

The genus *Pholcus* (Araneae, Pholcidae) in the Canary Islands

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This paper offers a detailed taxonomic revision of all Canarian *Pholcus* species described before 2003, all of which are newly described and newly illustrated. *Pholcus guadarfia* sp. nov. is described, while a neotype for *Pholcus malpaisensis* Wunderlich, 1992 is also provided. In addition, we propose *Pholcus gomeræ* Wunderlich, 1980 as a senior synonym for *Pholcus gomeroides* Wunderlich, 1987. More importantly, cladistic analysis based on the morphological characters of the Macaronesian *Pholcus* species was conducted for the first time. Parsimony analyses of 73 morphological characters revealed the close relationships between those species from the Canary Islands, Madeira and the Macaronesian enclave in Africa (between Agadir and Nouadhibou). © 2007 The Linnean Society of London, *Zoological Journal of the Linnean Society*, 2007, 151, 59–114.

ADDITIONAL KEYWORDS: cladistics – morphology – phylogeny – revision – taxonomy.

INTRODUCTION

Oceanic archipelagos have always been highly attractive natural laboratories for biologists studying evolutionary processes. While the majority of documented examples stem from the Galapagos and Hawaii archipelagos, recent investigations in the Canary Islands have demonstrated their value for biodiversity studies. This volcanic archipelago, located in the Atlantic off north-western Africa, comprises seven islands: Fuerteventura, Lanzarote, Gran Canaria, Tenerife, La Gomera, La Palma and El Hierro. They are almost perfectly aligned in an east–west orientation with the easternmost island, Fuerteventura, just 100 km off the African coast. The geological age of the islands decreases moving west. While Fuerteventura is about 20–22 Myr old, El Hierro is only 0.8–1 Myr old (Anguita & Hernán, 1975; Ancochea *et al.*, 1990; Coello *et al.*, 1992).

Both the trade winds and the differing elevations of the islands are responsible for the great variety in climatic conditions and habitats found in the archipel-

ago. These range from dry lowlands to humid subtropical forests (laurel forests), as well as alpine and subalpine deserts. The numerous lava tubes and the mesocavernous shallow stratum also contribute to this marked habitat diversity. A wide range of ecological conditions provides the ideal environment for a rich spectrum of flora and fauna.

Spiders (Araneae) have proven to be among the most diverse animal groups in the archipelago with more than 300 endemic species, the most remarkable being the genus *Dysdera* (Dysderidae). With 43 species endemic to the Canaries, it is the supreme example of the species radiation that many groups have undergone in these islands (Ribera & Arnedo, 1994; Arnedo & Ribera, 1996, 1997, 1999; Arnedo, Oromí & Ribera, 1996, 2000).

Other spider genera such as *Pholcus* (Pholcidae) are similarly known for their great diversity. Before the present study, 21 species of *Pholcus* had been reported from the Canary Islands, 20 of which are endemic. The first description of Canaries-endemic *Pholcus* dates from the late 19th century: *Pholcus ornatus* Bösenberg, 1895. This anthropophylic species is very common and can be found on every island except Fuerteventura and Lanzarote. The other species found on more than one island is *Pholcus fuerteventurensis* Wunderlich, 1992, known from Fuerteventura and

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Gran Canaria. The remaining species are monoisular endemics: *Pholcus knoeseli* Wunderlich, 1992, *P. malpaisensis* Wunderlich, 1992, *P. mascaensis* Wunderlich, 1987, *P. baldiosensis* Wunderlich, 1992, *P. roquensis* Wunderlich, 1992, *P. tenerifensis* Wunderlich, 1987, *P. multidentatus* Wunderlich, 1987, *P. calcar* Wunderlich, 1987, *P. corcho* Wunderlich, 1987, *P. helenae* Wunderlich, 1987, *P. edentatus* Campos & Wunderlich 1994, *P. gomerae* Wunderlich, 1980, *P. gomeroides* Wunderlich, 1987, *P. sveni* Wunderlich, 1987, *P. intricatus* Dimitrov & Ribera, 2003, *P. corniger* Dimitrov & Ribera, 2006, *P. bimbache* Dimitrov & Ribera, 2006, and *P. anachoreta* Dimitrov & Ribera, 2006. Although the cosmopolitan species *P. phalangioides* (Fuesslin, 1775) has also been observed in the Canary Islands, it is not regarded as part of the autochthonous fauna because it was introduced.

Despite the great number of species reported by Wunderlich (1980, 1987, 1992) and Campos & Wunderlich (1995), the diversity of *Pholcus* is known to be greater (Dimitrov & Ribera, 2003, 2006). This underestimation, in tandem with the scant information collected on species distribution, can be attributed to under-sampling. Moreover, in some cases the illustrations and/or descriptions were insufficiently precise, possibly resulting in inaccuracies as regards species determination.

The present study combines information gathered during numerous field trips over the last 3 years. It aims to clarify the taxonomic situation of the *Pholcus* species endemic to the Canary Islands. To this end, all species descriptions have been revised and new illustrations are provided. Detailed descriptions and illustrations of the species *P. intricatus*, *P. bimbache*, *P. anachoreta* and *P. corniger* can be found in either Dimitrov & Ribera (2003) or Dimitrov & Ribera (2006). In addition, a newly discovered *Pholcus* species from Lanzarote, *P. guadarfia* sp. nov., is described in the present study.

The first to discuss the relationships among the Canarian *Pholcus* species was Wunderlich (1987, 1992). He also proposed possible pathways for the colonization of the islands by this genus, as well as its subsequent spreading throughout the archipelago. Two main species groups were identified, 'tenerifensis' and 'ornatus', based on certain arbitrary morphological characteristics (principally concerning the female genitalia). Later, Campos & Wunderlich (1995) would again discuss these two groups and a third named '*Pholcus fuerteventurensis*'. In each case no cladistic analysis was performed, with numerous potentially informative characteristics ignored. Dimitrov & Ribera (2003, 2006) have suggested that the groups proposed by Wunderlich should be revised within a phylogenetic context, and have addressed other poten-

tially important traits. In these studies, all the Canarian members of this genus were divided into three groups – 'tenerifensis', gathering all the species from the western islands (Tenerife, La Gomera and El Hierro), except *P. ornatus*; 'ornatus', including *P. ornatus* and all endemic species from Gran Canaria except *P. edentatus*; and 'fuerteventurensis', encompassing those species from the easternmost islands and *P. edentatus* from Gran Canaria. However, these groups were used in a descriptive context solely to emphasize similarities between species.

In this paper relationships among the Canarian *Pholcus* species are examined by cladistic analysis of morphological characters. This analysis included all the known *Pholcus* species from the archipelago, as well as the rest of the Macaronesian *Pholcus* species. Regarding Macaronesia, some authors (e.g. Sunding, 1979) add to this region the area between Agadir and Nouadhibou in north-west Africa. Within this context, a newly discovered *Pholcus* from the Agadir region was included in our analysis.

MATERIAL AND METHODS

This work is based on information collected by us, as well as on material kindly loaned by the following individuals and institutions: SMF, Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt; ULL, Universidad de La Laguna, La Laguna; CCRUB, Departament de Biologia Animal, Universitat de Barcelona, Barcelona; MNHN, Muséum National d'Histoire Naturelle, Paris; Jörg Wunderlich, Dr Miquel Arnedo and Dr Bernhard Huber.

All materials collected by us were deposited in the CCRUB. Specimens were examined using Wild Heerbrugg (12–100×) and Leika MZ16A (10–115×) stereomicroscopes. Scanning microscopy was conducted with an Hitachi S2300 scanning electron microscope. Certain species were omitted from these analyses because very few specimens were available. Epigyna were treated with 50% lactic acid solution to render the remaining soft tissues transparent, and then temporarily mounted for drawing. Afterwards, they were washed in distilled water and stored in 70% ethyl alcohol.

The specimens used for SEM studies were dehydrated with alcohol gradient dehydration and ultrasonically cleaned. They were then air-dried when the structures to be observed were heavily sclerotized or critical-point dried when there was a risk of deformation of the structures during the drying process. The dried samples were mounted and covered with gold for observation.

All measurements in the descriptions are in millimetres, with the number of decimals given based on the presumed accuracy. Total body length represents

the sum of the lengths of the prosoma and the opisthosoma, omitting the pedicel.

The nomenclature used for the palpal sclerites and the female genitalia follows Huber (2000), Uhl (1994) and Uhl, Huber & Rose (1995). In Figures 8–24 palpal sclerites and parts of female genitalia are labelled accordingly. For further details on genital morphology in *Pholcus* see Uhl (1994) and Uhl *et al.* (1995).

Abbreviations: af, ventral apophysis of the femur; aa, apical apophysis; ta, terminal apophysis; alp, apical lamellar process; u, uncus; p, procurus; e, embolus; pl, pore plates; fp, frontal prominences; pla, proximo-lateral apophysis; c, cheliceral apophysis (distal cheliceral apophysis); ab, appendix of the bulb; tp, chitinized triangular plate of the epigynum; cp, callosity of the procurus; cy, cylindrical outgrowth of the triangular plate; b, bulb; tra, lateral apophysis of the trochanter.

TAXONOMIC SAMPLING

All known Canarian *Pholcus* species were included in the present analysis. To assess the relationships between the Canaries species with the rest of those endemic to the Macaronesian archipelagoes, other islands in the region were also incorporated into the study. The Azores, Selvagem and Cape Verde islands are not home to any endemic *Pholcus* species. Five species are known to inhabit the island of Madeira (Wunderlich, 1987, 1995), all of which were included in the analysis.

As North Africa is the closest continental area, and therefore the most likely source of colonization, it received special focus. There is currently only one species native to this zone, *Pholcus vachoni* (Dimitrov & Ribera, 2005b), and this too was included in our analysis. It should be noted, however, that Koch (1873) described the Moroccan species *Pholcus reini*, which was subsequently transferred to *nomina dubia* by Roewer (1955).

The dearth of knowledge regarding the phylogenetic relationships among the *Pholcus* species complicates selecting an outgroup from this genus. Thus, the decision was made to include all species from Morocco and the Iberian Peninsula. The only two species found in this area besides the already mentioned *P. vachoni* are *P. phalangioides* (Fuesslin, 1775) and *P. opilionoides* (Schrank, 1781). Although both species were included in our analyses, it should be noted that *P. phalangioides* is an anthropophylic and cosmopolitan species, and most likely of Asiatic origin (B. Huber, pers. comm.).

In contrast to the poorly known internal phylogeny of *Pholcus*, the relationships between the

pholcid genera have been addressed in various studies (Huber, 2000, 2003a, b, c; Bruvo *et al.*, 2005; Dimitrov & Ribera, 2005a). Within this context, the closely related species *Ossinissa justoi* (Wunderlich, 1992), as well as three species from the closely related pholcines genera (*sensu* Huber, 2000, 2003a, b, c) were included in our study: *Spermophora senoculata* (Dugès, 1836), *Spermophorides sciakyi* (Pesarini, 1984) and *Spermophorides mercedes* (Wunderlich, 1987). Additionally, the species *Holocnemus caudatus* (Dufour, 1820) was incorporated both as a member of the holocnemines group and as a species, as it presents very different morphological characteristics.

The complete list of taxa scored for the cladistic analyses is presented in Appendix 1.

Seventy-three morphological characters were used in the analyses (38 for the male palp, 12 for the female genitalia, 14 for the chelicerae, five for the prosoma and two for the opisthosoma). A complete list of the characters is detailed in Appendix 2. A matrix with the coded characters is provided in Appendix 3. Some potentially informative characters as the ultrastructure of the surface granulation of the appendix of the male bulb (Fig. 146) were not included in the analysis because of the very few information available about their variability.

CLADISTIC ANALYSIS

Numerical cladistic analyses using parsimony criterion with uniform weighting were performed using NONA, Version 2 (Goloboff, 1999). In addition, implied weighting analyses were conducted with Pee-Wee, Version 2.8 (Goloboff, 1997). Implied weighting was selected as a rational method to handle characters, which present homoplasy. Under this method, the character trustworthiness is judged based on the degree of homoplasy exhibited by that character in an individual tree. In this case, the character conflict is resolved in favour of the characters exhibiting a lower homoplasy by searching trees with a maximum total fit (Goloboff, 1993). Fit depends on a concavity constant (K), which controls the influence of any given homoplastic characters. This constant can vary from K = 1 to K = 6; as the values decrease, the weight of the characters with homoplasy drops. The value of K, however, must be arbitrarily assigned. To reduce the subjectivity of the results, this method was employed only as an additional measure of clade stability under various conditions.

Heuristic searches were performed in both uniformly and differentially weighted parsimony analyses. The commands used to conduct these searches were hold 10000 h/100 mult*1000 max* in NONA, and h10000 h/2 mult*1000 max* in Pee-Wee. For

Pee-Wee, searches were repeated for all possible K values.

ASSESSING THE STABILITY OF THE OBTAINED TREES
(SENSITIVITY ANALYSES)

In addition to implied weighting, the sensitivity of the results was further examined by means of bootstrapping and parsimony jackknifing. Both methods randomly re-sample and re-weigh characters, and can thus be taken as indicators of data sensitivity to random perturbations. Bootstrapping (Felsenstein, 1985) randomly re-samples characters with replacement and then re-weighs them, building a matrix the same size as the original. Jackknifing (Farris *et al.*, 1996) does much the same but without replacing characters, and in each replicate approximately 40% of the characters are removed. To estimate bootstrap and the jackknife support 1000 pseudo-replicates were performed using NONA.

Data sensitivity was further analysed by means of taxa removal. As it is well known that incomplete information for a given taxon may lead to reduced accuracy of phylogenetic analyses, we used this as a criterion for exclusion (Gauthier, 1986; Novacek, 1992; Wilkinson & Benton, 1995; Gao & Norell, 1998). Three species suffered significant proportions of missing data: *P. baldiosensis* (male unknown) with 68% data missing; *P. vachoni* from Morocco (female unknown) with 16% data missing; and *P. silvai* (no female for detailed study and the male in poor condition) with 32% data missing. We then eliminated all possible combinations of one, two or the three species together. Various matrices were thereby constructed, all independently analysed, and their corresponding results then compared. The list of matrices is provided in Table 1.

Cladogram manipulation and character optimization were conducted using WinClada, Version 1.00.08 (Nixon, 2002). All multistate characters were treated as non-additive (Fitch, 1971).

TAXONOMIC REVISION

FAMILY PHOLCIDAE C.L. KOCH, 1851

GENUS *PHOLCUS* WALCKENAER, 1805

PHOLCUS GUADARFIA SP. NOV. (FIGS 1–7)

Holotype: m, SPAIN, Canary Islands, Lanzarote, Barranco de la Espoleta, 1.ii.2003, Dimitrov & De Mas leg. (direct collection) (CCRUB 4578–172).

Paratypes: Same data as for holotype, 1 mm, 4 ff (CCRUB 4583–172, 4579–172); 1 m and 1 juv. same data as for holotype (ULL AÑ-2151); 2 ff (CCRUB 4677–173, 4678–173).

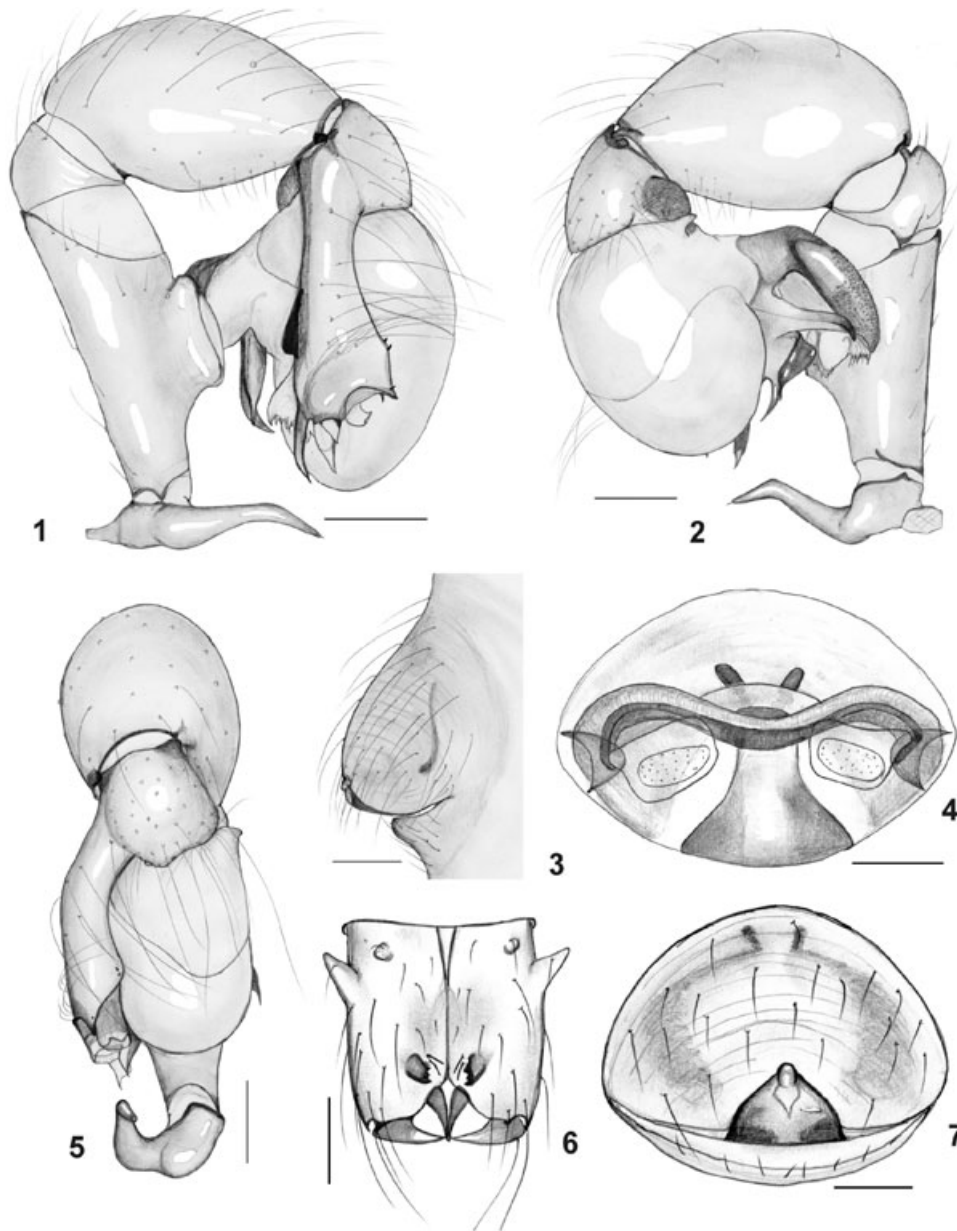
Etymology: The species name honours Guadarfia, last king of the native inhabitants (*guanches*) of Lanzarote Island. Noun in apposition.

Diagnosis: Distinguished from similar congeners (*P. edentatus* and *P. fuerteventurensis*) by the larger and heavily sclerotized apical apophysis of the procurus; the presence of four small dorsal spines on the procurus, as well as by a nearly straight and sharpened apophysis of the genital bulb appendix (Fig. 2). Other important characteristics are the shape of the uncus and the conspicuously curved trochanteral apophysis. Females are distinguished by the shape of the triangular plate of the epigynum and the morphology of the vulva (Figs 4, 7).

Description: Male (Holotype): prosoma oval with brownish-yellow colouring. Dorsally with brownish marking divided into two parts by a yellowish fovea. Each part subdivided once more by yellow-coloured zones. Margins of the brownish pigmented area irregular. Well-marked fovea. Elevated ocular area. The two lateral triads on short cylindrical outgrowths with darker brownish colour. AME at the height of the upper margin of the ALE. Frontally, the ocular elevation darker with dark brown marking, starting close to the top of the AME and extending to the base. Diameter of AME one-third the diameter of ALE. Distance between AME and ALE half the diameter of ALE.

Table 1. List of matrices analysed in the present study. Columns: the taxa excluded; number of species and number of parsimony-informative sites

Matrix	Taxa excluded	No. of taxa	Info
COMPLETE	None	33	60
NOBAL	<i>P. baldiosensis</i>	32	59
NOSIL	<i>P. silvai</i>	32	60
NOVACH	<i>P. vachoni</i>	32	60
NOSILBAL	<i>P. silvai</i> and <i>P. baldiosensis</i>	31	59
NOSILVACH	<i>P. silvai</i> and <i>P. vachoni</i>	31	60
NOBALVACH	<i>P. baldiosensis</i> and <i>P. vachoni</i>	31	59
NOBALVACHSIL	<i>P. baldiosensis</i> , <i>P. vachoni</i> and <i>P. silvai</i>	30	59



Figures 1–7. *Pholcus guarafia* sp. nov.: 1, male palp, prolateral; 2, male palp, retrolateral; 3, epigynum, lateral; 4, vulva, dorsal; 5, male palp, frontal; 6, male chelicerae, frontal; 7, epigynum, ventral. Scale bars 0.2 mm.

Dorsally, the ocular elevation carries two rows of long hairs. Chelicerae brownish with dark brown distal cheliceral apophyses (Fig. 6). Distal cheliceral apophyses with two modified hairs at the tip. Upper margin of the proximolateral apophyses higher than the base of frontal prominences. Legs and palp with brownish colouring slightly darker than prosoma. Palp as in Figures 1, 2 and 5. Opisthosoma cylindrical with brownish colour. Dorsally, ten darker spots are visible, grouped into two longitudinal rows – five in each. The first two spots in each row are larger, with ellipsoid

shape while the last three are smaller, rounded and closer to the central axis of the opisthosoma. Ventrally, a darker band is visible over the gonopore. Spinnerets marked by brownish colouring.

Female: prosoma as in male but with lighter colouring; dorsally, the darker markings appear smaller; ocular area less elevated and the eyes closer. Distance between AME and ALE less than half the diameter of ALE. Dark brown areas surrounding the eyes reduced in comparison with male. Chelicerae brownish without apophyses. Opisthosoma possesses a shape and

pigmentation similar to male. Epigynum with relatively small triangular plate, brownish in colour. Epigynum and vulva as depicted in Figures 3, 4 and 7.

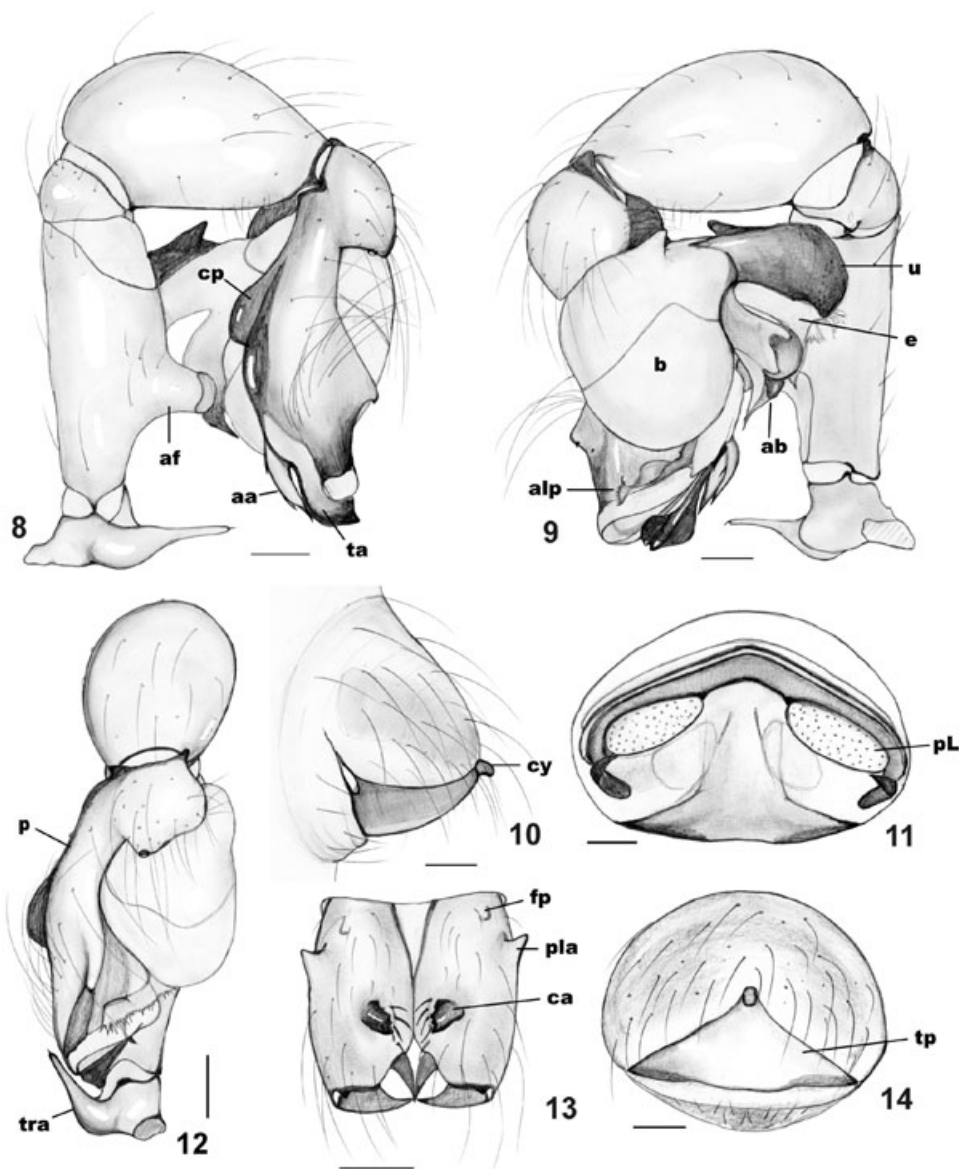
Measurements: Male: prosoma 1.3 long, 1.7 wide. Opisthosoma 3.7 long, 1.5 wide. Total body length 5.0. Leg I, femur 10.4, patella 0.5, tibia 9.1, metatarsus 14.7, tarsus 1.6, total 36.3. Palp: femur 0.6, patella 0.2, tibia 0.7, procurus 0.7. Female: Prosoma 1.5 long, 1.6 wide. Opisthosoma 3.7 long, 1.6 wide. Total body length 5.2. Leg I, femur 8.6, patella 0.6, tibia 8.7, metatarsus 13.9, tarsus 1.7, total 33.5.

Distribution: This species is endemic to Lanzarote and is known only from the type locality (Fig. 276).

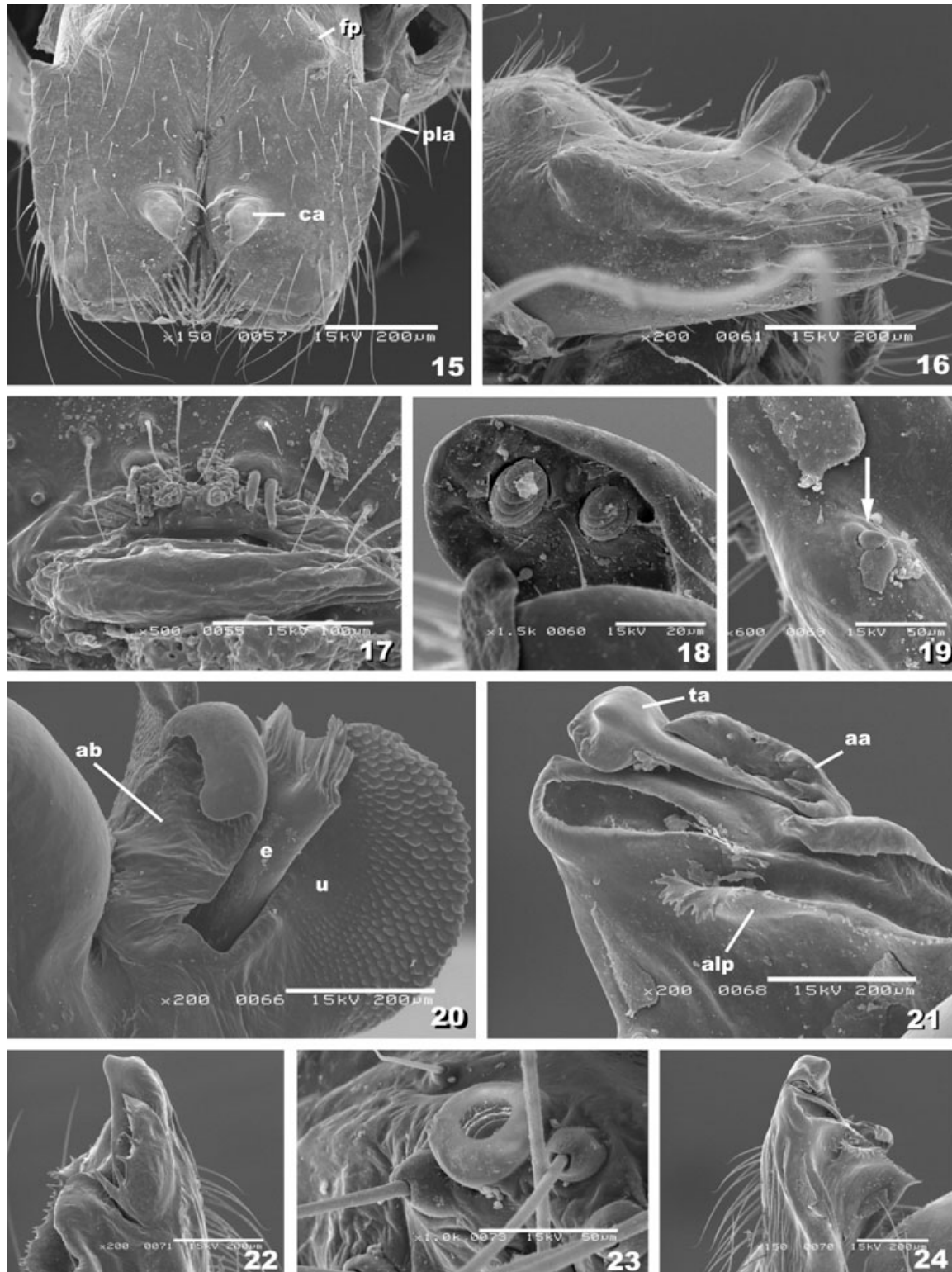
Natural history: *P. guarafia* was collected in an open valley with heavily eroded margins and very scarce vegetation at 20–50 m above sea-level. This spider lives in spaces between the substrate and the bottom of large stone blocks, which are scattered among the limits of the ravine. It builds small webs attached to smooth surfaces free of sand or other materials.

PHOLCUS MALPAISENSIS WUNDERLICH, 1992
(FIGS 8–24)

Pholcus malpaisensis Wunderlich, 1992: 321, figs 165, 166.



Figures 8–14. *Pholcus malpaisensis*: 8, male palp, prolateral; 9, male palp, retrolateral; 10, epigynum, lateral; 11, vulva, dorsal; 12, male palp, frontal; 13, male chelicerae, frontal; 14, epigynum, ventral. Scale bars 0.2 mm.



Figures 15–24. *Pholcus malpaisensis*: 15, male chelicerae, frontal; 16, male chelicerae, lateral; 17, male gonopore, ventral; 18, tips of the distal apophysis of male chelicerae, retrolateral; 19, small dorsal tooth of the procurcus, dorsal (arrow points to the tooth); 20, projections of the male bulb, retrolateral; 21, apex of the procurcus, retrolateral; 22, apex of the procurcus, ventral; 23, male tarsal organ, 24, procurcus, dorso-retrolateral. Scale bars: 15, 16, 20, 21, 22, 24, 200 μm ; 23, 29, 50 μm ; 17, 100 μm ; 18, 20 μm .

Neotype: By present designation, m, SPAIN, Canary Islands, Tenerife, Barranco de Badajoz, 12.viii.2003, Dimitrov & Txasko (CCRUB 4535-171).

Other material: Same data as for neotype, 3 mm, 3 ff (CCRUB 4638-173, 4621-173, 4530-170); Tenerife, Barranco de Las Raíces, 2 mm, 1 f, 12.viii.2003, Dimitrov & Txasko (CCRUB 4529-170); 1 f, 1 m, 12.viii.2003, Dimitrov & Txasko (ULL AÑ-2159); Barranco de Las Raíces, 1 juv., 1f, 3.iii.2002, Dimitrov, De Mas & Ribera (CCRUB 4534-170).

Diagnosis: Distinguished from its similar relatives (*P. roquensis* and *P. knoeseli*) by the shape of the uncus, which in *P. malpaisensis* is both much thicker over its last third and more curved. The shape of the male bulb's appendix is also different across the three species and a very useful tool for proper identification (Figs 9, 20). The apical apophysis of the procurus does not have the long curved outgrowth observed in *P. roquensis*, and has longer spines than *P. knoeseli*. Other important characteristics are the morphology of the procurus (Figs 8, 9, 12, 21, 22, 24) and the shape of the cheliceral apophyses (Figs 13, 16, 18). Distinctive female characteristics include the more regular colouring of the triangular plate of the epigynum (in *P. knoeseli* and *P. roquensis* two of the apexes have darker zones, with the rest much lighter in colour), and the shape of the valve (Fig. 11).

