



The genus *Clubiona* Latreille, 1904 (Araneae: Clubionidae) in the Maghreb, with notes on the *genevensis* group and new records from the Mediterranean Region

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Abstract

A survey of the members of the genus *Clubiona* Latreille, 1904 in the Maghreb is presented. The presence of *Clubiona compta* C. L. Koch, 1839, *C. diniensis* Simon, 1878, *C. leucaspis* Simon, 1932, *C. phragmitis* C. L. Koch 1843 and *C. vegeta* Simon, 1918 is confirmed. *Clubiona pseudosimilis* Mikhailov, 1990, from the eastern Mediterranean is new to Africa and Portugal. A specimen of *C. neglecta* O. Pickard-Cambridge, 1862, cited from Morocco in the past, was misidentified and appears to be *C. pseudoneglecta* Wunderlich, 1994. The species is new to Algeria and Spain. Two new synonyms are revealed: *Clubiona baborensis* Denis, 1937 from Algeria = *C. diniensis* Simon, 1878 N. Syn. and *Clubiona venusta* Pavesi, 1880 from Tunisia = *Selamia reticulata* (Simon, 1870) N. Syn. *Clubiona mandibularis* Lucas, 1846 is considered a Nomen dubium. The *compta* group is redefined and the “*genevensis* subgroup” is elevated to species group, including two subgroups. A key and illustrations to the species of the *genevensis* group are presented and all the species occurring in the Maghreb are illustrated.

Key words: Sac spiders, distribution, Northwest Africa, new synonyms, *compta* group, male palp

Introduction

The family Clubionidae Wagner, 1887, grouping the often-called sac spiders, includes 614 species distributed in 15 genera. Among them, the genus *Clubiona* Latreille, 1904 is by far the most diverse, with 491 species and 3 subspecies (World Spider Catalog 2017). Based mainly on genital characters, Mikhailov (1995) proposed the subdivision of *Clubiona* into four subgenera. The subgenus *Clubiona* *sensu stricto* itself contains the majority of the Holarctic species and 14 species groups (including subgroups as well) have been defined (see Mikhailov 1992; 1995; 2012).

The Palaearctic species are relatively well known (Almquist 2006; Mikhailov 1990, 1992, 2003; Mikhailov & Szinetar 1997) and regarding the Maghreb, eight species of *Clubiona* have been cited from this region in the past: *Clubiona baborensis* Denis, 1937, *C. compta* C. L. Koch, 1839, *C. leucaspis* Simon, 1932, *C. mandibularis* Lucas, 1846, *C. neglecta* O. Pickard-Cambridge, 1862, *C. phragmitis* C. L. Koch, 1843, *C. vegeta*, Simon, 1918 and *C. venusta* Pavesi, 1880.

The Maghreb is usually defined as the region of Northwest Africa that includes Mauritania, Morocco (including the Western Sahara), Algeria, Tunisia, and Libya. It can be divided in two main parts: the Mediterranean Maghreb and the Saharan Maghreb. The Mediterranean part is situated between the Atlas Mountains and the Mediterranean Sea, the southern extent corresponding with the 100 mm isohyet and the southern range of the European olive (*Olea europaea*). Main natural vegetations are Mediterranean acacia-argania dry woodland and succulent thickets (only in Morocco), Mediterranean dry woodlands and steppe, Mediterranean woodlands and

forests, Mediterranean conifer and mixed forests and Mediterranean High Atlas juniper steppe (only in Morocco). *Clubiona* species only occur in the Mediterranean Maghreb.

Whereas *Clubiona comta*, *C. leucaspis*, *C. neglecta*, *C. phragmitis* and *C. vegeta* are well-known species from Europe, *C. baborensis* is only known from a single female from Algeria and *C. venusta* is a forgotten species only known from an old description without figures. *Clubiona mandibularis* was transferred into *Amaurobius* by Simon (1864), but it is listed again as *Clubiona* in the World Spider Catalog (2017).

This paper presents new synonymies and records of *Clubiona* species, mainly for the Maghreb, and provide high quality photographs of habitus and genitalia. The *comta* group (Mikhailov 1995) is redefined and the “*genevensis* subgroup” is elevated to species group, including the *genevensis* and the *decora* subgroups. For some closely related species of the *genevensis* group, detailed scanning electron microscope (SEM) views of the male palp are shown for the first time and a key to the species of this group is also provided.

Material and methods

Colored photographs of the habitus, the male palps and the female genitalia were taken with a Leica MZ16 using the LAS automontage software (ver. 3.8). Some images were taken (with the kind help of P. Oger) with an Olympus SZX7 (for habitus) or a Realux UNI 500 LED (genitalia) with a Moticam 5.0 MP and using Images Plus 2.0 and HeliconFocus 6.6.1 software. Some female genitalia were dissected and digested using a tablet of Total Care Enzima® (protein removal system originally for cleaning contact lenses and containing Subtilisin A - 0,4 mg/tablet) and then immersed in 75% ethanol. For SEM photos, detached male palps were first immersed in a few ml of acetone (overnight) and then dried by rapid evaporation of acetone on a heated plate (+60°C). Dried parts were then gold coated and examined and photographed with a JEOL 6480 LV scanning electron microscope. Illustrations were assembled and edited in Photoshop CS5 (white balance and color contrast adjusted).

A subdivision in species group as proposed by Mikhailov (1995; 2012) has generally been accepted (*e.g.* Deeleman-Reinhold 2001) and is followed here. All the material was collected by the first author and stored in his collection, unless otherwise mentioned. Abbreviations: NHML: Natural History Museum London. CMB: Collection Museo Bergamo. CJH: Collection Jesus Hernandez. CAH: Collection Arnaud Henrard. CPO: Collection Pierre Oger. CRB: Collection Robert Bosmans; CSB: Collection Souâd Benhalima. ISRM: Institut Scientifique, Rabat; MCSNG: Museo civico di Storia naturale, Genua. MNHNP: Muséum national d'Histoire naturelle, Paris. RMCA: Royal Museum for Central Africa, Tervuren. SMF: Natur-Museum und Forschungsinstitut Senckenberg, Frankfurt. ZMMU: Zoological Museum of the Moscow State University, Moscow.

Taxonomy

Genus *Clubiona* Wagner, 1887

Type species: *Clubiona pallidula* (Clerck, 1757).

The *genevensis* group. Mikhailov (1992; 1995) accommodated some *Clubiona* species into the *comta* group, which also comprised the *genevensis* subgroup. According to him, these species differed from the others by some characters linked to the embolus in the males and to the copulatory apparatus of the females. All species but *Clubiona comta* were part of the *genevensis* subgroup. Actually, the representatives of the last group are well distinguished by conspicuous characters, and are treated here as belonging to a species group of their own. *Clubiona comta* remains therefore the only representative of the *comta* group, and the newly erected *genevensis* group includes therefore eight species: *Clubiona decora* Blackwall, 1859, *C. diniensis* Simon 1878, *C. genevensis* L. Koch, 1866, *C. leucaspis* Simon, 1932, *C. minor* Wunderlich, 1987, *C. pseudominor* Wunderlich, 1987, *C. vegeta*, Simon, 1918, *C. wunderlichi* Mikhailov, 1992. Some of these species are not always easy to distinguish and often have broadly overlapping distributions (Helsdingen 1979). Two species described from China, *i.e.* *C. parallela* Hu & Li, 1987 and *C. zhangmuensis* Hu & Li, 1987, and originally included in the *genevensis* group (Mikhailov 1995), do not fit the diagnosis below. The strongly enlarged and protruding tegulum of the male palp and characteristics of the female epigyne and vulva of those two species fit perfectly with the diagnosis of the “*corticalis* group” (subgenus *Paraclubiona*), to which they must be transferred.

Diagnosis. Representatives of the *genevensis* group are characterized in the males by the palp with an almost rounded or ovoid bulbus (Figs 4, 12, 17, 25, 38, 46) and bearing a group of modified dark setae on the retrolateral face of the cymbium (Figs 3–5, 11, 16, 24, 37, 45, 68–79). The females have an epigyne characterized by wide atria (or copulatory openings) and a deep notch in its ventral margin (Figs 6, 13, 18, 26–28, 39, 47).

Remarks. The examined species of the *genevensis* group, *i.e.* *Clubiona diniensis*, *C. genevensis*, *C. leucaspis* and *C. vegeta*, are provided with modified setae situated on the retrolateral face of the cymbium (Figs 11, 16, 24, 37, 45, 52, 53, 56, 57, 60, 61, 64, 71, 77). They also occur in *C. decora* (see Figs 3–5) but were not examined here with SEM. The group also includes *C. minor* from Tenerife and La Gomera (the Canaries), *C. pseudominor* from La Palma (the Canaries) (Wunderlich, 1987, 1991; World Spider Catalog 2017) and *C. wunderlichi* from Mongolia (Mikhailov 1992; World Spider Catalog 2017) but these were not examined. The special setae are inserted near the base of the cymbium and extend up to half its length (Figs 3, 4, 11, 52) or less (Figs 24, 37, 45, 56, 60, 64). The basal part is slightly barbed and is provided with a sub-basal enlargement that can be spherical (Figs 70, 76) or plate-shaped (Figs 73, 79). The extremity is needle like and barbed (Figs 57, 61, 71, 77) or flattened and lanceolate (Figs 16, 53, 68). The retrolateral tibial apophysis (RTA) is sometimes provided with a thin, translucent, needle-like extension at its apex. It was observed in one specimen of *C. decora* (Fig. 5), one specimen of *C. vegeta* (Fig. 65) and on one specimen of *C. genevensis* (P. Oger, pers. comm.; see also on <http://arachno.piwigo.com/>). This structure appears to be fragile (*e.g.* it could break during copulation) and it was lacking on another *C. vegeta* male observed with SEM (Fig. 66). This character may be informative but was not used in the key since its presence in other species may be overlooked.

Inside the *genevensis* group, two well-defined subgroups (here called the *genevensis* subgroup and the *decora* subgroup) can be recognized. The *genevensis* subgroup includes *Clubiona genevensis*, *C. leucaspis* and *C. vegeta*. These species are characterized in the males by the palp with the embolus originating basally and directed laterally (Figs 25, 38, 46), by the basolateral extension of the bulbus and cymbium much longer than wide (Figs 59, 63, 67), and by the modified short cymbial setae (length less than half length of cymbium) (Figs 24, 37, 45, 56, 60, 64). The females have an epigyne with large, tightened and strongly convoluted copulatory ducts connected inferiorly to the atrio-spermathecal part (Figs 29–32, 40, 41, 48–51). The *decora* subgroup includes *Clubiona decora*, *C. diniensis*, *C. minor*, *C. pseudominor* and *C. wunderlichi*. Males of this subgroup are well characterized by the palp with embolus originating in distal or median part of bulbus and directed anteriorly (Figs 4, 12, 17) (origin of embolus basal and directed laterally in the other species of the *genevensis* group: Figs 25, 38, 46), short basolateral extension of bulbus and cymbium (Figs 54, 55) (much longer in the other species: Figs 59, 63, 67) and long modified cymbial setae (Figs 3, 4, 11, 52) (shorter in the others: Figs 24, 37, 45, 56, 60, 64). Females are characterized by the epigyne with copulatory ducts loose, slightly coiled and connected laterally to the atrio-spermathecal part (Figs 6–8, 13–15) (in the other species of the *genevensis* group, the tightened and strongly convoluted copulatory ducts are connected inferiorly to the atrio-spermathecal part: Figs 29–32, 40, 41, 48–51).

Key to the *Clubiona* species of the *genevensis* group

Clubiona minor, *C. pseudominor* and *C. wunderlichi* were not examined and, for these species, the key is based on characters found in literature.

- 1 Males (those of *C. pseudominor* and *C. wunderlichi* unknown) 2
- Females 7
- 2(1) Embolus originating in distal or median part of bulbus and directed anteriorly (Figs 4, 12, 17; Wunderlich 1987: fig. 640), basolateral extension of bulbus and cymbium short, as long as wide (Figs 54, 55); modified cymbial setae long: as long as half the length of cymbium or more (Figs 3, 4, 11, 16, 52) 3 (*decora* subgroup)
- Embolus originating more basally and directed laterally (Figs 25, 38, 46); basolateral extension of bulbus and cymbium much longer than wide (Figs 59, 63, 67); modified cymbial setae shorter, length less than half length of cymbium (Figs 24, 37, 45, 56, 60, 64) 5 (*genevensis* subgroup)
- 3(2) Palpal tibia nearly twice as long as wide (Fig. 11); RTA tip more rounded (Fig. 11); origin of embolus in distal part of bulbus (Figs 12, 17) *C. diniensis*
- Palpal tibia slightly longer than wide (Fig. 3; Wunderlich 1987: fig. 641); RTA with sharp tip (Fig. 3; Wunderlich 1987: fig. 641); origin of embolus in median part of bulbus (Fig. 4; Wunderlich 1987: fig. 640) 4
- 4(3) RTA thin, triangular, not broadened basally (Fig. 3) *C. decora*
- RTA with broad base extending dorsally (Wunderlich 1987: figs 641, 642) *C. minor*

- 5(2) Retrolateral tibial apophysis (RTA) rounded, slightly longer than wide at its base (Figs 37, 62); ventral profile of anterior part of bulbus concave (Figs 37, 60); modified cymbial setae with spherical sub-basal swelling (Figs 74–76); abdomen dorsally with pale spot on posterior half (Fig. 34) *C. leucaspis*
- RTA roughly triangular or bluntly pointed (Figs 24, 45, 57, 58, 65, 66); ventral profile of bulbus convex (Figs 24, 45, 56, 64); modified cymbial setae with flattened sub-basal swelling (Figs 73, 79); abdomen without postero-dorsal white spot (Figs 20–23, 42, 43) 6
- 6(5) Chelicerae not enlarged (Figs 20, 22, 23); RTA roughly triangular, with blunt, rounded tip (Figs 24, 57, 58); modified cymbial setae with well developed, plate shaped sub-basal swelling (Figs 72, 73) *C. genevensis*
- Chelicerae dark brown, strongly protruding (Figs 43, 44); RTA triangular with sharper tip (Figs 45, 65, 66); sub-basal swelling of modified cymbial setae reduced, crescent shaped (Fig. 79) *C. vegeta*
- 7(1) Copulatory ducts loose, slightly coiled or not, connected laterally to the atrio-spermathecal part (Figs 6–8, 13–15; Wunderlich 1987: figs 643–645; Mikhailov 1992: figs 2A, B) 8 (*decora* subgroup)
- Copulatory ducts tightened, strongly convoluted, connected inferiorly to the atrio-spermathecal part (Figs 29–32, 40, 41, 48–51) 12 (*genevensis* subgroup)
- 8(7) Copulatory ducts straight forward, not coiled (Wunderlich 1987: figs 643–645, 645a) 9
- Copulatory ducts coiled (Figs 6–8, 13–15; Mikhailov 1992: figs 2A, B) 10
- 9(8) Fertilization duct well developed, conical (Wunderlich 1987: fig. 644) *C. minor*
- Fertilization duct thinner, tube-shaped (Wunderlich 1987: fig. 645a) *C. pseudominor*
- 10(8) Epigyne with two distinct oval atria (Figs 13, 14, 18) *C. diniensis*
- Epigyne with only one, roughly inverted heart-shaped atrium (Figs 6–8; Mikhailov 1992: figs 2A, B) 11
- 11(10) Spermathecae far away from the anterior part of longitudinal copulatory ducts (Figs 6–8) *C. decora*
- Anterior part of longitudinal copulatory ducts almost reaching the inferior part of spermathecae (Mikhailov 1992: figs 2A, B) *C. wunderlichi*
- 12(7) Abdomen dorsally with short anterior median stripe and with contrasting pale oval area on posterior half (Figs 35, 36); spermathecae small, separated by their diameter or more (Figs 39–41) *C. leucaspis*
- Abdomen usually with longer, sometimes interrupted median stripe, posteriorly without dorsal pale spot (Figs 21, 42); spermathecae larger, separated by less than their diameter (Figs 26–33, 47–51) 13
- 13(12) Dorsal median stripe most often absent in anterior third of abdomen, fading into V-shaped stripes in posterior third (Fig. 21); copulatory opening often narrower, longer than wide (Figs 26, 27); vulva with narrower atrium (Figs 30, 32) ... *C. genevensis*
- Dorsal median stripe often reaching anterior margin of abdomen, tapered posteriorly and fading in posterior third (Fig. 42; better preserved in the male Fig. 43); copulatory opening wider, at least as wide as long (Figs 47, 48); vulva with wider atrium (Figs 49, 51) *C. vegeta*

***Clubiona decora* Blackwall, 1859**

(Figs 1–8; Map 1)

Clubiona decora Blackwall, 1859: 256 (♂, type series from Madeira, without further locality, J. Y. Johnson leg.; not examined, deposition unknown); Wunderlich, 1987: 241, 434, fig. 645b (♀).

Microclubiona decora; Wunderlich, 1992: 35, 482, fig. 758 (♂).

