P+TL I: 11.67, II: 10.42, III: 6.67, IV: 8.42; front femora slightly broadened; patellal and tibial macrosetae not flattened (but may be in juveniles and adults from some areas). *Abdomen*. (Fig. 2.2.n). Length 14.83, width 12.08; broadest anterior to main apodemes; 'microsigillae' well developed. *Epigyne*. A broad fan-shaped plate, widest point about half-way in anterior view (Fig. 2.3.g); foveae broad, deep, paddle-shaped hollows, narrowing and partly overhung basally, separated by a long, strongly developed median ridge (Fig. 2.3.h, see also Fig. 2.3.j); posterior lobe of spermathecae visible dorsal to line of epigynal groove (Fig. 2.3.h); no copulatory ducts visible; spermathecae separated by half a spermatheca width or less; well sclerotised overall. *Colour in alcohol*. Carapace dark

reddish-chestnut, slightly paler on dorsal caput and anterior eye tubercle. Chelicerae dark yellow basally, darkening distally to deep chestnut. Labium, maxillae and sternum orange-brown. Pedipalps yellow at femora darkening to black distally. Femora I, II and IV deep chestnut with a blue shine; femur III paler orange-brown; distal legs dark, mottled orange with copious brown–black. Abdomen ventrally fawn around pedicel, ringed by paler area then dorsal colouration, also pale around spinnerets; dorsally blackish background with paler patches and brown markings edged with yellow; remains of whitish patches on flanks.

Male. Carapace length range 0.98–1.41. *Drawn specimens*. Figs. 2.4.i–k, KS86092. General characters see *P. illepidus*.

Male KS KS86092. *Prosoma*. Carapace: length 1.33, width 0.96, height 0.47; eye tubercle poorly defined, broad and almost without any dip between caput and eye tubercle in lateral view. Labium: length 0.11, width 0.18. Sternum: length 0.53, width 0.51. *Eyes*. AME > PME > PLE = ALE; ALE ca 1/3 x its own diameter from AME; height of ventral margin of ALE is at mid point of AME. *Legs*. P+TL I: 1.57, II: 1.49, III: 0.82, IV: 1.10; macrosetae of distal patella and tibia of legs I and II slightly flattened basally. *Abdomen*. Length 1.75, width 1.20; a rather skewed ellipsoid, widest point near apex. *Palpal organ*. (Figs. 2.4.i–k, Plate 2.3.d). Radix–stipes joint retrolateral, almost all of stipes hidden by cymbium, embolus and TA arise dorsally (normally obscured by cymbium, Fig. 2.4.k); embolus a stout, evenly curving rod, tapering slowly then abruptly (Figs. 2.4.i, Plate 2.3.d); TA narrow at base, flanking the embolus, broadens to a lamina and free of embolus apically (Fig. Plate 2.3.d); PM a pointed sclerotised bump (Figs. Figs. 2.4.i, j, Plate 2.3.d).

Colour in alcohol. Carapace dark olive, most of caput dark brown–black; dorsal eye tubercle and part of caput orange. Chelicerae as carapace with light prolateral V near tip. Labium, maxillae and sternum dark olive. All femora orange basally darkening to dark olive-brown distally; distal legs orange with black markings, tarsi cream with black rings. Abdomen ventrally olive ringed by black; white flanks; dorsal with dark pattern on a white ground. Palpal cymbium black, edges brownish; tibia, and patella with black on cream, femur mainly creamy-white.

Remarks

On average *P. stygius* have longer legs than *P. illepidus*. Many *P. stygius* females have a more extensive pale patch on the caput than most *P. illepidus* and a shorter eye tubercle. Not all specimens, however, have either character and both are within the variation range of *P. illepidus*.

Variation

Fewer specimens were available for examination but there appears to be a similar range of variation to that seen in *P. illepidus*. Examined adult females from Australia and New Guinea have lacked flattened macrosetae on the patellae. Some Australian males and both the male from Singapore and the adult female from Sumatra have these flattened macrosetae but otherwise appear identical.

Distribution

The species is found in coastal far north-east Queensland and northwards through Sumatra and Borneo to Burma (Fig. 2.5.b).

2.3.4. The *P. columnaris*-group

Included Australasian species: *Poltys jujorum*, *P. milledgei*. Other described species (SE Asia): *Poltys columnaris* Thorell, *P. pogonias* Thorell, *P. raphanus* Thorell, *P. squarrosus* Thorell, *P. turriger* Simon, *P. turritus* Thorell.

The *Poltys columnaris*-group appears to be rather complex. The genitalia of the two Australian species are similar, especially in females, but the huge eye tubercle of *P. jujorum* is distinctive, being far longer than in *P. milledgei*. These two species are also well separated genetically, at least in COI sequences. At least six species from the *P. columnaris*-group have been described from SE Asia and the Asian mainland. Three of these species, *P. columnaris*, *P. turriger* and *P. squarrosus* are similar in characters and may prove to be conspecific but the variation in eye position in these individuals almost bridges the gap between the two Australian species. Although existing names should be used if possible, both Australian species have been described as new because neither perfectly matches any of these types and it may be many years before suitable material is available to resolve this problem. A single male from Borneo, which may belong to one of these Asian species, is discussed below; this is definitely distinct from the Australian species. Another closely related SE Asian type is *P. pogonias* from the Nicobar Islands. This subadult female is also close to *P. milledgei*, except that there is no sign of the

sclerotised eyespot-like maculae, which are visible on the abdomen of every other specimen examined (see next paragraph), and the eye arrangement is outside the variation seen in other specimens. Given the isolation of the Nicobar Islands, and several other apparent cases of speciation seen in island *Poltys* specimens examined during the course of this study, it seems likely that this is an endemic species.

All *P. columnaris*-group species females have an extremely short and broad epigyne and most have rows of shiny black maculae on the dorsal abdomen, just anterior to the spinnerets (Figs. 2.7.k, Plate 2.5.d). These 'eyespots' are smooth clear cuticular lenses that lie over black pigment spots. In living and well-preserved specimens, these can be extremely prominent and they may be used to deter predators as (at least from a human perspective down a microscope) they resemble rows of black, beady eyes. Some *P. columnaris*-group species also possess modified patellal spines, which as well as being flattened distally, are elongate and appear to have a weak fracture zone near the base of the shaft, at least in females (Plate 2.5.c, arrowed). Females of both *P. jujorum* and *P. milledgei* have these spines, as well as most males of the latter. Most of the older types are missing many spines and have not been assessed for this character. These two Australasian *P. columnaris*-group species, and four out of the other six described species, have a rather elongate eye tubercle with an anterior protuberance between the anterior eyes (Plate 2.5.a, Figs. 2.21.a, d, g, p). The remaining two species, *P. turritus* and *P. raphanus* (which will probably prove to be conspecific) have only a tiny bump between the PME (Figs. 2.21.j, m). In the Australian species, at least, female abdominal shape is rather less variable than in the other species groups dealt with here.

Matched males are known only for the two Australasian species. The *P. columnaris*-group male mentioned above from Borneo (RMNH ex coll. CLD) has eye tubercle proportions quite different to the Australian species. The palpal organs of this specimen show the same general features as seen in the two Australian species, with a proportionately long MA, a broad, dorsal TA, and a reduced, prolaterally displaced conductor. The palpal characters are intermediate between the two Australian species, but somatic features are distinctive.

2.3.4.1. *Poltys jujorum* sp. nov.

Figures 2.6.a–h, 2.7.a–e, 2.8.a–e, 2.9.a–f, 2.10.a, Plates 2.4.a,b, 2.5.a–d.

Etymology

Named in honour of Judy Thompson and John Olive, whose generous hospitality has greatly facilitated several trips to northern Queensland.

Type material.

AUSTRALIA: ***Queensland***: HOLOTYPE: ♀ S66574 (ex KS58080), Goldsborough Valley SF, side track to quarry, 17°12′S 145°44′E, 22 May 2000, M&S, webs on dead twigs at night, open woodland. PARATYPES: ♂ KS58074, ♀ KS58078, data as holotype; ♂ KS58064, lane W of Capt. Cook H'way, ca 2.5 km W of Trinity Beach, 16°47′S 145°40′E, 14 May 2000, M&S, beating; ♀ KS84328, ♂ S66575, Abergowrie SF, Broadwater Creek camping area, 18°25′S 145°56′E, 24 May 2000, M&S

(♀ night coll., ♂ beating); ♀ S42574, Scraggy Point, Hinchinbrook Is., 18°17′S 146°06′E, 5 Jan. 1986, P. Myroniul? (sic), dune and swale system.

Other material

AUSTRALIA: ***Queensland***: ♀♀ KS58066 (2), KS58067–9, ♂♂ KS58070–1, Abergowrie SF, 18°25′S 145°56′E, 24 May 2000; ♀♀ KS58065, 2.5 km W of Trinity Beach, 16°47′S 145°40′E, 14 May 2000; ♀♀ KS33931, KS33941, Edmonton, 17°01′S 145°45′E, 29 May 1973, 1 Apr. 1973; ♂ KS58073, ♀♀ KS58075–77, KS58079, KS58080 (3), Goldsborough Valley SF, 17°12′S 145°44′E, 22 May 2000; ♀ KS33849, Kuranda, 16°49′S 145°38′E, 15 Aug. 1971; ♀ KS33940, Mareeba, 17°00′S 145°26′E, 8 Sep. 1974; ♀ KS58063, Tam O'Shanter SF, 0.9 km W Limbo Ck, Tully–Mission Beach Rd, 17°55′S 146°04′E, 23 May 2000; ♂ S42559, Black Mountain, NEQ, summer 1971–2; ♀ S42619, Iron Range, 12°39′S 143°17′E, 30 Jun. 1976; subadult ♀ S42504, Lockerbie Scrub, 10°48′S 142°28′E, 18 Apr. 1973; ♀ S42579, Shiptons Flat, 15°48′S 145°15′E, 22 Apr. 1982.

Remarks

There are no definite records for this species outside Australia. A subadult female from Kinabalu NP, N. Borneo (RMNH ex coll. CLD) that is comparable in eye tubercle proportions and general appearance, might indicate a wider distribution.

Diagnosis

Females. From other species groups: carapace profile relatively high and narrow (Fig. 2.6.e), extended and pointed eye tubercle (Fig. 2.7.a), front femora relatively short and distinctly broadened (Fig. 2.6.a), epigyne much wider than long (Fig. 2.9.a). From *P. milledgei*: eye tubercle larger and more elongate and ALE well separated from AME (Fig. 2.7.b); copulatory ducts are short so spermathecae are directly basal to the foveae in posterior view (Fig. 2.9.b).

Males. From other species groups by extended and pointed eye tubercle (Fig. 2.8.d), short embolus and reduced conductor (Fig. 2.9.d, e). From *P. milledgei*: eye tubercle massive (Fig. 2.8.d), flattened leg macrosetae are usually short and rounded (Fig. 2.8.e), the conductor wraps further prolaterally and is adpressed to the embolus so that it may be difficult to distinguish in ventral view. In lateral view, an open space is usually present between the MA and the other sclerites (compare Figs. 2.9.d and j, Plates 2.4.b and d).

Description

Female. Carapace length range 2.94–3.67. *Drawn specimens*. Figs. 2.6.a, c–f, 2.7.a, b, KS58077 (male Fig.2.6.b from Fig. 2.8.a); Figs. 2.6.g, h, KS58067; Figs. 2.7.c, d, 2.9.c, S66574 (holotype); Fig. 2.7.e, KS58080; Figs. 2.9.a, b, KS58078.

Holotype. *Prosoma.* Carapace: length 4.00, width 2.69, height 1.10; long and narrow (Figs. 2.6.a, e); eye tubercle well developed, strongly elevated (Fig. 2.7.b); produced into a rounded protuberance between PME; eye tubercle sagittate in dorsal view

due to tufts of flattened setae that arise on the tip of the eye tubercle and posterior to the PME (Plate 2.5.a, b). Chelicerae: paturon with 4 promarginal teeth (Fig. 2.6.f). Labium: length 0.39, width 0.65. Sternum (Fig. 2.6.d): length 1.37, width 1.43; sternal extensions at bases of legs III–IV. *Eyes*. (Figs. 2.6.e, 2.7.b). AME = PME > PLE > ALE; ALE > 2 x its own diameter from AME, almost half way towards PLE position; ventral margin of ALE is more ventral than AME; both pairs of anterior eyes are set looking ventrally on eye tubercle (Fig. 2.7.b). *Legs*. P+TL I: 4.78, II: 4.33, III: 2.90, IV: 3.47; front femora distinctly broadened with greatest diameter ca 3/5 way to apex (Fig. 2.6.a); some patellal and tibial macrosetae on all legs flattened, distal patellal macrosetae usually elongate (Fig. 2.7.e), but often broken at weak point (Plate 2.5.c, arrowed). *Abdomen*. Length 10.83, width 2.75; broadest just anterior to main apodemes; on dorsal surface just anterior to spinnerets there are two rows of shiny, black maculae, 6 on a posteriorly pointing fold, 4 immediately anterior, and two anterior lateral pairs (Figs. 2.7.c, d). *Epigyne*. Much broader than long, most of the anterior surface is covered by a broad 'lip' (Figs. 2.9.a, c); posterior plates short; median posterior plate not reduced but fused or closely adjacent to lateral plates over much of their lengths, then narrows to a bridge between pocket-like distal foveae (Fig. 2.9.b); copulatory ducts exit foveae laterally, ducts usually shorter than *P. milledgei*; spermathecae separated by about a spermatheca width. *Colour in alcohol.* Carapace yellow, caput fuscous brown with darker patches anterior to PLE, stripes of pale yellow lead onto orange-brown eye tubercle; dark brown ventral to main eyes. Chelicerae brown, paler V distally. Labium, maxillae and sternum yellow-brown. Pedipalps creamy-yellow, sparsely mottled with brown. Femora I and II with a small amount of black

basally, then all yellow except for a broad black terminal band; femur III pale yellow, mottled with black, to black distally; femur IV mostly dark; all dark areas with blue shine; distal legs mottled with yellow and brown. Abdomen ventrally dark grey around pedicel and posteriorly to spinnerets except paler book lung covers; white flanks then laterally and anteriorly to dorsal colour pattern of black and brown over some white.

Male. Carapace length range 1.04–1.12. *Drawn specimens*. Figs. 2.8.a–e, 2.9.d–f, KS58074.

Male KS58074. *Prosoma*. Carapace: length 1.14, width 0.71, height 0.33 (at fovea); lightbulb-shape in dorsal view (Fig. 2.8.d); highest at eye tubercle, latter massive and elevated (Fig. 2.8.a); eye tubercle anterior a blunt point; in dorsal view eye tubercle sagittate as in female. Clypeus >1x AME. Labium: length 0.09, width 0.19. Sternum: length 0.42, width 0.42. *Eyes*. (Figs. 2.8.a, c) AME ≥ PME > PLE ≥ ALE; ALE >1x its own diameter from AME; ventral margin of ALE is ventral to that of AME. *Legs*. (Fig. 2.8.a). P+TL I: 1.04, II: 0.98, III: 0.57, IV: 0.73; all patellae and some tibiae with some macrosetae flattened into a leaf-shape (Fig. 2.8.e). *Abdomen*. (Figs. 2.8.a, b). Length 1.57, width 0.88; a tall, rather lumpy ellipsoid, with slightly extended rounded apex, widest at mid-height; small tufts of setae arise from bumps; apodemes visible. *Palp*. (Figs. 2.9.d–f, Plate 2.4.a, b). Tegulum rather angular (Fig. 2.9.e); conductor wispy and adpressed to proventral embolus (Fig. 2.9.d, Plate 2.4.a, b); MA filiform, broad basally (Fig. 2.9.d, Plate 2.4.b); small PM possibly present (see *P. milledgei*, Fig. 2.1.c) but if so, normally hidden by MA; radix–stipes joint dorsal, totally hidden by cymbium (Fig. 2.9.f); TA a broad membranous flap (Fig. 2.9.e, Plate 2.4.a, b); embolus short and stout (Fig. 2.9.e, Plate

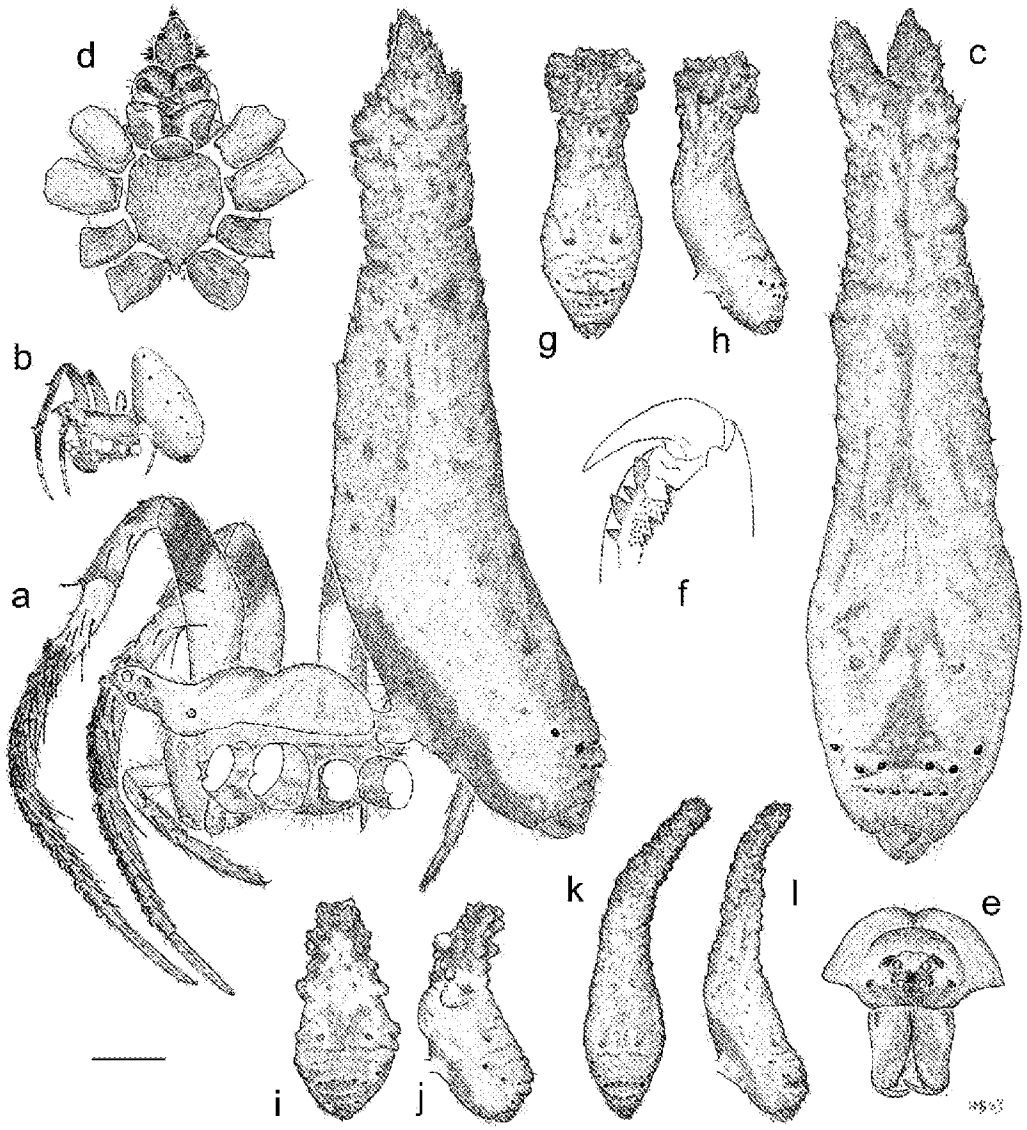

FIGURE 2.6. *Poltys columnaris*-group, female characters. a–f, *P. jujorum*: a, general lateral view; b, male at same scale; c, abdomen, dorsal; d, ventral prosoma and coxae; e, frontal carapace and chelicerae; f, left chelicera showing denticles. g–l, examples of variation in abdominal shape seen in both Australian species, dorsal and ventral (g–h, *P. jujorum*, i–l, *P. milledgei*). Scale line: 2 mm for g–l; 1 mm for a–e; 0.25 mm for f.