Description: Male (Neotype): Oval prosoma with brownish-yellow colouring. Dorsally, a brownish marking, with smooth borders over the thorax. The marking divided into two parts by the fovea, which is well marked. Elevated ocular area with dark brown pigmentation surrounding the eyes. Dorsally, the ocular area carries a group of long hairs. Frontally, the ocular elevation with darker pigmentation. Diameter of AME half the diameter of ALE. Distance between AME equal to their diameter; distance between them and ALE equal to ALE diameter. Yellowish sternum with brownish margins, and a light-brownish marking covering its last two-thirds. Chelicerae brownish with dark brown distal cheliceral apophyses (Fig. 18), the latter with two modified hairs at the tip. Near the base of the distal cheliceral apophyses groups of modified hairs (bristles) are visible. Apex of proximolateral apophyses does not extend to the base of frontal prominences. Chelicerae as in Figures 13, 15 and 16. Palp as in Figs 8, 9 and 12. Procurus has two small dorsal spines (Figs 9, 19), one smaller and placed dorso-retrolaterally. Procurus' apical apophysis as in Figure 22, its terminal apophysis well developed with small conical elevation (Fig. 21). Tarsal organ as in Figure 23. Opisthosoma cylindrical with yellow-grey colouring. Dorsally, two longitudinal lines of darker spots are visible, each line with four spots. The first

three spots are tear-shaped, the last smaller and rounded. Ventrally, genital zone slightly elevated and darker in colour. Gonopore as in Figure 17. Spinnerets with brownish markings.

Female: Prosoma as in male but with smaller darker markings over the thorax. Ocular area less elevated with eyes closer together. Distance between AME and ALE half the diameter of ALE. Sternum with smaller marking and lighter colouring. Chelicerae without apophyses. Opisthosoma as in male but lighter in tone. Epigynum and vulva as in Figures 10, 11 and 14.

Measurements: Male: Prosoma 1.7 long, 1.8 wide. Opisthosoma 4.8 long, 2.2 wide. Total body length 6.5. Leg I, femur 12.7, patella 0.7, tibia 13.7, metatarsus 22.0, tarsus 1.6, total 50.7. Palp: femur 1.0, patella 0.3, tibia 1.1, procurus 1.4. Female: Prosoma 1.5 long, 1.9 wide. Opisthosoma 5.3 long, 2.4 wide. Total body length 6.8. Leg I femur 12.7, patella 0.8, tibia 14.1, metatarsus 24.9, tarsus 2.9, total 55.4.

Distribution: This species is native to Tenerife where it is found in the Guimar zone, in concrete in Barranco de Badajoz and Malpais de Guimar (Fig. 276). This species has also been collected in the Los Raices area. Although *P. malpaisensis* was collected by Wunderlich (1992) in Malpais de Guimar, we were unable to locate it. Nevertheless, Malpais of Guimar should be included as part of its distribution.

Discussion: The first description of this species was based solely on female specimens from Malpais de Guimar in south-east Tenerife (Wunderlich, 1992). Together with the rest of the specimens, they were deposited in the ULL. Unfortunately, no other specimens were subsequently collected, and both type material and paratypes formerly deposited at the ULL have been lost. Moreover, the information and very few illustrations provided in the original description are applicable to at least two other species native to Tenerife – *P. knoeseli* and *P. mascaensis*. This could easily lead to considerable taxonomic confusion, as an objective identification of *P. malpaisensis* remains virtually impossible. To resolve this taxonomic confusion, and in accordance with Article 75 of the ICZN (4th edition), a neotype was designated. As there are no known specimens of this species, a neotype was chosen from material collected by us from a locality just 3 km distant from the original type locality. This neotype is based on a male specimen and has been deposited in the CCRUB.

Although several trips were undertaken to Malpais de Guimar to collect material from the original type locality, none was found. Numerous factors may explain its absence, given the considerable changes this region has undergone during the last decade. For

example, all agricultural activities have been banned and the area is now a protected natural reserve.

Taking into account the dubious taxonomic classification of *P. malpaisensis*, the discovery of an apparently new *Pholcus* so close to the type locality presented two options regarding its own taxonomical placement: (1) we could claim it as a new species and risk creating an unnecessary synonymy; or (2) we could classify it as *P. malpaisensis* based on its proximity to the type locality and the absence of any discrepancies from the original diagnosis. As explained above, we opted to designate a neotype to better clarify a muddled situation.

P. malpaisensis shares similar morphologies with the rest of the endemic Tenerifean *Pholcus* species, the most remarkable characteristics being the shape of the apical apophyses of the procurus and the shape of the uncus.

Natural history: Typical locality where we could find *P. malpaisensis* was located at about 1 km after the entrance of the Barranco de Badajoz. This part of the gorge is narrow with very high and almost vertical walls. The whole area is very humid and has abundant vegetation in places with enough sunlight. There are several artificial galleries which were built to collect water for a small pumping station. All specimens were collected in entrances of galleries and around the pumping station. Most of the spiders were collected from ceilings but also some were found on different levels on the walls and even close to the ground. In all cases if the web was not directly on the ceiling it was built under protruding parts or small cavities on the walls, or under fallen rocks and cement blocks.

PHOLCUS GOMERAE WUNDERLICH, 1980 (FIGS 25–43)

Pholcus gomeræ Wunderlich, 1980: 223, figs 14–22; Wunderlich, 1987: 80, figs 102–112.

Pholcus gomeroides Wunderlich, 1987: 81, figs 113–117. New synonymy.

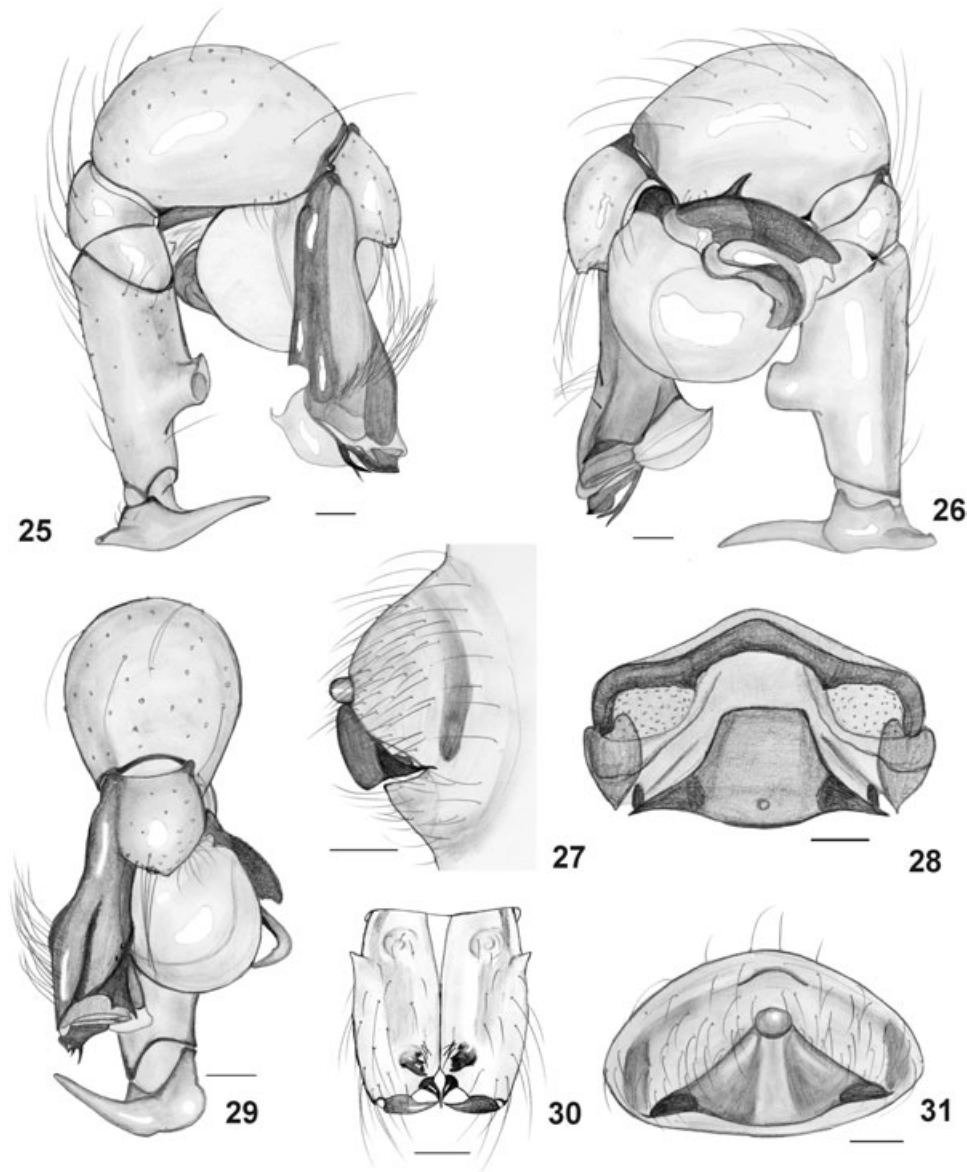
Synonymy justification: Having examined type material of *Pholcus gomeræ* (SMF 29976), as well as various paratypes from both this species and *P. gomeroides* (see below), we could find no significant differences between them. Furthermore, numerous *Pholcus* specimens collected from La Gomera were examined with similar conclusions. The original description of *P. gomeroides* contained very few drawings, and in fact none of the female, a strange omission given that there were then females available. Detailed comparison of the female epigynum and vulva revealed them to be practically identical. The differences noted by Wunderlich (1987) should be regarded as intraspecific variations. Such differences in the apical apophyses of the procurus ('lamella' *sensu*

Wunderlich, 1987) and the positioning of the procurus' dorsal spines are visible in the rest of the *Pholcus* species.

Material examined: *Pholcus gomeroides*: 1 m, holotype from La Gomera, Canary Islands, Spain (SMF 35557); 2 mm, 2 mm subad., 1 f subad., paratypes from La Gomera (SMF 35558). *Pholcus gomeræ*: 1 m, holotype from La Gomera (SMF 29976); 2 ff, paratypes from La Gomera (SMF 29977); 3 mm, 4 ff, 2 juv., from La Gomera, El Cedro, 27.ii.2002, Dimitrov & De Mas (CCRUB 4544-171, 4538-171, 4537-171, 4645-173, 4617-173, 4603-173, 4602-173); 5 mm, 8 ff, from La Gomera, Epina, 28.ii.2002, Dimitrov & De Mas (CCRUB 4539-171-4543-171, 4600-173, 4615-173); 1 m, La Gomera, Epina, 28.ii.2002, Dimitrov & De Mas (ULL AÑ-2149); 2 mm, 1 juv., La Gomera, Chorros de Epina, 19.viii.2004, Dimitrov & Antón (4544-171); 3 mm, 2 ff, La Gomera, Las Mimbreras, 17–28.ii.2002, Dimitrov & De Mas (CCRUB 4536-171, 4604-173); 1f La Gomera, Las Mimbreras, 17–28.ii.2002, Dimitrov & De Mas (ULL 4646-173); 1 m, 1 f, La Gomera, Las Mimbreras, 20.viii.2004, Dimitrov & Antón (CCRUB 4546-171); 3 mm, 1 f, 2 juv., La Gomera, near Las Mimbreras, 20.viii.2004, Dimitrov & Antón (CCRUB 4547-171, 4545-171).

Diagnosis: *P. gomeræ* is distinguished from its most similar congener, *P. sveni*, by the following characteristics: longer spines over the retrolateral side of the procurus (Fig. 39); two apical outgrowths, nearly equal in length, on the apical apophysis of the procurus (Fig. 37); and the less curved apophysis of the trochanter. Other distinctive characteristics of the male include the shape of the bulb's appendix, the shape of the uncus (Figs 26, 41), and the apophyses of the chelicerae (Figs 30, 32, 33, 40). The diagnostic characteristics of the female include a less elevated triangular plate and the shape of the valval ridge, which in *P. gomeræ* is less arched (Fig. 28).

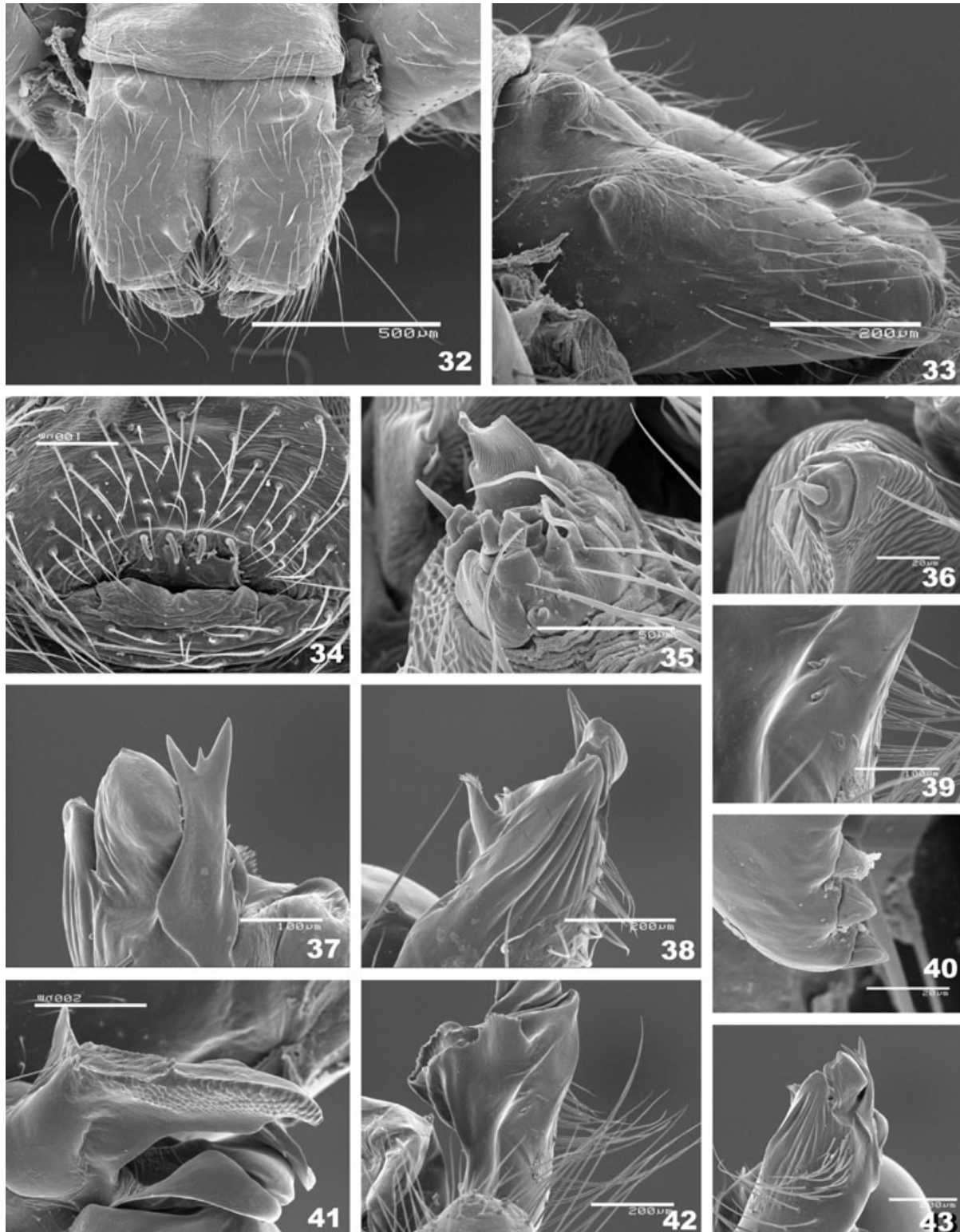
Description: Male: yellowish prosoma with brownish dorsal marking over thoracic area. Dorsal marking divided into two parts by the fovea, which is yellowish in colour like the rest of the prosoma. Both parts contain a yellowish spot more or less oval in shape. Borders of the dorsal marking irregular and not extending to the prosoma's exterior margin. The eyes, on an ocular elevation, with the same colouring as the prosoma except for the interocular area, which has dark brown pigmentation. Frontal part of ocular elevation with a brownish marking. Distance between lateral triads three times the diameter of ALE. Diameter of AME half the diameter of ALE, while distance between them nearly equal to the ALE diameter. Dorsally, the ocular area with hairs considerably longer than those of the prosoma. Sternum



Figures 25–31. *Pholcus gomerae*: 25, male palp, prolateral; 26, male palp, retrolateral; 27, epigynum, lateral; 28, vulva, dorsal; 29, male palp, frontal; 30, male chelicerae, frontal; 31, epigynum, ventral. Scale bars 0.2 mm.

yellowish with brownish margins. Chelicerae brownish-yellow, distal cheliceral apophyses (Figs 40, 33) brownish with cylindrical shape and three small distal outgrowths (modified hairs). At the base of distal cheliceral apophyses (Figs 30, 32) is placed a group of thick modified hairs – bristles. Upper margin of proximolateral apophyses (proximal teeth) higher than the lower margin of frontal prominences. Proximal prominences with large base, nearly one-third the width of the chelicerae. Chelicerae as in Figures 30, 32, 33. Palp as in Figs 25, 26, 29, with yellowish pigmentation; trochanter with long retrolateral apophysis; procurus heavily sclerotized with

dark brown colouring. Procurus as in Figures 38, 42, 43. Apical apophysis of the procurus carries two nearly equal outgrowths at the tip, the ventral with a shorter conical spine at its base (Fig. 37). Procurus with well-developed terminal apophysis lacking conical elevation and with a small apical depression (Fig. 43). Long legs with yellowish colouring, darker than prosoma. Opisthosoma cylindrical with yellowish pigmentation. Dorsally, four brownish spots in the shape of an inverted V are visible. Size and intensity of spot pigmentation decreases towards the distal part of the opisthosoma. Spinnerets feature darker markings on their basal areas. Spinnerets as in



Figures 32–43. *Pholcus gomearae*: 32, male chelicerae, frontal; 33, male chelicerae, lateral; 34, male gonopore, ventral (Dimitrov & Ribera, 2005a); 35, anterior lateral spinnerets; 36, posterior median spinnerets; 37, apical apophysis of the procurcus, ventral; 38, procurcus, dorsal; 39, small teeth on the procurcus, dorsal; 40, apex of the distal apophysis of male chelicerae; 41, projections of the male bulb, dorso-retrolateral; 42, procurcus, retrolateral; 43, procurcus, prolateral. Scale bars: 33, 38, 41–43, 200 µm; 34, 37, 39, 100 µm; 36, 40, 20 µm; 35, 50 µm; 32, 500 µm.

Figures 35, 36. Ventrally, the genital area with darker pigmentation. Gonopore as in Figure 34.

Female: prosoma as in male except for the less elevated ocular area and the shorter distance between AME and ALE, which is half the ALE diameter. Chelicerae lack apophyses. Opisthosoma cylindrical with slightly lighter pigmentation than in the male. Elevated epigynum with a brownish band over a strongly sclerotized triangular plate. Epigynum as in Figures 27, 31; vulva as in Figure 28.

Measurements: Male: Prosoma 2.4 wide, 2.7 long; opisthosoma 2.1 wide, 4.9 long. Total body length 7.6. Leg I, femur 15.6, patella 0.9, tibia 15.1, metatarsus 25.4, tarsus 2.8, total 59.8. Palp, femur 0.9, patella 0.3, tibia 1.3, procurus 1.2. Female: Prosoma 2.3 wide, 2.0 long; opisthosoma 3.2 wide, 5.4 long. Total body length 7.4. Leg I, femur 13.6, patella 0.9, tibia 14.6, metatarsus 23.5, tarsus 1.9, total 54.5.

Distribution: This species is endemic to La Gomera Island. Its distribution is restricted to the higher zones of the island (Fig. 276).

Natural history: *P. gomerae* is very common, with quite numerous populations throughout the laurisilva forests of La Gomera. It builds its webs in small excavations near mountain roads or cavities on the hill-sides. The drainage pipes of the road network proved to be one of the best places to collect this species. Several specimens were found in cavities between the roots of large trees. In some of the populations the individuals were very clustered, leaving just a couple of centimetres between each other, and it was practically impossible to distinguish individual webs.

Comments: The morphology of the male palp, particularly the shape of the procurus and the uncus, suggests that this species is very closely related to *P. sveni*. These two species differ not only in their morphology but also in their preferred habitats. In contrast to *P. gomerae*, *P. sveni* is found outside the forest, specifically in ravines in the southern part of the island.

PHOLCUS SVENI WUNDERLICH, 1987 (FIGS 44–61)

Pholcus sveni Wunderlich, 1987: 80, figs 93–101.

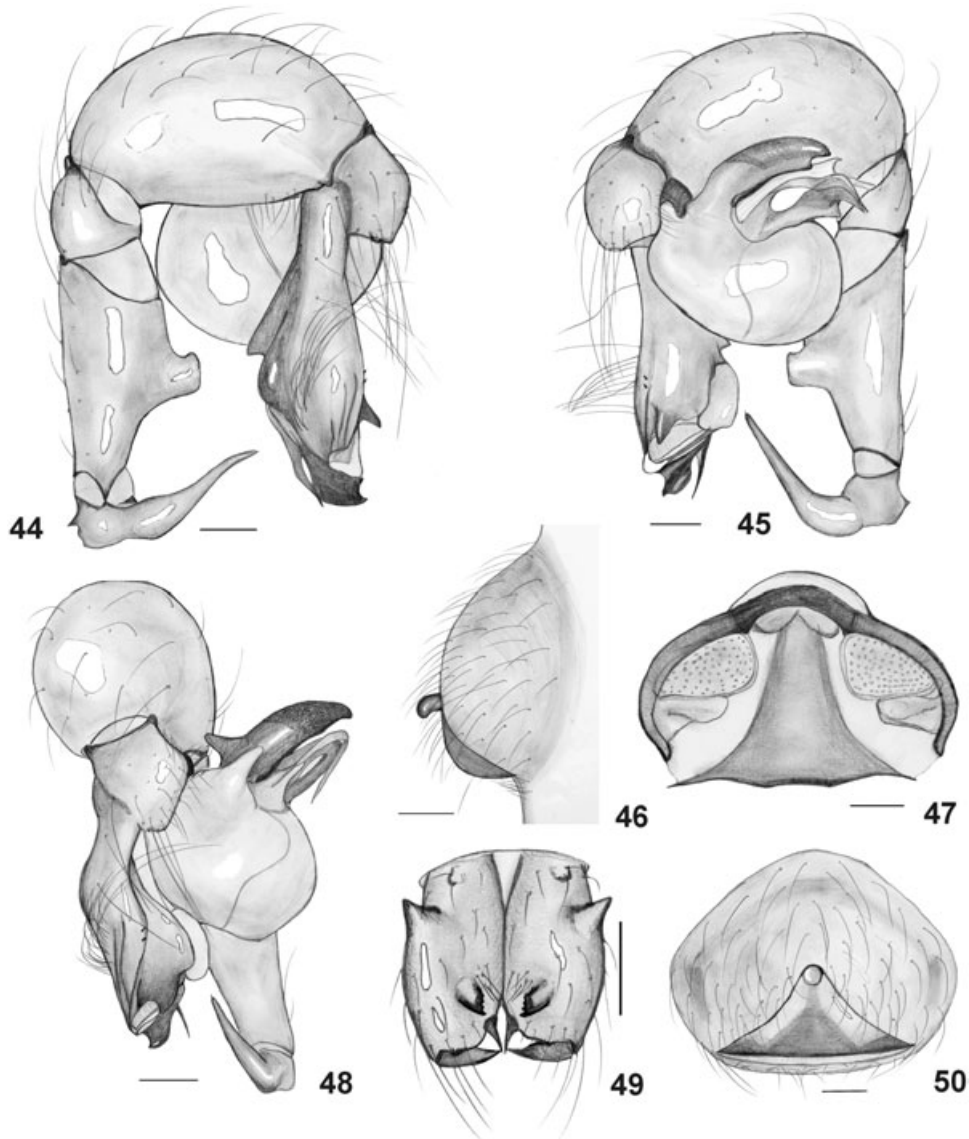
Material examined: 1 m, holotype, from La Gomera, Canary Islands, Spain (SMF 35555); 1 m, 2 ff, 1 juv., La Gomera, Valle Gran Rey, 28.ii.2002, Dimitrov & De Mas (CCRUB 4618-173, 4548-171, 4606-173); 1 f, La Gomera, Valle Gran Rey, 28.ii.2002, Dimitrov & De Mas (ULL AÑ-2154); 1 f, La Gomera, Las Hayas, 28.ii.2002, Dimitrov & De Mas (CCRUB 4616-173); 1 m, 1 f, 1 juv., La Gomera, Barranco de Agaga, 16.viii.2004, Dimitrov & Antón (CCRUB 4549-171).

Diagnosis: Very similar to *P. gomerae* and *P. bimbache*. Easily distinguished from *P. bimbache* by the shorter claw-shaped apophyses of the appendix and the shape of the uncus (Figs 45, 53). Procurus with shorter, dorso-retrolateral spines (Figs 45, 54). Apical apophysis of the procurus (Fig. 57) with longer ventral outgrowth at the tip. The upper margin of the proximolateral apophyses of the chelicerae does not extend to the base of the proximal prominence (Figs 49, 51). The female valve has a more arched ridge than in *P. gomerae*, but less so than in *P. bimbache*. Pore plates are smaller than in *P. bimbache* (Fig. 47).

Description: Male: prosoma oval with brownish-yellow colouring. Dorsally, the dark markings typical of the Canarian *Pholcus* species are visible. Fovea well marked. Elevated ocular area with darker pigmentation and long dorsal hairs. Eyes surrounded by brownish colouring. Distance between AME equal to their diameter, while the distance between them and ALE slightly larger than the ALE diameter. AME diameter one-third the diameter of ALE. Sternum yellowish with darker central zone and brownish margins. Chelicerae brownish with darker distal cheliceral apophyses (Figs 49, 51, 52). Near the base of the distal cheliceral apophyses a group of modified hairs (bristles) is visible. Tip of distal apophyses carries three modified hairs (Fig. 58). Upper margin of proximolateral apophyses does not extend to the base of frontal prominences. Palps as in Figures 44, 45, 48. Procurus with robust terminal apophysis with two small, conical outgrowths (Fig. 56). Procurus' apical apophysis terminates with longer ventral, and shorter dorsal outgrowths (Fig. 57). Opisthosoma cylindrical with yellowish pigmentation. Dorsally, six darker spots distributed in two longitudinal lines are visible. Ventrally, a darker transversal line is visible over the genital area. Gonopore as in Figure 59. Spinnerets as in Figures 60, 61.

Female: prosoma as in male but with less elevated ocular area. Eyes closer together, with the distance between AME and ALE smaller than the ALE diameter. Chelicerae without apophyses. Sternum as in the male but with lighter colouring. Opisthosoma as in the male. Ventrally, a darker arching line is visible over the triangular plate. Epigynum and vulva as in Figures 46, 47, 50.

Measurements: Male: Prosoma 1.1 long, 1.3 wide; opisthosoma 2.9 long, 0.9 wide. Total body length 4.0. Leg I, femur 8.8, patella 0.5, tibia 8.8, metatarsus 14.7, tarsus 2.4, total 35.6. Palp: femur 0.7, patella 0.3, tibia 0.8, procurus 0.7. Female: Prosoma 1.5 long, 1.7 wide; opisthosoma 4.0 long, 1.5 wide. Total body length 5.5. Leg I, femur 9.0, patella 0.5, tibia 9.3, metatarsus 15.1, tarsus 1.9, total 35.8.



Figures 44–50. *Pholcus sveni*: 44, male palp, prolateral; 45, male palp, retrolateral; 46, epigynum, lateral; 47, vulva, dorsal; 48, male palp, frontal; 49, male chelicerae, frontal; 50, epigynum, ventral. Scale bars 0.2 mm.

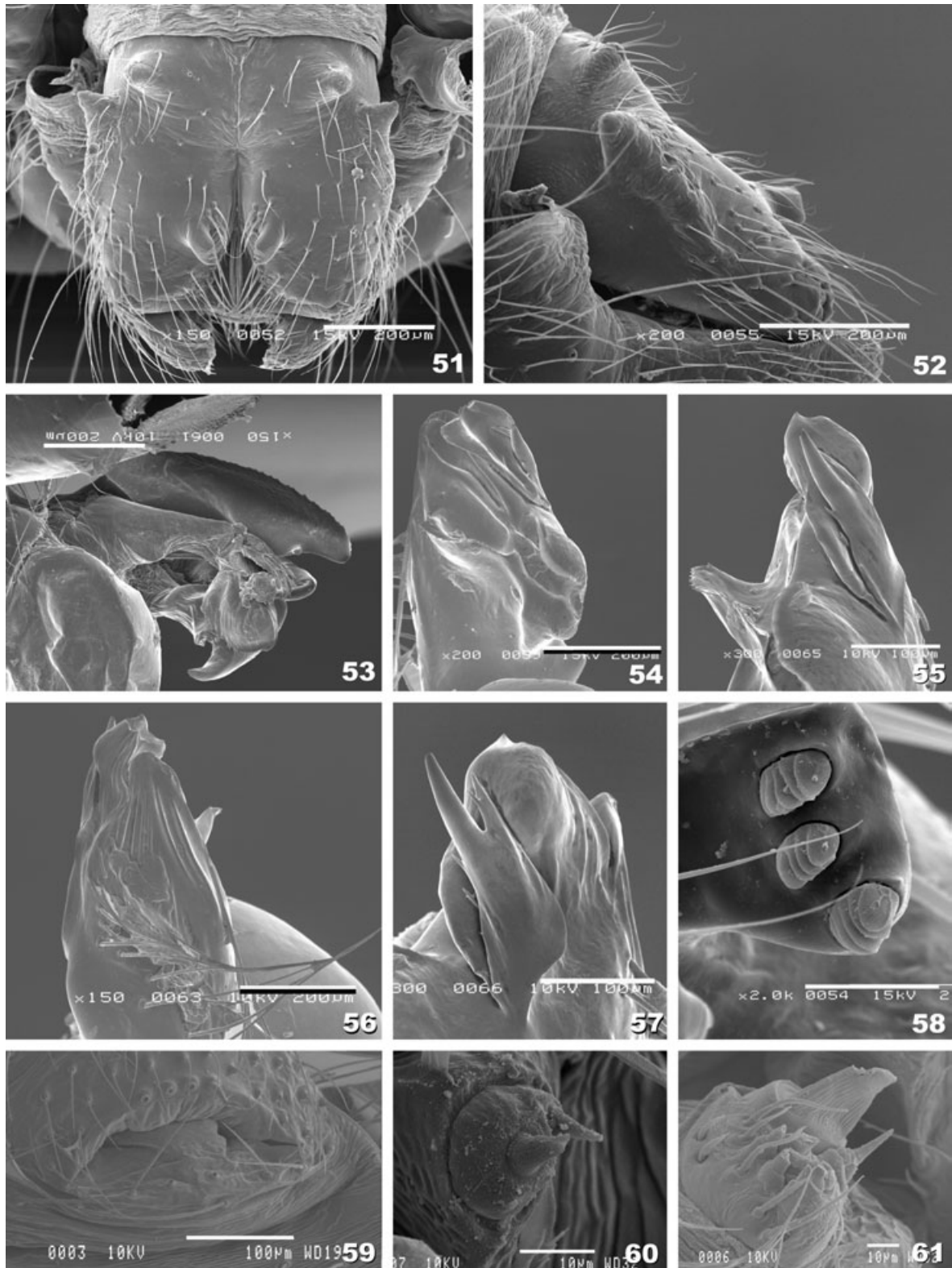
Distribution: This species is endemic to La Gomera where it is known to inhabit the Valle Gran Rey and Barranco de Argaga (Fig. 276).

Natural history: *P. sveni* was collected in several localities at low altitude in the Gran Rey valley. Few specimens were found in the adjacent Barranco de Argaga close to sea-level. The surroundings of these valleys are very dry with steep slopes and xerophytic vegetation. However, their lower parts are much more humid. In Valle Gran Rey almost the entire area is covered with numerous agricultural plots and houses. In both localities *P. sveni* lives in lower areas under large stones, always close to small pools of water.

