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Notes on the variation, identification and distribution of British species of the *Tegenaria atrica* group (Araneae, Agelenidae)

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Summary

The range of variation in palp and epigyne structure of *Tegenaria atrica* C. L. Koch, *T. saeva* Blackwall and *T. gigantea* Chamberlin & Ivie is described and figured, and attention is drawn to the characters which are important for identifying the three species; their distribution in Britain is discussed and illustrated with maps.

Introduction

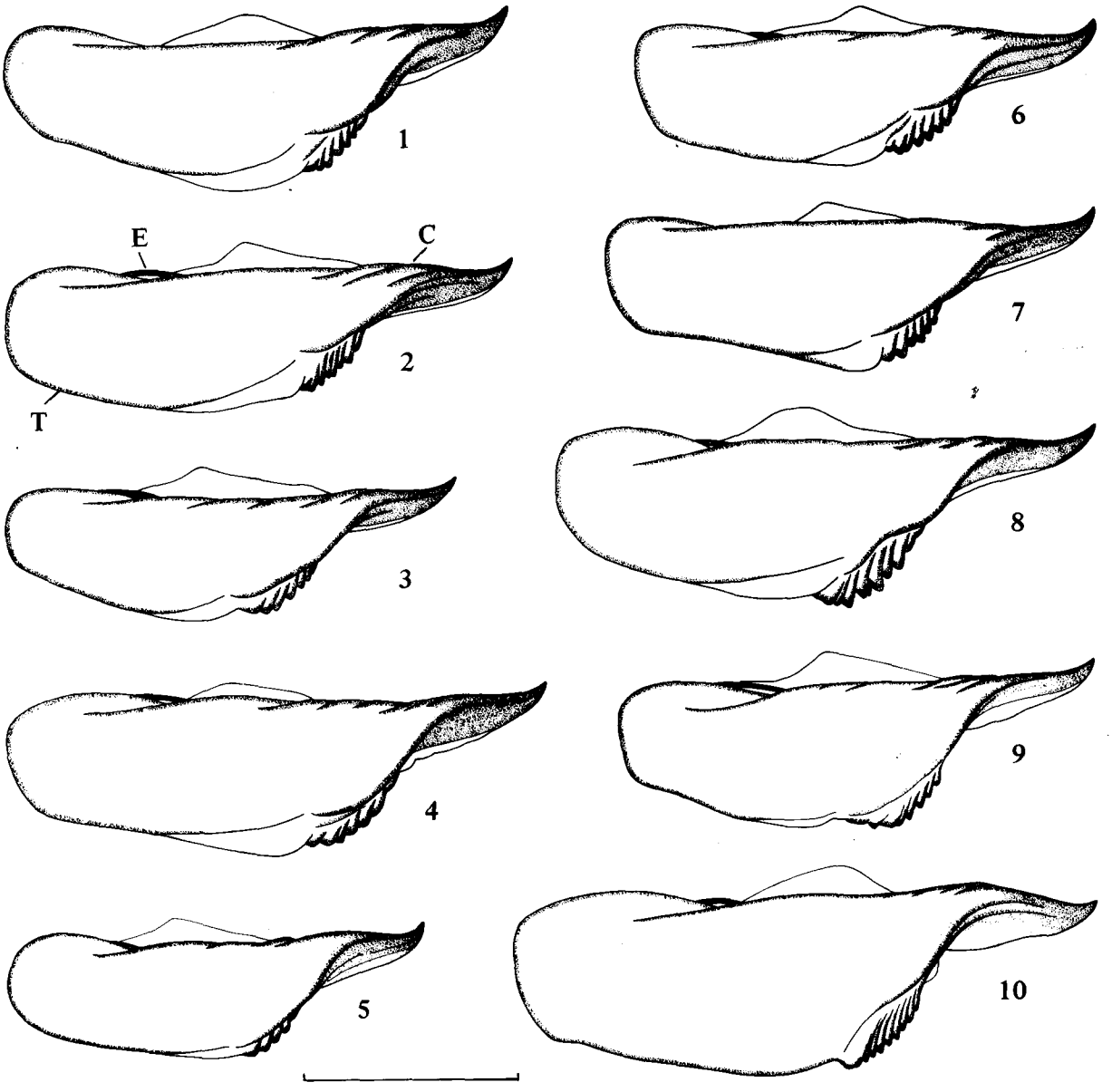
Since the original description of *Tegenaria propinqua* Locket (Locket, 1975), which later proved to be synonymous with *T. gigantea* Chamberlin & Ivie, 1935 (Crawford & Locket, 1976), many British arachnologists have experienced difficulty in distinguishing this species from *T. saeva* Blackwall. This appears to have been partly because the specimens figured by Locket (1975) were rather extreme forms, and partly because the most important diagnostic characters were not sufficiently emphasised. The differences between *T. saeva* and *T. atrica* C. L. Koch illustrated in Locket, Millidge & Merrett (1974) are also incomplete. An attempt is therefore made in this paper to clarify the situation by illustrating a range of forms of all three species, and by indicating the most useful diagnostic features of the palp and epigyne.

