

**IRISH
BIOGEOGRAPHICAL
SOCIETY**

BULLETIN NO.7 1983



Bulletin of the Irish Biogeographical Society

Number 7 (for 1983)

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ISSN 0032-1185

Abbreviation: Bull. Ir. biogeog. Soc.

Editor: J. P. O'Connor

DATE OF PUBLICATION: **16 MAR 1984**

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EDITORIAL

With this Bulletin, the Irish Biogeographical Society has continued its policy of publishing original data on the biogeography of the Irish Flora and Fauna. The contents demonstrate the wide interests covered by the Society. The seven bulletins published to-date provide concrete examples of the achievements of the Society in promoting work on Irish biogeography since the I.B.S. was founded. In particular, the check-lists have proved both extremely popular and useful. Much work remains yet to be done. For many groups, there are for example no reliable Irish check-lists. Even for recorded species, little is often known about their distribution, present status, ecology etc. Thus, there is ample and wide scope for both amateurs and professionals throughout the country to make serious contributions to this subject in the Bulletin. It is to be hoped therefore that many more people will join the Society and help with this research.

In addition to major papers, this issue also contains sections for field notes and conference reports. Much more of this type of contribution is needed if the Bulletin is to fully reflect the activities of the Society, so put pen to paper and send in articles. Thought provoking reviews and articles on general aspects of Irish biogeography and related topics would also be welcome. Manuscripts which authors wish to have considered for publication in Bulletin No. 8 should be submitted before 1 September, 1984.

Due to production and other difficulties in the past, it has not been always possible for the Society to publish the Bulletin in the relevant calendar year. The date of publication of Bulletin No. 7 is therefore stamped on the title page. This procedure was initiated when Bulletin No. 5 and Bulletin No. 6 were both stamped 10 August 1983 as their date of publication.

It is not always appreciated that for a publication like the Bulletin, the editor merely represents the tip of an ice-berg. Without the constant support and encouragement of the members of the Society including the Committee, no Bulletin would ever appear. I wish therefore to thank all for their interest and enthusiasm. A special word of thanks is owed to the contributors of articles, referees and those involved with the production of the Bulletin, especially Declan Doogue.

J. P. O'Connor,

Editor,

23 November, 1983.

IRISH CENTIPEDES

A. D. Barber

The first Irish chilopod records were those of Templeton (1836) although Leach (1815) had described Lithobius forficatus as "Habitat in Anglia, Hibernia rarior". In the 30 years or so between 1890 and 1920 a considerable number of Irish records were published by Pocock, Brolemann, Carpenter, Johnson, Selbie, Foster and Barde-Birks (see Bibliography) but there appears to be no subsequent data in the literature. There are, however, lists in the National Museum of Ireland, Dublin, mostly referring to published material but with a number of additions from the same period.

Collections have been made by M. J. Bishop, D. Doogue, C. Mothersill and A. J. Rundle in the last ten years but the total number of species/site records is only about 100. Fig. 1 shows the distribution of these records on a 10 km grid basis with traceable older records as open circles. It can be seen that total coverage is very incomplete and that large areas of Ireland in the North, North West and South have had no recent collections made and that there are areas for which no records of any age exist.

Twenty species are recorded (ignoring obvious temporary importations), about half of those known to occur in England. A vice county list is shown in Table 1. It is interesting to reflect on the fact that about 15 new British records have been recorded since the last Irish list was published and some of these animals have proved to be quite widespread.

One species, Lithobius agilis C. L. Koch, known from every country in N. W. Europe (Eason, 1982), has been recorded for Ireland but not for Great Britain. However Eason (1965) gives reason to think that the Irish specimens might have been L. tricuspis Meinert, a species recorded from various parts of Europe and now known to occur fairly frequently in an area of South Devon (Eason, 1965 & author's unpublished records). The two sites from which L. agilis was recorded were Coolmore, Co. Donegal and Acton Wood, Co. Armagh (Johnson, 1913); there have been no recent collections from these areas.

It would seem appropriate to briefly review the distribution of the other recorded species:

Haplophilus subterraneus (Shaw): a large, yellow species often recorded from gardens in England and likely to be widely dispersed in urban sites in Ireland. It occurs well away from gardens in S. W. England and is likely to do so in S. Ireland but the only recent record is from Dublin.

Hydroschendyla submarina (Grube): a rather uncommon littoral species found at Clare Island.

Schendyla nemorensis (C. L. Koch): there are scattered records of this rather small geophilomorph which is likely to prove widespread in soil. Schendyla peyerimhoffi Brol. & Ribaut is known from coastal sites in S. England and could possibly occur in Ireland; it is rather similar to the preceding. The small soil type, Brachyschendyla dentata Brol. & Ribaut has been recorded from soil in Southern England, the Netherlands and Denmark in recent years and may occur in Ireland.