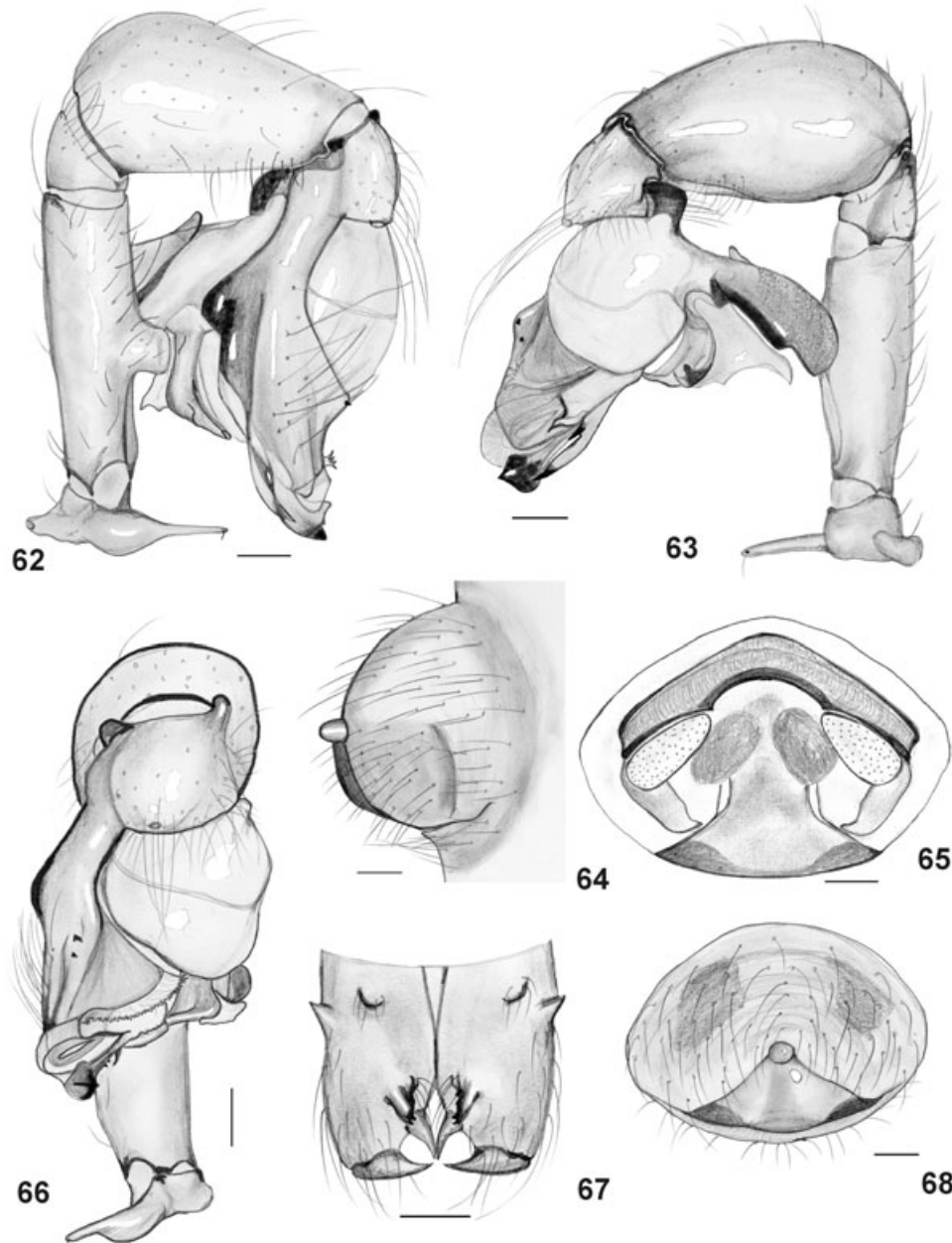
Comments: *P. sveni* is very similar to *P. gomerae* and *P. bimbache* both in the morphology of the procurus' apical part and the bulb's appendix. These similarities are also common to the Tenerife species. This again underlines the close relationships among the fauna of the archipelago's occidental islands: Tenerife, La Gomera and El Hierro.

PHOLCUS KNOESEL WUNDERLICH, 1992 (FIGS 62–79)
Pholcus knoeseli Wunderlich, 1992: 320, figs 156–164.

Material examined: 1 m, paratype, from Las Mercedes, Tenerife, Canary Islands, Spain, Knosel (in



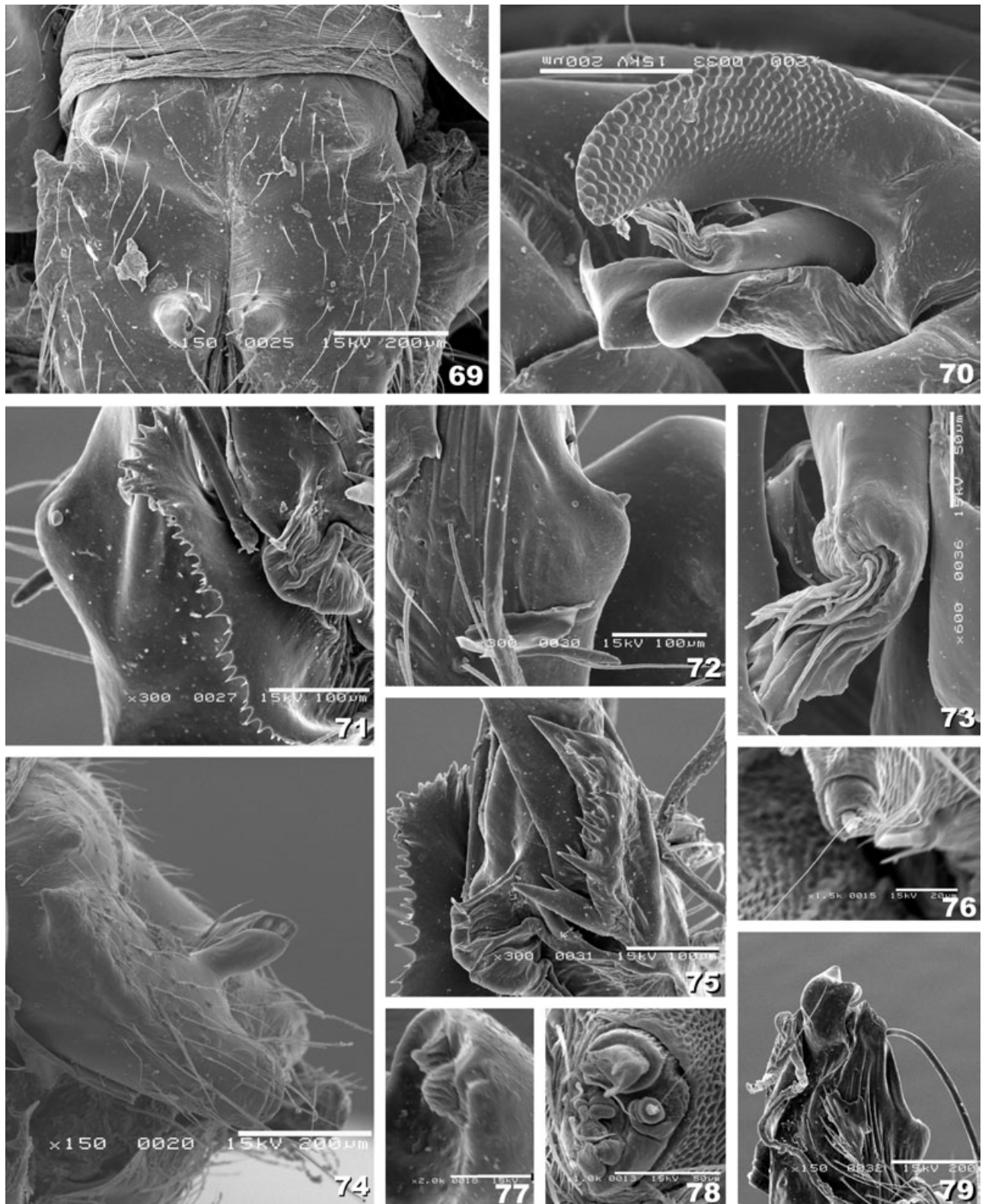
Figures 51–61. *Pholcus sveni*: 51, male chelicerae, frontal; 52, male chelicerae, lateral; 53, projections of the bulb, pro-lateral; 54, procursus, retrolateral; 55, apex of the procursus, ventral; 56, procursus, prolateral; 57, apical apophysis of the procursus, ventral; 58, distal apophysis of male chelicerae, retrolateral; 59, male gonopore, ventral; 60, posterior median spinnerets; 61, anterior lateral spinnerets. Scale bars: 51–54, 56, 200 μm ; 55, 57 and 59, 100 μm ; 58, 20 μm ; 60, 61, 10 μm .



Figures 62–68. *Pholcus knoeseli*: 62, male palp, prolateral; 63, male palp, retrolateral; 64, epigynum, lateral; 65, vulva, dorsal; 66, male palp, frontal; 67, male chelicerae, frontal; 68, epigynum, ventral. Scale bars 0.2 mm.

MNHN F08iNr3); 4 mm, 1 f, 6 juv., El Bailadero, Tenerife, 22.ii.2002, Dimitrov, De Mas & Ribera (CCRUB 4565-171, 4566-171, 4567-172, 4568-171); 1 m, 1 juv., El Bailadero, Tenerife, 22.ii.2002, Dimitrov & Ribera (CCRUB 4643-173, 4644-173); 1 juv., Pico del Inglés, Tenerife, 21.viii.2003, Dimitrov & Antón (CCRUB 4605-173); 1 f, Pico del Inglés, Tenerife, 21.viii.2003, Dimitrov & Antón (ULL AÑ-2152).

Diagnosis: Distinguished from similar congeners (*P. roquensis* and *P. malpaisensis*) by the shape of the procurus, the width of its base and apical area considerably greater as compared with *P. roquensis*; the small spine's dorsal position on the procurus over its wider part (Figs 71, 72); the shape of the uncus (much wider in *P. malpaisensis*) as well as the appendix of the genital bulb (Figs 63, 70). The shape of the membrane at the embolus' apex (Fig. 73) is also a very



Figures 69–79. *Pholcus knoeseli*: 69, male chelicerae, frontal; 70, projections of the bulb, retrolateral; 71, short spines of the procurus, retrolateral; 72, short spines of the procurus, prolateral; 73, embolus; 74, male chelicerae, lateral; 75, apical apophysis of the procurus, ventral; 76, posterior median spinnerets; 77, distal apophysis of male chelicerae; 78, anterior lateral spinnerets; 79, procurus, prolateral. Scale bars: 69, 70, 74, 79, 200 μ m; 71, 72, 75, 100 μ m; 78, 50 μ m; 76, 77, 20 μ m.

useful tool for distinguishing this species from its similar congeners.

Description: Male: prosoma yellowish with dorsal marking, which in this species is divided in two large parts by the fovea, each part again subdivided in two. The marking has smooth and well-marked margins. Elevated ocular area with darker pigmentation surrounding the eyes. AME less than the half the diameter of ALE. Distance between AME and ALE equal to half the diameter of ALE. The area between the lateral triads and the dorsal part of the ocular area is covered by long hairs. Yellowish sternum with darker colouring in both its central part and borders. Chelicerae (Figs 67, 69, 74) brownish-yellow; distal cheliceral apophyses dark brown, with three bristles at their base and two modified hairs at the tip (Fig. 77). Proximalateral apophyses overpass with their upper margins the base of the frontal prominences. Yellowish legs, slightly darker than prosoma. Palps yellowish with darker pigmentation across the heavily sclerotized areas. Palps as in Figures 62, 63, 66. Procurus with large terminal apophysis featuring well-developed conical outgrowths (Fig. 79). Apical apophysis of the procurus with two longer outgrowths at the two extremes, with numerous sharpened and shorter outgrowths between them (Fig. 75). Cylindrical yellowish-grey opisthosoma with two lines of spots on its dorsal side. Each line has four spots with brown colouring and tear-like shape. The last spot in each line is much smaller, lighter and oval in shape. Ventrally, a darker coloured transverse line is visible in the genital area. Spinnerets (Figs 76, 78) exhibit darker pigmentation at the base.

Female: prosoma as in male but with a less elevated ocular area and shorter hairs on its dorsal area. The dark marking on sternum much smaller and reduced to one longitudinal line. Chelicerae without apophyses. Opisthosoma more yellowish than in the male. The two lines of dorsal spots placed closer to each other, with the first pair joined in the middle resembling an inverted V. Epigynum and vulva as in Figures 64, 65, 68.

Measurements: Male: Prosoma 1.8 long, 1.9 wide; opisthosoma 4.0 long, 2.0 wide. Total body length 5.9. Leg I, femur 13.8, patella 0.9, tibia 13.7, metatarsus 21.8, tarsus 2.9, total 53.1. Palp, femur 0.8, patella 0.2, tibia 1.1, procurus 1.2. Female: Prosoma 1.9 long, 2.0 wide; opisthosoma 5.1 long, 3.2 wide. Total body length 7.0. Leg I, femur 11.7, patella 0.7, tibia 10.7, metatarsus 17.8, tarsus 1.5, total 42.5.

Distribution: *P. knoeseli* is known to inhabit numerous localities in the Anaga zone on Tenerife Island (Fig. 276).

Natural history: *P. knoeseli* lives under large rocks or in the cavities on the hillsides in the remnants of the humid laurisilva forest over the higher limits of the Anaga massif. The webs are built on the ceilings. As in *P. gomeræ* the populations are often so dense that it is difficult to delimit individual webs.

PHOLCUS TENERIFENSIS WUNDERLICH, 1987

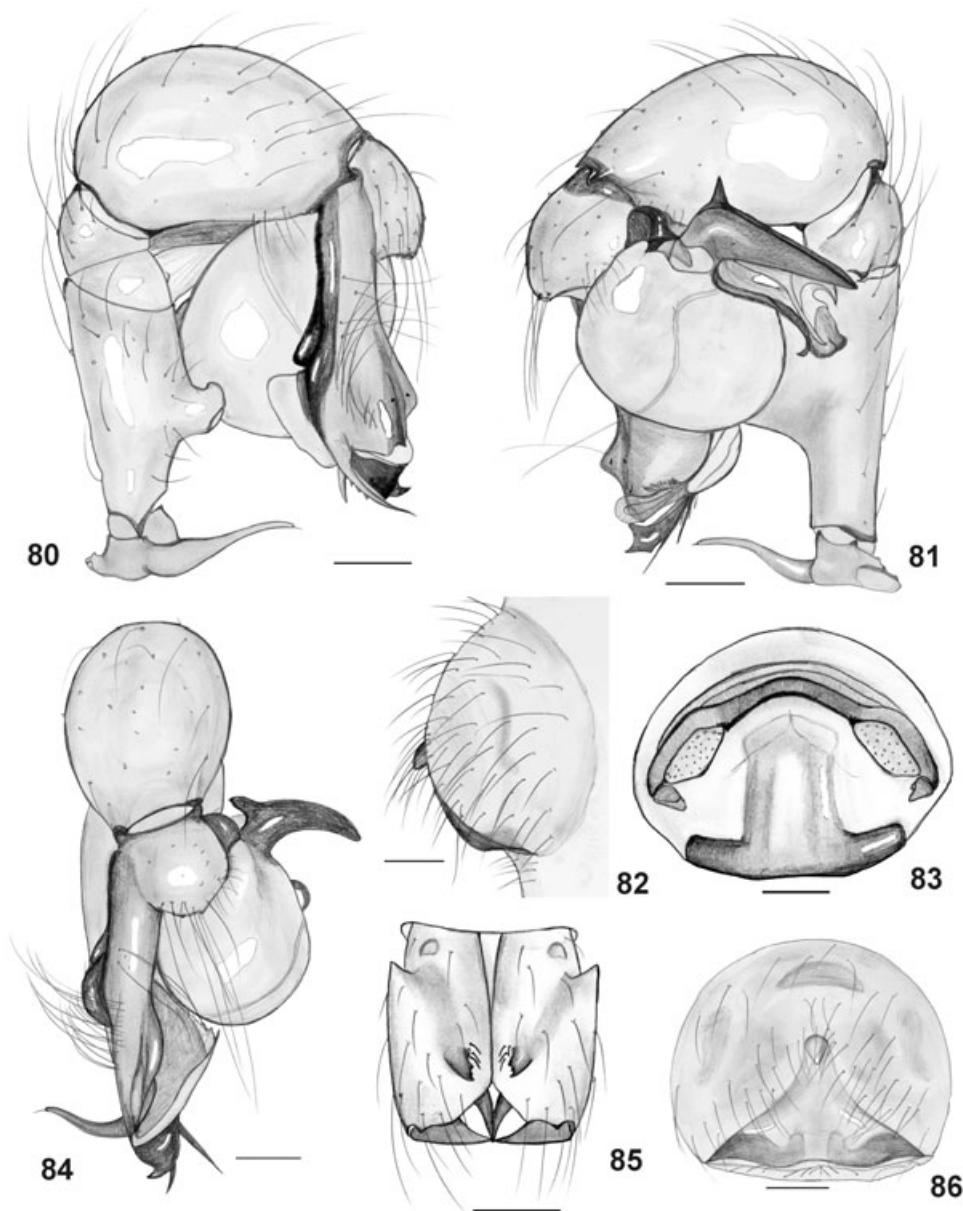
(FIGS 80–98)

Pholcus tenerifensis Wunderlich, 1987: 79, figs 84–92.

Material examined: 1 m, holotype, from Barranco del Infierno, Tenerife, Canary Islands, Spain (SMF 35553); 2 mm, 4 ff, 2 juv., Barranco del Infierno, Tenerife, 2.iii.2002, Dimitrov & De Mas (CCRUB 4513-170, 4514-170, 4625-173, 4665-173).

Diagnosis. *P. tenerifensis* is easily distinguished from similar congeners, *P. roquensis* and *P. knoeseli*, by the shape of the procurus (Figs 80, 84, 89, 96), as well as by the shape of the apical apophysis of the procurus, which bifurcates near the base with one branch curved and much longer than the other (Fig. 94). Other distinctive characteristics include the sharper angle of the uncus' curvature (Figs 81, 91), the longer trochanteral apophyses, and the shape of the appendix of the bulb (Figs 81, 91). Distinctive characteristics for the female include the shape of the epigynal triangular plate, which is higher, and the morphology of the vulva (Figs 83, 86).

Description: Male: prosoma rounded, yellowish in colour. Dorsally, with a zone of brownish pigmentation over the thorax. Well-marked, yellowish fovea, separates the brownish marking into two parts. Ocular area elevated with darker marking frontally. Ocular area surrounding the eyes has dark brown pigmentation. Distance between AME and ALE half the diameter of ALE. ALE diameter two-fold greater than diameter of AME. Yellowish sternum with brownish borders. Chelicerae darker than the rest of the prosoma, featuring dark brown distal cheliceral apophyses with bristles near their base. Distal apophyses with two modified hairs (Fig. 88). Apex of proximalateral apophyses extends past the base of frontal prominences. Chelicerae as in Figures 85, 87, 90. Palps as in Figures 80, 81, 84. Procurus very wide distally (Fig. 89). Terminal apophysis of the procurus heavily sclerotized with well-developed conical outgrowth (Figs 89, 95). Apical apophysis features one very long sharpened outgrowth and various shorter spines (Fig. 94). Procurus with two retrolateral short spines (Fig. 93). Tarsal organ as in Figure 98. Opisthosoma yellow-brownish, cylindrical in shape. Dorsally, two longitudinal rows of darker spots are visible, each row comprising four spots, the last much smaller than the



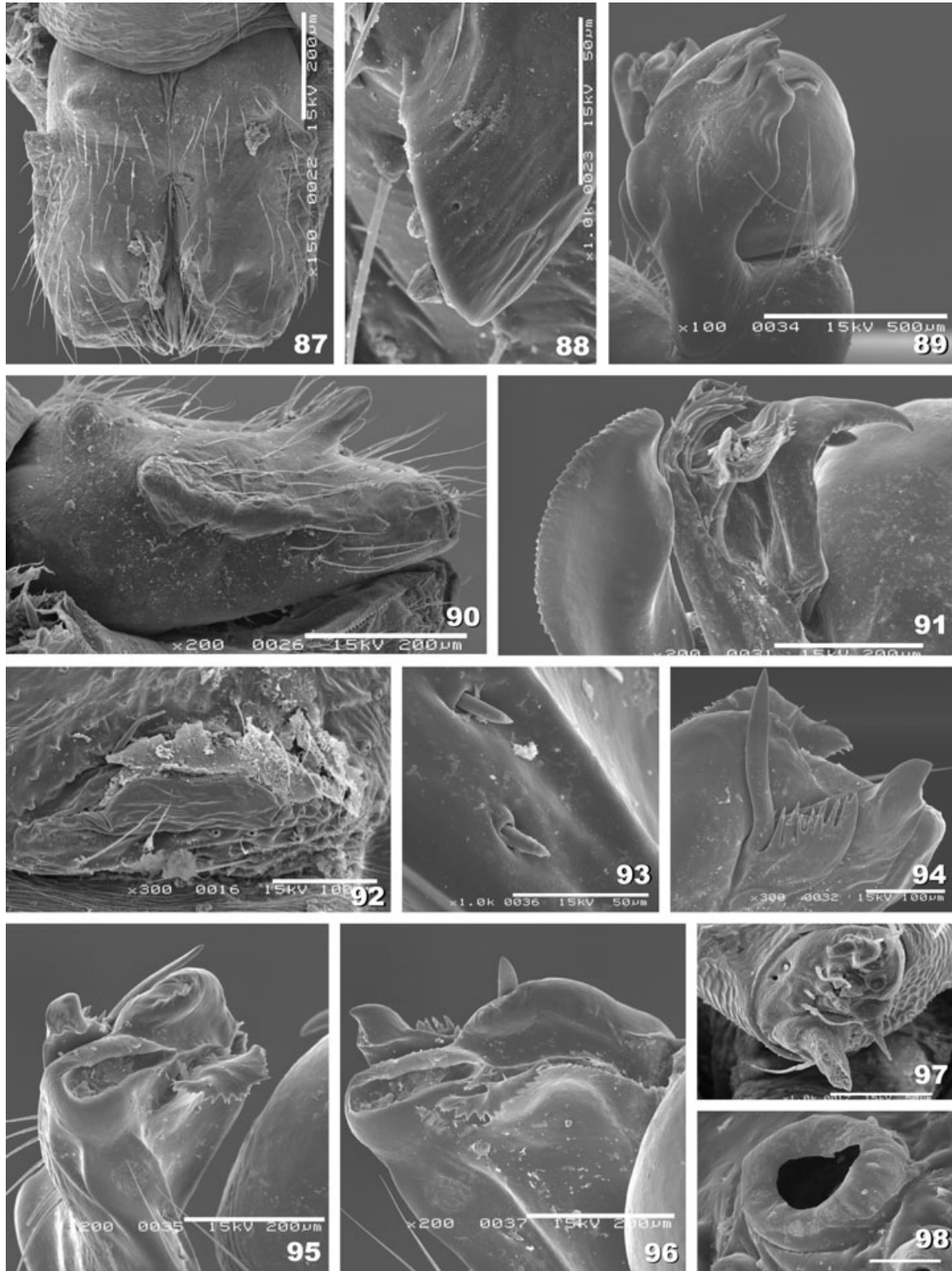
Figures 80–86. *Pholcus tenerifensis*: 80, male palp, prolateral; 81, male palp, retrolateral; 82, epigynum, lateral; 83, vulva, dorsal; 84, male palp, frontal; 85, male chelicerae, frontal; 86, epigynum, ventral. Scale bars 0.2 mm.

others. Ventrally, the genital area darker in colouring. Gonopore as in Figure 92. Spinnerets with brownish margins. ALS as in Figure 97.

Female: prosoma as in male but with lighter pigmentation. Ocular area less elevated; sternum has a darker central zone, the rest lighter than in the male. Chelicerae without apophyses and yellowish in colour. Shape and colour of opisthosoma as in male. Epigynum slightly elevated with triangular plate dark brown in colour. Epigynum as in Figures 82, 86; vulva as in Figure 83.

Measurements: Male: Prosoma 1.3 long, 1.5 wide; opisthosoma 3.7 long, 1.5 wide. Total body length 5.0. Leg I, femur 11.2, patella 0.6, tibia 11.7, metatarsus 15.6, tarsus 1.5, total 40.6. Palp, femur 0.9, patella 0.2, tibia 0.9, procurus 1.0. Female: Prosoma 1.7 long, 1.9 wide; opisthosoma 4.6 long, 1.9 wide. Total body length 6.3. Leg I, femur 9.7, patella 0.8, tibia 10.7, metatarsus 16.6, tarsus 2.2, total 40.0.

Distribution: This species is only known to inhabit the Barranco del Infierno on Tenerife Island (Fig. 276).



Figures 87–98. *Pholcus tenerifensis*: 87, male chelicerae, frontal; 88, distal apophysis of male chelicerae, frontal; 89, male palp, prolateral; 90, male chelicerae, lateral; 91, projections of the bulb, prolateral; 92, male gonopore, ventral; 93, small retrolateral teeth of the procurcus, retrolateral; 94, apical apophysis of the procurcus, ventral; 95, procurcus, dorso-retrolateral; 96, procurcus, retrolateral; 97, anterior lateral spinnerets; 98, male tarsal organ. Scale bars: 87, 90, 91, 95, 96, 200 µm; 92 and 94, 100 µm; 88, 93, 97, 50 µm; 89, 500 µm; 98, 20 µm.

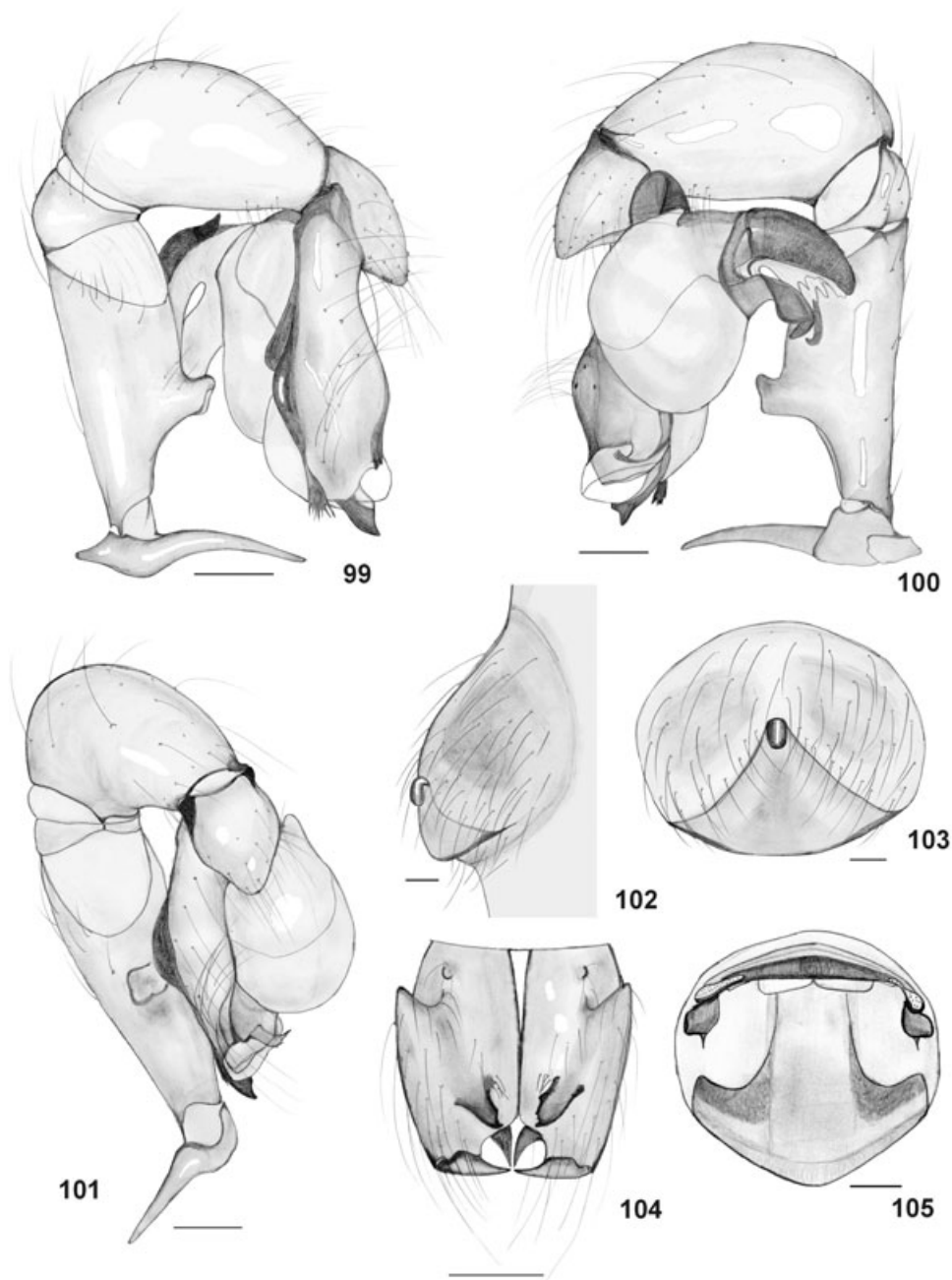
Natural history: *P. tenerifensis* lives under stones or in small cavities on the sides of the higher and more humid part of the Barranco del Iniferno. All specimens that we collected were found close to pools of water and in some cases on stones directly above.

Comments. *P. tenerifensis* is a member of the Tenerifean endemic complex. This species possesses some of the characteristics of this group: the terminal apophy-

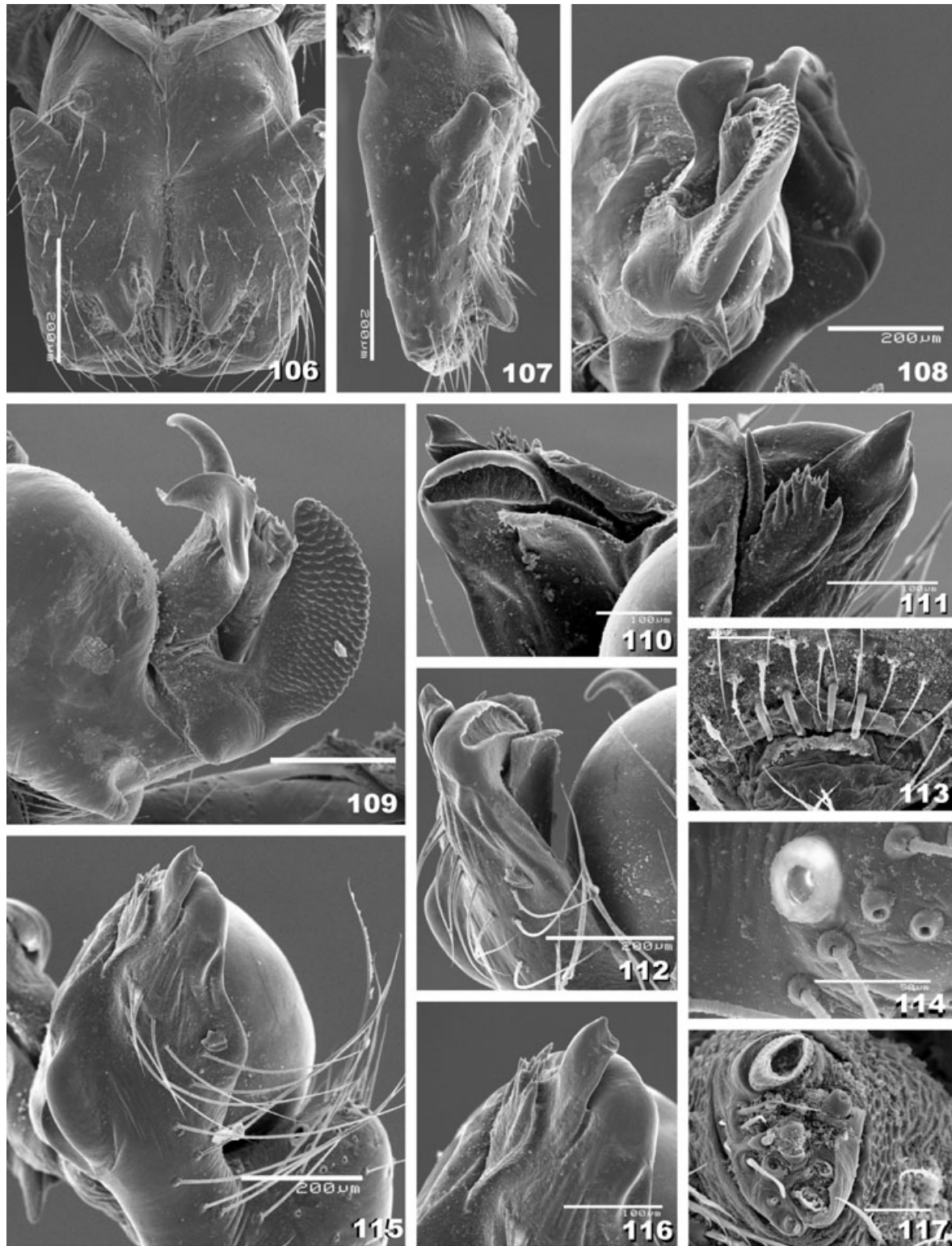
sis and the shape of the procurus' apical apophysis are more fully developed. The closest species are *P. roquensis* and *P. knoeseli*.

