

ON THE ADERIDAE OF GIBRALTAR, WITH NOTES ON THE SYSTEMATICS OF THE GENERA *OTOLELUS* KLINGER, 2000 AND *COBOSOSIA* COLLADO & ALONSO ZARAZAGA, 1996 (COLEOPTERA)

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Abstract: A provisional list of the Aderidae (Coleoptera) of Gibraltar is provided. Four species are recorded, including one new to the Iberian fauna: *Cobososia angulithorax* (Desbrochers des Loges, 1881). The systematics of the genera *Otolelus* Klinger, 2000 and *Cobososia* Collado & Alonso Zarazaga, 1996 is discussed and the following nomenclatural change is proposed: *Xylophilus benimorae* Pic, 1893 = *Cobososia angulithorax* (Desbrochers des Loges, 1881), syn. n.

Key words: Coleoptera, Aderidae, Cobososia, Otolelus, Aderus populneus, Cobososia angulithorax, Cobososia pallescens, Xylophilus benimorae = Cobososia angulithorax, syn. n., Cobososia fulvicolor, Otolelus pruinosus pruinosus, Otolelus neglectus, Iberia, Gibraltar.

Aderidae de Gibraltar y notas sobre la sistemática de los géneros *Otolelus* Klinger, 2000 y *Cobososia* Collado & Alonso Zarazaga, 1996 (Coleoptera)

Resumen: Se presenta una lista provisional de los Aderidae (Coleoptera) de Gibraltar. Se citan cuatro especies, incluyendo una nueva para la fauna ibérica: *Otolelus angulithorax* (Desbrochers des Loges, 1881). Se discute la taxonomía de los géneros *Otolelus* Klinger, 2000 y *Cobososia* Collado & Alonso Zarazaga, 1996 y se proponen el siguiente cambio nomenclatural: *Xylophilus benimorae* Pic, 1893 = *Cobososia angulithorax* (Desbrochers des Loges, 1881), syn. n.

Palabras clave: Coleoptera, Aderidae, Cobososia, Otolelus, Aderus populneus, Cobososia angulithorax, Cobososia pallescens, Xylophilus benimorae = Cobososia angulithorax, syn. n., Cobososia fulvicolor, Otolelus pruinosus pruinosus, Otolelus neglectus, Iberia, Gibraltar.

Taxonomy/Taxonomía: *Cobososia benimorae* (Pic, 1893) = *Cobososia angulithorax* (Desbrochers des Loges, 1881), **syn. n.**

Introduction

The Aderidae is a relatively small family of Tenebrionoidea, with ca. 1000 species known worldwide, mostly from the tropics (Lawrence *et al.*, 1990; Chandler, 2002). 26 are known from Europe, with seven reported from the Iberian Peninsula: *Aderus populneus* (Creutzer in Panzer, 1796), *Anidorus nigri-nus* (Germar, 1842), *Anidorus sanguinolentus* (von Kiesenwetter, 1861), *Euglenes oculatus* (Paykull, 1798), *Otolelus flaveolus* (Mulsant & Rey, 1866), *Otolelus neglectus* (Jacquelin du Val, 1863), *Otolelus pruinosus pruinosus* (von Kiesenwetter, 1861) (Nardi, 2004, 2008). The figure for Iberia is low and likely to be the result of undersampling. For example, the Aderidae of France comprise 13 species (Gompel & Barrau, 2002).

The British territory of Gibraltar is located near the southernmost point of the Iberian Peninsula (approx. N36°07' W5°20') and is dominated by the Rock of Gibraltar, which is composed of Jurassic limestone and rises from sea level to 426 m. In a small and densely populated area of approx. 6 km², Gibraltar supports a variety of terrestrial habitats including maquis, garigue, open habitats, dunes, gardens and some remnants of woodland. Together these support a diverse flora and fauna, including a variety of endemic and near-endemic species, some of the latter being shared with North Africa (Perez, 2006).

In the course of a survey of Gibraltar's entomofauna, two of the authors (KB & CP) have collected four species belonging to the Heteromera family Aderidae, specimens of

which were infrequently collected employing a variety of methods. This gives us the opportunity to present a draft list of species found on the Rock, add a new species to the Iberian fauna and discuss the status of three species in the genera *Cobososia* Collado & Alonso Zarazaga, 1996 and *Otolelus* Klinger, 2000, all within the taxonomic framework proposed by Nardi (2008).

