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Neotype fixation and redescription of *Chthonius tetrachelatus* (Preyssler, 1790), type species of the subgenus *Ephippiochthonius* Beier, 1930 (Pseudoscorpiones: Chthoniidae)

Fixace neotypu a redeskripce druhu *Chthonius tetrachelatus* (Preyssler, 1790), typového druhu podrodu *Ephippiochthonius* Beier, 1930 (Pseudoscorpiones: Chthoniidae)

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Systematics, Pseudoscorpiones, *Chthonius tetrachelatus*, neotype, Prague

Abstract. A male neotype of *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790) is designated and described from the centre of Prague (park at Karlovo náměstí).

INTRODUCTION

Preyssler (1790) described *Scorpio tetrachelatus* from a single specimen found in singular circumstances – alive in a glass of beer in his house ("Der Aufenthaltsort dieses Thierchens scheint so, wie des Bücherscorpions (*Scorpio cancroides* Lin.) in Häuser zu seyn; weil ich es selbst in einem Zimmer in einem Glase Bier fand; doch schien ihm dieser Aufenthaltsort nicht der liebste zu seyn, weil es darinnen nicht schwimmen konnte, und sich herauszukriechen bestrebte. Ob es bei uns gemein ist oder selten sei, kann ich nicht entscheiden, weil ich solches nur einmal gefangen habe" – Preyssler (1790: 56-57)). Stecker (1874) attributed the species to the genus *Chthonius* C. L. Koch, 1843 and Beier (1930) included it in the subgenus *Ephippiochthonius* Beier, 1930, of which *S. tetrachelatus* is, by subsequent designation of Hoff (1949), the type species.

The subgenus *Ephippiochthonius* includes 92 species, mainly endemic or with restricted geographical range in the Mediterranean region. Only *Chthonius* (*E.*) *virginicus* J. C. Chamberlin, 1929 has been described from eastern U.S.A. and *C.* (*E.*) *tetrachelatus* (Preyssler, 1790) is considered to have a world-wide distribution showing a primary area in the western Palaearctic Region (chiefly Euromediterranean), although it was also introduced to eastern Canada, U.S.A. (including Hawaii), Cuba, Argentina, Seychelles and southeastern Australia (Harvey 2009).

Chthonius tetrachelatus was redescribed several times (Beier 1932, Hadži 1933, Vachon 1941a,b, Rafalski 1949, Hoff 1950, 1951, Beier 1963, Dumitresco & Orghidan 1964, von Helversen 1966, Ćurčić 1972, Nelson 1975, Harvey 1987), but never from typical or topotypical specimens. Harvey (1987) emphasized that "the possibility exists that more than one species has been confused under this name".

Preyssler's original description, although accurate for the time, is now inadequate for recognizing the species and the type specimen must be considered lost or destroyed (J. Hájek,

in litt.). Because of the uncertainty in the literature concerning the identity of the species, a neotype is designated here to facilitate ongoing taxonomic work. A more detailed description of *C. tetrachelatus,* with evaluation of its variability, will be published later. In order to fix a suitable neotype, it is important to identify the original locality, since "Bohemia", currently reported as *locus typicus* of this species (Harvey 2009), is too vague. It is certain that Johann Daniel Eduard Preyssler (1768 – 23.IV.1839) worked from 1789 to 1798 at "K. K. Tabak und Siegelgefallene-Kammeraladministrationsamt" and lived in the Havelska street, in the centre of Prague (Picka 1989). Since *C. tetrachelatus* is very common in and around Prague, including synanthropic habitats (Šťáhlavský 2001), it seems appropriate to designate a neotype from material collected in the centre of Prague (park at the Karlovo náměstí square, see Šťáhlavský (2001: 75, fig. 1, no. 46 and p. 77)).

In the following description, the terminology follows Chamberlin (1931), including later modifications by Harvey (1992) (trichobothrial abbreviations) and Judson (2007) (faces of appendages, rallum, notations of chelal sensilla). Measurements were taken according to Chamberlin's (1931) reference points.