PHOLCUS MASCAENSIS WUNDERLICH, 1987
(FIGS 99–117)

Pholcus mascaensis Wunderlich, 1987: 81, figs 118–127 and 702.



Figures 99–105. *Pholcus mascaensis*: 99, male palp, prolateral; 100, male palp, retrolateral; 101, male palp, frontal; 102, epigynum, lateral; 103, epigynum, ventral; 104, male chelicerae, frontal; 105, vulva, dorsal. Scale bars 0.2 mm.



Figures 106–117. *Pholcus mascaensis*: 106, male chelicerae, frontal; 107, male chelicerae, lateral; 108, projections of the bulb, ventral; 109, projections of the bulb, retrolateral; 110, apex of the procurus, retrolateral; 111, apical apophysis of the procurus, ventral; 112, procurus, dorsal; 113, male gonopore, ventral; 114, male tarsal organ; 115, male palp, prolateral; 116, terminal apophysis of the procurus, ventro-prolateral; 117, anterior lateral spinnerets. Scale bars: 106–109, 115, 200 µm; 110, 111, 116, 100 µm; 113, 114, 50 µm; 117, 20 µm.

Material examined: 1 m, holotype, from Barranco de La Masca, Tenerife, Canary Islands, Spain (SMF 35559); 1 f, 1 juv., from Cueva de Chio, Tenerife, 24.ii.2002, Dimitrov & De Mas (CCRUB 4682-173, 4596-172); 1 juv., Cueva de Chio, 24.ii.2002, Dimitrov (CCRUB 4683-173); 1 m, Cueva de Chio, 30.xi.1999, GIET (Grupo de Investigaciones Espeleológicas de Tenerife) (CCRUB 4595-172).

Diagnosis: *P. mascaensis* can be distinguished from its similar Canarian congeners, *P. intricatus* and *P. roquensis*, by the morphology of the apical apophysis of the procurus (Fig. 111), which has a lamina shape with irregular margins and a longer ventral outgrowth (*P. intricatus* is also lamina in shape but much narrower). The shape of the procurus is also different, while the uncus is thicker and more arched than in *P. roquensis*, and exhibits a more gradual curvature than in *P. intricatus* (Figs 100, 109). The position of the small teeth on the procurus is also different and a useful distinguishing trait. Distinctive characteristics of the female include the shape and colouring of the epigynum's plate, which in *P. mascaensis* is much clearer, with a tiny darker band appearing only near the genital opening (Figs 102, 103).

Description: Male: prosoma oval yellowish in colour. Dorsally, a brownish marking appears across the thorax, subdivided into four parts with irregular margins. In the central part of the thorax, the fovea crosses this marking. Eyes on elevated ocular area, surrounded by a darker pigmentation. AME very close together, the distance between them less than their diameter. Distance between AME and ALE equal to ALE's diameter. Diameter of AME half the diameter of ALE. Sternum brownish with darker margins. Chelicerae darker than the prosoma. Distal cheliceral apophyses dark brown with a group of modified hairs near their bases (bristles), and two modified hairs at the apex. Upper margin of proximolateral apophysis extends to the base of the frontal prominence without passing over it. Chelicerae as in Figures 104, 106, 107. Palps as in Figures 99–101. Distally, procurus wide (Figs 110, 112, 115), with terminal apophysis and high conical elevation (Fig. 111). Apical apophysis (Figs 111, 116) of the procurus with a longer ventral outgrowth but a much shorter dorsal one. Between these outgrowths the apical apophysis features a cluster of short, sharpened endings (Fig. 111). Bulbal projections as in Figures 108, 109. Tarsal organ as in Figure 114. Opisthosoma yellowish, with four darker dorsal spots, the first rectangular in shape, the second resembling an inverted V, the remaining two rounded and placed on either side of the opisthosoma's central axis. Ventrally, the pigmentation clearer, with two longitudinal lines lacking hairs. Small darker marking appears

over the genital zone. Gonopore as in Figure 113. ALS as in Figure 117.

Female: prosoma as in male but lighter in colour. Ocular area less elevated, with shorter dorsal hairs than in the male. Chelicerae without apophyses. Shape and colour of opisthosoma as in male. Ventrally, epigynum elevated. Epigynum and vulva as in Figures 102, 103, 105.

Measurements: Male: Prosoma 1.0 long, 1.2 wide; opisthosoma 4.3 long, 1.5 wide. Total body length 5.3. Leg I, femur 9.0, patella 0.5, tibia 9.1, metatarsus 14.4, tarsus 35.4. Palp: femur 0.7, patella 0.2, tibia 0.7, procurus 0.8. Female: Prosoma 1.2 long, 1.3 wide; opisthosoma 4.9 long, 2.0 wide. Total body length 6.1. Leg I, femur 9.8, patella 0.6, tibia 10.7, metatarsus 16.1, tarsus 2.4, total 39.6.

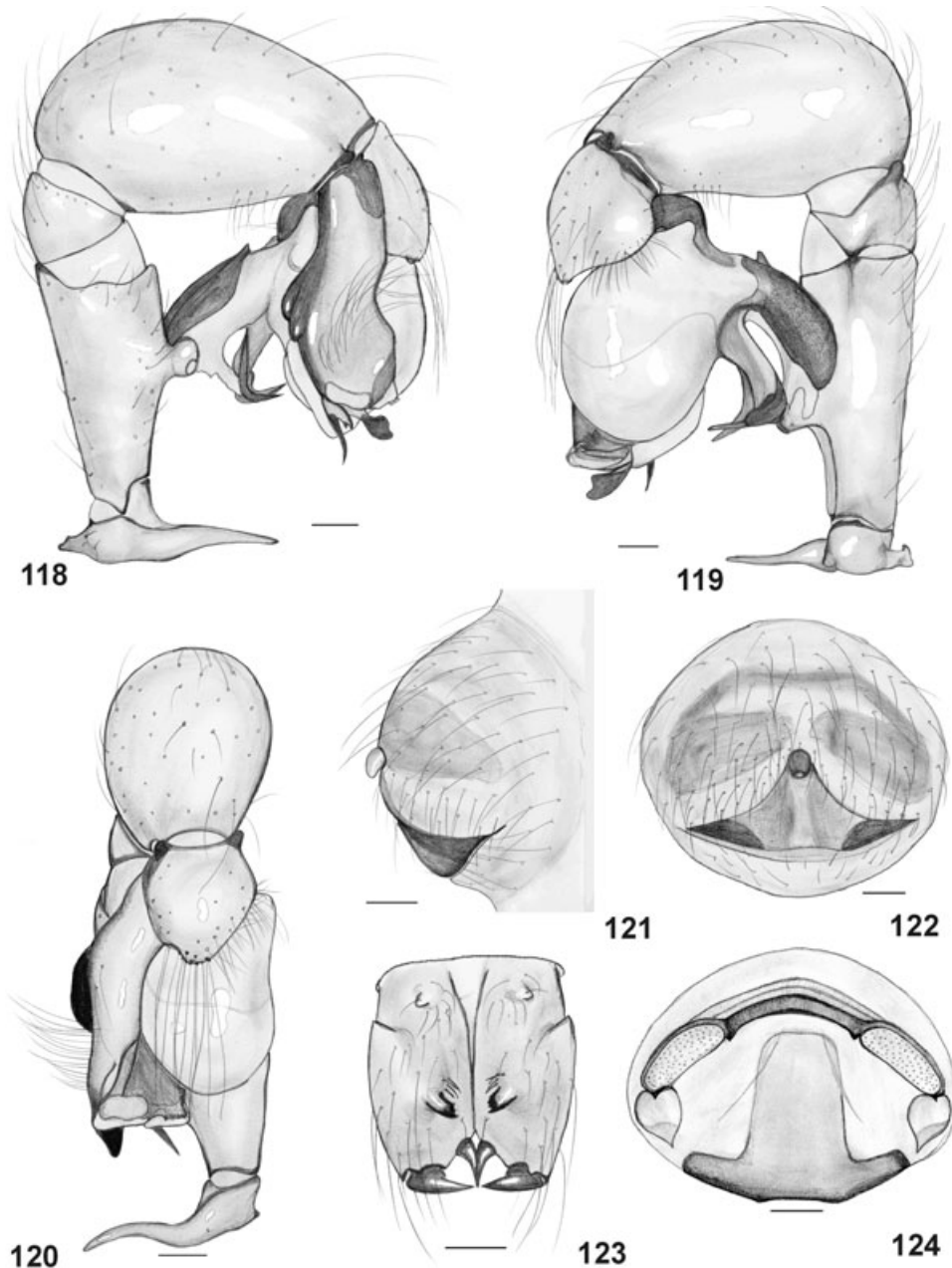
Distribution: This species is known to inhabit Barranco de Masca and the Cueva de Chio cave on Tenerife Island (Fig. 276). These two sites are located in close proximity and it is possible that this species is also endemic to the southern part of the island. *P. mascaensis* is endemic to Tenerife Island.

Natural history: *P. mascaensis* was only collected from Cueva de Chio. The cave is situated close to the type locality in a pine forest with very poor understorey vegetation. This species does not present any troglomorphic features and all specimens were collected at the entrance of the cave. Interestingly *P. mascaensis* construct its webs under large rocks on the cave floor close to the ground and not on the ceiling.

PHOLCUS ROQUENSIS WUNDERLICH, 1992 (FIGS 118–138)

Pholcus roquensis Wunderlich, 1992: 322, figs 170–177.

Material examined: 1 m, holotype, from Cueva de los Roques, Tenerife, Canary Islands, Spain (ULL T-CR-55); 2 f, paratypes, same data as for holotype (ULL T-CR-67, T-CR-54); 2 f, same locality as for holotype, 27.ii.2002, Dimitrov & Ribera (CCRUB 4652-173, 4651-173); 1 m, same locality as for holotype, 24.ii.2002, Dimitrov & Ribera (CCRUB 4676-173); 1 f, 1 juv., same locality as for holotype, 24.ii.2002, Dimitrov, De Mas & Ribera (CCRUB 4569-172); 1 f, 1 juv., same locality as for holotype, ix.2003 and 23.x.1999, GIET (Grupo de Investigaciones Espeleológicas de Tenerife) (CCRUB 4527-170-4528-170); 2 ff, same locality as for holotype, September 2003 and 23.x.1999, GIET (ULL CR-C/AÑ-1266); 3 mm, 1 f, 1 juv., same locality as for holotype, 28.ix.2003, DZUL (Departamento de Zoología, Universidad de La Laguna) (ULL AÑ-1489); 1 m, 3 juv., same locality as for holotype, 28.ix.2003, DZUL (ULL AÑ-1511).

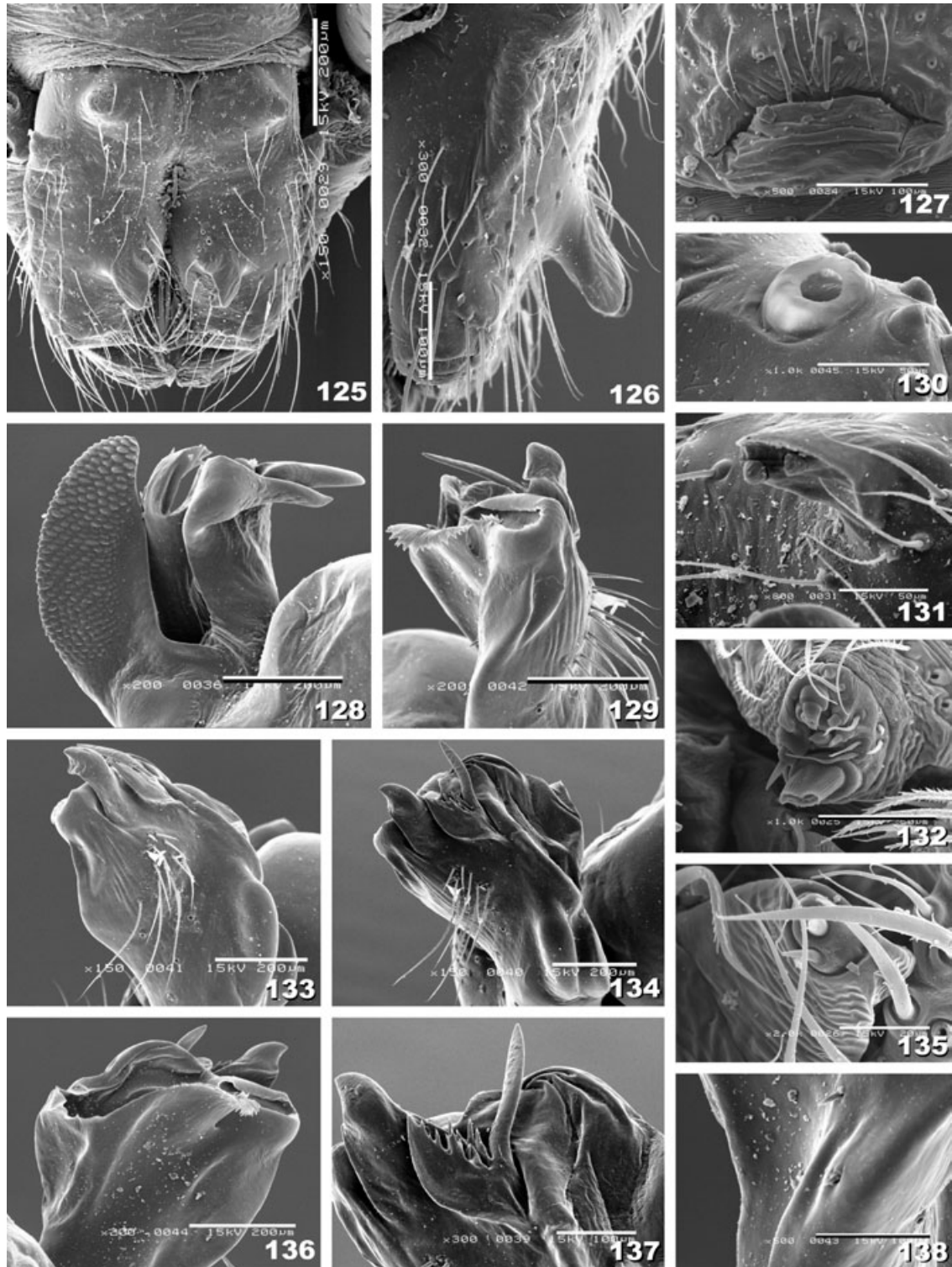


Figures 118–124. *Pholcus roquensis*: 118, male palp, prolateral; 119, male palp, retrolateral; 120, male palp, frontal; 121, epigynum, lateral; 122, epigynum, ventral; 123, male chelicerae, frontal; 124, vulva, dorsal. Scale bars 0.2 mm.

Diagnosis: This species, although very similar to *P. tenerifensis*, is easily distinguished by several characteristics: the shape of its procurus, whose base is nearly as thick as the apical part; the shape of the apical apophysis of the procurus, having irregular in placement and size shorter ventral outgrowths (Figs 134, 137). The shapes of the bulb's appendix and uncus are also different, and are useful traits in identifying this species (Figs 119, 128). The female is dis-

tinguished by the shape of the triangular plate of the epigynum and the morphology of the vulva (Figs 122, 124).

Description: Male: prosoma oval yellowish in colour. Dorsally, the area over the thorax is brownish in colour. Well-marked fovea dividing this brownish pigmentation in two parts. Eyes above an elevated ocular area; eye distribution typical of this genus – AME in



Figures 125–138. *Pholcus roquensis*: 125, male chelicerae, frontal; 126, male chelicerae, lateral; 127, male gonopore, ventral; 128, projections of the bulb, retrolateral; 129, procursus, dorsal; 130, male tarsal organ; 131, distal apophysis of male chelicerae; 132, anterior lateral spinnerets; 133, procursus, prolateral; 134, procursus, ventral; 135, posterior median spinnerets; 136, distal part of the procursus, retrolateral; 137, apical apophysis of the procursus, ventral; 138, small retrolateral teeth of the procursus, retrolateral. Scale bars: 125, 126, 128, 129, 133, 134, 136, 200 µm; 127, 137, 138, 100 µm; 130–132, 135, 20 µm.

the centre of the frontal ocular area, the rest in two lateral triads. All eyes surrounded by dark brown pigmentation. Diameter of ALE two-fold greater than that of AME. Distance between ALE and AME equal to the diameter of ALE. Between the lateral triads the ocular area features a small prominence. Sternum yellowish with darker margins. Chelicerae as in Figures 123, 125, 126. The distal cheliceral apophyses dark brown in colour with typical bristles near the base and two modified hairs at the tip (Fig. 131). Upper margin of proximolateral apophyses does not extend to the base of the frontal prominences. Legs yellowish with femurs appearing darker ventrally. Palps as in Figures 118–120. Distally, procurus wider, with terminal apophysis and a well-developed conical outgrowth (Figs 129, 133–135). Procurus carries two small retrolateral spines (Fig. 138). Between these spines passes a small ridge. Tarsal organ as in Figure 130. Opisthosoma cylindrical with brownish-yellow in colour. Dorsally, darker spots are visible, the first placed centrally in the shape of an inverted V, followed by four oval spots placed in two parallel lines. Ventrally, a darker line over the genital area is visible. Gonopore as in Figure 127. Spinnerets darker at their bases. Spinnerets ultrastructure as in Figures 132, 135.

Female: prosoma coloured as in male except for the smaller size of the brownish pigmented area over the thorax. Ocular area less elevated with the eyes closer together; chelicerae without sexual modifications. Sternum yellowish. Opisthosoma as in male but lighter in tone. Epigynum and vulva as in Figures 121, 122, 124.

Measurements: Male: Prosoma 1.5 long, 1.9 wide. Opisthosoma 3.6 long, 1.7 wide. Total body length 5.1. Leg I, femur 10.3, patella 0.7, tibia 10.4, metatarsus 16.6, tarsus 1.5, total 39.4. Palp femur 0.9, patella 0.4, tibia 1.2, procurus 1.2. Female: Prosoma 1.7 long, 1.9 wide. Opisthosoma 4.5 long, 2.5 wide. Total body length 6.2. Leg I, femur 10.7, patella 0.7, tibia 10.3, metatarsus 16.1, tarsus 2.2, total 40.0.

Distribution: *P. roquensis* is only known to inhabit the Cueva de Los Roques cave on Tenerife Island (Fig. 276).

Natural history: *P. roquensis* lives under large stones in the entrance of Cueva de Los Roques. This cave is situated in the Cañadas del Teide on the slopes of the Teide volcano at an altitude over 2200 m. The surrounding area has low vegetation cover with dominating small subalpine xerophytic shrubs. As in *P. mascaensis*, *P. roquensis* prefers to build its webs near the ground.

Comments: *P. roquensis* is a member of the Tenerifean *Pholcus* endemic complex. While this species has only

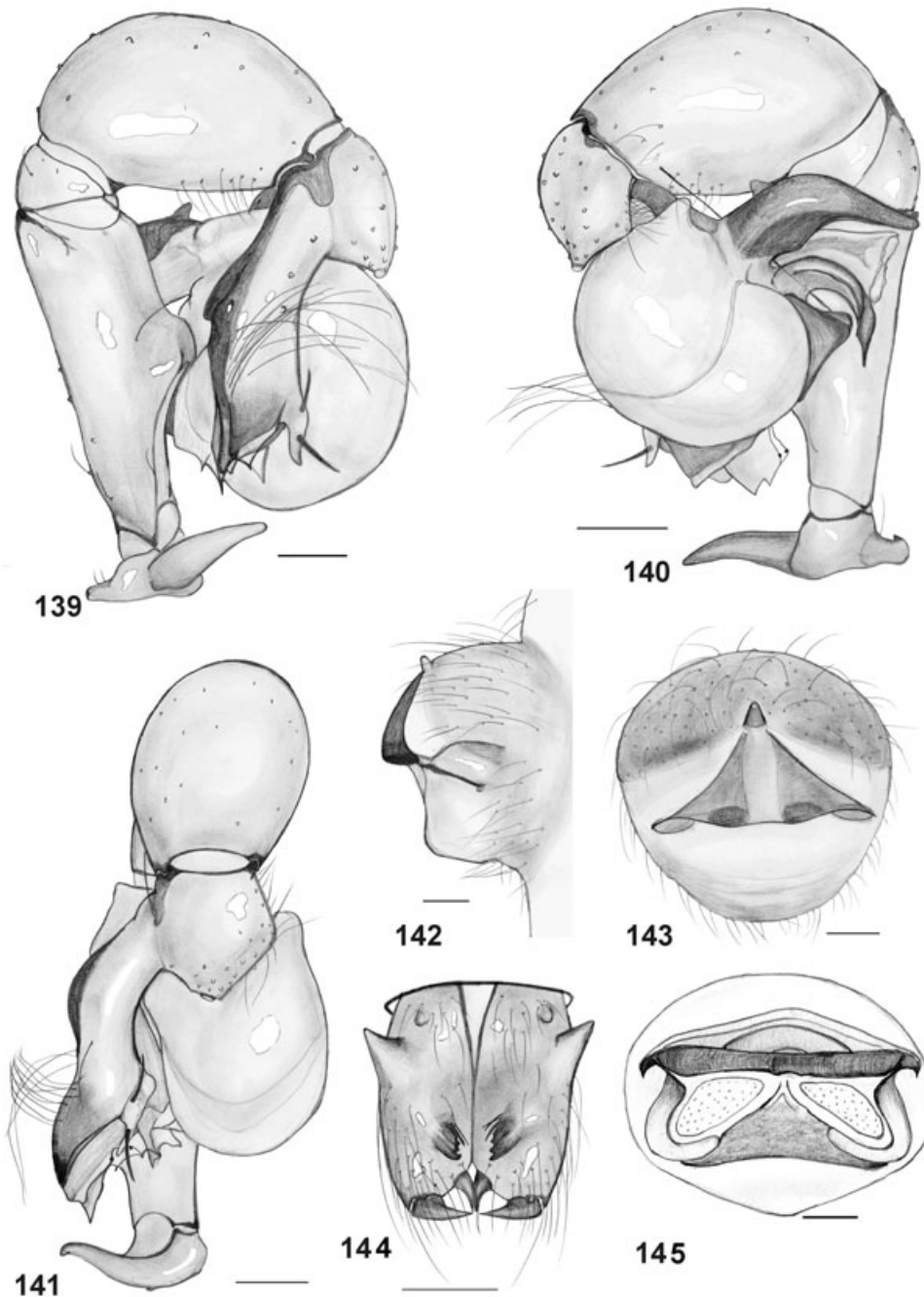
been detected in the Cueva de Las Roques cave, it does not possess troglomorphic characteristics and it is possible that *P. roquensis*' actual distribution is wider. To confirm this, further sampling in similar areas is required.

PHOLCUS ORNATUS BÖESENBERG, 1895
(FIGS 139–159)

Pholcus ornatus Bösenberg, 1895: 12, fig. 14; Schmidt, 1977: 55, fig. 2; Wunderlich, 1980: 226, figs 23–30; Wunderlich, 1987: 82, figs 128–141, 701; Wunderlich, 1992: 321, fig. 169; Campos & Wunderlich, 1995: 294, fig. 3.

Material examined: 2 mm, 1 f, 2 juv., from Baranco de Agua, La Palma, Canary Islands, Spain, 14.viii.2003, Dimitrov, Anton & Txasko (CCRUB 4669-173, 4610-173, 4532-170); 2 mm, 2 ff, 1 juv., Cueva de San Marcos, Tenerife, Canary Islands, 21.ii.2002, Dimitrov & Ribera (CCRUB 4570-170, 4675-173, 4609-173, 4671-173); 1 m, 2 ff, 1 juv., Tierra de Trigo, Tenerife, 23.ii.2002, Dimitrov & De Mas (CCRUB 4571-172, 4670-173); 1 m, 2 ff, Los Llanos, Tenerife, 11.iii.2002, Dimitrov, Ribera & De Mas (CCRUB 4572-172, 4654-173, 4653-173); 3 mm, 2 ff, Finca Kraft, Tenerife, 28.viii.2003, Txasko (CCRUB 4611-173, 4592-172); 3 ff, 29 juv, from Hermigua, La Gomera, Canary Islands, P. Oromi (CCRUB 4511-170-4512-170); 2 mm, 3 ff, Hermigua, La Gomera, Canary Islands P. Oromi (ULL AÑ-2157); 1 m, 1 juv., Barranco de los Gallegos, La Palma, Canary Islands, 18.viii.2003, Dimitrov & Txasko (CCRUB 4531-170); 1 juv., Los Franceses, La Palma, 13.viii.2003, Dimitrov, Antón & Txasko (CCRUB 4608-173); 1 f, San Bartolomé, Tenerife, 20.viii.2003, Txasko (CCRUB 4640-173), 1 f, San Benito, Tenerife, 27.viii.2003, Dimitrov & Txasko (CCRUB 4655-173); 1 f, San Isidro, Tenerife, 25.i.2003, Txasko (CCRUB 4641-173); and three specimens in the ULL (ULL T-CV-30, T-CV-33, T-SM-24).

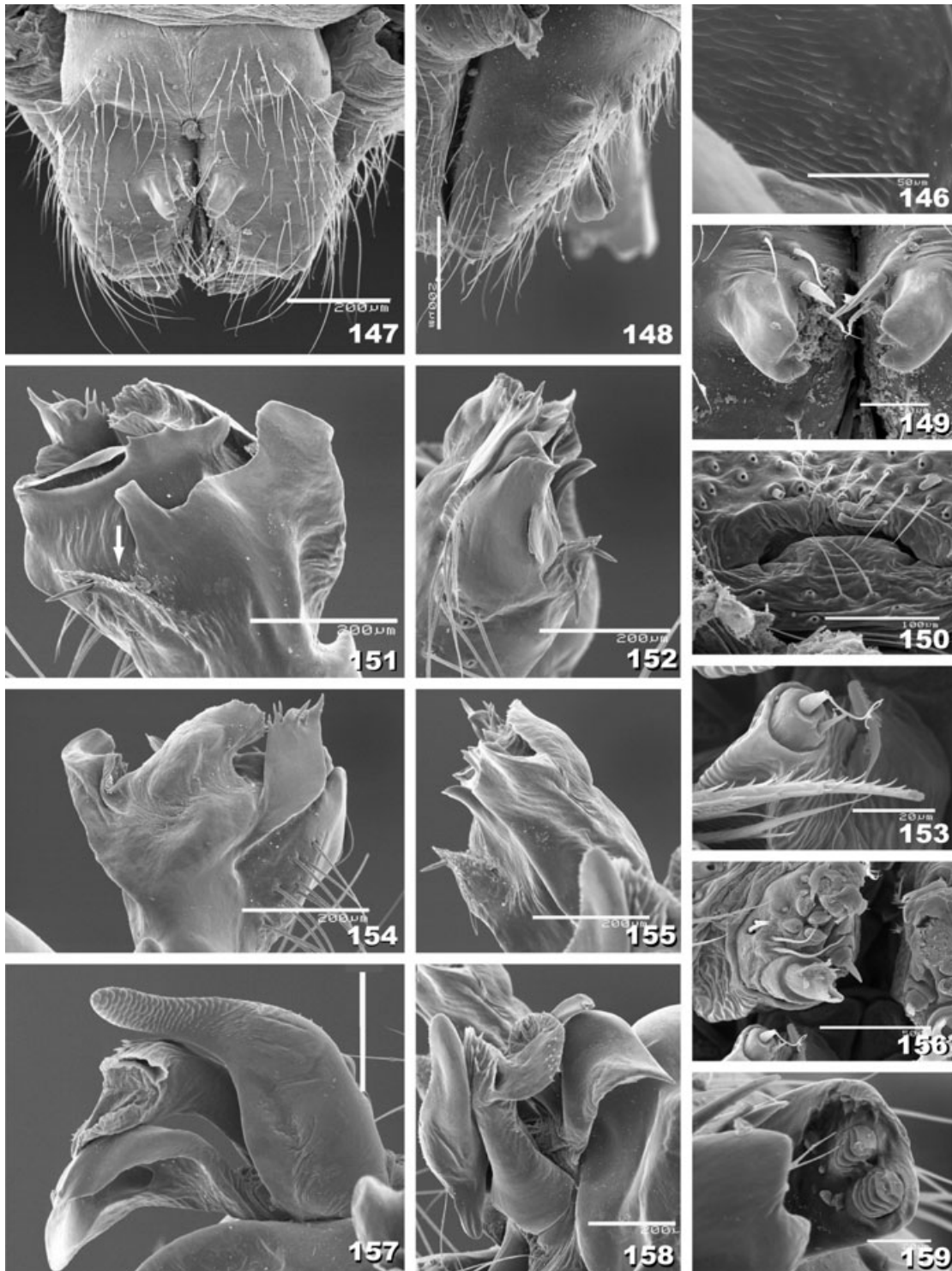
Diagnosis: *P. ornatus*, *P. corcho* and *P. calcar* comprise a group of species that, morphologically, are very similar and difficult to distinguish individually. *P. ornatus* can be identified by the following characteristics: the procurus' sharpened (Fig. 152) and relatively tiny apical apophysis (viewed prolaterally); the larger inflatable area of the procurus, containing two small dark teeth (Fig. 140); the shape of the uncus (Figs 140, 157); the shape of the appendix of the genital bulb (Fig. 140, 157, 158); and both the shape of the procurus' dorsal apophysis, as well as the positioning of its dorsal spines. Females are distinguished by the shape of the triangular plate of the epigynum (Fig. 143) and the morphology of the vulva (Fig. 145).



Figures 139–145. *Pholcus ornatus*: 139, male palp, prolateral; 140, male palp, retrolateral; 141, male palp, frontal; 142, epigynum, lateral; 143, epigynum, ventral; 144, male chelicerae, frontal; 145, vulva, dorsal. Scale bars 0.2 mm.

Description: Male: prosoma oval, yellowish in colour, over the dorsal region with brownish pigmentation typical of this genus. The dorsal marking in this species starts at the dorsal region of the ocular elevation and extends over the thorax. Fovea well marked with darker pigmentation. The dorsal mark divided in four parts. Eyes on elevated ocular area. Distance between

AME and ALE smaller than the diameter of ALE; separation between AME less than their diameter; diameter of AME half the diameter of ALE. All eyes surrounded by brownish pigmentation. Just beside the lateral triads are located two groups of long hairs forming longitudinal lines. Sternum yellowish with brownish margins. Chelicerae yellowish with dark



Figures 146–159. *Pholcus ornatus*: 146, granulation of the appendix of the bulb; 147, male chelicerae, frontal; 148, male chelicerae, lateral; 149, distal apophyses of male chelicerae, frontal; 150, male gonopore, ventral (Dimitrov & Ribera, 2005a); 151, procurrus, retrolateral, arrow points the small teeth near the base of the dorsal apophysis of the procurrus; 152, procurrus, prolateral; 153, posterior median spinnerets; 154, procurrus, ventral; 155, dorsal apophysis of procurrus, retrolateral; 156, anterior lateral spinnerets; 157, projections of the bulb, retrolateral; 158, apices of bulb projections; 159, male distal cheliceral apophysis, retrolateral. Scale bars: 147, 148, 151, 152, 154, 155, 158, 200 µm; 149, 146, 50 µm; 150, 100 µm; 153, 156, 159, 20 µm.

distal cheliceral apophyses and bristles very close to their base. Distal apophyses with two modified hairs at the tip and a very short dorsal outgrowth (Figs 149, 159). Upper margin of proximolateral apophysis ends at the base of the frontal prominence. Chelicerae as in Figures 144, 147, 148. Palps as in Figures 139–141. Although in some specimens the procursus may have a third dorsal spine (Wunderlich, 1992), the two-spine procursus is more common. The procursus' apical apophysis possesses a few short, sharpened outgrowths (Fig. 154). Apically, procursus has a very complex structure with numerous very short spines near the base of the dorsal apophysis (Figs 151, 152, 154, 155). Opisthosoma yellowish with cylindrical shape. Dorsally, eight darker spots are grouped in two longitudinal lines. Ventrally, a darker line is visible over the genital area. Gonopore as in Figure 150. Spinnerets as in Figures 153, 156.

