

***Nematoproctus praeseclus* Loew (Diptera, Dolichopodidae) new to Britain, found together with *N. distendens* (Meigen), and notes on their habitat preferences**

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Summary

Nematoproctus praeseclus Loew, 1857 and *N. distendens* (Meigen, 1824) were recorded together at a restored wetland site in West Sussex, the former being the first record for Britain. A key and figures are provided for separating both sexes. They were part of a species-rich assemblage of wetland dolichopodids that included several nationally scarce species. The ecology of *N. distendens* is summarised from British and published continental records, and it is tentatively suggested that it requires seasonally fluctuating water levels.

Introduction

Nematoproctus is a small genus of medium-sized flies with three west Palaearctic species (Pollet 2011). The genus falls within the subfamily Rhaphiinae and the species resemble *Rhaphium* but are distinguished by the arista being placed mid-dorsally rather than at or very close to the apex of the postpedicel. In Britain, *N. distendens* (Meigen, 1824) has been known since 1962 (Falk and Crossley 2005) and, although found from Hampshire to Yorkshire, it is sparsely distributed and rarely recorded (Fig. 1). This paper reports the addition of *N. praeseclus* Loew, 1857, to the British fauna, and the presence of a population of *N. distendens* at the same site.

The 2019 spring field meeting of the Dipterists Forum was held at in West Sussex. The main attraction was visiting England's first and largest re-wilding site, Knepp Castle Estate. For many decades this farm was intensive arable and dairy but, owing to falling profitability on the difficult heavy Wealden clay, and inspired by examples of the Oostvaardersplassen in the Netherlands and the ideas of Frans Vera (2000), the decision was made in 2002 to ring-fence the estate, remove all internal stock barriers and allow the site to develop to wood pasture, grazed by a variety of large herbivores. The result is about 1,400ha of extensively grazed and structurally diverse habitat (Tree 2018). While most of the site is moderately dry grassland, wood and scrub, there are many waterbodies scattered through the area, consisting of the River Adur and its many small sluggish tributary streams, ponds and a lake, many of these with swamp-like margins.

Spring of 2019 was particularly dry so sampling at Knepp concentrated on the water bodies. A second visit was made by the author in mid July, during a hot dry summer. In May, 34 species of dolichopodids were recorded, and in July at least 43 species, together giving a total of 59 species. Other recorders added another three species in May 2019, and a list of earlier records included another two (and two suspect) species. Thus the site supported at least 64 species, representing about 20% of the British dolichopodid fauna. From three water bodies, *Nematoproctus praeseclus* was recorded, and from several more in both May and July, *N. distendens* was also found.

Identification

Specimens were identified using Parent (1938). Males of *praeseclus* differ clearly from those of *distendens* in having almost entirely yellow legs, rather than largely black hind legs, and in having small genital cerci. When using the key to genera by d'Assis-Fonseca (1978), the small size of the genitalia of *praeseclus* caused the key to fail as he described the genital appendages as 'conspicuous', since the only then-known British species, *distendens*, has long cerci. Whereas

the discrepancy between the fly’s appearance and the text in d’ Assis-Fonseca’s key to males made it clear that the male *praesectus* was an additional species, his key to genera for females, and the brief account, would not alert the user (including myself!) to *praesectus*. The following key distinguishes both sexes of the two species we now have in Britain.

Key to males

- 1 Hind leg mainly black, yellow only on basal half of femur (Fig. 2); genital cerci long ribbon-shaped, conspicuous and projecting far beyond surstylus (Fig. 3f); mid femur with ventral hairs as long as shaft’s depth (Fig. 3b); front tarsus with ventral fringe as wide as shaft only at base of basitarsus, become shorter distally (Fig. 3d) *distendens*
- Hind leg mainly yellow, becoming black only at tip of tibia and on tarsi (Fig. 2); genital cerci triangular, inconspicuous and scarcely projecting beyond surstylus (Fig. 3e); mid femur with ventral hairs short, less than half shaft’s depth (Fig. 3a); front tarsus with ventral fringe as deep as shaft’s width on segments 1-3, becoming shorter distally (Fig. 3c) *praesectus*

