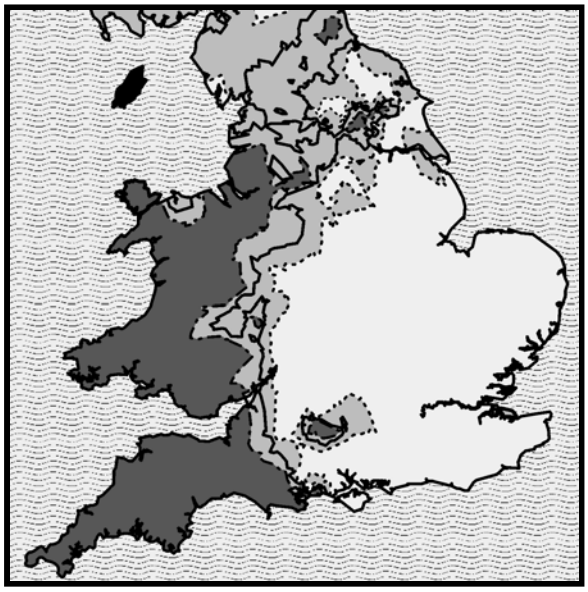
Identification of *Tegenaria gigantea* and *T. saeva.*

Over much of central and southern England and Wales, these species are readily separated. The difficulty comes in the regions where the species distributions overlap because here they can hybridise and first generation hybrids may backcross to the parental species producing a graded series of intermediates. The map below shows interpolated 'contour' lines indicating the major zones of overlap, and thus the areas from which spiders with intermediate morphologies may be found. It is important to note that hybrids may occasionally be found well away from the overlap zones as a result of human transportation of one species into the area occupied by the other.



GIS-interpolated map showing areas of England and Wales where *T. saeva* is estimated to occur at a frequency of > 0.78 (dark grey), < 0.22 (white) and between 0.22 and 0.78 (light grey). The dark lines within the light grey areas are where the two species are predicted to occur at equal frequency.

Map reproduced from Croucher *et al*. (2007)

Diagnostic features - males

The figures below show lateral views of the tegulum (T) and 'conductor' (C) of typical *T. saeva* (Fig. a) and *T. gigantea* (Fig. b) from geographical areas well away from the overlap zone. The palps are oriented so that the embolus (E) is just visible. *T. saeva* has an almost 90 degree angle to the lower (as shown here) edge of the tegulum + conductor and the distal point of the conductor ('beak') is narrow (arrowed). In *T. gigantea*, the conductor merges seamlessly into the tegulum with no sharp lower angle, and the 'beak' is much wider and merges more gradually into the body of the conductor.

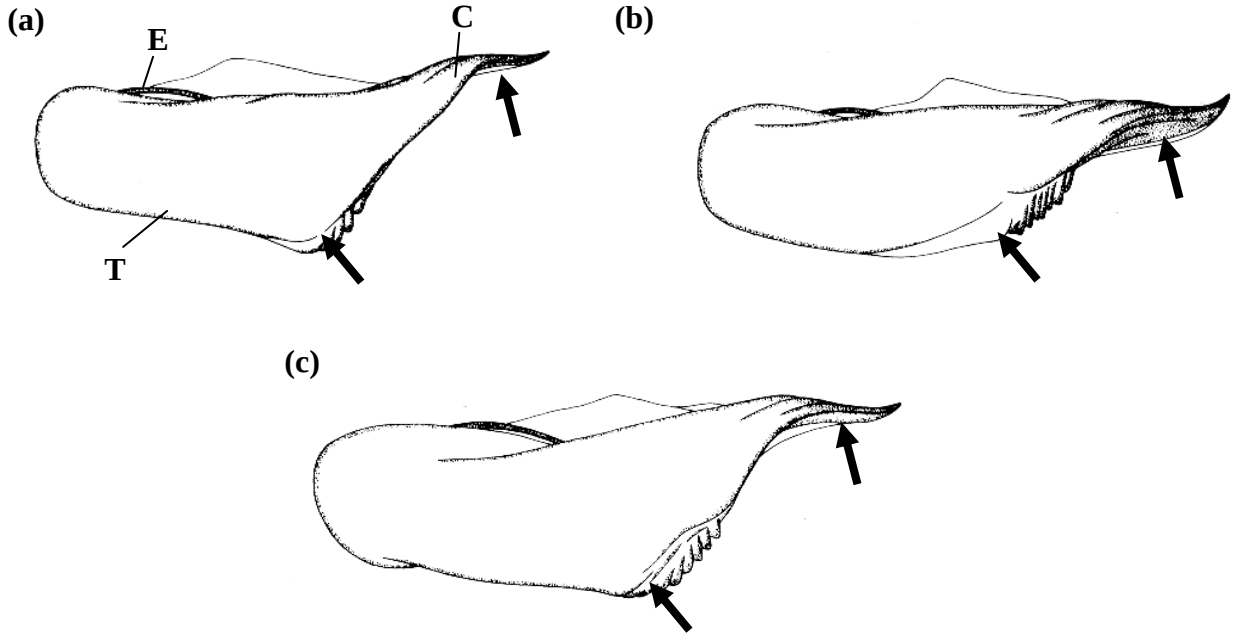


Figure c shows a probably hybrid male in which both the 'beak' and, to a lesser extent, the lower angle are intermediate between 'good' *T. saeva* and *T. gigantea*. In judging the lower angle, the fluted features (above and to the right of the lower arrows) are ignored. Putative hybrids frequently show the 90 degree lower angle of *T. saeva* but the wide 'beak' characteristic of *T. gigantea*.