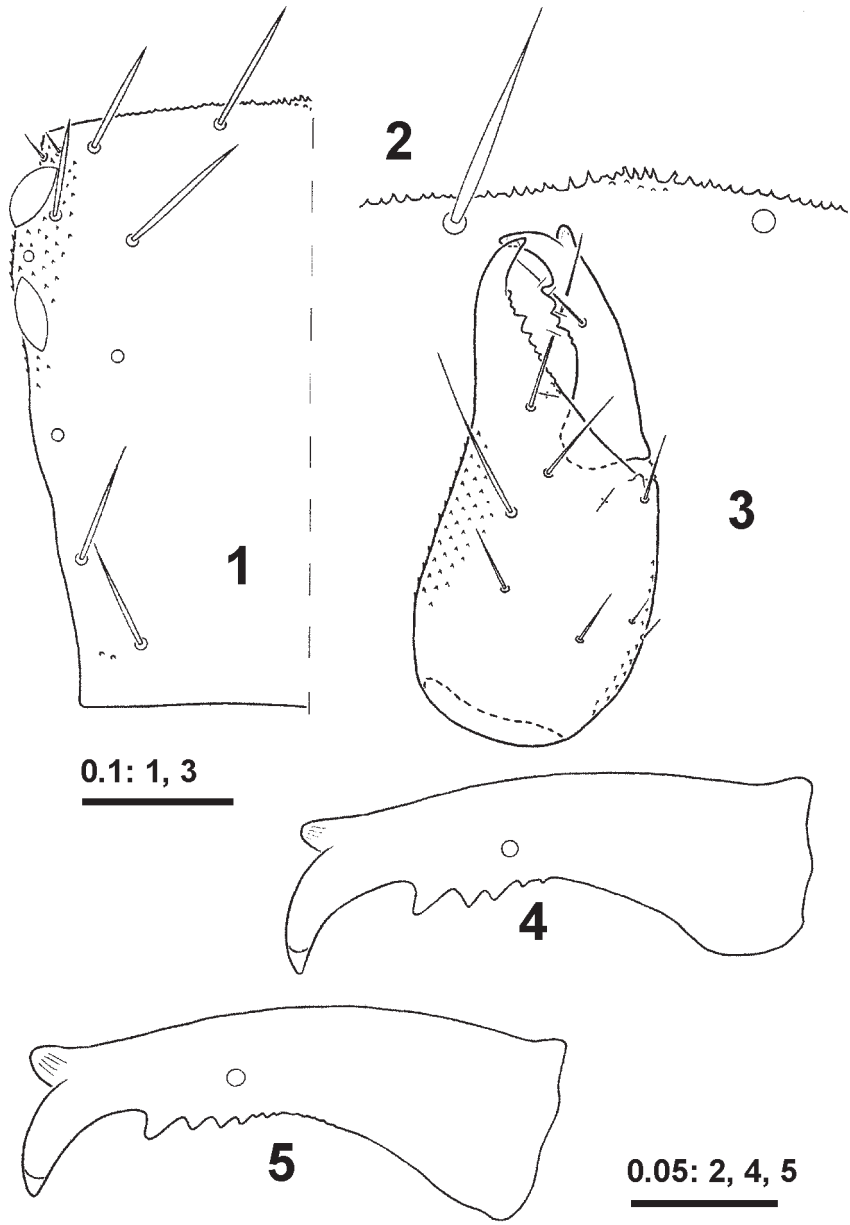
RESULTS

Redescription of *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790)