Key to females

- 1 Front coxa black at base; hind tibia dark to black in at least apical half (Fig. 2); wing darker anteriorly; marginal setae of tergites 2 and 3 long, lateral setae half tergites’ length *distendens*
- Front coxa entirely yellow; hind tibia dark in apical quarter (Fig. 2); wing uniformly grey; marginal setae of tergites 2 and 3 short and inconspicuous, lateral setae one third tergites’ length *praesectus*

To separate females, Parent (1938) used the colour of the palps and the number of ventral setae on the mid tibia; neither work convincingly with the limited British material to hand, and these characters are not used in my key. In detail, the palps of *distendens* females may be pale at the extreme tip rather than being entirely dark, and *praesectus* has only a pale rim to the palp rather than being mainly yellow. The mid tibia of *distendens* may have only one long ventral seta and 2-3 rather short ones, rather than ‘3 setae’, and that of *praesectus* may have one long and an additional short one, rather than just ‘1 seta’. His colour characters, used in my key, appear to work satisfactorily. The unreliable character of the number and size of setae is also found in the key to Holarctic species by Stackelberg and Negrobov (1976). If this character is ignored, both sexes of both species can still be correctly identified using this key, where *distendens* is mistakenly referred to as *discedens*, and also using the updated version by Negrobov *et al.* (2018) that accommodates a new species from Japan. The genitalia are illustrated by Stackelberg and Negrobov (1976) and those of *distendens* by Buchman (1961).

The third west Palaearctic species, *N. longifilus* Loew, 1857, could occur in Britain. It is distinguished by its cerci being far longer than those of *distendens*, reaching forward to the third abdominal segment, and by its almost entirely yellow legs like those of *praesectus*. In females, both the antennal scape and palps are partly yellow; neither of the other two species have both these parts partly yellow together.

Data

All specimens were from Knepp Castle Estate, West Sussex (V.C. 13); the location names are mostly compartments used by the estate and most do not appear on Ordnance Survey maps.

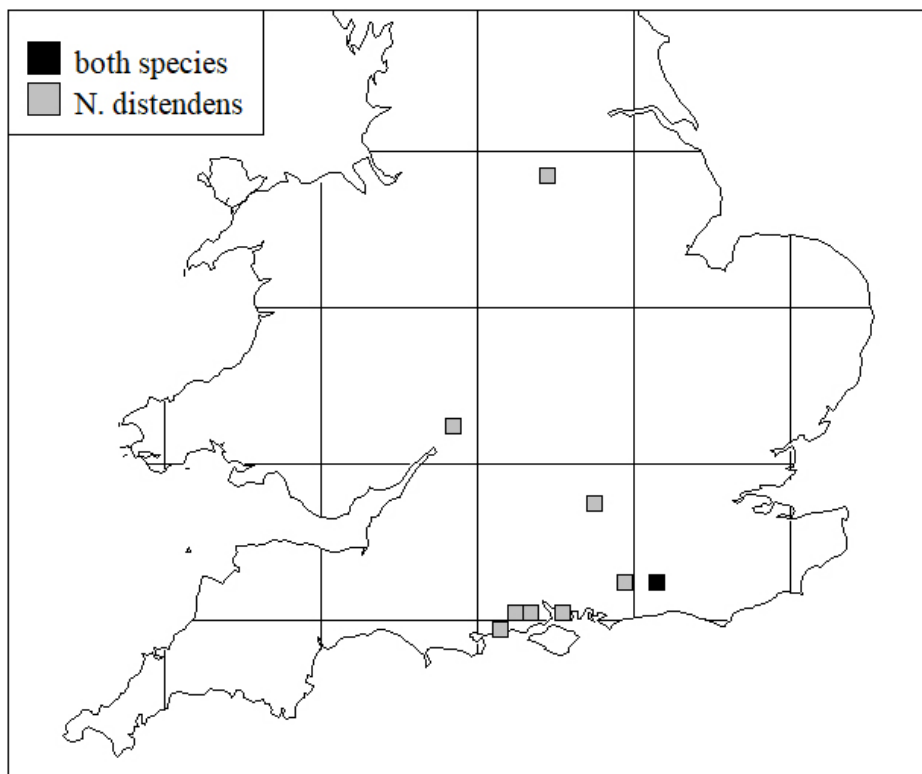


Fig. 1. Distribution of *Nematoproctus distendens* and *N. praesectus* in Britain. All records are from 1962 onwards.