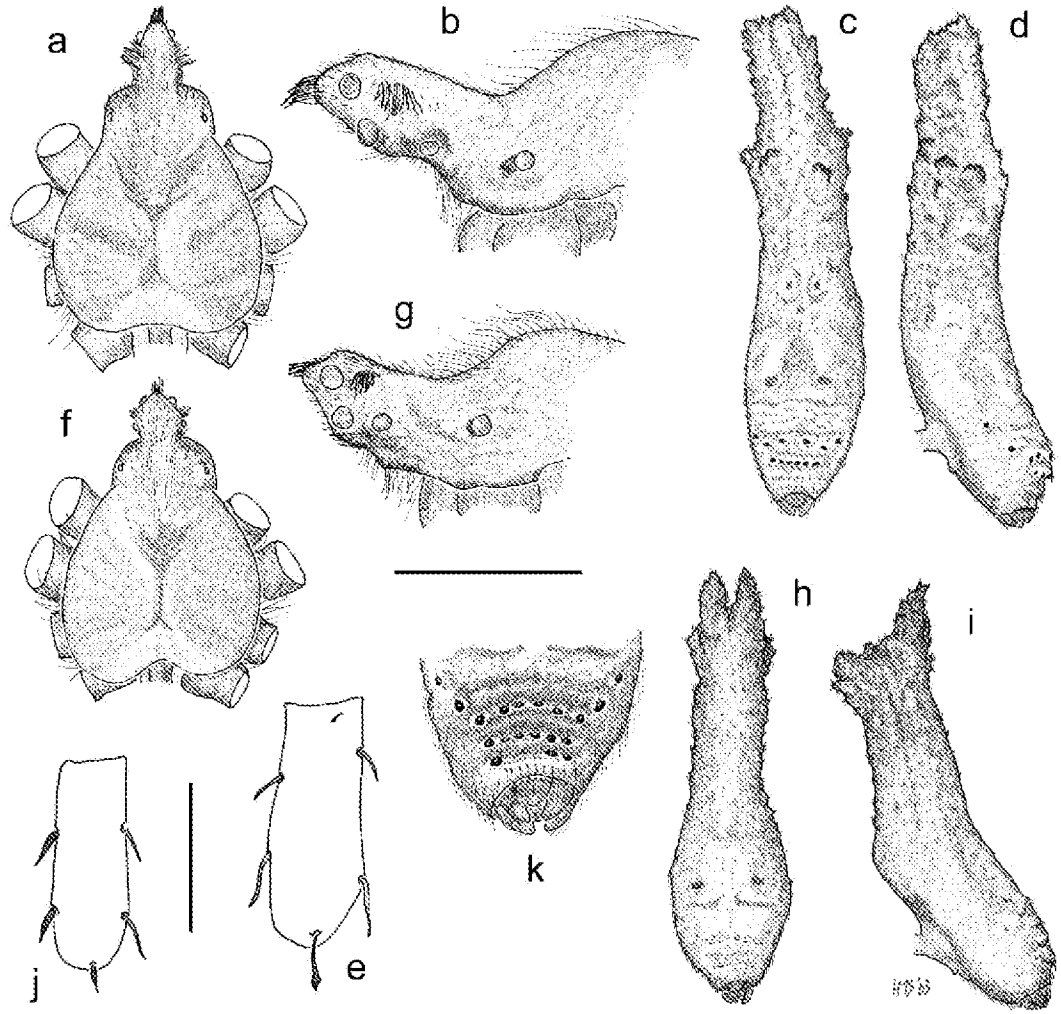

FIGURE 2.7. Australian *Poltys columnaris*-group females. a–e, *P. jujorum*: a, carapace and coxae, dorsal; b, eye region, lateral; c–d, holotype abdomen dorsal and lateral; e, spination, leg I dorsal patella. f–k, *P. milledgei*: subjects as a–e, k, abdominal maculae, posterodorsal. Horizontal scale: 3 mm for abdomens; 2 mm for a, f, k; 1 mm for b, g. Vertical scale 1 mm for patellae.

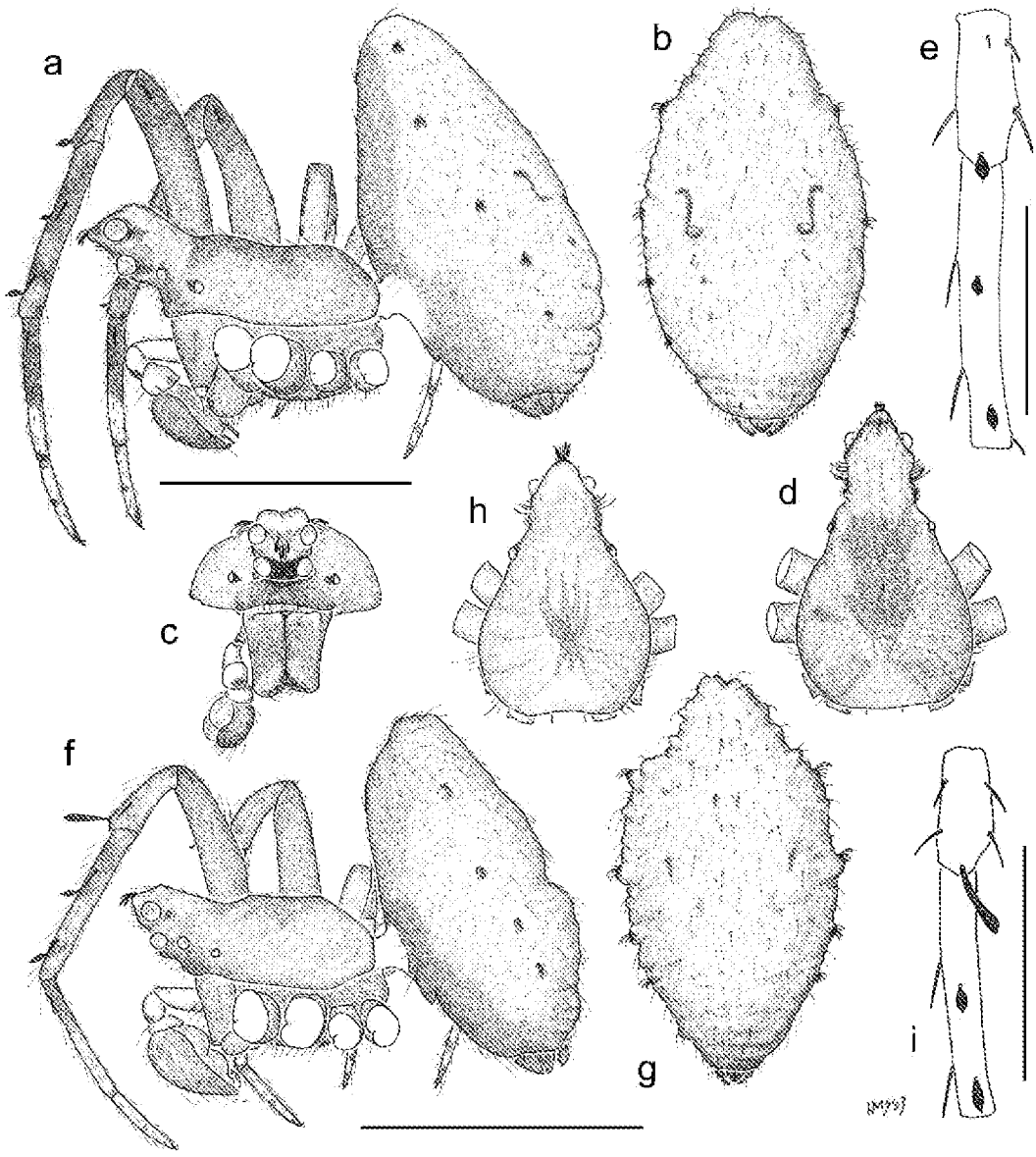

FIGURE 2.8. Australian *Poltys columnaris*-group males. a–e, *P. jujorum*: a, general lateral view; b, abdomen, dorsal; c, frontal carapace, right palpus and chelicerae; d, carapace and coxae, dorsal; e, left patella and tibia I showing flattened macrosetae. f–i, *P. milledgei*: f, general lateral view; g, abdomen, dorsal; h, carapace and coxae, dorsal; i, left patella and tibia I showing flattened macrosetae. Horizontal scales: 1 mm for a–d and f–h. Vertical scales 0.5 mm for legs.

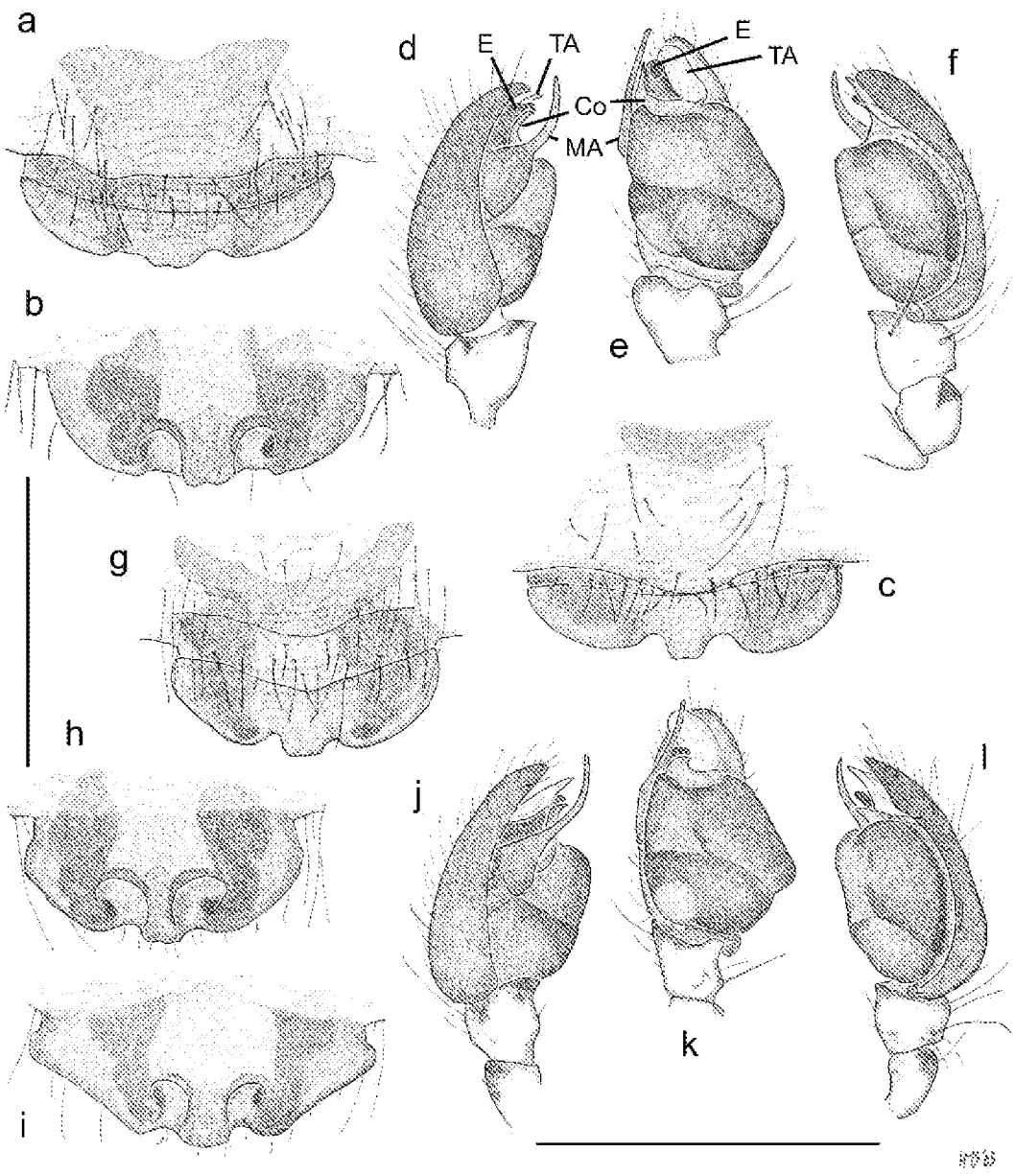

FIGURE 2.9. Australian *Poltys columnaris*-group genitalia. a–f, *P. jujorum*: a–c, epigyna, a, c, anterior, b, posterior (c, holotype); d–f, male palpus: prolateral, ventral, retrolateral. g–l, *P. milledgei*: g–i, epigyna, g, anterior, h–i, posterior (g–h, holotype); j–l, male palpus: prolateral, ventral, retrolateral. Scale lines 0.5 mm, vertical for epigyna, horizontal for palpi.

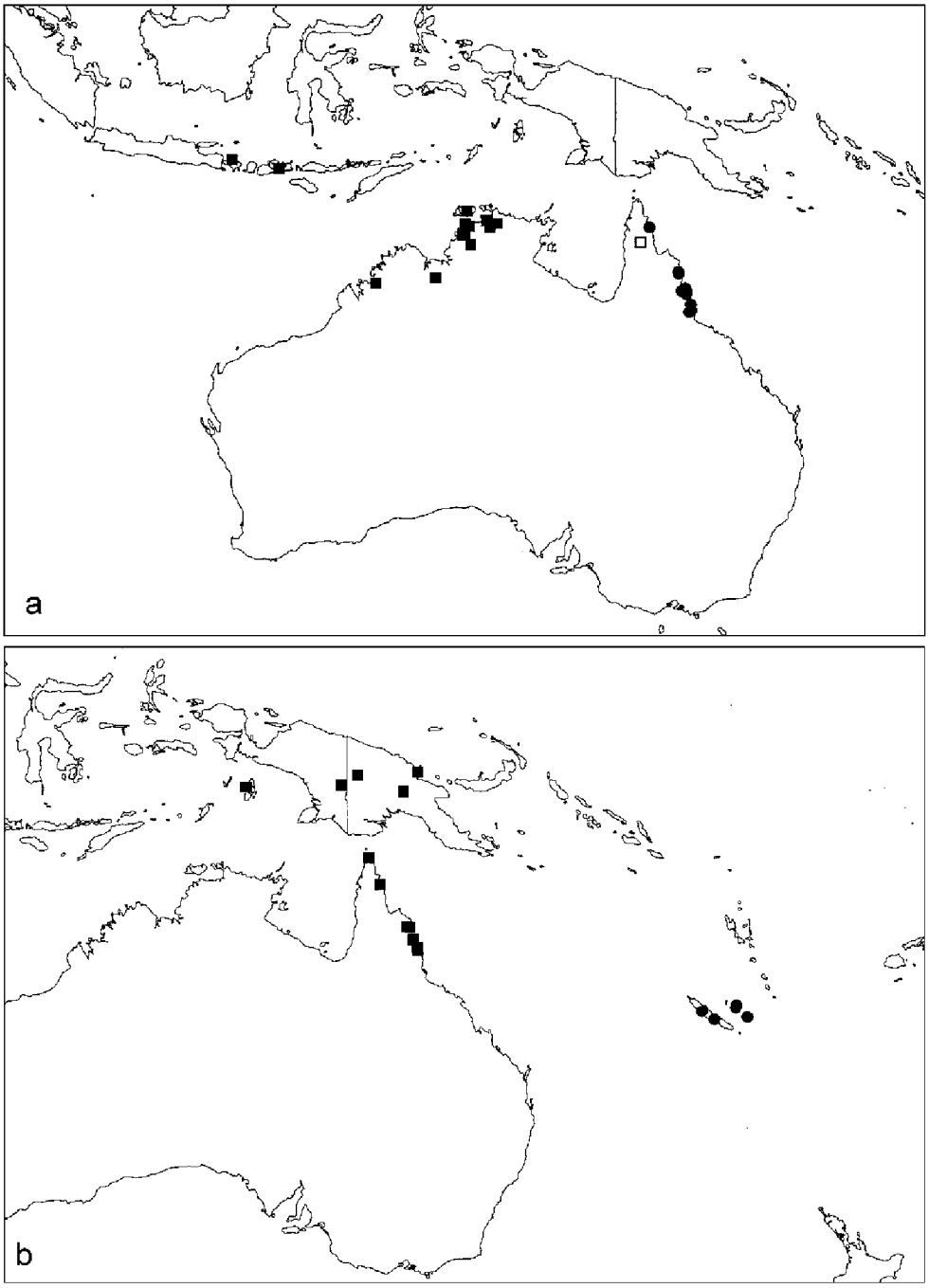

FIGURE 2.10. Distribution of Australian *Poltys* species. a, *P. columnaris*-group species: *P. jujorum* (circles); *P. milledgei* (adult records, black squares; subadult, white square). b, *P. frenchi*-group species: *P. frenchi* (squares); *P. timmeh* (circles).

2.4.b). *Colour in alcohol*. Lateral carapace light olive, caput darkens slightly to eye tubercle, latter orange dorsally, carapace and caput with black median markings; dark brown on ventral eye tubercle, around AME and ALE and under PLE (Fig. 2.8.c). Chelicerae, labium, maxillae and sternum fuscous olive; chelicerae, with yellow distally. Femora I and II pale creamy-olive darkening distally; femur III olive-white basally, with spots and terminal band; femur IV olive with white patch retrolaterally; distal legs I and II with dark olive rings and marks to mid metatarsus, then white with black marks; legs III and IV olive-white dorsally and black maculation ventrally. Palpal cymbium dark brown, contrasts with white tibia, patella and femur, tibia and patella with black tips. Abdominal book lung covers and epigastric area pale, otherwise ventrally dark grey; dorsum mostly grey–white with black speckling and a pair of black scroll-like lines.

Variation

In some females the eye tubercle is higher than the main carapace. Female abdominal shape is less variable than in other species groups, all are elongate to a greater or lesser extent and none has been seen with humeral tubercles (Figs. 2.6.a, c, g, h, also as in *P. milledgei*, 2.6.i–l and 2.7.h, i). Abdominal 'eye spots' are rather variable in size and number. Epigynes are rather variable and often difficult to distinguish from *P. milledgei*.

Distribution

The species occurs in far north-east Queensland, mostly on the coast, and possibly further northwards (Fig. 2.10.a).

2.3.4.2. *Poltys milledgei* sp. nov.

Figures 2.1.c, d, 2.6.i–l, 2.7.f–k, 2.8.f–i, 2.9.g–l, 2.10.a, Plates 2.1.d, 2.2.a, b, 2.4.c, d, 8.4.c.

Etymology

This species is named in honour of Graham Milledge who has assisted me on many collecting trips.

Type material

AUSTRALIA: ***Northern Territory***: HOLOTYPE: ♀ KS84110, Humpty Doo, Solar Village, 12°35′S 131°05′E, 20 May 1999, G,M&S & J. Webber, night collecting. PARATYPES: ♂ KS55728, Litchfield NP, Florence Falls, 13°09′S 130°46′E, 19 May 1999, G,M&S; ♂ WAM T62875 (ex KS55740) 23 May 1999, on silk line between dead twigs at night; ♂ NTM A952, as KS55740, 19 May 1999, G,M&S, hanging in dead tree near subadult ♀ at night; ♀ KS55738, Litchfield NP, Wangi Falls, 13°09′S 130°40′E, 22 May 1999, G,M&S; ♀ NTM A953, Duncans Douglas, nr Daly River Research Station, 13°50′S 131°11′E, 18 May 1991, J. Webber; ♀ WA98/1981, Cahills Crossing, 12°25′S 132°58′E, 29 May 1992, M.S. Harvey, J.M. Waldock.

Other material examined

AUSTRALIA: ***Northern Territory***: ♂ KS55735, Darwin, East Point, 12°25′S 130°49′E, 21 May 1999; ♀♀ KS55726 (3), Humpty Doo, Solar Village, 12°35′S 131°05′E,

20 May 1999; ♂ KS53838, ♀ KS53839, ♂♀ KS53840, ♀ KS53841, Litchfield NP, Florence Falls, 13°09′S 130°46′E, 5–6 Aug. 1998; ♀♀ KS55730–31, ♀♀ KS55739 (3), ♂ KS55740, ♂♀ KS55741, ♂ KS55743, Litchfield NP as previous record, May 1999; ♂ KS59254 ex eggsac laid by one of KS55739, matured 14 Sep. 1999; ♀♀ (3) KS55736, Litchfield NP, Wangi Falls, 13°09′S 130°40′E, 22 May 1999; ♀ (NTM), Melville Island, 11°33′S 130°56′E, 3 Aug. 1975; ♀ (NTM), Wangi Station, 13°09′S 130°38′E, 22 Aug. 1975; ♂ S42555, South Alligator Inn, 12°40′S 132°30′E, Nov. 1979; ♂♀ S42556, West Alligator River mouth, 12°15′S 132°16′E, 12 Nov. 1979; ♀♀ S42581, West Alligator mouth, 12°11′S 132°16′E, 22 July 1979; ♀♀ WA98/1982–3, Cahills Crossing, 12°25′S 132°58′E, 29 May 1992. ***Queensland***: subadult ♀ S42587, Rokeby Station, 13°40′S 142°40′E, 30 May 1973 (eye tubercle proportions appear to match this species). ***Western Australia***: ♀ KS55747, Lake Argyle Rd, 9 km N of campsite, 16°02′S 128°46′E, 9 June 1999; ♀ WA98/1972, Walcott Inlet (South), 18°27′S 124°45′E, May 1996. INDONESIA: ***Bali*****:** ♀ & juveniles (RMNH ex coll. CLD), Ambengan, N. Bali, 21 Jan. 1990. ***Sumbawa*****:** ♀♀ & juveniles (RMNH ex coll. CLD), Samokat, 20 hrs from Besar, 3 Jan. 1990.