Female: prosoma as in male but with a less elevated ocular area. AME closer to the lateral triads than in male. Size of eyes in the triads smaller than in male. Diameter of AME one-third the diameter of ALE. Darker zone around eyes smaller. Chelicerae without apophyses. Opisthosoma with clearer pigmentation than in the male. Ventrally, epigynum slightly elevated, the triangular plate dark and strongly sclerotized. Epigynum and vulva as in Figures 142, 143, 145.

Measurements: Male: Prosoma 1.4 long, 1.9 wide; opisthosoma 3.9 long, 2.2 wide. Total body length 5.8. Leg I, femur 11.0, patella 0.6, tibia 11.7, metatarsus 19.1, tarsus 2.4, total 44.8. Palp, femur 0.7, patella 0.2, tibia 0.8, procursus 0.9. Female: Prosoma 1.6 long, 1.9 wide; opisthosoma 4.1 long, 2.5 wide. Total body length 5.7. Leg I, femur 10.5, patella 0.5, tibia 10.7, metatarsus 16.6, tarsus 2.3, total 40.6.

Distribution: *P. ornatus* has the broadest distribution in the Canary Islands compared with the rest of the Canarian *Pholcus* species, and is spread throughout the entire archipelago (Fig. 276) except for the two easternmost islands – Fuerteventura and Lanzarote. *P. ornatus* is well known for its synanthropic tendencies (Campos & Wunderlich, 1995). It is possible that accidental transport by humans helped spread this species.

Natural history: *P. ornatus* is very common and easy to find in houses or other human constructions. It is also found in cavities on the walls of natural gorges like Barranco de Agua or near entrances of caves. It builds its web on ceilings of human constructions or natural cavities, near the ground under stones or other bulky materials (tree trunks, metal pieces, carton boxes, etc.) and in some cases on nearly vertical surfaces in narrow and humid places.

Comments: Despite *P. ornatus*' wide distribution in the archipelago, it has morphological characters common to species endemic to Gran Canaria. This suggests that *P. ornatus* most likely has its origins in Gran Canaria, having spread to the other islands by human transport.

Unfortunately we could not examine the type of *P. ornatus* but the numerous illustrations available in the literature (especially those in Wunderlich, 1987) are adequate to determine this species unequivocally.

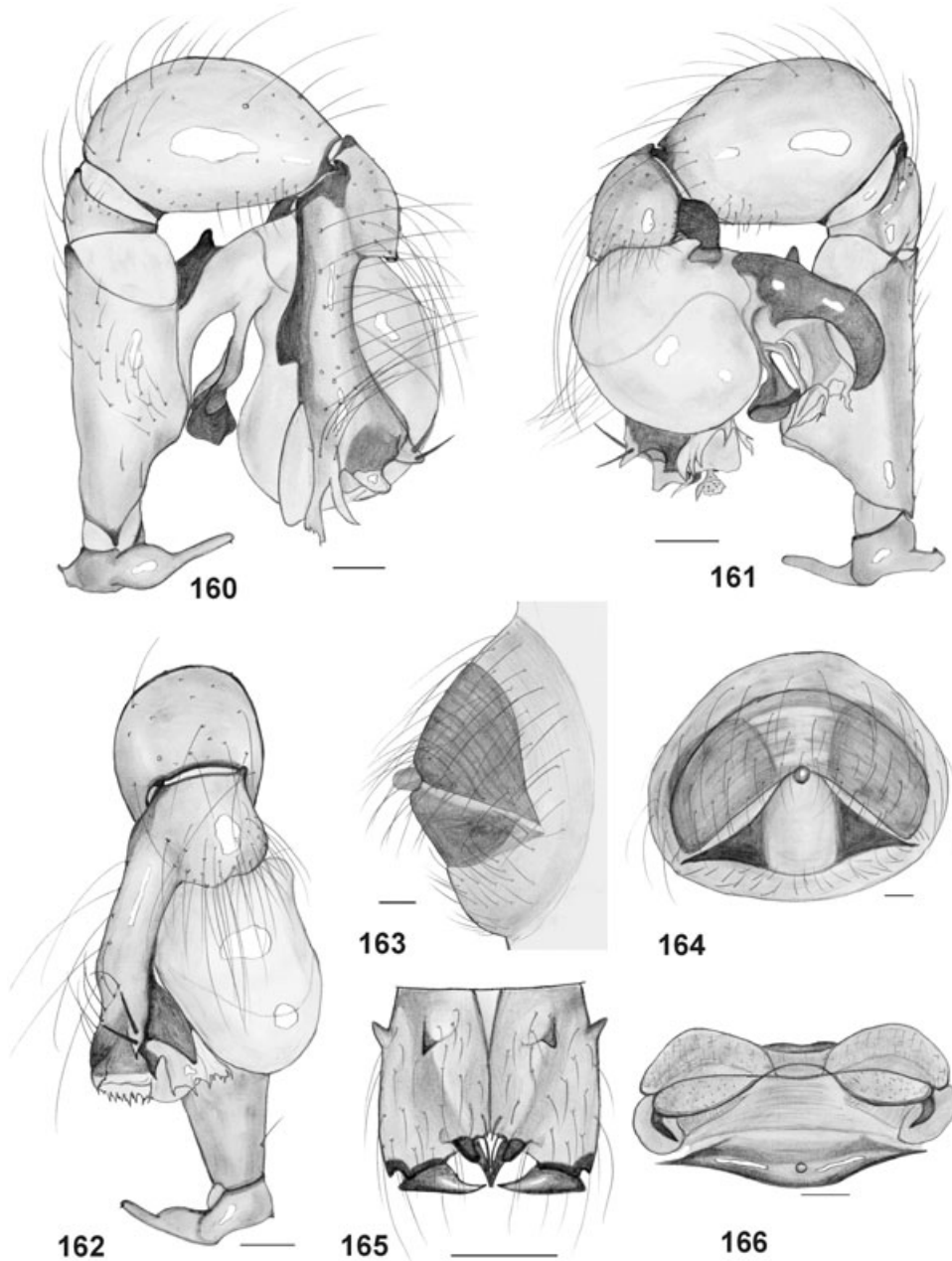
PHOLCUS MULTIDENTATUS WUNDERLICH, 1987
(FIGS 160–176)

Pholcus multidentatus Wunderlich, 1987: 84, figs 150–156; Wunderlich, 1992: 321, figs 167, 168.

Material examined: 1 m, holotype, from Barranco de Fataga, Gran Canaria, Canary Islands, Spain, Wunderlich (SMF 35541); 1 m, 2 ff, paratypes, same data as for holotype (SMF 35542); 2 mm, 3 ff, 1 juv., Gia, Gran Canaria, 5 May 2004, Dimitrov & Txasko (4649-173, 4650-173); 4 mm, 4 ff, Tamadaba, Gran Canaria (CCRUB 4612-173, 4551-171, 4550-171); 1 m, from Cuevas Caidas, Gran Canaria 9.viii.2002, De Mas & Delgado (CCRUB 4613-173); 3 mm, from El Juncal, Gran Canaria, 11.viii.2002, De Mas & Delgado (CCRUB 4552-171); 2 mm, from Pinar de Pajonales, Gran Canaria, 11.viii.2002, De Mas & Delgado (CCRUB 4553-171); 1 m, 1 f, from Punto de Granja, Gran Canaria, 5.viii.2002, De Mas & Delgado (CCRUB 4656-173).

Diagnosis: *P. multidentatus* differs from similar congeners (*P. helenae* and *P. calcar*) in the procursus' bifurcated, membranous apical apophyses, which feature small outgrowths (Fig. 175), and the shape of the uncus, which is arched without a clear inflection point (Figs 161, 171). The shape of the appendix of the bulb as well as the general morphology of the procursus is also different. The females are distinguished by the shape of the triangular plate of the epigynum (Fig. 164) and the morphology of the vulva (Fig. 166).

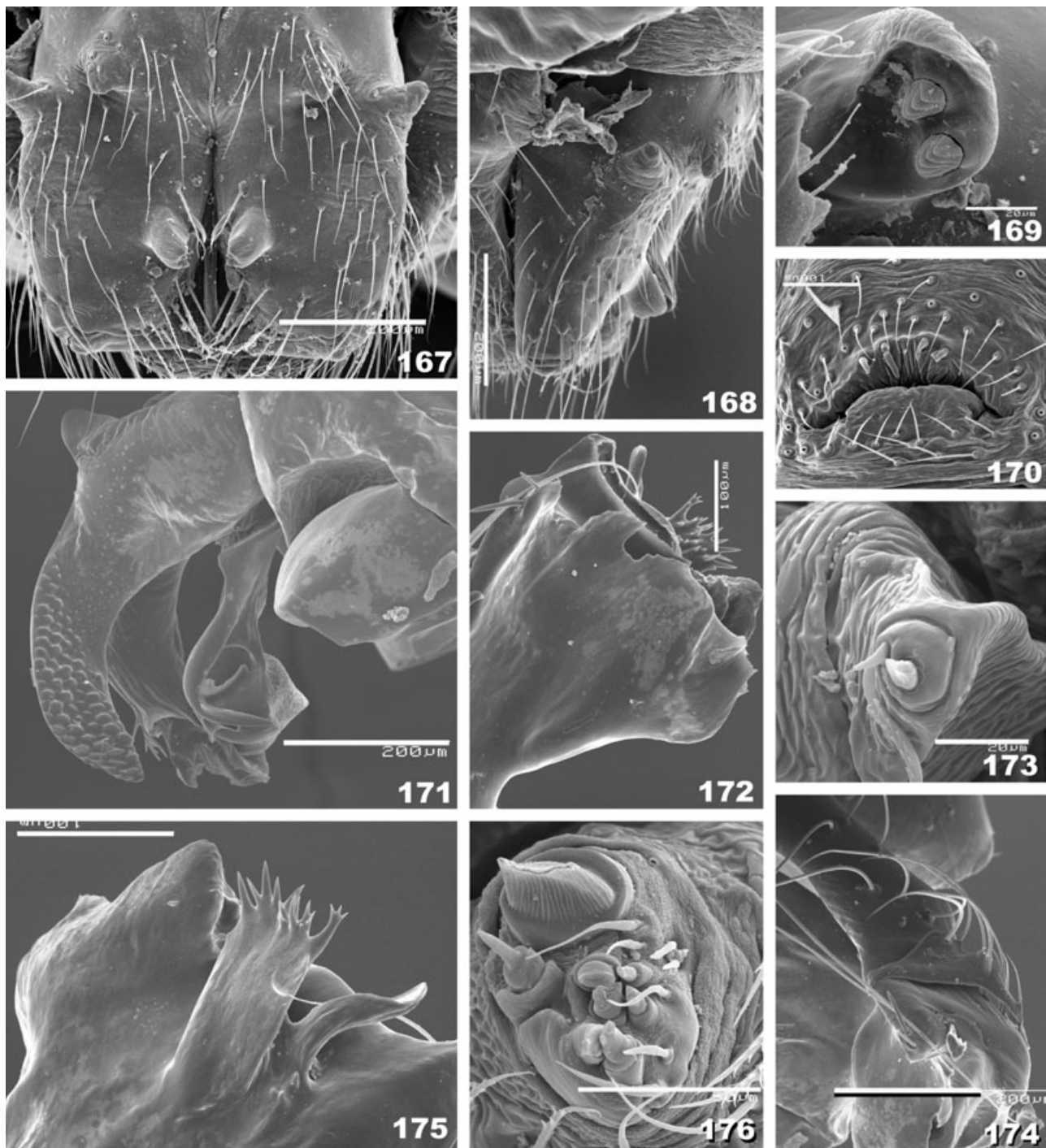
Description: Male: prosoma yellowish. Dorsally, two brownish markings are visible over the thorax, each marking subdivided into two parts with irregular margins. Fovea yellowish, centrally between the two markings. Eyes over an elevated ocular area. ALE, PLE and PME grouped into two lateral triads. Distance between AME smaller than their diameter. Diameter of ALE two-fold greater than that of AME, distance between them slightly larger than ALE diameter. All eyes surrounded by dark pigmented area. Sternum brownish-yellow with darker margins. Chelicerae (Figs 165, 167, 168) with yellow–brownish



Figures 160–166. *Pholcus multidentatus*: 160, male palp, prolateral; 161, male palp, retrolateral; 162, male palp, frontal; 163, epigynum, lateral; 164, epigynum, ventral; 165, male chelicerae, frontal; 166, vulva, dorsal. Scale bars 0.2 mm.

colour and with darker distal cheliceral apophyses situated very close to the cheliceral tooth. Distal apophyses with two modified hairs and very short conical outgrowth (Fig. 169). Proximolateral apophyses with very narrow base and upper margin extending over the base of the frontal prominences. Frontal prominences with dark-coloured outgrowths. Palp as in Figures 160–162. In this species the procurus features two dorsal spines (Figs 172, 174). Apical apophy-

sis of the procurus bifurcated with one shorter dorsal part and a longer ventral part (Fig. 175). Lamellar ventral area with numerous short and sharpened outgrowths. Legs yellowish, darker than prosoma. Opisthosoma cylindrical yellowish in colour. Dorsally, eight brownish spots grouped in two longitudinal lines are visible. Ventrally, a small darker marking over the genital zone is visible. Gonopore as in Figure 170. Spinnerets ultrastructure as in Figures 173, 176;



Figures 167–176. *Pholcus multidentatus*: 167, male chelicerae, frontal; 168, male chelicerae, lateral; 169, distal apophysis of male chelicerae; 170, male gonopore, ventral; 171, projections of the bulb, retrolateral; 172, procurus, retrolateral; 173, posterior median spinnerets; 174, dorsal apophysis of the procurus, dorsal; 175, apical apophysis of the procurus, ventral; 176, anterior lateral spinnerets. Scale bars: 167, 168, 171, 174, 200 μm ; 170, 172, 175, 100 μm ; 169, 173, 20 μm ; 176, 50 μm .

darker margins visible when observed in alcohol-preserved specimens.

Female: prosoma as in male but with fewer hairs. Ocular area less elevated and eyes closer together.

Distance between AME and ALE half the diameter of ALE. Chelicerae without apophyses. Shape and colour of opisthosoma as in male. Epigynum elevated with darker pigmentation. Triangular plate heavily sclero-

tized and dark brown in colour. Epigynum as in Figures 163, 164. Vulva as in Figure 166.

Measurements: Male: Prosoma 1.2 long, 1.5 wide; opisthosoma 4.1 long, 1.5 wide. Total body length 5.3. Leg I, femur 11.0, patella 0.7, tibia 12.7, metatarsus 21.1, tarsus 2.2, total 47.7. Palp: femur 0.8, patella 0.3, tibia 0.8, procurus 0.9. Female: Prosoma 1.5 long, 1.9 wide; opisthosoma 4.4 long, 2.4 wide. Total body length 5.9. Leg I, femur 11.7, patella 0.7, tibia 11.9, metatarsus 18.9, tarsus 1.5, total 44.7.

Distribution: This species is endemic to Gran Canaria where it is known to inhabit many different localities, including Barranco de Fataga, Barranco de Tirajana, Barranco de Tocadamon, Barranco de El Risco, Ayaguas and Santa Lucia (Fig. 276).

Natural history: This species lives in natural cavities, very common on walls of the heavily eroded Gran Canarian ravines. It can be found in a wide range of altitudes starting from 300 m up to over 1000 m. In the low limit of its distribution *P. multidentatus* was collected in humid locations, often near palm trees or small gardens which were artificially watered. The specimens found at high altitude live in pine forest close to small temporal ponds of water.

PHOLCUS HELENAE WUNDERLICH, 1987
(FIGS 177–194)

Pholcus helenae Wunderlich, 1987: 85, figs 165–173; Wunderlich (1995): 419, figs 35, 36.

Material examined: 1 m, holotype, from Barranco Suage, Gran Canaria, Canary Islands, Spain (SMF 35536); 2 mm, 9 ff, 2 juv., from Barranco de los Tilos, Gran Canaria, 10.viii.2002, De Mas & Delgado (CCRUB 4515-170, 4516-170, 4518-170, 4623-173, 4657-173); 1 m, 4 ff, from Barranco Oscuro, Gran Canaria, 14.xii.2003, H. Lopez (ULL AÑ-1600); 1 f and 1 juv., from Barranco Oscuro, Gran Canaria, 14.xii.2003, H. Lopez (ULL AÑ-2148); 1 m, 1 f, 1 juv., from Embalse Perez and 2 ff from Fontanales, Gran Canaria (CCRUB 4519-170, 4624-173, 4517-170).

Diagnosis: Distinguished from similar congeners (*P. corcho* and *P. multidentatus*) by the following characteristics: the more chitinized apical apophyses of the procurus featuring only two very short outgrowths (Fig. 194); the shape of the appendix of the male bulb (Figs 178, 192); the procurus' smaller dorsal apophysis and the positioning of its dorsal spines (Figs 177, 189, 191); the general morphology of the procurus (Figs 177, 179, 191) and the longer and more curved trochanteral apophysis. The female is easily distinguished from the rest of the Canarian *Pholcus* species

by the high triangular plate of the epigynum (Fig. 181) and the morphology of the vulva.

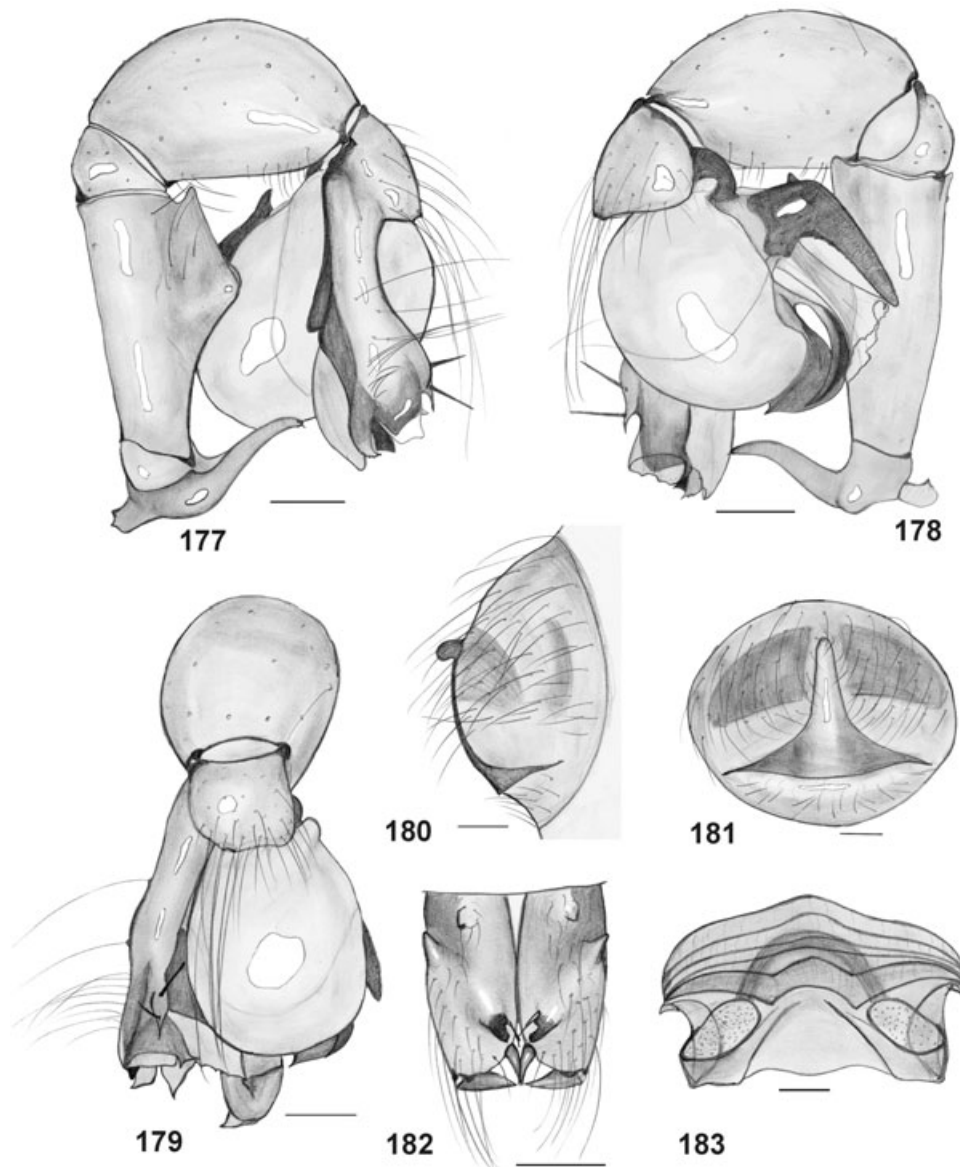
Description: Male: prosoma oval with a pale, yellowish colour. Dorsally, a brownish marking visible over the thorax. Ocular area elevated, the eyes surrounded by a zone of brownish pigmentation. In the AME zone, this pigmentation has the shape of a transversal band. ALE diameter three-fold greater than that of AME. Distance between AME slightly larger than their diameter, and the distance to ALE nearly twice the diameter of ALE. Sternum yellowish with brownish margins. A lighter area is visible directly in front of each coxal joint. Chelicerae (Figs 182, 184, 185) brownish, featuring darker distal apophyses with bristles at their base. Distal apophyses possess two modified hairs (Fig. 186). Upper margin of proximolateral apophyses extends to the base of the frontal prominences, which are marked by short darker outgrowths. Palps as in Figures 177–179. Procurus (Figs 189, 191) two dorsal spines. Dorsal apophysis of the procurus with numerous small spines (Fig. 187), and the apical apophysis with two very short outgrowths (Figs 190, 194). Embolus features a wider apical area with small teeth (Fig. 193). Opisthosoma cylindrical with brownish-yellow colouring. Dorsally with eight darker spots divided in two longitudinal parallel rows of four spots each. Ventrally, opisthosoma appears lighter in colour. Genital zone darker. Spinnerets with brownish spots.

Female: prosoma as in male but with a less elevated ocular area. AME closer to the lateral triads, with the distance between them and ALE equal to the ALE diameter. Sternum lighter than in male. Shape and colouring of opisthosoma as in male. Ventrally, the triangular plate of the epigynum appears very high and the genital area elevated. Epigynum and vulva as in Figures 180, 181, 183. Chelicerae without sexual modifications.

Measurements: Male: Prosoma 1.5 long, 1.7 wide. Opisthosoma 4.2 long, 1.9 wide. Total body length 5.7. Leg I femur 12.2, patella 0.8, tibia 12.7, metatarsus 21.5, tarsus 2.4, total 49.6. Palp femur 0.7, patella 0.2, tibia 1.0, procurus 0.9. Female: Prosoma 1.5 long, 1.9 wide. Opisthosoma 4.8 long, 1.7 wide. Total body length 6.3. Leg I femur 10.2, patella 0.7, tibia 11.2, metatarsus 21.0, tarsus 2.5, total 45.6.

Distribution: This species is endemic to Gran Canaria where it is known to inhabit such localities as Barranco de los Tilos, Embalse Perez and Fontanales (Fig. 276).

Natural history: *P. helenae* lives in the last remnants of laurisilva forest on the island of Gran Canaria where it is found in natural cavities in humid places with limited sunlight.



Figures 177–183. *Pholcus helenae*: 177, male palp, prolateral; 178, male palp, retrolateral; 179, male palp, frontal; 180, epigynum, lateral; 181, epigynum, ventral; 182, male chelicerae, frontal; 183, vulva, dorsal. Scale bars 0.2 mm.

PHOLCUS CALCAR WUNDERLICH, 1987 (FIGS 195–211)

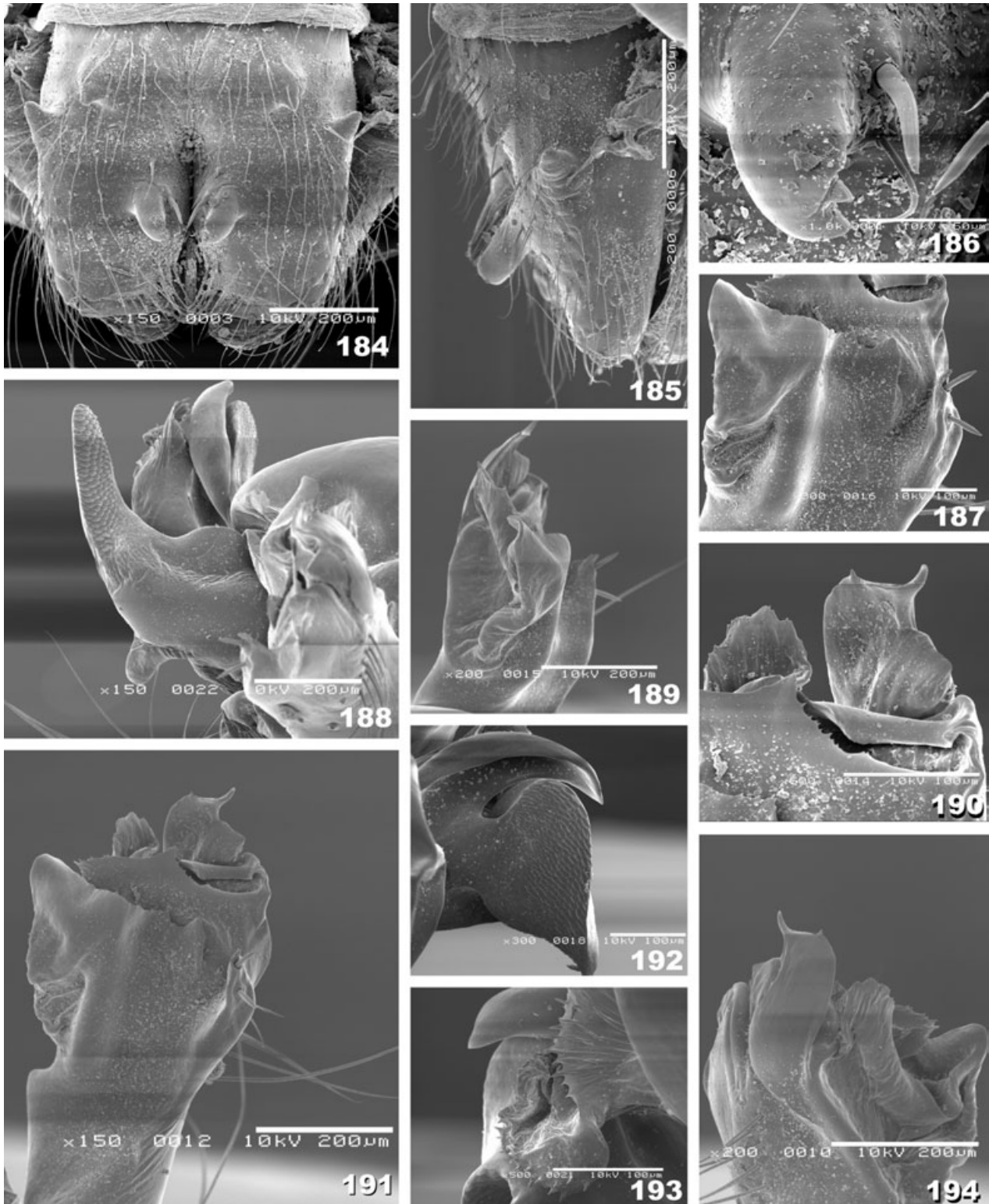
Pholcus calcar Wunderlich, 1987: 84, figs 157–164.

Material examined: 1 m, 2 ff, 1 juv., Tamadaba (recreation zone), Gran Canaria, Canary Islands, Spain, 6.v.2004, Dimitrov & Txasko (CCRUB 4583-172, 4584-172).

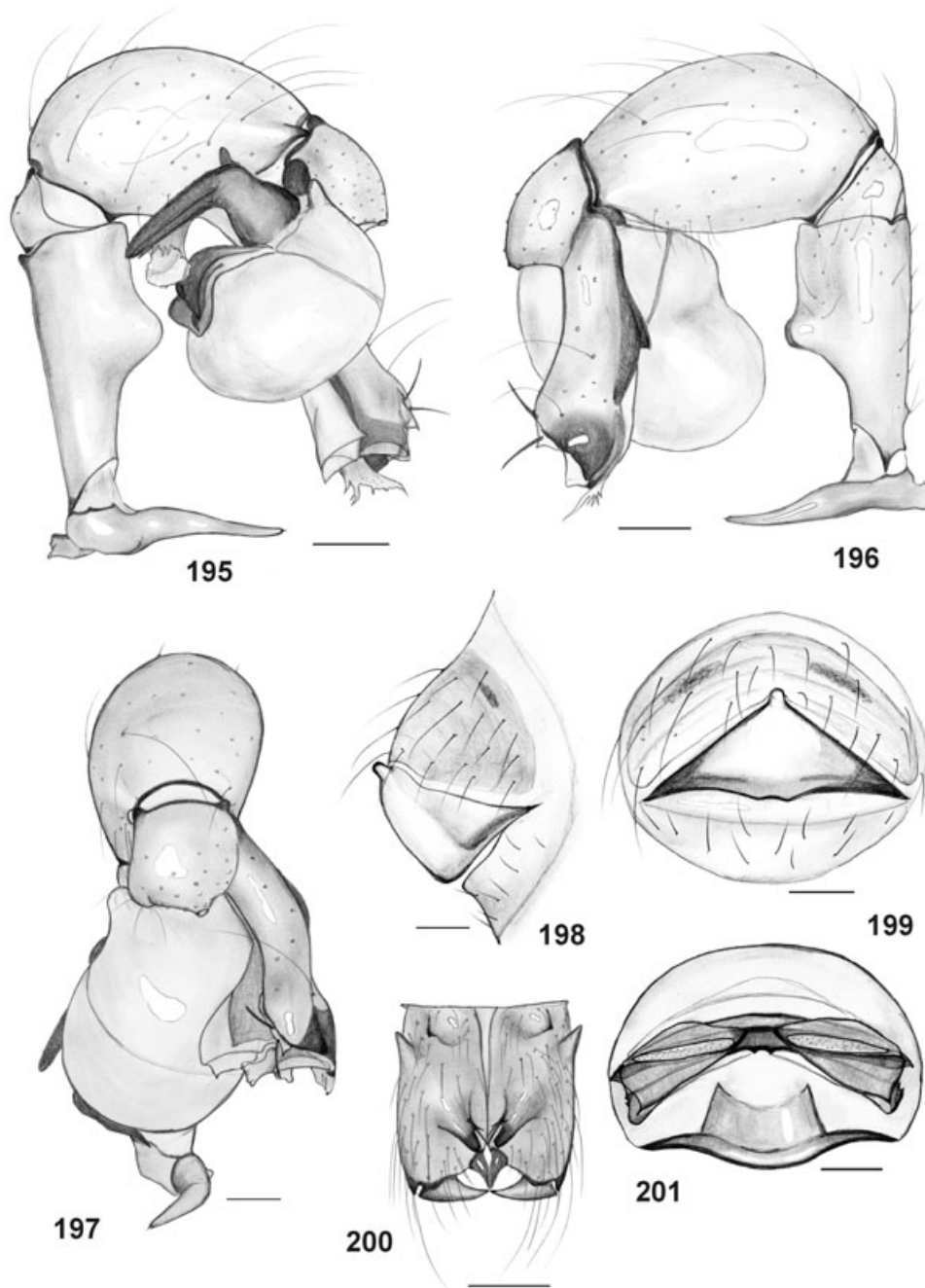
Diagnosis: Very similar to *P. corcho* and *P. ornatus*, but distinguished by the following characteristics: well-developed apical apophysis of the procurus, which features irregular margins with small outgrowths (Fig. 211); the shape of the appendix of the

genital bulb (Fig. 119); the longer trochanteral apophysis and the shape of the uncus, which forms an angle of nearly 90° at its inflection point (Figs 195, 210). The females are distinguished by the shape of the triangular plate of the epigynum (Fig. 199) and the morphology of the vulva (Fig. 201).