Diagnostic features - females

Females are generally somewhat more difficult to distinguish than males. Orientation is absolutely crucial. The epigyne is angled so that the anterior, inner surface of the epigastric fold is exactly vertical i.e. in line with the viewing angle (Fig. d).

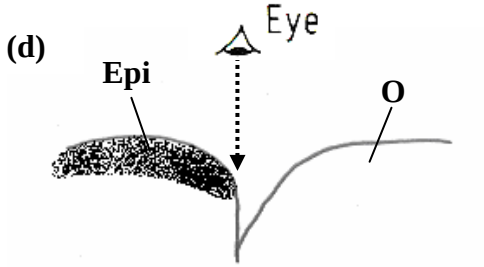
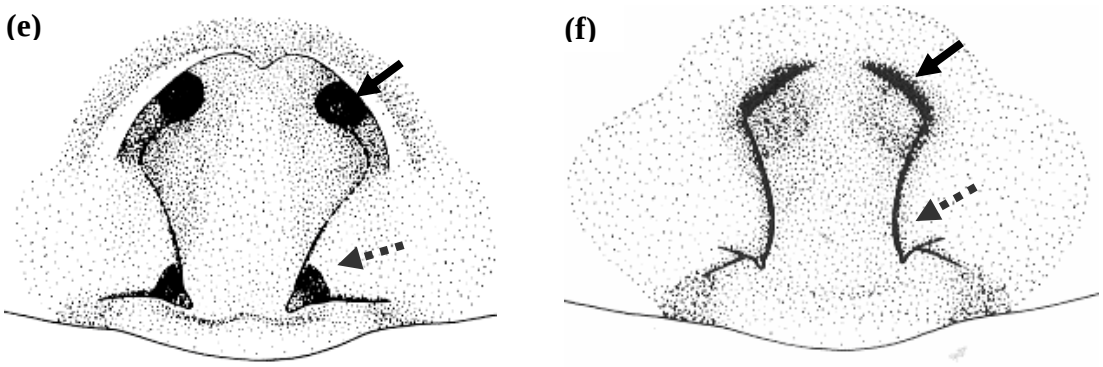


Figure d. Schematic lateral view of the female ventral surface showing the epigyne area (Epi) and the opisthosoma (O), with the epigastric fold in between. The correct viewing angle is shown by the dotted arrow.

Typical ventral views of epigynes are shown below for *T. saeva* (Fig. e) and *T. gigantea* Fig. f).

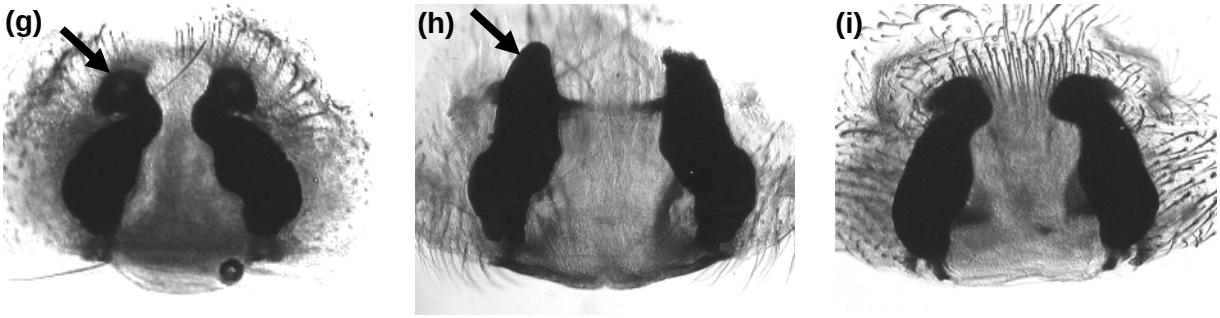


In *T. saeva* (Fig. e), when oriented as in Fig. d, the openings to the spermathecae are seen as full, circular dark spots (solid arrow) and without a strongly sclerotinised anterior arch. In *T. gigantea* (Fig. f), the openings of the spermathecae are much more oblique and, when oriented correctly, appear as narrow slits (solid arrow). There is also a strong, sclerotinised anterior arch over each slit that often join in the mid-line. Note that if viewed <u>obliquely from behind</u>, the openings to the spermatheca in *T. gigantea* are also fully visible and round, hence the need for careful, and consistent, positioning. Roberts (1995) mentions the shape of the apophyses (dotted arrows) as having diagnostic value, but this is not very reliable.

In first-generation hybrid females, the openings to the spermathecae are intermediate between the situations described above i.e. they appear as half-occluded circles. The degree of sclerotinisation of the anterior arch in hybrids is variable. Of course, because of backcrossing into the parent species, all grades of intermediates with respect to this character may be encountered.

The relative orientation of the spermathecae, when viewed dorsally in cleared material, also helps to distinguish the species. In *T. saeva*, the spermathecae strongly converge towards

the anterior end; whereas in *T. gigantea* they remain roughly parallel (Figs g and h, respectively). Quantifying this difference is problematic because of the considerable variation in the details of spermathecal shape between individuals. The direction of twist of the anterior end of the spermathecae also seems to differ. In *T. saeva* the twist is strongly outwards (Fig. g, arrow), whereas in *T. gigantea* it is weakly inwards or shows no discernible twist at all (Fig. h, arrow). In hybrids the spermathecal morphology is intermediate (Fig. i)



All line drawings, except for Fig. d, are modified from Merrett (1980).

References

Croucher, P. J. P., Jones, R. M., Searle, J. B. and Oxford, G. S. 2007. Contrasting patterns of hybridization in large house spiders (*Tegenaria atrica* group, Agelenidae). *Evolution* **61:** 1622–1640.

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