

Zelotes mundus (Araneae: Gnaphosidae) in the Camargue: a continental species reaches the western Mediterranean coast

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Summary

Zelotes mundus (Kulczyński, 1897), a gnaphosid spider previously known from eastern Europe and Asia, is newly recorded from the Camargue, southern France.

Introduction

Forty individuals of a gnaphosid not previously known from France were captured in reed beds in the Camargue (southern France) in July 1999 during the course of a study on the influence of reed cutting on the fauna (Schmidt *et al.*, 2005). After *Drassyllus lutetianus* (L. Koch, 1866), it was the most numerous gnaphosid collected. At first the species was mistaken for *Zelotes serotinus* (L. Koch, 1866) (= *Zelotes longipes* (L. Koch, 1866)). Further investigations showed that the specimens from the Camargue belong to *Zelotes mundus* (Kulczyński, 1897), which is known from Austria, Hungary and the Balkan Peninsula eastwards to China, Kazakhstan and Russia (Milasowszky *et al.*, 2007). Here, we provide a morphological description and discuss its taxonomy and distribution. All measurements are in millimetres.

Zelotes mundus (Kulczyński, 1897) (Figs. 1–6)

Prosthesima munda Kulczyński, in Chyzer & Kulczyński, 1897: 297, pl. 8, fig. 19 (D♂).

Zelotes yutian Platnick & Song, 1986: 12, figs. 41–44 (D♂♀).

Zelotes yutian: Marusik & Logunov, 1995: 197, 210, figs. 88–90 (♂♀);
Song *et al.*, 1999: 464, fig. 267 G, M (♂♀, same figures as in Platnick & Song).

Urozelotes yutian: Esyunin & Efimik, 1996: 110–111, figs. 16, 19–22 (♂♀).

Zelotes mundus: Bauchhenss *et al.*, 1997: figs. 1–6 (♂, D♀);
Milasowszky *et al.*, 2007: 22, figs. 1–3.

Material examined: France: the Camargue, July 1999. Pitfall traps in reed beds between Gallician (43°38'N, 4°18'E) in the northwest and Fos-sur-Mer (43°27'N, 4°52'E) in the southeast, 6♀ 5♂, leg. M. H. Schmidt, det. A. Hänggi, deposited in Naturhistorisches Museum Basel.

Female/male: Total length 4.5–6.9/3.2–5.1. Carapace length 1.84–2.10/1.30–2.10, width 1.44–1.66/0.96–1.58. Femur II length 1.20–1.34/0.82–1.34. Typical *Zelotes*

appearance with dark grey abdomen, blackish brown carapace, and paler, brown metatarsi and especially tarsi. Palps entirely brown. Dark brown scutum only in males, brown branchial opercula in both sexes. Genitalia as in Figs. 1–6. The male palp resembles the figure in Chyzer & Kulczyński (1897), and both sexes agree with the figures in Platnick & Song (1986) and Marusik & Logunov (1995). In Esyunin & Efimik (1996), the terminal and median apophyses of the male palp appear connected, which is not the case in other references or in our specimens. Bauchhenss *et al.* (1997) drew the median apophysis as a single tooth rather than as a protruding rectangle, but this may depend on the angle of observation. Otherwise, their figures of both sexes match our material. Male size varied considerably, but aggregated toward the two extremes. Small males were distinctly paler than large males, but otherwise not distinguishable.

Taxonomy

Milasowszky *et al.* (2007) demonstrated that *Zelotes yutian* is a synonym of *Zelotes mundus*. We agree with this and would like to support this synonymy and the replacement of the species in *Zelotes* by furnishing further arguments and figures.

Male: According to Esyunin & Efimik (1996), *Z. mundus* should be placed in *Urozelotes* Mello-Leitão, 1938. They argue that “the terminal apophysis structure of this species (fig. 20–21) is similar to the one of species of the genus *Urozelotes* Mello-Leitão, 1938 (see Platnick & Murphy, 1984)”. In their figs. 20 and 21 a slender, pointed apophysis is shown appressed to the embolus as mentioned in the diagnosis for the genus *Urozelotes* (Platnick & Murphy, 1984). In our specimens (Fig. 1) there is no such apophysis even if there appears to be under certain angles of view or under different light conditions. Additionally, detailed investigation (Figs. 2–3) showed that our specimens have only a small tooth on the base of the embolus and that from there a small ridge (rather a matter of colour than of structure) runs down to the base. There is no sign of the “pointed terminal apophysis closely appressed to the embolus” as in the diagnosis of *Urozelotes* in Platnick & Murphy (1984).

Conversely, in the diagnosis for species of the genus *Zelotes*, Platnick & Shadab (1983) require the combination of a preening comb on metatarsi III and IV and an intercalary sclerite. The preening comb is present also in *Urozelotes rusticus* (L. Koch, 1872) and is therefore not reliable for the placement of our specimens. Concerning the intercalary sclerite, on the unexpanded palp only a faint suggestion of something like a sclerite can be seen, which would indicate that our specimens are not *Zelotes*. However, Milasowszky *et al.* (2007) showed on the prepared palp that this structure really is a sclerite.