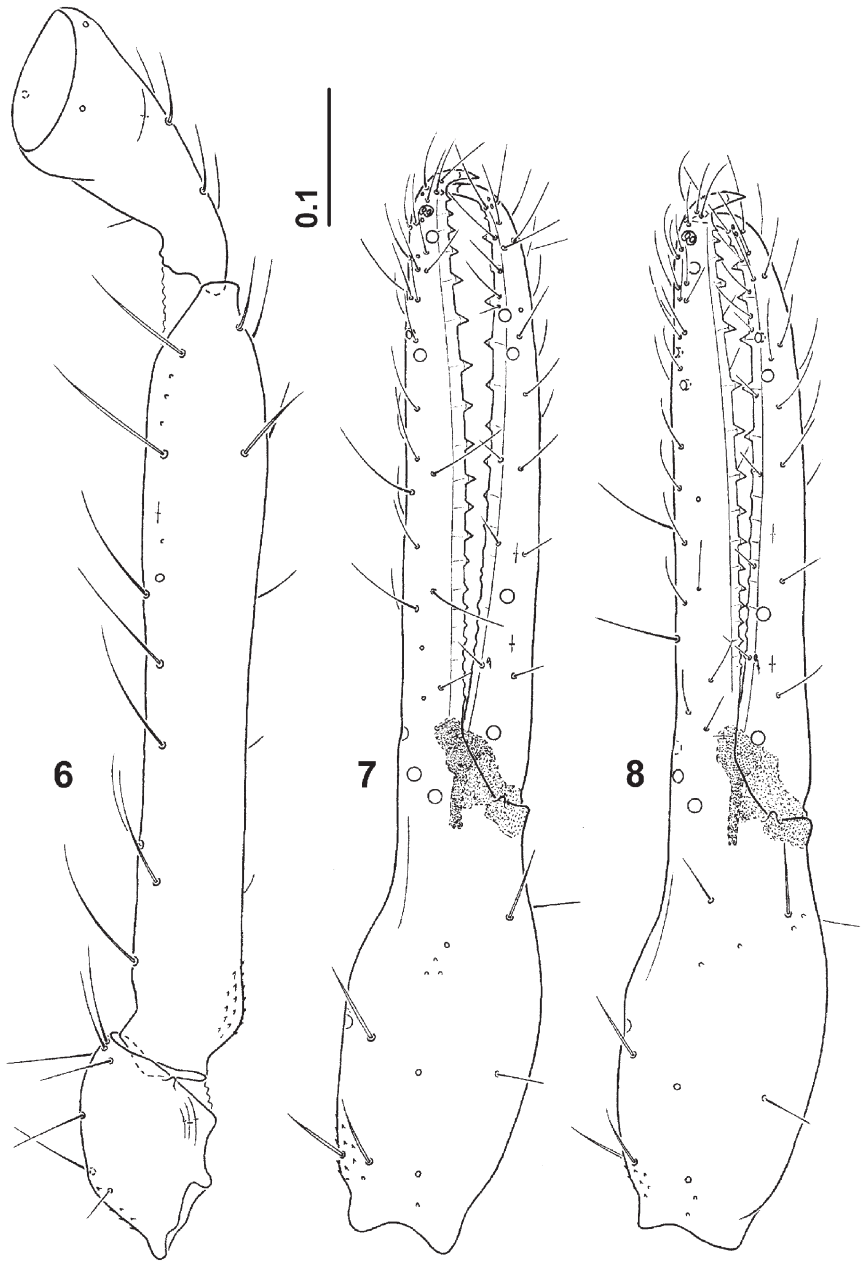
Material examined. 1 ♂ neotype, labelled "Bohemia – Prague centrum, Karlovo nám. 4.VII.1995 S. Vit leg. (*Ulmus*)" and "*Chthonius (E.) tetrachelatus* (Preyssler, 1790) ♂ neotypus G. Gardini III.2009" (deposited in Naturhistorisches Museum Wien, NHMW n. 21.752); 3 ♂♂ 2 ♀♀, collected with the neotype (deposited in G. Gardini coll., Genoa).

Description of ♂ neotype [data on topotypical ♂♂ in square brackets].