Diagnosis

As *P. jujorum* but with a more delicate and less elongate eye tubercle (Figs. 2.7.g, 2.8.f).

Females. Epigynal copulatory ducts are relatively long so the spermathecae are separate from the foveae in posterior view (Fig. 2.9.h).

Males. The flattened macrosetae of patellae I and II are usually elongate (ovate in males of *P. jujorum*) (Fig. 2.8.i); the free part of the membranous palpal conductor is visible separate from the embolus in lateral view, partially filling the space between the MA and the other sclerites (compare Figs. 2.9.j and d, Plates 2.4.d and b)

Description

Female. Carapace length range 2.69–3.80. *Drawn specimens*. Fig. 2.1.d, S42581; Figs. 2.6.i, j, KS55736; Figs. 2.6.k, l, KS53841; Figs. 2.7.f, g, k, KS55747; Figs. 2.7.h, i, 2.9.g, h, KS84110 (holotype); Fig. 2.7.h, WAM 98/1982; Fig. 2.9.i, KS55726. General features as *P. jujorum*, except for eye tubercle.

Holotype. *Prosoma.* Carapace: length 3.22, width 2.29, height 0.97; long and narrow; eye tubercle well developed, distinctly elevated (Figs. 2.7.f, g); produced into a rounded protuberance between the PME; eye tubercle sagittate in dorsal view due to tufts of flattened setae that arise on the tip of the eye tubercle and laterally posterior to the PME (as in *P. jujorum*, Plate 2.5.a, b). Chelicerae: fang medium length; paturon with 4 promarginal teeth. Labium: length 0.37, width 0.57. Sternum: length 1.37, width 1.31; sternal extensions at bases of legs III–IV. *Eyes*. (Fig. 2.7.g) AME > PME > PLE > ALE; ALE ca 1 x its own diameter from AME; height of ventral margin of ALE is level with ventral margin of AME. *Legs*. P+TL I: 4.37, II: 4.08, III: 2.65, IV: 3.31; front femora distinctly broadened with greatest diameter ca 3/5 way to apex; some patellar and tibial macrosetae on all legs flattened distally (Fig. 2.7.j), macrosetae on distal patellae usually short. (In *P. jujorum* these are usually long in females, although often broken. This is the

opposite to the relative states in males.) *Abdomen.* (Fig. 2.7.h, i). Length 10.01, width 3.28; broadest just anterior to main apodemes; on dorsal surface just anterior to spinnerets there are two rows of 6 shiny, black maculae on posterior pointing folds, plus a partial row of two posterior to these and two additional lateral pairs anteriorly. (Not well preserved on holotype, typical arrangement better illustrated by Fig. 2.7.k). *Epigyne*. Much broader than long, most of the anterior surface is covered by a broad 'lip' (Fig. 2.9.g); posterior plates short but usually longer than in *P. jujorum*; median posterior plate not reduced, appears almost fused to lateral plates over much of their lengths, then narrows to a bridge between pocket-like distal foveae (Figs. 2.9.h, i); copulatory ducts and spermathecae often visible through cuticle, former can be seen to be longer than in *P. jujorum*; spermathecae separated by about a spermatheca width. *Colour in alcohol.* Carapace yellow, caput and eye tubercle orange-brown, with yet darker patches anterior to PLE and on posterior caput; black around secondary eyes, dark brown ventral to main eyes. Chelicerae brown, yellow V distally. Labium, maxillae and sternum mid brown. Pedipalps creamy-yellow, sparsely mottled with brown. Femora I to III with a small amount of black basally, then all yellow except for a broad black terminal band; femur IV mostly dark brown; distal legs mottled with yellow and brown. Abdomen ventrally dark grey around pedicel and posteriorly to spinnerets except paler book lung covers; laterally and anteriorly then to dorsal colour pattern of black and brown over fawn and white; darkest at anterior.

Male. Carapace length range 0.78–0.96. *Drawn specimens*. Fig. 2.1.c, KS55740; Figs. 2.8.f–h, 2.9.j–l, KS55741; Fig. 2.8.i, KS59254.

Male KS55728. *Prosoma.* Carapace: length 0.86, width 0.55, height 0.31; lightbulb-shape in dorsal view (Fig. 2.8.h); highest at eye tubercle; eye tubercle elongate with distinct 'v' between caput and posterior eye tubercle in lateral view (Fig. 2.8.f); eye tubercle anteriorly a broadly rounded point; eye tubercle sagittate in dorsal view as in female. Labium: length 0.08, width 0.15. Sternum: length 0.35, width 0.34. *Eyes.* (Fig. 2.8.f). PME = AME > PLE ≥ ALE; ALE ca $1/8^{th}$ x its own diameter from AME; ventral margin of ALE is just dorsal to that of AME. *Legs.* (Fig. 2.8.f). P+TL I: 0.84, II: 0.76, III: 0.47, IV: 0.61; distal patellar setae of legs I and II flattened and elongate (Fig. 2.8.i), distal patellar setae legs III and IV and some dorsal tibial macrosetae on all legs flattened to an elongate leaf-shape. *Abdomen.* (Figs. 2.8.f, g). Length 1.24, width 0.73; a tall, rather lumpy, ellipsoid, with slightly extended rounded apex, widest at mid-height; tufts of setae arise from bumps. *Palpal organ.* (Figs. 2.9.j–l, Plate 2.4.c, d). Tegulum rather angular (Fig. 2.9.k); conductor a small membranous crescent, basal part difficult to discern clearly under a light microscope (Figs. 2.9.k, Plate 2.4.c); MA longer and more slender than in other species (Figs. 2.9.j, Plate 2.4.d); PM hidden (if present, see Fig. 2.1.c); radix–stipes joint dorsal, totally hidden by cymbium (Fig. 2.9.l); TA a broad membranous flap (Figs 2.9.k, Plate 2.4.c, d); embolus short and stout (Plate 2.4.d). *Colour in alcohol.* Lateral carapace light yellowish-olive, caput darkens slightly to eye tubercle, latter orange over the PME, carapace with black median markings; dark brown round AME, extends round ALE and under PLE. Labium and maxillae fuscous. Chelicerae yellow with fuscous centre. Sternum yellow-brown with black edges. Femora pale creamy-olive with fuscous markings; distal legs I and II with brown rings and marks to mid metatarsus, then white with black marks;

legs III and IV olive-white dorsally and almost solid black maculation proventrally. Palpal cymbium dark brown, contrasting with white tibia, patella and femur; tibia and patella with black tips. Abdominal book lung covers pale, white towards spinnerets; surrounding ventral areas grey; dorsum mostly grey–white with black speckling, black on the bumps and black 'cello' marks.

Variation

As in *P. jujorum*, the female abdominal 'eye spots' are rather variable in size and number. Female abdominal shapes and epigynes also feature a similar range of variation. One male from Darwin (KS55735) has all the flattened macrosetae short and rounded (like *P. jujorum* males).

Distribution

The species is recorded from the far north of Western Australia, the Northern Territory, southern Indonesia and possibly Queensland (Fig. 2.10.a).

2.3.5. The *P. frenchi*-group

Included Australasian species: *Poltys frenchi*, *P. timmeh*. Other species: none known.

Morphologically, these species appear to be the link between the *P. illepidus*-group and the *P. laciniosus*-group. There are usually four prolateral cheliceral teeth (LsLs) in *P. frenchi*, but this is often reduced to three (LLs) in *P. timmeh*. Specimens of *P. frenchi* are

variable in build. Heavier bodied females look rather like *P. illepidus*-group animals, especially when the abdomen is swollen with eggs, but lightly built specimens are much more slender, more like the *P. laciniosus*-group. There is also a similar range of variation in abdominal shapes as in the *P. laciniosus*-group. Males are extremely lightly built, even more so than *P. laciniosus*-group species. The genitalia also show some intermediate characters: like the *P. illepidus*-group, the male palp has a distinct TA but the embolus arises retrobasally, as in *P. laciniosus*-group species (Fig. 2.1.e); the PM is also well developed, although quite different in form to either group (Plate 2.5.e). In females, the spade-shaped epigyne is intermediate in shape and there appears to be a distinct, although short and narrow, copulatory duct that is formed similarly to that in the *P. laciniosus*-group (Fig. 2.1.f). No modification of patellal macrosetae has been noted.

Only two species are currently recognised, *P. frenchi*, which occurs from Australia to the southern Indonesian islands and *P. timmeh*, from New Caledonia and nearby islands. A single examined female from the highlands of West Papua (RMNH), if not teratogenic, may also be in the *P. frenchi*-group but its rather unique epigyne is difficult to place at present.

2.3.5.1. *Poltys frenchi* Hogg

Figures 2.1.e, f, 2.11.a–j, 2.10.b, 2.12.a–j, 2.13.a–g, Plates 2.5.e, f, 8.1.b, 8.3.e.

Poltys frenchi Hogg, 1899: 143, pl.13, f.2. Female holotype, Upper Endeavour River, Queensland, Australia; in NMV (K953), examined.

Poltys sigillatus Chrysanthus, 1961:211, f. 74–77. Female holotype, Mindiptana area, (locality marked 'Y' on map in Chrysanthus, 1971), 1959, Br. Monulfus, in RMNH (#970); examined. NEW SYNONYMY.

Remarks

Doleschall's *P. moluccum* and Bradley's *P. papuensis* may be senior synonyms of this species. The types, however, have not been located, and neither are definitively identifiable from the original descriptions. The specimen that Thorell (1878) probably used in his redescription of *P. moluccum* has been examined (NHRM, 1026). It is a juvenile from the *P. illepidus*-group and is not referable to the present species.

Other material examined

AUSTRALIA: ***Queensland***: ♂♂ KS86341, KS86342–44, ♀♀ KS86345–46, Cape Kimberley, track to lookout W of campsite, 16°16′28″S 145°28′05″E, 21 Sep. 2003; ♀♀ KS33928, KS33938, KS33958, KS33968–69, Edmonton, 17°01′S 145°44′E, 20 Sep. 1976, 8 Jun. 1975, 28 Aug. 1970, 2 Sep. 1976, 28 Aug. 1976; ♂♂ KS86338–40, ♂♀ KS86350–51, ♂ KS86491, Edmonton, as previous record, 18 Sep. 2003; ♂♂ KS58026–7, KS70356, Trinity Park, S side of Moores Gully, 16°48′12″S 145°42′04″E, 14 May 2000; ♂ KS86353, as previous record, 18 Sept. 2003; ♂♂ KS86254, KS86352, KS86492, Trinity Park, S end of Panguna Rd, 16°48′46″S 145°41′20″E, 24 Sep. 2003; ♀ KS86490, Wonga Beach, near caravan park , 16°19′58″S 145°25′19″E, 20 Sep. 2003; ♀ S42562, Cooktown, 15°28′S 145°15′E, Dec. 1975; ♀ S42620, Jacky Jacky Ck, Cape York, ca. 12°36′S 143°12′E, 28

Aug. 1985; ♀ S42503, Lockerbie, 10°48′S 142°28′E, 30 Jan. 1975. ***Moluccas***: ♀ (RMNH) Aru Is, Manoembai, 11–14 Oct 1929, Snellius expedition. PAPUA NEW GUINEA: ***Madang*****:** ♂♂ (RBIN) Baiteta forest, 5°01′S, 145°45′E, 4 Jun. 1993 & 15 Jun. 1995. ***Sandaun*****:** ♀ (HNHM) Feramin, NE (sic) Telefomin, 1450 m, 26–27 Aug. 1963. ***Simbu*****:** ♀ (HNHM) Karimui, 9–16 Jul. 1963.

Reared specimens deposited in other institutions: ex female KS86346: ♂ to QM S66576, ♂ to NMV K8897.

Diagnosis

Females. From other species groups: epigyne an inverted spade-shape, as long or longer than wide, but widest away from the base (Figs. 2.12.a–c); carapace profile low and broad, pale in colour, with a well defined eye tubercle (Figs. 2.11.a, e); front femora with distinct broadening (Fig. 2.11.a); four prolateral cheliceral teeth. From *P. timmeh* (non Australian) by narrower, less marginal epigynal foveae (Figs. 2.12.b, c).

Males. From other species groups by well defined, but almost flat-fronted, eye tubercle (Fig. 2.13.a) (recently collected specimens with bright orange–yellow on creamy-white carapace dorsally, Fig. 2.13.c); legs without flattened macrosetae; male palp embolus arises prolaterally (like *P. laciniosus*-group) but has distinct TA (Fig. 2.13.g). From *P. timmeh* by straight, solid conductor (Figs. 2.13.e–g) and that most of the sclerites are smaller in proportion to the tegulum and subtegulum (compare ventral views, Figs. 2.13.f and i).

Description

Female. The holotype is in poor condition and is fragile. A more recently collected specimen, which is a good physical match for the holotype (except in abdominal shape), is described here. Carapace length range: 4.00–5.83. *Drawn specimens*. Figs. 2.1.f, 2.11.a, c–f, KS86345 (male Fig. 2.11.b from Fig. 2.13.a); Figs. 2.11.g, h, S42562; Figs. 2.11.i, j, 2.12.a, b, S42503; Figs. 2.12.c–f, holotype (NMV).

Female S42562. *Prosoma.* Carapace (Figs. 2.11.a, e, f), length 5.83, width 4.17, height 1.47; broad and low (Fig. 2.11.f), lateral margins at coxa I straight or concave (Fig. 2.11.e); eye tubercle well developed, relatively slender and slightly elevated (Fig. 2.11.a). Chelicerae: paturon with 4 promarginal teeth. Labium: length 0.65, width 1.0. Sternum: length 2.37, width 2.37; sternal extensions at bases of legs II–IV (Fig. 2.11.d). *Eyes*. (Figs. 2.11.a, f). AME > PME > ALE > PLE; ALE ca 0.5 x its own diameter from AME; ventral margin of ALE is just ventral to mid point of AME. *Legs*. (Figs. 2.11.a). P+TL I: 8.58, II: 7.92, III: 4.67, IV: 6.08; front femora distinctly broadened with greatest diameter ca 3/5 way to apex. *Abdomen*. (Figs. 2.11.a, c, (holotype Figs. 2.12.e, f)). Length 11.25, width 8.00; broadest at small tubercles just anterior to main apodemes; 'microsigillae' well developed. *Epigyne.* (Holotype). Spade-like (as in cards), widest point less than half-way to tip (Fig. 2.12.c); distal tip expanded into paired lobes posteriorly (Figs. 2.12.c, d); foveae wide and relatively shallow but well separated from lateral margins (Fig. 2.12.c, also see Fig. 2.12.b), narrowing into short copulatory ducts basally (as in Fig. 2.1.f); spermathecae closely spaced; epigyne often lightly sclerotised compared to *P. illepidus*-group and *P. laciniosus*-group. *Colour in alcohol.* (S42562) Carapace yellow, pro-foveal

suture red, eye tubercle orange brown, carapace margins ventral to lateral eyes brown. Chelicerae orange-brown with pale patch basally. Labium and maxillae orange-brown. Pedipalps yellow-olive. Femora I and II orange-yellow with darker distal band; femur III mottled pale and brown; femur IV pale basally to dark distally; distal legs mottled orange–brown. Sternum orange-brown. Abdomen ventrally fawn, dorsally with brown and black markings on a pale ground. Fresh specimens have pale creamy-grey dorsal carapace.

Male. Carapace length range: 0.94–1.10. *Drawn specimens*. Fig. 2.1.e, KS86338; Figs. 2.13.a–d, KS86342; Figs. 2.13.e–g, KS86338.

Male KS86342. *Prosoma*. Carapace: length 1.04, width 0.78, height 0.33; broad pear-shape in dorsal view but lateral margins at coxa I straight to concave (usually straight–convex in other species) (Fig. 2.13.c); eye tubercle well defined with distinct 'v' between caput and eye tubercle in lateral view, slightly elevated (Fig. 2.13.a). Labium: length 0.10, width 0.18. Sternum: length 0.45, width 0.44. *Eyes.* (Figs. 2.13.a, d). AME ≥ PME > ALE ≥ PLE; ALE ca ½ x its own diameter from AME; height of ventral margin of ALE is at mid point of AME; AME prominent on slight tubercles. *Legs.* (Fig. 2.13.a). P+TL I: 1.29, II: 1.18, III: 0.63, IV: 0.88. *Abdomen.* (Figs. 2.13.a, b). Length 1.63, width 1.00; a narrow ellipsoid, broadest at 2/3 height. *Palpal organ*. Radix–stipes joint retrolateral (Fig. 2.13.f), stipes directed apically, not hidden by cymbium; embolus and TA arise retroapically (Figs. 2.13.g, Plate 2.5.f,); embolus a slender slightly curved rod, ventral groove visible under SEM (Fig. 2.13.e, Plates 2.5.e, f); TA adpressed to embolus basally, free retrolaterally apically (Fig. 2.13.g, Plate 2.5.f); PM a curved plate with reticulated surface, less heavily sclerotised than *P. laciniosus*-group (Fig. 2.13.f, Plate 2.5.e). *Colour*

in alcohol. Carapace pale olive-grey with black median markings; eye tubercle bright orange, with black around eyes and between AME, giving 'masked' appearance. Chelicerae as carapace with fuscous markings. Labium pale with fuscous edging to basal part, maxillae darker. Femora I, II and IV pale basally to dark distally (IV darkest); distal legs mottled fuscous, turning into distinct dark banding on distal metatarsi and tarsi; underside of tibia–metatarsus III with large black spots that merge together. Sternum pale anteriorly with dark lateral and posterior borders. Abdomen ventrally greyish-fawn, dorsally with dark pattern on a white ground.

Variation

The types of *P. frenchi* and *P. sigillatus*, plus the described Cooktown specimen (S42562), agree in width of epigynal foveae, colouration and general build. All the other females examined are slightly more lightly built, the carapace is more lightly coloured, and the epigynal foveae are narrower (Fig. 2.12.b). The shape of the abdomen of the figured female (Fig. 2.11.c) seems to be common in *P. frenchi* specimens in Australia but overall the variations in shape are similar to those seen in the *P. laciniosus*-group, including tall twig-like forms (Fig. 2.11.i) and ones with dual humeral tubercles and central 'tower'. More darkly coloured and heavily built specimens can also resemble *P. illepidus*-group, especially when swollen with eggs.