Strigamia crassipes (C. L. Koch) (= Scolioplanes crassipes): all old records of this should be treated with caution owing to possible confusion with S. accuminata (Leach) but both species may prove to be widespread in Ireland. Only the latter species tends to be recorded from Northern sites in Britain.

Strigamia maritima (Leach): a common littoral centipede likely to be found all round the Irish coast.

Geophilus carpophagus Leach: a common animal of moorland and woodland over much of Britain but can occur in urban sites and in houses. The specimens from these sites tend to be larger and have more trunk segments (Eason, 1979).

Geophilus electricus (L.): scattered records are to be expected from all parts of Ireland; it is often associated with gardens.

Geophilus insculptus Attems: widespread in Britain and likely to be so in Ireland. Older records refer to G. proximus, a species not so far recorded in the British Isles.

Geophilus fucorum Brol.: Brolemann (1896) lists G. gracilis as occurring in Galway and Johnson (Clare Island Survey) quotes this but in neither case is a precise location given. Brolemann (1930) includes Great Britain under G. gavoyi (including G. gracilis); Eason (1964) indicates that G. gracilis refers to G. fucorum a species known from scattered littoral sites in Britain and the Isle of Man.

Necrophloeophagus longicornis (Leach) (= Geophilus longicornis): likely to be widespread in Ireland as in Great Britain.

Brachygeophilus truncorum (Bergsoë & Meinert): a common small animal of woodland also found on moorland and heath.

Cryptops hortensis Leach: likely to be synanthropic in the North; widespread in gardens. Two other species of Cryptops, C. anomalans Newport (synanthropic sites in S. E. England) and C. parisi Brol. (widespread in some parts of S. W. England) could both be found in S. Ireland; they tend to be rather larger animals (up to 40 mm).

Lithobius variegatus Leach: until recently this species was thought to be endemic to the British Isles although occurring in the Channel Islands but E. H. Eason and A. Serra (in litt.) have shown it to be conspecific with L. rubriceps Newport (= L. insignis) which occurs in Spain, Portugal, S. Italy, Sicily and N. Africa; A. N. Keay (in litt.) has recently obtained a specimen from Brittany.

Eason & Serra comment on the larger size of the L. rubriceps specimens and also note certain similarities between some specimens from Clew Bay, Co. Mayo to these Southern animals and of the desirability of obtaining more Irish material.

L. variegatus is almost completely absent from the Eastern counties of England and Scotland and Dr. Eason is of the view that the 38°F (3.33°C) winter isotherm seems to be the boundary; certainly it is ubiquitous away from houses in most of Western Britain but absent from both upland and lowland sites in the East.

Lithobius forficatus (L.): a very common large centipede, likely to be found throughout Ireland. It is especially abundant in areas of greatest human influence but also occurs in many "wild" sites.

Superficially similar to L. forficatus are L. pilicornis Newport and L. piceus L. Koch. The former is common in some parts of S. W. England and S. W. Wales and one might predict its possible occurrence in S. Ireland. L. piceus occurs in a limited area of S. England (Surrey, N. Sussex, E. Hants) where it is common in woodland. It is known from Austria, France, Germany and Switzerland (Eason, 1982) and may possibly occur in Ireland.

Lithobius melanops Newport: widespread in both Britain and Ireland. The somewhat similar L. macilentus L. Koch (= L. aulacopus Latzel) has now been found to be widespread but scattered in England and Wales and may well turn up in Ireland.

Lithobius borealis Meinert (= L.lapidicola Latzel) is common on Moorland and heathland in various parts of Britain whilst the next species seems to take its place in other parts. It would be useful to have Irish records to examine this pattern further.

In Northern Britain specimens of this species tend to have well developed projections on tergite 9, a characteristic which tends to make separation from L.melanops difficult in some cases. It would be interesting to know to what extent this characteristic occurs in Irish specimens.

Lithobius crassipes L.Koch: the only Irish records are from the North; it is noticeably absent from S. W. England. Superficially similar, L.curtipes C.L.Koch has been recorded from various parts of Britain but not, as yet, from Ireland. L.calcaratus C.L.Koch, a very dark and active small lithobiid is widespread in Britain but has not been recorded from Ireland; said to prefer drier habitats, it occurs on acid moorland and heath.

Lithobius microps Meinert (= L.duboscqui Brol.) is common in gardens and urban areas and widespread in Ireland; being a small animal it has probably been missed in the past.