Results and Discussion

1) Provisional, annotated list of the Aderidae of Gibraltar

Aderus populneus (Creutzer in Panzer, 1796) Fig. 1g.

1 ex. 20.v.2006, 1 ex. 08.vi.2006, 1 ex. 01.vii.2009, 1 ex. 12.vi.2009 & 1 ex. 27.viii.2009 taken with a Rothamsted light trap at the Gibraltar Botanic Gardens (N36°07'537" W5°21'057", 30m a.s.l.), a 6 ha gardens comprised of exotic and Mediterranean vegetation. All specimens Leg. C. Perez & K. Bensusan, Gibraltar Ornithological & Natural History Society (GONHS) coll. This species had already been recorded from Gibraltar (Champion, 1891).

Otolelus pruinosus pruinosus (von Kiesenwetter, 1861) Fig. 1b.

1 ex. 23.iv.2008, close to Engineer Road, Upper Rock (N36°07'402" W5°20'555", 112 m. a.s.l.), beating herbaceous plants on the edge of high maquis vegetation. Leg. C. Perez & K. Bensusan, GONHS coll.

Otolelus neglectus (Jacquelin du Val, 1863) Fig. 1a.

1 ex. 18.vi.2009, Douglas Path (N36°07'746" W5°20'690", 380 m. a.s.l.), sieving soil and leaf litter under *Quercus coccifera*, on a steep

and fairly open rocky slope with deep pockets of soil, surrounded by maquis vegetation. Leg. C. Perez & K. Bensusan, GONHS coll.

***Cobosia angulithorax* (Desbrochers des Loges, 1881)** Fig. 1c. 1 ex. 27.viii.2009 & 1 ex. 12.ix.2009 taken with a Rothamsted light trap at the Gibraltar Botanic Gardens and Leg. C. Perez & K. Bensusan, GONHS coll. 1 ex. 27.viii.2009 taken with a Rothamsted light trap at the Gibraltar Botanic Gardens and Leg. C. Perez & K. Bensusan, N. Gompel coll.

2) Other species that could be present in Gibraltar:

The diversity of habitats in Gibraltar, leaves open the possibility of finding more Aderidae species. The most likely to be discovered are listed:

Anidorus sanguinolentus (von Kiesenwetter, 1861): common in Southern France and Spain (in particular, recorded from Malaga (Champion, 1891)).

Anidorus nigrinus (Germar, 1842): present in France and Spain.

Cobosia pallescens (Wollaston, 1854): a Mediterranean species.

Eugenes oculatus (Paykull, 1798): distributed across Europe.

3) Notes on the systematics of the genera *Cobosia* and *Otolelus*

3.1 Generic placement of *Xylophilus angulithorax* Desbrochers des Loges, 1881

Xylophilus angulithorax was first described from Bône, Algeria (today Annaba) in 1881 by Jules Desbrochers des Loges. Both Pic (1903) and Báguena Corella (1948) placed this species in the genus *Otolelus* Klinger, 2000 (then subgenus *Otolelus* Mulsant & Rey, 1866, see Mroczkowski, 1987 and Klinger, 2000) in their respective monographs. In 1962, however, Báguena Corella delineated the genus *Cobosia* to group several African Aderidae species characterized by a thorax of trapezoidal conformation with marked anterior angles, and included *X. angulithorax* in this new genus. This genus turned out, however, to be unavailable because Báguena Corella omitted to designate a type species. This was later corrected by Collado & Alonso Zarazaga (1996), who chose *Hylophilus fulvicolor* Escalera, 1942 as the type species. The valid genus name is therefore *Cobosia* Collado & Alonso Zarazaga, 1996.