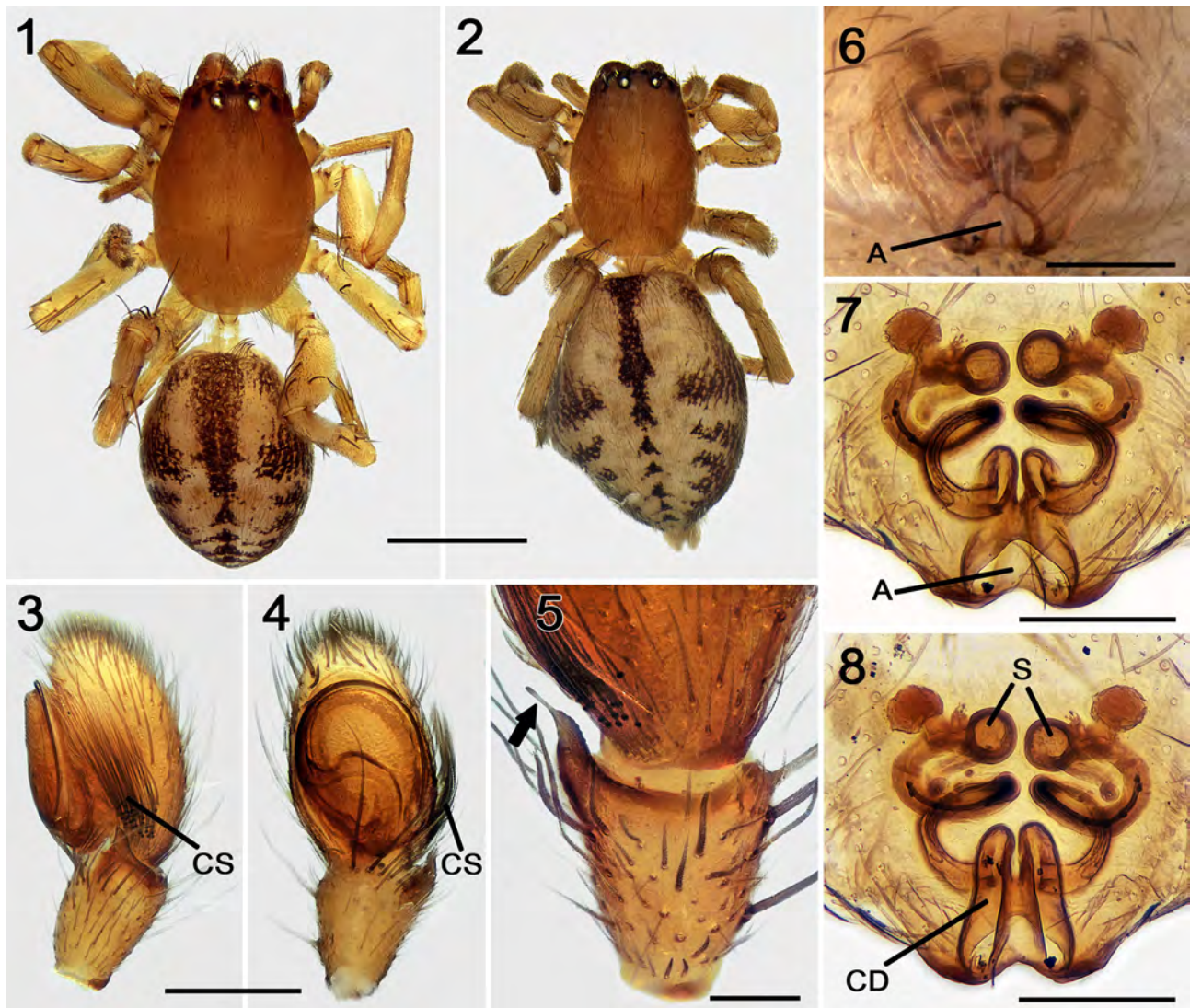
Diagnosis. *Clubiona decora* differs from all other species of the *genevensis* group by the male palpal tibia slightly longer than wide (Fig. 3), whereas it is nearly twice as long as wide in *C. diniensis* and as long as wide in the other species, the narrow and sharp RTA, and the origin of the embolus in the median part of bulbus Fig. 4), which is in the basal or distal part in the other species. Females are recognized by the epigyne with ventral margin interrupted medially, the small spermathecae distantly separated from the longitudinal copulatory duct (Figs 6–8) and the thin, convoluted copulatory ducts.

Description. See Wunderlich (1987, 1992).

Material examined. PORTUGAL: *Madeira*: Lombo do Coelho, 1 ♂ 1 ♀, 13.V.2005, J. Van Keer leg. (CRB).

Distribution. Kulczyński (1899) compared *Clubiona* specimens from France and Germany with material from Madeira and identified them as the same species, although their fig. 105 clearly shows the elongated tibial apophysis of *C. decora* and fig 101–104, 106 the much shorter tibial apophysis of *C. genevensis*. This confusion of *Clubiona decora* with *C. genevensis* has led to several misidentifications which sometimes still figure in modern catalogues. Citations of Bertkau (1890, 1893) from Italy and Portugal, of Chyzer & Kulczyński (1897) from Croatia, Hungary and Romania, of Kulczyński (1898) from Austria and of Lessert (1904) from Switzerland are based on Chyzer & Kulczyński's view (1897) **and** must be considered incorrect. Denis (1962) emphasizes there are clearly two different species which are readily separated by the shape of their genital organs. Tyschchenko (1971) mentions *C. decora* from Russia, and this was already corrected by Mikhailov & Fet in 1986, but is still mentioned

in the World Spider Catalogue (2017) under *C. decora*. Until further proof, *C. decora* is limited to Madeira, Porto Santo and the Azores. Citations from Portugal, Italy and the Balkans mentioned in Nentwig *et al.* (2017) probably refer to other species of the *genevensis* group.



FIGURES 1–8. *Clubiona decora* Blackwall, 1859: male and female (from Madeira); 1 male habitus, dorsal view; 2 female habitus, dorsal view; 3 male palp, retrolateral view; 4 same, ventral view. 5 detail of the retrolateral tibial apophysis (RTA) of the male palp, dorsal view (arrow on needle-like extension of RTA); 6 epigyne, ventral view; 7 vulva, ventral view; 8 same, dorsal view. Abbreviations: A = atrium, CD = longitudinal copulatory duct, CS = cymbial modified setae, S = spermathecae. Scale bars: 1, 2 = 1 mm; 3, 4, 6–8) = 0.2 mm; 5 = 0.1 mm.

***Clubiona diniensis* Simon, 1878**

(Figs 9–19, 52–55, 68–70; Map 1)

Clubiona diniensis Simon, 1878: 238 (holotype ♂ from France, Alpes de Haute Provence, vallée de la Bléone, MNHNP, not examined); Simon 1932: 924, 929, 967, figs 1408, 1418 (♂, ♀); Urones 1985: 47; Barrientos *et al.* 2016: 97 (♂).

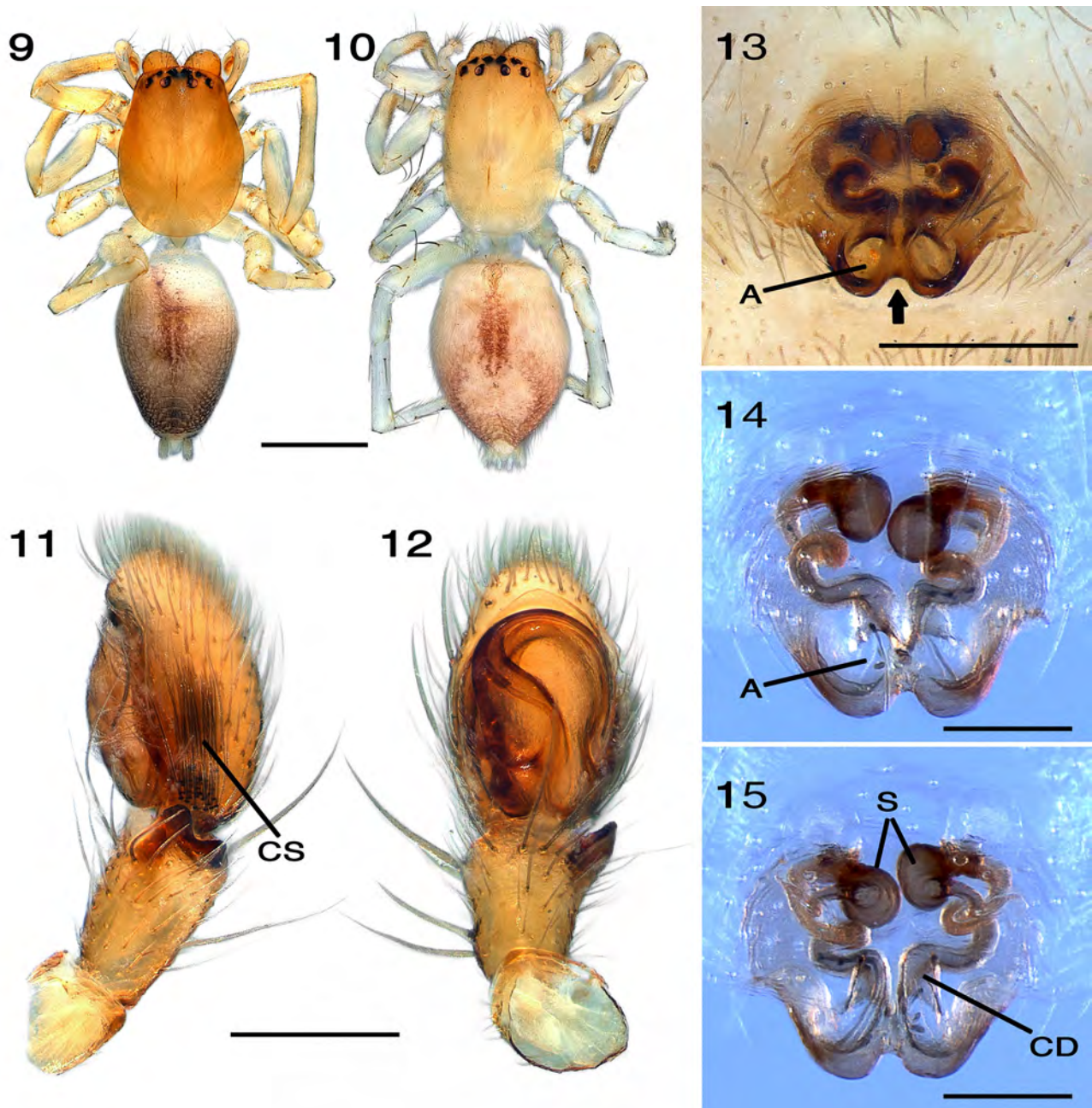
Clubiona baborensis Denis, 1937: 1050 (two ♀♀ syntypes from Algeria, Wilaya de Setif, Zouagha forest, 9 and 15.V.1936, probably in MNHNP, not examined). **N. Syn.**

Note. *Clubiona baborensis* was described from Algeria by Denis (1937) and only the female is known. We captured several females, corresponding completely with Denis' excellent figure of the epigyne, together with males. Both are identical to *C. diniensis* Simon, 1878 and *C. baborensis* Denis, 1937 therefore becomes its junior synonym.

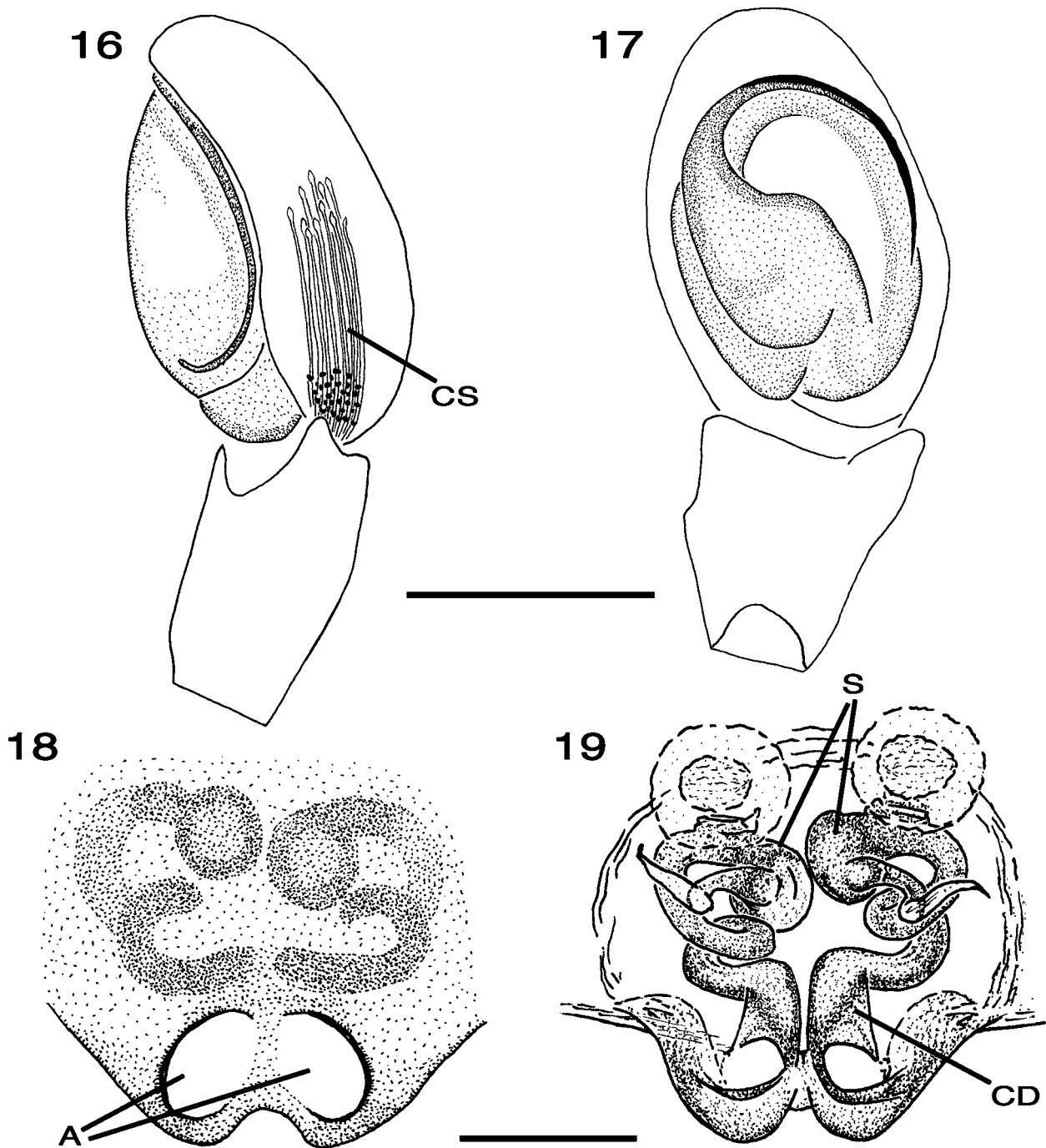
Diagnosis. Males of *C. diniensis* can be recognized by the long palpal tibia (nearly twice as long as wide) (Fig. 11) and by the embolus originating anteriorly (Figs 12, 17). In the other species of the *genevensis* group, the palpal tibia is much shorter and the embolus originates in basal or median part of the bulbus. Females are distinguished from the other species of the *genevensis* group by the presence of two distinct oval atria in the epigyne (Figs 13, 18).

Description. Last description of the male by Barrientos *et al.* (2016) and of the female by Denis (1937).

Previous citations in the Maghreb. ALGERIA: *Mila*: Zouagha forest (Denis 1937; type locality of *C. baborensis*).



FIGURES 9–15. *Clubiona diniensis* Simon, 1878: 9 male (from Spain) habitus, dorsal view; 10 female (from Spain) habitus, dorsal view; 11 male (from Algeria) palp, retrolateral view; 12 same, ventral view; 13 Female (from Algeria) epigyne, ventral view (arrow on deep ventral notch of the epigynal margin); 14 female (from France) vulva, ventral view; 15 same, dorsal view. Abbreviations: A = atrium, CD = longitudinal copulatory duct, CS = cymbial modified setae, S = spermathecae. Scale bars: 9, 10 = 1 mm; 11–13 = 0.2 mm; 14, 15 = 0.1 mm.