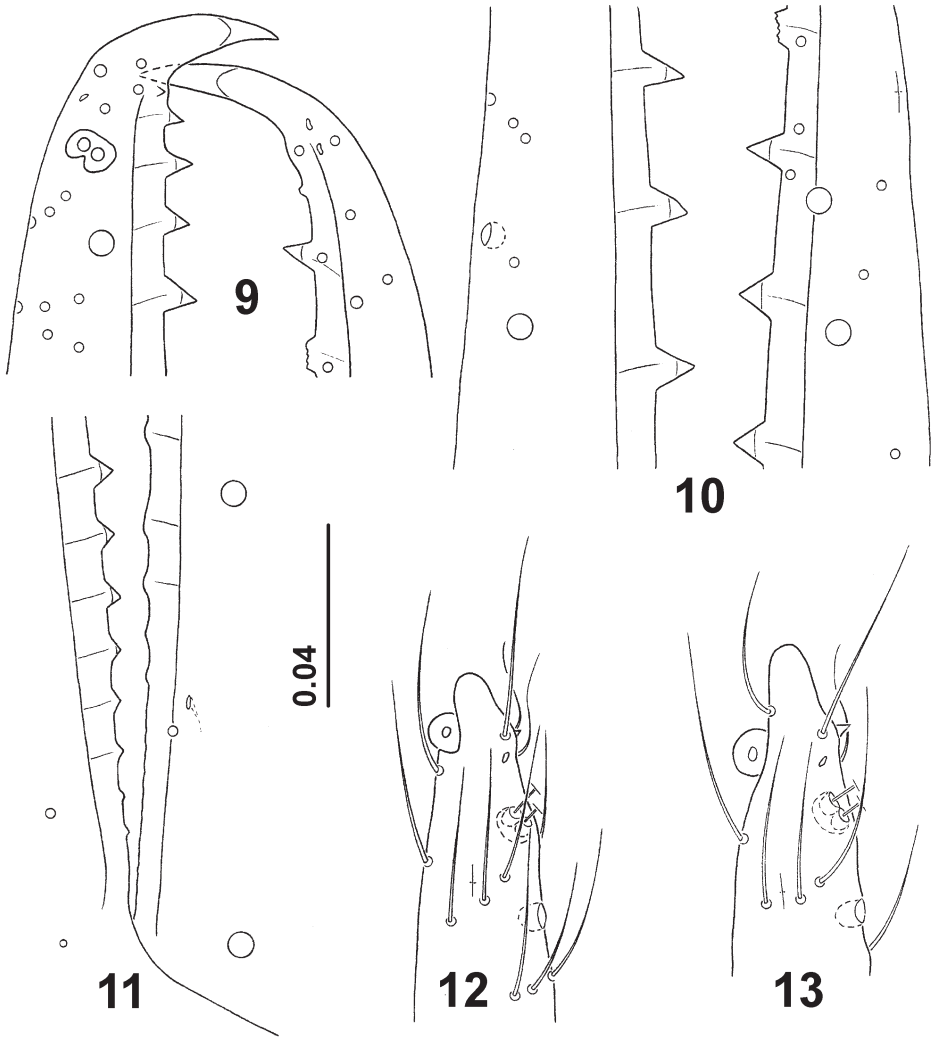
Body length 1.4 mm. Carapace, tergites, chelicera and pedipalps brown; cuticular hispid granulation on anterolateral surface of carapace, on cheliceral palm, on the basis of palpal femur and hand, and on anterodorsal face of femur+patella of leg IV. Carapace (Fig. 1) as long as broad, posteriorly slightly restricted; anterior margin (Fig. 2) medially slightly rounded (epistome absent), dentate between anteromedian setae, laterally entirely notched; ocular area as in Fig. 1: four well-developed eyes, anterior ones with very convex lenses (diameter 0.05 mm), posterior eyes with weak lenses (diameter 0.05 mm), both pairs of eyes with reflecting tapeta; distance from anterior eyes to anterior margin of carapace 0.025 mm, distance from anterior to posterior eyes 0.03 mm; 18 thick macrosetae (4:6:4:2:2) and two preocular microsetae on each side; length of anteromedian macrosetae 0.08 mm. Chaetotaxy of tergites I–X: 4:5[4]:4:4:6:6:6:6:6:6. Chaetotaxy of sternites II–X: 11[10–11]:(3)8[10](3):(2)8(2):9 :6:6:6:6:6; genital opening V-shaped, with seven setae on each side [7–8, 7–9]. Chelicera (Figs 3–4) 2.1 times as long as broad, palm with 6 + 2 setae; fixed finger with nine, movable finger with five teeth (three distal ones larger); movable finger without isolated subdistal tooth; *gl* ratio = 0.58; spinneret prominent, apically rounded (Fig. 4); rallum (= flagellum) with 11 pinnate blades; interior and exterior serrulae with 13 and 15 blades respectively. Manducatory process with two setae; coxal setae: pedipalp 3, I 3 + 3 marginal microsetae, II 4 + 8–9 [9–10] coxal spines, III 5–6 [5] + 3 [3–4] coxal spines, IV 6; intercoxal tubercle bisetose. Pedipalps (Figs 6–7): trochanter 1.7, femur 6.6, patella 2.0, chela 5.5 [5.4–5.8] and hand of chela 2.2 [2.1–2.3] times as long as broad; hand of chela not depressed at level



