

## SPIDERS (ARANEAE) FROM PORTO SANTO (MADEIRA, PORTUGAL): ADDITIONS TO THE CURRENT KNOWLEDGE

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**Abstract:** A field survey of the island of Porto Santo was conducted in connection with an environmental impact assessment study. Fifteen spider species are reported for the first time from the island, raising the number of recorded species to 64. Based on the new data we can remove *Zelotes longipes* (L. Koch, 1866) from the island's list and replace it with *Z. aeneus* (Simon, 1878).

**Key words:** Araneae, spiders, Porto Santo, Madeira, Portugal.

**Arañas (Araneae) de Porto Santo (Madeira, Portugal): aportaciones al conocimiento actual**

**Resumen:** Se realizó un estudio de campo en la isla de Porto Santo, en el marco de una evaluación de impacto ambiental. Se citan 15 especies de arañas de la isla por primera vez, elevando a 64 el número de especies registradas. Con los nuevos datos podemos retirar *Zelotes longipes* (L. Koch, 1866) de la lista de la isla y sustituirla por *Z. aeneus* (Simon, 1878).

**Palabras clave:** Araneae, arañas, Porto Santo, Madeira, Portugal.

### Introduction

The island of Porto Santo is situated about 45 km north-west of the island of Madeira, and it is the second largest of the Madeira archipelago, with an area of 40 km<sup>2</sup>. With 14 m.y. old, Porto Santo is the oldest island in the archipelago and one of the oldest in Macaronesia. The closest older islands are Selvagens, with 27 m.y. but 320 km away. The predominant landscape is open rocky ground, with very little vegetation and a semi-desertic climate, generally warm or mild and dry throughout the year. Exotic pine tree plantations are the most significant arboreal habitats. Reports concerning spiders from Porto Santo date back to early works by Kulczynski (1899, 1905), Schenkel, (1938), Denis (1962, 1963) and more recently to the work of Wunderlich (1987, 1992, 1995). Just recently, a checklist with a compilation of all the works available and further unpublished information was published (Cardoso & Crespo, 2008). In this work we present 15 new additions, raising the number of known species to 64. Of these, 3 are endemic (*Dysdera portisancti* Wunderlich, 1995, *Hogna schmitzi* Wunderlich 1992 and *Hogna biscoitoi* Wunderlich, 1992) and 6 others are found only in the Madeira archipelago. The remaining species present larger distributions.

### Material and methods

Most samples were made by lifting rocks and direct hand collecting. Many of them inside the perimeter of a golf course at the western part of the island, as part of an environmental impact assessment study. Sweeping low vegetation was performed only once. Most samples were taken

during day time. Spiders were kept in ethanol 80%. In the laboratory, specimens were identified using a Zeiss Stemi 2000 microscope. When needed, female genitalia was removed using a scalpel and hypodermic needles and left to degrade its soft parts in an acid solution prepared with 30 ml of water, 30 ml of acetic acid and 40 g of cloral hydrate for about 20 hours, or methyl salicylate for a variable amount of time, according to the specimen's size and rigidity.

All nomenclature followed Platnick's World Spider Catalogue (2009).

All specimens are deposited in the first author's personal collection.

### Results

#### Family ARANEIDAE Simon, 1895 (4 species)

##### • *Argiope trifasciata* (Forsskål, 1775)

MATERIAL: 1 female, 25-VIII-2008, golf course; 1 male and 1 female, 7-X-2008, golf course; 1 male, 8-X-2008, Pico do Facho. REMARKS: Very common among *Opuntia* spp. but also found near small river beds on other plants.

##### • *Cyrtophora citricola* (Forsskål, 1775) (Fig. 1)

MATERIAL: 1 male and 1 female, 8-X-2008, Pico do Facho. REMARKS: This species, although very common, wasn't reported yet for Porto Santo. It is remarkably abundant among *Opuntia* spp., where often several individuals were observed in the same plant.

##### • *Mangora acalypha* (Walckenaer, 1802) (Fig. 2)

MATERIAL: 1 female, 1-X-2009, Fonte da Areia. REMARKS: Although this common species was reported from most

Macaronesian islands, this was the first time it was reported for Porto Santo.