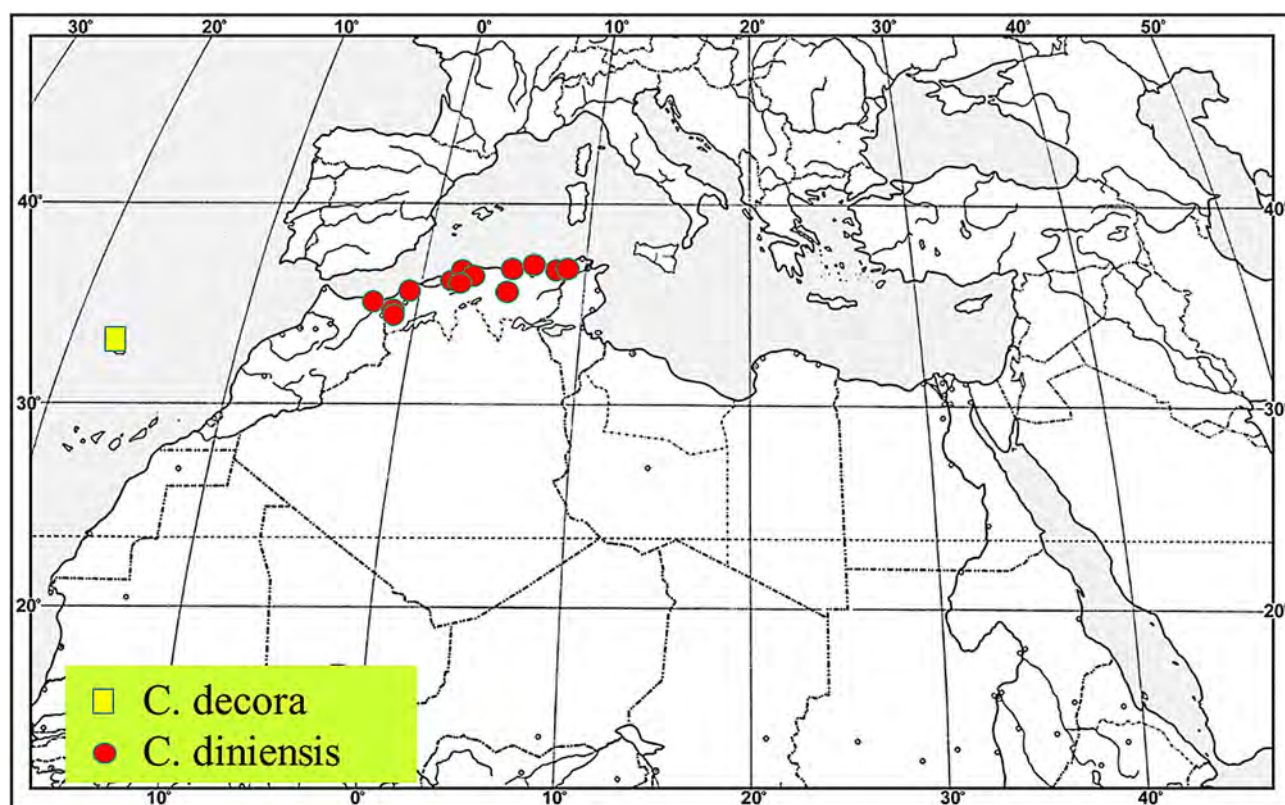
FIGURES 16–19. *Clubiona diniensis* Simon, 1878: 16 male (from Algeria) palp, retrolateral view; 17 same, ventral view; 18 female (from Algeria) epigyne, ventral view; 19 female (from France) vulva, dorsal view. Abbreviations: A = atrium, CD = longitudinal copulatory duct, CS = cymbial modified setae, S = spermathecae. Scale bars: 16, 17 = 0.2 mm; 18, 19 = 0.1 mm.

New records. AFRICA: ALGERIA: *Aïn Defla*: Djebel Zaccar, Aïn N' Sour, 900m, 1 ♀, litter in *Quercus ilex* forest, 18.V.1988, R. Bosmans leg. (CRB). *Alger*: Bainem, 250m, 1 ♀, under stones in *Quercus ilex* forest, 16.IV.1989 (CRB). *Bejaia*: Tichy S., 50m, 3 ♀♀, litter in herbs along Oued Djemaa, 20.V.1988, R. Bosmans leg. (CRB). *Blida*: Atlas Blidéen, Chréa, 830m, 2 ♂♂ 1 ♀, pitfalls in *Pinus halepensis* forest, 12.IV.1987, R. Bosmans leg. (CRB). *Boumerdes*: Réghaia, 45m, 2 ♂♂ 1 ♀, beating in *Quercus suber* forest, 14.II.1988, R. Bosmans leg. (CRB). *El Tarf*: El Kala National Park, 10m, 1 ♂, pitfalls at border of Lake Oubeira, 30.III.1988, R. Bosmans leg. (CRB). *Oran*: Forêt de Msila, 400m, 1 ♂, sieving litter in *Quercus suber* forest, 25.IV.1984, R. Bosmans leg.

(CRB). *Skikda*: Collo, Tamanart, 15m, 1 ♀, under stones in maquis, 6.VI.1987, R. Bosmans leg. (CRB). *Tlemcen*: Forêt de Tal Terny, 2 ♂♂, pitfalls in *Quercus ilex* forest, 24.V.1990, R. Bosmans leg. (CRB); Mansourah, Plateau de Lalla Setti, 975m, 1 ♀, litter in dry *Pinus halepensis* forest, 6.V.1984 (CRB). MOROCCO: *Fès-Meknès*: Taza, Dar Caid Medboh, 950m, 2 ♂♂, sieving litter in *Pinus halepensis* forest, 15.XII.2013, R. Bosmans leg. (CRB). TUNISIA: *Jendouba*: Ras Rajel, 200m, 1 ♀, beating in *Quercus suber* forest, 8.V.2006, R. Bosmans leg. (CRB). EUROPE: PORTUGAL: *Faro*: Marmelete-Casais, Ribera Alfambras, 1 ♀, beating in *Quercus suber* forest, 22.V.2007, R. Bosmans leg. (CRB); Sagres W., 1 ♀, beating *Pinus*, 22.V.2007, R. Bosmans leg. (CRB). SPAIN: *Caceres*: Plasencia, 1 ♂ 3 ♀♀, 13.V.1991, P. Poot leg. (CRB). *Cádiz*: Tarifa, 1 ♂, III.1992, P. Poot leg. (CRB). *Toledo*: between Zarzuelo del Monte and Ituero, 2 ♂♂ 2 ♀♀, under stones in open *Quercus ilex* forest, 1.IV.1997, R. Bosmans leg. (CRB). FRANCE: *Hérault*: Popian, 1 ♀, 25.V.1986, P. Poot leg., R. Bosmans leg. (CRB). *Aude*: Sigean, île de l'Aute, 1 ♀, beating shrubs, A. Henrard leg., 26.V.2012 (CAH). *Var*: Brue-Auriac, D35, 311 m, 2 ♂♂, maquis in *Pinus* forest, 03.V.2015, P. Oger leg. (CPO).

Ecology. In the Maghreb, *C. diniensis* lives in all types of forests from the seaside up to 800m. Adult males were collected from December to May, adult females from February to June.

Distribution. *Clubiona diniensis* appears to be a common species in Algeria but rare in Morocco and Tunisia. It was originally described from France, Alpes-de-Haute Provence (Simon 1878) and also cited from the French departments Aude, Var and Pyrénées-Orientales, from Catalunya in Spain (Simon 1932) and from Coimbra in Portugal (Bertkau 1893). Later, it was rarely collected. Soyer (1963) found it in the Bouches-du-Rhône, France, Caporiacco (1949) in Romagna, Italy, Urones (1985) and Barrientos *et al.* (2016) in Spain and Cardoso *et al.* (2008a, b) in Portugal.



MAP 1. Records of *Clubiona decora* Blackwall, 1859 and *C. diniensis* Simon, 1878 in the Maghreb and Madeira.

Clubiona genevensis L. Koch, 1866

(Figs 20–25, 26–33, 56–59, 71–73)

Clubiona genevensis L. Koch, 1866: 294 (deposition unknown; type locality unknown, but according to the species name, probably Geneva in Switzerland); Simon, 1932: 925, 930, 968, figs 1411, 1420 (♂♀); Wiehle, 1965: 478, f. 33-37 (♂♀); Helsdingen, 1979: 299, f. 4, 6-7 (♂♀); Mikhailov & Fet, 1986: 171.

Clubiona stigmatica Simon, 1878: 236 (♂♀); Simon 1932: 968 (Syn.).

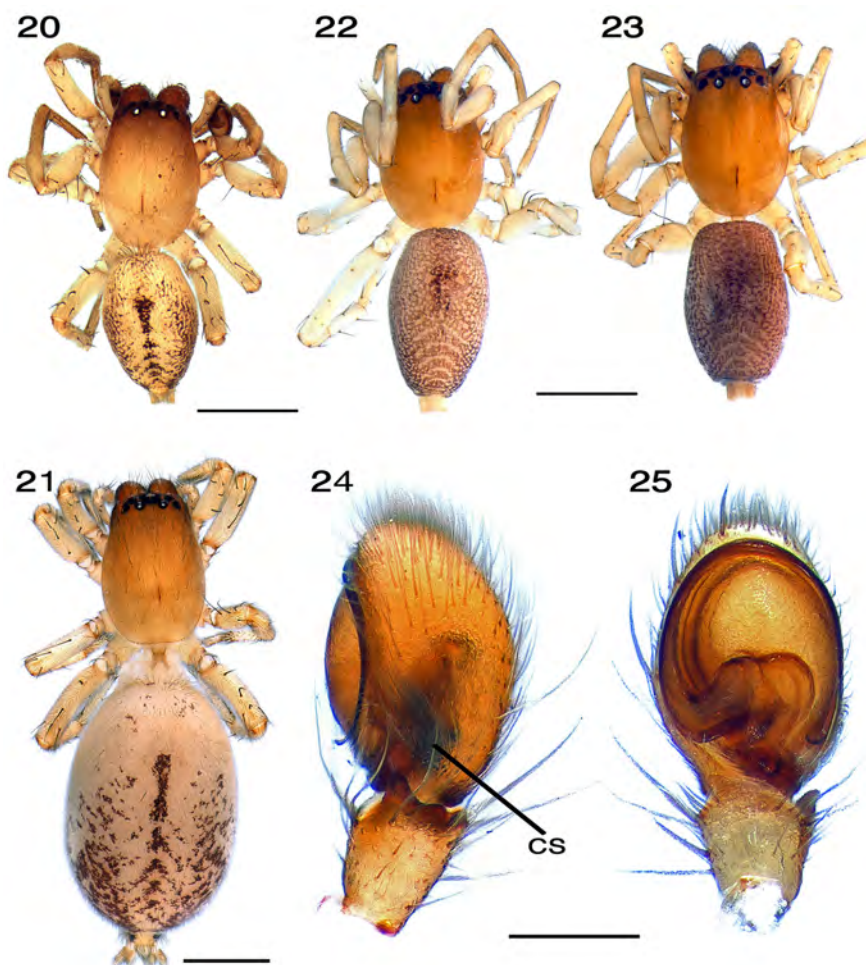
Clubiona decora; Bertkau 1890: 7; Bertkau 1893: 925; Kulczyński 1899; Lessert 1904: 388; Strand 1915: 159; Bacelar 1928: 179; Tyschenko 1971: 130, f. 310, 327 (♂♀) (all misidentifications).

Note. The name *C. genevensis* was first used by L. Koch in 1866, but only in an identification table, the most related species being *C. comta*. No further description was given, in contrast to many other *Clubiona* species described in the same paper and no figures were presented. As this description was unknown to Simon (1878) he named the same species *Clubiona stigmatica*. This species was later synonymised with *C. genevensis* by Simon (1932) and only since then the status of the species was cleared. A further confusion with *C. decora* is still continuing in recent catalogues (see under *C. decora*).

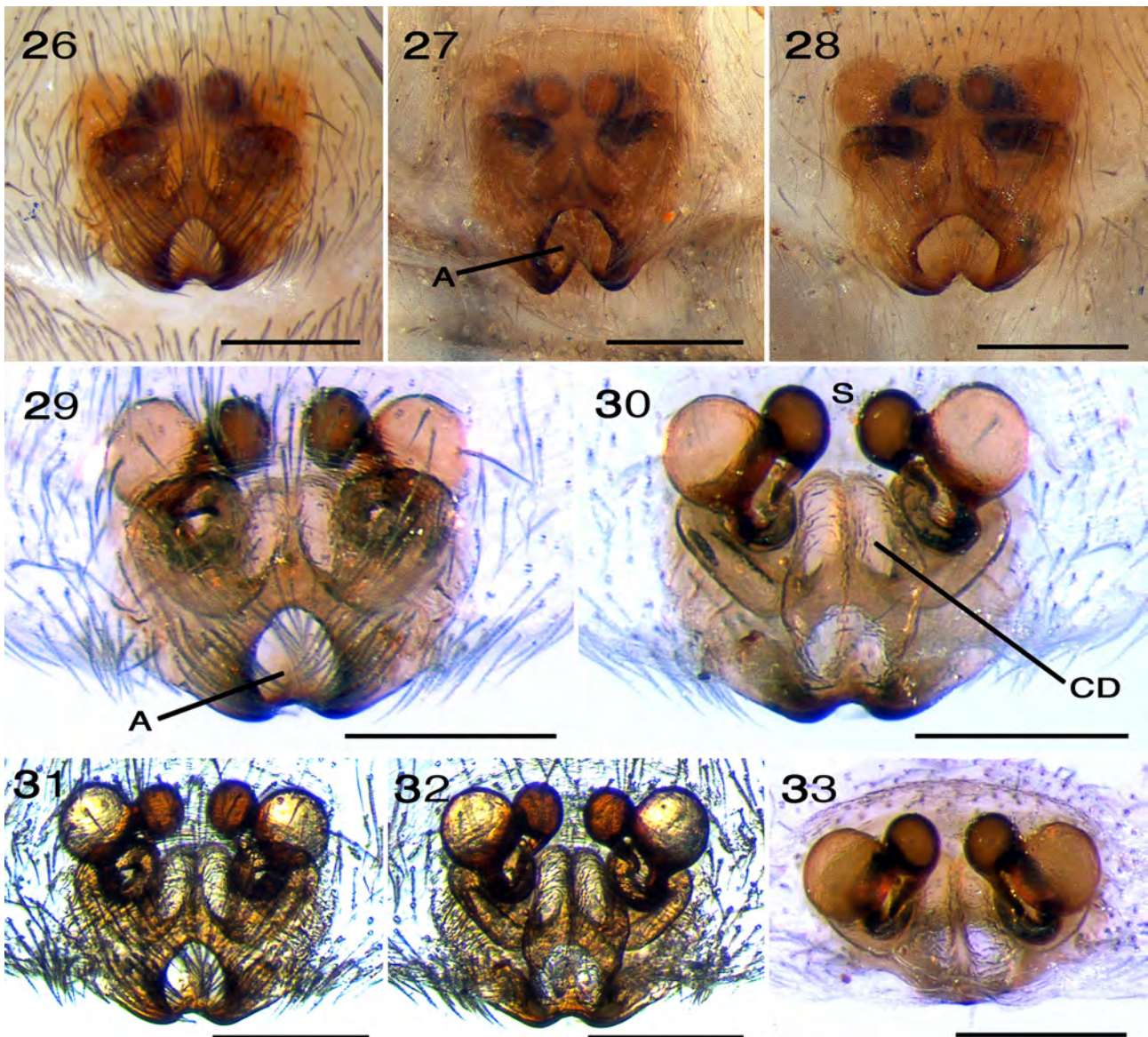
Diagnosis. *Clubiona genevensis* and *C. vegeta* are sister species which are difficult to separate by the genital organs, especially the females. Males differ by the dark, strongly protruding chelicerae in *C. vegeta* (Figs 43, 44), which are normally developed in *C. genevensis* (Figs 20, 22, 23). Females of *C. genevensis* are separated by the copulatory openings being usually narrower, longer than wide (Fig. 26) and the vulva with narrower copulatory ducts (Figs 30, 32). In *C. vegeta* the epigyne has a wider atrium (Figs 47–51). However, this character appears to be variable (see Figs 26–28) and thus not always reliable.

Description. Last described by Almquist (2006). Another relevant description is Helsdingen (1979).

New records. SPAIN: *Rioja*: Najera, 1 ♀, litter in *Pinus* forest, 7.IV.1992, R. Bosmans leg. (CRB). ITALY: *Sardinia*: Olbia-Tempio: Monte Limbara, 2 ♀♀, under stones in clearing in *Pinus* forest, 11.IV.2014, R. Bosmans leg. (CRB). GREECE: *Epiro*, Ioannina: Aaos National park, Aaos Gorge, 420m, 1 ♀, beating bushes in deciduous forest, 26.IV.2001; idem, 1 ♂, pitfalls at same site, 24.IV-13.VII.2001; Konitsa N., Macrovoudni, 1030m, 1 ♀, pitfalls in phrygana, 28.IV-25.VII.2001, all B. Vandenberghe leg. (CRB).



FIGURES 20–25. *Clubiona genevensis* L. Koch, 1866: 20 male (from France) habitus, dorsal view; 21 female (from France) habitus, dorsal view; 22, 23 males (from Greece) habitus, dorsal view; 24 male (from Greece) palp, retrolateral view; 25 same, ventral view. Abbreviation: CS = cymbial modified setae. Scale bars: 20–23 = 1 mm; 24, 25 = 0.2 mm.



FIGURES 26–33. *Clubiona genevensis* L. Koch, 1866, female genitalia: 26 epigyne (from France), ventral view; 27, 28 same (from Greece); 29 vulva (from France), ventral view, reflected light; 30 same, dorsal view; 31 same, ventral view; 32 vulva (from France), dorsal view; 33 same, ventro-dorsal view, transmitted light. Abbreviations: **A** = atrium, **CD** = longitudinal copulatory duct, **S** = spermathecae. Scale bars = 0.2 mm.

Other material examined. FRANCE: *Loire*: Malleval, Les Bruyères, 300m, 1 ♂, in litter at base of brooms, 09.III.2014, P. Dubois leg. *Vendée*: Olonne, rue des Granges, wooded dunes, 1 ♀, 26.V.2012, P. Oger leg. (CPO).

Distribution. South, Central and North Europe, Caucasus, Siberia, West and Central Asia (Helsdingen 2017; World Spider Catalog 2017).

