Tegenaria ferruginea (Panzer) in Britain, and differences from *T. parietina* (Fourcroy) (Araneae: Agelenidae)

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Summary

The occurrence of *Tegenaria ferruginea* (Panzer) in Britain is described, and differences from *T. parietina* (Fourcroy) in genitalia, relative leg length, coloration and habitat are discussed. Comparative drawings are provided of the male palp and epigyne of both species.

Introduction

The genus *Tegenaria* is relatively well represented in Britain, compared with other European countries at similar latitudes (Table 1). Between 50°N and 55°N, eight species have hitherto been recorded in England, compared with nine in Belgium and the Netherlands, and seven in Germany and Poland. Further north the number of species decreases, with five in Scotland, three in Denmark and Sweden, and two in Norway and Finland (Maurer, 1992; Platen *et al.*, 1995; P. Merrett, unpubl. records; Per de Place Bjørn, pers. comm.). Five species have been recorded in Iceland, but some of these probably represent repeated importations rather than self-sustaining populations (Agnarsson, 1996).

Surprisingly, *T. ferruginea* (Panzer) was, until recently, absent from the British list. This species is widespread in Europe (Maurer, 1992) and occurs in all continental countries bordering the English Channel and the southern North Sea (France, Belgium, the Netherlands, Germany and Denmark). Climatically, therefore, it seems reasonable that at least some parts of Britain should be suitable for *T. ferruginea*, with northern Europe being a potential source of colonists. In 1998 the first recorded British population of the species was discovered in the village of Elvington, about 9 km south-east of York (Oxford, 1999). The addition of this species to the British list makes the British *Tegenaria* fauna now identical with that of Belgium. The only other northern European *Tegenaria* species which is still absent from Britain is *T. campestris* (C. L. Koch), which is closest to *T. silvestris* L. Koch among British species.

It is possible that *T. ferruginea* has previously been overlooked in Britain because of confusion with the related *T. parietina* (Fourcroy). The long-legged males of *T. parietina* are strikingly different from *T. ferruginea*, but the epigynes of the two species are similar and females could easily have been misidentified. Both of these species (together with *T. silvestris, T. campestris*, and others) are included in the *T. ferruginea* species-group by Lehtinen (1967) and Maurer (1992). The purpose of this paper is to highlight the diagnostic characters of *T. ferruginea* and *T. parietina*, including the relative leg lengths of males and females.

Tegenaria ferruginea (Panzer, 1804) (Figs. 1–3, 7)

Aranea ferruginea Panzer, 1804: 190.
Tegenaria ferruginea: Simon, 1875: 65; 1937: 1007, 1040, figs. 1555, 1556; Dahl, 1931: 38, figs. 63, 64; Bonnet, 1959: 4288; Miller, 1971: 176, pl. 29, figs. 11, 12; Maurer, 1992: I 12, II 53; Roberts, 1995: 245.

Description: Female: Total length 12–15 mm. Carapace length 6.0–6.8 mm, width 4.2–4.8 mm. Male: Total length 10–12 mm. Carapace length 5.0–6.2 mm, width 3.9–4.5 mm. General appearance similar to other large *Tegenaria* species. Abdomen with prominent reddish longitudinal median band dorsally, flanked by prominent whitish patches, large anteriorly and reduced to small spots posteriorly (see Sauer & Wunderlich, 1985: 105). Typical markings on carapace and sides of abdomen very clear. Sternum with median longitudinal pale band and three pairs of large pale spots laterally, as in *T. parietina* but more distinct. Femora, patellae and tibiae of all legs with clearly marked but irregular and sometimes incomplete annulations (see Oxford, 1999: fig. 1). Male palp (Figs. 2–3): with long embolus and large conductor, and relatively short cymbium. Epigyne

	EN	B	NL	D	PO	SC	DK	SE	N	FI	IS
T. agrestis (Walckenaer, 1802)	+	+	+	+	+	+	−	−	−	−	−
T. atrica C. L. Koch, 1843	+	+	+	+	+	+	+	+	+	+	+
T. campestris C. L. Koch, 1834	−	−	+	+	+	−	−	−	−	−	−
T. domestica (Clerck, 1757)	+	+	+	+	+	+	+	+	+	+	+
T. ferruginea (Panzer, 1804)	+	+	+	+	+	−	+	+	−	−	+
T. gigantea Chamberlin & Ivie, 1935	+	+	−	−	−	+	−	−	−	−	+
T. parietina (Fourcroy, 1785)	+	+	+	−	+	−	−	−	−	−	−
T. picta Simon, 1870	+	+	+	+	−	−	−	−	−	−	−
T. saeva Blackwall, 1844	+	+	+	−	−	+	−	−	−	−	+
T. silvestris L. Koch, 1872	+	+	+	+	+	−	−	−	−	−	−