Nematoproctus praesectus

Hammer Pond, TQ145207, 19.v.2019, 1♂ 1♀, leg. C.M. Drake. A large narrow pond with a wide drawdown zone lushly vegetated with mixed short vegetation and taller dominants including *Sparganium erectum*, *Phalaris arundinacea*, *Equisetum* sp, and *Schoenoplectus lacustris*, heavily grazed and trampled, leaving plenty of bare mud, and surrounded by recent growth of willow (*Salix cinerea*) scrub and large oaks (*Quercus robur*) from previous hedgerows.

Brookhouse 6, TQ136202, 20.v.2019, 1♀, leg. C.M. Drake. An old field pond about 20m in diameter, with a wide shelving vegetated shore dominated by *Juncus* species and with *Glyceria fluitans* in the shallow water, grazed and trampled. Flies were collected from this small unshaded section, the rest of the pond's shore being under secondary willow scrub.

Brookhouse Lagg, TQ136204, 20.v.2019, 1♀, leg. C.M. Drake. A narrow (c. 20m wide) swamp fringe to a slow-flowing stream, with structurally varied and floristically diverse vegetation dominated by *Typha latifolia*, *Phalaris arundinacea*, and *Sparganium erectum*, over grasses, *Persicaria hydropiper* and *Mentha aquatica* (among many other plants), well grazed and trampled.