Males (Figs. 1-26)

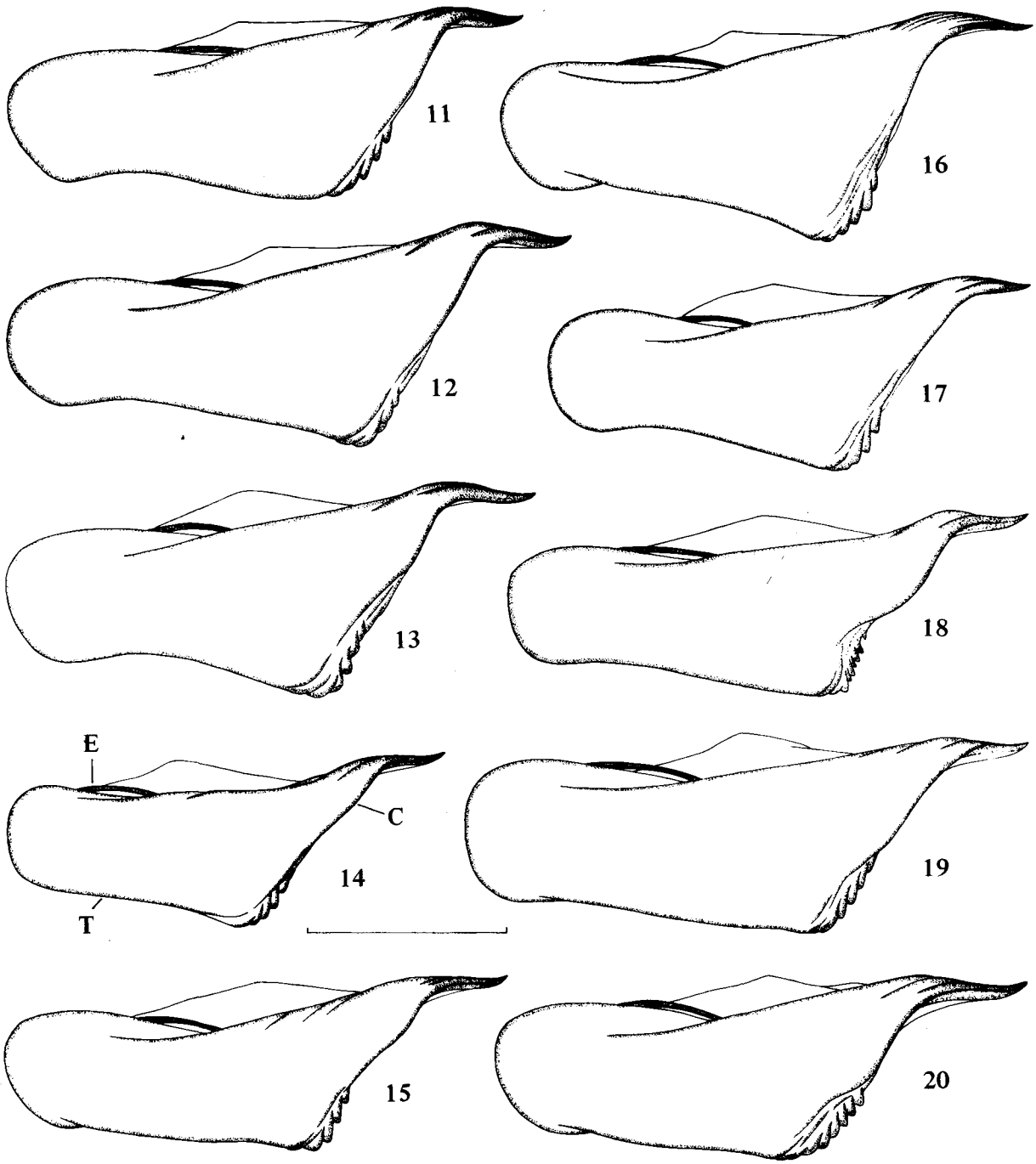
In the males it is clear that the most important diagnostic character is the shape of the tegulum and "conductor" as viewed laterally (i.e. from the outside). This is shown for *T. gigantea* in Figs. 1-10, for *T. saeva* in Figs. 11-20 and for *T. atrica* in Figs. 21-25. For the purposes of description in this paper, the lower surface in the figures, which is attached to the cymbium by the haematodocha, will be described as ventral, and the pointed end of the "conductor" will be described as distal. In order to obtain good lighting on these structures it is easier to view the palp this way up, rather than in the normal position with the cymbium uppermost. All these drawings have been made from as near as possible to the same angle, such that a small part of the embolus is just visible above the dorsal surface of the tegulum, and with the proximal and distal ends lying in approximately the same plane (these structures are labelled in Figs. 2, 14, 21).