***Clubiona leucaspis* Simon, 1932**
(Figs 34–41, 60–63, 74–76; Map 2)

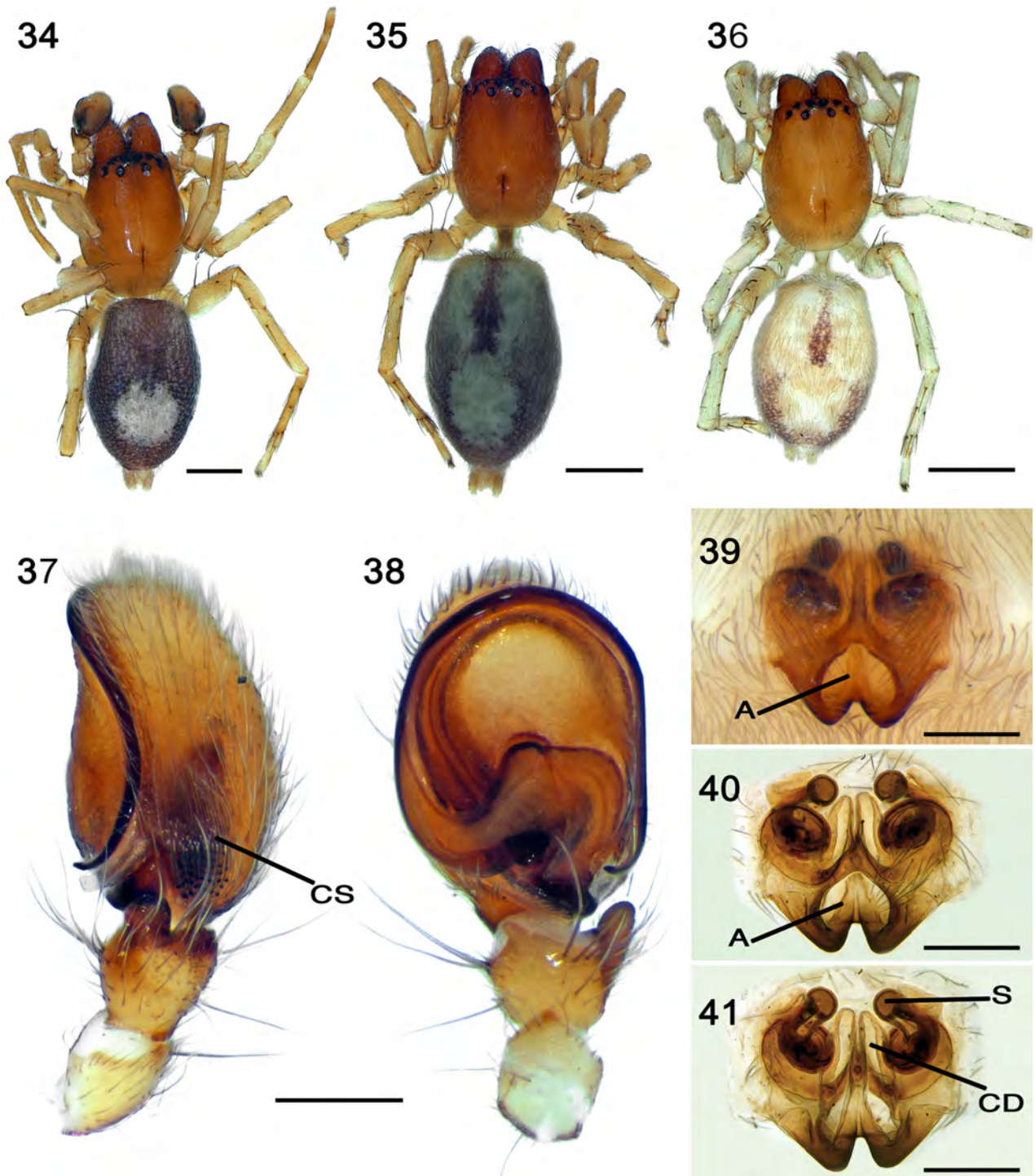
Clubiona leucaspis Simon, 1932: 925, 929, 968, figs 1410, 1417 (♂, ♀ syntypes from two French departments, Île-de-France: Paris and Sucy-en-Brie and Seine-et-Marne: Fontainebleau; probably in MNHNP, not examined); Denis 1956: 196 (cit.).

Diagnosis. Both male and female of *C. leucaspis* can be recognized by the contrasting pale area on the posterior

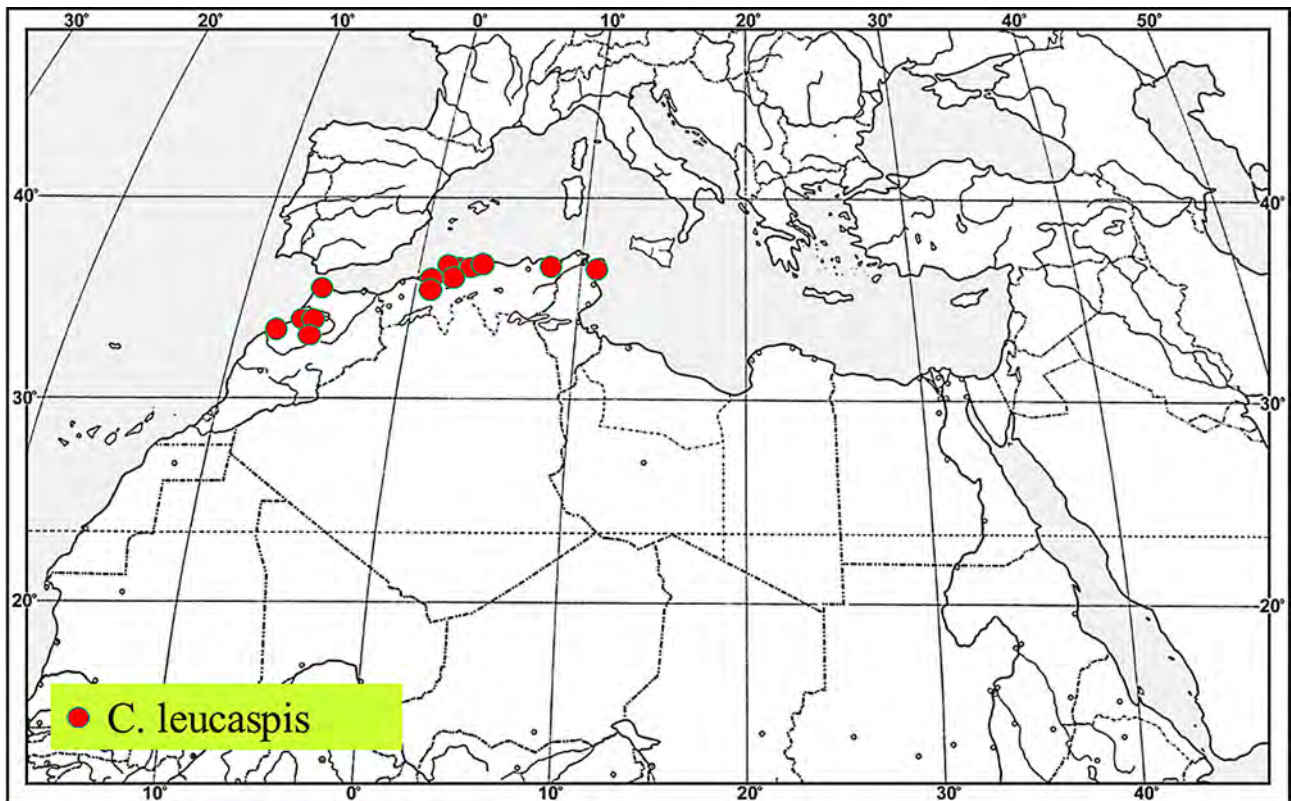
half of the abdomen (Figs 34–36). Males can further be distinguished by the anterior part of bulbus with ventral profile concave (Figs 37, 60) and the distally rounded and slightly longer than wide retrolateral tibial apophysis (Figs 37, 62). The females are recognized by the small spermathecae separated by their diameter or more (Figs 39–41).

Description. Last described by Denton (2016).

Previous citations in the Maghreb. ALGERIA: Without precise locality (Simon 1932). MOROCCO: *Grand Casablanca*: La Cascade (Denis 1956); Aïn Sebaa (Denis 1956).



FIGURES 34–41. *Clubiona leucaspis* Simon, 1932: 34 male (from Spain) habitus, dorsal view; 35, 36 same, females; 37 male (from Spain) palp, retrolateral view; 38 same, ventral view; 39 female (from Spain) epigyne, ventral view; 40 female (from France) vulva, ventral view; 41 same, dorsal view. Abbreviations: A = atrium, CD = longitudinal copulatory duct, CS = cymbial modified setae, S = spermathecae. Scale bars: 34–36 = 1 mm; 37–41 = 0.2 mm.



MAP 2. Records of *Clubiona leucaspis* Simon, 1932 in the Maghreb.

New records. AFRICA: ALGERIA: **Alger:** El Anasser, Jardin d'Essaie, 5m, 1 ♂, under bark, 27.II.1987, R. Bosmans leg. (CRB); El Harrach, 25m, 1 ♂, pitfalls in garden of Agricultural Institute (INA), 16.V.1983, R. Bosmans leg. (CRB); forêt de Bainem, 300m, 1 ♂, sieving *Cupressus* litter, 30.IV.1984, R. Bosmans leg. (CRB). **Blida:** Atlas Blidéen, Chréa, 1100m, 2 ♀♀, beating *Quercus ilex*, 28.IV.1987, R. Bosmans leg. (CRB). **Boumerdes:** Aïn Taya, 50m, 1 ♂, 20.II.1988 and 1 ♂, 4.V.1989, pitfall in garden, R. Bosmans leg. (CRB); Réghaia, 45m, 1 ♂ 1 ♀, beating in *Quercus suber* forest, 14.II.1988, R. Bosmans leg. (CRB). **Chleff:** Damous W., beating bushes, 5 ♀♀, 17.IV.1987, R. Bosmans leg. (CRB). **El Tarf:** El Kala National Park, lake Oubeira, 10m, 1 ♀, beating *Quercus suber*, 29.III.1988, R. Bosmans leg. (CRB); El Kala National Park, Lake Tolga, 50m, 1 ♂ 3 ♀♀, beating *Pinus* branches, 28.III.1988, R. Bosmans leg. (CRB). **Tipasa:** Douaouda, Oued Mazafran, 50m, 2 ♀♀, pitfalls in *Olea maquis*, 6.V.1987, R. Bosmans leg. (CRB); Sidi Fredj, 20m, 1 ♂ 1 ♀, pitfalls in *Pinus halepensis* forest, 10.IV.1987, R. Bosmans leg. (CRB); Zeralda, 10m, 1 ♀, beating in *Lentisca* maquis, 25.IV.1987, R. Bosmans leg. (CRB). **Tissemsilt:** Theniet-el-Had, 1500m, 1 ♂, pitfalls in *Cedrus* forest, 13.V.1987, R. Bosmans leg. (CRB). MOROCCO: **Rabat-Salé-Kénitra:** Rabat, Maâmora forest, 3 ♀♀, 1.I.1920, Thiery leg. (ISRM); Sidi Allal El Bahraoui, 150m, 2 ♂♂, 1.III.1989, 3 ♂♂ 3 ♀♀, 10.IV.1989, 4 ♀♀, 2.V.1989, 2 ♂♂, 17.I.1990, 2 ♂♂ 2 ♀♀, 27.II.1990, S. Benhalima leg. (CSB); Sidi Amira, 145m, 1 ♂, 1.III.1989, 3 ♂♂ 4 ♀♀, 10.IV.1989, 2 ♂♂ 5 ♀♀, 2.V.1989, 2 ♀♀, 10.VI.1989, 1 ♀ 3.VII.1989, 1 ♀ 27.II.1990, pitfalls in *Quercus suber* forest, S. Benhalima leg. (CSB); Oulmès, El Harcha, 1050m, 1 ♀, 22.V.1989, 4 ♂♂ 1 ♀, 26.II.1990, S. Benhalima leg. (CSB). **Tanger-Tétouan-Al Houceima:** Tetouan, Cabo Negro, 1 ♂, 9.IV.2006, S. Benhalima leg. (CSB); Larâche, Rhaba El Khalifa, 90m, 1 ♂, 7.III.1989, S. Benhalima leg. (CSB). TUNISIA: **Nabeul:** Zaouïet el Mgalez N., 1 ♂, under stones in *Pinus* forest, 26.I.2003, R. Bosmans leg. (CRB). EUROPE: PORTUGAL: **Leiria:** Lagoa de Obidos, 1 ♂, under bark of *Pinus*, 20.IV.2013, R. Bosmans leg. (CRB); Obidos town, 1 ♀, on wall, 20.IV.2013 (CRB). SPAIN: **Caceres:** Tarifa, 1 ♂ 2 ♀♀, III.1992, P. Poot leg. (CRB). **Islas Baleares:** Majorca, road Felanitx-Porto Can Gelat, 80m, 1 ♀, under stones in open *Pinus* forest, 4.IV.2003, R. Bosmans leg. (CRB). **Tarragona:** Coma Ruga, 1 ♂, under stones in olive yard, 6.IV.1998, R. Bosmans leg. (CRB). GIBRALTAR: Gibraltar, 1 ♀, under stones near top of the rock, 4.IV.1997, R. Bosmans leg. (CRB). FRANCE: **Corse-du-Sud:** Pianottoli, 1 ♀, VII.2002, P. Pantini leg. & det. (CMB). **Landes:** Le Muret, 1 ♀, pitfalls in heathland, 23.VII.1985, R. Bosmans leg. (CRB). **Aude:** Puivert,

516 m, 1 ♀, under stones on a slope, 24.V.2015, P. Oger (CPO). **Bouches-du-Rhône**: Saint-Antonin-Sur-Bayon, Site Sainte-Victoire, 402m, 1 ♀, maquis dans un champ de pierres, 04.V.2015, P. Oger leg. (CPO); Cengle-De-Négrel, Sainte-Victoire, 271m, 1 ♀, under stones in a maquis on a slope, 5.V.2015, P. Oger leg. (CPO); Grans, Poitevine-Regarde-Venir, 65m, 1 ♀, stones in open grassland with *Quercus ilex*, 5.V.2015, P. Oger leg. (CPO). **Drôme**: Eygluy-Escoulin, 1 ♂ 1 ♀, beating, 4.V.2014, V. Valli (CPO). **Loire**: Maclas, L'Egat, 360 m, 1 ♀, under stones in open grassland with *Calluna*, 1.IV.2015, P. Dubois (CPO). **Pyrénées-Atlantiques**: Larrau, 1 ♀, V.1990, P. Poot leg. (CRB). **Pyrénées-Orientales**: Argèles-sur-Mer, Chemin du Pas Den Diego, 4m, 2 ♀♀, along river edge of Mas Larrieu, 18.V.2015, P. Oger (CPO); Argèles-sur-Mer, La Pave (Albères), 139m, 1 ♂, under stones, 19.V.2015, P. Oger (CPO); Coustouges, Bergerie des Métayers, 817m, 1 ♀, under stones in grassland, 21.V.2015, P. Oger (CPO). **Var**: Nans-les-Pins, 400m, 1 ♀, sieving litter in mixed *Pinus-Quercus* forest, 3.IV.2017, R. Bosmans leg. (CRB); St-Paul-en-Forêt NW, 390m, 1 ♂, sieving litter in mixed *Pinus-Quercus* forest, 3.IV.2017, R. Bosmans leg. (CRB). **ITALY: Reggio di Calabria**: Bova Marina, 1 ♀, fogging in orchard, 7.VI.1994, P. Pantini det. (CMB); Locri, 1 ♀, fogging in orchard, 8.VI.1994, P. Pantini det. (CMB). **Sardinia**: Sassari, Maristella N., 25m, 1 ♀, sieving litter in *Pinus* forest in dunes, 10.IV.2014, R. Bosmans leg. (CRB).

Ecology. In the Maghreb, *C. leucaspis* occurs in *Pinus* forests of low altitude, *Quercus suber* and *Q. ilex* forests of lowland and *Cedrus atlantica* forests of high altitude, up to 1500m. It even occurs in the parks of Alger, the capital of Algeria. Adults males were collected from January to May, adult females from January to July.

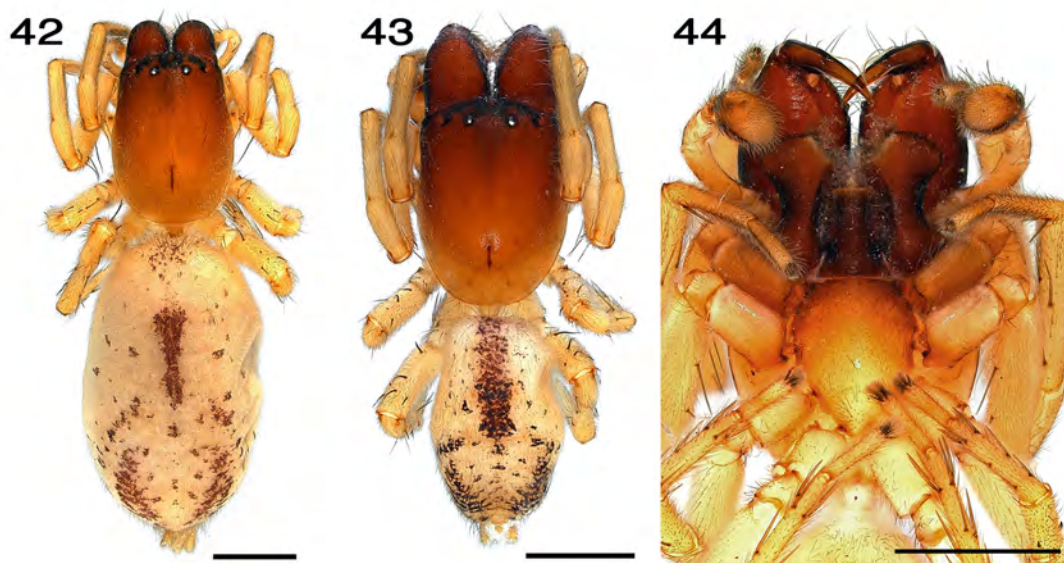
Distribution. *Clubiona leucaspis* appears to be common in Algeria and Morocco, but rare in Tunisia, where it is cited for the first time. It is originally a western Mediterranean species but expanding recently to the north and the east, with records in Belgium, the Netherlands, Germany, Austria and Bulgaria (Helsdingen 2017), Britain (Denton 2016) and Greece (Lecigne 2013).

