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Erigone promiscua (O. P.-Cambridge, 1872), its distribution and habitat in Europe with comparative notes on *E. longipalpis* (Sundevall, 1830) and *E. arctica* (White, 1852) (Araneae, Linyphiidae)

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Résumé

Une comparaison de la répartition et des habitats est faite entre *Erigone arctica, E. longipalpis* et *E. promiscua* en Europe. Bien que les trois espèces se trouvent dans des biotopes salins sur les littoraux, *E. arctica* est rare à l'intérieur sauf dans les montagnes de Scandinavie, *E. longipes* est normalement moins commune sur les littoraux mais se trouve plus fréquemment à l'intérieur, et *E. promiscua* préfère les biotopes terrestres plutôt que le littoral. Deux, *E. arctica* et *E. longipalpis* sont bien répandues en Europe, mais *E. promiscua* ne se trouve que dans l'extrême ouest. La grande diversité d'habitat notée pour *E. promiscua* est discutée.

Summary

The distribution and habitats in Europe of *Erigone arctica, E. longipalpis* and *E. promiscua* are compared. All three occur in saline biotopes on coasts but *E. arctica* is rare elsewhere except in the mountains of Scandinavia, whereas *E. longipalpis* is generally less abundant on coastlines but more frequent on inland sites. *E. promiscua* is most frequently associated with inland habitats. Both *E. arctica* and *E. longipalpis* are widespread in Europe but *E. promiscua* is confined to the extreme west. The wide variety of inland habitats recorded for this species is discussed.

Introduction

The genus *Erigone* includes several commmon species which are, in some cases, difficult to assign to particular habitats because they are so widespread (for example, *E. atra* and *E. dentipalpis*). *E. promiscua*, though less frequent, is widespread in Britain and has the puzzling characteristic of being equally "at home" in the saline environments of some coastal habitats and also in a wide range of inland situations. To a much less extent the same applies to *E. arctica* and *E. longipalpis*.

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	Total localities	Number coastal	Number inland
E. promiscua	297	124 (41.7%)	173 (58.2%)
E. longipalpis	183	125 (68%)	58 (31.6%)
E. arctica	207	183 (88.4%)	24 (11.5%)

Table I. — Numbers of coastal and inland records for *E. promiscua, E. longipalpis* and *E. arctica* in Britain. Data from records submitted to the British national Spider Recording Scheme (HARVEY *et al.*, 2002).

Distribution maps

The Provisional Atlas of British Spiders (HARVEY *et al.* 2002) includes numerous localities where *E. promiscua, E. arctica* and *E. longipalpis* have been recorded. By counting the coastal locations and carefully distinguishing them from obvious inland locations, the following figures were obtained (table I). Table I clearly shows that *E. arctica* is mainly coastal in distribution, *E. promiscua* shows a preference for inland situations, while *E. longipalpis* is inbetween. Although this is the status of these three species in Britain, on the continent of Europe the distribution pattern for *E. promiscua* is quite different, although the differences in the other two species are less obvious. The presence (number of localities) or absence of *E. promiscua* in 17 countries in central and western Europe are shown in table II. The figures suggest that Britain has about 90% of the recorded *E. promiscua* localities in Europe. These data (table II) come from well-recorded countries apart from Spain, Portugal, and Ireland where the spider fauna is not yet adequately known. The Atlantic climate of Britain with cool damp summers and, in general, mild winters may favour *E. promiscua*, but if so this species may be much more local in Spain and Portugal, perhaps confined to mountain areas and the coast. In western Europe, *E. arctica* extends as far north as Greenland, Spitzbergen and Novaya Zemlya (KNÜLLE, 1955), *E. longipalpis* reaches Iceland, while *E. promiscua* is not known north of the Faeroes (BENGTSON & HAUGE, 1979) but has been recorded as far west as the Azores (DENIS, 1964).

The habitat preferences of the three *Erigone* species

Erigone arctica

Some years ago this species, in Britain, was scarcely known from inland localities (LOCKET & MILLIDGE, 1953) apart from sewage works filter beds (BRISTOWE, 1939) and was regarded as a salt-marsh, drift-line and tidal-estuary species. Since then, more intensive recording has shown *E. arctica* to occur in inland saltings (salt mine waste deposits), stony margins of lakes, abandoned gravel pits (usually by water), river valley meadows and sewage filter beds. In Scandinavia (Norway, Sweden and Finland), *E. arctica* is widespread as a coastal and mountain species. The inland habitats are stony mountain-sides, alpine meadows (HOLM, 1950) and birch forest (HAUGE, 1977). It occurs along the coast of the Baltic Sea where *E. promiscua* is absent, and on the Dutch, Belgian and French coasts. The status of this species on the coasts of the Iberian peninsula is not known. There are several inland records for north and western Germany but habitat details are not available (A. STAUDT, pers. com.). KNÜLLE (1955) described *E. arctica* in Germany as a coastal species occuring in drift lines and pebble beaches but scarce on dunes and saltmarshes. He found that it could remain submerged in sea water for 36 hours. In Belgium it has been found on bare ground and freshly distur-