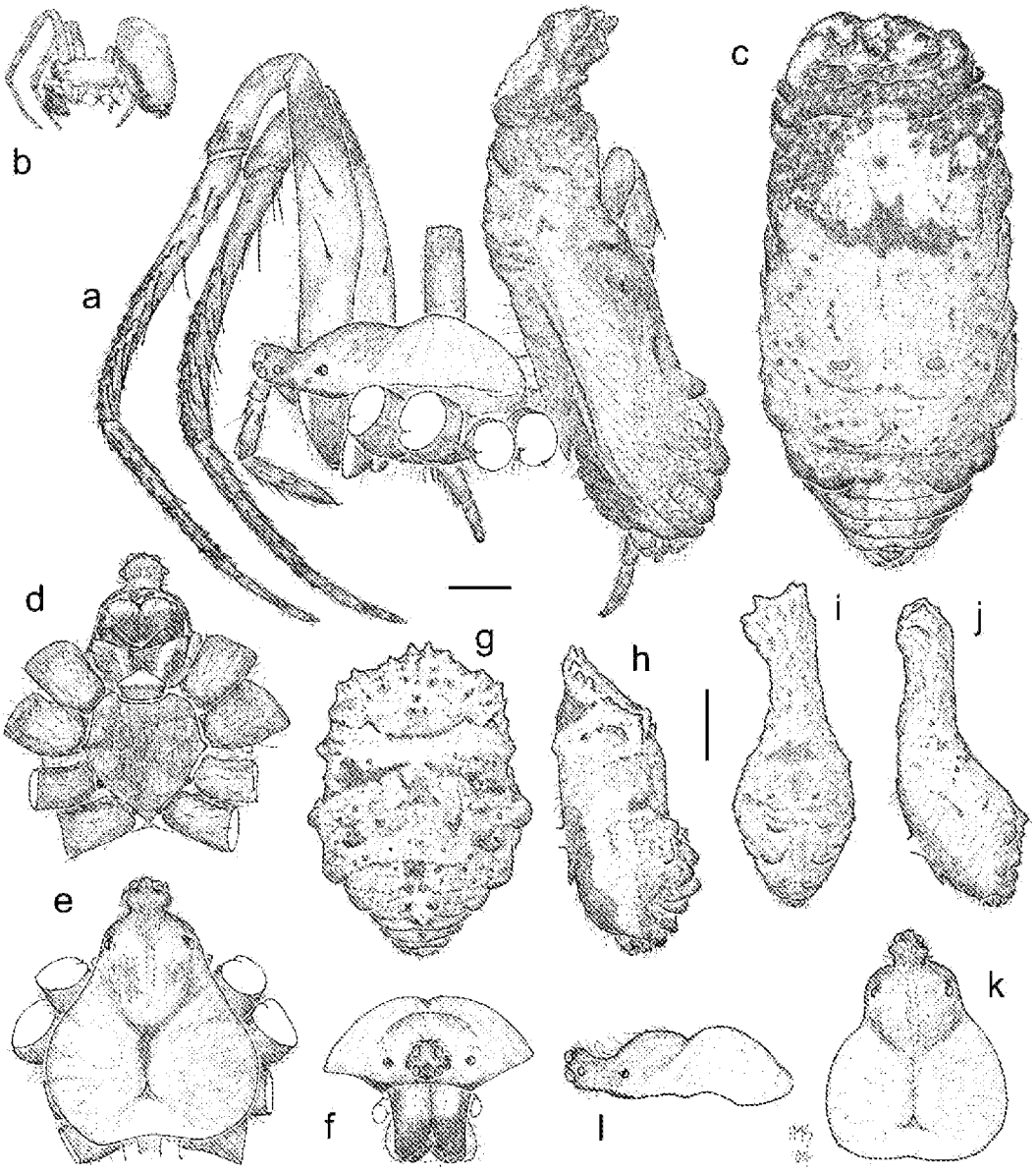

FIGURE 2.11. *Poltys frenchi*-group, female characters. a–j, *P. frenchi*: a, general lateral view; b, male at same scale; c, abdomen, dorsal; d, prosoma and coxae, ventral; e, carapace and coxae, dorsal; f, frontal carapace and chelicerae; g–j, examples of variation in abdominal shape, dorsal and lateral (also see holotypes, Figs. 2.12.e, i); k–l, *P. timmeh*, carapace, dorsal and lateral. Scale line: 1 mm for a–f, k–l; 2 mm for g–j.

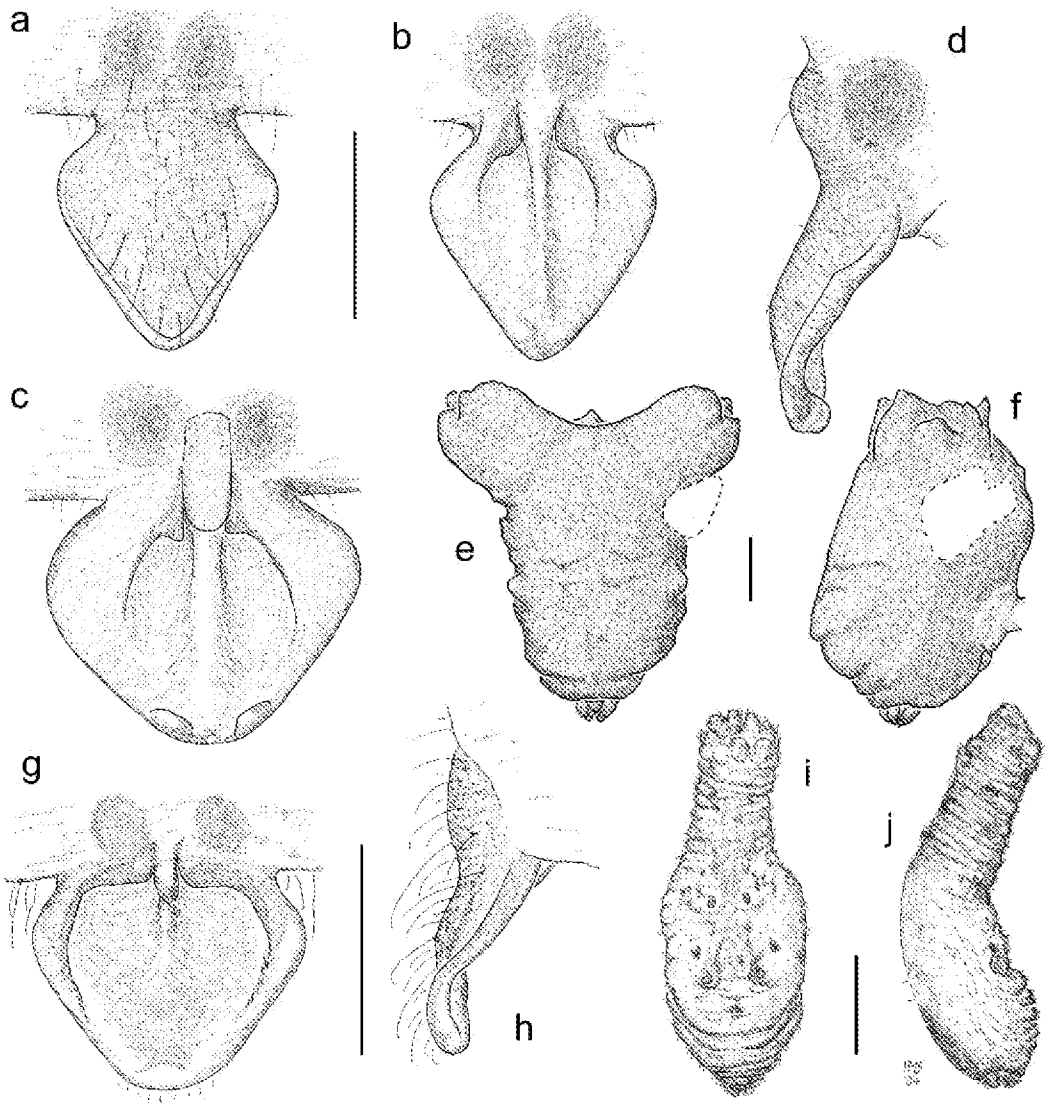

FIGURE 2.12. *Poltys frenchi*-group epigyna and holotype abdomens. a–f, *P. frenchi*: a–b, narrow form, epigyne anterior then posterior view; c–f, holotype: c–d, epigyne posterior and lateral; e–f, abdomen, dorsal and lateral (missing section is damaged). g–j, *P. timmeh* holotype: g–h, epigyne, posterior and lateral; i–j, abdomen, dorsal and lateral. Scale lines: 0.5 mm for epigyna; 2 mm for abdomens.

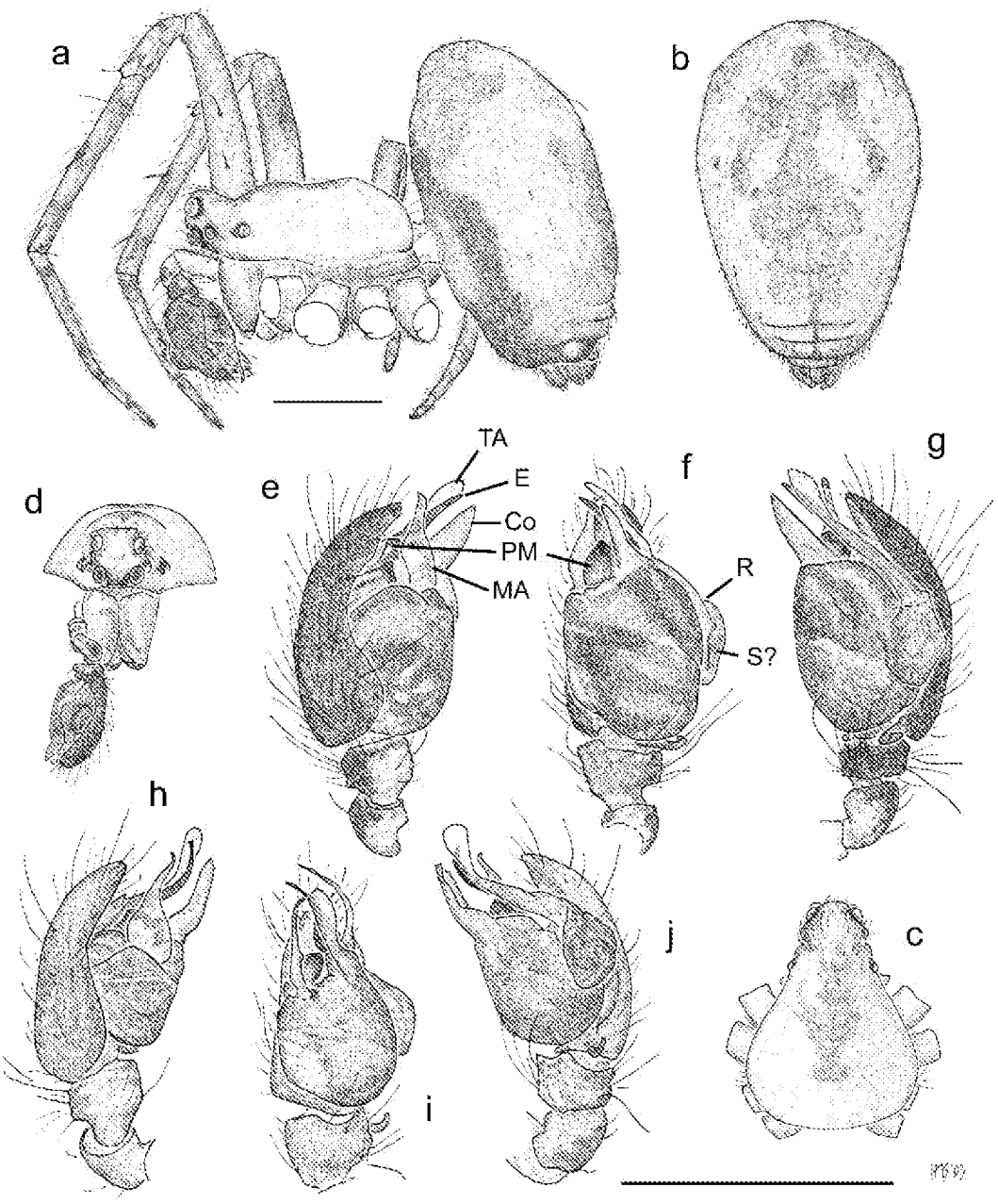

FIGURE 2.13. *Poltys frenchi*-group males. a–g, *P. frenchi*: a, general lateral view; b, abdomen, dorsal; c, carapace and coxae, dorsal; d, frontal carapace, right palpus and chelicerae. e–g, male palpus: prolateral, ventral, retrolateral. h–j, *P. timmeh*, male palpus, views as previous. Scale lines 0.5 mm, upper for a–d, lower for palpi.

Distribution

The species is recorded from northern Australia, New Guinea and southern Moluccas (Indonesia) (Fig. 2.10.b).

2.3.5.2. ***Poltys timmeh*** sp. nov.

Figures 2.10.b, 2.11.k, l, 2.12.g–j, 2.13.h–j.

Etymology

The specific name is an arbitrary combination of letters.

Type material

NEW CALEDONIA: HOLOTYPE: ♀ (HNHM), Lifou, Loyalty Islands, ca 20°43′S 167°15′E, 16 Aug. 1982, rainforest, beating. PARATYPES: ♂ (HNHM), data as holotype; ♀ KS86349, Tiea Reserve, 5 km E of Pouembout, 21°08′06″S 164°56′11″E, 4 Nov. 2001, T. Moulds, 36 m; ♂ (BPBM), Lifou, Loyalty Islands, 26–27 Mar. 1968, J.L. Gressitt & T.C. Maa; ♂♀ (AR14306-7 MNHNP, ex HNHM), Maré, Loyalty Islands, ca 21°30′S 168°00′E, 26 May–8 Jun. 1987 and 7 Jun. 1986 respectively, *Araucaria*; ♂ (HNHM), Farino, 21°40′S 165°46′E, 25 Aug. 1982; ♀ S66578, New Caledonia, Foret Nord, site 2, 22° 19′S 166°55′E, 2 Dec. 2004, QM party, rainforest, 200 m, night hand collecting.

Other material examined

NEW CALEDONIA: ♀ S69840, Pic du Grand Kaori, site 2, 22°17′S 166°53′E, 22 Nov. 2004, QM party, rainforest, 250 m, night hand collecting.

Diagnosis

Females. From other species groups, as *P. frenchi*, except number of prolateral cheliceral teeth is variable. From *P. frenchi* by broader and longer epigynal foveae that extend basally almost to the position of the spermathecae (Fig. 2.12.g), also by carapace shape (Figs. 2.11.k, l), and rather shorter legs with more distinctly broadened femora.

Males. From other species groups, as *P. frenchi* for palpal characters (no recently collected specimens seen to comment on colouration). From *P. frenchi* by longer, lobed conductor with distinct basal kink (Figs. 2.13.h, j) and that most of the sclerites are longer in proportion to the tegulum and subtegulum (compare ventral views, Figs. 2.13.i and f).

Description

Female. Carapace length range: 2.94–3.67. *Drawn specimens*. Figs. 2.11.k, l, KS86349; Figs. 2.12.g–j, holotype (HNHM) ex Lifou.

Holotype. *Prosoma.* Carapace: length 3.67, width 2.90, height 0.82; broad and relatively low, rear of caput slopes steeply into pro-foveal suture; eye tubercle well developed, slender basally, slightly enlarged anteriorly, slightly elevated (Figs. 2.11.k, l). Chelicerae: paturon with 3 promarginal teeth. Labium: length 0.43, width 0.61. Sternum: length 1.67, width 1.55; sternal extensions at bases of legs III–IV. *Eyes.* (Fig. 2.11.l). AME

> PME > PLE ≥ ALE; ALE ca 2/3 x its own diameter from AME; ventral margin of ALE level with mid point of AME. *Legs.* P+TL I: 4.90, II: 4.57, III: 2.90, IV: 3.67; front femora distinctly broadened with greatest diameter ca 3/5 way to apex leg I, or ½ way leg II; legs distinctly shorter than *P. frenchi*. *Abdomen.* (Figs. 2.12.i, j). Length 7.92, width 3.00; broadest at anterior apodemes; some 'microsigillae' visible but not strongly developed. *Epigyne.* (Figs. 2.12.g,h). Spade-like (as in cards), widest point less than half-way to tip; foveae broad and shallow (thin in lateral view, Fig. 2.12.h), occupying almost the entire posterior surface, narrowing abruptly into short, narrow copulatory ducts basally (Fig. 2.12.g); spermathecae closely spaced. *Colour in alcohol.* Carapace creamy-white, caput straw yellow, black around all eyes. Chelicerae cream, labium, maxillae and sternum yellow. Pedipalps cream. Femora I and II pale creamy-yellow with remains of dark distal band (with blue shine on recent specimen); femur III almost all cream; femur IV paler basally and distally, dark brown between; distal legs mottled yellow–cream, faint dark bands on distal metatarsi and tarsi of I and II. Abdomen ventrally blackish posteriorly, dorsally and anteroventrally with brown and black markings on a pale ground.

Male. Carapace length range: 0.98–1.43. *Drawn specimens*. Figs. 2.13.h–j (BPBM) ex Lifou.

Male (HNHM) ex Lifou. *Prosoma*. Carapace: length 1.43, width 0.98, height 0.41; broad pear-shape in dorsal view; eye tubercle well defined both in lateral and dorsal views (carapace similar shape to that shown for larger *P. noblei* male, Fig. 2.18.g), slightly elevated and PME slightly overhanging AME. Labium: length 0.14, width 0.26. Sternum: length 0.61, width 0.57. *Eyes.* AME > PME ≥ PLE > ALE; ALE almost touching AME;

height of ventral margin of ALE is just ventral to mid point of AME; AME prominent on slight tubercles. *Legs*. P+TL I: 1.76, II: 1.65, III: 0.86, IV: 1.12. *Abdomen.* AL 1.61, width 1.06; an almost evenly elongate ellipsoid; anterior margin slightly crenate, with submarginal 'microsigillae'; apodemes well developed for a male. *Palpal organ.* (Figs. 2.13.h–j). Radix–stipes joint retrolateral, stipes directed apicoventrally, not hidden by cymbium; embolus and TA arise retroapically (Figs. 2.13.i, j); conductor deeply grooved, retrolaterally expanded into rounded flap (Fig. 2.13.i), distinctly kinked basally (Fig. 2.13.h, j); embolus longer than in *P. frenchi*, a slender sinuously curved rod (Fig. 2.13.h) (but not examined under SEM, so groove may be present, as in *P. frenchi,* Plate 2.5.e); TA adpressed to embolus basally, free retrolaterally apically (Fig. 2.13.j); PM a curved plate (Fig. 2.13.i), appears similar to that of *P. frenchi* but microstructure unknown. *Colour in alcohol.* Carapace amber brown with darker caput; eye tubercle with orange dorsally, secondary eyes with black around, AME surround pale. Chelicerae brown to yellow distally. Sternum dark yellow with dark margins. Femora amber-olive; lower front legs yellow-olive dorsally, dark ventrally; rear legs mottled; all legs with distinct dark banding on distal metatarsi and tarsi. Abdomen dark ventrally and dorsal margins; main dorsal area pale with uneven central brown patch.

Variation

Some female specimens of *P. timmeh* have three promarginal cheliceral teeth whilst others have four. The range of abdominal variation is probably similar to that seen in *P. frenchi*.

Distribution

The species is only recorded from New Caledonia and the Loyalty Islands (Fig. 2.10.b).

2.3.6. The *P. laciniosus*-group

Included Australasian species: *Poltys laciniosus*, *P. grayi, P. noblei*. Other species: none known.

This is a distinct species group that appears to be endemic to Australia. The group is united by several characters: a reduced prolateral cheliceral tooth pattern; females with a more steeply domed carapace than normally found in other groups; long, roughly triangular epigynes with rolled in lateral posterior plates; relatively long copulatory ducts; and no TA in the male palp. Along with the (presumed) loss of a TA, associated palpal organ structures such as stipes and distal haematodocha are difficult to distinguish and may, or may not be present. For convenience, the basal part of the embolus, which expands into a membranous sac, has been termed stipes in the following descriptions. No modification of patellal macrosetae has been noted in the group. The three species are all variable in abdominal shape and colouration. This level of variation may be an adaptation to avoid predation in their often exposed day time hiding positions on dead twigs.

Included Australasian species: *Poltys laciniosus*, *P. grayi, P. noblei*.

2.3.6.1. *Poltys laciniosus* Keyserling

Figures 2.1.g, h, 2.14.a–f, l, m, 2.15.a, d, f, g, 2.16.a–g, 2.18.a–d, 2.19.a–c, 2.25, Plates 2.1.c, 2.2.c–e, 2.6.a, b, 8.1.c, 8.4.a.

Poltys laciniosus Keyserling, 1886: 123, pl. 9, f. 7. Female holotype from Peak Downs, Queensland, Australia; in BMNH (1890/2050), examined.

Poltys mammeatus Keyserling, 1886: 125, pl. 10, f. 1. Female holotype from Peak Downs, Queensland, Australia; in ZMH (labelled as the type of *P. laciniosus*, see remarks below), examined. NEW SYNONYMY.

Poltys bimaculatus Keyserling, 1886: 131, pl. 10, f. 4. Juvenile holotype from Peak Downs, Queensland, Australia; in ZMH, examined. NEW SYNONYMY.

Poltys salebrosus Rainbow, 1904: 104, f. 28–29. Juvenile holotype from Freemantle (sic), Western Australia, Australia; in AM (KS8697). NEW SYNONYMY.

Remarks

Both BMNH and ZMH hold types listed as the holotype of *P. laciniosus*. The BMNH specimen is a good match for the specimen illustrated by Keyserling under this name. A designated type of *P. mammeatus* has not been located but the ZMH specimen matches the colour pattern of the illustration. The shape is difficult to match with certainty, as the apex of the abdomen is inclined sharply over the prosoma, and posterior tubercles are not obvious. The specimen, however, is not in good condition and the abdomen has obviously been damaged. The ZMH type, therefore, has apparently been mislabelled as *P.*

laciniosus and should read *P. mammeatus*. The subadult types of *P. bimaculatus* and *P. salebrosus* are both from areas where no other *Poltys* species have been recorded and have features typical of *P. laciniosus*.