Figs 1–5. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 1 – male neotype: left half of carapace; 2 – Id.: anterior margin of carapace; 3 – Id.: right chelicera; 4 – Id.: movable finger of right chelicera; 5 – Female: id. (Scale bars in mm).
Obr. 1–5. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 1 – samčí neotyp: levá polovina karapaxu; 2 – totéž: přední okraj karapaxu; 3 – totéž: pravá chelicera; 4 – totéž: pohyblivý prst pravé chelicery; 5 – samice, pohyblivý prst pravé chelicery. (Měřítko v mm).



Figs 6–8. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 6 – male neotype: trochanter, femur and patella of right palp; 7 – Id.: chela, lateral view; 8 – Female: id. (Scale bar in mm).
Obr. 6–8. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 6 – samčí neotyp: trochanter (příkyčlí), femur (stehno) a patella (koleno) pravého makadla; 7 – totéž: klepeto makadla, boční pohled; 8 – samice, klepeto makadla, boční pohled. (Měřítko v mm).



Figs 9–13. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 9 – male neotype: tip of chelal fingers, antiaxial view; 10 – Id.: detail of chelal fingers at level of *est-it/b-t*, antiaxial view; 11 – Id.: detail of chelal teeth at level of *st-sb*, antiaxial view; 12 – Id.: tip of chelal fixed finger, dorsal view; 13 – Female: id. (Scale bar in mm).
Obr. 9–13. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): 9 – samčí neotyp: špičky prstů makadla, boční pohled; 10 – totéž: detail prstů makadla voblasti *est-it/b-t*, boční pohled; 11 – totéž: detail zubů makadla v oblasti *st-sb*, boční pohled; 12 – totéž: špička pevného prstu makadla, dorzální pohled; 13 – samice: špička pevného prsu makadla, dorzální pohled. (Měřítko v mm).

of *ib/isb*; fixed chelal finger straight, with 19 [16–21] triangular teeth with dental canals, gradually reduced proximally, and three [2–3] tiny, rudimentary, basal teeth without canals; tip of fixed finger with a modified accessory tooth (*td*) on antiaxial face and a deep hollow on paraxial face (Figs 9, 12); tip of fixed finger with simple, not lanceolate, setae (Fig. 12);

fixed finger at level of *est–it* with four teeth occupying 0.1 mm (Figs 7, 10); movable finger with a small subdistal tooth, seven [six] triangular and acuminate teeth in the distal half of the finger and nine [8–11] low, rounded teeth in the proximal half (Fig. 11); all teeth with dental canals; movable finger with sensilla *pc* halfway between *st*/*sb*; trichobothria as in Fig. 7; apodeme of movable finger strongly sclerotized; ratio of movable finger/hand of chela 1.4, ratio of pedipalpal femur/movable finger 1.3 and ratio of pedipalpal femur/carapace 1.5.

