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Distribution and habitat of *Talavera aperta*, *T. milleri* and *T. thorelli* in the Czech Republic (Araneae: Salticidae)

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Abstract. This paper deals with four species of the genus *Talavera* Peckham et Peckham, 1909: *T. aperta* (Miller, 1971), *T. milleri* (Brignoli, 1983), *T. monticola* (Kulczyński, 1884) and *T. thorelli* (Kulczyński, 1891) of theirs determination hasn't been quite clear so far. The relations of the species, for which very different assessments have been published, are discussed. Their distribution in the Czech Republic is documented except for *T. monticola* which past occurrence has not been confirmed.

Distribution, habitat, morphology, Araneae, *Talavera*, Palaearctic region

INTRODUCTION

Until quite recently ten species of genus *Euophrys* C. L. Koch, 1834 were known in the Czech Republic. Six from these species were gradually transferred to the genus *Talavera* in the nineties of the twentieth century (Logunov 1992, Żabka & Prószyński 1998).

Six species of the genus *Talavera* Peckham et Peckham, 1909 have been observed in the Czech Republic so far. Three of them – *T. aequipes* (O. P.-Cambridge, 1871), *T. petrensis* (C. L. Koch, 1837) and *T. westringi* (Simon, 1868) – are easy to identify but the remaining three species, *T. aperta*, *T. milleri* and *T. thorelli*, are more difficult. This is also true of *T. monticola*, whose past occurrence in the Czech Republic, has not been confirmed.

The difficulties encountered with the above species arise mainly from their sporadic occurrence and very small size. Two of the species – *T. monticola* and *T. thorelli* – were first described in the late 19th century, the remaining two species, nearly a century later. Prior to 1971 *T. monticola* was only recorded from the West Carpathians at altitudes above 1100 m (locus typicus Babia Góra). All the remaining localities for this species were in the High Tatras (Prószyński & Starega 1971, Miller 1971). Later – due to confusion over *T. aperta* – the species was also reported in the Czech Republic, but only from very low altitudes (Majkus (1988), found it on an unshaded spoil heap in Ostrava).

Talavera thorelli, on the other hand, was recorded from south-eastern Slovakia (Kulczyński 1891). The next record (a female) of this species in Europe was that by Tullgren (1944) from Sweden. Charitonov (1936) recorded it from central Asia but Marusik (1990) concluded that this material was *Chalcoscirtus* (Bertkau, 1880), not *Evophrys* C. L. Koch, 1834. The male was first described by Thaler (1981) who found it at Innsbruck and in the Austrian Tyrol. The first findings of this species in the Czech Republic (Velká Kotlina, 1994 leg. Chvátalová), as important for the study of the relationships between the species of the genus *Talavera* about which differences in opinion existed in the scientific community.

The third species, *T. aperta*, which Miller (1971) described very briefly, based on a male specimen, was never found again during Miller's life (1902–1983). The first individuals found in the Czech Republic were attributed incorrectly to the species *T. thorelli* (*sic*!), primarily due to a failure to take into account the differences in the shape of the anterior ridge of the atrium (e. g., Pekár 1999). A variability of this sign could not be understood without comparison with the corresponding structures of true females of *T. thorelli*.

Only when this manuscript was being finalized, was an unidentified male of the genus *Talavera*, which was found in Bohemia in 1962, finally determined. The fact that this spider was an individual of the species *T. milleri* was confirmed by finding another male, along with a female, on the Říp hill (2000, leg. M. Řezáč). The structure of the male copulatory organ is still undescribed, although information regarding its occurrence in Germany was published several years ago (Bauchhenss 1994).

The text which follows gives a brief account of the characteristics of all the four species including *T. milleri*, based on the material we have studied.

MATERIAL AND METHODS

Abbreviations. F – female, M – male.

Specimens studies are deposited in the National Museum in Prague (NMP), or they are kept in the author's reference collection (CB, CCh), in the collection of Milan Řezáč (CR), student of Charles University and in Zdeněk Majkus's collection (CM), University of Ostrava.

To use of the square grid: the four-digital code of the corresponding square is given in square brackets after the names of localities (Buchar 1982).