- *Neoscona crucifera* (Lucas, 1838)

MATERIAL: 1 female, 5-X-2008, golf course expansion; 1 female, 7-X-2008, golf course.

REMARKS: Specimens were observed in a variety of habitats: low grasses, riparian corridors and in pine trees.

#### Family DYSDERIDAE C.L. Koch, 1837 (1 species)

- *Dysdera crocata* C. L. Koch, 1838

MATERIAL: 1 female, 25-VIII-2008, golf course; 1 male and 1 female, 6-X-2008, golf course; 1 female, 27-IX-2009, golf course.

#### Family FILISTATIDAE Ausserer, 1867 (1 species)

- *Filistata insidatrix* (Forskål, 1775)

MATERIAL: 1 male, 29-IX-2009, golf course.

REMARKS: It was the first time that this widespread species was found in the island of Porto Santo. See the drawing of the male pedipalp in Crespo *et al.*, submitted (Fig. 1).

#### Family GNAPHOSIDAE Pocock, 1898 (2 species)

- *Drassodes lutescens* (C.L. Koch, 1839) (Fig. 3)

MATERIAL: 1 female, 25-VIII-2008, golf course.

REMARKS: This species was initially cited for the Madeira archipelago by Kulczynski (1899) but it was only now found in Porto Santo; its presence was, therefore, expected.

- *Zelotes aeneus* (Simon, 1878) (Fig. 4)

MATERIAL: 4 females, 4-X-2008, Pico Ana Ferreira; 1 male, 5-X-2008, Miradouro das Flores; 2 females, 5-X-2008, golf course; 1 female, 6-X-2008, Pico Branco; 1 female, 8-X-2008, Vila Baleira; 1 male and 2 females, 9-X-2008, Eiras; 1 female, 9-X-2008, near the small botanical garden; 2 females, 9-X-2008, Varadouro; 1 male and 1 female, 28-IX-2009, golf course.

REMARKS: This species was first cited from Madeira and Porto Santo by Schenkel, (1938), who realized that previous citation by Kulczynski (1899), under the synonymy of *Prosthesima setifera*, was in fact relating to *Z. aeneus*. However, Denis (1962) later identified this species as *Z. longipes* (L. Koch, 1866), and established Schenkel's citation as a synonymy. From there on, this species would be always referred to as *Z. longipes*, even though it is now easy to separate these two species. They can be distinguished by the posterolateral margin of the epigynum in females, which is excavated in *Z. longipes* and roughly square in *Z. aeneus*; in males the differences are also evident if we consider the shape of embolus and the terminal and median apophyses. In fact, even if we consider the drawings of Kulczynski (1899), we can observe that these couldn't possibly be referring to *Z. longipes*. Material belonging to this species from the island of Madeira was also available and these data confirm our identification, which leads the authors to suggest that *Z. longipes* should be replaced by *Z. aeneus* in the checklist of the Madeira archipelago spiders, with presence confirmed in Madeira and Porto Santo. Kulczynski also reported this species to the Selvagens Islands but no *Zelotes* material is available from them.

#### Family LYCOSIDAE Sundevall, 1833 (1 species)

- *Hogna* Simon, 1885

REMARKS: At least two different species of the four previously reported to the island were collected, being the only certain identity that of *H. schmitzi*. Due to the need of performing a more detailed work about this genus that will incorporate both morphological and genetic data, results are hereby omitted.

- *Pardosa proxima* (C.L. Koch, 1847)

MATERIAL: 1 female, 6-X-2008, golf course riparian corridor; 1 female, 27-IX-2009, golf course.

REMARKS: Although Platnick (2009) doesn't refer to the presence of this common species in the Madeira archipelago, the species was previously cited by other authors (*P. esperanzae* Schmidt, 1975, synonymised in Wunderlich, 1992a).

#### Family PHILODROMIDAE Thorell, 1870 (1 species)

- *Philodromus insulanus* Kulczynski, 1905 (Fig. 5)

MATERIAL: 1 female, 9-X-2008, Varadouro.