The placement of *Xylophilus angulithorax* within *Cobosia* Collado & Alonso Zarazaga, 1996 raises questions, however, upon comparison with specimens of *Otolelus pruinosus pruinosus* (von Kiesenwetter, 1861), the type species of *Otolelus* (Klinger, 2000; Nardi, 2007), and *Cobosia pallescens* (Wollaston, 1854) (Fig. 1). In many respects, *X. angulithorax* shares a lot more similarities with the former, from which it is only reliably separated by a few characters (see below). This prompted us to examine specimens of *Cobosia fulvicolor* (Escalera, 1942), the type species of *Cobosia* Collado & Alonso Zarazaga, 1996. All three species, – *Otolelus pruinosus pruinosus* (von Kiesenwetter, 1861), *Xylophilus angulithorax* Desbrochers des Loges, 1881, and *Cobosia fulvicolor* (Escalera, 1942)– are overall remarkably similar in respect of their external morphology. They share characters that otherwise vary much among other species placed in either *Cobosia* or *Otolelus*. For instance, they all bear identical double pubescence on their elytra and pronotum (identical to Fig. 2e) with one large seta arising from each point and smaller squamose hairs interspersed, giving a prui-

nose aspect to these beetles, a character absent from *Otolelus flaveolus* (Mulsant & Rey, 1866), *Otolelus neglectus* (Jacquelin du Val, 1863) or *Cobosia pallescens* (Wollaston, 1854) (Fig. 2d), which themselves share an extremely short pubescence.

We have nevertheless found diagnostic differences to separate *Otolelus pruinosus pruinosus* (von Kiesenwetter, 1861), *Xylophilus angulithorax* Desbrochers des Loges, 1881, and *Cobosia fulvicolor* (Escalera, 1942):

(i) The hind femorae are always entirely pale in *X. angulithorax*, darker on their proximal fourth in *Cobosia fulvicolor* (only visible from the side or ventrally), and largely enfuscated, at least over two thirds of their length from the base (paler morphs) or entirely dark in *Otolelus pruinosus pruinosus*.