The most obvious difference between *saeva* and *gigantea* lies in the size and shape of the distal point. This is short and narrow in *saeva*, but longer and much broader in *gigantea*. The statement made by Locket (1975: 85) that in *gigantea* the tip curves away from the cymbium while in *saeva* the tip is bent back towards the cymbium is rather misleading, because although in *saeva* this point does curve towards the cymbium initially the extreme tip curves back away from the cymbium as in *gigantea*. There is considerable variation in the extent of curvature in both species. The double curve is most apparent in *saeva* in Figs. 11-13 and 20, whereas in *gigantea* the curved tip is less marked than usual in Figs. 4, 9 and 10. The specimen from Jersey (Fig. 17) has no curvature at the tip, but this is clearly *saeva* because the point is narrow.

Three further differences between these species show a greater range of variation and are therefore less reliable. In typical *saeva*, e.g. as in Figs. 11-13, 16, 17, the mid-point of the tegulum + "conductor" as drawn is much broader than the rest, and there is a pronounced angle on the ventral margin. In typical *gigantea*, however, the "conductor" appears to merge smoothly into the tegulum with no widening or sharp ventral angle, e.g. Figs. 1-3, 6. In some less extreme specimens this difference is less obvious, cf. *saeva* Figs. 14, 15, 20 and *gigantea* Figs. 5, 8-10. The sclerotized ridges distal to this ventral angle tend to be more marked in *gigantea* than in *saeva* (cf. Figs. 11, 12 and 2, 8) but again some specimens show much smaller differences (cf. Fig. 20 and Fig. 5). The specimen of *saeva* from Betws-y-coed shown in Fig. 20 is the most *gigantea*-like of any male examined, and as it was taken in the same building as the *gigantea* shown in Fig. 10 it could be a hybrid. The shape of the *gigantea* palp in Fig. 10 is also slightly *saeva*-like in the broad base of the "conductor" and in its large overall size. It appears that another clear



Figs. 1-10: *Tegenaria gigantea* Chamberlin & Ivie, ♂ palpal organ, lateral view of tegulum and "conductor". **1** Sydney, Vancouver Is., Canada, 1935; **2** BM(NH), 1897; **3** Wimbledon, Surrey, 1954; **4** Wimbledon, Surrey, 1954; **5** Hartland Moor, Dorset, 1978; **6** Flatford, Suffolk, 1973; **7** Nilgiri Hills, India; **8** Hale, Cheshire, 1976; **9** Bowdon, Cheshire, 1976; **10** Betws-y-coed, Denbigh, 1976. Scale line 0.5 mm. C="conductor", E=embolus, T=tegulum.



Figs. 11-20: *Tegenaria saeva* Blackwall, ♂ palpal organ, lateral view of tegulum and "conductor". **11** Porthpean, Cornwall, 1970; **12** Isles of Scilly, 1959; **13** Swanage, Dorset, 1975; **14** Hartland Moor, Dorset, 1978; **15** Betws-y-coed, Denbigh, 1975; **16** France (ex MNHN); **17** Jersey, Channel Is., 1976; **18** Swanage, Dorset, 1896; **19** Cardiff, 1976; **20** Betws-y-coed, 1976. Scale line 0.5 mm. C="conductor", E=embolus, T=tegulum.