Table 1: *Tegenaria* species recorded from northern European countries: England (EN), Belgium (B), Netherlands (NL), Germany (D), Poland (PO), Scotland (SC), Denmark (DK), Sweden (SE), Norway (N), Finland (FI), Iceland (IS). *Tegenaria pagana* C. L. Koch, 1841 has also been found occasionally in some countries, but is unlikely to be an established member of the fauna.

(Fig. 1): with prominent posterior sclerotised plate, with concave rounded anterior margin and protruding as a lip posteriorly.

Material examined: GREAT BRITAIN: Elvington, Yorkshire (grid ref. SE 7047), 1998, 3♀ 1♂ (G. S. Oxford). FRANCE: Thiéfosse, near Corniment, Vosges, 1994, 4♀ 1♂ (E. Duffey).

Comparative material: *T. parietina*: GREAT BRITAIN: Hampton, Middlesex, 29 September 1971, 1♂ (J. A. Murphy); Wymondham, Norfolk, August 1989, 1♀ (G. S. Oxford); Broadway, Worcestershire, 9 March 1997, 1♀ (G. S. Oxford); Pershore, Worcestershire, 5 April 1999, 3♀ 2♂ reared in captivity, 1 imm. (G. S. Oxford); unknown locality, 1♀ (G. S. Oxford); Norwich, Norfolk, 1♂ (Castle Museum, Norwich); Colchester, Essex, 3♀ 5♂ (Colchester Museum).

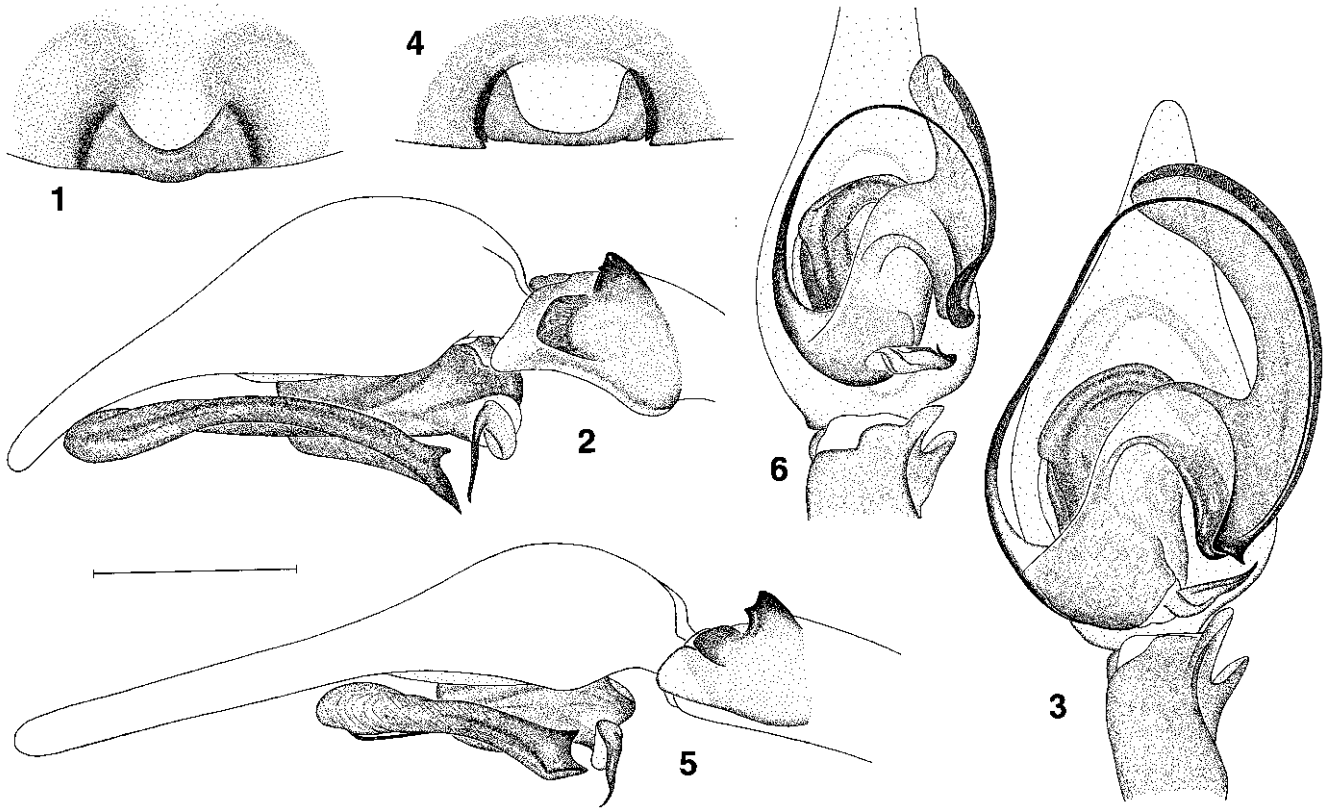
Comparison of *T. ferruginea* and *T. parietina*