Selected other material examined

AUSTRALIA: ***New South Wales*:** ♂ KS84599, 60 km W of Cobar, 31°33′04″S 145°12′56″E, 26 Mar. 2002; ♂ KS84600, 62 km W of Nyngan, 31°33′31″S 146°32′49″E, 26 Mar. 2002; ♂ KS70366, The Battery rest area, 32°12′S 150°28′E, 29 Oct. 2000; ♀ KS78296, Cocoparra NP, 34°04′46″S 146°13′23″E, 15 Mar. 2002; ♂♂ KS78293–94, Conimbla NP, 33°47′47″S 148°26′53″E, 14 Mar. 2002; ♀ KS33847, Euchora, Springwood, 33°42′S 150°34′E; ♀ KS33845, Gara Station, via Armidale, 31°36′S 148°54′E; ♂ KS72253, Gilwarny Forest Rd, 30°25′20″S 147°53′57″E, 15 Dec. 1999; ♂ KS74967, ♀ KS75494, Pilliga Forest Way, 30°31′11″S 149°37′25″E, 13 Nov. 2001; ♀ KS58687, Royal National Park, 34°08′S 151°04′E, 29 Oct. 1998; ♀♂ KS74960–61, Warrumbungles NP, 31°18′S 149°00′E, 9 Nov. 2001. ***Northern Territory***: ?♀ KS55745, Gregory NP, Victoria H'way, 15°31′04″S 131°18′23″E, 25 May 1999. ***Queensland***: ♂♂ KS5806, Blackwood NP, 21°28′41″S 146°43′33″E, 11 May 2000; ♂ KS58043, ♀ KS84601, Clermont, 22°48′25″S 147°38′22″E, 9 May 2000; ♂ KS58060, ♀ KS58059, Isla Gorge, campsite area, 25°11′32″S 149°58′25″E, 7 May 2000; ♂ KS58051, ♀♀ KS58050 (3), Peak Range NP via 'Limestone', 22°45′26″S 148°08′03E, 10 May 2000; ♂♂ KS5804, ♀ KS58042, Taunton NP, 23°29′33″S 149°16′39″E, 9 May 2000; ♂ KS58056, Theodore, 24°56′41″S 150°04′24″E, 10 May 2000; ♀ (MMUS) Duaringa, 23°41′S 149°40′E; ♀

(MMUS), Innot Hot Springs, 17°40′S 145°14′E; ♀ S42616, Altonvale Station, 28°01′S 149°15′E, 10 Jan. 1979; ♂ S42558, Blackdown Tableland, 23°47′S 149°04′E, 6 Feb. 1981; ♀♀ S42501, Camel Creek, 18°50′S 145°28′E, 5 Dec. 1955; ♀♀ ex S42608–09, Camira, 27°38′S 152°55′E, 23 Nov. 1986; ♀ S42500, Crows Nest, 27°16′S 152°03′E, 27 Jan. 1973; ♀ S42612, Dulacca, 26°38′S 149°48′E, 1 May 1928; ♀ S42551, Eidsvold, 25°22′S 151°07′E, Feb. 1915; ♀ S42591, Goondiwindi, 28°32′S 150°18′E, Jan. 1951; ♀ S42560, Mt Moffat NP, 24°53′S 147°57′E, 15 Dec. 1987; ♀ W1444, Purga, 27°41′S 152°42′E, 15 Dec. 1941; ♀ W1503, Rockhampton, 23°22′S 150°30′E, 26 Jun. 1942; ♀ W434, Toogoolawah, 27°05′S 152°22′E; ♀ S42550, Yandaburra, 24°13′S 148°00′E, 16 May 1976. ***South Australia***: ♀ KS78314, Arden Vale Rd, 5.1 km from Quorn, 32°18′08″S 138°00′49″E, 24 Mar. 2002; ♂ KS84596, Cocata Conservation Reserve, 33°17′28″S 135°18′59″E, 22 Mar. 2002; ♀ KS78310, nr Coffin Bay NP, 34°37′26″S 135°27′04″E, 22 Mar. 2002; ♂ KS78309, ♀ KS85050, Lake Gilles NP, 33°01′56″S 136°47′45″E, 21 Mar. 2002; ♂ KS84598, ♀ KS78313, Lincoln H'way, 41 km N of Cowell, 33°21′28″S 137°03′58″E, 24 Mar. 2002; ♂ KS84597, ♀♀ KS78311, Lincoln NP, 34°47′11″S 135°55′04″E, 23 Mar. 2002; ♀ KS78304, Millbrook Reservoir, 34°50′S 138°49′E, 19 Mar. 2002; ♂ KS91165, raised from female KS78304, Millbrook Reservoir, matured 30 Nov. 2002; ♀ KS78307, Mt Remarkable NP, 32°50′45″S 138°01′41″E, 20 Mar. 2002; ♀♂ KS78301–02, Ngarkat Conservation Park, 35°38′17″S 140°46′50″E, 17 Mar. 2002; ♂ KS84593, Scorpion Springs CP, 35°25′10″S 140°53′20″E, 17 Mar. 2002; ♀ NN12173, Billiatt CP, 34°59′23″S 140°28′24″E, 19 Nov. 1996; ♀ NN12178, Calpatanna Waterhole CP, 33°00′S 134°21′E, 27 11 1995; ♀ N1998771, Gawler Ranges, 32°22′S 135°34′E, Sep.

1972; ♀ N1998778, 13 km N Keilira Station, 36°37′S 140°10′E, 22 Mar. 1992; ♀♀ (4) (SAMA), Munyaroo CP, 13.7 km SE Moonabbie, 33°21′34″S 137°21′03″E, 30 Sep. 2002; ♀ NN12166, Murvio Homestead, 36°12′41″S 140°07′46″E, 3 Oct. 2000; ♀ NN12176, Pinkawillinie CP, 33°03′S 135°50′E, 23 Nov. 1995; ♀ N1998775, Tailem Bend, 35°15′S 139°28′E, Mar. 1947; ♀ N1998776, 4 miles E Wellington, 35°18′S 139°27′E, 13 Aug. 1994. ***Victoria***: Juvenile ♀, Boinka Flora Reserve, 35°11′46″S 141°36′39″E, Oct. 1999 (probably this species, close to recorded distribution in SA). ***Western Australia***: ♂ KS59255, Eucla roadhouse, 31°41′S 128°52′E, 7 Oct. 1999; ♂ KS59256, Pemberton, 34°27′S 116°02′E, 10 Oct. 1999; ?♀ WA98/1957, Beta Ck, 14°16′S 127°19′E, 20 Sep. 1996; ♀ WA98/1959, Gnowangerup, 33°56′S 118°00′E, 15 Nov. 1965; ♀ WA98/1960, Grasspatch, 33°14′S 121°43′E, 24 Dec. 1988; ♀ WA36/68, Lowden, 33°32′S 115°58′E, 10 Jan. 1936; ♀ WA39/2340, Maddington, 32°03′S 115°59′E, 27 Sep. 1939; ♀ WA98/1966, South Yardie Well, Cape Range, 22°25′S 113°46′E, 24 May 1995; ♀ WA98/1970, Torndirrup NP, 35°05′S 117°55′E, 25 Apr. 1990; ♀ WA27/305, Wooroloo, 31°48′S 116°19′E, Mar. 1927.

Reared specimens deposited in Australian museums: ex female KS78304: ♂♀ to NTM; ♂ to QM S66577, ♂ to SAMA NN21924, ♂ to WAM T63010; ex female KS78313: ♂ to NMV K8898, ♀ to NMV K8899, ♂ to SAMA NN21925.

Diagnosis

Females. From other species groups: epigyne as long or longer than wide, widest at base (Fig. 2.16.a); prolateral cheliceral teeth usually LLs (i.e. missing one small tooth, Fig. 2.14.f); carapace profile relatively high (Fig. 2.14.e); well defined eye tubercle (Fig. 2.14.a); front femora with distinct broadening. From *P. noblei* and *P. grayi*: carapace dark (Fig. 2.14.a), broadly blunt tip to epigyne and (except Kimberley and Northern Territory specimens) almost total reduction of the posterior median plate distal to the base (Figs. 2.16.a–d).

Males. From other species groups by the male palp: the embolus arises prolaterally without a terminal apophysis (Figs. 2.19.c, Plate 2.6.a). From *P. noblei* and *P. grayi* by longer embolus without a terminal flange (Fig. 2.19.b); conductor tip angled strongly towards prolateral (Figs. 2.19.b, Plate 2.6.b). Length of embolus slightly shorter in Western Australian specimens. Males are unknown from the Kimberley and Northern Territory, but the embolus length may be reduced where females have a short epigyne.

Description

Female. Carapace length range 2.82–4.49. *Drawn specimens*. Fig. 2.1.h, KS78299; Figs. 2.14.a, c–d, KS78300 (male Fig. 2.14.b from Fig. 2.18.a); Figs. 2.14.e, 2.15.a, d, f, g, 2.16.a, e, BMNH1890/2050 (holotype); Fig. 2.14.f, KS85050; Figs. 2.14.l, m, NN12173; Fig. 2.16.b, KS58050; Figs. 2.16.c, d, KS78310; Figs. 2.16.f, g, KS55745 (?*P. laciniosus*).

Holotype. *Prosoma*. Carapace: length, 3.80, width 2.82, height 1.18; relatively wide but tall (Figs. 2.15.a, 2.14.e); eye tubercle well developed, slender basally, slightly

elevated, with well developed dorsal protrusions above PME that point anteriorly (Figs. 2.14.a, 2.15.d). Chelicerae: paturon with 3 promarginal teeth (Fig. 2.14.f). Labium: length 0.41, width 0.78. Sternum: (Fig. 2.14.d) length 1.59, width 1.55; sternal extensions at bases of legs III–IV. *Eyes.* (Figs. 2.14.e, 2.15.d). AME = PME > ALE = PLE; ALE < 0.2 x its own diameter from AME; ventral margin of ALE is just ventral of mid point of AME. *Legs.* (Fig. 2.14.a). P+TL I: 5.92, II: 5.50, III: 3.00, IV: 4.00; front femora distinctly broadened with greatest diameter ca 3/5 way to apex in leg I, or ½ way, leg II. *Abdomen.* (Figs. 2.15.f, g, also see other shapes shown for the group in Figs. 2.14.a, c, h–m and 2.15.h–k). Length 8.70, width 4.78; broadest at humeral tubercles; some 'microsigillae' visible but not strongly developed. *Epigyne.* Tongue-like, widest point at base; lip broad either side of tip (Fig. 2.16.a); foveae merged almost from base into single, deep opening (Figs. 2.16.b, e); lateral plates curve ventrally either side of slight ridge of reduced median plate, basally forming tubes that lead into copulatory ducts; ducts not examined in holotype but usually pass anterior to spermathecae then wrap around dorsally to enter dorsally or posteriorly (Fig. 2.1.h); ducts separated along whole width; spermathecae separated by at least a single spermatheca width. *Colour in alcohol.* Carapace and most of caput olive-brown, anterior caput colour fades into yellow patch on dorsal eye tubercle. Chelicerae brown, paler basally and with orange on distal inner faces. Labium, maxillae and sternum orange-tan. Pedipalps yellow, mottled with brown distally. Femur I dark brown and orange with broad yellow band (dark areas with strong blue sheen on recent specimens); femur II similar but yellow band rather vague; femur III mottled to dark distally; femur IV dark to paler in distal third; distal legs mottled with yellow/orange and brown, distinct dark bands

on distal metatarsi and tarsi of I and II. Abdomen generally dark grey ventrally except paler book lung covers; dorsally with grey, brown and black markings on a pale ground. Note in recent specimens the yellow/orange against black banding on the front femora can be striking and may be used to startle potential predators (Plate 8.4.a). The dorsal carapace and caput are usually a rich dark brown against which the white hairs on the caput stand out strongly.

Male. Carapace length range 0.78–1.31. *Drawn specimens*. Fig. 2.1.g, KS91165; Figs. 2.18.a–d, KS58060; Figs. 2.19.a–c, KS58051.

Male KS58060. *Prosoma*. Carapace: length 0.86, width 0.69, height 0.31; a broad pear-shape in dorsal view (Fig. 2.18.c); height subequal at eye tubercle and fovea; eye tubercle well defined with distinct 'v' between caput and eye tubercle in lateral view (Fig. 2.18.a), less well defined in dorsal view; with strongly developed dorsal protrusions above PME, pointed anteriorly (Figs. 2.18.a, c, d). Labium: length 0.08, width 0.18. Sternum: length 0.40, width 0.44. *Eyes.* (Figs. 2.18.a, d) AME ≥ PME > ALE ≥ PLE; ALE almost touching AME; ventral margin of ALE is ventral to mid point of AME. *Legs.* (Fig. 2.18.a) P+TL I: 1.08, II: 1.00, III: 0.55, IV: 0.69. *Abdomen.* (Figs. 2.18.a, b, also see 2.18.e). Length 1.25, width 0.98; ellipsoid, broadest at 2/3 height. *Palpal organ.* Radix–stipes joint almost basal, stipes wraps margin of retrobasal subtegulum, not hidden by cymbium (Figs. 2.19.b, c, Plate 2.6.a); no TA; distal embolus wire-like, long, grooved and strongly arcing over apex of palp, roughly parallel to edge of cymbium, ending in a small barb (Figs. 2.19.b, Plate 2.6.a); PM a sculptured curving structure looking like a clenched fist, extending ventrally almost to edge of tegulum, heavily sclerotised (Figs. 2.19.b, Plate

2.6.b). *Colour in alcohol.* Lateral carapace pale olive, caput darker olive, both with black median markings; eye tubercle orange, with brown points to protrusions dorsal to PME; dark brown round AME. Chelicerae, labium, maxillae and sternum olive. Sternum with fuscous edges and median streak. Femora pale olive, darkening distally; distal legs mottled fuscous turning into dark banding on distal metatarsi and tarsi. Palpal cymbium olive brown with darker patches, tibia fuscous, patella fuscous dorsally, femur and ventral patella creamy-white. Abdominal book lung covers and posterior to epigastric fold pale, surrounding ventral areas olive darkening to black at spinnerets; dorsally with olive–brown and black pattern on a pale ground.

Variation

There is considerable variation in epigyne size and shape of *P. laciniosus* females. Specimens from all parts of Australia and representing all extremes of epigyne shape were included in the COI DNA analysis. Although this showed some minor variations in sequences, no consistent differences were found. The partial reduction of the posterior median plate and the unusually short length of the epigynes of the two specimens from the Northern Territory and the Kimberley (Figs. 2.16.f–g) are unique characters amongst the *P. laciniosus* specimens examined. Before the results for the DNA sequence were obtained these two specimens had been assumed to be of a different species, but the sequences indicate that all the tested specimens are conspecific (see Chapter 4). It is possible that contamination has occurred (unlikely as sequencing was repeated from the original extract) or that the one short sequence examined is not useful in this case. The status of these

specimens should be re-examined when males are available from the area or if further DNA studies are carried out.

As with other *Poltys* species, all morphological features are quite variable in shape and colouration, especially the abdomen. Some examples (taken from different species but representative of all within the group) are shown in Plates 8.3.a–d and Figs. 2.15.f–k. Male abdomens show only slight variation, some being more rounded (Fig. 2.18.b) and others tending towards taller and narrower (example from *P. noblei*, Fig. 2.18.e). There is considerable variation in male carapace shape and relative eye sizes (as illustrated in *P. grayi*, Figs. 2.18.f–i). The protrusions dorsal to the PME (Figs. 2.18.c, d) are variable but usually prominent in *P. laciniosus*.

Distribution

This is the most widespread of the endemic *Poltys* species. It is probably present over much of mainland Australia where tree or scrub cover is reasonably extensive. Away from centres of human population, the distribution shown (Fig. 2.20) mostly represents collecting trips made by museum arachnologists. *Poltys laciniosus* was not recorded on trips through the drier interior of Australia (Broken Hill, Coober Pedy, Uluru etc) and is uncommon on the east coast where *P. noblei* is dominant.

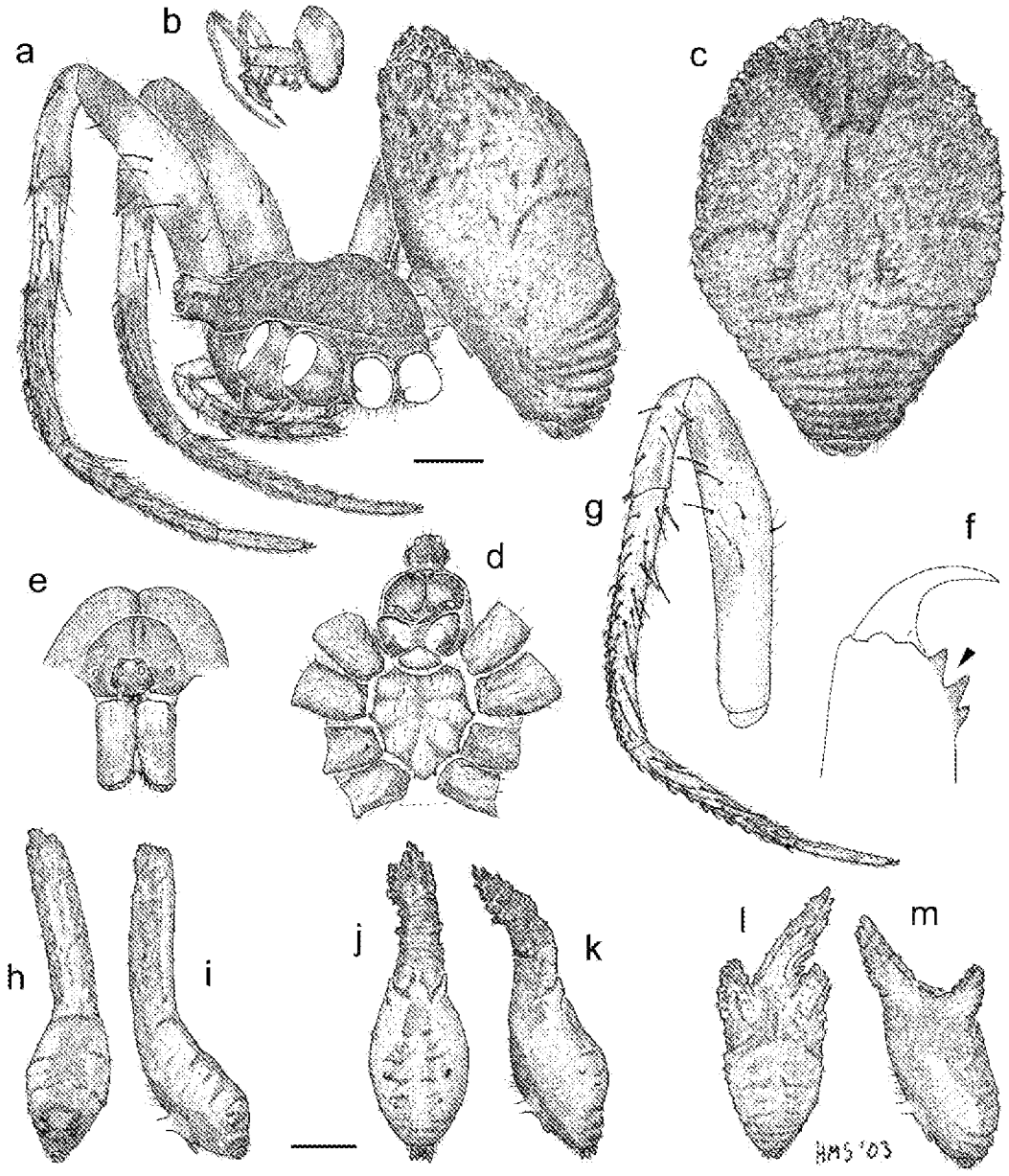

FIGURE 2.14. *Poltys laciniosus*-group, female characters. a–f, *P. laciniosus*: a, general lateral view; b, male at same scale; c, abdomen, dorsal; d, prosoma and coxae, ventral; e, holotype carapace and chelicerae, frontal; f, left chelicera and fang, prolateral; g, *P. grayi,* leg I, prolateral; h–m, examples of variation in abdominal shape seen in all species, dorsal and lateral (also see holotypes, Figs. 2.20, f–k), (h–i, *P. noblei*; j–k, *P. grayi*; l–m, *P. laciniosus*). Scale lines: upper 1 mm for a–e, g; 0.25 mm for f; lower line 2 mm for h–m.