LIST OF SPECIES

Talavera aperta (Miller, 1971)

(Figs 1, 4, 7, 11)

Evophrys aperta Miller, 1971: 140, t. 20, f. 19 (M); Prószyński 1976: t. 13, f. 120 (M), 1990: 124; 1991: 500 (misidentification, M: figs 1338.1+2 probably *T. inopinata*?, F: figs 1338.3+4 *T. monticola*); Fuhn & Gherasim 1998: 90, fig. 37 (F, M).
Euophrys aperta: Platnick 1997: 877 (M only); Pozzi & Hänggi 1998: 40.
Euophrys sp.: Weiss & Sarbu 1978: 240–241, figs 6,7; Absolon 1982: 103.
Euophrys thorelli: Majkus 1988: 58; Pavlík 1992: 52; Buchar 1993: 420; Buchar at al. 1995: 52; Pekár 1999: 153–154 (partim: figs 1–5); all misidentified.
? *Euophrys monticola*: Majkus 1988: 58.
Talavera aperta: Wunderlich 1994: 442; Vanuytven 1995: 25–26; Gajdoš at al. 1999: 291, map 9220.
Talavera monticola (partim): Żabka 1997: 103; Żabka & Prószyński 1998: 116.

Material examined. **Czech Republic**: E. Bohemia, Zámělský Borek [5862], a clay slate slope exposed to the south 310 m altitude, Xerobromion (Bromion erecti Koch 1926), pitfall trap, 1F early June 1978 leg. K. Absolon, CB; N Moravia, Ostrava [6175], spoil heap 200 m altitude, 1F 1976 leg. Z. Majkus, det. JB, CM; E. Moravia, Dřevohostice [6571], edge of a mixed deciduous forest 250 m altitude, 1F 1999 leg. V. Bryja, det. JB, S. Bohemia, Nedabyle [7053], xerothermic edge of a mixed deciduous forest 450 m altitude, 1M 1985 leg. J. Pavlík, det. JB, CB.

Discussion. Initially, when it was not possible to compare specimens with individuals of other species, all specimens of this species found in the Czech Republic were assumed to belong to *Evophrys thorelli* (see also the note in Thaler 1981: 125).

The shape of the embolus in the two species, *T. aperta* a *T. thorelli*, is similar, although if inspected closely, the embolus is considerably broader at the base and relatively shorter overall in *Talavera aperta* (Fig. 1) than in T. *thorelli* (Fig. 3). The differences are best seen if viewed from the

side, the embolus in *T. thorelli* is bent at the end only, whereas in *T. aperta* the basal half is bent (Fig. 4) which gives the embolus the shape of a cat's claw, as characterized in Miller's initial description (1971).

The transverse groove in the atrium of the epigyne *T. aperta*, which replaces the saddle roof-shaped organ, that can be clearly seen in *T. thorelli* (Fig. 8), is not very marked (Fig. 7). Also, the orifices are much closer in the epigyne of *Talavera aperta* than in *T. thorelli*. This is very apparent in the shape of the vulva (Figs 11 and 13).

Typical *Talavera aperta* males were found, along with females of this species, on spoil heaps in the Ostrava region (Majkus1988). Initially, the specimens were identified (JB) as *Evophrys thorelli*. However, when the true *Talavera thorelli* was found in the Jeseníky (Ash Mountains), it became immediately evident that the population in the Ostrava region was actually *Talavera aperta*. Regrettably of the wealth material collected on the Ostrava spoil heaps**,** a single female only (which Majkus lent us for this study) was preserved.

In the Czech Republic this species occurs at the edges of forests and grassy habitats exposed to the south. As well as L. J. Dobroruka collected his seven specimens of *T. aperta* on the similar habitats (Dobroruka in litt.).