Lamyctes fulvicornis Meinert: widespread but scattered records; it is said to prefer damper localities.

In addition to the above, a number of geophilomorphs have been found in Britain which might well turn up in Irish collections. Chaetechelyne vesuviana (Newport) is widespread in the Isle of Wight and S. W. Devon, Chaetechelyne montana oblogocribellata Verhoeff is known from a number of synanthropic sites in S. England, Clinopodes linearis (C.L.Koch) has been recorded several times, once very abundantly in a Surrey garden. Pachymerium ferrugineum (C.L.Koch) has only been found once, a coastal site in Sussex but is common in Scandinavia especially under moss and lichen covered rocks near the coast (G. Andersson, pers. comm.), Geophilus osquidatum Brol. is widespread in S. W. England and S. Wales, Chalandea pinguis (Brol.) is so far only known from a small area of N. Devon.

It can be seen that a number of unanswered questions relating to Irish Chilopoda exist. More extensive collecting is needed from all types of habitat in all areas both rural and urban. The latter case often offers, in certain respects, a richer fauna; Enghoff (1973) draws attention to the fact that the diplopod and chilopod fauna of Denmark reaches its peak of species diversity in heavily man influenced localities. It is possible that "new"

species may be found, not previously recorded from the British Isles.

The Centipede Recording Scheme operates on the same basis as that for millipedes and non-marine isopods using a record card that incorporates habitat as well as distributional data (see, e.g. Fairhurst et al., 1978). This is already giving us further insights into the ecology of these animals; a new "European" record card will be coming into use shortly, linked to the European Invertebrate Survey.

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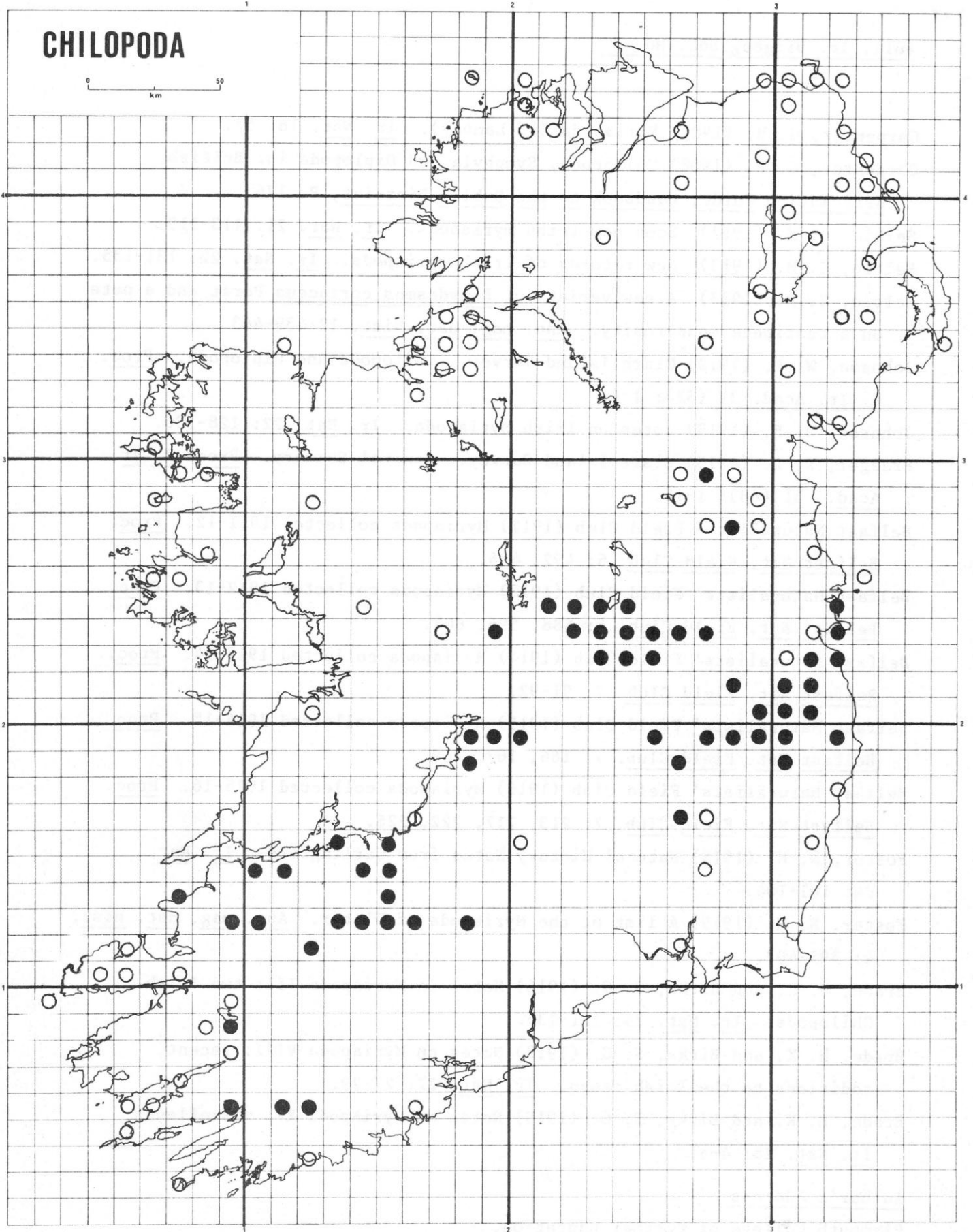
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● Recent Records (mainly post 1970).