Not recorded in	Number of localities in	
Netherlands	Belgium	3
Sweden	Norway	4
Finland	France	7
Denmark	Spain	6
Estonia	Portugal	2
Austria	Britain	297
Switzerland	Faroe Islands	7
Germany	Ireland	Several but no precise data available
Poland	Azores	1
Czech Republic	Morocco	1

Table II. — *E. promiscua* in Europe: number of localities recorded. In some cases the number quoted is approximate. For sources of information see "acknowledgements". Other sources are: France: ANON. (1990); Faroe Islands: BENGTSON & HAUGE (1979); Poland: PRÓSZYŃSKY & STAREGA (1971); Switzerland: MAURER & HÄNGGI (1990); Azores: DENIS (1964); Morocco: DENIS (1956); Czech Republic: BUCHAR & RŮŽIČKA (2002).

bed soil (L. BAERT, pers. com.). HÄNGGI *et al.* (1995) collected available records from many sources in central and western Europe and their graph of habitat preference shows *E. arctica* to be overwhelmingly coastal with a few inland records on terrestrial saltings and wet littoral areas.

Erigone longipalpis

This species is usually not as common in coastal saline habitats as *E. arctica* but it is almost more successful in adapting to inland environments. The inland habitats recorded include wet valley meadows, grazing marshes, wet heathland and bog, wetland caused by mining subsidence, disused railways, cattle hoofmarks in wet grassland, gravel pits, agricultural land (sown leys), dry heathland after burning and tidal stream and river valley where there is no saline influence (past Bulletins and Newsletters of the British Arachnological Society, Peter HARVEY pers. com., Peter MERRETT pers. com. and personal records). On the European continent HÄNGGI *et al.* (1995) show a habitat preference graph very similar to that of *E. arctica* except that there are more records for saline inland habitats and "moist littoral areas". The latter description is not precise but as it is grouped under "inland waters", it probably refers to the shores of shallow freshwater lakes. In Scandinavia *E. longipalpis* seems to be mainly coastal in distribution but HAUGE & THINGSTAD (1999) record this species from lake-side vegetation at 454 m and in low alpine *Dryas octopetala* heath below a dense growth of *Betula nana* and *Salix* spp. at 660 m altitude just above the timber line in northern Norway. Its status in Scandinavia probably needs further

	Habitat categories	Number recorded
1,2, 3, 4	Shingle, saltmarsh, sand dune and Machair	60
5	Heather heath-moorland	71
6	Other moorland	27
7	Gorse (*Ulex* spp.)	2
8	Open water	-
9	Wetland, acid	37
10	Wetland, other	17
11	Grassland, calcicolous	91
12	Grassland, other	62
13	Cultivated land and gardens	96
14	Buildings	1
15	Rock, scree, cliff, quarries	10
16	Caves, tunnels, wells	-
17	Scrubland	4
18	Deciduous woodland	14
19	Coniferous woodland	2
20	Mixed woodland	10
21	Young conifer plantations	-
22	Waste ground	10
23	Mountain (800-1140 m)	28
	Total	542

Table III. — The habitats recorded for *E. promiscua* in Britain using the classification system 1-23 (modified) of the British National Spider Recording Scheme (HARVEY *et al.*, 2002). See text for source of data.

investigation. There are a few inland records for France and more for Germany (A. STAUDT pers. com.) but few habitat details are available. In Brandeburg (north of Berlin) *E. longipalpis* is reported to be widespread and numerous in areas with halophilic plants and a weak saline influence but also on agricultural land and in fallow fields (Theo BLICK pers. com., quoting records by Andreas HERRMANN). KNÜLLE (1955) studied *Erigone* species on the north German coast and reports that *E. longipalpis* was particularly common on salt marshes and tidal estuaries extending into freshwater meadows. He did not find it on dunes but noted that it spun its web in cattle hoofprints in *Puccinellia* maritime grassland on the saltings. He found that, like *E. arctica*, it could tolerate long periods submerged. In Belgium *E. longipalpis* is widespread on the coast and has also been taken at 11 inland localities (BAERT, 1996) in grassland, agricultural land and coniferous forest. VAN WINGERDEN (1977) and MEIJER (1974) both recorded *E. longipalpis* on the Dutch North Sea coast (Schiermonnikoog) but it was not as common as *E. arctica*. It is not recorded for Switzerland, being generally absent from mountainous areas.

Erigone promiscua

The adaptation to terrestrial habitats is most advanced in this species, although it has an extreme western distribution in Europe (table I) unlike the two other *Erigone* species. Even in England it is scarce in the south-east (P. HARVEY pers. com.). Although well-established in coastal saline localities, it is usually not so abundant as *E. arctica* and *E. longipalpis*. However, there are exceptions. On the west coast saline sand dune meadows (Machair) of the Outer Hebrides, Scotland, in 1976 it was more abundant than either of the two related species (ANON., 1979).