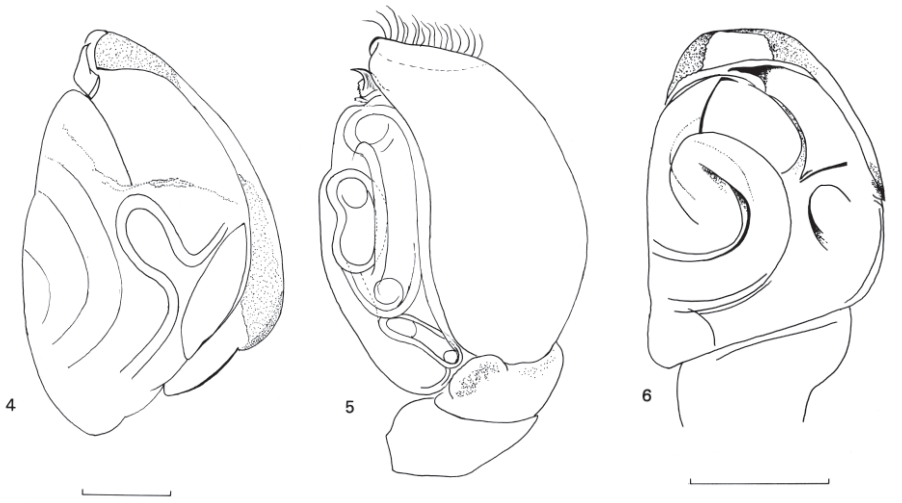
DISTRIBUTION. Central Europe: Belgium (Vanuytven 1995), Germany (Wunderlich 1994), Swiss (Pozzi & Hänggi 1998), Czech Republic, Slovakia (Gajdoš et al. 1999), Romania (Fuhn & Gherasim 1998).

***Talavera milleri* (Brignoli, 1983)**

(Figs 6, 10, 14)

Euophrys brevipes Miller, 1971: 140, t. 20, f. 20 (F); Prószyński 1976: t. 15, f. 142 (F).
Euophrys milleri Brignoli, 1983: 630, 637 (nomen novum): Prószyński 1990: 128 (F); Wunderlich 1994: 442; Platnick 1997 : 879 (F).
Euophrys (*Talavera*) *milleri*: Zabka & Prószyński 1998: 116.

Figs 1–3. Male palpus – ventral view. 1 – *Talavera aperta* (Miller): Czech Republic, Bohemia, Nedabyle; 2 – *T. monticola* (Kulczyński) after original drawing by F. Miller: Slovakia, Kriváň; 3 – *T. thorelli* (Kulczyński): Czech Republic, Velká Kotlina. Scale – 0.1 mm.



Figs 4–6. Male palpus. 4 (prolateral view) – *Talavera aperta* (Miller): Czech Republic, Bohemia, Nedabyle; 5 (retrolateral view) – *T. monticola* (Kulczyński) after original drawing by F. Miller: Slovakia, Kriváň; 6 (ventral view) – *T. milleri* (Brignolli): Czech Republic, Oblík. Scale – 0.1 mm.

Material examined. **Czech Republic**: N. Bohemia, Louny, Oblík hill [5548], rocky steppe 480 m altitude, 1M 29 May 1962 leg. JB, CB; N. Bohemia, Roudnice nad Labem, Říp hill [5651], rock steppe on south slopes of basalt hill 440 m altitude, 1M 22 April 2000, 1F 7 May 2000 leg. M. Řezáč, CR.

Discussion. This species was found at sites where remarkable thermophilic species occur. At the Oblík hill, these included *Atypus muralis* Bertkau, 1890 and *Zelotes declinans* Kulczyński, 1897, at the Říp hill *Atypus piceus* (Sulzer, 1776), *Pellenes nigrociliatus* (Simon, 1875) and *Trichopterna cito* (O. P.-Cambridge, 1872) (Buchar & Růžička in press).