Female: In the diagnosis for *Urozelotes*, Platnick & Murphy (1984) mentioned “an epigynum bearing an elongate, triangular median plate”. This is clearly not visible in either our specimens (Fig. 4) or those shown in

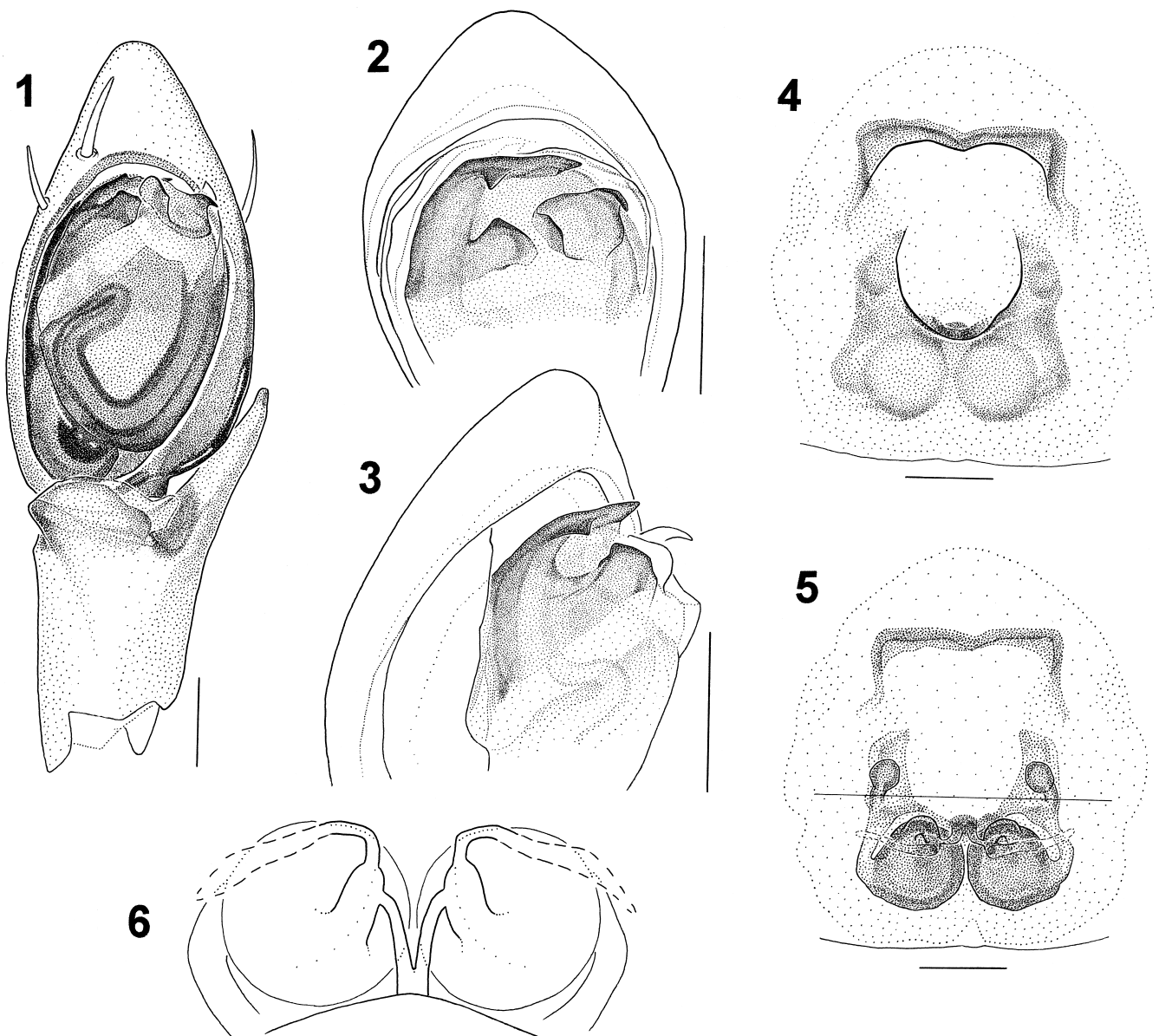
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Esyunin & Efimik (1996: fig. 16). Moreover, the structure of the vulva (internal organs) is quite different from that of *Urozelotes rusticus*, with the median epigynal ducts originating retrolaterally and surrounding the spermathecae laterally (Fig. 5). This is similar to the situation in *Zelotes puritanus* Chamberlin as figured by Platnick & Shadab (1983), Grimm (1985) and Thaler (1981). According to Senglet (2004) these “median ducts”, named “Einführgänge” (introduction ducts) by Grimm (1985), run from the insemination pore (normally somewhere in the (retro-)lateral epigynal margin) to the spermathecae, with the glandular ducts (*sensu* Senglet, 2004; paramedian epigynal duct *sensu* Platnick & Shadab, 1983) in the anterior part of the ducts. In our specimens the median ducts run more or less straight backwards, entering the spermathecae laterally. The reasons detailed above support the revised placement of the species in the genus *Zelotes* as proposed by Milasowszky *et al.* (2007).