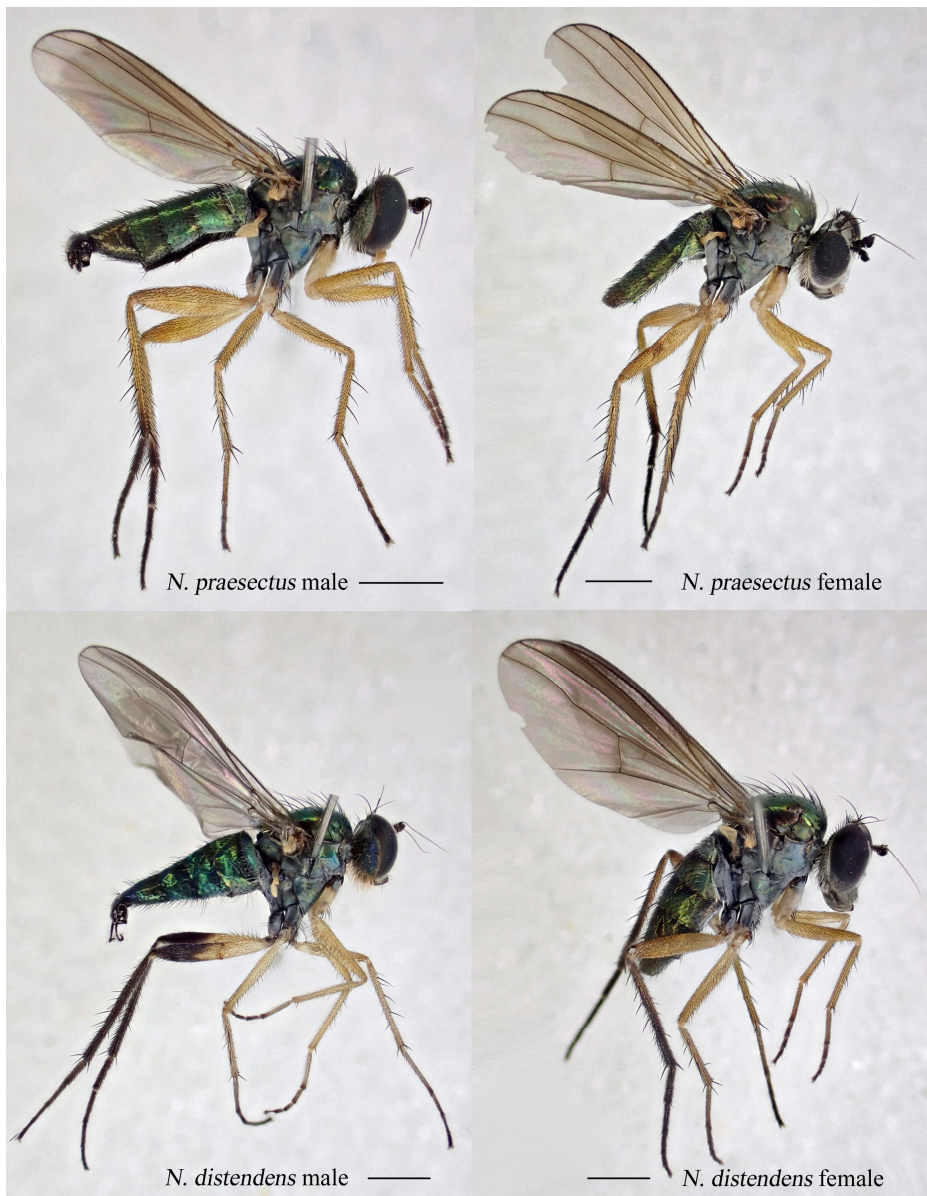


Fig. 2. *Nematoproctus praesectus* (above) and *N. distendens* (below) of each sex (males on left, females on right), from Knepp Castle Estate, May 2019. Scale line = 1mm. Photographs by Andrew J. Cunningham.

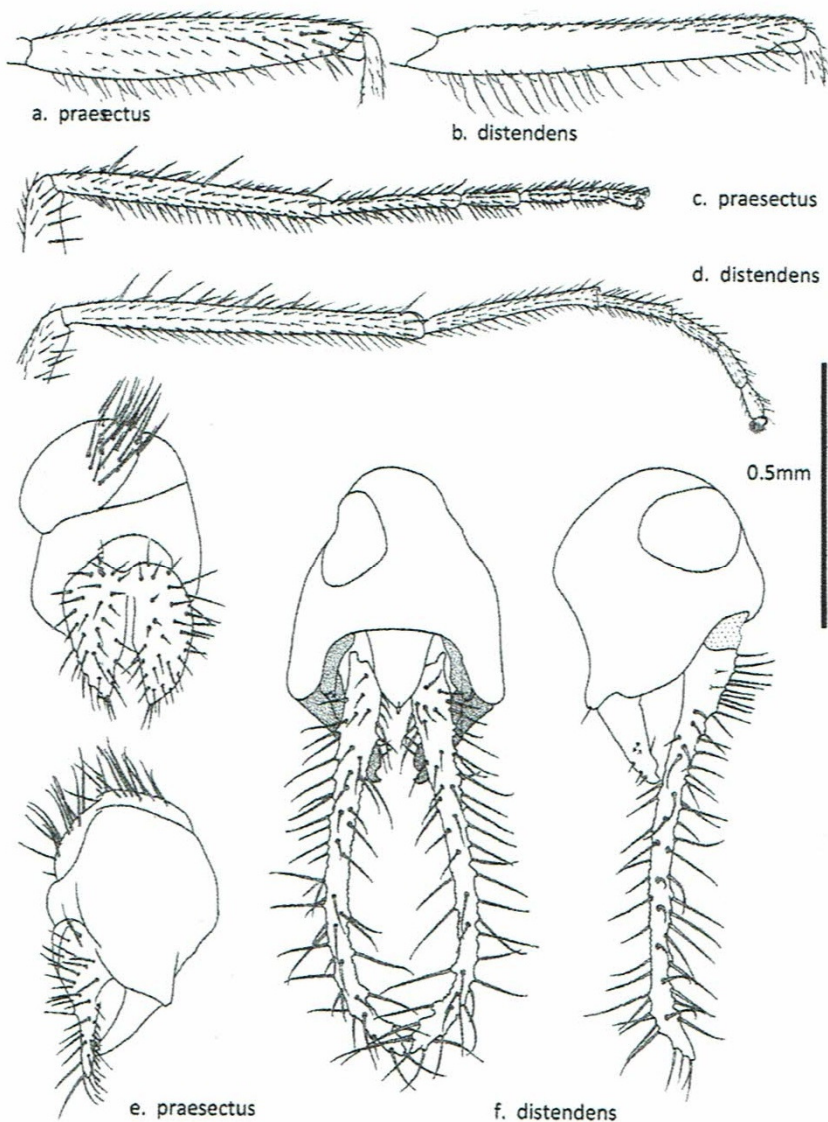


Fig. 3. *Nematoproctus distendens* and *N. praesectus* male legs and genitalia: a and b: mid femur, posterior face; c and d: front tibia and tarsus, posterior face; e and f: genitalia, dorsal (anatomically) and lateral. The lateral view for *praesectus* shows the right-hand side (as the left-hand side was slightly distorted) and tergite 7 with setae, whereas that for *distendens* shows the more conventional left-hand aspect without tergite 7. From dry-pinned specimens except *distendens* genitalia which were macerated.