The first finding of *Talavera milleri* at the Oblík can not be attributed unambiguously because the male of this species has only recently been described. Only a joint finding of the male and female at the Říp made a final assignment possible. The colour of the female is fully consistent with the description of the female in Miller's archives (deposited in JB), where the basic colour of the carapace is brown, with dark-brown radially arranged spots, a yellow stripe, occurs on the sides of the carapace, the back of the cephalic region and the narrow stripe skirting the whole carapace are black. The trochanter and femora of the palp are black, the remaining segments are yellow-white. The colour of the male from the Říp site is as follows: the carapace is yellow, with a narrow black stripe vanishing anteriorly, the top of the cephalic region is a contrasting black with orange scales, which are most dense on the clypeus and near the central line of eyes. The chelicerae are yellow. The palps, apart from the black femora, are dirty yellow, the base of the cymbium bears long white hairs, the legs are yellow with broad black rings. The femora, patellae and tibiae of the anterior legs are black with a blue metallic lustre. The sternum is dirty brown with a narrow black rim, the abdomen is dark and hairy dorsaily. The specimens from the Czech Republic are very small: the total length of the male from the Oblík site is 1.9 mm and its carapace is 0.9 mm. The total length of the male from the Říp hill is 1.7 mm and its carapace is 0.8 mm long. For the female found on Říp, the length is 2.1 mm, the carapace is 0.9 mm long. The position and shape of the male palp are very

typical: the embolus is slim, pointed, passing through the bulb (Fig. 6), whereby the species differs from *T. inopinata* (Wunderlich, 1993) where the embolus is bent (claw-shaped) in the direction opposite to that in *T. aperta*. The outlets of the receptaculum seminis are conspicuously long and to their orifices are bent backwards in a spiral shape (Fig. 10), which obvious on the vulva shown in Fig. 14.

Bauchhenss, who found a male specimen of this species in Germany (Bauchhenss 1994), provided us with a picture of that male, which is identical to that shown in Figs 6 and 14. This species occurs xerotherm grassy communities of relict character (plant alliance Festucion valesiacae Klika, 1931).

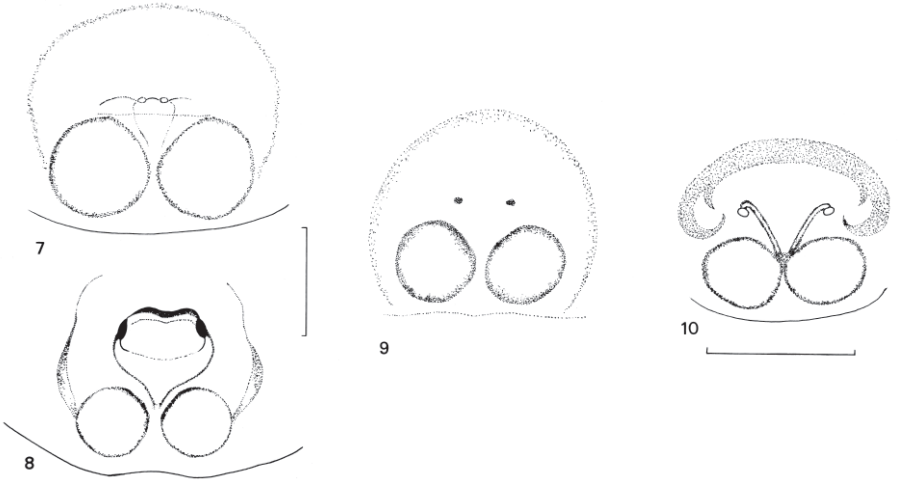
DISTRIBUTION. **Central Europe**: Germany (Wunderlich 1994), Czech Republic, Slovakia (Miller 1971).

Talavera monticola (Kulczyński 1884)
(Figs 2, 5, 9, 12)

Euophrys monticola Kulczyński, 1884 (M, F); Miller 1971: 140, t. 20, f. 14–15; Prószyński 1976: 41,42, ff 121, 139; 1990: 128; Thaler 1982: 124, f. 61, 66, 70.
Euophrys aperta: Prószyński 1991: 500, fig. 1338.4 (partim, F only).
Talavera monticola: Żabka 1997: 103 (non *E. aperta* Miller); Platnick 1997: 943.

MATERIAL EXAMINED. Slovakia, the High Tatras, Kriváň mountain [6886], 2 F 10 July 1956 leg. et det. F. Miller, NMP.

DISCUSSION. We have no specimen of this species from the Czech Republic. Although recorded from spoil heaps in the Ostrava region (Majkus 1988), no specimens were preserved. The opinion that *T. aperta* is identical with *T. monticola* (Żabka 1997) is unacceptable: as there are good diagnostic features distinguish the two species.