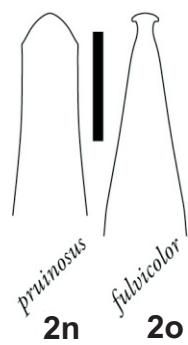
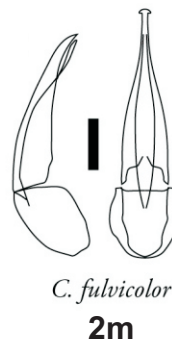
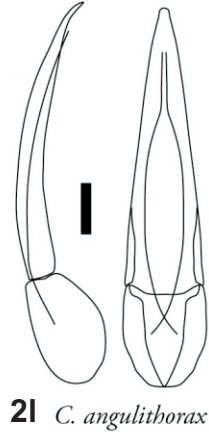
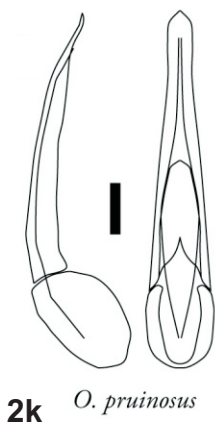
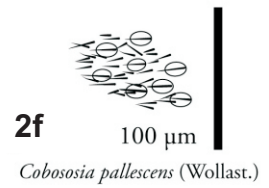
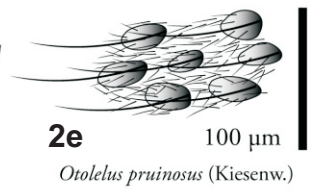
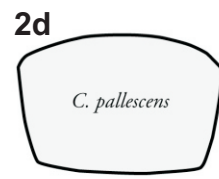
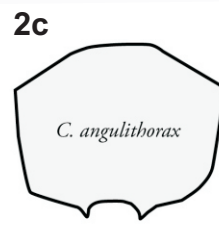
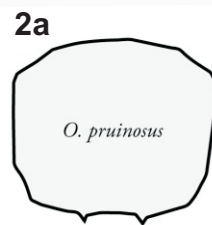
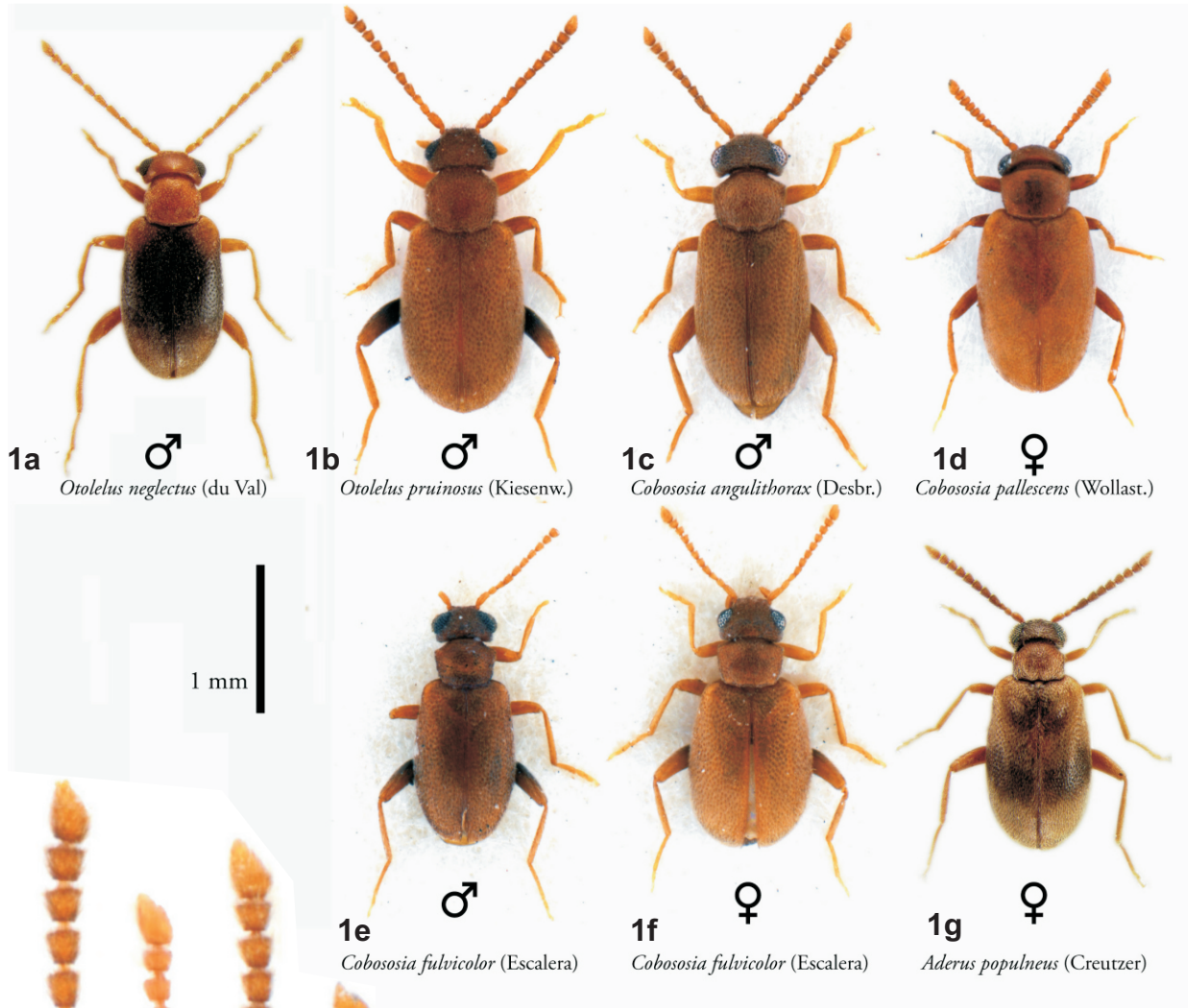
(ii) The shape of their pronota. Specifically, the sides of the trapeze defined by the outline of the pronotum in dorsal view are very oblique in *C. fulvicolor*, somewhat less so in *C. angulithorax*, and nearly parallel in *O. pruinosus pruinosus* (Fig. 2a-c).

(iii) The anterior angles of the pronotum are acute in *C. fulvicolor* and *X. angulithorax* but more rounded in *O. pruinosus pruinosus* (Fig. 2a-c).

(iv) The structure of the male genitalia is similar in all three species, with no parameres. However, they differ markedly from each other by their length and by the tapering of their apex (Fig. 2k-o).

Because of their similar prothoracic angles, *C. fulvicolor* and *X. angulithorax* appear more closely related, and since this character is diagnostic of the genus *Cobosia* (Báguena Corella, 1962), we chose to maintain *X. angulithorax* in this genus *Cobosia*. Nevertheless, in each of these two genera (*Cobosia* and *Otolelus*), several species are more dissimilar from the type species than these two type species (*C. fulvicolor* and *O. pruinosus pruinosus*) are from each other. Therefore, we believe that the genus *Cobosia* Collado & Alonso Zarazaga, 1996 should be considered a junior synonym of *Otolelus* Klinger, 2000. We do not propose this synonymy formally yet, as we prefer to examine more species of each genus, and discuss this matter in the context of a larger revision.