FIG. 1: CURRENT COVERAGE

TABLE 1

IRISH CENTIPEDES - VICE COUNTY RECORDS

VICE COUNTY .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>H. subterraneus</i>	*			*				*			*									*
<i>H. submarina</i>																				
<i>S. nemorensis</i>									*									●		*
<i>S. crassipes</i>	*			*									□							*
<i>S. maritima</i>	*		*						*											
<i>G. carpophagus</i>			●														*			*
<i>G. electricus</i>																		●		
<i>G. insculptus</i>	□							●												⊛
<i>N. longicornis</i>	*		*					●			*	●	*		*			●		⊛
<i>B. truncorum</i>		●	●					●		●								●		*
<i>C. hortensis</i>	*	●	*																	
<i>L. variegatus</i>	*	⊛	⊛	●				●			*	*	*		*			●		⊛
<i>L. forficatus</i>	*	●	*		*	●	●	●		●			*	●				●	●	⊛
<i>L. melanops</i>	*	*	*					●	*				□		*			●	●	*
<i>L. borealis</i>		●	●																	*
<i>L. agilis</i>																				
<i>L. crassipes</i>																				
<i>L. microps</i>		●	*					●		●		●	*					●	●	
<i>L. fulvicornis</i>	*												*					●		

- * Literature records
- Lists in National Museum
- Recent field records
- ⊛ Literature and field record.

TABLE 1 (Contd.)

IRISH CENTIPEDES _ VICE COUNTY RECORDS

VICE COUNTY	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
<i>H.subterraneus</i>	★	★								★	★	★					★	★	★		
<i>H.submarina</i>							★														
<i>S.nemorensis</i>	★		★				★								★		★		★	★	
<i>S.crassipes</i>		★															★				
<i>S.maritima</i>	★						★			★					★	★		★			
<i>G.carpophagus</i>							★		□				★	★		★	★	★	★	★	
<i>G.electricus</i>							★		★											★	
<i>G.insculptus</i>	★							★	★	★		★							★	★	★
<i>N.longicornis</i>	★	●				□		★		★	★	★				★	★	★	★	★	
<i>B.truncorum</i>							□	★	★			★				★		★	★	★	
<i>C.hortensis</i>	★																		★	★	
<i>L.variegatus</i>	★		●				★		★			★	□		★	□	★	□	★	★	
<i>L.forficatus</i>	★	★	●				★	★	★	★		★	□		★	□	★	★	★	★	
<i>L.melanops</i>	★		●				★								★	★		★	★	★	
<i>L.borealis</i>								★	★	★				★	★		★	★	★	★	
<i>L.agilis</i>														★			★				
<i>L.crassipes</i>											★	★						★	★	★	
<i>L.microps</i>	●	●	●		★				□	★						★		★	★	★	
<i>L.fulvicornis</i>		★	●		★		★									★		★	★	★	

Note . *G.fucorum* not included as vice-county cannot be precisely identified
 (Galway).

AN UNUSUAL HABITAT FOR DRYAS OCTOPETALA L.

T. G. F. Curtis and H. N. McGough

Dryas octopetala L. is an arctic, circumpolar species of base-rich habitats occurring in upland and montane areas on rocky ledges and crevices. It descends to sea level in north and west Scotland and in western Ireland (Clapham et al., 1962; Elkington, 1971). In western Ireland, it occurs extensively on limestone pavement where it is found as a member of the dwarf shrub heath (Praeger, 1934) and of limestone grasslands (Ivimey-Cook and Proctor, 1966). In northern Scotland, it sometimes occurs as a maritime plant on rock ledges under the influence of windblown, calcareous shell sand (Gimingham, 1964). It is also a member of the machair and dune pasture communities in these areas.