Nematoproctus distendens

Hammer Pond, TQ143207, 19.v.2019, 2♀; 17.vii.2019, 2♀, leg. C.M. Drake. Similar to the Hammer Pond sample with *N. praeseclus* but with abundant *Phalaris arundinacea*, *Equisetum* sp., *Schoenoplectus lacustris* and *Mentha aquatica*.

Hammer Pond inflow stream, TQ140207, 17.vii.2019, 2♀, leg. C.M. Drake, small clay stream dominated by *Helosciadium* [formerly *Apium*] *nodiflorum* and *Sparganium erectum* in grassland, sampled at two points separated by about 200m.

Brookhouse Lagg, 18.v.2019, 1♂, leg. and det. R.J. Wolton; 20.v.2019, 3♂ 2♀; 17.vii.2019, 6♀, leg. C.M. Drake, site as described for *N. praeseclus*, and, where *distendens* was recorded, extending nearly 400m along the stream.

The Mill Pond, TQ159220, 18.v.2019, 1♂, leg. and det. R.J. Wolton, lake margin.

The Mill Pond, TQ161225, 18.v.2019, ♂♀, leg. and det. P.J. Chandler, woodland strip north of drained lake.

The Mill Pond, TQ158220, 18.v.2019, ♂♀, leg. and det. R.K.A. Morris, woodland next to drained lake.

The following 24 species were found in the same samples as either species of *Nematoproctus* in May: *Achalcus cinereus* (Haliday in Walker), *Argyra diaphana* (Fabricius), *Argyra leucocephala* (Meigen), *Campsicnemus curvipes* (Fallén), *C. scambus* (Fallén), *Dolichopus latilimbatus* Macquart, *D. plumipes* Scopoli, *D. simplex* Meigen, *Gymnopternus metallicus* (Stannius), *G. silvestris* Pollet, *Hercostomus nanus* (Macquart), *H. parvilamellatus* (Macquart), *Rhaphium appendiculatum* Zetterstedt, *R. caliginosum* Meigen, *R. commune* (Meigen), *R. crassipes* (Meigen), *R. fasciatum* Meigen, *Sympycnus pulicarius* (Fallén), *Syntormon denticulatus* (Zetterstedt), *S. macula* Parent, *S. pallipes* (Fabricius), *S. pumilus* (Meigen), *S. silvianus* Pârva, *Thrypticus tarsalis* Parent.

Additional species recorded at these sites in July were *Campsicnemus pusillus* (Meigen), *Chrysotus blepharosceles* Kowarz, *C. cilipes* Meigen, *C. gramineus* (Fallén), *C. palustris* Verrall, *Dolichopus campestris* Meigen, *D. festivus* Haliday, *D. trivialis* Haliday, *D. unguatus* (Linnaeus), *D. virgultorum* Haliday in Walker, *D. wahlbergi* Zetterstedt, *Gymnopternus aerosus* (Fallén), *G. cupreus* (Fallén), *Lamprochromus bifasciatus* (Macquart), *Microphor anomalus* (Meigen), *Poecilobothrus chrysozygos* (Wiedemann), *P. nobilitatus* (Linnaeus), *Rhaphium auctum* Loew, *Sciapus platypterus* (Fabricius), *Sybistroma obscurellum* (Fallén), *Syntormon aulicus* (Meigen), *S. bicolorellus* (Zetterstedt), *Teuchophorus nigricosta* (von Roser), *T. simplex* Mik, *T. spinigerellus* (Zetterstedt) and *Thrypticus nigricauda* Wood. Collected from tree-trunks, and not part of the wetland fauna, were *Medetera borealis* Thunberg (determination unsure), *M. muralis* Meigen and *M. truncorum* Meigen. More species of dolichopodids were collected elsewhere at Knepp Castle Estate.

Of these, *Campsicnemus pusillus*, *Dolichopus virgultorum*, *Rhaphium fasciatum*, *Syntormon macula*, *Thrypticus nigricauda* and *T. tarsalis* are Nationally Scarce, and all except *D. virgultorum* almost certainly develop in the same water-margin fringe where it is thought that *Nematoproctus* larvae live, although the two *Thrypticus* species are likely to have been mining in *Eleocharis palustris* which was present where they were collected.