***Clubiona vegeta* Simon, 1918**

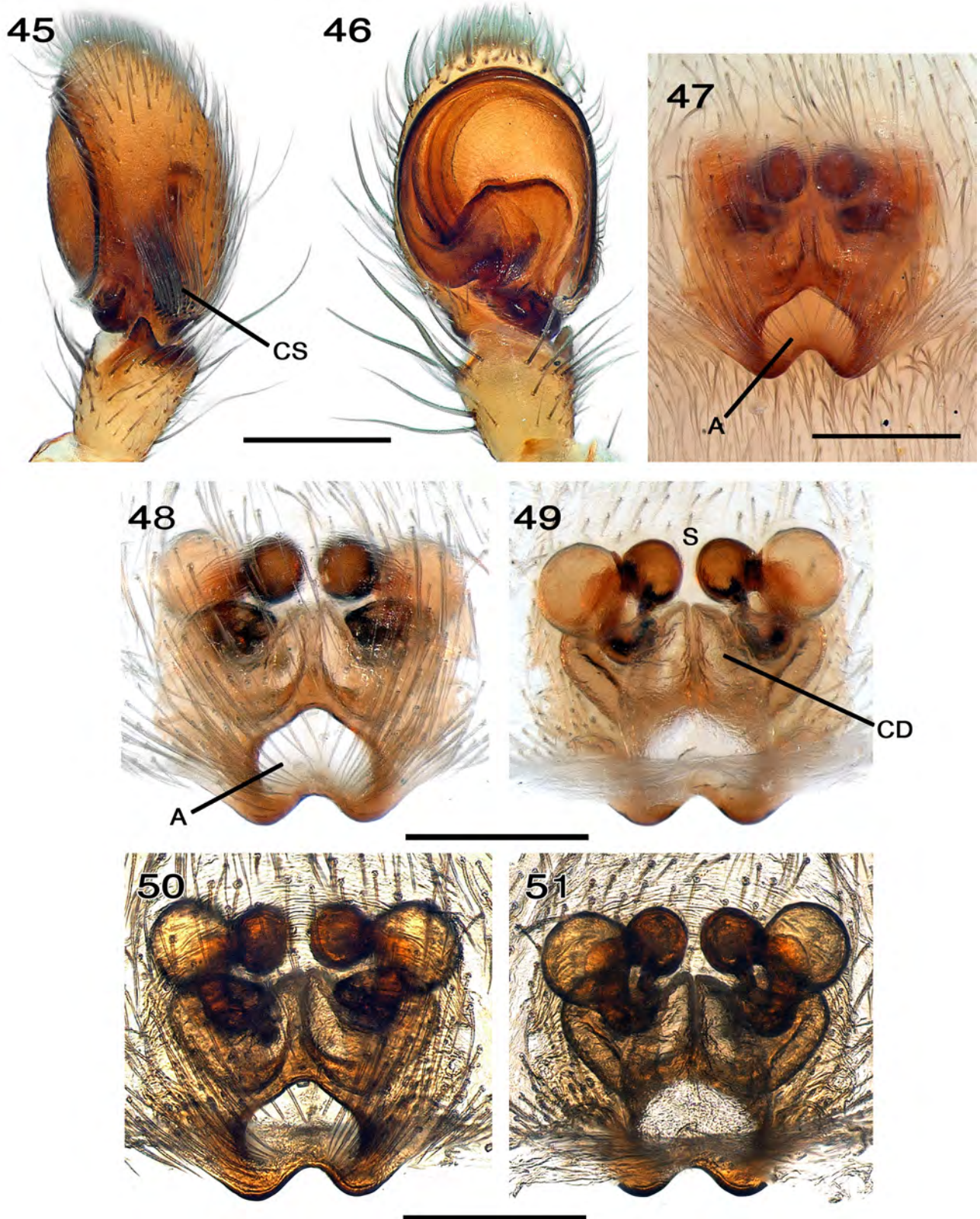
(Figs 42–44, 45–51, 64–67, 77–79; Map 3)

Clubiona parvula Lucas, 1846: 205, pl. 12, fig. 2 (♂, ♀ syntypes from Algeria, around Alger; not examined, probably in MNHNP; preoccupied by *Clubiona parvula* Blackwall, 1833); Simon 1899: 84 (cit.); Simon 1909: 32 (cit.).
Clubiona vegeta Simon, 1918 (nom. n.).

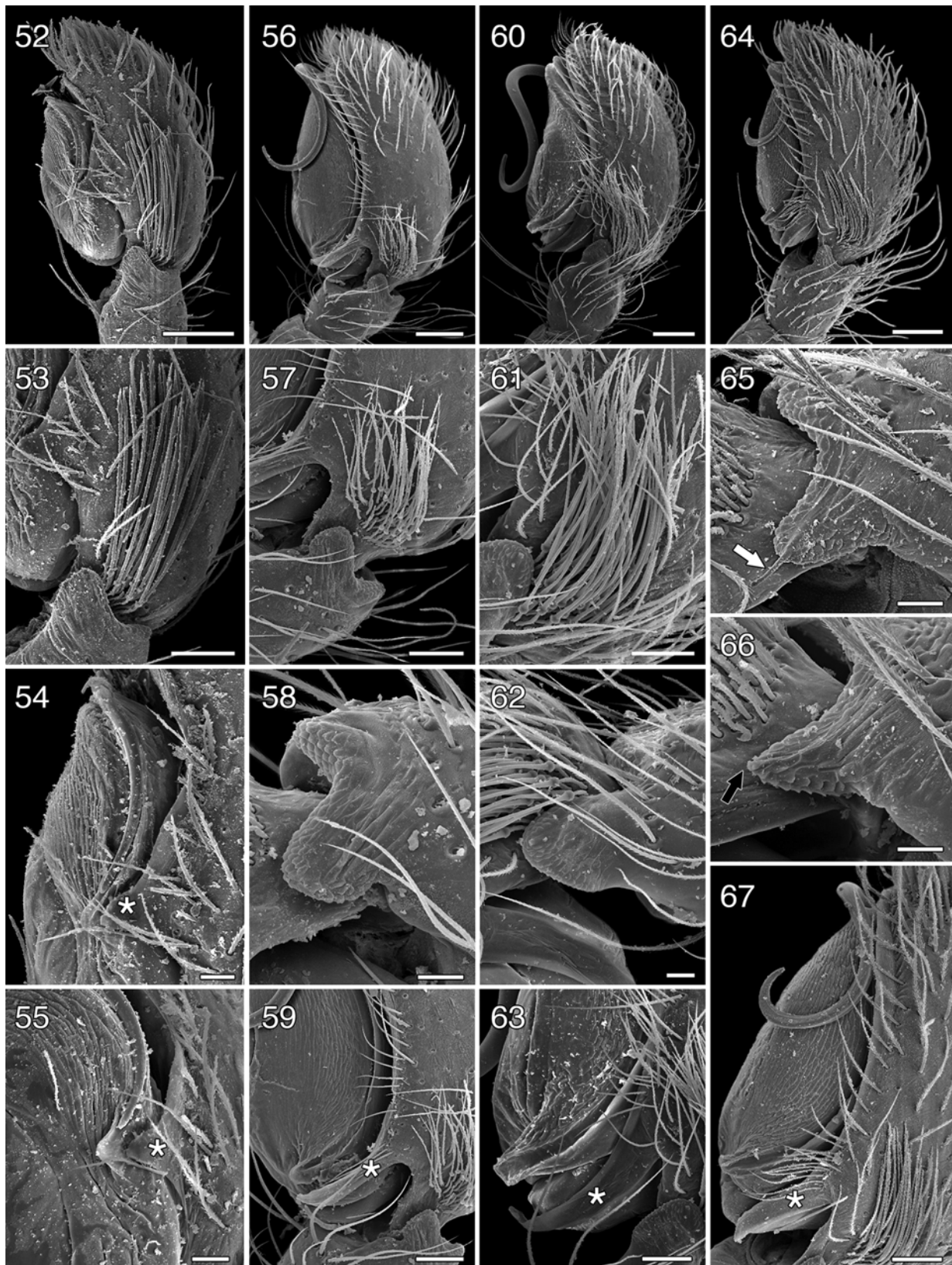
Diagnosis. *Clubiona vegeta* and *C. genevensis* are sister species which are difficult to separate by the genital organs, especially the females. Males of *C. vegeta* mainly differ from *C. genevensis* by the strongly protruding and dark chelicerae in (Figs 43, 44). Females of *C. genevensis* are separated by the usually narrower atria (Figs 26, 27) and copulatory ducts (Figs 30, 32). In *C. vegeta*, those are larger (Figs 47–51).



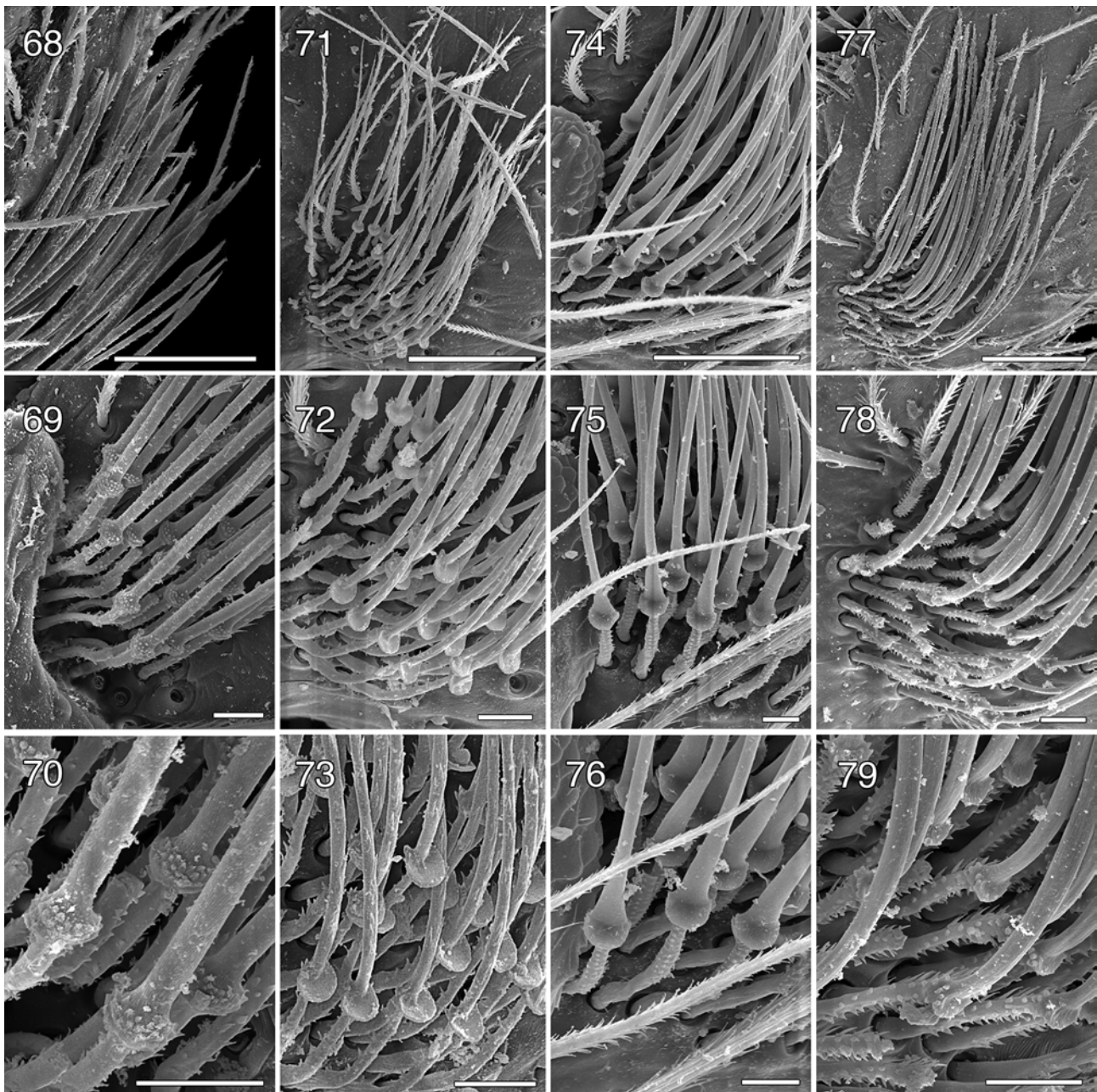
FIGURES 42–44. *Clubiona vegeta* Simon, 1918, male and female (from Tunisia): 42 female habitus, dorsal view; 43 male habitus, dorsal view; 44 same, detail of the prosoma, ventral view. Scale bars = 1 mm.



FIGURES 45–51. *Clubiona vegeta* Simon, 1918, male and female (from Tunisia): 45 male palp, retrolateral view; 46 same, ventral view; 47 epigyne, ventral view; 48 vulva, ventral view, reflected light; 49 same, dorsal view; 50 vulva, ventral view, transmitted light; 51 same, dorsal view. Abbreviations: A = atrium, CD = longitudinal copulatory duct, CS = cymbial modified setae, S = spermathecae. Scale bars = 0.2 mm.



FIGURES 52–67. *Clubiona* spp., male palp: 52–55 *Clubiona diniensis* Simon, 1878 (from Algeria); 56–59 *C. genevensis* L. Koch, 1866 (from Greece); 60–63 *C. leucaspis* Simon, 1932 (from Spain); 64–67 *C. vegeta* Simon, 1918 (from Tunisia). 52, 56, 60, 64 left palp, retrolateral view; 53, 57, 58, 61, 62, 65, 66 detail of RTA and base of cymbium, retrolateral view (65, white arrow, RTA needle-like extension present; 66, black arrow, RTA needle-like extension absent, probably broken); 54, 59, 63, 67 detail of bulb and basolateral extension of cymbium (stars), retrolateral view; 55 same, ventral view. Scale bars: 52, 56, 60, 64 = 0.1 mm; 53, 57, 59, 61, 63, 67 = 50 μ m; 54, 55, 58, 62, 65, 66 = 20 μ m.



FIGURES 68–79. *Clubiona* spp., male palp, details on the modified cymbial setae, retrolateral view: 68–70 *Clubiona diniensis* Simon, 1878 (from Algeria); 71–73 *C. genevensis* L. Koch, 1866 (from Greece); 74–76 *C. leucaspis* Simon, 1932 (from Spain); 77–79 *C. vegeta* Simon, 1918 (from Tunisia). 68 detail of setal apices; 69, 72, 74, 75, 78 detail of setal bases; 70, 73, 76, 79 detail of the swellings; 71, 77 global view. Scale bars: 68, 71, 74, 77 = 50 μ m; 69, 70, 72, 73, 75, 76, 78, 79 = 10 μ m.

Description. Last described by Sterghiu (1985). For another relevant description, see Helsdingen (1979).