Figs 7–10. Epigyna – ventral view. 7 – *Talavera aperta* (Miller): Czech Republic, Moravia, Ostrava; 8 – *T. thorelli (*Kulczyński): Czech Republic, Velká Kotlina; 9 – *T. monticola* (Kulczyński): Slovakia, Kriváň; 10 – *T. milleri* (Brignolli): Czech Republic, Bohemia, Říp. Scale 0.2 mm (7,8), 0.15 mm (10).

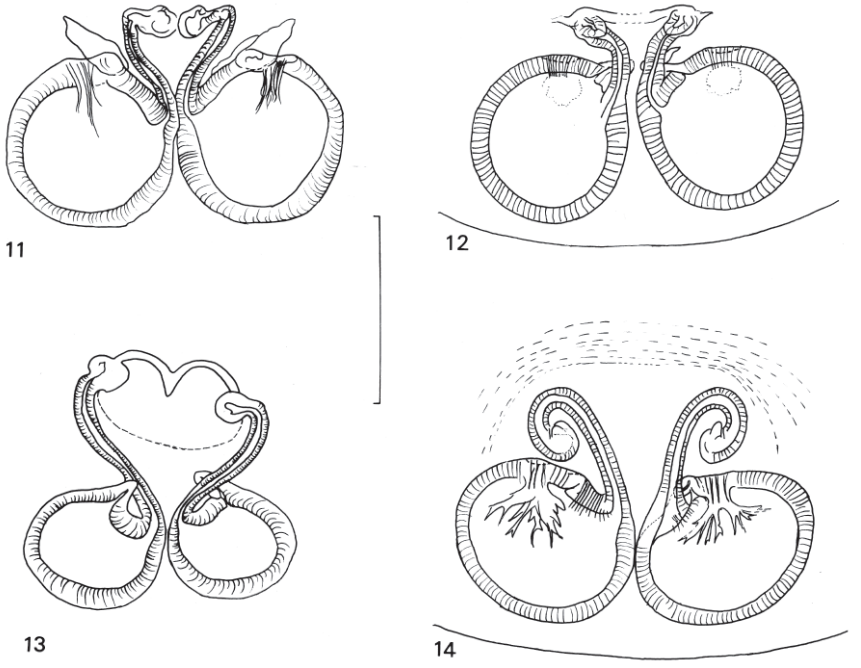
The difference in the males is that the embolus of *T. monticola* runs in the axis of the pale field (distal haematodocha) (Fig. 2), whereas in *T. aperta* it is at a right angle with to that axis (see Fig. 1). Also, the shape of the embolus is different.

The orifices are considerably closer to one another in *T. aperta*, which can be clearly seen in the picture of the vulva, where the outlets of the receptaculum are oriented towards the orifices from the outside in *T. aperta* (Fig.11) and from the inside in *T. monticola* (12). The female copulatory organs of these two species depicted in Prószyński's key (1991: Figs 1337, 1338) are actually of the same species – *Talavera monticola*.

The saddle roof-shaped structure of the epigyne, which is very marked in *T. thorelli* and considerably less marked in *Talavera aperta*, is very poorly developed in our specimen of *T. monticola* and it can only be seen when observed at an angle from the rear.

Distribution. This Alpine-Carpathian species (Thaler 1981) apparently reaches as far as the lowlands to the north of the Carpathians (Żabka 1997) and the river valleys of Slovakia (Gajdoš et al.; map 9240). So far, the species has not been probably found in the Romanian Carpathians (Fuhn & Gherasim 1995) or the Czech Republic.

***Talavera thorelli* (Kulczyński, 1891)**
(Figs 3, 8, 13)



Figs 11–14. Vulva – dorsal view. 11 – *Talavera aperta* (Miller): Czech Republic, Moravia, Ostrava; 12 – *T. monticola* (Kulczyński) after original drawing by F. Miller: Slovakia, Kriváň; 13 – *T. thorelli* (Kulczyński): Czech Republic, Moravia, Velká Kotlina; 14 – *T. milleri* (Brignolli) after original drawing by F. Miller: Slovakia, Kobyla. Scale 0.2 mm.

