On *Zelotes subterraneus* (C. L. Koch) in Britain (Araneae, Gnaphosidae)

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Summary

The occurrence of *Zelotes subterraneus* (C. L. Koch) in Scotland and southeastern England is established. Some specimens show evidence of introgression from the closely related species *Z. apricorum* (L. Koch).

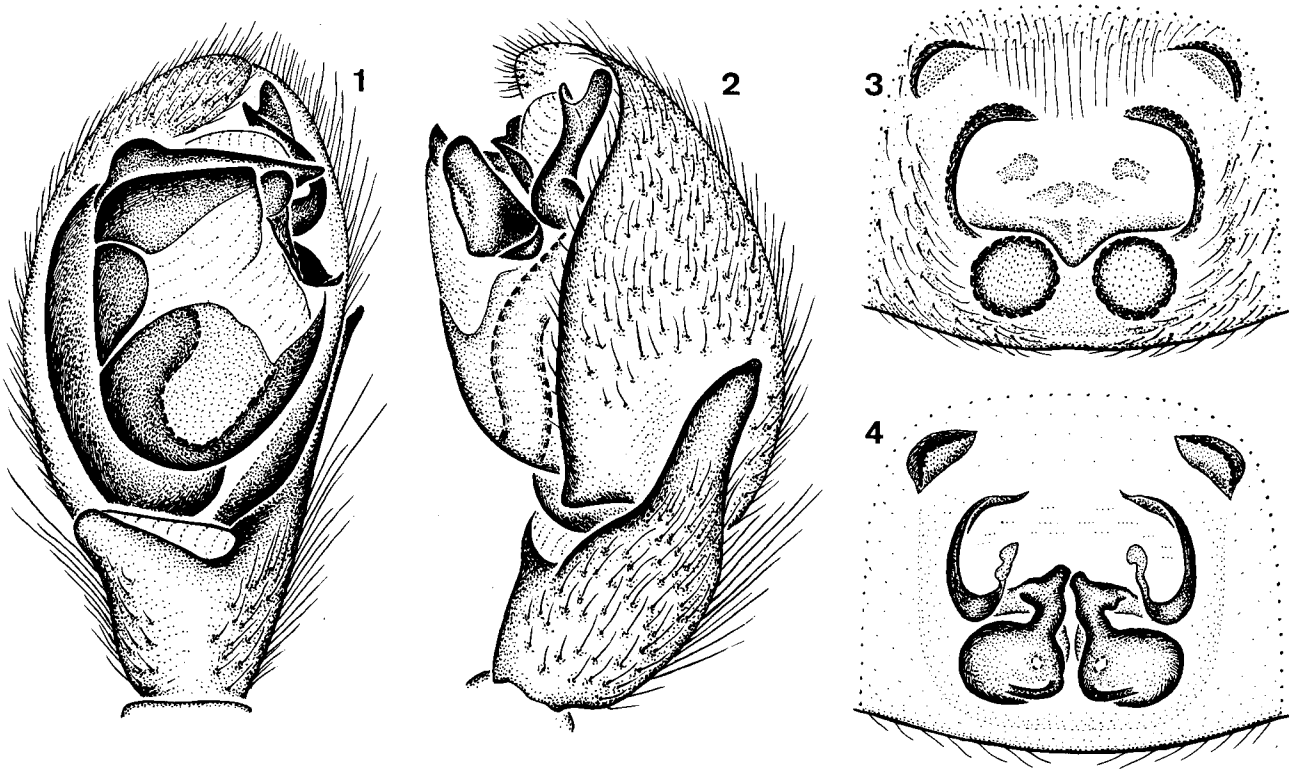
Introduction

Two extensive studies of the gnaphosid genus *Zelotes* have recently been published, one dealing with the American species (Platnick & Shadab, 1983) and one covering the central European fauna (Grimm, 1985). These works have clarified considerably the taxonomic problems posed by *Zelotes subterraneus* (C. L. Koch) and its close relatives, and have led to the recognition that some British specimens formerly identified as *Zelotes apricorum* (L. Koch) actually belong to *Z. subterraneus*.

There has been a long history of confusion between these two species in Europe, with some authors even regarding them as synonyms. The confusion is amply reflected in museum collections; most of the vials we have examined that were labelled as *Z. subterraneus* actually contain *Z. apricorum* instead. This state of affairs has had little effect on British workers, who have generally admitted to having only *Z. apricorum* in their fauna. Grimm (1982, 1985) clearly established that the two are distinct species and produced a tentative but informative map of their distributions within Europe.