- ▶ **Fig. 1.** Habitus of *Otolelus*, *Cobosia* and *Aderus* species. (a) *Otolelus neglectus* from France, (b) *O. pruinosus pruinosus* male, pale specimen from France, (c) *C. angulithorax* male from Gibraltar, (d) *C. pallescens* female (unknown origin), (e, f) *C. fulvicolor* male (paratype) and female (holotype) from Equatorial Guinea, (g) *Aderus populneus* from France.
- ▶ **Fig. 2.** Morphological details in *Cobosia* and *Otolelus* species. (a-d) Pronotal shapes of *O. pruinosus pruinosus* male from France (a), *C. fulvicolor* male (paratype) from Equatorial Guinea (b), *C. angulithorax* male from Gibraltar (c) and *C. pallescens* female of unknown origin (d). (e-f) Details of elytral disc punctuation and pubescence in *O. pruinosus pruinosus* from France and *C. pallescens* of unknown origin, respectively. (g-j) Right antenna of *O. pruinosus pruinosus* from France (g), *C. fulvicolor* female (holotype) from Equatorial Guinea (h), *C. angulithorax* male from Gibraltar (i) and *C. pallescens* female of unknown origin (j). (k-o) Male genitalia of *O. pruinosus pruinosus* from France (k, n), *C. angulithorax* male from Gibraltar (l), *C. fulvicolor* male (paratype) from Equatorial Guinea (m, o).



3.2 Status of *Xylophilus benimorae* Pic, 1893

Among the species that Báguena Corella (1962) had placed in his genus *Cobosisia*, two are found in Europe: *Cobosisia pallescens* (Wollaston, 1854) (Canary Islands, Italy, Cyprus, Sicily (Israelson, 1970; Nardi, 2004, 2008)) and *Cobosisia angulithorax* (Desbrochers des Loges, 1881), (Gibraltar (this note), Sardinia (Pic, 1910; Luigioni, 1929; Porta, 1934)). A third species, *Cobosisia benimorae* (Pic, 1893), is recorded from North Africa in addition to the former two. Whilst the status of *C. pallescens* (Wollaston) (type kept at the Natural History Museum of London) has been clarified by Israelson (1970), the original descriptions of the other species are ambiguous, prompting us to examine their type material kept at the Natural History Museum in Paris (MNHN). In 1893, Pic described “*Xylophilus Beni-Morae*”, also from Algeria. In his original description, he gives three criteria with which to separate *X. benimorae* from *X. angulithorax*: in the former the pronotum bears no impression, its anterior angles are strongly marked, and the species is smaller overall. In his 1903 key to Aderidae (Pic, 1903), however, the criteria to distinguish between both species are different: shoulders well marked, and pubescence fine in *X. benimorae*, shoulders weak and pubescence medium in *X. angulithorax* (yet the original description of *X. angulithorax* refers to fine pubescence, demonstrating the subjective, arbitrary nature of such descriptions).

In addition to the three specimens from Gibraltar cited above, we examined the material from Pic’s collection (MNHN). Unfortunately, the type specimen or specimens of *X. angulithorax* were unavailable (on loan), but we examined two *X. benimorae* syntypes and another specimen, as well as six *X. angulithorax* specimens identified by Pic as such. All match Desbrochers’ original description of *X. angulithorax* reasonably well, and in particular, all have the thoracic impressions Pic refers to¹. We have dissected the following specimens in order to examine their genitalia:

– the male syntype of *X. benimorae*, which we hereby design as the lectotype (the other syntype likely being a female that we design as a paralectotype).

– one male specimen from Pic’s series of *Cobosisia angulithorax* (Desbrochers des Loges, 1881), from Saint-Charles, Algeria.

– one male of *C. angulithorax* (Desbrochers des Loges, 1881) from Gibraltar.