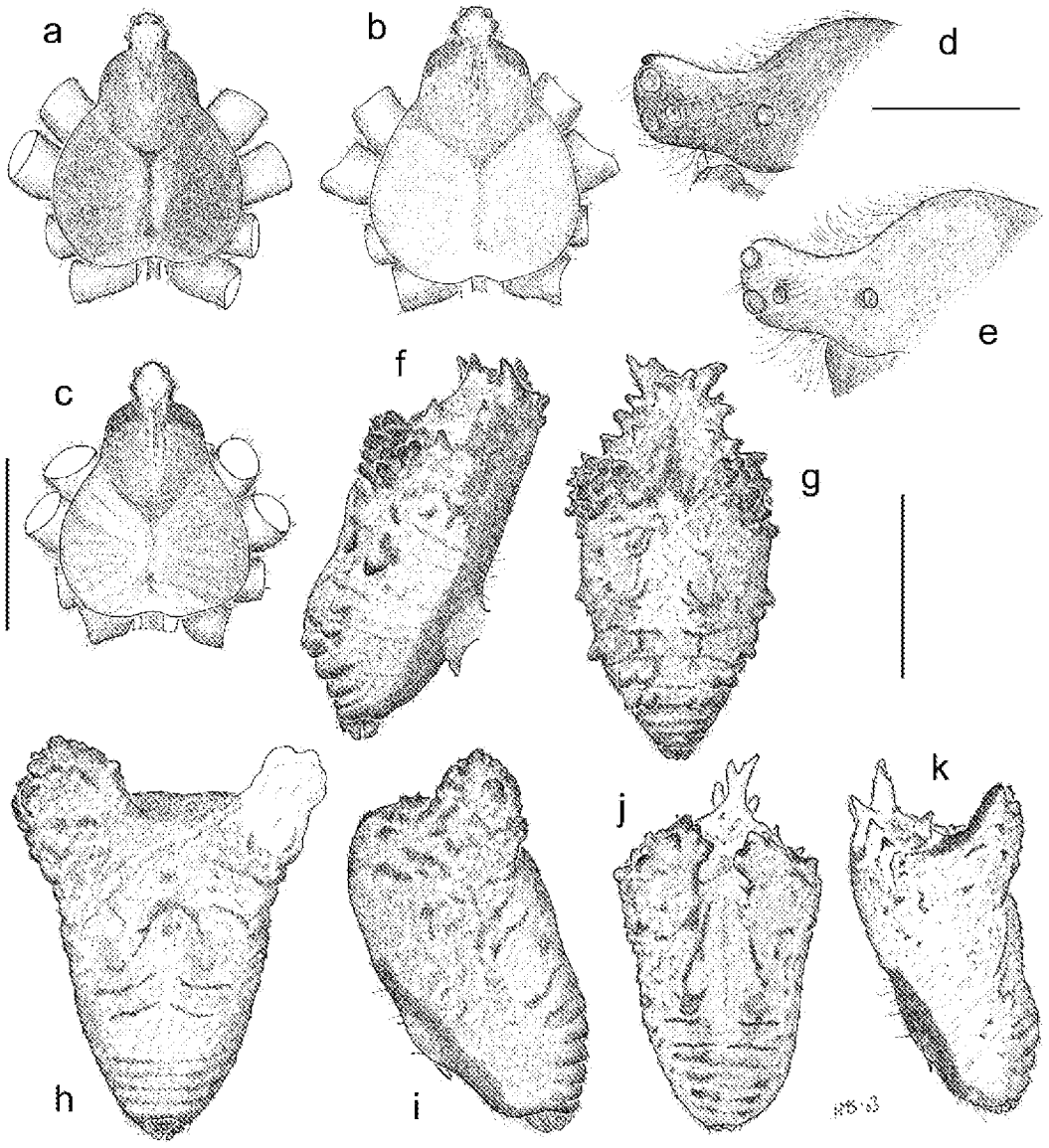

FIGURE 2.15. *Poltys laciniosus*-group females. a–c, carapace and coxae, dorsal: a, *P. laciniosus* (holotype), b, *P. grayi*, c, *P. noblei*. d–e, eye region, lateral, of specimens shown in a–b. f–k, abdomens of holotypes, dorsal and lateral: f–g, *P. laciniosus*; h–i, *P. grayi* (right humeral tubercle damaged); j–k, *P. noblei*. Scale lines: lower right, 3 mm for f–k; upper right, 2 mm for a–b; 1 mm for d–e; left, 2 mm for c.

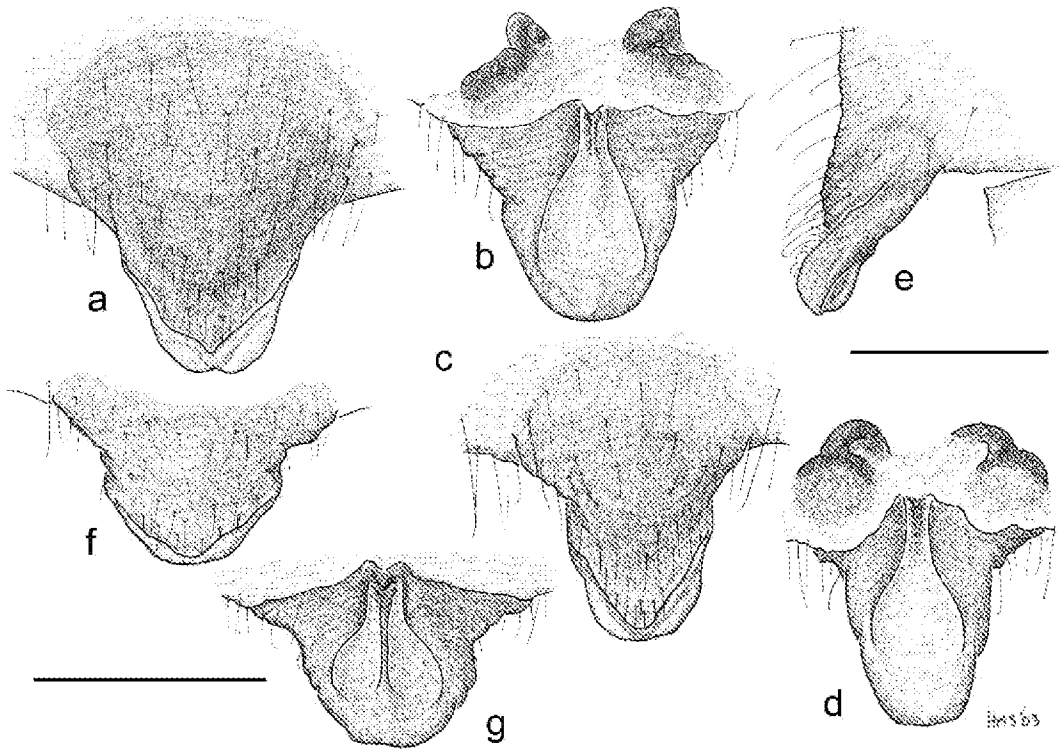

FIGURE 2.16. *Poltys laciniosus* epigyna: a–d, normal range of variation, anterior then posterior view, large and broad epigyna such as a and b are typical of northern specimens, narrow and small such as c and d are more typical in the south; e, lateral (a, e, holotype); f–g, *P. laciniosus?* ex Kimberley region. Scale lines 0.5 mm, lower left for f–g only.

2.3.6.2. *Poltys grayi* sp. nov.

Figures 2.14.g, 2.14.j, k, 2.15.b, e, h, i, 2.17.a–d, 2.18.f–j, 2.19.d–f, 2.20, Plates 2.6.e. 8.3.a, b, 8.4.d.

Etymology

This species is named in honour of Dr Mike Gray, who first collected this species.

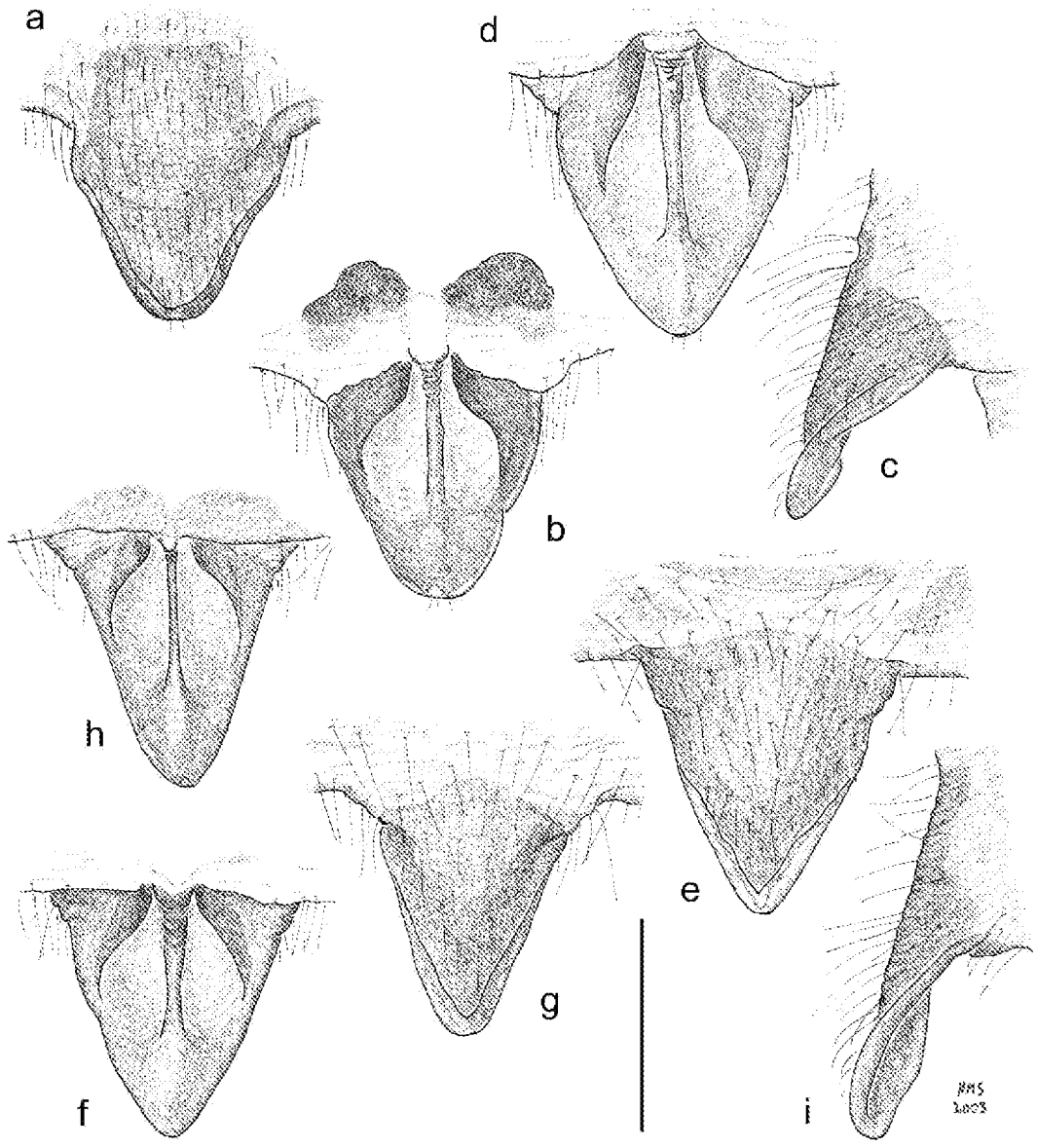

FIGURE 2.17. *Poltys laciniosus*-group epigyna. a–d, *P. grayi*: a–c, holotype: anterior, posterior and lateral; d, variant, posterior. e–i, *P. noblei*: e–f, broad example, anterior and posterior; g–i, narrow example, anterior, posterior and lateral. Scale line 0.5 mm.

Type material

AUSTRALIA: ***New South Wales: Lord Howe Island***: HOLOTYPE: ♀ KS71139, between War Memorial and Lord Howe Island Board, 31°31′53″S 159°04′02″E, 15 Dec. 2000, HMS, in web feeding on one moth, second wrapped at side of web, night. PARATYPES: ♂ KS71127, track to start of Gower Walk, 31°33′54″S 159°04′29″E, 10 Dec. 2000, HMS, night coll.; ♂ KS71130, jnct of tracks on Smoking Tree Ridge, 31°33′20″S 159°05′09″E, 3 Dec. 2000, HMS & C. Reid, beating dead twigs; ♀ KS70616, track to start of Mt Gower walk, S end Salmon Beach, 31°33′50″S 159°04′30″E, 1 Mar. 2001, G. Milledge, night coll.; ♂♀ KS70351, Middle Beach Rd–Anderson Rd track, 31°31′36″S 159°04′08″E, 8 Dec. 2000, HMS, ♂ on edge of ♀ web, night coll; ♂♀ KS70352, start of Transit Hill track opp. Board yard, 31°31′48″S 159°04′05″E, 6 Dec. 2000, HMS, at night, courting.

Other material

AUSTRALIA: ***New South Wales: Lord Howe Island***: ♂ KS71140, ♀♀ KS71136, KS71138, KS70347, Bowker Ave, 31°31′47″S 159°04′08″E, 9 & 14 Dec. 2000; ♀ KS70344, Capella South, 31°33′13″S 159°04′50″E, 11 Dec. 2000; ♂ KS71132, Gower–Lidgbird Ridge, 31°34′49″S 159°04′58″E, 12 Dec. 2000; ♂ KS71134, ♀ KS90967, start of Gower walk, 31°33′54″S 159°04′29″E, 10 Dec. 2000; ♀♀ KS71137, KS70340, KS70343, KS90953, KS90955, KS90968, sites along Lagoon Rd, 31°31′S 159°04′E, 6–15 Dec. 2000 (KS90968 and KS90953 laid eggsacs ‘A’ and ‘B’ in Smith 2003, respectively); ♂ KS71131, opposite LHI Board office, 31°31′49″S 159°04′05″E, 4 Dec. 2000; ♂♂

KS71126, KS71133, Max Nichols Memorial Boardwalk, 31°31′3″S 159°03′35″E, 11 Dec. 2000; ♂♀ KS70350, Middle Beach Rd, 31°31′40″S 159°04′07″E, 24 Nov. 2000; ♀ KS70341, Middle Beach Rd–Anderson Rd track, 31°31′36″S 159°04′08″E, 8 Dec. 2000; ♀ KS90954, Palm Nursery, 31°31′S 159°03′E, Feb. 2001; ♂ KS33924, trail on N face of North Hummock., 31°32′48″S 159°04′54″E, 6 Feb. 1971; ♀♀ KS70348 (2), KS71135, Research Centre, 31°31′37″S 159°03′58″E, 24 Nov. 2000; ♀ KS70342, ♂ KS71129, Smoking Tree Ridge, 31°33′17″S 159°05′09″E, 3 & 10 Dec. 2000; ♀♀ KS70346, KS70349, KS70345, Steven's Reserve, 31°31′34″S 159°03′49″E, 5 & 15 Dec. 2000; ♂♂ KS71128, KS71141, Transit Hill, 31°32′09″S 159°04′43″E, 8 Dec. 2000; ♀ KS71142, Windy Point, 31°32′05″S 159°04′08″E, 14 Dec. 2000.

Diagnosis

Use *P. laciniosus*-group diagnosis to separate specimens from other species groups.

Females. From *P. laciniosus* by long 'V'-shaped epigyne with distinctly separate foveae (Fig. 2.17.b), and pale carapace without projections above PME (Figs. 2.15.b, e). From *P. noblei* by epigyne margins parallel at base before converging and tip usually more rounded (Figs. 2.17.b, d).

Males. Conductor not as strongly twisted as *P. laciniosus* (Fig. 2.19.e); embolus shorter than *P. laciniosus* but terminal flange absent or small cf. *P. noblei* (Figs. 2.19.e, Plate 2.6.e).

Description

Female. Carapace length range 3.27–4.29. *Drawn specimens*. Figs. 2.14.g, 2.15.b, e, KS70346; Figs. 2.14.j, k, KS71138; Figs. 2.15.h, i, 2.17.a–c, KS71139 (holotype); Fig. 2.17.d, KS70341. General characters see *P. laciniosus*.

Holotype. *Prosoma.* Carapace: length, 3.92, width 3.06, height 1.14; relatively wide but tall; eye tubercle well developed, slender basally, slightly enlarged anteriorly, slightly elevated (Figs. 2.15.b, e). Chelicerae: paturon with 3 promarginal teeth. Labium: length 0.45, width 0.75. Sternum: length 1.71, width 1.63; well formed sternal extensions at bases of legs III–IV, also a slight point at II. *Eyes.* (Fig. 2.15.e). PME ≥ AME > ALE = PLE; ALE ca 0.3 x its own diameter from AME; ventral margin of ALE is just ventral of mid point of AME. *Legs.* (Fig. 2.14.g). P+TL I: 5.67, II: 5.42, III: 3.25, IV: 4.08; front femora distinctly broadened with greatest diameter ca 3/5 way to apex leg I, or ½ way leg II. *Abdomen.* (Figs. 2.15.h, i, Plate 8.3.a). Length 7.58 (not including humeral tubercles), width 7.08; broadest at humeral tubercles; some 'microsigillae' visible but not strongly developed. *Epigyne.* Tongue-like, widest point at base, sides more or less parallel before converging to a bluntly rounded tip (Fig. 2.17.a); distal median bulge variable, but usually distinct (Fig. 2.17.c); foveae separated by a strong median ridge, foveae broader basally than *P. noblei* (usually visible through lateral plates) in posterior view (Figs. 2.17.b, d); lateral plates curve ventrally either side of basal median plate, forming tubes into the copulatory ducts; ducts pass anteromedially between spermathecae then turn outwards to enter dorsomedially; ducts broadly separated along whole width; spermathecae separated by about 1.5x a spermatheca width. *Colour in alcohol.* Carapace pale creamy-yellow,

caput fuscous laterally and with darker patches anteriorly, yellow patch on dorsal caput and eye tubercle, dark brown around main eyes. Chelicerae brown, orange on cheliceral boss and distal inner faces. Labium, maxillae and sternum orange-tan. Pedipalps creamy-yellow, sparsely mottled with brown. Femora I and II pale basally then with two brown bands almost surrounding yellow band (Fig. 2.14.g); femur III pale mottled to darker distally; femur IV dark to paler in distal third; distal legs mottled with yellow and brown, distinct dark bands on distal metatarsi and tarsi of I and II. Abdomen ventrally dark grey around pedicel and posteriorly to spinnerets except paler book lung covers, laterally and anteriorly with band of cream; dorsally overall white, with black and grey markings.

Male. Carapace length range 0.90–1.22. *Drawn specimens*. Figs. 2.18.f, g, j, KS71134; Figs. 2.18.h, i, KS71140; Figs. 2.19.d–f, KS71127. General characters see *P. laciniosus*.

Male KS71127. *Prosoma.* (Figs. 2.18.h, i). Carapace: length 1.00, width 0.78, height 0.37; eye tubercle well defined with distinct dip between caput and eye tubercle in lateral view. Labium: length 0.11, width 0.19. Sternum: length 0.45, width 0.46. *Eyes.* (Figs. 2.18.h). AME > PME > PLE > ALE; ALE almost touching AME; height of ventral margin of ALE is at mid point of AME. *Legs.* P+TL I: 1.22, II: 1.12, III: 0.61, IV: 0.78. *Abdomen.* Length 1.31, width 0.88; a tall ellipsoid, rounded apex, widest at mid-height; main two pairs of apodemes well developed for a male. *Palpal organ.* (Figs. 2.19.d–f, Plate 2.6.e). Radix–stipes joint retrobasal, obscures margin of retrobasal subtegulum, sclerites not hidden by cymbium (Figs. 2.19.e, f); no TA; distal embolus wire-like, grooved and curving towards tip of MA, ending in a small barb (Figs. 2.19.e, Plate 2.6.e); PM a

sculptured curving structure looking like a clenched fist, extending ventrally almost to edge of tegulum, heavily sclerotised; conductor thumb-like, with only slight angle towards prolateral (Figs. 2.19.d, e). *Colour in alcohol.* Lateral carapace light olive, caput darker, both with black median markings and fuscous margin; eye tubercle orange; dark brown round AME. Chelicerae, labium and maxillae olive: chelicerae, paler basally and distally. Sternum yellow-brown with fuscous edges. Femora fuscous olive-black, pale basally; femur III with darker partial banding; patella to upper metatarsus of all legs dark orange-olive dorsally, darker or blackened ventrally, dark banding on distal metatarsi and tarsi. Palpal cymbium and tibia dark olive, cymbium black distally, patella and femur creamy-white marked with black. Abdominal book lung covers pale, darker towards spinnerets; surrounding ventral areas black with orange maculation in area anterior to pedicel; dorsum with vague olive–brown and black pattern on a lighter ground.