Similar confusion has occurred in America, where the most commonly collected species in the genus has been identified by most workers as *Z. subterraneus*. It is, however, a distinct species (*Z. fratris* Chamberlin) distinguishable by the shorter embolus of males and the differently shaped epigynal ducts of females (Platnick & Shadab, 1983). The only other close relative of *Z. subterraneus* in America is a small Arctic-alpine form, *Zelotes sula* Lowrie & Gertsch.

In England, *Z. apricorum* has long been recognised as a widely distributed, if thinly spread, member of the fauna (Locket & Millidge, 1951; Locket, Millidge & Merrett, 1974). In September 1961, J. A. L. Cooke collected at Colne Point in Essex three males and two females that differed in genitalic structure from typical *Z. apricorum*. In particular, the characteristic large flange, so clearly visible on the male embolus in typical *Z. apricorum* (Fig. 1), was lacking, being represented only by a rudimentary, translucent, narrow extension. Cooke found little in the external details of the female epigynum that would unambiguously differentiate the form, however, and neither he (Cooke, 1962, 1963) nor Locket, Millidge & Merrett (1974) were convinced that a second species was involved.



Figs. 1-4: *Zelotes apricorum* (L. Koch), specimens from Argyll, Scotland. **1** Palp, ventral view; **2** Palp, retrolateral view; **3** Epigynum, ventral view; **4** Epigynum, dorsal view.

The recent studies mentioned above stimulated a renewed interest in Cooke's specimens, which were kindly loaned to us by I. Lansbury of the Hope Entomological Collections, Oxford University (HEC). In many respects, they conformed to Grimm's (1982) account of *Z. subterraneus,* and we therefore subsequently examined specimens in the British Museum (Natural History), made available by P. Hillyard (BMNH), as well as specimens in the American Museum of Natural History (AMNH) and the personal collections of G. H. Locket (GHL) and F. M. and J. A. Murphy (JAM). An appeal to members of the British Arachnological Society for the loan of additional specimens elicited helpful contributions from N. P. Ashmole of the University of Edinburgh (NPA), P. R. Harvey (PRH), R. C. Hider of the University of Essex (RCH), K. Rowland of the Colchester and Essex Museum (KR), and J. A. Stewart (JAS). Illustrations in this paper were provided by M. U. Shadab of the American Museum.