Our observations lead us to conclude that (i), the genitalia of all dissected males have a similar shape (Fig. 2l), but differ from that of *C. pallescens* (Wollaston, 1854) (illustrated by Israelson, 1970); (ii) none of the diagnostic criteria indicated by Pic in either of his publications referring to these species (1893, 1903) hold to separate the specimens we have examined in two species; (iii) in addition to the criteria given by Pic, we have noticed that the forelegs of males of both species have their tibia slightly bent inwards, as is the case in *O. pruinus pruinus*.

Given this, we propose that *Xylophilus benimorae* Pic, 1893 be considered a junior synonym of *Cobosisia angulithorax* (Desbrochers des Loges, 1881), **syn. n.**

¹ a character difficult to see, depending on the angle of observation. It produces a small notch at the base of the pronotum, and is also present in *Otolelus pruinus pruinus* (Kiesenwetter, 1861).

C. pallescens and *C. angulithorax* are unambiguously distinct, not only by the shape of the male genitalia, but also by their external morphology (Fig. 1c,d). The most reliable characters to separate the two species are:

– the pubescence (fine, pruinose and simple in *C. pallescens*, double in *C. angulithorax*).

– the shape of the pronotum (strictly trapezoidal in *C. pallescens*/constricted before the anterior angles in *C. angulithorax*).

– the absence of any impression or notch at the base of the pronotum in *C. pallescens*.

3.3 Material examined

Otolelus pruinus pruinus (von Kiesenwetter, 1861)

Over 300 specimens examined from Southern France (see Gompel & Barrau, 2002) and Gibraltar (see section 1). Specimens used for figures of the present paper: France, Bouches-du-Rhône, Gémenos, 27.v.1995, 1 ex., N. Gompel leg. (Fig. 2k); France, Gard, Vauvert, 26.viii.2000, 1 ex., N. Gompel leg. (Fig. 1b, 2a, 2e, 2g, 2k, 2n)

Cobosisia angulithorax (Desbrochers des Loges, 1881)

Collection MNHN. Algeria: Tarfaia, A. Théry leg., 1 ex.; Saint-Charles, A. Théry leg., 1 ex.; Bône, 3 ex. – Morocco: Sebou, A. Théry leg., 1 ex.; Collection Museo Nacional de Ciencias Naturales, Madrid (MNCNM): Morocco: Tanger, M. Escalera leg. (Cat. 43226), 1 ex.; Tanger (Cat. 43227), 1 ex.

Cobosisia fulvicolor (Escalera, 1942)

Upon examination of the holotype and four paratypes of *Cobosisia fulvicolor* (Escalera, 1942) kindly sent by Mrs Mercedes Paris (MNCNM), it was immediately obvious that one paratype belonged to a different species and probably to a different genus and had been placed in the type series of *Cobosisia fulvicolor* (Escalera, 1942) by mistake. We exclude this specimen from the type series. It bears the following labels: Guinea Española, Dr L. Báguena/Mitem/Paratipo/MNCN Cat. Tipos N°12056/MNCN_Ent N° Cat. 43236. We have added a label: “excluded from the type series of *Hylophilus fulvicolor* Escalera, 1942, N. Gompel det. 2010”. The holotype and the other three paratypes are however similar to each other, and in line with the description given by Escalera (1942). We have not however examined the entire series kept at the MNCNM.

Equatorial Guinea: Bata, L. Báguena leg., 1 female (holotype, MNCN Cat. Tipos N°12056/N° Cat. 43228; see Fig. 1f, 2h), 1 male (paratype, MNCN Cat. Tipos N°12056/N° Cat. 43232; see Fig. 1e, 2b, 2m); Rio Benito, L. Báguena leg., 1 male (paratype, MNCN Cat. Tipos N°12056/N° Cat. 43237), 1 female (allotype, MNCN Cat. Tipos N°12056/N° Cat. 43229).

Cobosisia benimorae (Pic, 1893)

Algeria: Biskra, 1 male (lectotype, collection M. Pic, MNHN); 1 male, Beni-Mora (collection M. Pic, MNHN) – Unknown origin: 1 female (paralectotype, collection M. Pic, MNHN).

Cobosisia pallescens (Wollaston, 1854)

Syria: Kaifa, Reitter leg., 3 ex. – Lebanon: Beirut, 1 ex. – Italy: Sicilia, Ragusa leg., 1 ex. – Unknown origin: 1 female (type, collection M. Pic, MNHN; see Fig. 1d, 2d, 2f, 2j).

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