Remarks

The only previous records of a *Poltys* species from Lord Howe Island were by Rainbow (1920) who described *Poltys penicillatus* and Gray (1974) who collected a male and ascribed it to Rainbow's species. Rainbow's description was based on a female specimen collected by A.M. Lea on an expedition to Lord Howe and Norfolk Islands. This specimen actually represents *P. illepidus*, which is recorded from Norfolk Island, but has not since been found on Lord Howe. Gray's male specimen is the first record of the new species described here.

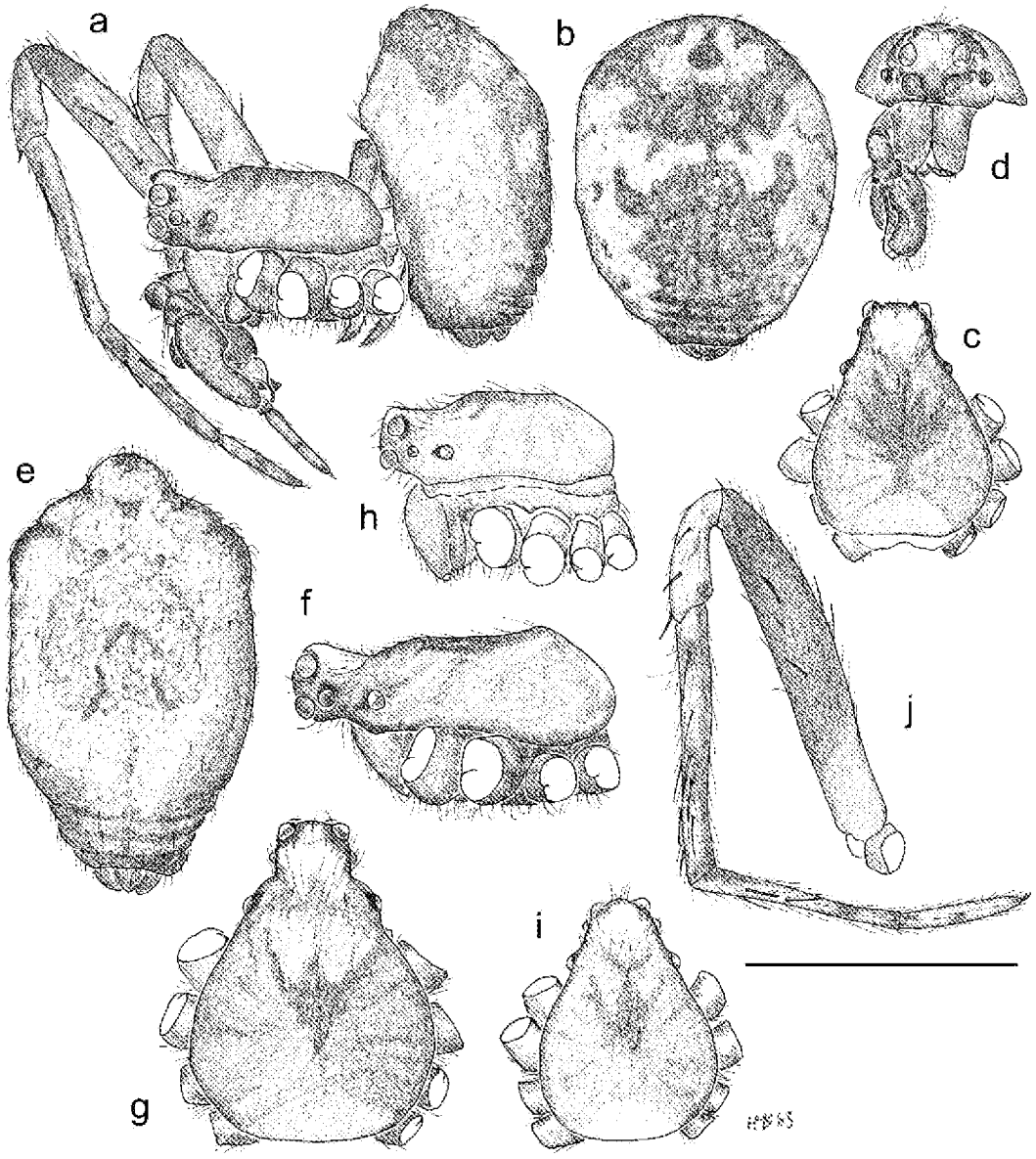

FIGURE 2.18. *Poltys laciniosus*-group males. a–d, *P. laciniosus*: a, general lateral view; b, abdomen, dorsal (rounded variant); c, carapace and coxae, dorsal; d, frontal carapace, right palpus and chelicerae. e–j, extent of variation throughout species group. e, abdomen dorsal, elongate variant (*P. noblei*). f–g, j, large specimen: f, prosoma lateral, g, dorsal; j, spination prolateral leg I; h–i, small specimen: h, prosoma lateral, i, dorsal (f–j all *P. grayi*). Scale line 1.0 mm.

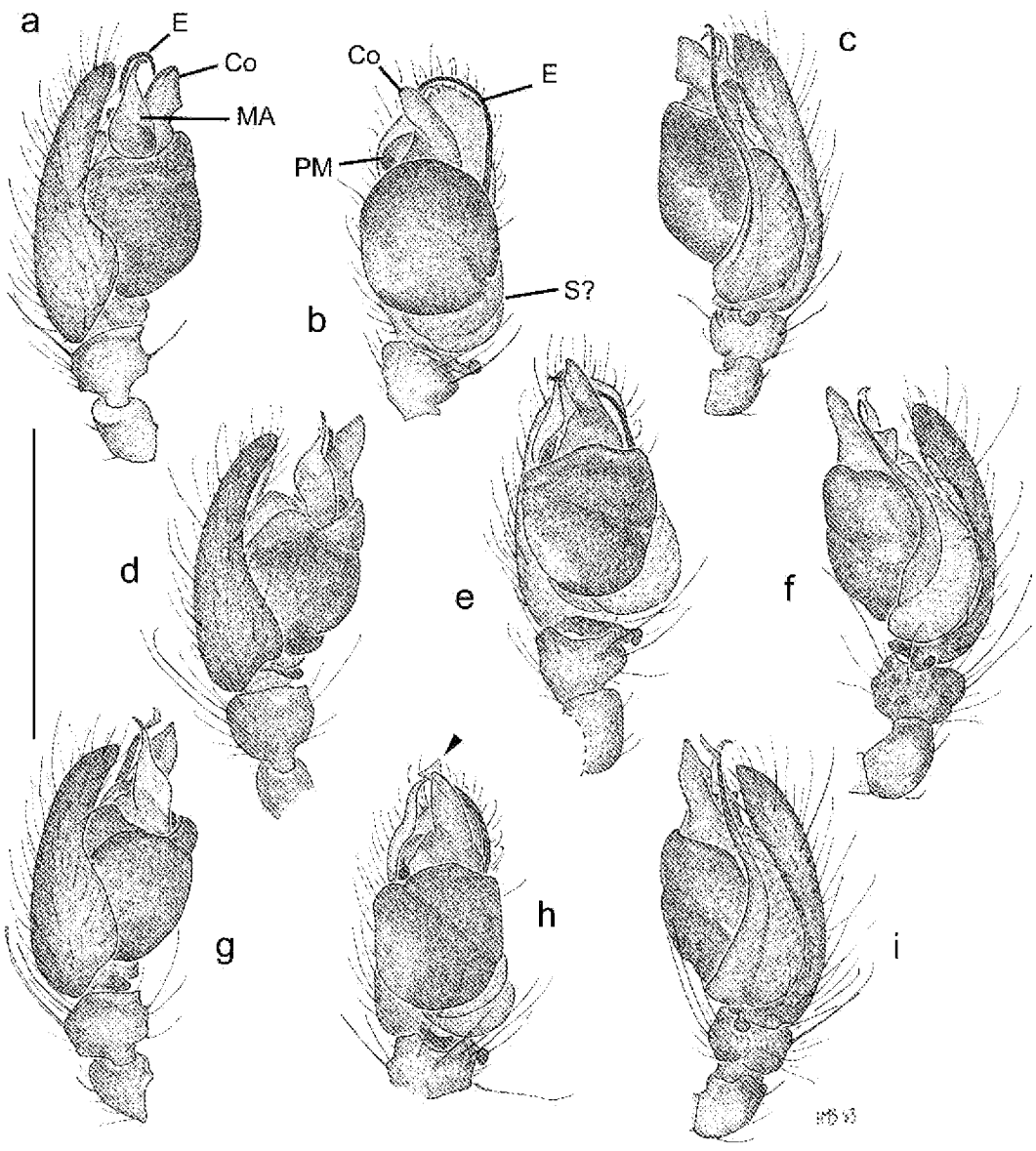

FIGURE 2.19. *Poltys laciniosus*-group male palpi. a–c, *P. laciniosus*: prolateral, ventral, retrolateral; d–f, same for *P. grayi*; g–i, same for *P. noblei*. Scale line: 0.5 mm.

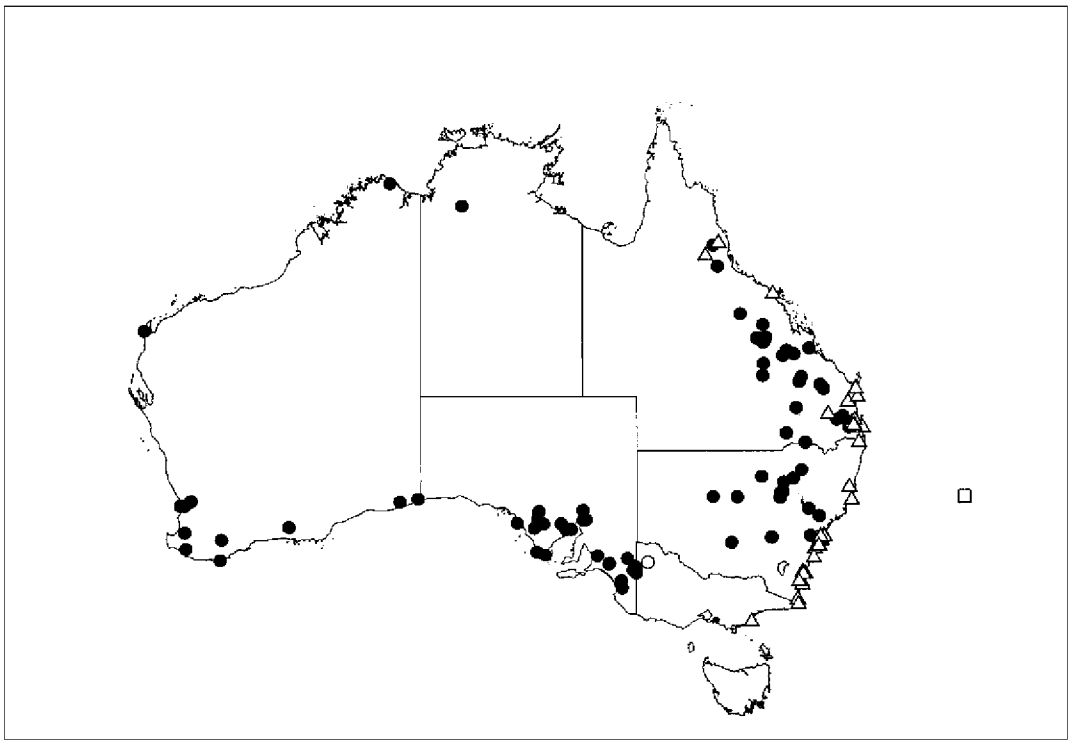

FIGURE 2.20. Distribution of *Poltys laciniosus*-group species: *P. laciniosus* (adult records, black circles; juvenile, white circle); *P. grayi* (squares); *P. noblei* (triangles).

Variation

Whilst some female specimens of *P. grayi* are similarly coloured to typical *P. noblei*, many are almost totally lacking carapace pigmentation and also have extremely palely coloured abdominal camouflage and reduced dark areas on legs (Fig. 2.14.g). The variation in somatic characters is similar to other species in the group. The epigyne varies in shape, especially the acuteness of the point (Figs. 2.17.b, d). The flange on the tip of the male embolus is also variable and in some specimens is large enough to reflect light in the same way as *P. noblei*.

Distribution

This species is only recorded from Lord Howe Island in the Tasman Sea (Fig. 2.20).

2.3.6.3. ***Poltys noblei*** sp. nov.

Figures 2.14.h, i, 2.15.c, j, k, 2.17.e–i, 2.18.e, 2.19.g–i, 2.20, Plates 1.1, 2.6.c, d. 8.3.c, d, 8.4.e.

Etymology

This species is named in honour of John Noble, who has collected many specimens for the Australian Museum collections, including *Poltys*.

Type material

AUSTRALIA: ***New South Wales***: HOLOTYPE: ♀ KS34412, Beecroft, Sydney, 33°45′S 151°04′E, 3 Aug. 1992, J. Noble. PARATYPES: ♂ KS52216, Beecroft, Sydney, 33°45′S 151°04′E, Mar. 1998, J. Noble, matured late May 1998; ♀ (and non-type juveniles) KS33957, ♂ (and non-type juveniles) KS72255, Broken Bay, 33°34′S 151°19′E, 10 Apr. 1966, Mascord Collection; ♂ KS55718, King's H'way, 12 km W Batemans Bay, 700 m N along rd to Shallow Crossing, Tourist drive 3, 35°37′S 150°08′E, 30 Mar. 1999, HMS, beating dead *Acacia decurrens?*, as juvenile, matured 28 Apr. 99; ♂ KS54368, Ku-ring-gai Chase NP, Powerline Track, 33°40′21″S 151°08′09″E, 4 Jan. 1999, MRG & HMS, hanging

on silk line from dead twig; ♀ KS55708, as KS54368, 29 Dec. 1998, MRG, at night in webs on living prickly Hakea; ♂ NMV K-8895, Long Beach Rd, 1.4 km off Princes H'way on sidetrack to NE, 35°41′S 150°14′E, 30 Mar. 1999, HMS, beating dead *Acacia decurrens?*, as juvenile, matured 28 Apr. 99; ♀ KS55685**,** Mystery Bay, Council bushland near beach, 36°18′S 150°07′E, 12 Jan. 1999, HMS, at night in dead twigs, laid eggsac, 15 Jan. 99; ♀ KS53844, Royal National Park, Lady Carrington Drive, 34°08′50″S 151°01′45″E, 15 Oct. 1998, HMS, twigs at night; ♂ KS70368, Royal National Park, Sir Bertram Stevens Drive, ca 0.3 km E Artillery Hill, 34°04′59″S 151°03′20″E, 20 Dec. 1999, HMS, ex dead twigs, beating. ***Queensland***: ♂ KS58062, Forty Mile Scrub NP, 18°07′56″S 144°48′40″E, 12 May 2000, M&S, beating; ♀ (and non-type juvenile) KS313, Mt Dryander (lower slopes) N of Proserpine, 20°15′S 148°32′E, Apr. 1975, MRG & C. Horseman, 120 m; ♀ S42496, Fig Tree Pocket, Roedean St, 27°31′S 152°57′E, 14 Dec. 1974, V.E. Davies; ♂ S42547, Upper Brookfield, SEQ, 27°28′S 152°51′E, 17 Jun. 1981, V.E. Davies, R.J. Raven. ***Victoria***: ♀ NMV K-8896, Ninety Mile Beach, half way between Seaspray and Paradise Beach, 38°20′S 147°20′E, 10 Jan. 1999, HMS, in web at night on dead *Banksia*.

Selected other material examined

AUSTRALIA: ***New South Wales***: ♂ KS55714, Ashfield, 33°53′S 151°08′E, 4 Feb. 1999; ♀ KS33920, Avalon, 33°38′S 151°20′E, 8 Dec. 1957; ♂ KS72254, ♀ KS78144, Beecroft, Sydney, 33°45′S 151°04′E, 8 Apr. 2001 & 14 Apr. 2002; ♀ KS56886, Bodalla SF, 1.5 km S of Bodalla on Princes H'way, 36°06′50″S 150°03′28″E, 18 Feb. 1999; ♀

KS10162, Bonny Hills, 31°36′S 152°51′E, 9 Dec. 1981; ♂ KS70369, Cordeaux Dam Rd, 34°18′S 150°49′E, 26 Oct. 2000; ♀ KS56887, Dampier SF, 36°07′S 149°57′E, 19 Feb. 1999; ♂ KS57786, Heathcote NP, jnct Woronora Dam Rd and Old Prince′s Hwy, 34°09′30″S 150°58′10″E, 8 Dec. 1999; ♂♀ KS52215, Mt Warning camp site, Wallaby Track, 28°24′S 153°16′E, 17 May 1998; ♂ KS56885, Murramarang NP, North Head Rd, 35°41′52″S 150°16′37″E, 17 Mar. 1999; ♀ KS69653, Nadgee hut area, 37°22′S 149°55′E, 1973. ***Queensland***: ♂ KS86249, ♀ KS86250, SW of Malanda, Merragallan Rd, 17°25′08″S 145°32′37″E, 22 Sep. 2003; ♀ S42552, Black Mountain, NEQ, 1972; ♀ S42494, Brisbane, 27°28′S 153°01′E, 10 Apr. 1974; ♀♀ S42609 (3), Camira, 27°38′S 152°55′E, 7 Dec. 1985; ♀ S42553, Cooloola, 25°27′S 153°05′E, 7 Nov. 1976; ♀ S42497, Closeburn, 27°20′S 152°52′E, 20 Dec. 1970; ♀ S42597, Double Is Pt, 25°55′S 153°11′E, 4 Aug. 1985; ♀ S42499, Godwins Beach, Deception Bay, 27°11′S 153°01′E, 19 Jan. 1979; ♀ S42592, Marlaybrook, 26°51′S 151°34′E, 7 Mar. 1976; ♀ S42495, Mt Cootha, 27°29′S 152°57′E, 1 Jan. 1974; ♀ S55610, N Stradbroke Island Enterprise, 27°37′S 153°26′E, 10 Jan. 2002; ♀ W165 (QM), Red Hill, Gympie, 26°11′S 152°39′E, 4 Jun. 1925.

Diagnosis

Use *P. laciniosus* diagnosis to separate from other species groups.

Females. From *P. laciniosus* by long ‘V’-shaped epigyne with distinctly separate foveae (Figs. 2.17.e–h), and rather paler carapace. From *P. grayi* by epigyne margins that converge from base in almost straight line, tip often acutely pointed (Figs. 2.17.f, g).

Males. Embolus with large terminal flange (difficult to see directly, but reflects light strongly) (Figs. 2.19.h, Plate 2.6.c), conductor almost straight (Fig. 2.19.h).

Description

Female. Carapace length range 2.78–4.45. *Drawn specimens.* Figs. 2.14.h, i, S42495; Fig. 2.15.c, KS78144; Figs. 2.15.j, k, KS34412 (holotype); Figs. 2.17.e, f, KS55685; Figs. g–i, KS313. General characters see *P. laciniosus.*

Holotype. *Prosoma.* Carapace (Fig. 2.15.c), length, 3.67, width 2.94, height 1.14; relatively wide but tall; eye tubercle well developed, slender basally, slightly enlarged anteriorly, slightly elevated; dorsal protrusions above PME moderately well developed. Chelicerae: paturon with 3 promarginal teeth. Labium: length 0.41, width 0.71. Sternum: length 1.63, width 1.55; sternal extensions at bases of legs II–IV. *Eyes.* AME ≥ PME > PLE > ALE; ALE ca 0.3 x its own diameter from AME; ventral margin of ALE is just ventral to mid point of AME. *Legs.* P+TL I: 5.75, II: 5.42, III: 3.17, IV: 4.08; front femora distinctly broadened with greatest diameter ca 3/5 way to apex leg I, or ½ way leg II. *Abdomen.* (Figs. 2.15.j, k). Length 8.33, width 4.75; broadest at humeral tubercles; some 'microsigillae' visible but not strongly developed. *Epigyne.* A triangular plate, widest point at base, sides converge from base to a more or less pointed tip (Figs. 2.17.e, g); with a prominent distal bulge in lateral view (Fig. 2.17.i; basally epigyne often deeper than shown); foveae narrower than those of *P. grayi* basally, separated by a strong median ridge of variable height (Figs. 2.17.f, h); lateral plates curve either side of basal median plate, forming tubes into the copulatory ducts; ducts of holotype not examined but usually pass

anteromedially between spermathecae then turn outwards to enter basomedially; ducts separate, but closer together than *P. grayi* until they turn laterally; spermathecae separated by about two spermatheca widths. *Colour in alcohol.* Carapace amber, caput darker, with yet darker patches anteriorly; yellow patch on dorsal caput deepens to orange on eye tubercle; protrusions dorsal to PME tipped brown; dark brown ventral to main eyes. Chelicerae brown, orange on cheliceral boss and distally. Labium, and maxillae orange-tan. Sternum brown. Pedipalps yellow, sparsely mottled with brown. Femur I mostly dark brown from base except for yellow band; femur II colouration less distinct; femur III pale, distally dark retrolaterally; femur IV dark to paler in distal third; distal legs mottled with yellow and brown, distinct dark bands on distal metatarsi and tarsi of I and II. Abdomen ventrally black around pedicel and posteriorly to spinnerets except paler book lung covers, and a rectangular patch anterior to pedicel, laterally and anteriorly creamy-white; dorsally with a cream point and extending down the median line (like the centre of a broken twig), surrounded by black and grey markings on a greyish background.