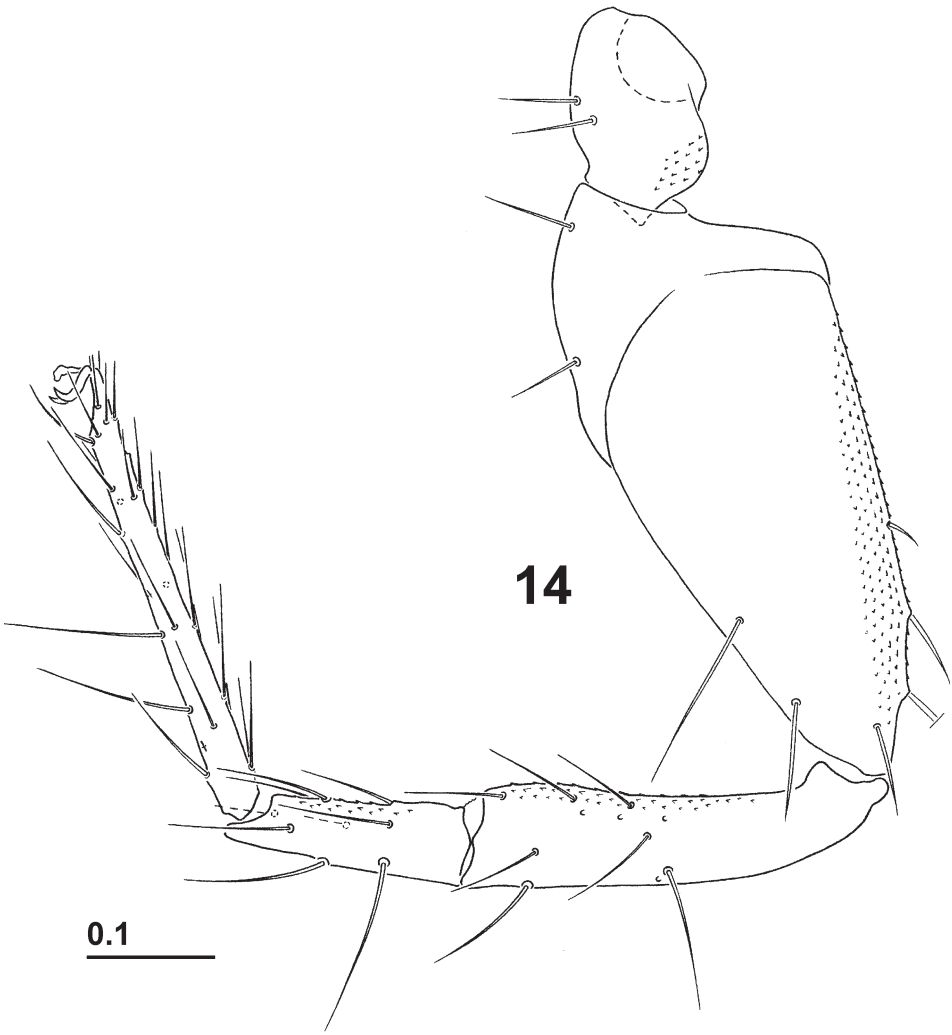


Fig. 14. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): male neotype: left leg IV, lateral view. (Scale bar in mm).
Obr. 14. *Chthonius* (*Ephippiochthonius*) *tetrachelatus* (Preyssler, 1790): samčí neotyp: levá zadní končetina IV, boční pohled. (Měřítko v mm).

Leg IV (Fig. 14): trochanter 1.45, femur + patella 2.4, tibia 4.1, basitarsus 3.0 and telotarsus 12.7 times as long as deep.

Measurements (all in mm). Carapace 0.40 × 0.40 (0.36 anteriorly). Chelicera 0.35 × 0.17, movable finger length 0.18. Pedipalps: trochanter 0.17 × 0.10; femur 0.59 × 0.09; patella 0.24 × 0.12; chela 0.82 [0.78–0.86] × 0.15 [0.14–0.16]; hand length 0.33 [0.31–0.34]; movable finger length 0.46 [0.44–0.49]. Leg IV: trochanter 0.16 × 0.11; femur+patella 0.52 × 0.22; tibia 0.33 × 0.08; basitarsus 0.18 × 0.06; telotarsus 0.38 × 0.03.

Additional data for females.

Chelicera: spinneret and dentation of movable finger as in Fig. 5. Pedipalps: trochanter 1.6, femur 5.9–6.1, patella 1.9–2.0, chela (Fig. 8) 5.1 and hand 2.1 times as long as broad, weakly depressed at level of *ib/isb*; fixed chelal finger with 16–17 triangular teeth with dental canals and 1–2 tiny rudimentary basal teeth without canals; tip of fixed finger with small hollow on paraxial face (Fig. 13); movable finger with 5–6 triangular and acuminate teeth in distal half and 8–9 low, rounded teeth in proximal half, all teeth with dental canals; trichobothria as in Fig. 8; ratio of movable finger/hand of chela 1.3–1.4, ratio of pedipalpal femur/movable finger 1.3.