Discussion

Finding both species of *Nematoproctus* in the same samples or in close proximity suggests that they share a similar ecology. This co-occurrence is not unique as Pollet *et al.* (1987, 1988, 1989) also recorded both together in Belgium on the occasion that *praeseclus* was first found in that country. *Nematoproctus distendens* is Nationally Rare (Drake 2018) and there is only limited habitat data for it in the national Empididae, Hybotidae and Dolichopodidae Recording Scheme

(Dipterists Forum 2019), some of which is enlarged upon in published accounts from other countries. The habitats include several woodland streams in the New Forest (Hampshire), a shaded muddy creek adjacent to the River Loddon in Berkshire for which a published photograph shows a shelving margin and tall alder woodland around it (Chandler 1994), winter-flooded swampy grassland surrounded by willows (Gloucestershire) (Drake unpublished) and unimproved neutral grassland and riverside marsh subject to periodic flooding (Yorkshire) (Falk and Crossley 2005). Although no habitat information was supplied with other records, some sites are floodplain washlands and wet woodlands next to rivers. For 12 sites with a grid reference accurate enough to locate the site, all are at a low altitude of between near-sea-level to less than 40m OD; Knepp Castle Estate lies on land at about 10m OD. Nearly all the sites lie on Quaternary deposits of sands, gravels, alluvium, terrace deposits or lacustrine clays on floodplains (British Geological Survey 1977), with the exception of Knepp Castle Estate on Cretaceous Weald Clay. The sites therefore appear to be characterised by being on geologically recent deposits associated with floodplains or at least low-lying flat ground. It is likely that water levels fluctuate more markedly in such places than in many other types of wetlands, either from winter-flooding by rivers or summer drawdown of ponds and marshes. This perhaps is a key requirement of *distendens*. On the very limited data for *praesepectus*, living in the same sites as *distendens* at Knepp, it is tentatively suggested that it has the same requirement.

This suggestion for the habitat of *distendens* and *praesepectus* in Britain is partially supported by limited information on mainland European sites, with those further north showing greatest similarity but those to the south being distinctly different. The species appears to be uncommon to rare in most studies. In southern Belgium, all three species of *Nematoproctus* were recorded by the River Ourthe, a moderately large meandering piedmont river with a floodplain at about 150m OD in low hilly country (Pollet *et al.* 1987). In this study *distendens* occurred in several Malaise trap and sweep-net samples at sites described as humid woodland, river bank, eutrophic ponds near the river, and the bed of a rivulet; *praesepectus* was found only on the riverbank itself where the vegetation was sparse or absent; *longifilus* was present at some of the *distendens* sites and also at a reed marsh. From this study the authors concluded that *praesepectus* was ‘rather stenotopic’, being confined to the river bank, and this appeared to be confirmed by a later study where it was water-trapped across most of the shoreline (Pollet *et al.* 1988), although more sweep-sampling at these sites on a different occasion revealed *praesepectus* at a reed marsh and in pasture (Pollet *et al.* 1989). Both species were found in the St Petersburg Region of Russia, where Stackelberg (1962) described *praesepectus* as very rare and recorded it on a lake shore, and *distendens* as rare and recorded it on sunlit leaves of bird cherry *Prunus padus* at the edge of a small grove at a water meadow by a river. *Nematoproctus praesepectus* was recently recorded for the first time in Finland where it was collected on four occasions using a Malaise trap at the swamp margin of a lake on a bird reserve (Haarto *et al.* 2019). In north-west France *distendens* was found at several points in alder carr (*Alnus*) and oak-birch (*Quercus-Salix*) woodland by a lake, which appears to represent a rather different habitat to those in Britain (Tayoub *et al.* 1990). In the Czech Republic, a single specimen was recorded from a wetland with pools on a former clay pit at about 400m (Gelbič and Olejníček 2011). Further south in Romania, a locality for *distendens* is given as the large city of Oradea on the floodplain of the river Crisul Repede at 130m OD, and another was at a town by a fast upland river at about 290m OD, but a third record was from a village in hilly or montane country at about 600m OD (Pârvu 1982, 2000). Thus it appears that in parts of mainland Europe *distendens* may have a different ecology to that found in Britain. *Nematoproctus praesepectus* may be restricted to more sparsely vegetated habitats, or at least in vegetation kept opened by grazing and trampling, although not necessarily next to rivers.