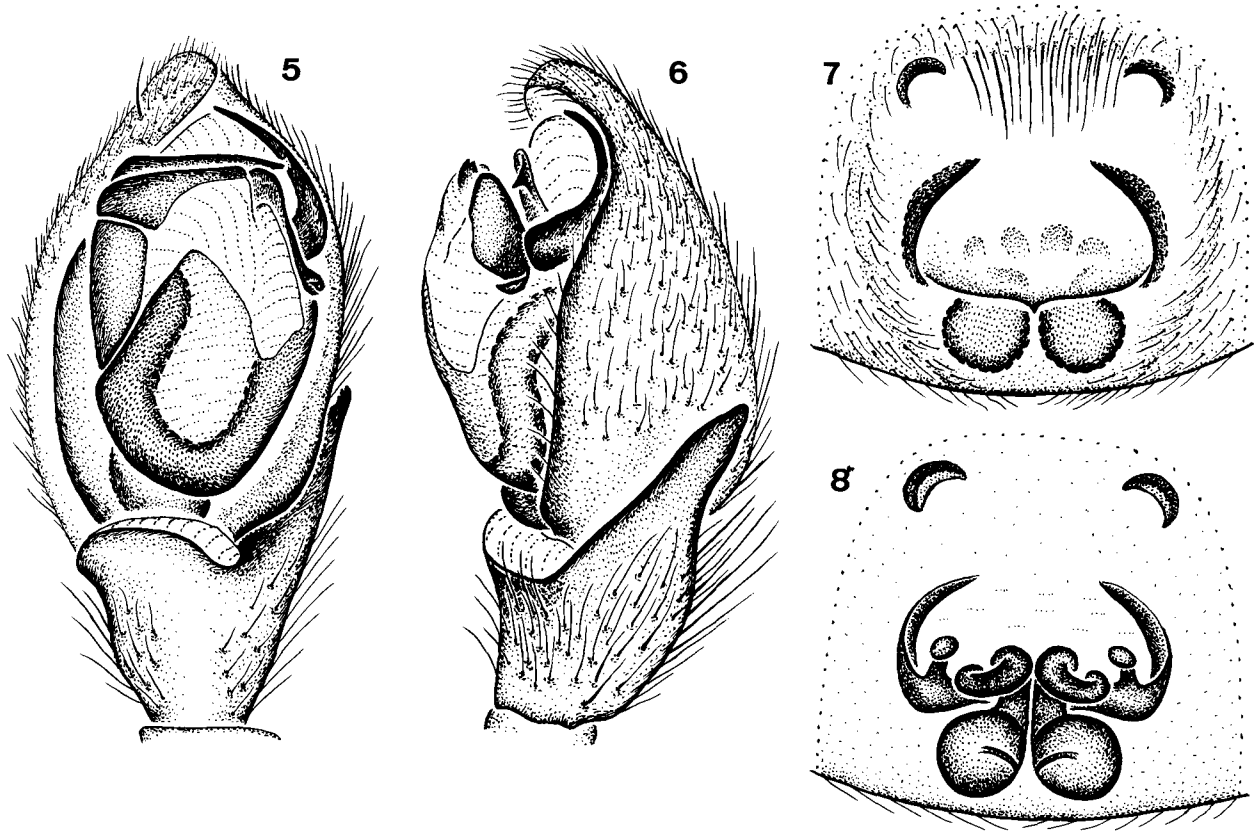
Results

The localities at which specimens have been collected are shown in Fig. 14; with the exception of two Scottish sites, these records are consistent with the distribution indicated for *Z. apricorum* by Locket, Millidge & Merrett (1974, Map 48) and recent county records.

Of the 92 British specimens examined, 69 belong to *Z. apricorum*; the genitalia of typical specimens are shown in Figs. 1-4. The remaining 23 specimens were collected from a stretch of coastline in East Anglia running from Colne Point in Essex to Dunwich in Suffolk, from a coastal site at Banffshire in northeastern Scotland, and from three localities in the Cairngorm Mountains, also in Scotland. The Cairngorm specimens proved to be typical *Z. subterraneus*; their genitalia are shown in Figs. 5-8.

The remaining specimens of *Z. subterraneus,* all coastal, show varying degrees of introgression from *Z. apricorum,* presumably reflecting some hybridisation and subsequent backcrossing (this hypothesis is strengthened by the collection of a typical male *Z. apricorum* at Colne Point). In addition to the rudimentary flange on the male embolus mentioned above (Fig. 9), East Anglian females have the characteristic apical twist of the median epigynal ducts much less pronounced than in typical *Z. subterraneus* (Figs. 10, 11; a similar range of variation was noted by Grimm, 1982, within a series of *Z. apricorum* females from Box Hill, Surrey). The most remarkable specimen was collected on the Banffshire coast by J. A. Stewart (Figs. 12, 13); both the external and internal elements of the epigynum appear to be those of *Z. subterraneus* on one side and *Z. apricorum* on the other!

Although relatively few specimens have been available, the Cairngorm records clearly establish *Z. subterraneus* as a member of the British fauna. The coastal specimens from East Anglia and Banffshire show signs of introgression from *Z. apricorum,* but neither males nor females can be placed in that species, for they lack its autapomorphies (the large embolar



Figs. 5-8: *Zelotes subterraneus* (C. L. Koch), specimens from Inverness, Scotland. **5** Palp, ventral view; **6** Palp, retrolateral view; **7** Epigynum, ventral view; **8** Epigynum, dorsal view.

flange of males and the anteriorly knobbed median epigynal ducts of females) and possess those of *Z. subterraneus* (the elongated embolus of males and apically twisted median epigynal ducts of females). The distribution of the British specimens examined (Fig. 14) fits well with the general European pattern indicated by Grimm (1982: fig. 8), which is additionally supported by the discovery of two typical females of *Z. subterraneus* collected on the Lofoten Islands, Norway, in June 1975, by N. P. Ashmole. Careful collecting in the northeastern half of Britain (particularly along the coast), the northeastern half of France, and in Belgium could well reveal much of interest concerning the ranges of the two species.