Description: Male: prosoma rounded with yellowish colouring. Dorsally, a brownish colouring extends over the thorax. Well-marked and yellowish fovea. Elevated ocular area with darker pigmentation around the eyes. Distance between AME and ALE slightly larger than the ALE diameter. Diameter of



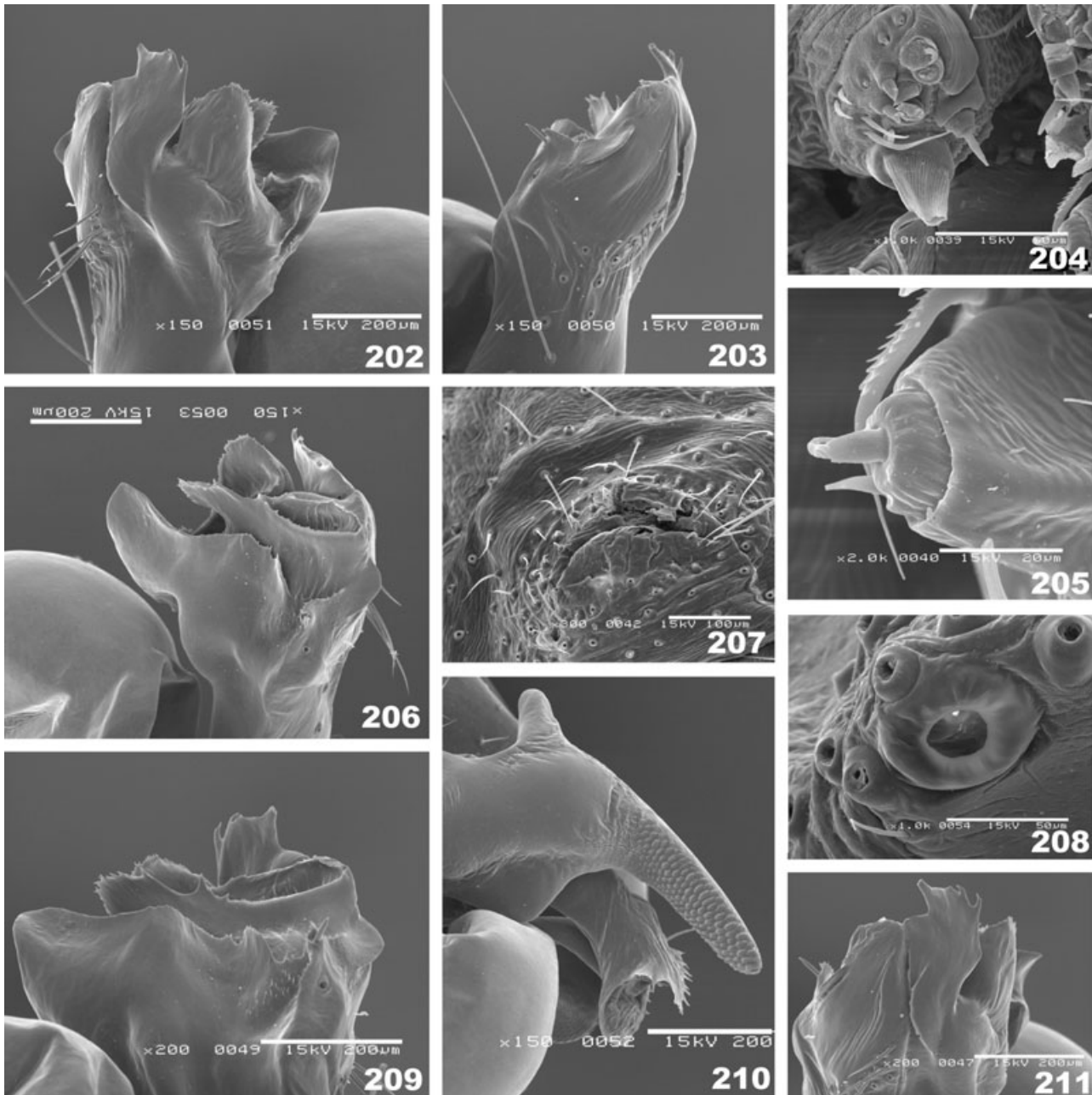
Figures 184–194. *Pholcus helenae*: 184, male chelicerae, frontal; 185, male chelicerae, lateral; 186, distal apophysis of male chelicerae, frontal; 187, dorsal apophysis of procurus, dorso-retrolateral; 188, projections of the bulb, retrolateral; 189, procurus, retrolateral; 190, apex of the procurus, retrolateral; 191, procurus, retrolateral; 192, appendix of the male bulb, prolateral; 193, apex of the embolus, retrolateral; 194, apical apophysis of the procurus, ventral. Scale bars: 184, 189, 191, 194, 200 μm ; 187, 190, 192, 193, 100 μm ; 186, 50 μm .



Figures 195–201. *Pholcus calcar*: 195, male palp, prolateral; 196, male palp, retrolateral; 197, male palp, frontal; 198, epigynum, lateral; 199, epigynum, ventral; 200, male chelicerae, frontal; 201, vulva, dorsal. Scale bars 0.2 mm.

AME half the diameter of ALE. Yellowish-brown sternum with darker margins. Chelicerae yellowish with darker distal cheliceral apophyses. Distal apophyses have two modified hairs. Upper margin of proximolateral apophysis (proximal teeth) extends past the base of frontal prominence. Frontal prominences with darker outgrowths. Chelicerae as in Figure 200. Palp as in Figures 195–197. Procrurus

(Figs 202, 203, 206, 209) with two long dorsal spines placed on a small dorsal apophysis. Dorsal apophysis with short, sharpened outgrowths near its base. Apical apophysis of the procurus features a couple of short outgrowths, close to its ventral extreme (Fig. 211). Tarsal organ as in Figure 208. Opisthosoma cylindrical with brownish-grey colouring. Dorsally, eight darker spots are divided between two



Figures 202–211. *Pholcus calcar*: 202, procurus, ventral; 203, procurus, proterolateral; 204, anterior lateral spinnerets; 205, posterior median spinnerets; 206, procurus, dorso-retrolateral; 207, male gonopore, ventral; 208, male tarsal organ; 209, dorsal apophysis of the procurus, dorsal; 210, projections of the bulb, retrolateral; 211, apical apophysis of the procurus, ventral. Scale bars: 202, 203, 206, 207, 209–211, 200 µm; 204, 208, 50 µm; 207, 100 µm; 205, 20 µm.

longitudinal lines, the first three spots in each line oval, the last rounded and smaller. Ventrally, two small brownish spots appear above a slightly elevated genital zone. Gonopore as in Figure 207. Spinnerets as in Figures 204, 205.

Female: prosoma as in male but ocular elevation less pronounced. Darker colouring over thorax

reduced, and the hairs on the dorsal side of the ocular elevation much shorter. Chelicerae darker than the prosoma with brownish colouring but without apophyses. Sternum as in male. Opisthosoma cylindrical with colouring and dorsal spots as in male. Ventrally triangular plate of the epigynum with dark brown colouring. The epigynum area above the plate also dark

brown but lighter in tone. Epigynum and vulva as in Figures 198, 199, 201.

Measurements: Male: Prosoma 1.1 long, 1.2 wide. Opisthosoma 3.9 long, 1.5 wide. Total body length 5.0. Leg I, femur 10.3, patella 0.7, tibia 11.7, metatarsus 19.1, tarsus 2.9, total 44.7. Palp, femur 0.9, patella 0.2, tibia 1.0, procurus 1.0. Female: Prosoma 1.5 long, 1.7 wide. Opisthosoma 3.9 long, 1.5 wide. Total body length 5.4. Leg I, femur 11.7, patella 0.7, tibia 11.9, metatarsus 21.5, tarsus 2.2, total 48.0.

Distribution: This species is endemic to Gran Canaria (Fig. 276).

Natural history: The only locality where we could find *P. calcar* was the pine forest of the natural park of Tamadaba at altitudes above 900 m. It lives in natural cavities on the hillsides in shady and humid areas.

Comments: Wunderlich (1987) indicates that the type material of this species is in the collection of SMF but it does not occur in the catalogue and we could not find it. The illustrations in the original description proved to be sufficient to determine these specimens as conspecific with *P. calcar*.

PHOLCUS CORCHO WUNDERLICH, 1987
(FIGS 212–229)

Pholcus corcho Wunderlich, 1987: 83, figs 142–149(a); Campos & Wunderlich, 1995: 294, figs 1, 2.

Material examined: 1 m, holotype, from Cuevas del Corcho, Gran Canaria, Canary Islands, Spain (SMF 35561); 1 f, paratype, same data as for holotype (SMF 35562); 2 mm, 1 f, Las Cumbres, Gran Canaria, 12.viii.2002, De Mas & Delgado (CCRUB 4585-172).

Diagnosis: Distinguished from similar Canarian *Pholcus* species (*P. calcar* and *P. helenae*) by the following characteristics: short and curved apical apophysis of the procurus; the thinner apical part of the procurus (Figs 212, 224); the shapes of the appendix of the bulb and the uncus (Figs 213, 228). The females are distinguished by the following traits: the shape of the triangular plate of the epigynum (Fig. 216); the semi-circular darker colouring over the triangular plate (in fact, parts of the vulva, which are visible by transparency) and the morphology of the vulva (Fig. 218).

Description: Male: prosoma and brownish-yellow in colour. Dorsally, *P. corcho* exhibits the brownish pigmentation typical of Canarian *Pholcus* species. Well-marked fovea. Ocular area with two lateral triads over short cylindrical outgrowths. AME frontally in the centre of the ocular elevation. Eyes surrounded by a darker coloured area. Diameter of AME one-third the

diameter of ALE. Distance between AME and ALE similar to the diameter of ALE. Distance between AME slightly larger than their diameter. Sternum coloured like the rest of prosoma with darker margins. Chelicerae (Figs 217, 219, 220) with short, thick, dark brown, distal cheliceral apophyses. Distal apophyses with two modified hairs at the tip and a small conical outgrowth (Fig. 221). Apex of proximolateral apophyses extends to the base of the frontal prominences. Frontal prominences with dark brown outgrowths. Palp as in Figures 212–214. Procurus (Figs 224, 227) with two dorsal spines and numerous short, sharpened outgrowths at the base of the dorsal apophysis. Apical apophysis of the procurus with very few and very short outgrowths (Fig. 223). Tarsal organ as in Figure 222. Opisthosoma cylindrical with brownish-yellow colouring. Dorsally, two longitudinal lines of darker spots are visible, four spots to each line. Ventrally, pigmentation slightly lighter with one transversal darker band visible over the genital area. Gonopore as in Figure 225. Spinnerets as in Figures 226, 229.

Female: prosoma as in male but ocular area less elevated and with much shorter outgrowths. Distance between AME and lateral triads shorter, not exceeding half the ALE diameter. AME closer. Chelicerae without apophyses. Shape and pigmentation of opisthosoma as in male. Epigynum and vulva as in Figures 215, 216, 218.

Measurements: Male: Prosoma 1.0 long, 1.5 wide. Opisthosoma 2.8 long, 1.2 wide. Total body length 3.8. Leg I, femur 7.3, patella 0.6, tibia 7.6, metatarsus 11.0, tarsus 2.0, total 28.5. Palp, femur 0.7, patella 0.2, tibia 0.9, procurus 0.8. Female: Prosoma 1.5 long, 2.0 wide. Opisthosoma 4.6 long, 1.6 wide. Total body length 6.1. Leg I, femur 10.3, patella 0.7, tibia 11.0, metatarsus 16.6, tarsus 2.7, total 41.3.

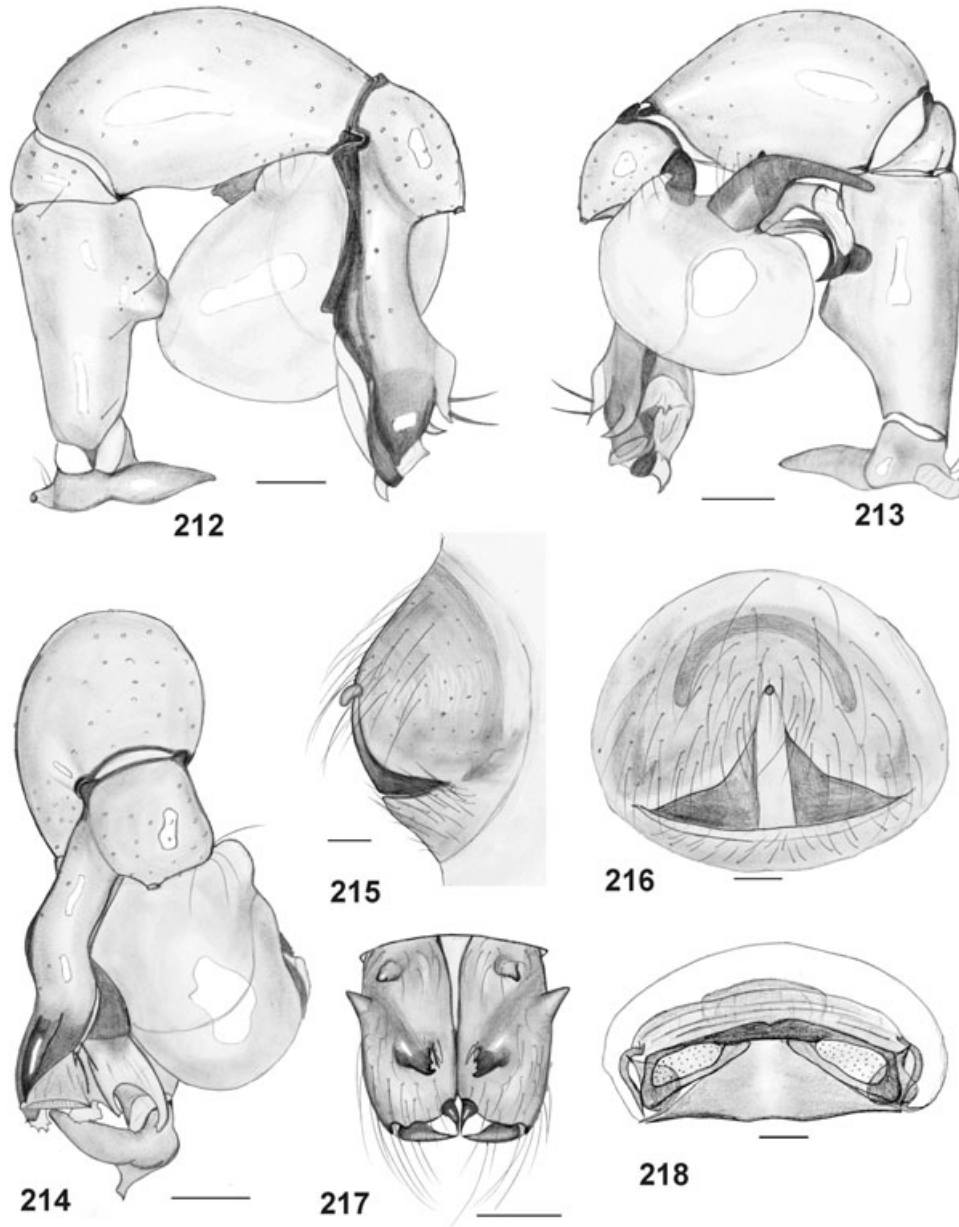
Distribution: This species is endemic to Gran Canaria where it is known to inhabit Los Cumbres and Los Cazadores (Fig. 276).

Natural history: *P. corcho* lives in the high and humid localities in the north of the island. It is found in small cavities in valleys with abundant vegetation common in this area.

PHOLCUS EDENTATUS CAMPOS & WUNDERLICH, 1995
(FIGS 230–250)

Pholcus edentatus Campos & Wunderlich, 1995: 295, figs 4–9.

Material examined: 2 mm, 2 ff, from Barracno de Guayadeque, Gran Canaria, Canary Islands, Spain, 12.viii.2002, De Mas & Delgado (CCRUB 4614-173, 4594-172, 4593-172).

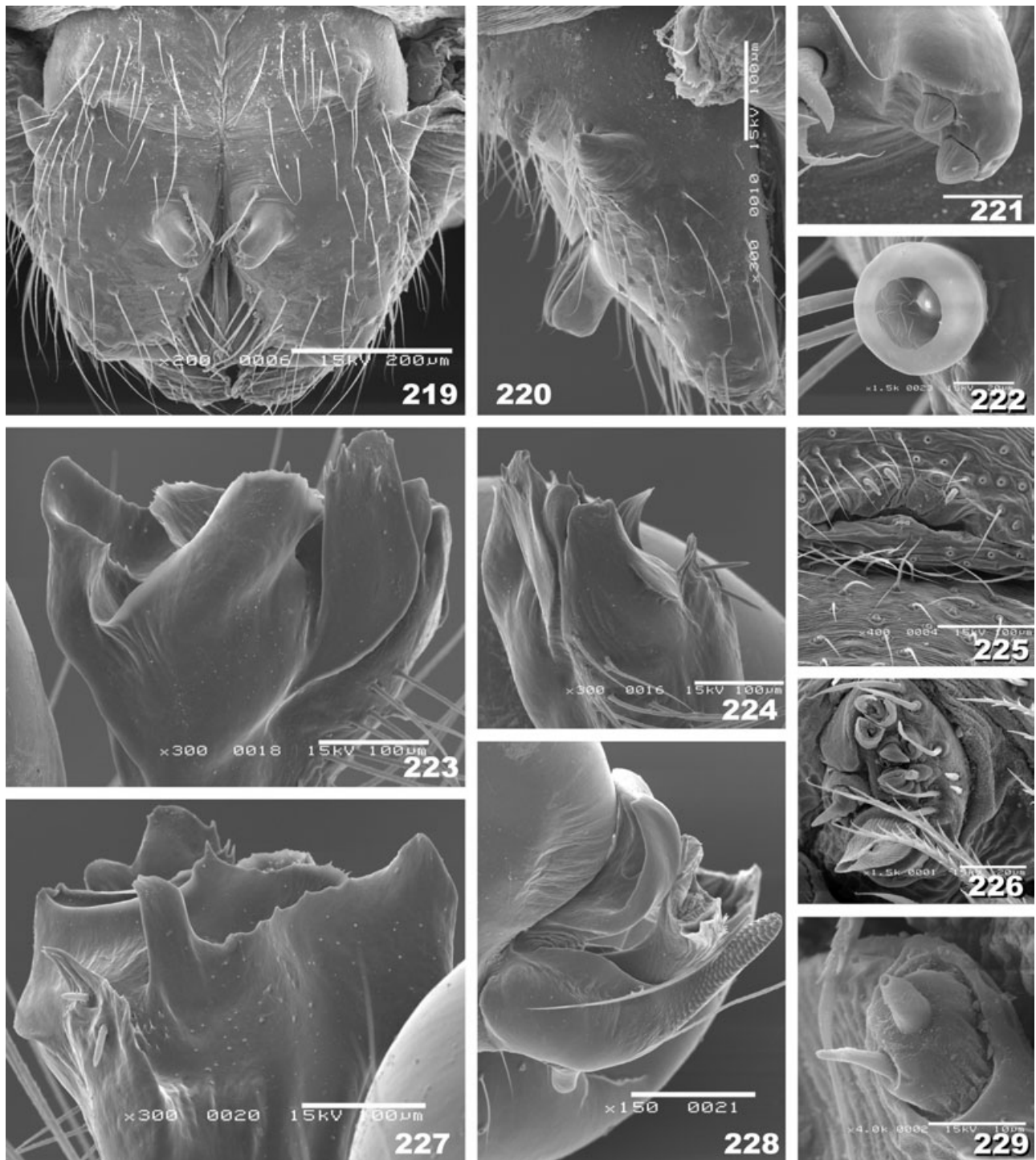


Figures 212–218. *Pholcus corcho*: 212, male palp, prolateral; 213, male palp, retrolateral; 214, male palp, frontal; 215, epigynum, lateral; 216, epigynum, ventral; 217, male chelicerae, frontal; 218, vulva, dorsal. Scale bars 0.2 mm.

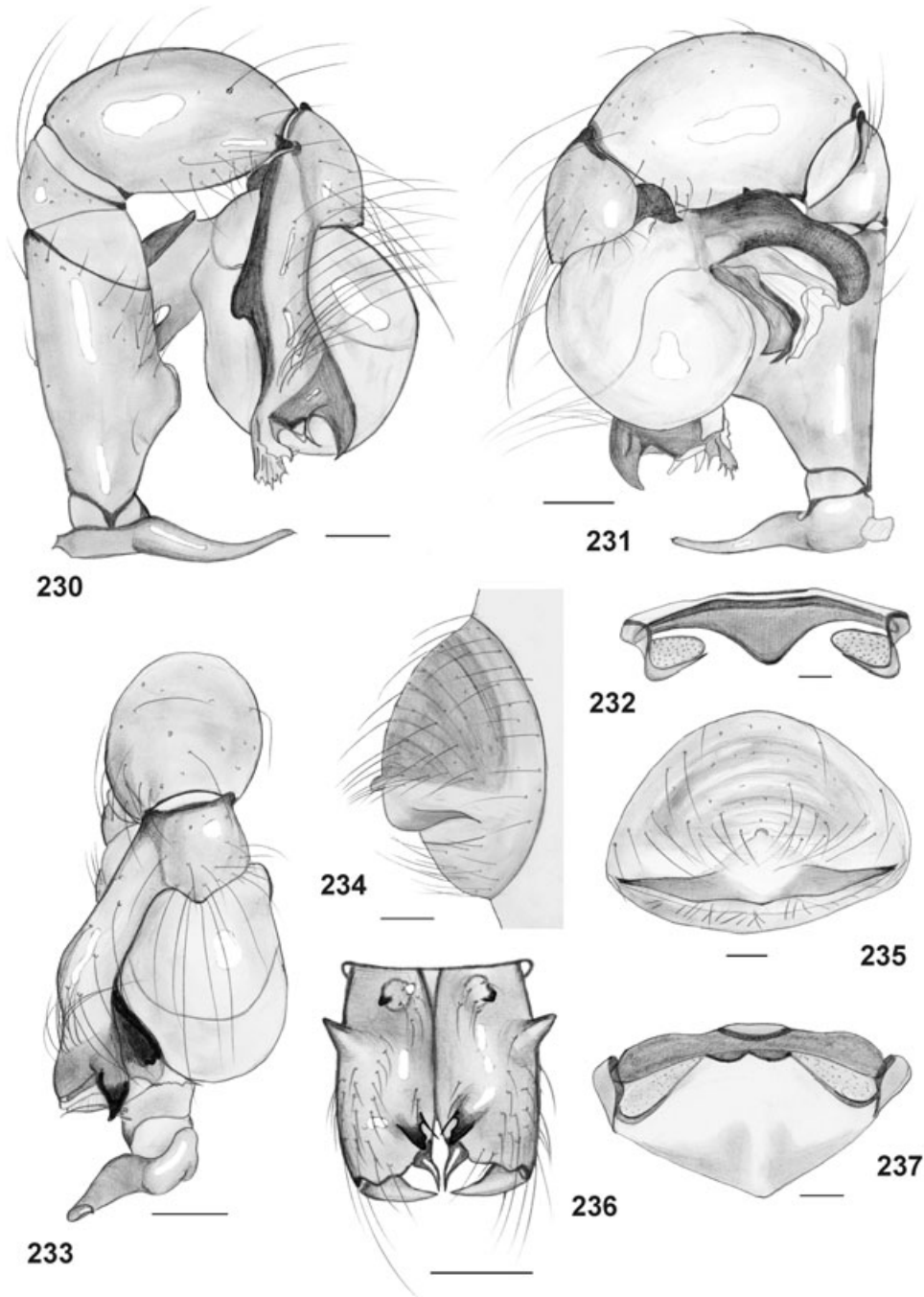
Diagnosis. *P. edentatus* can be distinguished from similar congeners by the following characteristics: the shape of the unculus, which has an inflection to its dorsal side (Fig. 231); the shape of the procurus' apical apophysis, which is lamellar with a wide base and irregular margins (Fig. 245); the procurus' large, heavily sclerotized dorsal apophysis (Figs 230, 243). The shape of the appendix of the bulb and the general morphology of the procurus are also very useful for identification purposes. The female is distinguished by a low triangular plate with a very wide base

(Fig. 235) as well as by the morphology of the vulva (Fig. 237).

Description: Male: prosoma yellowish with brownish tones. Dorsally, a brownish colouring appears across the thorax. Ocular area elevated with brownish pigmentation around the eyes. Distance between AME and ALE equal to the diameter of ALE. Diameter of ALE half the diameter of ALE. Distance between AME strongly reduced. Frontal part of ocular elevation marked by darker pigmentation. Sternum



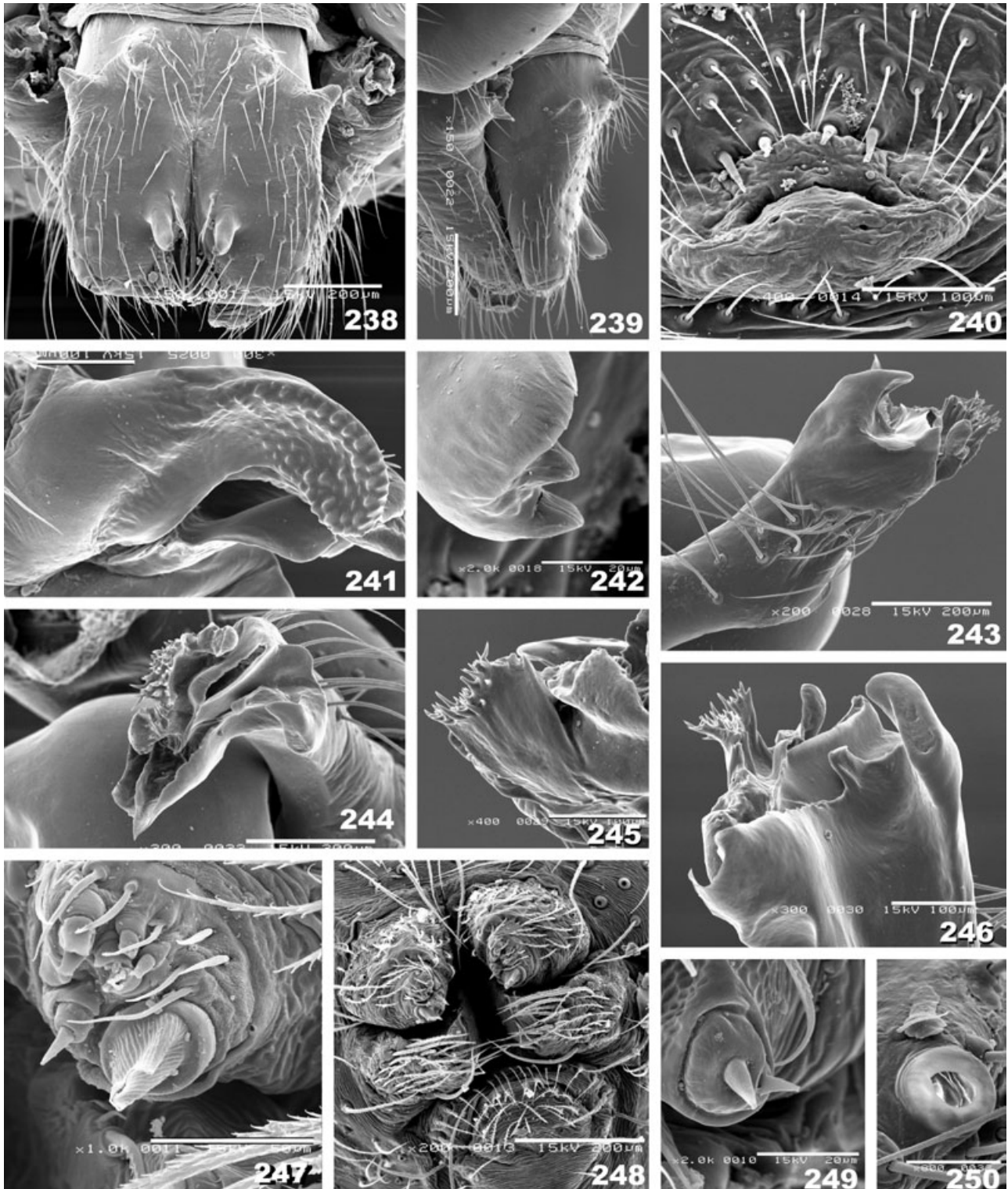
Figures 219–229. *Pholcus corcho*: 219, male chelicerae, frontal; 220, male chelicerae, lateral; 221, distal apophysis of male chelicerae; 222, male tarsal organ; 223, apical apophysis of the procurus, ventral; 224, procurus, prolateral; 225, male gonopore, ventral; 226, anterior lateral spinnerets; 227, apex of the procurus, dorso-retrolateral; 228, projections of the bulb, retrolateral; 229, posterior median spinnerets. Scale bars: 219, 228, 200 μm ; 220, 223–225, 227, 100 μm ; 221, 222, 226, 20 μm ; 229, 10 μm .



Figures 230–237. *Pholcus edentatus*: 230, male palp, prolateral; 231, male palp, retrolateral; 232, pore plates of the vulva, dorsal view; 233, male palp, frontal; 234, epigynum, lateral; 235, epigynum, ventral; 236, male chelicerae, frontal; 237, vulva, dorsal. Scale bars 0.2 mm.

yellow-brownish with darker margins. Chelicerae (Figs 236, 238, 239) slightly darker than the prosoma. The distal cheliceral apophyses dark brown, with bristles very close to their bases, and carrying two modified hairs (Fig. 242) as well as a small dorsal protuberance. The apex of the proximolateral apophy-

ses does not extend to the base of frontal prominences. Frontal prominences with darker outgrowths. Palp as in Figures 230, 231, 233. Procursus (Figs 230, 233, 243, 244, 246) features large and heavily sclerotized dorsal apophysis. Apical apophysis of the procurus very wide, with one larger ventral part as well as



Figures 238–250. *Pholcus edentatus*: 238, male chelicerae, frontal; 239, male chelicerae, lateral; 240, male gonopore, ventral; 241, projections of the bulb, retrolateral; 242, distal apophysis of male chelicerae; 243, procurus, prolateral; 244, apex of procurus, frontal; 245, apical apophysis of the procurus, ventral; 246, procurus, retrolateral; 247, anterior lateral spinnerets; 248, spinnerets, ventral; 249, posterior lateral spinnerets; 250, male tarsal organ. Scale bars: 238, 239, 243, 244, 248, 200 μm ; 240, 241, 245, 246, 100 μm ; 247, 250, 50 μm ; 242, 249, 20 μm .

numerous small apical outgrowths (Fig. 245), and one smaller dorsal outgrowth. Tarsal organ as in Figure 250. Opisthosoma yellow-brownish with cylindrical shape. Dorsally, eight darker spots appear distributed in two parallel longitudinal lines, their size decreasing towards the end of the opisthosoma. Ventrally, opisthosoma lighter with a darker transversal band over the genital area. Gonopore as in Figure 240. Spinnerets as in Figures 247–249.

Female: prosoma as in male except for the less pronounced elevation of the ocular area. Eyes closer together, with the distance between AME and ALE half the diameter of ALE. Sternum as in male. Chelicerae without apophyses. Colouring of opisthosoma as in the male. Epigynum and vulva as in Figures 232, 234, 235, 237.

Measurements: Male: Prosoma 1.5 long, 1.9 wide. Opisthosoma 4.9 long, 1.9 wide. Total body length 6.4. Leg I femur 12.5, patella 0.7, tibia 13.2, metatarsus 22.0, tarsus 2.3, total 50.7. Palp femur 0.7, patella 0.3, tibia 0.8, procurus 0.8. Female: Prosoma 1.4 long, 1.5 wide. Opisthosoma 4.8 long, 2.4 wide. Total body length 6.2. Leg I femur 11.2, patella 0.8, tibia 11.7, metatarsus 18.0, tarsus 2.4, total 44.2.

Distribution: This species is endemic to Gran Canaria where it is known to inhabit Barranco del Guayadeque (Fig. 276).

Natural history: *P. edentatus* lives in natural cavities in the lower parts of the Barranco de Guayadeque gorge. Although the walls of the gorge are very dry and with scarce xerophytic vegetation, the lower part is much more humid due to the development of limited agricultural activities and the accumulation of rain water.

Comments. All type material deposited in ULL is lost; however, the drawings provided in the original description by Campos & Wunderlich (1995) are sufficient to establish these specimens as conspecific with the lost types.

PHOLCUS FUERTEVENTURENSIS WUNDERLICH, 1992
(FIGS 251–268)

Pholcus fuerteventurensis Wunderlich, 1992: 319, figs 145–155; Campos & Wunderlich, 1995: 295, fig. 10.