Nematoproctus distendens appears to have a typical midsummer flight period, although the records in May at Knepp Estate provided the earliest dates available in the national recording

scheme’s data (Fig. 4). So far, *praeseclus* is known only from May, and its non-appearance at Knepp Estate in July may just have been a consequence of the hot dry weather resulting in most species being present in low numbers. Records from continental Europe for *distendens* run from the beginning of June to the beginning of August, and those for *praeseclus* are from mid May to early July (all references as in paragraph above excluding Pärnu 1982). There are fewer records for *praeseclus* than *distendens* and too few to confirm whether *praeseclus* really does have a slightly earlier flight period than that of *distendens*.

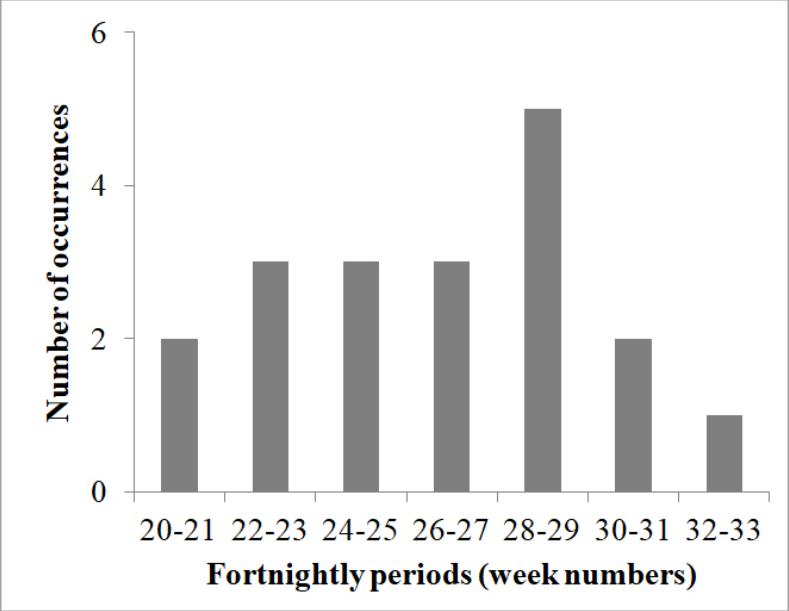


Fig. 4. Flight period of *Nematoproctus distendens* in fortnightly periods from mid May to early August, using data from the Empididae, Hybotidae and Dolichopodidae Recording Scheme.

Finding *Nematoproctus praeseclus* in Britain is not entirely unexpected as it occurs from north-west France to Ukraine, including Belgium, although it is clearly very rare in Flanders (Parent 1938, Pollet 2000, Pollet *et al.* 1987, 1988, 1989). The usual question will be asked whether this fly is a recent immigrant or a long-standing but undetected British resident. Being a recent immigrant seems unlikely in view of its scarcity in northern Europe. In favour of it being of a long-term but undetected resident is the nature of the site. I have often wondered how 19th century dipterists in mainland Europe found and described a huge number of species without the modern convenience of transport to reach seminatural habitats where uncommon species tend to be most easily found today. Perhaps the relaxed land management at Knepp more closely resembles that of pre-industrial farming where these dipterists collected, with no pesticides, limited drainage, structurally diverse vegetation, and no tidying-up after rampaging herbivores. This last item on the list may be important at wetland margins in helping to maintain open unshaded conditions with a complex micro-scale structure of tiny pools. Trampling of water margins by cattle has been shown to be beneficial to the associated insects (Dolman 1993, Drake 1995) and it is likely to be a valuable aspect of the relaxed management at Knepp encouraging

the recovery of species suppressed in productive lowland England by contemporary farming practices. A refuge may well have existed at Knepp in the 'laggs' (wet slightly swampy ground by the streams) that were difficult to cultivate (Tree 2018). The population of *praeseclusus* at Knepp is therefore thought to be ancient rather than the result of recent migration. Support for this opinion comes from its association with the species-rich assemblage of wetland dolichopodids that included several Nationally Scarce or uncommon species. These species have also probably benefited by release from constraints imposed by conventional intensive land-use, and it is unlikely that such a rich assemblage would be found nearby except perhaps at long-established wetland reserves.

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