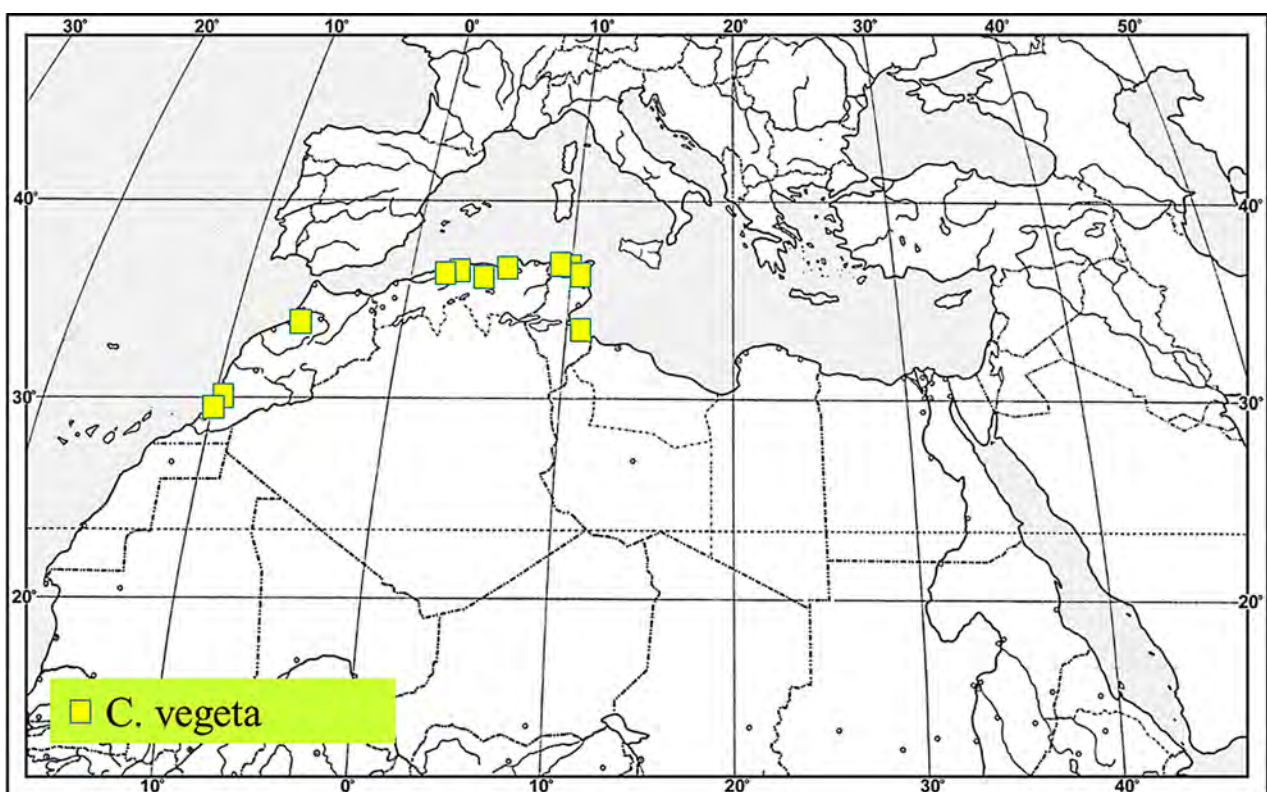
Previous citations in the Maghreb. ALGERIA: *Alger*: Surroundings of Alger (Lucas, 1846, sub *C. parvula*). *Djelfa*: Takersan (Simon, 1899, sub *C. parvula*). MOROCCO: *Marrakech-Safi*: Essaouira (as Mogador; Simon 1909, sub *C. parvula*).

New records. AFRICA: ALGERIA: *Sétif*: Bir el Arche, 900m, 3 ♀♀, under stones in cultivated fields, 27.II.1990 (CRB). *Skikda*: Ben Azouz, 200m, 1 ♂, litter in *Eucalyptus* plantation, 2.III.1990, R. Bosmans leg. (CRB). *Tipasa*: Sidi Fredj, 10m, 1 ♂, under stones in dunes with maquis, 18.XII.1986, R. Bosmans leg. (CRB). MOROCCO: *Rabat-Salé-Khénitra*: Rabat, Maâmora forest, Sidi Amira, 145m, 1 ♂ 1 ♀, 1.III.1989, S. Benhalima leg. (CSB). *Souss-Massa*: between Tamri and Tamanar, 1 ♀, pitfalls in coastal dunes, 15-28.IV.2012, R. Bosmans leg. (CRB). TUNISIA: *Bizerte*: Utique, 6 ♂♂ 8 ♀♀, litter in *Euphorbia* hedge, 29.I.2003, R. Bosmans leg. (CRB). *Nabeul*: Tazerka, 4 ♂♂ 3 ♀♀, border of salt marsh and dunes, 26.I.2003, R. Bosmans leg. (CRB). *Tunis*: la

Goulette, 1 ♀, under stones in *Pinus* plantation, 30.I.2003, R. Bosmans leg. (CRB). **Medenine**: Djerba, Midoun, 1 ♀, litter in dunes, 15.XII.2014, K. De Smet leg. (CRB). EUROPE: PORTUGAL: **Évora**: Ribera do Almugro, 1 ♀, litter in *Eucalyptus* plantation, 8.IV.1996, R. Bosmans leg. (CRB). **Beja**: Serpa W., near Rio Guadiana, 1 ♀, beating trees, 24.V.2007, R. Bosmans leg. (CRB). **Faro**: Luz, W. Lagos, 1 ♂ 1 ♀, under stones along fields, 15.II.2006, R. Bosmans leg. (CRB). SPAIN: **Alava**: Salvatierra, 1 ♀, under stones in low maquis, 6.IV.1992, R. Bosmans leg. (CRB). **Albacete**: Almansa, 950m, 1 ♀, under stones in maquis, 3.IV.1996, R. Bosmans leg. (CRB). **Alicante**: Crevillente, 1 ♀, litter in wasteland, 8.IV.1998, R. Bosmans leg. (CRB). **Almeria**: Cabo de Gata, 1 ♂, pitfalls in dunes, IV.1999, R. Bosmans leg. (CRB); Vera, Rio Antas, 1 ♀, litter along river, 8.IV.1999, R. Bosmans leg. (CRB). **Islas Baleares**: Mallorca: Cala Vicente, 3 ♀♀, 9.III.1971, D. J. Clark leg. (NHML); Ibiza: Ses Feixes, pitfalls, 28.XII-8.I.2010, J. Hernandez leg. (CJH). **Cádiz**: Tarifa, 1 ♂ 3 ♀♀, IV.1991, P. Poot leg. (CRB). **Murcia**: Sierra de la Tercia, Totana W., 2 ♀♀, under under stones in maquis, 4.IV.1996, R. Bosmans leg. (CRB). FRANCE: **Haute-Corse**: Calacuccia, Lozzi, track to Monte Cinto, 1200m, 1 ♀, under stones in open maquis, 25.V.1995, R. Bosmans leg. (CRB). **Bouches-du-Rhône**: Chateaufeuf-le-Rouge, 233m, 1 ♀, open *Quercus* maquis, 1.V.2015, P. Oger leg. (CPO); **Pyrénées-Orientales**: Argelès-sur-Mer, Chemin du Pas Den Diego, 4m, 3 ♀♀, along Mas Larriou, 18.V.2015, P. Oger leg. (CPO); Baixas, 130m, 2 ♀♀, under stones on a slope, 17.V.2015, P. Oger leg. (CPO); Ortaffa, La Polleda, 28m, 4 ♀♀, under stones in dry grassland, 25.V.2015, P. Oger leg. (CPO). ITALY: **Foggia**: Lesina, La Porcareccia dunes, 1 ♂, pitfalls, 5.XII.2003, S. Biserni & A. Renzi leg., P. Pantini det. (CMB). **Palermo**: Roccella Valdemone, torrente Roccella, 1 ♂, at light trap, 28.XI.1995, P. Pantini & M. Valli leg., P. Pantini det. (CMB); Terrasini, riserva naturale Orientata Caporoma, 2 ♀♀, 14.IV.2012, pitfalls in palm grove, C. Cusimano leg., P. Pantini det. (CMB). GREECE: **Peloponnisos**: Lakonia: Vathia N., 1 ♀, phrygana along dry rivulet, 22.V.1998, R. Bosmans leg. (CRB), 1 ♀, 14.IV.2012, pitfalls in palm grove, C. Cusimano leg., P. Pantini det. (CMB).

Ecology. In the Maghreb, *C. vegeta* was collected in various, often man-influenced habitats such as *Eucalyptus* and *Pinus* plantations, secondary maquis, coastal dunes, salt marshes and cultivated fields. Adult specimens of both sexes were found from December to April.

Distribution. *C. vegeta* was found in Algeria and Morocco and for the first time in Tunisia. It occurs much more to the south than other *Clubiona* species, in Morocco in the region of Agadir and in Tunisia on the island Djerba. It occurs further in Europe, Central Asia, and the Canary Islands (Helsdingen 2017).



MAP 3. Records of *Clubiona vegeta* Simon, 1918 in the Maghreb.

The *comta* group

Clubiona comta C. L. Koch, 1839

(Figs 80–87; Map 4)

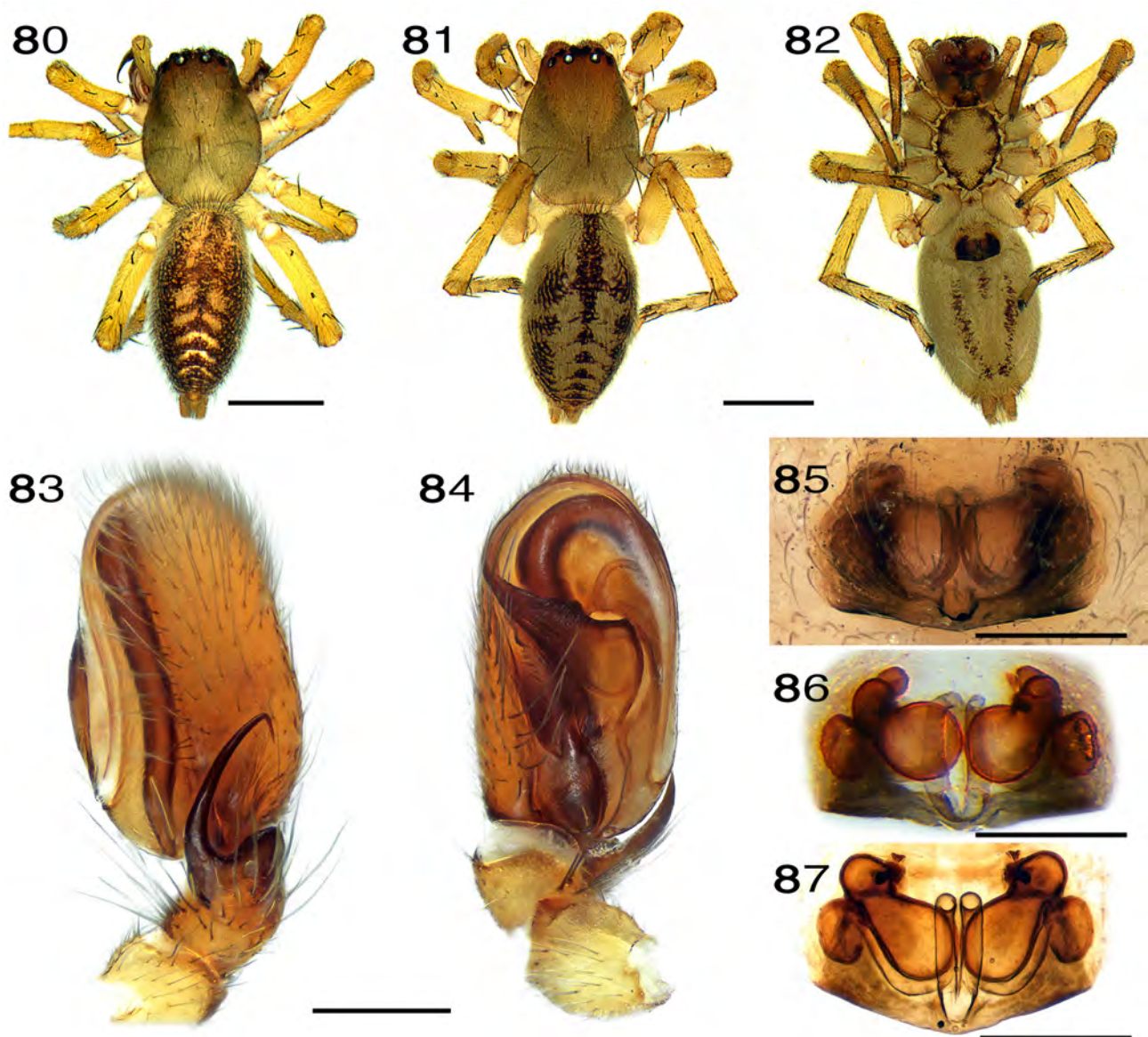
Clubiona comta C. L. Koch 1939: 16, fig. 440 (♀ syntypes from Germany, not examined, depository unknown).

Clubiona pallipes Lucas, 1846: 212 (♀ holotype from Algeria, Philippeville (= Skikda) (MNHNP, Coll. Lucas; examined); Simon 1878: 237 (Syn.).

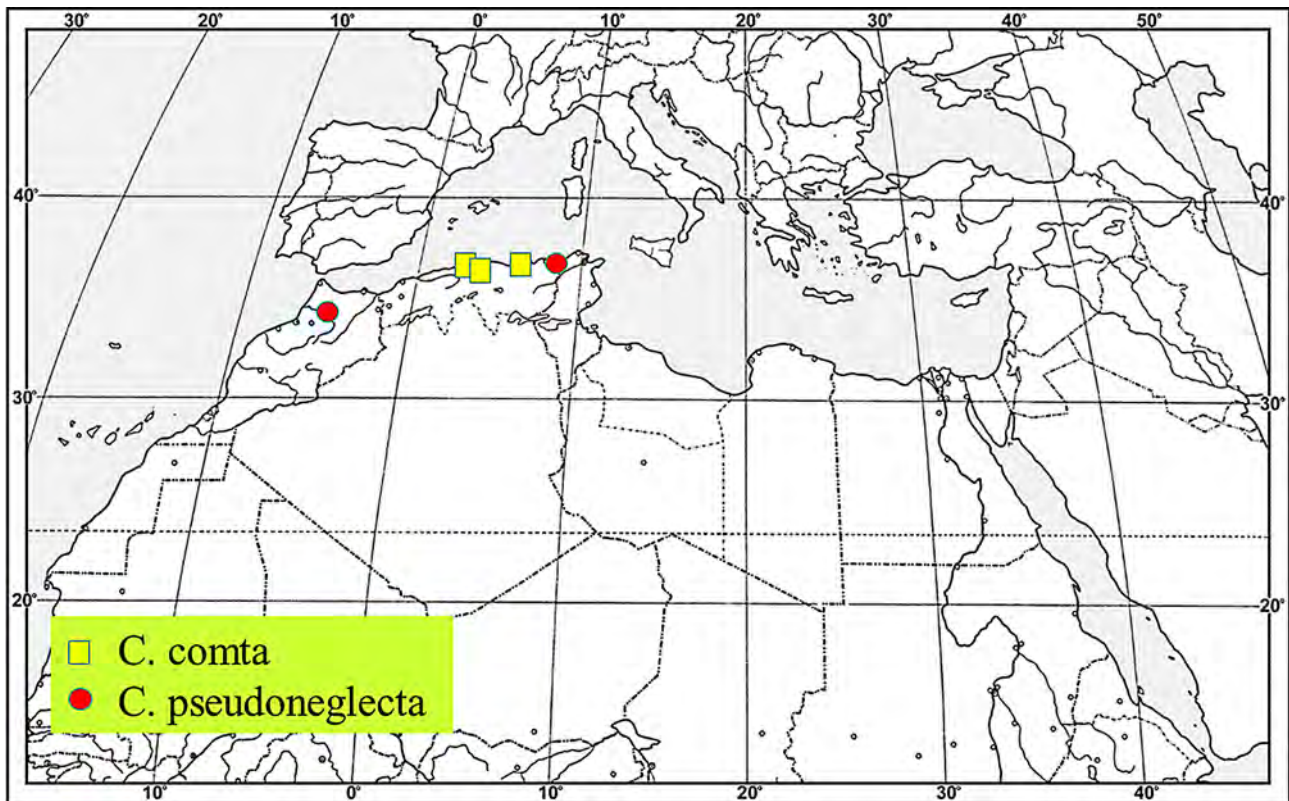
Diagnosis. *C. comta* is easily recognized by the series of pale chevrons occupying the posterior end of abdomen (Figs 80, 81). The male is recognized by the bifid RTA bearing a long, thin and curved ventral apophysis and a shorter, rounded dorsal lobe (Figs 83, 84). The female is characterized by the epigyne with heavily sclerotized basal bar with median notch (corresponding to the copulatory opening), and by the vulva with median, parallel copulatory ducts coiling to the median part of the secondary spermathecae (Figs 85–87).

Description. Relevant previous description in Almquist (2006).

Previous citations in the Maghreb. ALGERIA: *Skikda*: Philippeville (=Skikda; Lucas 1846).



FIGURES 80–87. *Clubiona comta* C. L. Koch, 1839, male and female (from Belgium): 80 male habitus, dorsal view; 81 female habitus, dorsal view; 82 same, ventral view; 83 male palp, retrolateral view; 84 same, ventral view; 85 female epigyne, ventral view; 86 vulva, ventral view; 87 same, dorsal view. Scale bars: 80–82 = 1mm; 83–87 = 0.2 mm.



MAP 4. Records of *Clubiona comta* C. L. Koch, 1839 and *C. pseudoneglecta* Wunderlich, 1994 in the Maghreb.