Male palp: The basic structure of both species is very similar, but in *T. ferruginea* the embolus and conductor are much longer and the cymbium shorter (Fig. 3 cf. Fig. 6), with the result that in lateral view the conductor is seen to extend about 90% of the way along the length of the cymbium in *T. ferruginea* but only about 50% in *T. parietina* (Fig. 2 cf. Fig. 5). There are also smaller differences in the shape of the tibial apophyses.

Epigyne: Similar in form in both species, but rather more variable in *T. parietina*. In *T. ferruginea* the anterior margin of the sclerotised posterior plate is smoothly rounded, and the posterior margin is slightly extended as a rounded lip (Fig. 1). In *T. parietina* the anterior margin of the sclerotised plate rather takes the form of three sides of a trapezium with rounded posterior corners, and the posterior margin is hardly, if at all, extended; the sclerotised plate is also much narrower in the median part of the epigyne (Fig. 4).

Leg length: The lengths of femur, patella, tibia, metatarsus and tarsus of leg I of males and females of both species were measured and compared with carapace width. Femur, tibia, metatarsus and tarsus lengths were found to be highly intercorrelated ($r>0.95$) and patella versus the rest somewhat less so ($r>0.75$). Metatarsus I length was therefore taken as a surrogate for total leg length and divided by carapace width to produce the quotients shown in Fig. 7. Mean values were: *T. parietina* ♂ 3.6 ($n=8$), ♀ 2.1 ($n=9$); *T. ferruginea* ♂ 1.6 ($n=2$), ♀ 1.5 ($n=6$). For comparison, identical measurements were taken on 10♂ and 10♀ *T. saeva* Blackwall (from Devon). These gave means of 2.3 for males and 1.5 for females (Fig. 7). The differences in these values for males and females of the same species are highly significant ($p<0.001$) for *T. parietina* and *T. saeva* but not for *T. ferruginea*. Values for males of *T. parietina* and *T. ferruginea* are highly significantly different ($p<0.001$), as are the values for females of these two species ($p<0.001$). This shows that individuals of both sexes of *T. parietina* and *T. ferruginea* are easily identifiable by their relative metatarsus I lengths; this is especially true of males.

Preliminary observations were made on the growth of four individuals of *T. parietina* through their development (these proved to be 2♀ 2♂). Measurements



Figs. 1–6: **1–3** *Tegenaria ferruginea* (from Elvington). **1** Epigyne; **2** Left male palp, ectal view; **3** Ditto, ventral view. **4–6** *Tegenaria parietina* (♀ from Wymondham, ♂ from Hampton). **4** Epigyne; **5** Left male palp, ectal view; **6** Ditto, ventral view. Scale line = 1.0 mm.