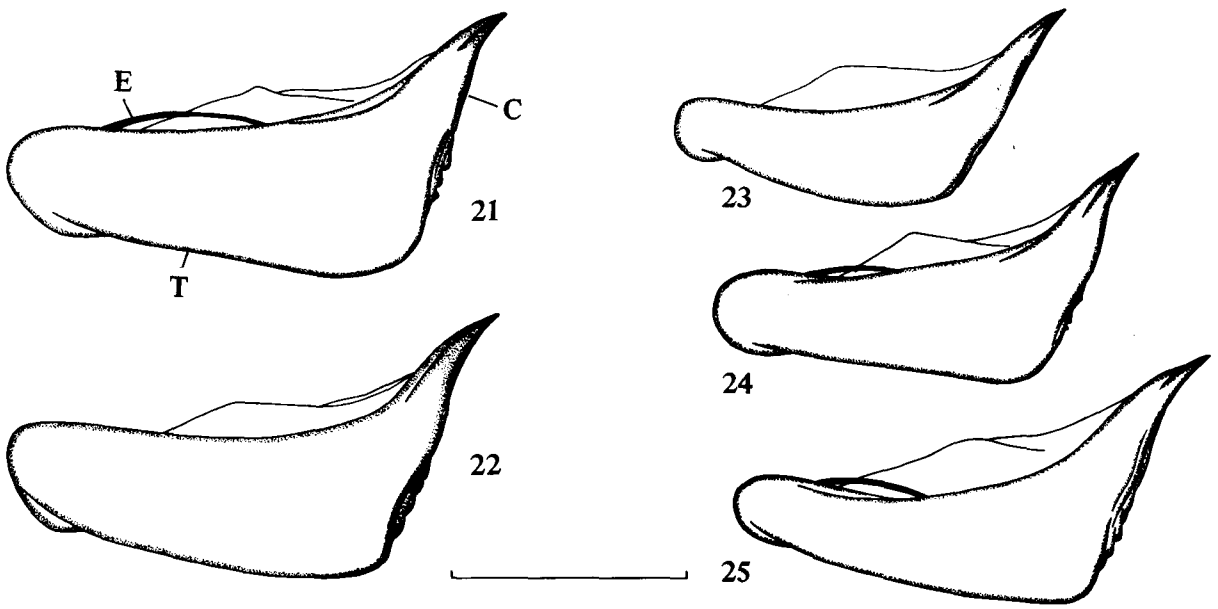
separation between *saeva* and *gigantea* can be obtained by plotting carapace length against maximum length of tegulum + "conductor" (as orientated in Figs. 1-25), the palpal organ of *saeva* always being longer than that of *gigantea* for any given carapace length (Fig. 26).

Fewer specimens of *T. atrica* have been examined, but it seems to be much less variable than the other two species. Figs. 21-25 show the range of size observed and some variation in the ridges on the ventro-distal surface, but the form of the distal point apparently varies little. It is clearly closer to *saeva* than to *gigantea* in shape, but the pronounced concave curvature of the dorsal margin and the lack of any recurved point in *atrica* are distinctive. Also, when the palpal organ length is plotted against carapace length there is again a clear separation, the palp of *atrica* being smaller even than that of *gigantea* (Fig. 26).

Females (Figs. 27-35)

The distinction between females of *gigantea* and *saeva* as described by Locket (1975: 85) is correct, but a little amplification is needed. In *gigantea* the anterior arch-shaped sclerotized ridge varies in shape. Usually there appears to be a central gap, as in Figs. 27-29 and Locket's fig. 17, but occasionally the ridge is continuous across the width of the epigyne, as in Fig. 30. There is also often a diffuse darkened area below and just posterior to this sclerotized ridge, as shown in Figs. 27-29, but the darkening never seems to be localized into clearly defined seminal receptacles as it is in *saeva* (Figs. 31-33).

The difference between the epigynes of *saeva* and *atrica* has not been clearly shown in the literature. The seminal receptacles are usually much closer together in *atrica*, as shown in Figs. 34-35 and in Locket & Millidge (1953, fig. 9C) and Locket, Millidge & Merrett (1974, fig. 23B), but they may occasionally be almost as close together in *saeva* (Fig. 33). A further difference is provided by the fact that in *atrica* the whole central area of the epigyne appears much flatter than in *saeva*, and the seminal receptacles appear close to the surface and not deeply recessed as in *saeva*. This is difficult to show in a drawing, but is very obvious in the specimen. Also, the lateral kidney-shaped dark areas shown in Figs. 34-35 were present in all specimens of *atrica* examined, but not in *saeva*.



Figs. 21-25: *Tegenaria atrica* C. L. Koch, ♂ palpal organ, lateral view of tegulum and "conductor". 21 Southport, Lancs (Jackson Coll.); 22 Newcastle, 1975; 23 Dublin (Jackson Coll.); 24 Nuremberg, Germany (Koch Coll.); 25 "Wipfelder, Steinbruch" (Koch Coll.). Scale line 0.5 mm. C="conductor", E=embolus, T=tegulum.