New records. AFRICA: ALGERIA: **Boumerdes:** Réghaia, estuary of Oued Réghaia, 10m, 1 ♂ 2 ♀♀, pitfalls in *Olea europaea* maquis, 13.VI.1988, R. Bosmans leg. (CRB). **Tizi Ouzou:** Yakouren, 800m, 1 ♂, pitfalls in riverine *Alnus* forest, 3.III.1990, R. Bosmans leg. (CRB). EUROPE: BELGIUM: **Wallonia:** Bois de On, 1 ♂, sieving litter, 02.IV.2011, P. Oger leg. (CPO); Réserve de Plombières, 1 ♀, sieving litter, 24.X.2011, P. Oger leg. (CPO). PORTUGAL: **Beja:** Vila Nova de Milfontes, 1 ♀, shrubs bordering salt marsh of Rio Mira, 16.IV.2013, R. Bosmans leg. (CRB). **Faro:** Marmeleite E., 1 ♀, litter in *Quercus suber* forest, 16.IV.2013, R. Bosmans leg. (CRB). FRANCE: **Alpes-Maritimes:** Préalpes, 1 ♂, V.1975, P. Hillyard leg. (NHML); **Var:** Estérel P.N., L'Escaillon W., 260m, 1 ♀, 6.IV.2017, R. Bosmans leg. (CRB). ITALY: **Campania:** Napoli, Vesuvius, E. slope, 5 ♀♀, beating in deciduous forest, 12.VI.2002, R. Bosmans leg. (CRB). **Molisse:** Bojano, 1 ♀, beating branches in deciduous forest, 27.VI.2002, R. Bosmans leg. (CRB). **Sardinia:** Cagliari, Sadali S., 510m, 1 ♀, litter in small *Populus* forest near spring, 16.IV.2014, R. Bosmans leg. (CRB); Sassari, Alghero W., Stana de Calich, 1 ♂, pitfalls along a creek, 12-19.IV.2014, R. Bosmans leg. (CRB). GREECE: **Epiro:** Monodendri, Vikos gorge, 690m, 4 ♀♀, beating in deciduous forest, 1.V.2007, B. Vandenberghe leg. (CRB).

Ecology. In the Maghreb, *C. comta* was once collected in an estuary and also in an *Alnus* forest at a height of 800m. This points to a preference of wet habitats, whereas in Europe it occurs also in drier areas. Males were found in March and June, females only in June.

Distribution. *C. comta* is rare in the Maghreb and was only found in Algeria. It is much more common in South, Central and North Europe and occurs also in Russia.

The pallidula group

Clubiona phragmitis (C. L. Koch, 1843)

(Figs 88–94; Map 5)

Clubiona phragmitis C. L. Koch, 1843: 135, figs 846, 847 (♂♀ syntypes from Germany, Erlangen, not examined, depository unknown); Denis 1945: 54 (cit.).

Diagnosis. Males are recognised by the RTA with two unequal, blunt processes and the hook-like embolus (Fig. 94), females by epigyne with four elongated structures visible in transparency (Figs 90, 91).

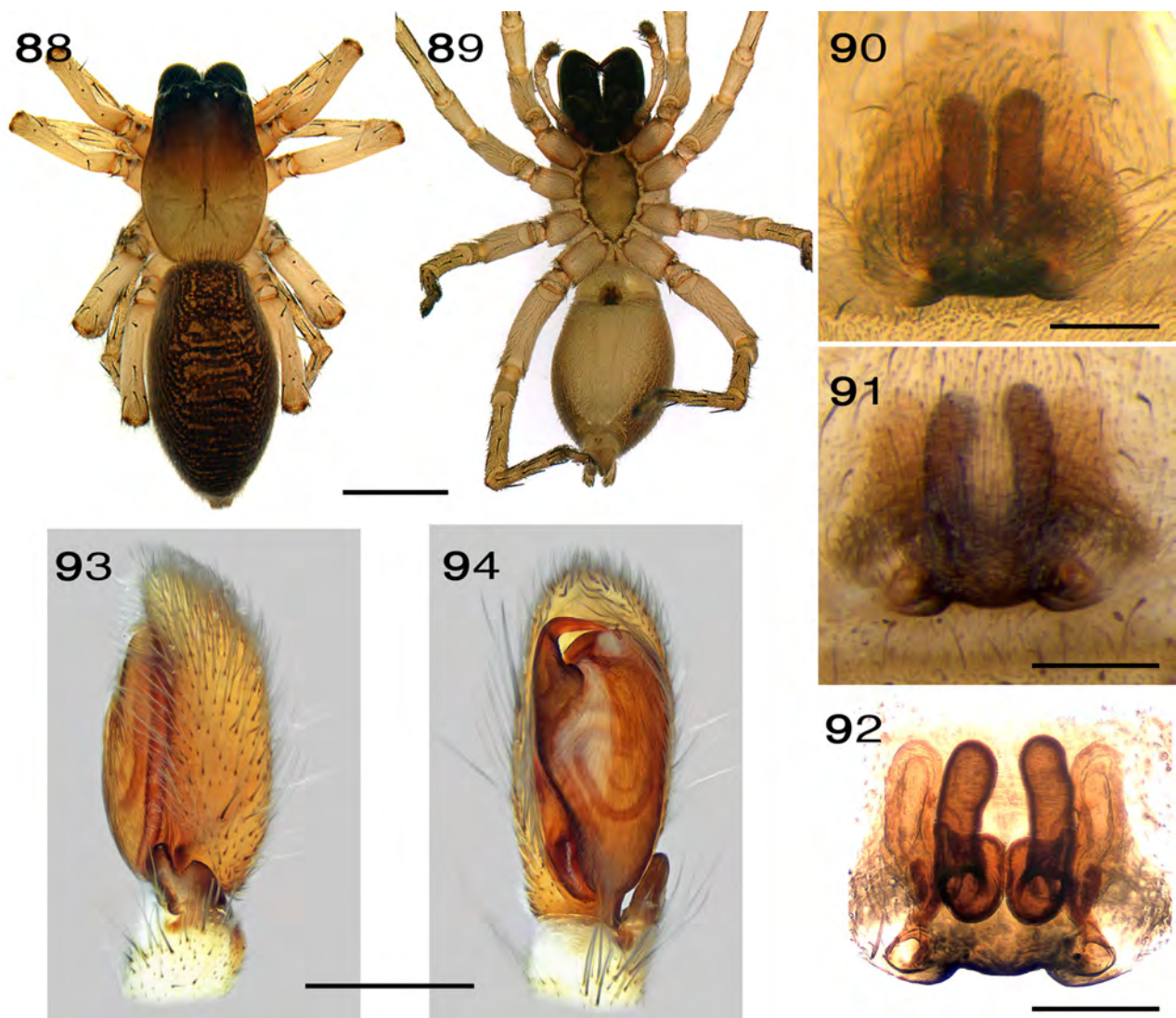
Description. Last described by Kim & Lee (2014) and also excellently by Almquist (2006).

Previous citations in the Maghreb. MOROCCO: *Fès-Meknès*: Timhadit (Denis 1945).

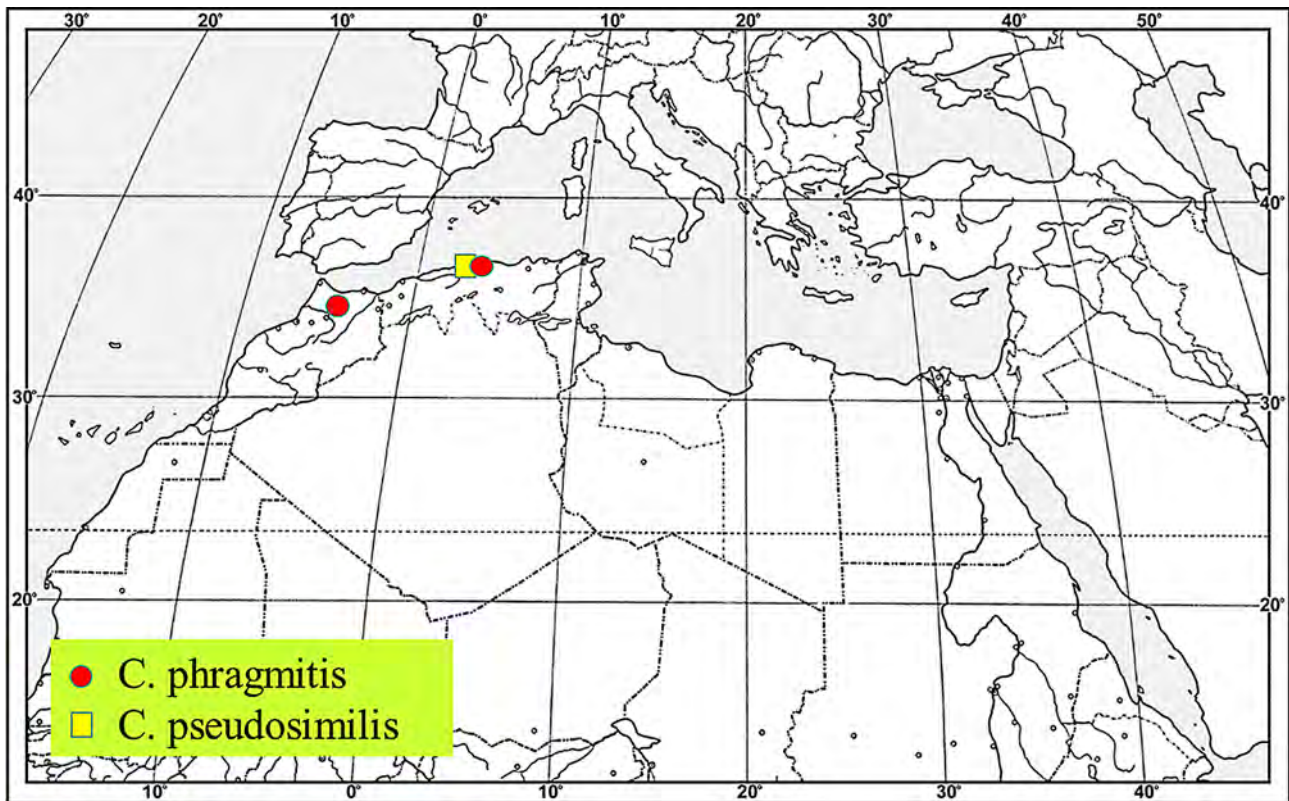
New records. AFRICA: ALGERIA: *Boumerdes*: Réghaia, estuary of Oued Réghaia, 25m, 1 ♀, in marshy area, 24.II.1986, R. Bosmans leg. (CRB). EUROPE: BELGIUM: *Wallonia*: Andenne, Réserve de Sclaigneaux, calcareous meadow, 1 ♀, pitfall, 06.IV.2012, P. Oger leg. (CPO); *Flanders*: Genk, De Maten, 1 ♂ 1 ♀, beating plants near pond, 13.VI.2014, P. Oger leg. (CPO). PORTUGAL: *Faro*: Barrage de Alcoutim, 1 subadult ♂ 2 ♀♀, marshy area below the dam, 18.II.2006, R. Bosmans leg. (CRB). SPAIN: *Cordoba*: Alcolea, 1 ♂, litter along Rio Guadalquivir, 10.IV.1994, R. Bosmans leg. (CRB). *Islas Baleares*: Menorca: Cala n'Portel, 1 ♀, 27.IX.1970, D. J. Clark leg. (BMNH). *Palencia*: Fuentes de Nava, 1 ♂, pitfalls, 24.VI.1996, U. Stengele leg. (CRB). FRANCE: *Bouches-du-Rhône*: Aigues Mortes, 1 ♂, IV.1984, P. Poot leg. (CRB). *Pyrénées-Orientales*: Milas, dike along river Tet, 1 ♂ 1 ♀, in herbs, 6.VII.1991, R. Bosmans leg. (CRB). *Vendée*: Olonne, chemin de la Bernarderie, fixed dunes, 1 ♀, 15.VII.2013, P. Oger leg. (CPO).

Ecology. *C. phragmitis* is a true wetland species. In the Maghreb it was only collected in the estuary of the Oued Réghaia near Alger.

Distribution. *C. phragmitis* is rare in the Maghreb. It was cited only once in Morocco (Denis 1945) and is here recorded for the first time on the coast of Algeria.



FIGURES 88–94. *Clubiona phragmitis* C. L. Koch, 1843: 88 female (from Belgium) habitus, dorsal view; 89 same, ventral view; 90 female (from Belgium) epigyne, ventral view; 91 same (from France); 92 vulva (from France), dorsal view; 93 male (from Belgium) palp, retrolateral view; 94 same, ventral view. Scale bars: 88, 89 = 1 mm; 90–94 = 0.2 mm.



MAP 5. Records of *Clubiona phragmitis* C. L. Koch, 1843 and *C. pseudosimilis* Mikhailov, 1990 in the Maghreb.

The *similis* group

Clubiona pseudoneglecta Wunderlich, 1994

(Figs 95–102; Map 4)

Clubiona pseudoneglecta Wunderlich, 1994: 157, figs 1–3 (holotype ♀ from Germany, Hessen, Rüdeshiem, A. Malten leg., SMF, not examined); Pozzi & Hänggi, 1998: 34, Figs 1–3 (♂).

Clubiona neglecta; Jocqué 1977: 327 (misidentification).

Diagnosis and description. See the excellent description of Merrett (2001).

Previous misidentification in the Maghreb. MOROCCO: *Fès-Meknès*: Ifrane, Cascade des Vierges, 1 ♀ (Jocqué 1977, sub *C. neglecta*), RMCA M.T.146158, examined.

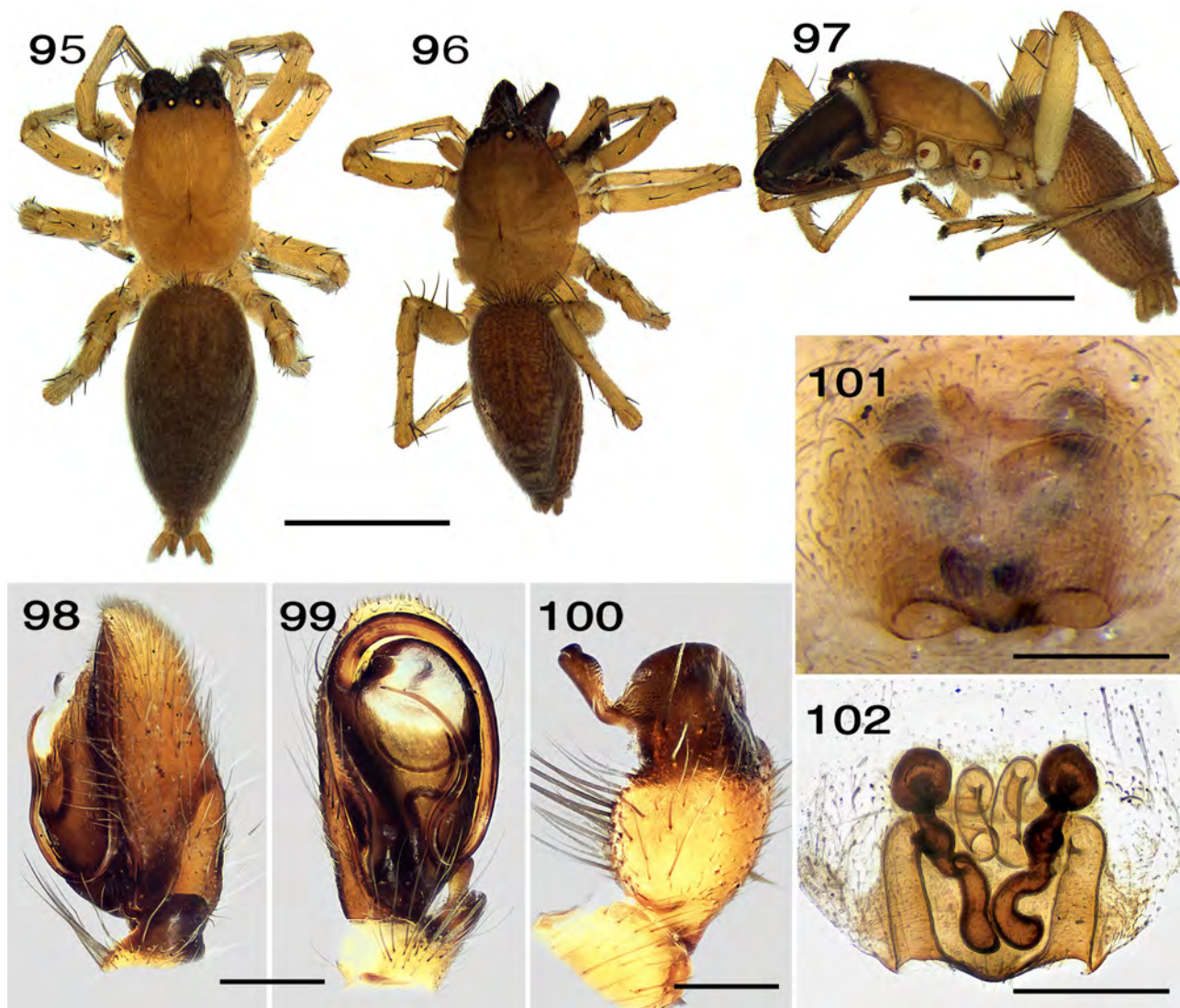
New records. AFRICA: ALGERIA: *El Tarf*: El Kala National Park, N. Lake Oubeira, Bou Merchen, 55m, 2 ♂♂, litter in marshy area with *Juncus*, 5.IV.1982, R. Bosmans leg. (CRB). EUROPE: SPAIN: *Barcelona*: Guardiola de Berga, 2 ♂♂ 2 ♀♀, under stones along Rio Llobregat, 6.VII.1991, R. Bosmans leg. (CRB). *Gerona*: Ripoll, 800m, 1 ♀, in camping site, 7.VII.1991, R. Bosmans leg. (CRB). *Madrid*: Pelayos de la Presa, 1 ♂ 1 ♀, in grasses along Rio Albergue, 13.IV.1999, R. Bosmans leg. (CRB). *Orense*: Puebla de Trives, 750m, 12.VIII.1994, R. Bosmans leg. (CRB). *Palencia*: Fuentes de Nava, Laguna de la Nava, pitfalls, VI–XI.1976, U. Stengele leg. (CRB). CROATIA: *Ličko-Sensjka*: pass between Karlobag and Gospic, 1 ♀, Valle & Bianchi leg, 12.VIII.1969, P. Pantini det. (CMB). GREECE: *Peloponnisos*: Achaia, Tsivlos, 3 ♀♀, *Platanus* forest along Krathis river, 28.VII.2001, R. Bosmans leg. (CRB).