REMARKS: This is the first time this species is cited from Porto Santo, until now it was only known from Madeira (Kulczynski, 1905, Denis, 1962).

#### Family PRODIGOMIDAE Simon, 1884 (1 species)

- *Zimirina lepida* (Blackwall, 1859) (Fig. 6)

MATERIAL: 2 females, 5-X-2008, Miradouro das Flores; 1 female, 5-X-2008, Morenos.

REMARKS: This is the species' first record from the island of Porto Santo. This species was until now only known from the island of Madeira. The epigynum appears to present some degree of variation in the shape of the copulatory ducts and the sclerotization of the epigynal arch.

#### Family SALTICIDAE Blackwall, 1841 (2 species)

- *Macaroeris diligens* (Blackwall, 1867)

MATERIAL: 1 female, 4-X-2008, dunes of Vila Baleira; 2 females, 5-X-2008, golf course; 1 male and 1 female, 6-X-2008, golf course riparian corridor; 3 females, 7-X-2008, golf course; 1 female, 29-IX-2009, golf course.

REMARKS: Cocoons of this species were very easy to find among the branches of *Tamaryx gallica* L., which is usually present in riparian corridors and in dune areas.

- *Macaroeris nidicolens* (Walckenaer, 1802) (Fig. 7)

MATERIAL: 1 female, 7-X-2008, golf course.

REMARKS: This was the first time this common species was found in the island of Porto Santo.

#### Family SEGESTRIIDAE Simon, 1893 (1 species)

- *Segestria florentina* (Rossi, 1790)

MATERIAL: 3 males and 2 females, 6-X-2008, golf course riparian corridor; 1 female, 25-IX-2009, golf course.

#### Family SICARIIDAE Keyserling, 1880 (1 species)

- *Loxosceles rufescens* (Dufour, 1820) (Fig. 8)

MATERIAL: 1 female, 28-IX-2009, golf course; 1 female, 2-X-2009, Moledo.

REMARKS: Although the fact is not surprising given its cosmopolitan distribution, it is the first time this species is cited to Porto Santo.

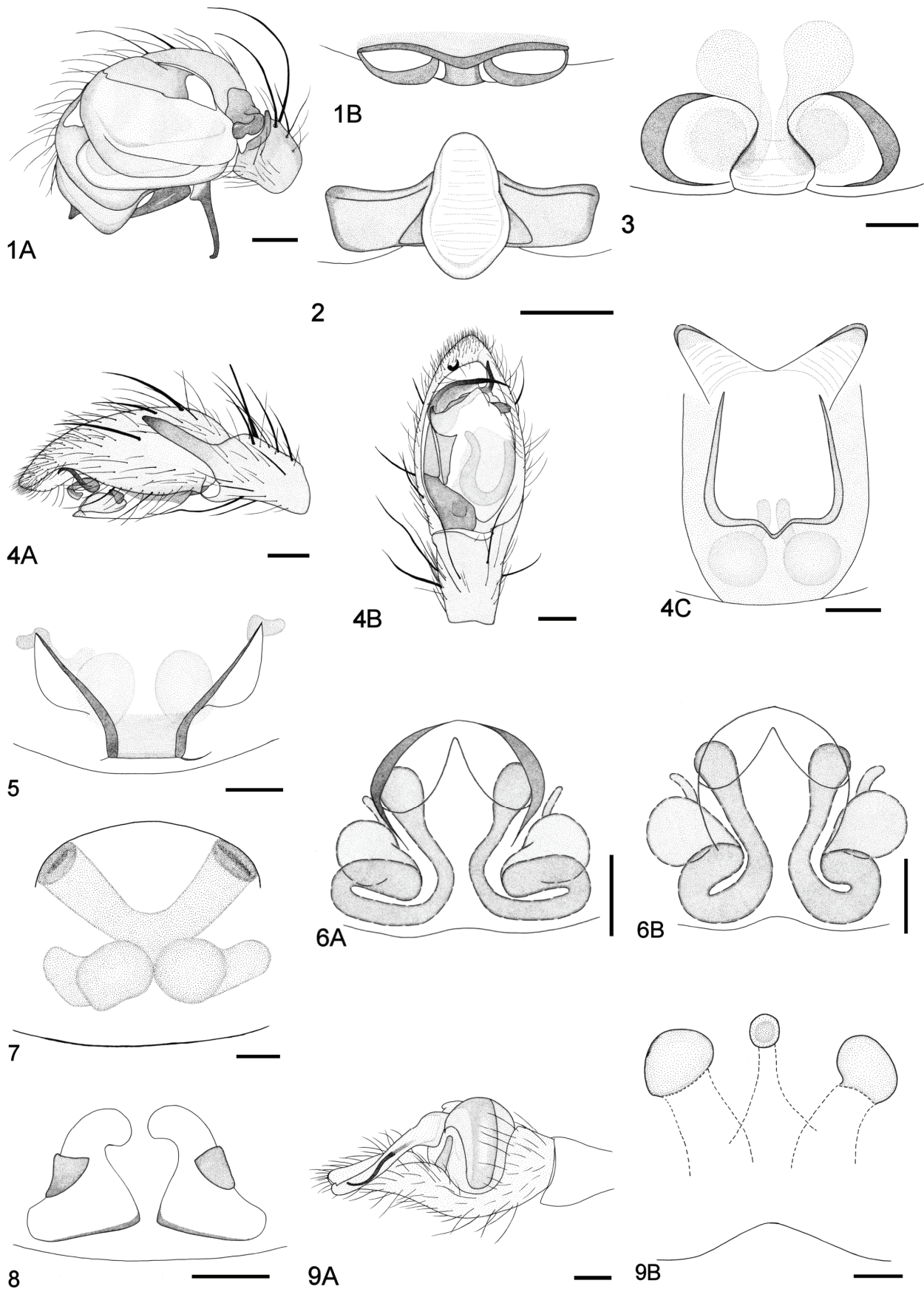
#### Family TETRAGNATHIDAE (1 species)