It proved impossible to obtain any reliable distinction between the three species based on epigyne measurements, partly because of considerable variation, and partly because of the difficulty of defining accurately any epigyne measurement in these species.

Distribution and Discussion

The present known distribution of *saeva* and *gigantea* in Britain is shown in Figs. 36 and 37. The precise limits of the range of both species are not yet clear, but it remains broadly true, as indicated by Locket (1975), that *saeva* occurs in western England and Wales, while *gigantea* occurs mainly in the eastern part of the country. Both species have been found in southern Scotland and they overlap slightly in north-west England, North Wales and central southern England. Material in the British Museum (Natural History) dating from around 1900 appears to support the present distribution pattern. Only a few specimens have been found outside their normal range; the specimen of *gigantea* shown in Fig. 28 was received from V. A. Wheatley (Helston, Cornwall) among a large quantity of *saeva*, a specimen of *saeva* was in a tube of *gigantea* labelled Felbridge (Surrey) in my own collection (cited by Locket, 1975), and a pair of *saeva* were found among a large number of *gigantea*

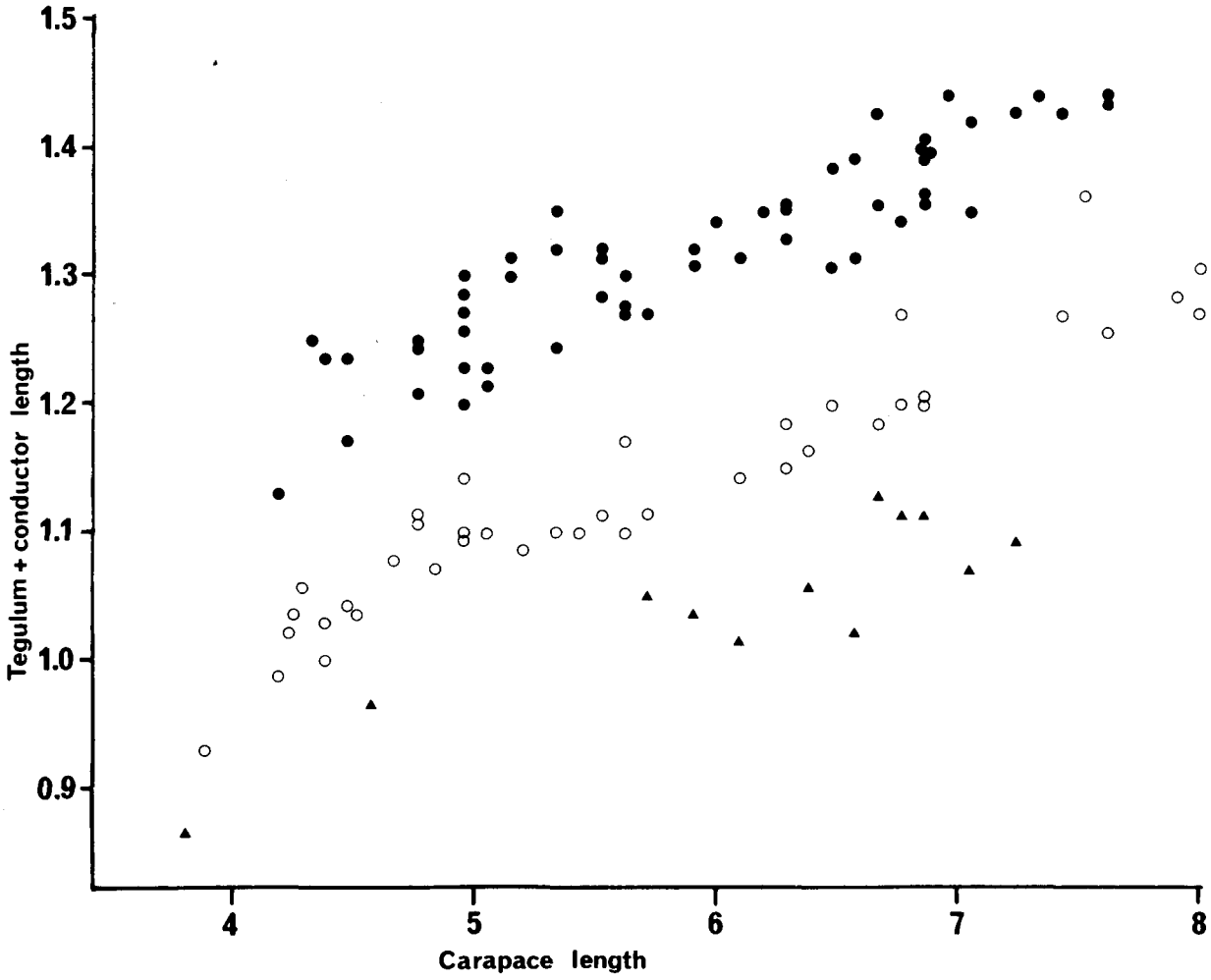
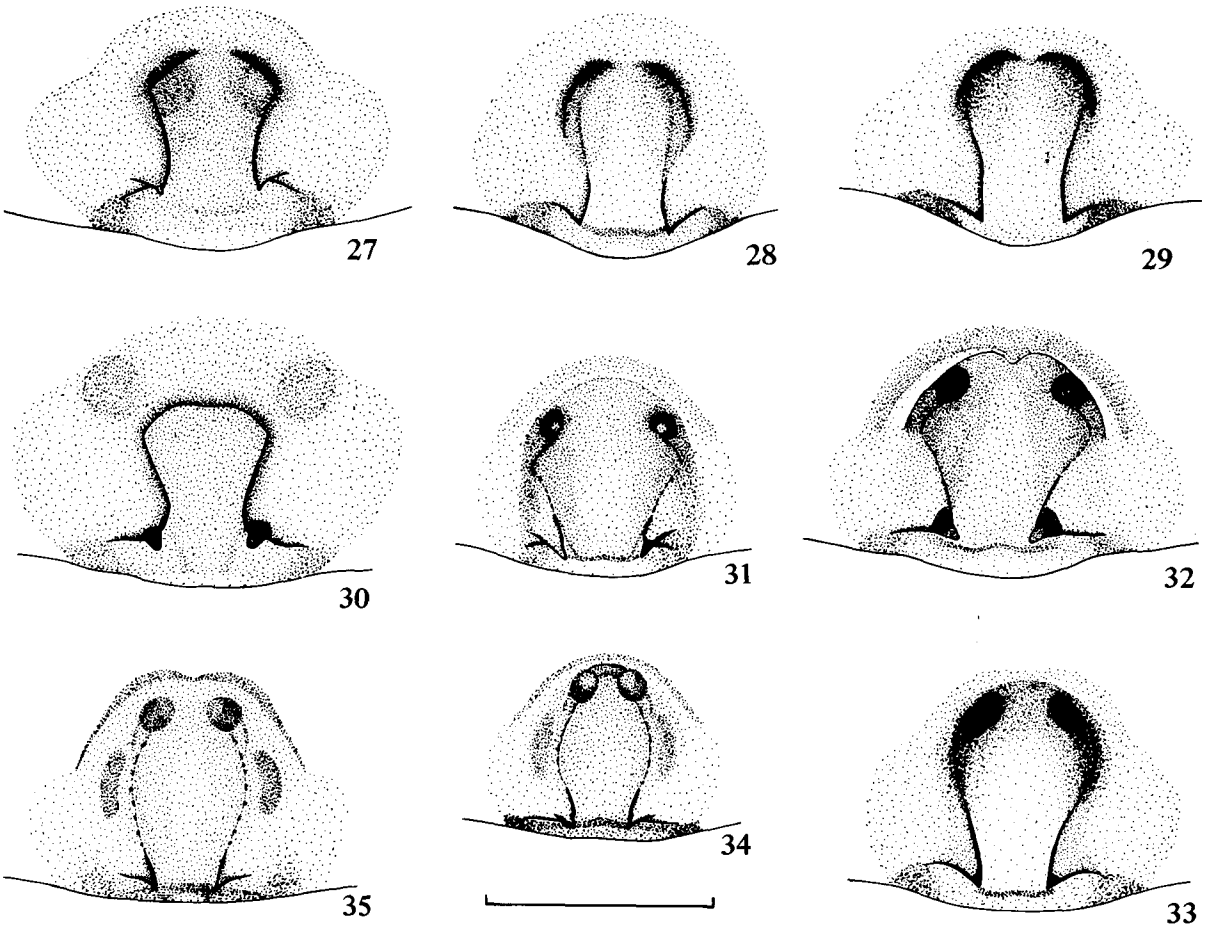