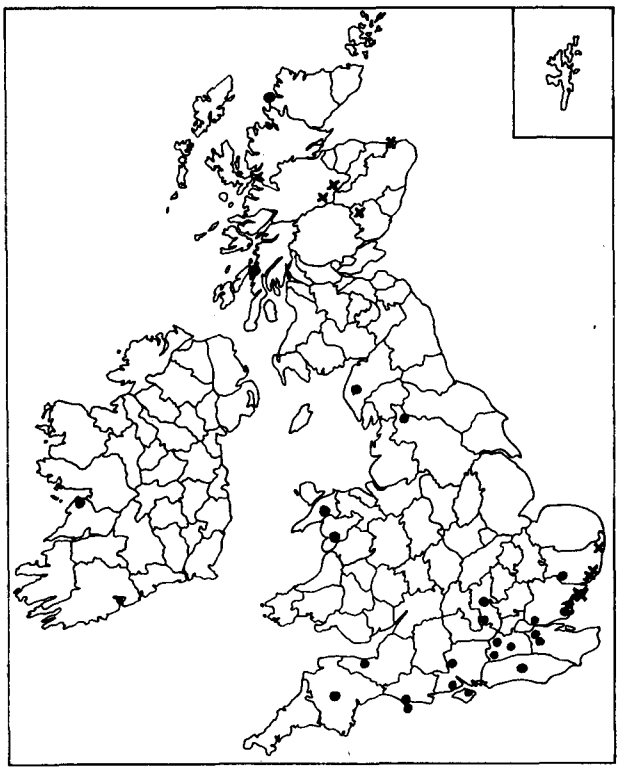
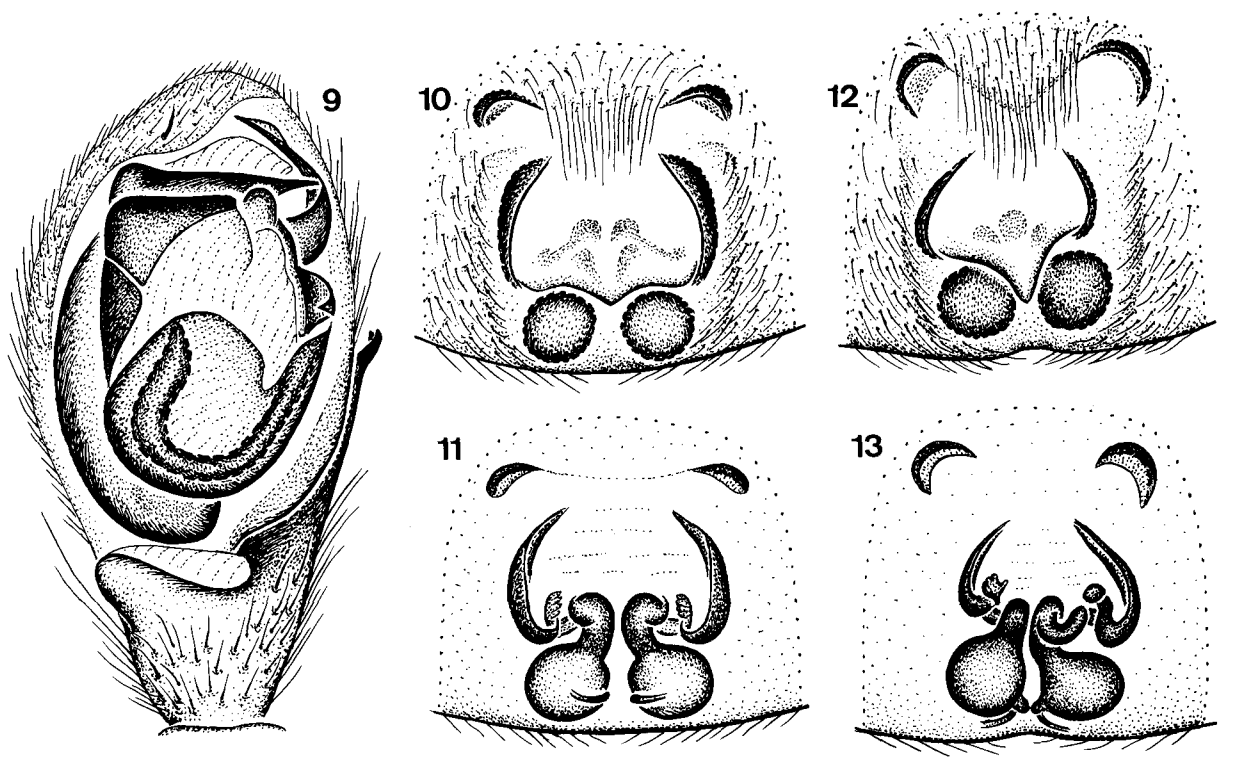


Fig. 14: Britain, showing records of *Zelotes apricorum* (L. Koch) as dots and *Z. subterraneus* (C. L. Koch) as crosses.