- *Tetragnatha fuerteventurensis* Wunderlich, 1992 (Fig. 9)

MATERIAL: 4 males and 5 females, 25-VIII-2008, golf course (near a lake).

MATERIAL USED FOR COMPARISON: *T. nitens kullmani* Wiehle, 1962, 1 adult female, 1 subadult male, 1 subadult female and 1 juvenile, deposited in the Senckenberg Museum of Natural History, label SMF 12742.

REMARKS: The specimens found were caught in a giant communal web containing hundreds of individuals. Wunderlich (1992) only found this species in a river at the island of Fuerteventura and being so, it enlarges the known distribution of this species. Some degree of variation can be observed in the female genitalia from that described by Wunderlich, most notably the position of the median receptaculum but this may be due to the removal or handling of the structure.



**Fig. 1.** *Cyrtophora citricola*: **A**, male pedipalp, retrolateral; **B**, female epigynum. **Fig. 2.** *Mangora acalypha*: female epigynum. **Fig. 3.** *Drassodes lutescens*: female epigynum. **Fig. 4.** *Zelotes aeneus*: **A**, male pedipalp, retrolateral; **B**, male pedipalp, ventral; **C**, female epigynum. **Fig. 5.** *Philodromus insulanus*: female epigynum. **Fig. 6.** *Zimirina lepida*: **A**, female from Miradouro das Flores, cleared epigynum; **B**, female from Morenos, cleared epigynum. **Fig. 7.** *Macarokeris nidicolens*: female epigynum. **Fig. 8.** *Loxosceles rufescens*: seminal receptacles. **Fig. 9.** *Tetragnatha fuerteventurensis*: **A**, male pedipalp, ventral; **B**, female vulva. Fig. 1-4, 8-9: scale bars = 0,1 mm. Fig. 5-7: scale bar = 0,05 mm.