Male. Carapace length range 0.84–1.20. *Drawn specimens*. Fig. 2.18.e, KS72254; Figs. 2.19.g–i, KS52216. General characters see *P. laciniosus.*

Male KS52216. *Prosoma.* Carapace: length 1.12, width 0.80, height 0.41; eye tubercle well defined with distinct 'v' between caput and eye tubercle in lateral view; with well-developed dorsal protrusions above PME. Labium: length 0.10, width 0.20. Sternum: length 0.50, width 0.48. *Eyes.* AME = PME > ALE = PLE; ALE about 1/6th its own diameter from AME; height of ventral margin of ALE is at mid point of AME. *Legs.* P+TL I: 1.57, II: 1.25, III: 0.69, IV: 0.90. *Abdomen.* (Fig. 2.18.e). Length 1.57, width 0.96; a tall

ellipsoid, slightly pointed at apex and with slight humeral bumps; widest at humeral bumps. *Palpal organ.* (Figs. 2.19.g–i, Plates 2.6.c, d). Radix–stipes joint almost basal, stipes wraps margin of retrobasal subtegulum, not hidden by cymbium (Figs. 2.19.h, i); no TA; distal embolus wire-like but thicker than *P. laciniosus*, grooved and gently arcing towards tip of MA, flaring into a curved apical flange at tip (arrowed in.Fig. 2.19.h, Plate 2.6.c, d); conductor thumb-like, almost straight; PM a sculptured curving structure looking like a clenched fist, extending ventrally almost to edge of tegulum, heavily sclerotised (Figs. 2.19.h, Plate 2.6.c). *Colour in alcohol.* Lateral carapace pale olive, caput darker olive, both with black median markings and fuscous margin; eye tubercle orange, with brown points to protrusions dorsal to PME; dark brown round AME. Chelicerae, labium, maxillae and sternum olive: chelicerae, paler basally and distally, sternum with fuscous edges. Femora pale olive, darkening distally; femur I with pale yellow band as seen on females; femur III with darker partial banding; patella to upper metatarsus of all legs pale olive dorsally, blackened ventrally, dark banding on distal metatarsi and tarsi. Palpal cymbium olive-brown with darker patches; tibia fuscous, patella fuscous dorsally, femur and ventral patella mostly creamy-white. Abdominal book lung covers and posterior to epigastric fold pale, two white patches anterior to spinnerets; surrounding ventral areas black changing to brown apically; dorsum with vague olive–brown and black pattern on a white ground.

Variation

As in *P. laciniosus*, a wide range of female abdominal shapes has been recorded for *P. noblei*. The variation in the analysed section of COI, however, was found to be small over the entire N–S range of the species and apparently is not related to abdominal shape. The development of the dorsal protrusions above the PME is variable but usually less pronounced than in *P. laciniosus*. Some epigynes approach a shape more typical of *P. grayi*, but the foveae still narrow more sharply into the copulatory ducts (often visible through the lateral plates in posterior view).

Distribution

This species is locally abundant along the East coast of Australia, from southern Victoria northwards (Fig. 2.20). In far northern Queensland, it is displaced to moist habitats at higher altitude (and *P. frenchi* takes its place in lowland rainforest areas).

2.3.7. Australasian species currently considered *nomina dubia*

Poltys moluccum (Doleschall, 1859): 45, f. 1. Indonesia: Amboina. The type specimen could not be found in unsorted material in RMNH, the most likely repository. This species was synonymised with *P. illepidus* by Simon (1885) but the illustration and mention of an elongate web suggest it is not that species. If the type is found the name may prove to be a senior synonym of *P. frenchi*, but the fauna of this area is insufficiently known to assert this with any certainty at present.

Poltys dromedarius (Bradley, 1876b): 249, f. 2. New Guinea: Hall Sound (Chevert Expedition). Most Chevert Expedition material is in the MMUS, but the type could not be located there.

Poltys papuensis (Bradley, 1876a): 223, f. 2. New Guinea: Hall Sound (Chevert Expedition). As above, this type should be in the MMUS, but could not be located there. Bradley's figure of this species shows an elongate epigyne, so if found this type could prove to be a senior synonym of *P. frenchi*. The *Poltys* fauna of New Guinea, however, is insufficiently known at present.

2.4. NOTES ON SOUTHEAST ASIAN *POLTYS* SPECIES

In addition to the species discussed under the *P. illepidus* and *P. columnaris*-group headings above, the *Poltys* fauna of SE Asia contains at least two species, or species groups, which are not represented in the Australian fauna. One of these (the *P. mouhoti*-group) contains three described species, *P. mouhoti*, *P. idae* and *P. longitergus* Hogg, the females of which have extremely elongate, curled and club-tipped abdomens. These types were not examined in detail to avoid unnecessary handling as the abdomens are easily damaged and the species do not occur in Australia. Two non-type specimens from India (BMNH) and Malaysia (JK coll.) were examined, however, and one of these is figured here as a representative of the group. Various unmatched males have been examined, but none stands out as being likely to belong to this *P. mouhoti*-group.

The other *Poltys* taxon that is not represented in Australia, *P. elevatus* Thorell, is currently only recorded from Sumatra and Singapore. The outstanding feature of *P.*

elevatus is a dense brush of setae on retrolateral femur IV, with flattened setae proximally (Fig. 2.22.d). This setal patch appears to meet with long setae on the lateral flanks of the abdomen adjacent to the book lung covers. Together they may form a stridulatory organ. I have not seen any other signs of similar modification in other *Poltys* species, but a similar character is found in *Caerostris* Thorell (Grasshoff, 1984).

All the described species of *Poltys* from Australasia and the SE Asian region which has a known overlap with the Australian fauna (northwards to Burma and Vietnam) are listed in Table 2.1. Some basic illustrations of epigynes and other possibly diagnostic features are also shown in Figs. 2.21.a–q and 2.22.a–h. All figures except 2.22.d, e–g are of type specimens

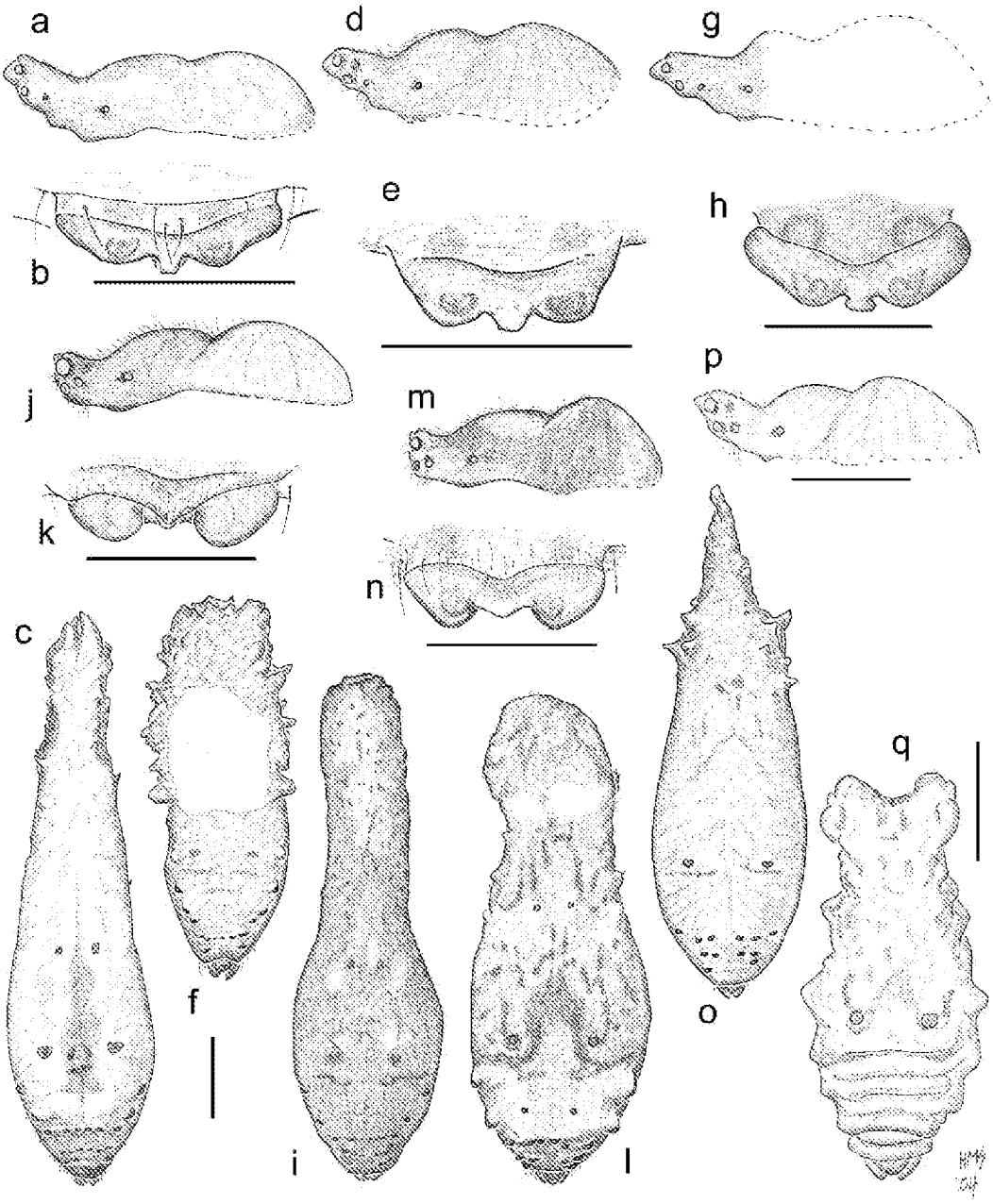

FIGURE 2.21. SE Asian *Poltys columnaris*-group type specimens: carapace lateral, epigyne ventral (except *P. pogonias*), abdomen, dorsal. a–c, *P. columnaris*; d–f, *P. squarrosus*; g–i, *P. turriger*; j–l, *P. turritus*; m–o, *P. raphanus*; p–q, *P. pogonias* (juvenile). Scale lines: p–q, 1.0 mm; scale below f, applies to all other carapaces and abdomens, 1.0 mm for carapaces, 2.0 mm for abdomens; epigynes with individual lines, all 0.5 mm.

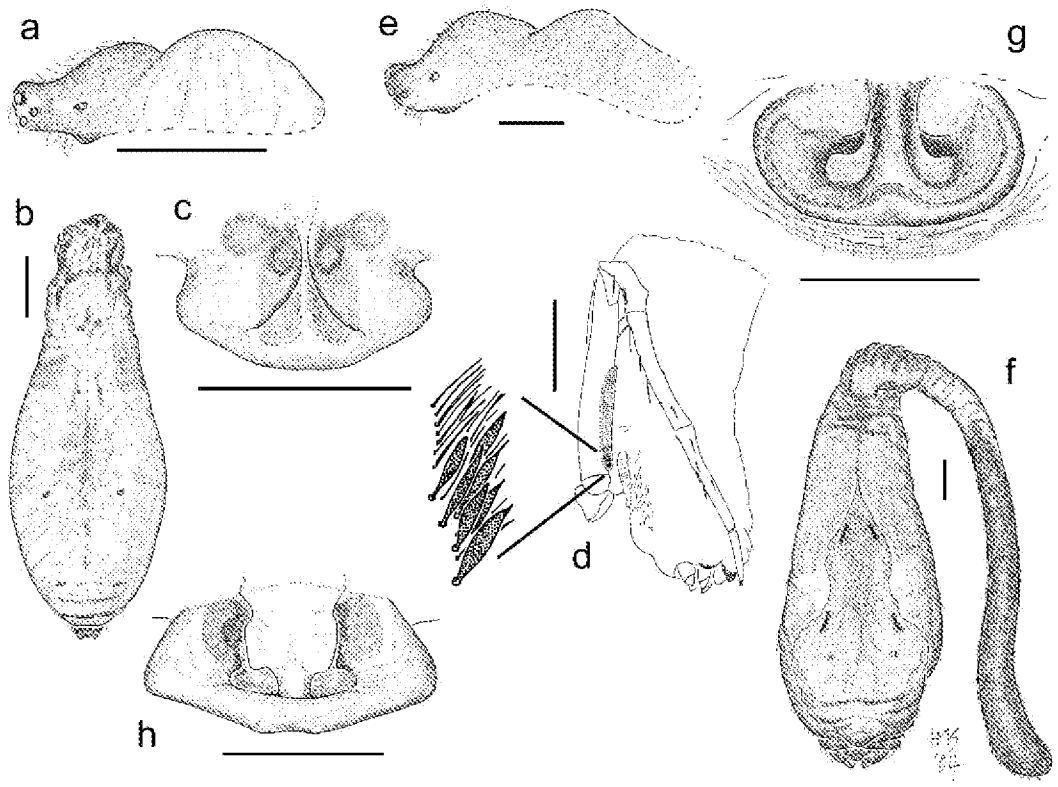

FIGURE 2.22. Other SE Asian *Poltys* species. a–c, *P. elevatus* type specimen: a, carapace lateral; b, abdomen, dorsal; c, epigyne ventral; d: *P. elevatus* ex Singapore (BMNH), left leg IV and part of abdomen, showing brush of hairs on posteroventral femur. e–g, example of *P. mouhoti*-group ex Malaysia (JK coll.), e, carapace lateral; f, abdomen, dorsal; g, epigyne posterior. h, *P. pannuceus*, type specimen, epigyne ventral. Scale lines: epigynes and d, inset, 0.5 mm, others, and d, main, 2.0 mm

Table 2.1. Summary checklist of described S.E. Asian & Australasian *Poltys* species. The following abbreviations have been used: f., figure(s); pl., plate(s); syn., synonym; s/syn., senior synonym.

Species	Type locality or country	Type repository	Sex of primary type	Status (Platnick 2006)	Status assigned in current work	Known distribution and notes
Australia						
P. bimaculatus Keyserling, 1886: 131, pl.10, f.4	Peak Downs, Qld	ZMH	Juvenile	Current	Syn. = *P. laciniosus*	
P. coronatus Keyserling, 1886:128, f.10	Cape York, Qld	Not located	Female	Current	Syn = *P. illepidus*	Described from a specimen in Bradley's collection
P. frenchi Hogg, 1899: 143, pl.13, f.2	Endeavour River, Qld	NMV	Female	Current	No change	Northern Australia, New Guinea and southern Moluccas
P. grayi sp. nov.	Lord Howe Island	AM	Female	-	New species	Lord Howe Island
P. jujorum sp. nov.	Goldsborough, Qld	QM	Female	-	New species	Northeastern Australia
P. keyserlingi Keyserling, 1886: 129, pl.10, f.3	Gayndah, Qld	ZMH	Juvenile	Current	Syn = *P. illepidus*	
P. laciniosus Keyserling, 1886: 123, pl.9, f.7	Peak Downs, Qld	BMNH	Female	Current	No change	Australian mainland
P. mammeatus Keyserling, 1886: 125, pl.10, f.1	Peak Downs, Qld	ZMH	Female	Current	Syn. = *P. laciniosus*	
P. microtuberculatus Rainbow, 1916: 118, pl.22, f.44	Gordonvale, Qld	AM	Juvenile	Current	Syn. = *P. stygius*	

Species	Type locality or country	Type repository	Sex of primary type	Status (Platnick 2006)	Status assigned in current work	Known distribution and notes
P. milledgei sp. nov.	Darwin, NT	AM	Female	-	New species	Northern Australia and southern Indonesia
P. multituberculatus Rainbow, 1898: 82, pl.18, f.2	Cooktown, Qld	AM	Female	Current	Syn. = *P. illepidus*	
P. noblei sp. nov.	Sydney, NSW	AM	Female	-	New species	Eastern coast of Australia
P. penicillatus Rainbow, 1920: 249, pl.29, f.57	Lord Howe Island	SAMA	Female	Current	Syn. = *P. illepidus*	
P. salebrosus Rainbow, 1904: 104, f.28–29	Fremantle, WA	AM	Juvenile	Current	Syn = *P. laciniosus*	
New Caledonia						
P. timmeh sp. nov.	New Caledonia	HNHM	Female	-	New species	New Caledonia and the Loyalty Islands
New Guinea						
P. dromedarius (Bradley, 1876b): 249, f.2	Hall Sound, PNG	Not located	Probably juvenile	Current	*Nomen dubium*	Should be in MMUS
P. papuensis (Bradley, 1876a): 223, f.2	Hall Sound, PNG	Not located	Probably adult	Current	*Nomen dubium*	Should be in MMUS; may be s/syn of *P. frenchi*
P. sigillatus Chrysanthus, 1961:211, f.74–77	Irian Jaya	RMNH	Female	Current	Syn. = *P. frenchi*	
Malaysia and Indonesia						
P. apiculatus Thorell, 1892: 228	Singapore	Not located	Unknown	Current	No change (not studied)	

Species	Type locality or country	Type repository	Sex of primary type	Status (Platnick 2006)	Status assigned in current work	Known distribution and notes
P. columnaris Thorell, 1890:87	Sumatra	OUM	Female	Current	No change (not studied)	Sumatra, Burma probably Vietnam, possibly N Borneo
P. elevatus Thorell, 1890:82	Sumatra	OUM	Female	Current	No change (not studied)	Sumatra, Singapore. Very distinctive brush of hairs on retrolateral femur IV—may be stridulatory
P. idae (Ausserer, 1871): 817, pl.5, f.1-3	Borneo	NHMW	?Female (Not checked)	Current	No change (not studied)	*P. mouhoti*-group
P. illepidus C.L. Koch, 1843: 97, f.821	P.Bintan, Indonesia	Not located	Unknown	Current	No change	Northern Australia to at least Thailand. Solomon Is. and oceanic islands to the east of Australia
P. longitergus Hogg, 1919: 95, pl.10, f.7	Sumatra	BMNH	Juvenile	Current	No change (not studied)	*P. mouhoti*-group
P. moluccum (Doleschall, 1859): 45, f.1	Amboina	Not located	Unknown	Syn. = *P. illepidus*	*Nomen dubium* (not *P. illepidus*)	May be s/syn. of *P. frenchi*
Nicobar Islands						
P. pogonias Thorell, 1891:54	Nicobar Is	ZMUC	Juvenile	Current	No change (not studied)	*P. columnaris*-group

Species	Type locality or country	Type repository	Sex of primary type	Status (Platnick 2006)	Status assigned in current work	Known distribution and notes
Burma, Laos and Vietnam						
P. acuminatus Thorell, 1898: 346	Burma	MSNG	Juvenile	Current	No change (not studied)	*P. illepidus*-group, probably not identifiable
P. dubius (Walckenaer, 1842): 198	Vietnam	Not located	Probably juvenile	Current	No change (not studied)	Probably not identifiable
P. mouhoti (Günther, 1862): 2, pl.8, f.A	Laos	BMNH	Female	Current	No change (not studied)	Similar or conspecific species recorded from Borneo to India
P. pannuceus Thorell, 1895:167	Burma	BMNH	Female	Current	No change (not studied)	Burma to Sumatra, ?*P. illepidus*-group
P. raphanus Thorell, 1898: 348	Burma	MSNG	Female	Current	No change (not studied)	Probably = *P. turritus*
P. squarrosus Thorell, 1898: 350	Burma	MSNG	Female	Current	No change (not studied)	*P. columnaris*-group
P. stygius Thorell, 1898: 344	Burma	MSNG	Female	Current	No change	Northern Australia to Burma
P. turritus Thorell, 1898: 347	Burma	MSNG	Female	Current	No change (not studied)	*P. columnaris*-group
P. turriger Simon, 1897: 480	Vietnam	MNHNP	Female	Current	No change (not studied)	*P. columnaris*-group
P. unguifer Simon, 1909: 117	Vietnam	MNHNP	Juvenile	Current	No change (not studied)	*P. illepidus*-group, may not be identifiable