Other material examined. FRANCE: *Vendée*: Salble d'Olonne, Aubraie road, 1 ♂, in tall grass, 12.VII.2013, P. Oger leg. (CPO); St Michel en l'Herm, 1 ♀, in tall grasses 10.VII.2013, P. Oger leg. (CPO)

Ecology. Only collected once in April in the wetlands of the El Kala National Park in Algeria.

Distribution. A female from Morocco identified as *C. neglecta* by Jocqué (1977) was re-examined and appears to belong to *C. pseudoneglecta*. *Clubiona neglecta* is deleted from the list of Morocco and replaced by *C.*

pseudoneglecta. The species is also cited for the first time in Algeria, Croatia and Spain. It was originally described by Wunderlich (1994) from SW Germany, where it also was confused with *Clubiona neglecta* in the past. It appears to have a large distribution and was then also found in Switzerland (Pozzi & Hänggi 1996; Hänggi 1999), Hungary (Mikhailov & Szinetar 1997), Belgium and the Netherlands (Roberts 1998). Merrett (2001) redescribed the species and added Great Britain, France and Greece to its distribution area. The species was further cited from Azerbaijan, Armenia, Bulgaria, Hungary and Moldavia by Mikhailov (2003), from Slovakia by Kuntner & Šereg 2002 and from Italy by Isaia *et al.* 2007.



FIGURES 95–102. *Clubiona pseudoneglecta* Wunderlich, 1994, male and female (from France): 95 female habitus, dorsal view; 96 male habitus, dorsal view; 97 same, lateral view; 98 male palp, retrolateral view; 99 same, ventral view; 100 RTA, retrolateral view; 101 epigyne, ventral view; 102 vulva, dorsal view. Scale bars: 95–97 = 1 mm; 98, 99, 101, 102 = 0.2 mm; 100 = 0.1 mm.

***Clubiona pseudosimilis* Mikhailov, 1990**

(Figs 103–110; Map 5)

Clubiona pseudosimilis Mikhailov, 1990: 311, Figs 16–20. Holotype ♂ and paratype ♀ from Georgia, Lagodekhi Reserve; several more paratypes from Georgia, Armenia and Azerbaijan; ZMMU, not examined

Diagnosis. Males of *C. pseudosimilis* differ from the closely related *C. neglecta* by the considerably shorter embolus (Fig. 106). Females are more close to *C. similis* and differ by the larger spermathecae (Figs 109, 110).

Description. See Mikhailov, 1990.

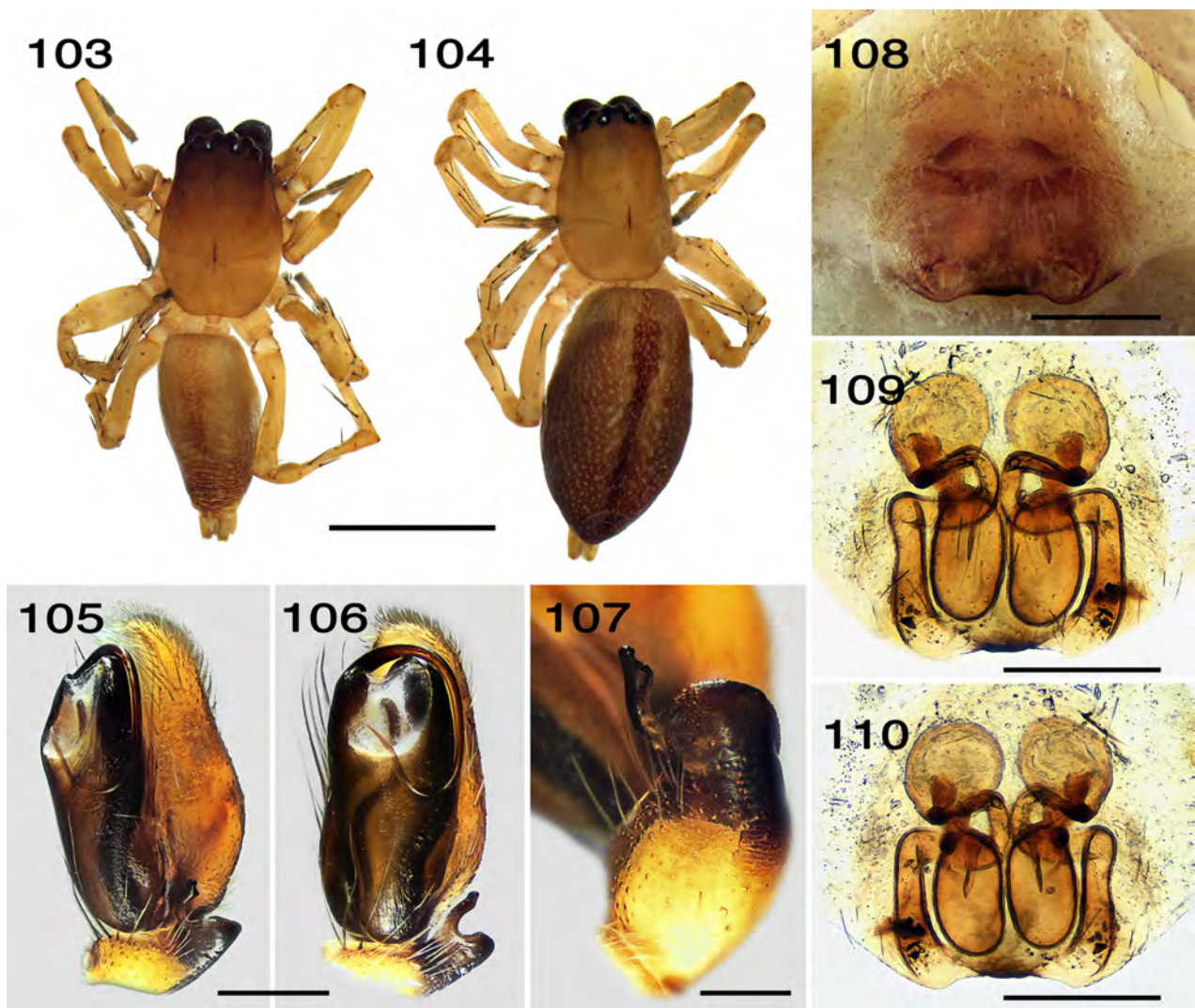
Previous citations in the Maghreb. None.

New records. AFRICA: ALGERIA: **Boumerdes:** Réghaia, estuary of Oued Réghaia, 1 ♀, pitfalls in *Carex* vegetation, 13.VI.1988, R. Bosmans leg. (CRB).

EUROPE: PORTUGAL: **Setubal:** Lagoa de Melides, 1 ♂ 2 ♀♀, litter in dunes along river mouth, 15.IV.2013, R. Bosmans leg. (CRB).

Ecology. *C. pseudosimilis* was only collected once in April in the estuary of the Oued Réghaia near Alger in Algeria.

Distribution. *C. pseudosimilis* is cited here for the first time in the Maghreb in Algeria and for the first time in Portugal, considerably enlarging its distribution area. At both localities it was collected in river mouths. Until recently this species was only known from Caucasian countries: Armenia, Azerbaijan and Georgia (Mikhailov 1990) and the Krasnodar and Kabardino-Balkaria regions of Russia. (Mikhailov 1992, 2003). Bosmans *et al.* (2013) expanded the distribution area to Greece, Crete.



FIGURES 103–110. *Clubiona pseudosimilis* Mikhailov, 1990, male and female (from Portugal: 103 male habitus, dorsal view; 104 female habitus, dorsal view; 105 male palp, retrolateral view; 106 same, ventral view; 107 RTA, retrolateral view; 108 epigyne, ventral view; 109 vulva, ventral view; 110 same, dorsal view. Scale bars: 103, 104 = 1 mm; 105, 106, 108 – 110 = 0.2 mm; 107 = 0.1 mm.

Doubtful species

Clubiona mandibularis Lucas, 1846: 212, pl. 12, fig. 7 (♀ holotype from Algeria, wilaya of Algiers, Kouba, not found at MNHNP); Simon 1864: 199 (transfer do *Amaurobius*). **Nomen dubium**

Remarks. Originally described in *Clubiona*, the species was transferred to *Amaurobius* by Simon (1864), but in later catalogues, including the World Spider Catalog (2017), it is listed again in *Clubiona*. According to Lucas (1846), *Clubiona mandibularis* resembles *Clubiona nutrix* (Walckenaer, 1802) (= *Cheiracanthium punctorium* (Villers, 1789)).

Misplaced species

Clubiona venusta Pavesi, 1880: 342 (subadult ♀ holotype from Tunisia, Isola Scikli, Violante journey 1877, MCSNG; examined) = *Selamia reticulata* (Simon, 1870). **N. Syn.**

Remarks. *Clubiona venusta* Pavesi, 1880 is a forgotten species and was never cited after the original description. In the description, the holotype is said to be of 7 mm long with brown prosoma and violet-brown abdomen. Pavesi (1880) assigned the species to the 'corticalis' group, related to *Clubiona mandibularis* Lucas, 1846 and *C. ornata* Thorell, 1875 (= *C. subsultans* Thorell, 1875). The type material could be examined and it appears to be a subadult ♀ belonging to the zodariid genus *Selamia* Simon, 1873. The shape of the prosoma, the leg spinulation and the violet colour pattern of the abdomen are typical for the genus. As *Selamia reticulata* (Simon, 1870) is the only current member of the genus occurring in Tunisia, *Clubiona venusta* enters into the synonymy of that species.

New records of *Clubiona* species from European Mediterranean countries

Clubiona aducta Simon, 1932

New records. PORTUGAL: **Bragança:** Santa Combinha, 600m, 1 ♀, grassland, 18.VIII.1994, R. Bosmans leg. (CRB). **Vila Real:** São Salvador de Viveiro, 950m, 1 ♀, 16.VIII.1992, R. Bosmans leg. (CRB).

Distribution. This rare species was described from Central Spain (Simon, 1932) and cited from Portugal by Machado (1949). Urones (1988) described the ♀, also from Central Spain. Ferrandez & Beamonte (2005) added two localities near Madrid and these are the only known so far. Two new localities for Portugal are presented.

Clubiona brevipes (Blackwall, 1841)

New records. ITALY: **Molise:** Bojano, 1 ♀, beating branches in deciduous forest, 27.VI.2002, R. Bosmans leg. (CRB).

Distribution. South, Central and North Europe, South Russia, Caucasus (Helsdingen 2017).

Clubiona corticalis (Walckenaer, 1802).

New records. SPAIN: **Burgos:** Puerto de la Brugula, 990m, 1 ♂ 2 ♀♀, under stones at border of *Pinus* forest, 31.III.1997, R. Bosmans leg. (CRB). PORTUGAL: **Leiria:** Lagoa de Obidos, 1 ♀, beating *Pinus* branches, 20.IV.2013, R. Bosmans leg. (CRB). GREECE: **Peloponnisos:** Achaia: Mega Spileo Monastery, 1 ♀, garden around Monastery, 14.IV.2000, R. Bosmans leg. (CRB).

Distribution. Europe to East Asia (Helsdingen 2017).

Clubiona diversa O. Pickard-Cambridge, 1862

New records. SPAIN: **Gerona:** Puerto de Tosas, 1 ♂, near fountain in *Pinus* forest, 10.VII.1991, R. Bosmans leg. (CRB).

Distribution. South, Central and North Europe, Russia, Mongolia, Korea, Japan (Helsdingen 2017).

Clubiona hilaris Simon, 1878

New records. FRANCE: *Savoie*: Valloire, Larivine, 1 ♂ 1 ♀, 5.VIII.1980, R. Bosmans leg. (CRB). ITALY: *Valle d'Aosta*: Valle Salvarenche, Plan Pessey, 1150m, 2 ♀♀, 13.VII.1989, R. Bosmans leg. (CRB).

Distribution. Mountains of Spain, France, Italy, Austria, Switzerland, Bulgaria, Macedonia and Romania (Helsdingen 2017).

Clubiona juvenis Simon, 1878

New records. FRANCE: *Bouches-du-Rhône*: Aigues Mortes, 1 ♀, 16.IV.1984, P. Poot leg. (CRB).

Distribution. South and Central Europe, Russia, China (Helsdingen 2017).

Clubiona neglecta (O. Pickard-Cambridge, 1862)

New records. SPAIN: *Cantabria*: road Potes-Piedraslenguas, 850m, 1 ♀, under stones in grassland, 13.VII.1985, R. Bosmans leg. (CRB). *Granada*: Sierra Nevada, Pic Valeta, 950m, 1 ♀, near spring in grassland, 10.VIII.1991, R. Bosmans leg. (CRB). *Jaen*: Cotorrios S., along Rio Guadalquivir, 12.IV.1999, R. Bosmans leg. (CRB). *Madrid*: Pelayos de la Presa, 1 ♂ 1 ♀, under stones in grassland, 13.IV.1999, R. Bosmans leg. (CRB).

FRANCE: *Bouches-du-Rhône*: Aigues Mortes, 1 ♂, 16.IV.1984, P. Poot leg. (CRB).

Distribution. All Europe, Central Asia, China, Korea (Helsdingen 2017; World Spider Catalog 2017).

Clubiona similis (L. Koch, 1866)

New records. SPAIN: *Cantabria*: road Potes-Piedraslenguas, 850m, 1 ♀, under stones in grassland, 13.VII.1985, R. Bosmans leg. (CRB); road Puerto de Pandeleva-Portilla de la Reina, 3 ♀♀, herbs along rivulet in grassland, 14.VII.1985, R. Bosmans leg. (CRB). *Gerona*: Puigmal, Fons de l'Home Mort, 1700m, 1 ♂, under stones in grassland, 13.VII.1991, R. Bosmans leg. (CRB).

Distribution. Europe (Helsdingen 2017).

Clubiona terrestris Westring, 1851

New records. SPAIN: *Barcelona*: San Domingo, 5 km from Callella de Mar, 1 ♀, along rivulet, 9.IV.1991, R. Bosmans leg. (CRB). *Cantabria*: Bulnes, 500m, 1 ♀, dry grassland, 19.VII.1985, R. Bosmans leg. (CRB). *Gerona*: Ogassa, Serra de Sant Amand, 900m, 1 ♀, 8.VII.1991, R. Bosmans leg. (CRB). *Huesca*: Garganta de Bujaruelo, 1400m, 1 ♀, grassland along rivulet, 1.VIII.1984, R. Bosmans leg. (CRB). GREECE: *Ionian Islands*: Lefkada: Sivros, Kerasias springs, 1 ♂ 4 ♀♀, litter in *Platanus* forest, 23.X.1999, R. Bosmans leg. (CRB). Kefalonia: Aghios Nikolaos, lake Avithos, 1 ♀, marshy area, 5.VIII.2001, R. Bosmans leg. (CRB). Zakynthos: Gerakari, 1 ♂, under stones along ditch in flooded Citrus orchard, 3.VIII.2001, R. Bosmans leg. (CRB). *Peloponnisos*: Achaia: Peristera, 1100m, 1 ♀, grassland along river Styx, 13.IV.2000, R. Bosmans leg. (CRB); Tsivlos, 2 ♂♂ 2 ♀♀, *Platanus* forest along river Krathis, 28.VII.2001, R. Bosmans leg. (CRB).

Distribution. Europe except Russia (Helsdingen 2017; Mikhailov 2003).

Conclusions

Eight *Clubiona* species have been cited in the past: *Clubiona baborensis*, *C. comta*, *C. leucaspis*, *C. mandibularis*, *C. neglecta*, *C. phragmitis*, *C. vegeta* and *C. venusta*. Only the presence of 4 species can be confirmed: *C. comta*, *C. leucaspis*, *C. phragmitis* and *C. vegeta*. *Clubiona neglecta* was misidentified and appeared to be *C.*

pseudoneglecta. *Clubiona venusta* Pavesi, 1880 appeared to be a junior synonym of *Selamia reticulata* (Simon, 1870). *Clubiona baborensis* Denis, 1937 appears to be junior synonym of *C. diniensis* Simon, 1878. Finally, *C. mandibularis* Lucas, 1846 remains a **nomen dubium**. *Clubiona pseudosimilis* is mentioned for the first time in the Maghreb in Algeria. Subsequently, the number of *Clubiona* species in the Maghreb is reduced to seven.

Clubiona species have a very limited distribution area in the Maghreb. They all occur in a narrow coastal area of not more than 50 km wide. They were found in two main habitat types: forests and wetlands. The two forest species, *C. diniensis* and *C. leucaspis* occur in all forest types, *C. diniensis* up to 800m, *C. leucaspis* up to 1500m. *Clubiona comta*, *C. phragmitis*, *C. pseudoneglecta*, *C. pseudosimilis* are wetland species in the Maghreb, only occurring in areas of large biological value: the wetlands of the estuary of the Oued Réghaia, and the wetlands of the El Kala National Park. The record of *C. comta* in a riverine *Alnus* forest in the Forêt de Yakouren is also of biological importance. Only one *Clubiona* species, *i.e.* *C. vegeta*, occurs in more man-influenced habitats.

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