Measurements (all in mm). Pedipalps: trochanter 0.16 × 0.10; femur 0.59–0.61 × 0.10; patella 0.23–0.24 × 0.12; chela 0.81–0.87 × 0.16–0.17; hand length 0.33–0.36; movable finger length 0.45–0.46.

REMARKS

It is impossible at present to check all previous records of *Chthonius tetrachelatus*, which is one of the most widely distributed and frequently cited species among pseudoscorpions (Harvey 2009). Several more or less complete redescriptions of this species are available, but they are based on specimens (often with heterogeneous morphology) of unspecified European origin (Beier 1932, 1963) or on specimens introduced from Europe to other parts of the world (Hoff 1950, 1951, Nelson 1975, Harvey 1987) or on specimen from countries other than Bohemia, such as Slovenia and Croatia (Hadži 1933), Poland, the Caucasus and Eastern Turkey (Rafalski 1949), Romania (Dumitresco & Orghidan 1964), Germany (von Helversen 1966) and Serbia (Ćurčić 1972). Vachon (1941a,b) used specimens from North America and many European and North African countries, probably belonging to different species, but took measurements from a pair from Côte d'Or, France. The status of North American records was questioned by Muchmore (1981), who suggested that some or all might be misidentifications of *C. virginicus*. The latter probable came from Europe as well (Muchmore 1981) and resembles *C. kewi* Gabbutt, 1966 from Great Britain.

Beier's (1932, 1963) descriptions of *C. tetrachelatus* agree with morphological features and measurements of the specimens from Prague except that the length/breadth ratio reported for the chela is slightly lower at 4.8.

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SOUHRN

V současné době zahrnuje podrod *Ephippiochthonius* celkem 92 druhů, přičemž většina z nich je endemická nebo jen s malým rozšířením v mediteránní oblasti. Výjimkou jsou *Chthonius* (*E.*) *virginicus* J. C. Chamberlin, 1929, který byl popsaný z východní části U.S.A.

a *C.* (*E.*) *tetrachelatus* (Preyssler, 1790), který je udáván z celé západní části palearktického regionu a vlivem člověka se rozšířil i do Kanady, U.S.A. (včetně Havaje), Kuby, Argentiny, Seychel a jihovýchodní Austrálie (Harvey 2009). Široce rozšířený druh *C.* (*E.*) *tetrachelatus* byl popsaný Preysslerem z Čech již v roce 1790. Vzhledem k možnosti, že pod tímto jménem je v současné době označováno více druhů (Harvey 1987), ale vznikla potřeba přesně definovat původní druh. Snaha o redeskripci tohoto druhu se v literatuře objevila v dřívější době již mnohokrát (Beier 1932, Hadži 1933, Vachon 1941a,b, Rafalski 1949, Hoff 1950, 1951, Beier 1963, Dumitresco & Orghidan 1964, von Helversen 1966, Ćurčić 1972, Nelson 1975, Harvey 1987), nikdy však na základě typového, popřípadě z typové lokality pocházejícího materiálu. V této práci je proto stanoven a detailně popsán neotyp s ohledem na to, že původní Preyslerův materiál je ztracen nebo zničen (J. Hájek, osob. sdělení). Neotyp pochází z centra Prahy (Karlovo náměstí, viz Šťáhlavský (2001: str. 75, obr. 1, číslo lokality 46 a str. 77)), z blízkosti pravděpodobného sběru původně popsaného materiálu. Terminologie použitá pro popis neotypu je použitá dle Chamberlina (1931) a modifikována dle Harveye (1992) a Judsona (2007). Rozměry byly měřeny podle Chamberlina (1931). S ohledem na obrovský rozsah dřívějších údajů široce rozšířeného druhu *C.* (*E.*) *tetrachelatus* není zahrnuto v této práci porovnání staršího materiálu s nově popsaným neotypem.