#### Family THERIDIIDAE (6 species)

- *Argyrodes argyrodes* (Walckenaer, 1802) (Fig. 10)  
MATERIAL: 1 male and 2 females, 7-X-2008, golf course riparian corridor.  
REMARKS: This is the first time the species is cited for the island of Porto Santo. 1 of the females was caught in a *Neoscona crucifera* web, while the remainder couple was captured from an *Argiope trifasciata* web.
- *Cryptachaea acoreensis* (Berland, 1932) (Fig. 11)  
MATERIAL: 1 female, 6-X-2008, golf course riparian corridor.  
REMARKS: Although this species has been found throughout the world, it is only now known from Porto Santo.
- *Paidiscura orotavensis* (Schmidt, 1968) (Fig. 12)  
MATERIAL: 1 male and 2 females, 4-X-2008, dunes of Vila Baleira; 1 male and 4 females, 7-X-2008, golf course riparian corridor.  
REMARKS: This is the first time the species is mentioned to the island of Porto Santo.
- *Steatoda grossa* (C.L. Koch, 1838)  
MATERIAL: 1 male, 6-X-2008, golf course riparian corridor.
- *Steatoda nobilis* (Thorel, 1875)  
MATERIAL: 1 female, 25-VIII-2008, golf course; 1 female, 7-X-2008, golf course.
- *Theridion hannoniae* (Denis, 1944) (Fig. 13)  
MATERIAL: 1 female, 4-X-2008, Pico Ana Ferreira.  
REMARKS: Although not surprisingly, this is the first time the species is cited from Porto Santo.

#### Family THOMISIDAE Sundevall, 1833 (1 species)

- *Xysticus nubilus* Simon, 1875  
MATERIAL: 1 female, captured on 5-X-2008 as juvenile, reached adulthood on 25-II-2009, golf course.

#### Family ULOBORIDAE Thorell, 1869 (1 species)

- *Uloborus walckenaerius* (Latreille, 1806) (Fig. 14)  
MATERIAL: 1 female, 8-X-2008, Pico do Facho.  
REMARKS: This is the first time the species is cited for Porto Santo, although previous authors cited it from Madeira and the Canary Islands. The only adult specimen was found among an *Opuntia* sp.

#### Family ZODARIIDAE Thorell, 1881 (1 species)

- *Zodarion styliferum* (Simon, 1870) (Fig. 15)  
MATERIAL: 2 females, 29-IX-2009, golf course.  
REMARKS: Although already known to be present in Madeira, this is the first time the species is cited for Porto Santo.

### Discussion

It is remarkable that from just a simple set of *ad-hoc* sampling, 15 species are found that weren't yet cited to this island, and this raises the species number from 49 to 64 species. This just illustrates how poor the knowledge about Porto Santo spiders was.