Supplementary remark: As in almost all zelotine species, our specimens bear a pair of glandular structures mediodorsally on the spermathecae, situated near the fertilisation ducts. Surprisingly, in our specimens these are directly joined with the fertilisation ducts and the latter seem to be united ventrally (Fig. 6). However, these structures are very obscure and we are not sure about their functional aspects.

Distribution and habitat

The known records of *Z. mundus* are listed in Milasowszky *et al.* (2007). Hitherto the westernmost records were in eastern Austria at 16°E. Our specimens came from seven large reed beds (*Phragmites australis* Trin. ex Steud.) in the Camargue, as far west as 4°18'E and less than 5 km from the Mediterranean coast. Another two reed beds were sampled in which the species was not found. Subsequently, three females were



Figs. 1–6: *Zelotes mundus*. **1** Left palp, ventral; **2** Tip of left palp, ventral, slightly apically; **3** Ditto, retro-apical; **4** Epigyne, ventral; **5** Vulva, dorsal, in clove oil; **6** Vulva, frontal, cut as indicated by line in Fig. 5, in clove oil. Scale lines=0.1 mm.

captured on 9 June 2000 between an elevated path and a salt marsh (sansouire) at Salin de Badon and another female on 2 August 2004 in freshwater *Cladium mariscus* (L.) Pohl beds at Sollac near Fos-sur-Mer (Olivier Villepoux, pers. comm.). These two records lie within the geographical area of our earlier collections from reed beds. *Zelotes mundus* was not found among spider catches from seven other *C. mariscus* sites and a number of salt marshes, so it appears to be less common in these habitats than in reed beds. With reeds, salt steppe and rice fields, the major habitat types in the Camargue are similar to those in which *Z. mundus* has been recorded in eastern Europe and Asia. However, the typical Mediterranean climate differs markedly from that of the previously known locations in its mild and humid autumn, winter and spring. Given this broad bioclimatic amplitude, the known distribution of *Z. mundus* is possibly far from complete. Further wetlands and saline areas along the Mediterranean coast should be checked for the presence of this interesting spider.

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References

- BAUCHHENSS, E., WEISS, I. & TOTH, F. 1997: Neufunde von *Zelotes mundus* (Kulczyński, 1897) mit Beschreibung des Weibchens. *Arachnol. Mitt.* **13**: 43–47.
- CHYZER, C. & KULCZYŃSKI, L. 1897: *Araneae Hungariae* **2** (2): 147–366. Academiae Scientiarum Hungaricae, Budapest.
- ESYUNIN, S. L. & EFIMIK, V. E. 1996: Remarks on the Ural spider fauna, 6. New data on the taxonomy and faunistics of gnaphosid spiders of the South Urals (Arachnida Aranei Gnaphosidae). *Arthropoda Selecta* **5**: 105–111.
- GRIMM, U. 1985: Die Gnaphosidae Mitteleuropas (Arachnida, Araneae). *Abh. naturw. Ver. Hamb.* (NF) **26**: 1–318.
- MARUSIK, Y. M. & LOGUNOV, D. V. 1995: Gnaphosid spiders from Tuva and adjacent territories, Russia (Aranei: Gnaphosidae). *Beitr. Araneol.* **4**: 177–210.
- MILASOWSZKY, N., HEPNER, M., SZUCSICH, N. U. & ZULKA, K. P. 2007: *Urozelotes yutian* (Platnick & Song, 1986), a junior synonym of *Zelotes mundus* (Kulczyński, 1897) (Arachnida: Gnaphosidae). *Bull. Br. arachnol. Soc.* **14** (1): 22–26.
- PLATNICK, N. I. & MURPHY, J. A. 1984: A revision of the spider genera *Trachyzelotes* and *Urozelotes* (Araneae, Gnaphosidae). *Am. Mus. Novit.* **2792**: 1–30.
- PLATNICK, N. I. & SHADAB, M. U. 1983: A revision of the American spiders of the genus *Zelotes* (Araneae, Gnaphosidae). *Bull. Am. Mus. nat. Hist.* **174**: 97–192.
- PLATNICK, N. I. & SONG, D. X. 1986: A review of the zelotine spiders (Araneae, Gnaphosidae) of China. *Am. Mus. Novit.* **2848**: 1–22.
- SCHMIDT, M. H., LEFEBVRE, G., POULIN, B. & TSCHARNTKE, T. 2005: Reed cutting affects arthropod communities, potentially reducing food for passerine birds. *Biol. Conserv.* **121**: 157–166.
- SENGLET, A. 2004: Copulatory mechanisms in *Zelotes*, *Drassyllus* and *Trachyzelotes* (Araneae, Gnaphosidae), with additional faunistic and taxonomic data on species from Southwest Europe. *Mitt. schweiz. ent. Ges.* **77**: 87–119.
- SONG, D. X., ZHU, M. S. & CHEN, J. 1999: *The spiders of China*. 1–640. Hebei Sci. Technol. Publ., Shijiazhuang.
- THALER, K. 1981: Bemerkenswerte Spinnenfunde in Nordtirol (Österreich). *Veröff. Mus. Ferdinandeum Innsbr.* **61**: 105–150.