Approximately 1100 records of *E. promiscua* were submitted to the national Spider Recording Scheme for the Provisional Atlas of British Spiders (HARVEY *et al.*, 2002). Habitat types were assigned to 542 of these records using the Recording Scheme's very generalised classification system. Table III lists the number of records for each of the 23 habitat categories, slightly modified. These figures are only a guide and should be interpreted with caution as the results may have been different if all 1100 records had habitat data. Nevertheless, the table shows that *E. promiscua* is a very versatile species, able to colonise a wide range of environments from mountain tops to coastlines and from woodlands to agricultural land and gardens. It occurs in both wet and dry habitats but with a marked preference for more open and unshaded situations, although there are 26 records for different types of woodland. It was absent from a survey of spiders by hand-collecting on 39 fenland sites in East Anglia in 1969-1972 (DUFFEY, 1972) and it was also absent from a later survey of 58 fenland sites in Norfolk and Suffolk using pitfalls and water traps (D. PROCTOR pers. com.). Neither KNÜLLE (1955) on German reclaimed polders nor MEIJER (1980) on the Dutch Lauwerzee polder recorded *E. promiscua* during the colonisation phase by terrestrial invertebrates. Some detailed records are as follows: on mica waste tips, Bodmin Moor, Cornwall (personal records); from cracks between stones of storage buildings on St Kilda, Outer Hebrides (D. MACKIE*); wet flush with mosses and low herbs, Pennine Hills, Upper Teesdale (D. HORSFIED*); on disturbed sandy ground with lichens and sparse vegetation, Foxhole Heath, Suffolk (personal records); on 22 heathland sites (wet and dry) from Hampshire to Cornwall and on 7 calcicolous grasslands (P. MERRETT pers. com.); Cairngorm mountains, Scotland 885-1000 m (D.

* Reported in past numbers of the Bulletin and Newsletters of the British Arachnological Society.

HORSFIELD*); Ben Hope Mountain, Scotland 1000 m (J. COOKE*); blanket bog, shingle beach, unimproved meadow in ancient woodland, limestone pavement in north Yorkshire, hay meadows, sphagnum bog and on bare peat and moss (all P. HARVEY pers. com.). On the island of Unst, Shetland, it was common on damp, peaty soil vegetated with *Juncus, Ranunculus, Trifolium, Taraxacum*, grasses and mosses and also in heavily grazed grassland on a hillside as well as in other inland localities (ASHMOLE, 1979). HÄNGGI *et al.* (1955) quote records from Belgium and Norway and record the following habitats: moist meadows, coastal dunes, saline grassland, dwarf shrub heath, rushes and alder & willow shrub mire. In France it is recorded from coastal heathland in Les Landes, from river valleys in the southwest (DENIS, 1962), from heathland in the Loire valley further north (M. CRUVEILLIER pers. com.) and from the Brittany and Normandy coasts (ANON., 1990). It is recorded in Portugal and several localities in Spain. In the latter it occurs both on the coast and in the mountains at 1980 m (R. BOSMANS pers. com.), where it was taken amongst stones around a mountain lake. In 1954 an Austrian expedition to the Sierra Nevada mountains in south-west Spain made a collection of spiders which were identified by J. DENIS (1957). *E. promiscua* was recorded on the Picacho de Valeta, Prado Llano at 2600 m and 2800 m in alpine grassland. DENIS (1957) also mentions a record of this species taken at between 3000 and 3600 m in the Atlas mountains of Morocco, Massif du Toubkal (in FAGE, 1938). On the Faeroe Islands BENGTSON & HAUGE (1979) collected *E. promiscua* from cattle-grazed grassland, in grass by a stream, grass heath with mosses, *Calluna* heath and amongst vegetation in a village. HUBLÉ (1976) found it in dune slacks on the Belgian coast, where it was said to be abundant, and it has been taken inland on the Kalmthout heathland (R. JOCQUÉ pers. com.). HAUGE *et al.* (1991) record it from several islands off the southwest coast of Norway in coastal heathlands of *Empetrum, Erica, Eriophorum, Juncus, Calluna* and mosses. It has not been found on the Norwegian mainland.

On heathland in the south of England MERRETT (1969) found that adult males and females occurred throughout the year, although the greatest male activity was in December, January and February.

Conclusion

E. arctica and *E. longipalpis* are predominently coastal in distribution. The former occurs sparingly inland, while the latter is more widespread and found in open, wetland and man-made habitats without saline influence. Both are widely distributed along northern and western European coastlines.

In contrast, *E. promiscua* has an extreme western distribution in Europe. Although occurring commonly in saline coastal habitats it is never as abundant as the other two species except in rare situations. In Britain nearly 60% of recorded localities are inland and include a wide range of environments, so it is not a typical pioneer species, though open, disturbed ground is well represented in table II. Its ability to live in almost any habitat in Britain is unusual and one might speculate that this is a stage in the evolution of adapting to a landscape greatly modified by man in a region with a mild Atlantic climate.

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