Fig. 26: Relationship between carapace length and maximum length of palpal organ (tegulum and "conductor" viewed laterally as in Figs. 1-25) for *Tegenaria saeva* (●), *T. gigantea* (○) and *T. atrica* (▲). Measurements in mm.

labelled "Whetstone" (Middlesex) in the collection of the BM(NH). It might be expected that these species, which are often so closely associated with man, would occasionally be found outside their normal range as a result of chance transportation. In fact it is remarkable that their ranges seem to remain largely constant in Britain with only a small area of overlap, especially since possible climatic differences would appear to be less important for species which frequently occur indoors. The occurrence of slightly intermediate forms in places where the two species occur together (see e.g. Figs. 9, 10, 20) suggests that occasional hybridisation may occur, and possibly also between *saeva* and *atrica* (e.g. Fig. 33). This does not, of course, indicate that they are not valid species, since in general there is a clear separation. So far it has not been possible to demonstrate any ecological difference between the species. As stated by Locket



Figs. 27-30: *Tegenaria gigantea* Chamberlin & Ivie, epigyne. **27** Carlisle, 1974; **28** Helston, Cornwall; **29** Manchester, 1977; **30** Penrith, Cumbria, 1971.

Figs. 31-33: *Tegenaria saeva* Blackwall, epigyne. **31** Jersey, Channel Is., 1976; **32** Ilfracombe, Devon, 1927; **33** Manchester, 1976.

Figs. 34-35: *Tegenaria atrica* C. L. Koch, epigyne. **34** Vienna, Austria, 1977; **35** Carlisle, 1971.
Scale line 1.0 mm.

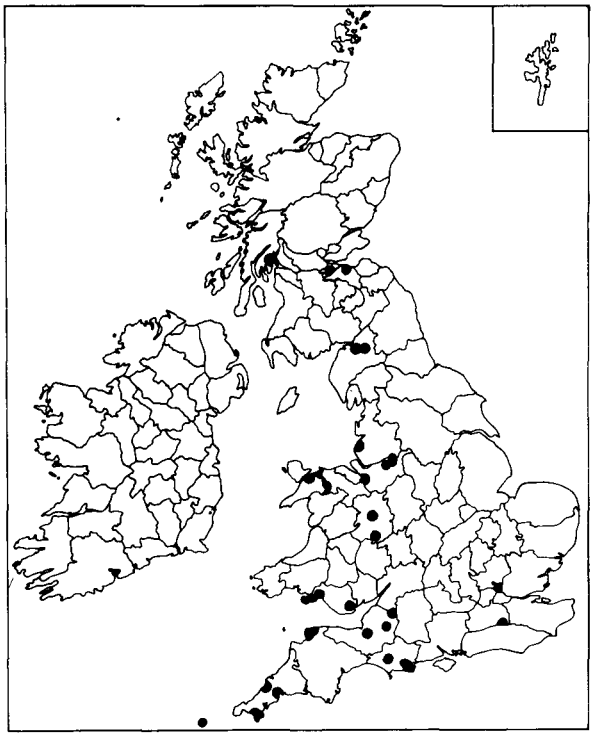


Fig. 36: Distribution of *Tegenaria saeva* in the British Isles.

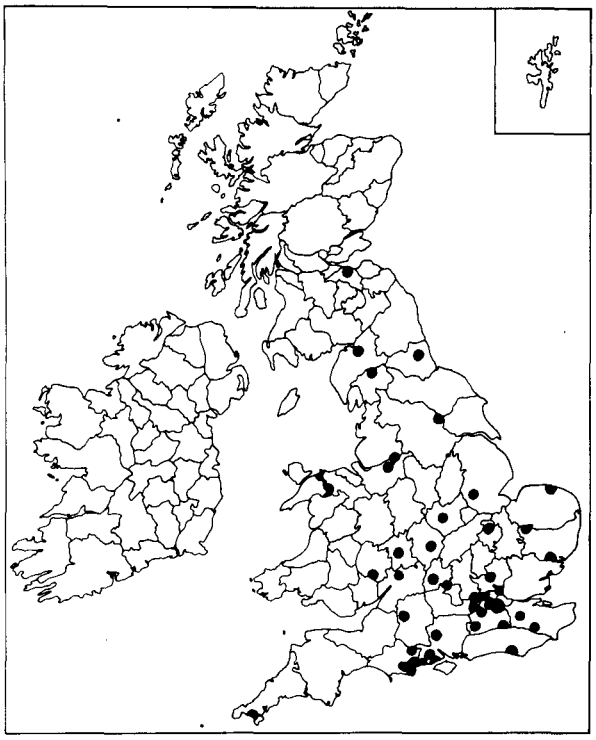


Fig. 37: Distribution of *Tegenaria gigantea* in the British Isles.