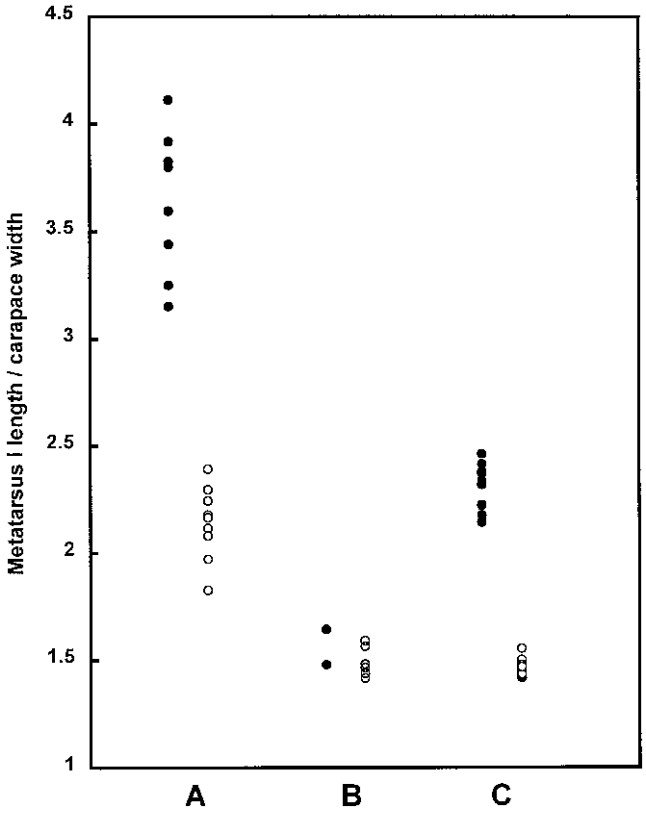


Fig. 7: Metatarsus I length/carapace width for adult males and females of *Tegenaria* species. **A** *T. parietina*; **B** *T. ferruginea*; **C** *T. saeva*. Closed symbols=males, open symbols=females.

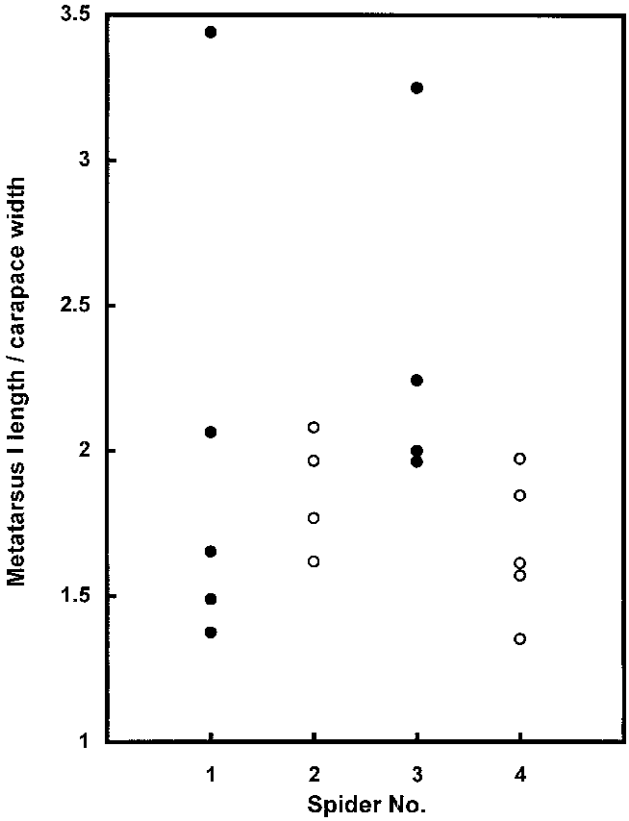


Fig. 8: Metatarsus I length/carapace width for four *Tegenaria parietina* from Pershore followed during their development to maturity. Closed symbols=males, open symbols=females. Each point represents an instar. Relative metatarsus length increases through development so that within each column higher points represent later instars. Note the large increase in relative metatarsus length between the penultimate and final instars of males.

were taken with a microscope fitted with a calibrated eye-piece graticule while spiders were restrained in a "spi-pot" (Roberts, 1995). Subsequent checks on exuviae and preserved adults showed that live measurements were accurate to within two graticule units (0.25 mm). The data show that the marked sexual dimorphism of *T. parietina* males is fully manifest only in the final instar (Fig. 8), although there may be hints of it earlier. Figure 7 indicates that an individual with a relative metatarsus I length of 1.8 or more is extremely unlikely to be *T. ferruginea*. By this means, later instar juveniles of *T. parietina* (Fig. 8) can reliably be distinguished from those of *T. ferruginea*.