Material examined

Z. apricorum: England: BUCKINGHAM: Bix Bottom, 14 June 1970 (JAM), 3♀; Chequers, 6 July 1973 (BMNH), 1♀. CUMBERLAND: Borrowdale, 16 Sept. 1965 (JAM), 2♀. DEVON: No specific locality (AMNH), 1♂, 1♀. DORSET: Chesil Beach, 30 July 1968 (JAM), 1♀; Portland (GHL), 1♂, 11♀. ESSEX: Bradwell, 17 Sept. 1970 (JAM), 3♀; Colne Point, 11 June 1961 (GHL), 1♂; Fingringhoe Ranges, 19 July 1983 (KR), 1♀; Foulness, 30 June 1982 (KR), 1♀; Grays Chalk Pit, Aug.-Sept. 1984 (PRH), 2♀. HAMPSHIRE: Needs Oar Point, 7 Apr. 1960 (GHL), 1♂; Stockbridge, 3 June 1967 (GHL), 1♀; Wootton Creek, 20 May 1956 (BMNH), 2♀. KENT: Borough Green, 15 June 1963 (BMNH), 1♀; Cudham, 12 Mar. 1961 (BMNH), 2♂, 1♀. SOMERSET: Dunster, 20 June 1963 (AMNH), 6♀. SUFFOLK: Hadleigh Wood, 21 Aug. 1954 (BMNH), 1♀. SURREY: No specific locality (AMNH), 2♀; Box Hill, May-June 1954-56 (BMNH), 7♀, Sept. 1956 (BMNH), 1♂; Chiddingfold, 8 Nov. 1970 (JAM), 1♀; Chobham Common, 18 July 1968 (JAM), 1♂, 1♀. SUSSEX: No



Figs. 9-13: *Zelotes subterraneus* (C. L. Koch), specimens showing evidence of introgression from *Z. apricorum*. **9-11** Specimens from Essex, England; **12, 13** Specimen from Banff, Scotland. **9** Palp, ventral view; **10, 12** Epigynum, ventral view; **11, 13** Epigynum, dorsal view.

specific locality (AMNH), 1♀. YORKSHIRE: Malham Tarn, 7 Sept. 1967 (JAM), 1♀. *Ireland:* CLARE: Burren, 27 July 1967 (JAM), 2♀. *Scotland:* ARGYLL: Faery Island, Loch Sween, 23-27 Sept. 1982-84 (NPA), 1♂, 2♀. SUTHERLAND: Stoer (GHL), 1♂. *Wales:* CAERNARVON: Beddgelert, 27 July 1970 (JAM), 1♀. MERIONETH: Dolgellau, 8 June 1956 (BMNH), 3♀.

Z. subterraneus: England: ESSEX: Colne Point, 4 Oct. 1961 (HEC), 3♂, 2♀, 1977-78 (RCH), 1♂, 1♀. SUFFOLK: Dunwich, 11 Sept. 1970 (JAM), 1♀; Orford Beach, 10 June 1960 (BMNH), 1♀; Shingle Street, 7 Sept. 1959 (GHL), 1♂, 13-16 Sept. 1970 (JAM), 2♀. *Scotland:* ANGUS: Glen Doll, 27 July 1971 (JAM), 1♀, 6 June 1982 (JAS), 1♀. BANFF: Crovie, 24 July 1975 (JAS), 1♀. INVERNESS: Cairngorm mountains, 1-3 Nov. 1980 (NPA), 2♂, 4♀; Newtonmore, 9 Sept. 1979 (JAS), 2♀.

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Nomenclatural Note

The following Opinion has been published by the International Commission on Zoological Nomenclature in *Bull.zool.Nom.* **43** (2): 144, on 9 July 1986.

Opinion No. 1394 *Centrurus limpidus* Karsch, 1879 and *Centruroides ornatus* Pocock, 1902 (Arachnida, Scorpiones): conserved.

Editor