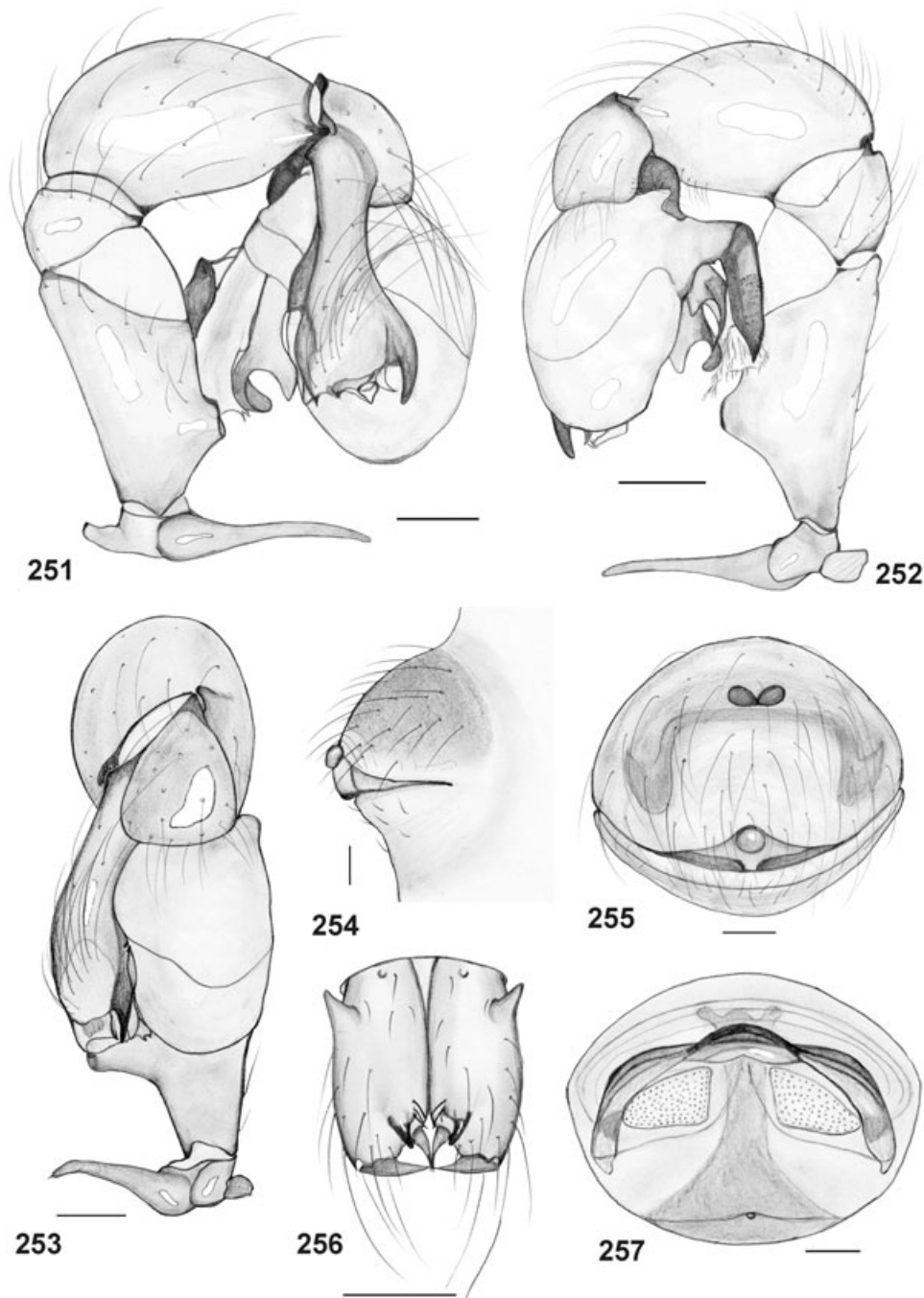
Material examined: 1 m, holotype, from Barranco de Los Molinos, Fuerteventura, Canary Islands, Spain (SMF 37189); 1 m, 5 ff, 1 juv., from Barranco de La Torre, Fuerteventura, 30.i.2003, Dimitrov & De Mas (CCRUB 4658-173, 4635-173, 4633-173, 4620-173, 4523-170); 3 mm, 8 ff, 1 juv., from Barranco de Los Molinos, Fuerteventura, 29.i.2003, Dimitrov &

De Mas (CCRUB 4666-173, 4634-173, 4574-172, 4522-170, 4521-170); 2 mm, 2 juv., from Antigua, Fuerteventura, 29.i.2003, Dimitrov & De Mas (CCRUB 4577-172, 4668-173, 4637-173); 1 m, 1 f, 1 juv., from Ajui, Fuerteventura, 29.i.2003, Dimitrov & De Mas (CCRUB 4667-173, 4573-172); 1 m, Pajara, Fuerteventura, 21.i.2003, Dimitrov & De Mas (CCRUB 4575-172); 1 m, from Valle de Tarajala, Fuerteventura, 31.i.2003, Dimitrov & De Mas (CCRUB 4576-172).

Diagnosis: *P. fuerteventurensis* is distinguished from its similar congeners (*P. edentatus* and *P. anachoreta*) by the following characteristics: a pointed and unarched uncus with a less pronounced ridge (Figs 252, 261); the procurus' smaller, sharpened, apical apophysis and the shape of its apical part (Figs 251, 267, 265); and the shapes of the appendix of the bulb (Fig. 252) and the cheliceral apophyses (Figs 256, 258), which can also be used to identify this species. The female has a small triangular plate with two dark-coloured bands (Fig. 255).

Description: Male: prosoma rounded with brownish-yellow colour. Dorsally, the thorax with brownish colouring, which begins as two darker lines over the dorsal side of the ocular elevation and spreads almost completely across the thorax. Well-marked fovea yellowish in colour. Ocular area elevated with two lateral triads on short cylindrical outgrowths. Diameter of AME less than half the diameter of ALE. Distance between AME and ALE less than ALE diameter. Eyes surrounded by brownish pigmentation. Sternum yellowish with darker margins. Chelicerae (Figs 256, 258, 259) light brownish featuring dark distal cheliceral apophyses with two modified hairs and a conical outgrowth at the tips (Fig. 260). Three bristles placed very close to the base of each distal apophysis. Frontal prominences carry very short outgrowths. Upper margin of proximolateral apophyses extends to the bases of frontal prominences. Palps as in Figures 251–253. Procurus (Figs 262, 265, 266) with two short dorsal spines (Fig. 268). Apical apophysis of the procurus with wide base and sharpened apex (Fig. 267). Distally, procurus carries one well-developed and strongly chitinized dorsal apophysis (Figs 251, 265). Opisthosoma cylindrical with brownish-yellow colouring. Dorsally, ten brownish spots are visible, arranged in two parallel longitudinal lines. The last spot in each line smaller and closer to the centre of the opisthosoma. Ventrally, a darker transversal band is visible over the genital area. Spinnerets as in Figures 263, 264.

Female: the prosoma has the same colouring as in the male. Ocular area less elevated, with AME closer to the lateral triads. The brownish pigmentation around AME forms a continuous band, which extends over the frontal and dorsolateral parts of the ocular



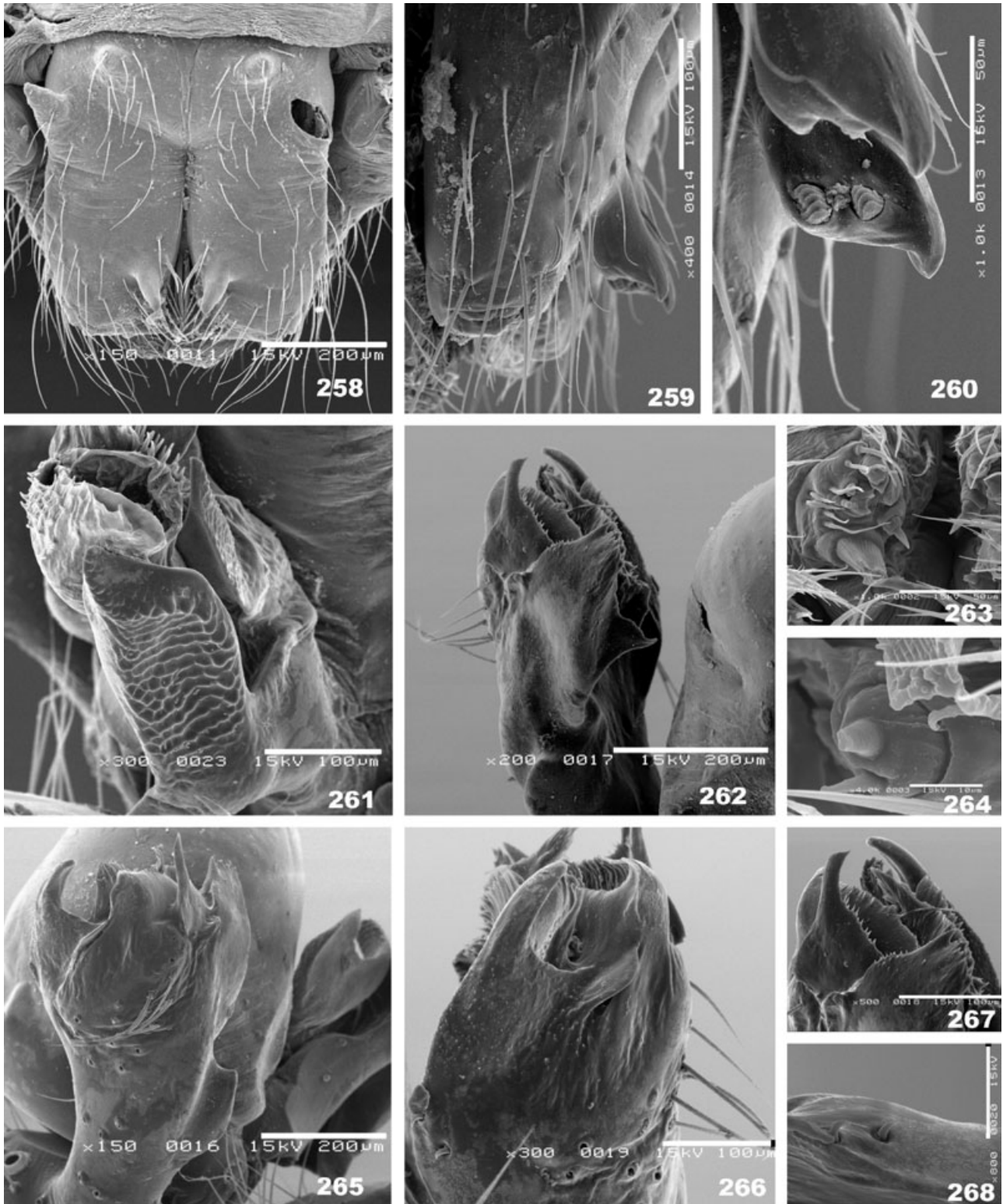
Figures 251–257. *Pholcus fuerteventurensis*: 251, male palp, prolateral; 252, male palp, retrolateral; 253, male palp, frontal; 254, epigynum, lateral; 255, epigynum, ventral; 256, male chelicerae, frontal; 257, vulva, dorsal. Scale bars 0.2 mm.

elevation. Sternum yellowish. Chelicerae as in male but without sexual modifications. Opisthosoma as in male but lighter. Epigynum and vulva as in Figures 254, 255, 257.

Measurements: Male: Prosoma 1.3 long, 1.5 wide. Opisthosoma 3.7 long, 1.5 wide. Total body length 5.0. Leg I femur 9.0, patella 0.5, tibia 9.1, metatarsus 16.6,

total 37.1. Palp, femur 0.7, patella 0.2, tibia 0.8, procurus 0.8. Female: Prosoma 1.1 long, 1.2 wide. Opisthosoma 3.7 long, 1.7 wide. Total body length 3.9. Leg I, femur 7.8, patella 0.5, tibia 7.6, metatarsus 11.7, tarsus 1.6, total 29.2.

Distribution: This species is known to inhabit many localities in Fuerteventura and also Barranco Hondo



Figures 258–268. *Pholcus fuerteventurensis*: 258, male chelicerae, frontal; 259, male chelicerae, lateral; 260, distal apophysis of male chelicerae; 261, projections of the bulb; 262, procurus, ventral; 263, anterior lateral spinnerets; 264, posterior median spinnerets; 265, procurus, prolateral (Dimitrov & Ribera, 2005a); 266, procurus, dorsal; 267, apical apophysis of the procurus, ventral; 268, small teeth on the procurus, dorsal. Scale bars: 258, 262, 265, 200 µm; 259, 261, 266, 267, 100 µm; 260, 263, 268, 50 µm; 264, 10 µm.

on Gran Canaria (Fig. 276). Together with *P. ornatus*, this is the second species found on more than one island in the archipelago.

Natural history: *P. fuerteventurensis* is very widely spread all over Fuerteventura where it is found in cavities and small caves on hillsides. Some specimens were collected at sea-level in a small cave near Ajui, which is partially flooded during high tide. Although this species normally builds its webs on horizontal surfaces we observed webs built on practically vertical rocks in the Barranco de la Torre. Interestingly, *P. fuerteventurensis* has been found also in human constructions.

PHOLCUS BALDIOSENSIS WUNDERLICH, 1992
(FIGS 269–271)

Pholcus baldiosensis Wunderlich, 1992: 318, figs 141–144a.

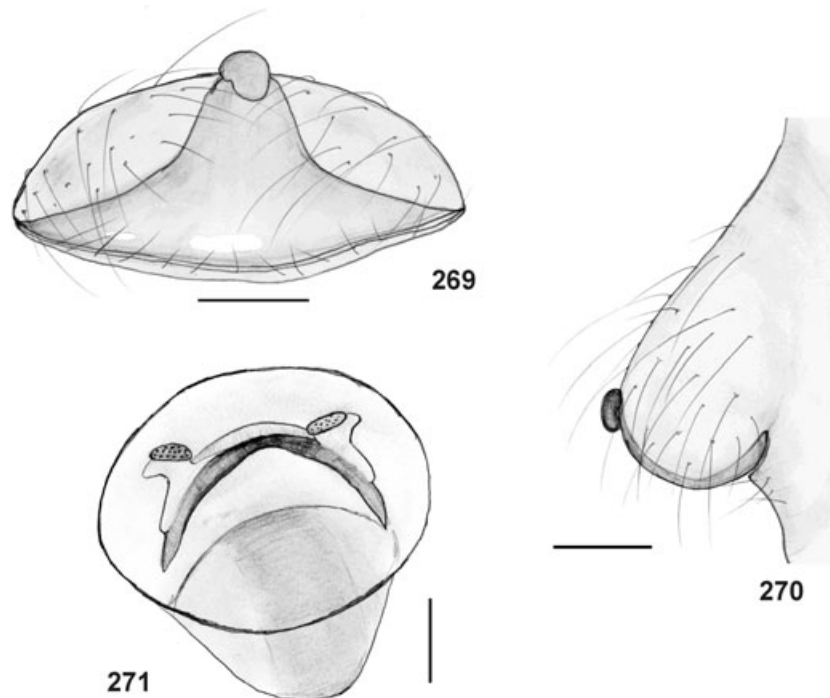
Material examined: 1 f, holotype and 1 juv., from Cueva de los Baldios, Tenerife, Canary Islands, Spain, 3.xi.1988, Oromí (in ULL); 1 f, from Cueva de La Puerta, Tenerife, 8.v.1993, Izquierdo (CCRUB 4564–171).

Diagnosis: *P. baldiosensis* is easily distinguished from the rest of the epigean Canarian *Pholcus* species by

such troglomorphic characteristics as the reduction in eyes and the very pale colouring. The most similar species, which also presents troglomorphies, is *P. corniger*. However, while in *P. baldiosensis* only AME and ALE are reduced, in *P. corniger* the eyes are completely lost. The epigynum and vulva's morphology are also very characteristic (Figs 269–271). The male *P. baldiosensis* remains unknown.

Description: Female: prosoma whitish with yellowish tones. Dorsally, some vestiges of thoracic pigmentation are visible. Well-marked fovea and cephalothoracic junction. Low ocular area, with eyes strongly reduced in number and size. AME and ALE absent, with the remaining eyes on two short cylindrical outgrowths. Ocular area whitish and lacking the darker pigmentation around the eyes typical of the epigean members of this genus. Sternum with brownish margins. Chelicerae and legs slightly darker than prosoma. Opisthosoma cylindrical and coloured like the prosoma. Ventrally, epigynum elevated with brownish triangular plate. Epigynum as in Figures 269, 270. Vulva as in Figure 271. Spinnerets with brownish spots.

Measurements: Female: Prosoma 1.0 long, 1.1 wide. Opisthosoma 2.2 long, 1.5 wide. Total body length 3.2. Leg I femur 7.3, patella 0.5, tibia 7.6, metatarsus 11.4, tarsus 1.9, total 28.7.



Figures 269–271. *Pholcus baldiosensis*: 269, epigynum, ventral; 270, epigynum, lateral; 271, vulva, dorsal. Scale bars 0.2 mm.

Distribution: This species is only known to inhabit the Cueva de los Baldios cave and Cueva de la Puerta on Tenerife Island (Fig. 276).

Natural history: *P. baldiosensis* is a troglobite spider found in Cueva de los Baldios and Cueva de la Puerta away from the cave entrance. It builds its web close to the cave floor under stones or under protruding parts of the cave walls.

Comments: This was the first cave-dwelling species of *Pholcus* found in the Canary Islands. Unfortunately, the male of this species remains unknown.

CLADISTIC ANALYSIS

RESULTS

Descriptive statistics for the most parsimonious trees determined by the analyses are provided in Table 2. A parsimony analysis of the COMPLETE matrix conducted in NONA resulted in 50 most parsimonious trees, with length of 252 (CI = 41 and RI = 66). A strict consensus for these trees, with bootstrap and jackknife values, is given in Figure 272. The results of the analysis corroborate the monophyly of *Pholcus* which was well supported (bootstrap 97, jackknife 99). The monophyly of the Macaronesian *Pholcus* was lost in the strict consensus and a trichotomy was formed by *P. opilionoides*, the group *P. baldiosensis* + *P. corniger* and a clade containing the rest of the species. A significant portion of the clades identified in the most parsimonious trees was collapsed in the consensus, thereby leaving an unresolved polytomy which includes all species from the easternmost islands: *P. edentatus* from Gran Canaria, *P. vachoni* (from Morocco) and three Madeira species (*P. silvai*, *P. parvus* and *P. dentatus*). Only three clades: *corniger*, the central clade, and one large clade encompassing the rest of the species from Tenerife, La Gomera and El Hierro (western clade) attained bootstrap values higher than 50. Jackknife showed support for the same three clades, though values were slightly higher than that of bootstrap. Two groups receiving bootstrap values below 50 were supported by relatively high jackknife figures. These included *P. magnus* + *P. madeirensis*, with a jackknife value of 60, and *P. corcho* + *P. helenae*, with a jackknife value of 56. When examining the NONA output, we found the relative positions of the Madeira species to be very conflicting, with the exception of *magnus* + *madeirensis*. The same could be said for the easternmost island species, *P. edentatus* from Gran Canaria and *P. vachoni* from Morocco.

Analyses of the COMPLETE matrix using Pee-Wee, with a concavity of K = 1–6, yielded numerous differences compared with the NONA results. In all cases,

Table 2. Summary of the analyses, with uniformly weighted parsimony in NONA and with implied weighting in Pee-Wee. *N* trees is the number of the most parsimonious trees retained; the number of steps for the trees from Pee-Wee is given in parentheses

Matrix	MP		k1		k2		k3		k4		k5		k6	
	<i>N</i> trees	Steps	<i>N</i> trees	Fit	<i>N</i> trees	Fit	<i>N</i> trees	Fit	<i>N</i> trees	Fit	<i>N</i> trees	Fit	<i>N</i> trees	Fit
COMPLETE	50	252	11	288.6 (259–264)	5	348.0 (259–261)	5	387.5 (254–256)	1	415.8 (254)	2	436.1 (254–255)	4	452.7 (254)
NOBAL	16	248	5	279.5 (255–257)	5	339.2 (255–257)	3	378.8 (251–252)	1	407.0 (251)	2	427.3 (250–251)	2	443.8 (251)
NOSIL	14	251	4	290.8 (257 260)	2	350.9 (257)	2	389.8 (257)	2	417.4 (254)	2	437.2 (254)	2	254.1 (254)
NOVACH	12	248	2	294.9 (256 259)	1	353.4 (253)	1	392.4 (253)	1	419.7 (253)	3	439.5 (250 251 253)	4	455.8 (251)
NOSILBAL	2	247	2	281.7 (253)	2	342.1 (253)	2	381.1 (253)	2	408.5 (250)	2	428.4 (250)	2	445.1 (250)
NOSILVACH	4	247	1	298.1 (252)	1	356.8 (252)	1	394.9 (252)	1	421.7 (252)	1	441.2 (252)	4	457.3 (250)
NOBALVACH	2	244	1	285.0 (252)	1	344.6 (249)	1	382.7 (249)	1	411.0 (249)	3	430.7 (246 247 249)	1	446.9 (249)
NOBALVACHSIL	16	244	1	289.0 (248)	1	348.0 (248)	1	386.2 (248)	1	413.0 (248)	1	432.4 (248)	1	448.4 (248)

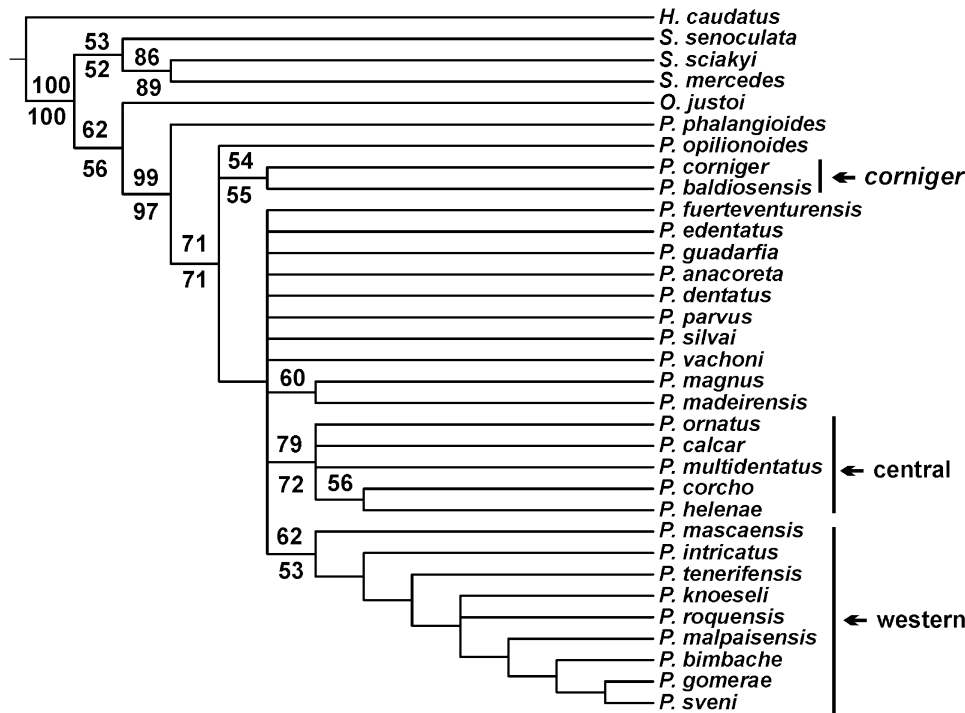


Figure 272. Strict consensus of 50 trees found by NONA ($L = 299$, $CI = 35$, $RI = 55$) analysing the COMPLETE matrix. Numbers below branches represent the bootstrap values; numbers above branches are jackknife values.

the number of resulting trees was much lower: from 11 with $K = 1$, to one with $K = 4$. Figure 273 displays the most parsimonious tree, with a value of $K = 4$. Very similar results were observed with $K = 3$ and $K = 5$, the only difference being the internal arrangement of taxa in the western clade. The *corniger* and western clades were again identified, and did not differ from the NONA results. The unique difference to the central clade was the inclusion of *P. guarafia* as a member. In addition to these groups, two more clades were formed: (1) an eastern clade, which gathers all species from the easternmost islands, excluding Lanzarote, and *P. vachoni* from Morocco; and (2) a Madeira clade including all species endemic to Madeira.

Applying $K = 6$ provided very similar results, and the only difference regarding topology with $K = 3-5$ was in the placement of the Madeira clade, which resulted in an unresolved trichotomy with the central and eastern clades. Again, the most conflicting area appears to be the positioning of the species from Madeira and the eastern Canary Islands, as well as *P. vachoni*.

Very different results were obtained from the analyses with $K = 1-2$. In both cases, the Madeira clade appeared paraphyletic and was placed as a sister group to the species from the western clade.

Most of the branches within the Macaronesian group of species did not receive bootstrap or jackknife

support. Although the analyses applying implied weighting in Pee-Wee resulted in much fewer trees with all possible K values, these were nonetheless always longer than the trees from NONA. Additionally, all trees from Pee-Wee suggested that *P. guarafia* is a base member of the clade formed by the Gran Canaria species, with the exception of *P. edentatus*. This placement was highly incongruent with the NONA results, where none of the trees exhibited such a relationship.

Running NONA with all possible combinations of removed taxa always resulted in fewer trees and more stable topology, compared with the results from the COMPLETE matrix. Pee-Wee also gained in stability, with the resulting trees fewer and presenting less conflict. Analyses of all matrices based on the different combinations of removed taxa helped us to detect the two most problematic species – *P. silvai* and *P. baldiosensis*. This combination corresponds to the NOSILBAL matrix. The corresponding results based on analyses of this matrix will be addressed further below.

When *P. silvai* and *P. baldiosensis* are excluded, NONA provides only two most parsimonious trees ($L = 247$, $CI = 42$, $RI = 67$); one of them is shown in Figure 275. The same five clades resulting from the analysis of the COMPLETE matrix with Pee-Wee when $K = 4$ were observed. They were, however,

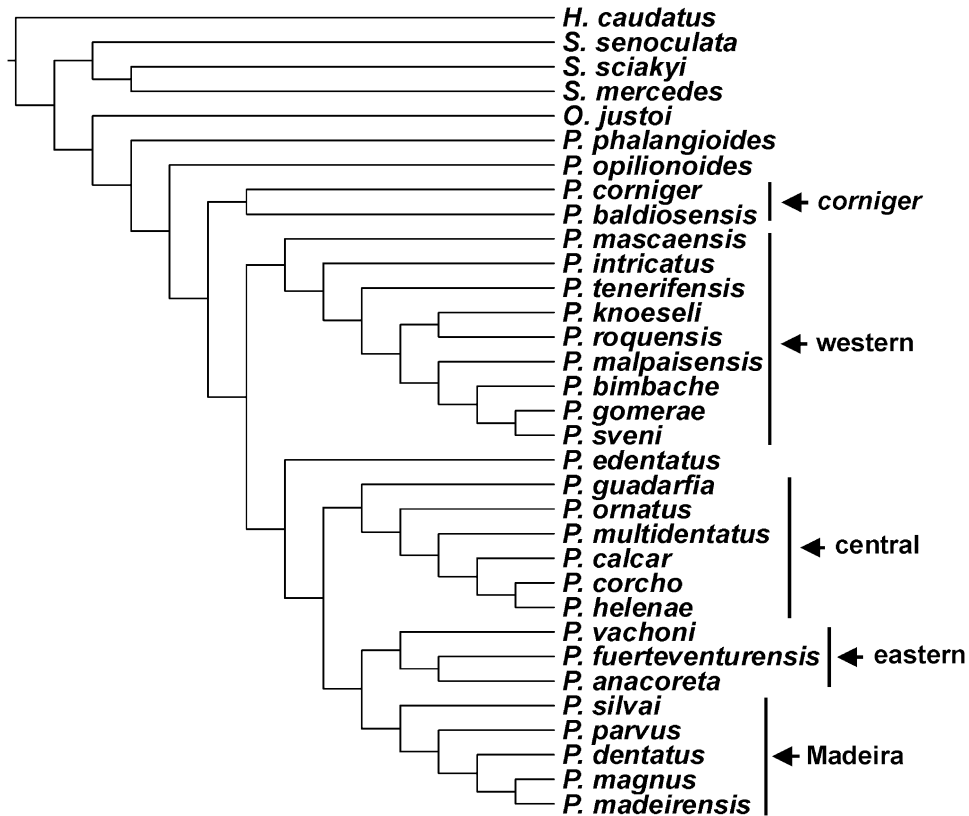


Figure 273. The unique most parsimonious tree found with Pee-Wee with $K = 4$ ($L = 254$, $CI = 41$, $RI = 65$) based on the COMPLETE matrix.

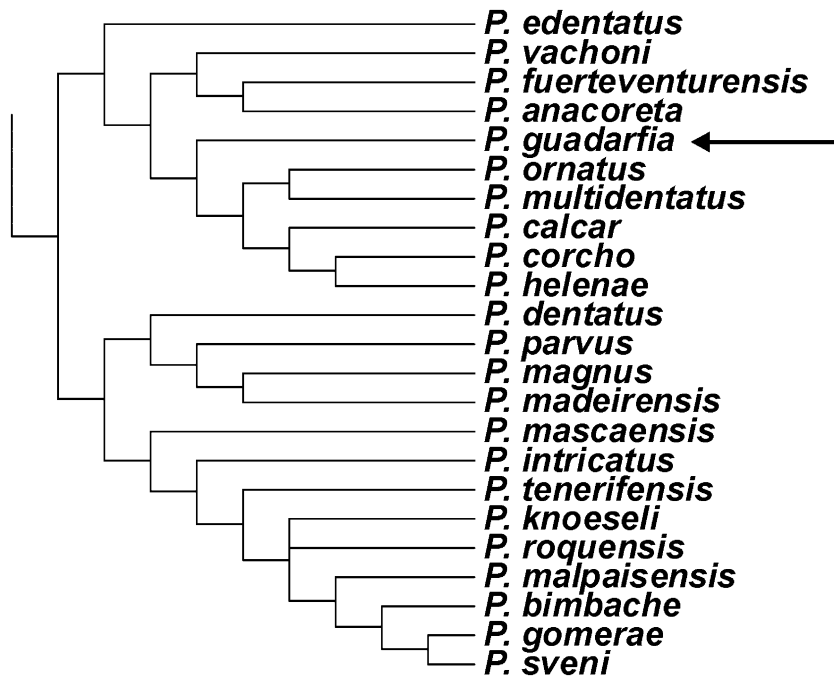


Figure 274. Differences from the results of NONA in the trees from the analyses with Pee-Wee ($k = 1-6$) of the matrix NOSILBAL.

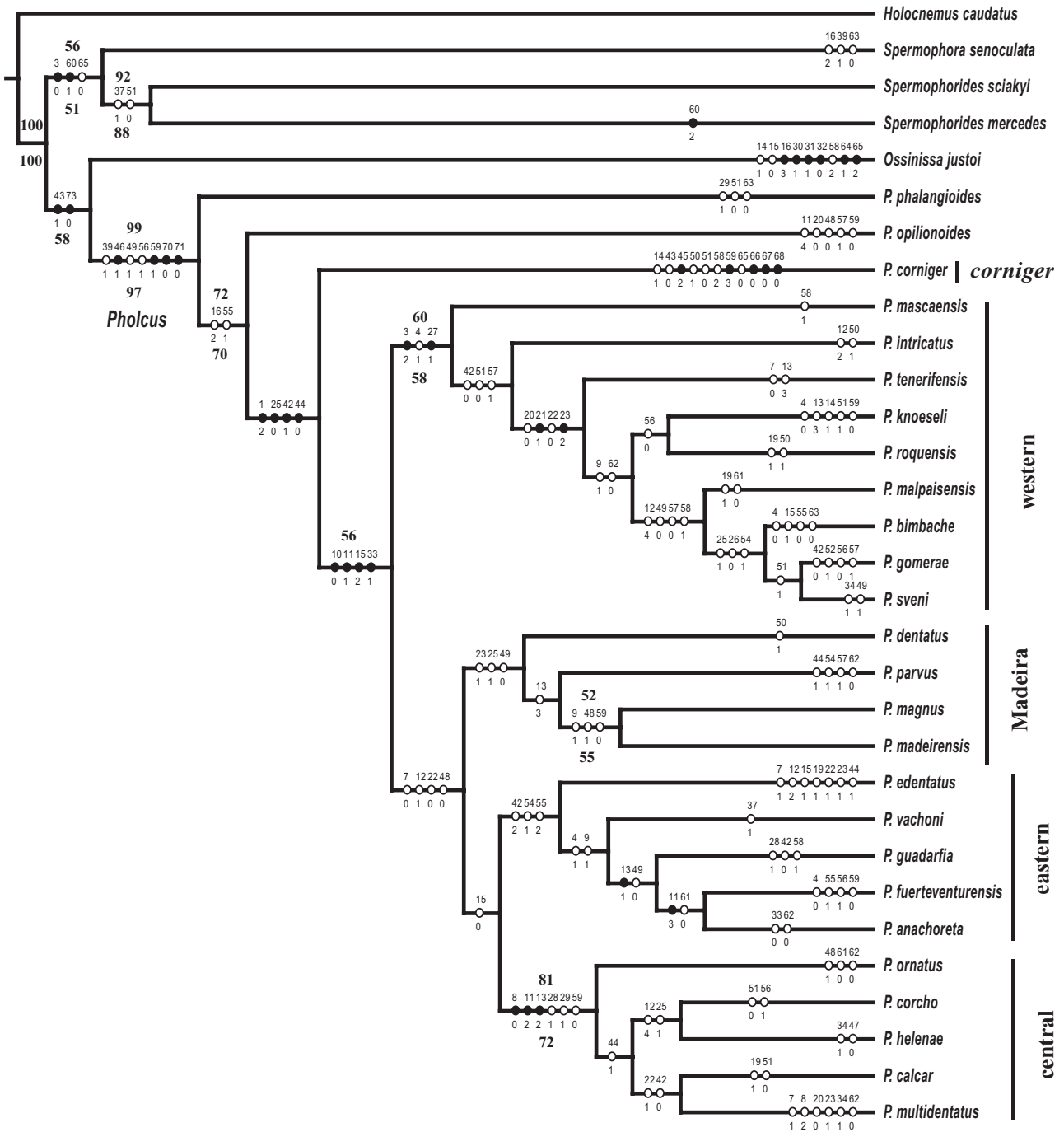


Figure 275. Preferred most parsimonious tree from NONA ($L = 247$, $CI = 42$, $RI = 67$) based on the NOSILBAL matrix. Numbers below branches represent the bootstrap values; numbers above branches are jackknife values. Black circles represent unique gains; white circles represent homoplastic gains or reversals. Numbers above the circles indicate the number of character and numbers below its state. Only the unambiguous character changes are mapped.

differently arranged and the Madeira species were placed as a sister group to the central + eastern clades. The internal relationships of the five main clades resulted unsupported in all these analyses, thus permitting us only a few general observations: the species

from Tenerife occupy a basal position with respect to those from La Gomera and El Hierro; the only supported relationship in the Gran Canarian species clade is that of *P. corcho* with *P. helenae*. Regarding the Madeira clade, *P. madeirensis* and *P. magnus* are

more closely related to each other than to the rest of the Madeira species.