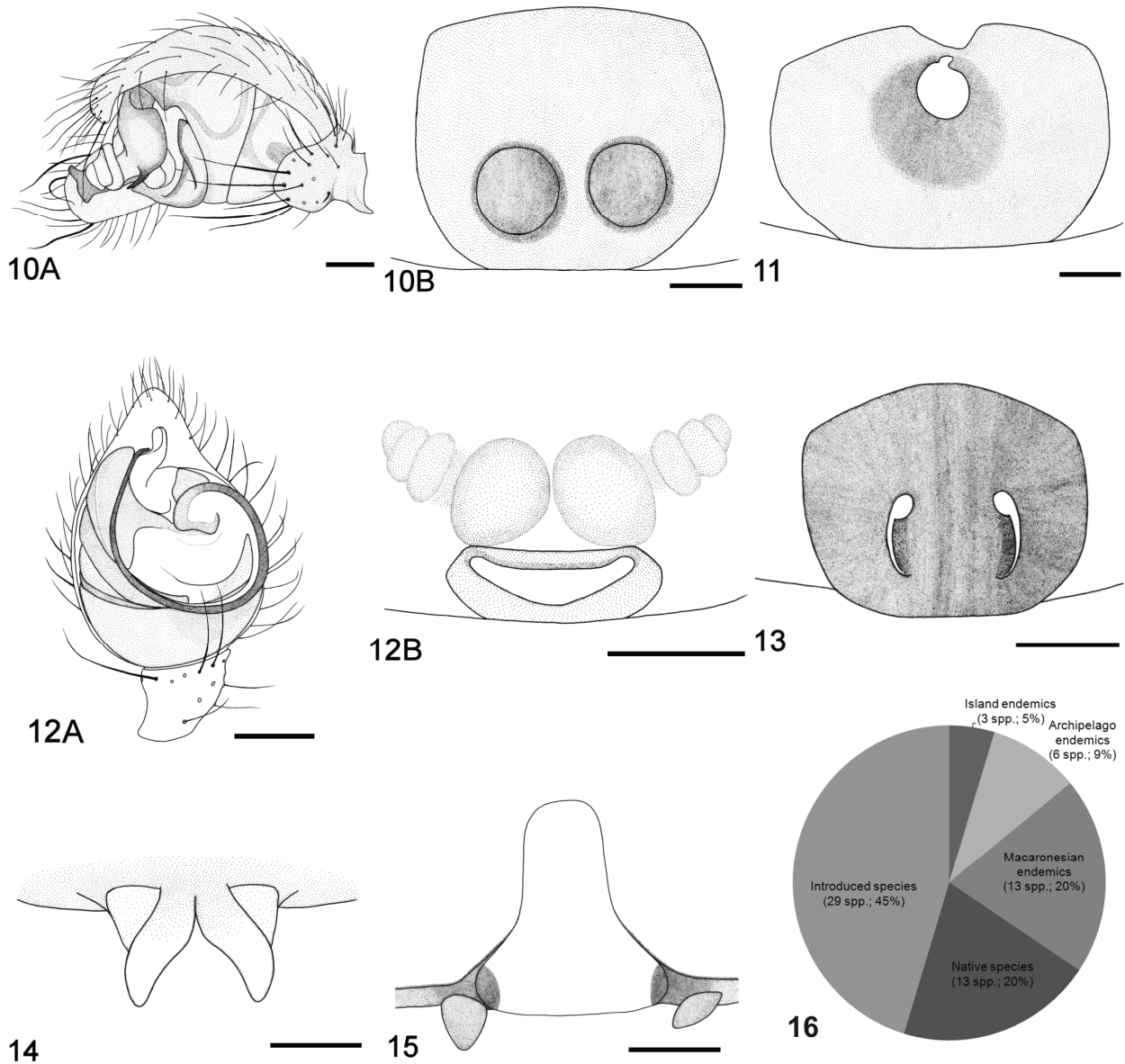
Endemics (data retrieved from Cardoso & Crespo, 2008) account for only 34% of the island spider community, and the apparent introductions in this island reach 45% (Fig. 16). This could be due to the simple lack of knowledge of the island spider fauna because more common species with wider distributions are readily seen and identified and more

cryptic and perhaps native species are more easily overlooked, which can explain the very low number of single island endemics (3 species; 5%). Also, the old age of Porto Santo implies that a larger percentage of single island endemics could be present, perhaps not as many as in Madeira due to the smaller area and much more homogeneous biota than those of the latter island, but still, it is likely that more than 3 species exist that are endemic to Porto Santo. Material was collected that is not reported in the present paper, consisting of single males or females, readily identified as unknown to the region, but further work on these specimens will need more material from both sexes. Ideally, a standardized sampling protocol directed towards spiders should be made in order to boost the knowledge of the spider fauna, not only in Porto Santo, but as well in the remainder islands of the whole Madeira archipelago. Unlike Madeira, which has received some degree of attention by arachnologists, the Desertas and Selvagens haven't received much attention. Future work could lead to more detailed biogeographic, systematics or ecology studies.

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**Fig. 10.** *Argyrodes argyroides*: **A**, male pedipalp, retrolateral; **B**, female epigynum (scale bars = 0,1 mm). **Fig. 11.** *Cryptachaea acoreensis*: female epigynum (scale bar = 0,05 mm). **Fig. 12.** *Paidiscura orotavensis*: **A**, male pedipalp, ventral; **B**, female epigynum (scale bars = 0,1 mm). **Fig. 13.** *Theridion hannoniae*: female epigynum (scale bar = 0,05 mm). **Fig. 14.** *Uloborus walckenaerius*: female epigynum (scale bar = 0,1 mm). **Fig. 15.** *Zodarion styliferum*: female epigynum (scale bar = 0,1 mm). **Fig. 16.** Distribution of the 64 spider species reported to Porto Santo according to their origins.