The functional significance of having legs nearly two and a half times as long in an adult male *T. parietina* compared with those of *T. ferruginea* is obscure, but may reflect either the distance travelled to find mates and/or some aspect of courtship which differs between the species.

Coloration: The reddish median band on the abdomen of *T. ferruginea* is distinctive in living specimens, but fades rapidly in spirit. The pale patches on either side of this median band in *T. ferruginea* are formed largely by dense whitish plumose hairs over unpigmented areas of the integument. In *T. parietina* any pale patches are much less evident and there are fewer plumose hairs. The legs of *T. ferruginea* are clearly annulated, whereas in *T. parietina* any annulations are much more obscure. Other markings on the carapace and abdomen, and the pale spots on the sternum, are also more distinct in *T. ferruginea*.

Habitat: Roberts (1995) suggests that *T. parietina* is found "sometimes in houses, but usually in very old buildings; outdoors in more southerly parts of Europe". He reports *T. ferruginea* as occurring in "holes and crevices in overhanging banks, crevices in tree trunks in woodland and in barns and derelict buildings". The Elvington population of *T. ferruginea* occurs in crevices on the outside walls of a church (the inside has not been checked), in cracks within the trunks of yew trees in the churchyard, on an ivy-covered wooden fence and in a dense, ivy-bottomed hedge, which conforms to Roberts' habitat description. The French *T. ferruginea* came from an old farmhouse. Specimens of *T. parietina* were collected mainly from within buildings, but those from Broadway, Pershore and Wymondham were on outside walls. Thus the insides and outsides of buildings seem to provide habitats for both species; *T. ferruginea* alone may colonise more natural holes and fissures.

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The web of *Trogloneta granulum* Simon (Araneae, Mysmenidae)

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Summary

Spiders of the species *Trogloneta granulum* Simon, 1922 build tiny, three-dimensional webs in their humid environment. The basic building components which make up the design of a finished web are: hub, radial threads, and transverse threads which interconnect the radial threads. All parts of the web, with the exception of the hub, are covered with droplets of sticky secretion. The inner transverse threads, laid close to the hub, connect all the radial threads, whilst the transverse peripheral threads connect only two or three radii. The structure of the web shows elements typical of the "symphytognathoid" families. No wrapping behaviour occurs during prey capture.

Introduction

Neither the web nor the spinning activity of *Trogloneta granulum* Simon, 1922 has been described so far. This paper describes the structure of the web, with notes on prey capture, and provides data useful in the study of mutual phylogenetic relations of orb-weaving spiders and their relatives. *Trogloneta granulum* is a rare spider whose body length rarely exceeds 1 mm. It was originally described from a cave in southern France (Simon, 1922), and was reported from a second French cave by Fage (1931). So far the most detailed morphological study has been published by Thaler (1975), who found this species in the Austrian northeastern Alps under stones deeply embedded in the forest floor, and as a preliminary classification he placed it in the family Symphytognathidae. Forster & Platnick (1977) transferred *Trogloneta* to the Mysmenidae. According to Růžička (1996) *T. granulum* is a very rare relict species found in stabilised stony debris without air circulation. Together with the Theridiosomatidae and Anapidae, both of the above-mentioned families form an important evolutionary line of so called "symphytognathoid" families (Coddington, 1990). In accordance with the cladistic classification formulated for the "Infraorder Araneomorphae", the Anapidae and Symphytognathidae are closest to each other while all the "symphytognathoids" form part of the so-called "higher araneoids" (Coddington & Levi, 1991).

Material and methods

The observations were made exclusively in the laboratory between 4 April 1997 and 24 February 1998 and further in the period from 3 April to 22 May 1999, on a total of 41 specimens, consisting of 35 females and 6 males. Three of these males were collected as subadults and they reached maturity in the laboratory. All the studied material came from the locality of Vysoká Běta in the Blanský Les Protected Landscape Area (South Bohemia), where these spiders live among stony debris in a beech forest at an altitude of about 780 m. They build their tiny, to the naked eye practically invisible, webs directly on the surface of stones or on rotting leaves between stones at a depth of about 30–70 cm. The spiders were collected together with the wet leaves and placed in Petri dishes 100 mm in diameter and 15 mm high. They were later separated in the laboratory into groups of two or three in Petri dishes of the same dimensions or singly into small tube vials 50 mm long