Euophrys thorelli Kulczyński in Chyzer et Kulczyński, 1891: 44, t. 2, fig. 4 (F); Tullgren 1944: 39, t. 3, f. 24; Miller 1971: 140; Prószyński 1976: 41, f. 145; 1979: 307, f. 70; 1990: 131; Thaller 1981: 124, f. 60, 68–69 (M, F); Logunov et al. 1993: 121, f. 18; Snazell 1995: 39–40.
Talavera thorelli: Logunov 1992: 78,79, figs 18,27; Platnick 1997: 943.

Material examined. **Czech Republic**: N. Moravia, Velká Kotlina [5969], Poo chaixii- Deschampsietum caespitosae, 1290 m, 1M 1 June – 1 August 1994; 2M 1 August – 3 October 1994; 1M 6 June – 9 August 1995; 1F 9 August – September 1995; Festuco supinae-Vaccinietum myrtilli calamagrostietosum, 1390 m altitude, 2M 6 June – 9 August 1995; Festuco supinae –Vaccinietum myrtilli vaccinietosum, 1400 m altitude, 1M 9 August – 27 September 1995, all specimens from pitfall traps leg. J. Rusek, CCh; 1430–1450 m altitude, 3M 18 July 1998; 2F, 1M 15 August 1998; small rock on a phyllite basis containing basic minerals, 1320–1360 m altitude, 5M; Festuco supinae-Vaccinietum myrtilli calamagrostietosum, 1400–1440 m altitude, 1F, 4M all specimens found under stones leg. et det. I. Chvátalová, CCh.

Discussion. Now that the pictures of all the four above-mentioned species of the genus *Talavera* are available, it is clear that, especially as far as the female sex organ is concerned, the appearance of the epigyne in *T. thorelli* cannot be confused with that of any other species.

The orifices are covered by a marked saddle roof-shaped transverse structure (Fig. 8). This is also apparent on the vulva (Fig. 13). As for the appearance of the embolus of the male copulatory organ, its position resembles that in *T. aperta* but is much longer and slimmer, and is bent towards the cymbium only at the very end.

The Czech site where this species was found is remarkable. The Velká Kotlina National Natural Reserve is a mighty glacial cirque, which is open to the east, with steep, partly rocky slopes. The altitude is 1150–1450 metres. Avalanche and water erosion have shaped the relief of the cirque. The snow cover at the top of the cirque, which is as much as 10 m thick, persists for up to 9 months each year. Climatically, this area is a cold region (Quitt 1971). The average yearly air temperature on the Praděd mountain, which is 4 km from the site and its surroundings, is 0.9 °C, the average precipitation is 1275 mm. There are 124 ice days (daily temperature not exceeding – 0.1 °C) in a year. The climate of this region is comparable to that of the Alpine zone of the highest mountains in central Europe or with subarctic regions such as Iceland and northern Norway. Inside the Velká Kotlina cirque the climate is slightly warmer (larger temperature fluctuations) and more humid than on the Praděd mountain. Four hundred and eighty-five plant species have been recorded from the cirque (Jeník 1971). In addition to mountain species, at the lower boundary of their occurrence, thermophilic species are also found. The prominent accompanying spider species include, among others, *P. sordidata*, *Bolyphantes caucasicus*, *Xysticus gallicus*, *X. obscurus* and *Semljicola faustus* (leg. I. Chvátalová, unpublic).
Distribution. *Talavera thorelli* lives both at warm sites in lowlands and in high mountains. An extra-Mediterranean Euro-Siberian species. The northernmost occurrence is in southern Scandinavia (Tulgren 1944), the southernmost in Europe, the northern Tyrol (Thaler 1981) and Romania (Weiss & Petrisor 1999), the southernmost in Asia, Kyrgyzstan (Logunov at al. 1993). The pictures of specimens from the surroundings of Novosibirsk and Perm (Logunov at al. 1993) indicate that they differ from those from Jeseníky (Ash Mountains).

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