(1975) both *gigantea* and *saeva* have been taken indoors and out of doors, and sometimes even in the same building, or in Dorset on the same area of heathland. The available phenological records are based on small numbers of individuals from widely scattered localities, so that possible small differences in the phenology of the species could not be detected, but there is no indication of any major difference. Males of *saeva* have been found between late July and mid October, most records coming from late August and September, while males of *gigantea* have been found from mid August to mid October, with a peak at about the same time as for *saeva*.

The records for *atrica* shown in *British Spiders* Vol. 3 (Map 219) are correct, but to these should be added a record from Forfar, Scotland, 20 February 1927 (Fig. 38). The male specimen, which is in the collection of the BM(NH), was taken in Forfar Post Office, and was erroneously recorded as *T. atrica* C. L. Koch (= *T. saeva* Bl.) by Bristowe (1939), and shown as for *saeva* in *British Spiders* Vol. 3 (Map 218). There is also an additional recent record from near Carlisle (a female in Carlisle Museum collection, taken 11 November 1971, see Fig. 35).

The results of body measurements, as shown in Fig. 26, strongly suggest that all three species may reach maturity in three, or possibly four, different instars, since the range of size is over 100 per cent. Similar results were obtained by Bonnet (1930) for *Tegenaria parietina* (Fourcroy). Nearly all of the specimens collected on recently burnt heathland in Dorset during 1978 fell into the extreme lower end of the size range of *saeva* and *gigantea*, a scarcity of food probably being responsible.

Little can be added to the remarks about European distribution made by Locket (1975) and Crawford & Locket (1976). The rather scanty information available suggests that *atrica* is the commonest species in central and eastern Europe, while *saeva* is most frequent in western Europe, *gigantea* occurring, but possibly not commonly, in Germany and France (also apparently in India, see Fig. 7). It is most curious that the continental distribution of the three species appears to be the opposite of that which prevails in

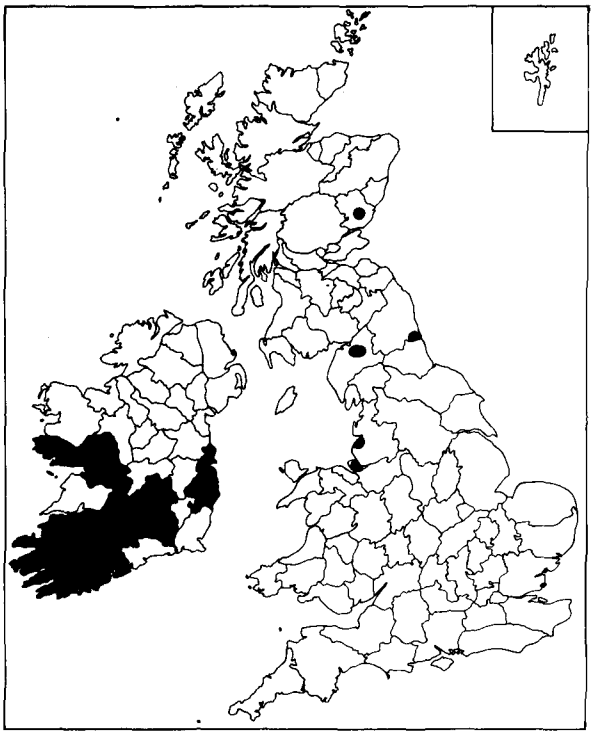


Fig. 38: Distribution of *Tegenaria atrica* in the British Isles.

the British Isles. Possibly *atrica* was the first species to migrate to the British Isles after the last glaciation and succeeded in colonising Ireland. The species *saeva* and *gigantea* may have spread to England and Scotland later, and perhaps ousted *atrica* in all except a few northern localities, but apparently have failed to colonise Ireland. In order to define their ranges and habitat requirements more precisely, I should be most interested to receive locality and habitat records from anywhere in Europe, and especially information on the relative abundance of the three species in different localities.

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Addendum

After this paper was completed I received a reprint of a recent paper by Brignoli (1978) in which he states that he considers *T. gigantea* Chamberlin & Ivie, 1935 to be a synonym of *T. duellica* Simon, 1875. This possibility was also suggested by Locket (1975: 88). Brignoli (1978) records *T. duellica* from Spain and Portugal.

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