Pee-Wee analyses of the NOSILBAL matrix with $K = 1-6$ resulted in two trees with practically identical topology. The only major differences regarding the trees applying uniform weighting in NONA were in the position of *P. guarafia*, which shifted from the eastern to the central clade, and the placement of the Madeira species as sister group to the western clade. Independent of the K value, the placement of *P. guarafia* with the Gran Canaria species was retained (arrow in Fig. 274). Nearly the same clades as those from the analyses of the COMPLETE matrix received bootstrap and jackknife support over 50, although the values were slightly higher.

DISCUSSION

After a detailed analysis of the data (see above), we decided to exclude *P. sveni* and *P. baldiosensis* from the data set, based on the large amount of missing data and their significant effect on the resulting cladograms. The results from NONA were preferred over those from Pee-Wee. As discussed in the Material and Methods section, because the use of differential

weighting is more subjective, we used the results from the uniformly weighted parsimony. The resulting outcome from implied weighting helped in assessing clade stability and comparing conflicting topologies.

The two most parsimonious cladograms obtained in NONA from the NOSILBAL data set recovered nearly identical relationships. The unique difference found between the two trees was the arrangement of *P. knoeseli* and *P. roquensis* in the western clade: they form either a monophyletic group or a paraphyletic arrangement. Because in both trees the clades that we describe are present and show identical relationships, our conclusions are not affected at all by the selection of either cladogram. We use the cladogram in Figure 275 as our preferred working hypothesis, and the relationships discussed henceforth are based on this selection.

Although the monophyly of the Macaronesian *Pholcus* species is not supported by bootstrap or jackknife values, nearly all of the most parsimonious trees, independent of either the analysis employed or the matrix examined, recovered this group as monophyletic. Thus, it was accepted as the most plausible hypothesis.

Two major groups can be defined. One comprises the species from Tenerife and the westernmost islands,

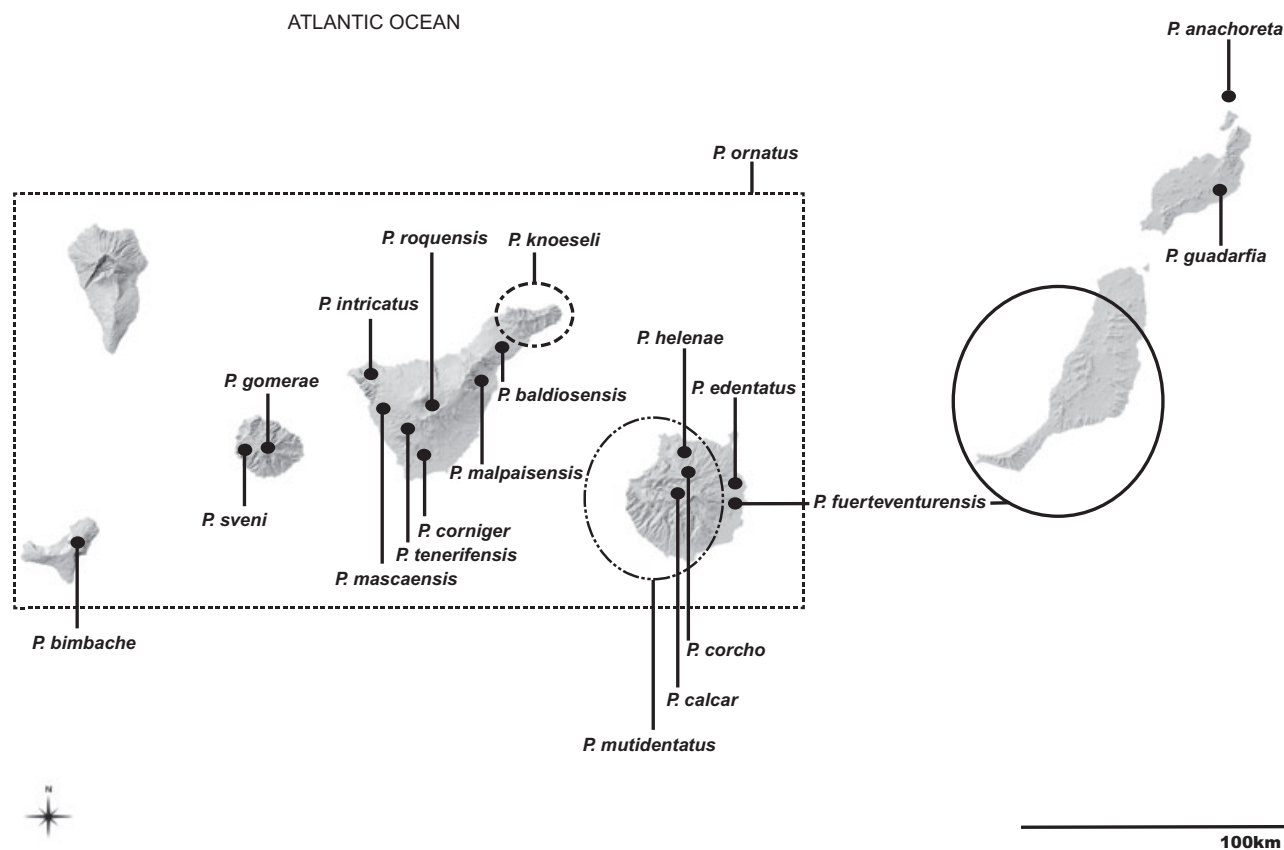


Figure 276. Known distribution of *Pholcus* species endemic to the Canary archipelago.

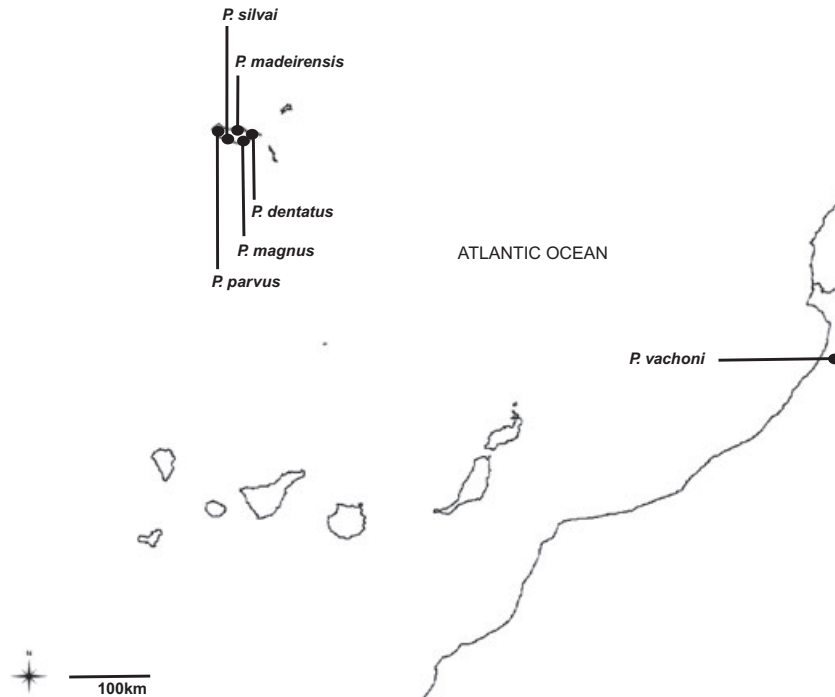


Figure 277. Known distribution of *Pholcus* species endemic to Madeira and North-West Africa.

excluding *P. baldiosensis* and *P. corniger*. The other large clade consists of the species from Gran Canaria, Fuerteventura, Lanzarote, Montaña Clara, Madeira and the species from the Macaronesian enclave in north-west Africa. These two groups are recognized as monophyletic, although possess low jackknife support.

The troglomorphic species from Tenerife, *P. corniger*, is basal with respect to the rest of the Macaronesian species. When *P. baldiosensis* is included in the analysis these two troglomorphic species form a small clade at the same basal position.

Five main clades for the Macaronesian *Pholcus* species were identified:

1. *corniger* (*P. corniger* and *P. baldiosensis*).
2. A western clade that includes *P. mascaensis*, *P. intricatus*, *P. tenerifensis*, *P. knoeseli*, *P. roquensis* and *P. malpaisensis* from Tenerife, *P. gomeræ* and *P. sveni* from La Gomera, and *P. bimbache* from El Hierro.
3. A clade encompassing all the Madeira endemic species. This clade is a sister group to the central and eastern Canarian clades.
4. Central clade composed of all species from Gran Canaria, except *P. edentatus*.
5. Eastern clade embracing the species from Lanzarote, Montaña Clara, Fuerteventura, *Pholcus vachoni* from Morocco, and *P. edentatus* from Gran Canaria.

While the exact number of colonization events cannot be determined from these results, they nonetheless

suggest that the Canarian species have resulted from local diversification processes. The Canarian species are grouped in four main clades, three of which are very similar to the groups described by Dimitrov & Ribera (2003). The unique difference is that *P. baldiosensis* and *P. corniger* are not recognized as members of the 'tenerifensis group' and are grouped in the *corniger* clade. Of utmost interest is the species *P. vachoni* from Morocco. All trees suggested that it represents a back-colonization from the Canaries. Although merely a hypothesis, were it to be confirmed, it would provide another instance of back-colonization observed in spider species from this archipelago. Prior to this study, the possibility of back-colonization had only been demonstrated in the spider genus *Dysdera* (Dysderidae) (Arnedo, Oromí & Ribera, 2001). Back-colonization has also been observed in the plant genus *Monanthes* (Crassulaceae) (Mes, Wijers & Hart, 1997).

Another interesting observation is the positioning of the two cave-dwelling species. This is not the only case in the Canaries where a basal species was found in caves (see Oromí & Izquierdo, 1994; Arnedo *et al.*, 2001). The role of caves as refuges for relict species has been proposed by Barr & Holsinger (1985). Therefore, this placement of *P. corniger* (and *P. baldiosensis* when included) indicates that they are most likely the remnants of relict fauna.

The monophyly of the Macaronesian *Pholcus* species, as well as the placement of the Madeira clade as an in-group to the Canarian species, suggests that an

ancestor from the Canary Islands most likely colonized Madeira. This is consistent with the pattern of colonization used to explain the distribution of various plant genera in Macaronesia (Trusty *et al.*, 2005; Böhle, Hilger & Martin, 1996; Kim *et al.*, 1996). A similar colonization pattern was discussed in the case of the spider genus *Dysdera* (Arnedo *et al.*, 2001), as well as in some insect genera (Emerson, Oromí & Hewitt, 2000).

The present study reveals the remarkable species radiation that the spider genus *Pholcus* has undergone throughout the Macaronesian region. All the results based on parsimony analyses of morphological characters corroborate the monophyly of the Macaronesian *Pholcus* species. Moreover, this study demonstrates the possible colonization of Madeira from the Canary Islands, as well as the back-colonization of the continent from the eastern islands.

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APPENDIX 1

Complete list of taxa scored for the cladistic analysis. Distribution of Canarian and Macaronesian endemics is shown on Figures 276, 277.

1. *Pholcus ornatus* Bösenberg, 1895 Spain: Canary Islands
2. *Pholcus calcar* Wunderlich, 1987 Spain: Canary Islands, Gran Canaria
3. *Pholcus corcho* Wunderlich, 1987 Spain: Canary Islands, Gran Canaria
4. *Pholcus helenae* Wunderlich, 1987 Spain: Canary Islands, Gran Canaria
5. *Pholcus multidentatus* Wunderlich, 1987 Spain: Canary Islands, Gran Canaria
6. *Pholcus fuerteventurensis* Wunderlich, 1992 Spain: Canary Islands, Fuerteventura
7. *Pholcus edentatus* Campos & Wunderlich, 1995 Spain: Canary Islands, Gran Canaria
8. *Pholcus guadarfia* sp. nov. Spain: Canary Islands, Lanzarote
9. *Pholcus anachoreta* Dimitrov & Ribera, 2006 Spain: Canary Islands, Montaña Clara
10. *Pholcus tenerifensis* Wunderlich, 1987 Spain: Canary Islands, Tenerife
11. *Pholcus mascaensis* Wunderlich, 1987 Spain: Canary Islands, Tenerife
12. *Pholcus intricatus* Dimitrov & Ribera, 2003 Spain: Canary Islands, Tenerife
13. *Pholcus knoeseli* Wunderlich, 1992 Spain: Canary Islands, Tenerife
14. *Pholcus roquensis* Wunderlich, 1992 Spain: Canary Islands, Tenerife
15. *Pholcus corniger* Dimitrov & Ribera, 2006 Spain: Canary Islands, Tenerife
16. *Pholcus baldiosensis* Wunderlich, 1992 Spain: Canary Islands, Tenerife

17. *Pholcus malpaisensis* Wunderlich, 1992 Spain: Canary Islands, Tenerife
18. *Pholcus gomeræ* Wunderlich, 1980 Spain: Canary Islands, La Gomera
19. *Pholcus sveni* Wunderlich, 1987 Spain: Canary Islands, La Gomera
20. *Pholcus bimbache* Dimitrov & Ribera, 2006 Spain: Canary Islands, El Hierro
21. *Pholcus dentatus* Wunderlich, 1995 Portugal: Madeira
22. *Pholcus parvus* Wunderlich, 1987 Portugal: Madeira
23. *Pholcus silvai* Wunderlich, 1995 Portugal: Madeira
24. *Pholcus magnus* Wunderlich, 1987 Portugal: Madeira
25. *Pholcus madeirensis* Wunderlich, 1987 Portugal: Madeira
26. *Pholcus phalangioides* (Fuesslin, 1775) Cosmopolitan
27. *Pholcus opilionoides* (Schrank, 1781) Holarctic
28. *Spermophora senoculata* (Dugès, 1836) Holarctic
29. *Spermophorides sciakyi* (Pesarini, 1984) Spain: Canary Islands
30. *Spermophorides mercedes* (Wunderlich, 1987) Spain: Canary Islands
31. *Holocnemus caudatus* (Dufour, 1820) Spain: Valencia
32. *Pholcus vachoni* Dimitrov & Ribera, 2005b Morocco: Agadir
33. *Ossinissa justoi* (Wunderlich, 1992) Spain: Canary Islands, El Hierro.

APPENDIX 2

The following 73 morphological characters were coded in a data matrix:

Character 1. Lateral apophysis of the trochanter: 0 – absent; 1 – short; 2 – long (more than 1.5 times the diameter of the trochanter).

Character 2. Ventral ridge on the femur between its distal extreme and the base of the ventral femoral apophysis: 0 – present (Figs 177, 195, 212); 1 – absent (Fig. 251 for example).

Character 3. Shape of the ventral apophysis of the femur: 0 – ventral apophysis absent; 1 – with wide base and trapezoid shape (Fig. 230); 2 – cylindrical (Fig. 80)

Character 4. Incision on the ventral apophysis of the femur: 0 – like a line going from one extreme to the other (Figs 177, 230); 1 – with oval shape, may not reach the distal limit (Figs 1, 99).

Character 5. Uncus: 0 – absent; 1 – present.

Character 6. Ridge on the uncus: 0 – absent (Figs 70, 100); 1 – present (Fig. 261; Dimitrov & Ribera, 2005b: fig. 5)

Character 7. Shape of the uncus: 0 – with well-marked inflection point (Figs 178, 210); 1 – arched (Figs 100, 110).

Character 8. Width of the uncus: 0 – with very wide base and a strong reduction in the width in its inflection point (Figs 178, 210); 1 – with wide base and gradually decreasing width toward the apex (Fig. 100); 2 – cylindrical and getting narrow just in its last third (Figs 70, 171); 3 – very small uncus, with cylindrical shape (this state refers to the very small uncus of *Spermophora*).

Character 9. Projection of the dorsal edge of the uncus in retrolateral view: 0 – a ‘smooth’ line (Figs 100, 109); 1 – line with incision (Figs 63, 70).

Character 10. Bulbal apophysis: 0 – bifurcated (Figs 195; 228); 1 – not bifurcated (Dimitrov & Ribera, 2006: fig. 25).

Character 11. Shape of the apophysis of the bulb: 0 – with one sharpened apex (Dimitrov & Ribera, 2006: fig. 25); 1 – with two apophyses distally, one of them claw shaped (Fig. 91); 2 – with two distal apophyses both wider toward the apex (Fig. 178); 3 – with two distal apophyses, one of them with wide apex, with two processes and a semicircular incision between them (Fig. 251); 4 – without apophyses, wide and not sharpened.

Character 12. Callosity of the procurus: 0 – absent (refers to the procurus of *Spermophora* and *Spermophorides*); 1 – with one protuberance and with strait cut distally (Figs 160; 265); 2 – with one tear-shaped protuberance (Fig. 230); 3 – with two tear-shaped protuberances (Figs 89, 99); 4 – with two protuberances, one of them with strait cut distally (Figs 177, 212).

Character 13. Dorsal spines on the procurus: 0 – absent (Fig. 243); 1 – three very small (Fig. 1); 2 – two or three long (more than 0.1mm) (Figs 155, 189); 3 – two very short with wider base (like small teeth) (Figs 71, 93).

Character 14. Central axis of the procurus (in prolateral view): 0 – strait or slightly curved (Fig. 212); 1 – with a well-pronounced curvature (Fig. 62).

Character 15. Apex of the procurus (in prolateral view): 0 – wider than the rest of the procurus (Figs 251, 265); 1 – with similar width as the rest (less than 1.10 wider) (Fig. 230); 2 – narrower (Figs 8, 115).

Character 16. Apex of the procurus dorsally (in prolateral view): 0 – carries membranous structure (Fig. 212); 1 – with heavily sclerotized apophysis (Figs 251, 265); 2 – without apophysis or other struc-

tures (Fig. 115). 3 – with deep incision (Dimitrov & Ribera, 2005a: fig. 15).

Character 17. Small retrolateral teeth on the procurus: 0 – absent (Fig. 213); 1 – present (Fig. 138).

Character 18. Apical apophysis of the procurus: 0 – present (Figs 57, 134); 1 – absent (Dimitrov & Ribera, 2005a: fig. 15).

Character 19. Basal part of the apical apophysis of the procurus: 0 – wide (equal or wider than the first third of the apophysis) (Fig. 194); 1 – narrow (Fig. 134).

Character 20. Division of the apical apophysis of the procurus: 0 – bifurcated (Fig. 134); 1 – not bifurcated (Fig. 223).

Character 21. Shape of the apical apophysis of the procurus: 0 – laminar, without cylindrical part (Fig. 202); 1 – claw shaped, with cylindrical outgrowth or cylindrically shaped (Fig. 111).

Character 22. Shape of the apex of the apical apophysis of the procurus (prolaterally): 0 – pointed (Fig. 265); 1 – with irregular borders (when bifurcated, if one of the two parts has irregular borders also coded 1) (Figs 99, 116).

Character 23. Outgrowths on the apical apophysis of the procurus: 0 – absent very few, less than 10 (Fig. 194); 1 – numerous shaped like small teeth (Fig. 175); 2 – with larger and sharpened conical outgrowths (Fig. 94).

Character 24. Apical lamellar process of the procurus: 0 – absent (see Dimitrov & Ribera, 2005a: fig. 24); 1 – present (Figs 95, 96).

Character 25. Sclerotization of the apical lamellar process: 0 – membranous, transparent (Fig. 161); 1 – well quitinized (Figs 44, 45).

Character 26. Edges of the apical lamellar process: 0 – smooth (Fig. 213); 1 – irregular (Figs 9, 21).

Character 27. Terminal apophysis of the procurus (*sensu* Dimitrov & Ribera, 2003): 0 – absent; 1 – present.

Character 28. Dorsal apophysis of the procurus (normally carrying spines): 0 – absent (Figs 25, 251); 1 – present (Figs 196, 224).

Character 29. Small teeth on the dorsal and retrolateral surface of the procurus. When dorsal apophysis is present these teeth are grouped near its base: 0 – absent; 1 – present (Figs 209, 227).

Character 30. Well-developed dorso-retrolateral apophysis of the procurus (only *Ossinissa justoi* has such apophysis in the current data set): 0 – absent; 1 – present (see Dimitrov & Ribera, 2005a: figs 8, 24).

Character 31. Cavity of the procurus (the cavity of the procurus is autapomorphy of the genus *Ossinissa*): 0 – absent; 1 – present (see Dimitrov & Ribera, 2005a: fig. 14).

Character 32. Shape of the tarsal organ (*sensu* Huber, 2000): 0 – flat; 1 – capsulated.

Character 33. Shape of the embolus: 0 – cylindrical; 1 – wider distally.

Character 34. Curvature of the lateral apophysis of the trochanter (in retrolateral view): 0 – strait or slightly curved – the apex falls on the axis passing through the middle of the trochanter (Fig. 212); 1 – curved – the apex of the apophysis fall outside this axis (Figs 45, 81).

Character 35. Relative size of the tibia and the femur of the male palp: 0 – femur shorter than the half of the tibia; 1 – femur and tibia almost equal in length.

Character 36. Shape of the tarsus of the male palp: 0 – rounded with slightly curved distal margin; 1 – nearly rectangular with almost straight distal margin (see Dimitrov & Ribera, 2005a: figs 8, 15); 2 – with the distal part forming a cone (Figs 12, 101).

Character 37. Spine of the embolus: 0 – absent; 1 – present.

Character 38. Position of the channel on the copulatory bulb (frontal view): 0 – close to the distal edge of the bulb; 1 – near the media.

Character 39. Frontal prominences of the chelicerae: 0 – absent (see Dimitrov & Ribera, 2005a: fig. 17); 1 – present (Figs 32, 238).

Character 40. Proximolateral apophysis of the chelicerae (proximal teeth): 0 – absent (in the present data matrix only *Holocnemus caudatus* does not have proximolateral apophysis of the chelicerae); 1 – present.

Character 41. Stridulatory organs on chelicerae: 0 – absent; 1 – present.

Character 42. Relative position of the frontal prominences and the proximolateral apophyses of the chelicerae: 0 – the apex of the proximolateral apophysis reaches over the base of the frontal prominences (Fig. 165, 167); 1 – the tip of the proximolateral apophyses reaches the base of the frontal prominences without over passing them (Fig. 147); 2 – the apex of the proximolateral apophysis does not reach the base of the frontal prominences (Fig. 125); 3 – proximolateral apophysis more proximal to the clypeus than the frontal prominences (refers to the position of the proximolateral apophysis in *Spermophora*).

Character 43. Modified hairs (bristles) near the base of the distal apophyses of the chelicerae (Figs 167, 186): 0 – absent; 1 – present.

Character 44. Dark outgrowth (Figs 165, 236) of the frontal prominences of the chelicerae: 0 – absent; 1 – present.

Character 45. Modified hairs on the tip of the distal cheliceral apophyses (Figs 58, 159): 0 – two; 1 – three; 2 – more than three; 3 – one.

Character 46. Position of the modified hairs of the chelicerae: 0 – apical (see Dimitrov & Ribera, 2005a: fig. 9); 1 – retrolateral (Figs 58, 159).

Character 47. Conical protuberance of the distal apophysis of the chelicerae: 0 – absent (Fig. 88); 1 – present (Fig. 149).

Character 48. Distance between the frontal prominences and the clypeus: 0 – short, smaller or closer to the diameter of the base of the prominences (Figs 236, 238); 1 – long (Fig. 147).

Character 49. Width of the base of the proximolateral apophyses: 0 – narrow (similar to the width in the first two thirds of the apophyses); 1 – wide.

Character 50. Relative position of the distal apophyses and the margins of the chelicerae: 0 – the distance between the exterior margins of the chelicerae and the distal apophyses is equal or more than 1.5 times, the distance between them and the interior margin of the chelicerae; 1 – the distance to the interior and the exterior margin is more or less equal; 2 – close to the exterior margin.

Character 51. Relative position of the distal apophysis of the chelicerae and the clypeus: 0 – close (distal apophyses in the middle of the chelicerae or closer). 1 – distant (distal apophyses in the last one third of the chelicerae).

Character 52. Pigmentation pattern of the chelicerae: 0 – absent; 1 – present.

Character 53. Triangular plate of the epigynum: 0 – absent; 1 – present.

Character 54. Height of the triangular plate: 0 – high (Fig. 181); 1 – low (Fig. 255).

Character 55. Pigmentation of the triangular plate: 0 – the part just over the genital opening has a dark colored band (Figs 102, 103); 1 – two darker lateral zone can be observed clearly (Figs 143, 216); 2 – the pigmentation changes its intensity but does not form well distinguishable areas (Fig. 235).

Character 56. Pigmentation of the epigynum (should not be mixed with the parts of the vulva observed by transparency): 0 – present (Figs 163, 164); 1 – absent (Figs 10, 14).

Character 57. Base of the triangular plate: 0 – slightly arched (Fig. 216); 1 – with the shape of a double S (Fig. 235).

Character 58. Shape of the genital zone of the female (lateral view): 0 – rounded; 1 – tear-shaped; 2 – elevated, with conical shape.

Character 59. Shape of the cylindrical outgrowth of the triangular plate: 0 – straight; 1 – curved toward the base of the plate; 2 – the triangular plate has smooth proximal edge without outgrowth; 3 – the genital zone conically shaped with the tip curved, forming big cylindrical outgrowth.

Character 60. ‘Bump’ on the female external genitalia: 0 – absent; 1 – present; 2 present with incision.

Character 61. Distance between the pore plates of the vulva. 0 – close; 1 – distant (when the distance between them is equal or greater than its width).

Character 62. Size of the pore plates: 0 – big; 1 – small (when the longer axis of the pore plate is smaller than one-third of the height of the vulva).

Character 63. Orientation of the pore plates: 0 – straight; 1 – inclined (the longer axis is orientated laterally).

Character 64. Well quitinized frame around the pore plates: 0 – present; 1 – absent.

Character 65. Anterior median eyes: 0 – absent; 1 – present; 2 – reduced.

Character 66. Anterior lateral eyes: 0 – absent; 1 – present; 2 – reduced.

Character 67. Posterior median eyes: 0 – absent; 1 – present; 2 – reduced.

Character 68. Posterior lateral eyes: 0 – absent; 1 – present; 2 – reduced.

Character 69. Lateral triads elevation: 0 – not elevated; 1 – on small protuberances; 2 – on stems.

Character 70. Position of the spinnerets: 0 – caudal; 1 – ventral.

Character 71. Shape of the opisthosoma: 0 – cylindrical; 1 – globular; 2 – cylindrical with conical elongation.

Character 72. Pigmentation pattern: 0 – yellowish or brownish; 1 – greyish.

Character 73. Pigmentation pattern of the opisthosoma: 0 – no markings or if any always dorsally; 1 – distinctive markings on the opisthosoma which extends both dorsally and ventrally.

APPENDIX 3

Data matrix used for cladistic analyses.

<i>ornatus</i>	2010100000	2120000001	0001010110	0110120111	0110011110	1010101000	0010111120	000	
<i>calcar</i>	2110100000	2120000011	0101000110	0110120111	001101?000	0010100000	1110111120	000	
<i>corcho</i>	2110100000	2420000001	0001100110	0110120111	0111011000	0110110000	1110111120	000	
<i>helenae</i>	2110100000	2420000001	0001100110	0111120111	0111010010	1110101000	1110111120	000	
<i>multidentatus</i>	2010101200	2120000000	0111000110	0111120111	0011011000	1110101000	1010111120	000	
<i>fuerteventurensis</i>	2010110210	3110010001	0001010000	0110120111	0210011000	1011110000	0110111120	000	
<i>edentatus</i>	2010101200	1200110011	0111010000	0110120111	0211011010	1011201010	1110111120	000	
<i>guadarfia</i>	2011100210	1110010001	0001010100	0110120111	0010011000	1011200110	1110111120	000	
<i>anachoreta</i>	2011110210	3110010001	0001000000	0100120111	0210011000	1011200010	0010111120	000	
<i>tenerifensis</i>	2021100100	1330221000	1021011000	0111120111	0010010110	0010111010	1110111120	000	
<i>mascaensis</i>	2021101100	1300221001	0101011000	0110120111	0110010110	1010000110	1110111120	000	
<i>intricatus</i>	2021101100	1200221001	0101011000	0111120111	0010010111	0010011010	1110111120	000	
<i>knoeseli</i>	2020101210	1331221000	1021011000	0110120111	0010010110	1010101000	1010111120	000	
<i>roquensis</i>	2021101210	1300221010	1021011000	0110120111	0210010111	0010101010	1010111120	000	
<i>corniger</i>	2010101211	0301120???	???	0100120111	010021?111	0011110230	1110000020	000	
<i>baldiosensis</i>	??????????	??????????	??????????	0?????????	??????????	??11210110	1110002220	000	
<i>malpaisensis</i>	2021101110	1400221010	1021011000	0110120111	0210010000	0010110110	0010111120	000	
<i>gomeræ</i>	2021101210	1400221000	1021101000	0110120111	0010110000	1111101110	1010111120	000	
<i>sveni</i>	2021101210	1400221000	1021101000	0111120111	0210110010	1011110110	1010111120	000	
<i>bimbache</i>	2020101210	1400121000	1021101000	0110120111	0210?10100	0011010110	1000111120	000	
<i>dentatus</i>	?0??100200	1100221001	0011100000	011?120111	0110?1?001	10101?0010	????111120	000	
<i>parvus</i>	2???	1130221001	0011100000	0110120111	0111?1?000	00111?1010	1010111120	000	
<i>silvai</i>	2???	100200	1130220001	0011100000	011?120111	0????1????	??1???????	????111120	000
<i>magnus</i>	2010100210	1??0221001	0011100000	0110120111	0110?1?1?0	0?101?0000	1110111120	000	
<i>madeirensis</i>	2010100210	1130221001	0011100000	0110120111	0110?1?1?0	1?101?0?00	1110111120	000	
<i>phalangioides</i>	1010101101	0100110001	0101110010	0100120111	0011010110	0010210010	0000111120	000	
<i>opilionoides</i>	1010101111	4300120000	01011000?0	0100120111	001101?010	1011111000	????111120	000	
<i>senoculata</i>	100-101301	0000120---	-----0?	0100100111	0301000100	100--0-021	000?011101	101	
<i>sciakyi</i>	100-0----	1 0000110---	-----0?	0100101101	0-0-300-01	000--0-021	0010011101	101	
<i>mercedes</i>	100-0----	1 0000110---	-----0?	0100101101	0-0-300-01	000--0-022	0010011101	101	
<i>caudatus</i>	00110----	1 4000110---	-----000	010-000000	1-0-300--2	1110200020	????111111	211	
<i>justoi</i>	1010101101	02010301--	---0--0001	1000110101	0-1-100-01	100--0-220	0011211121	100	
<i>vachoni</i>	2011110210	1100010001	0001000000	0110121111	0210011010	10????????	????111120	000	