Whilst engaged on a survey of the vegetation of Muckanagh lough, Co. Clare, we found extensive Dryas stands in an unusual association of species on the north-west shore of the lake (R 368938). A relevé was taken, using the Braun-Blanquet scale of cover abundance and the results are shown (Table 1). The vegetation zone was 5 metres wide and 20 metres in length and the relevé was taken 3 metres from the water's edge. The intervening ground consisted of a zone of calcareous shell sand, onto which Dryas overlapped to form a dense mat 0.5m in width.

The relevé shows many of the features of fen associations but it also shows aspects of other communities, notably grassland with Antennaria dioica, Euphrasia rostkoviana and Trifolium pratense and heath (Juniperus communis). Potentilla fruticosa, which is frequently found at the upper parts of areas liable to inundation, also occurred. Dryas itself occurred within the zone as a dense carpet between the Schoenus tussocks. The substrate consisted of flat, fen peat of 25cms in depth.

As the species normally occurs on free-draining sites (Elkington, op. cit.), its occurrence amongst a community of wetland affinities is unusual. The site is obviously inundated at the height of winter floods, as evidenced by the presence of P. fruticosa. The most likely explanation of its occurrence here may be the frequent deposition of shell sand, preventing acidification and assisting in improving the drainage. Thus conditions here are similar to those found on dune pastures and machair of Scotland where the accumulation of calcareous shell sands is a major factor in assisting the persistence of calcicole species requiring free drainage.

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TABLE 1: RELEVÉ FROM THE SHORE OF MUCKANAGH LOUGH, CO. CLARE.

Nomenclature follows Scannell and Synnott, 1972; mosses as in Smith, 1978.
Size: 2m x 2m; total cover: 100%; vegetation height: 30 cms average, some shrubs to 60 cms.

<u>Agrostis stolonifera</u>	1
<u>Antennaria dioica</u>	+
<u>Briza media</u>	1
<u>Calliergon cuspidatum</u>	+
<u>Carex flacca</u>	1
<u>Carlina vulgaris</u>	+
<u>Dryas octopetala</u>	3
<u>Euphrasia rostkoviana</u>	+
<u>Festuca rubra</u>	3
<u>Juniperus communis</u>	+
<u>Lotus corniculatus</u>	1
<u>Parnassia palustris</u>	+
<u>Plantago lanceolata</u>	+
<u>Potentilla erecta</u>	+
<u>Potentilla fruticosa</u>	1
<u>Prunella vulgaris</u>	+
<u>Salix repens</u>	1
<u>Schoenus nigricans</u>	2
<u>Succisa pratensis</u>	1
<u>Trifolium pratense</u>	+

SOME NEW RECORDS OF SPIDERS (ARANEAE) FROM IRELAND

R. Snazell

Between the 3 - 7 June, 1981, I attended an informal meeting of the Irish Biogeographical Society held in Dublin. Attending were members of the Society who were interested in improving the knowledge of the spider fauna of Ireland which has been much neglected in the past. Since the work of Pack-Beresford and Carpenter in the early years of the century, most records have come from small collections made by visiting zoologists, usually to the southern and western counties and to sites of international interest such as the Burren.

The purpose of this meeting was to further the study of spiders among Irish-based zoologists and to that end time was spent both in the laboratory, concentrating on basic taxonomy, and in the field, examining various sampling techniques. The laboratory work consisted of the identification of specimens taken during the field excursions and also of small collections made previously by members. Several excursions were made to sites of potential araneological interest. These were as follows:

North Bull Island, Co. Dublin. 0/24-37-. 3.VI.1981. Dunes and dune meadow.

Great Sugarloaf, (G.S.) Co. Wicklow 0/23-12-. 4.VI.1981. Scree and moorland.

Buckronev Marsh, (B.M.) Co. Wicklow T/29-79-. 4.VI.1981. Marsh on landward side of Mizen Head.

Pollardstown Fen, (P.F.) Co. Kildare N/78-17-. 5.VI.1981. Large area of drying fen.

Louise bridge, (L.B.) Co. Kildare N/99-36-. 5.VI.1981. Marshy area by canal side.

Howth, Co. Dublin 0/28-38-. 6.VI.1981. Heathland and cliffs.

All these sites were of considerable interest and would merit further examination.

As a result of the meeting the following species were recorded. The abbreviations given above are used in the list of new county records.

Species new to Ireland

Six species were recorded as new to Ireland. Two of these, Theridion melanurum Hahn and Pocadicnemis juncea Locket & Millidge, have no reliable

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Irish records as they have recently been involved in taxonomic changes (Locket & Millidge, 1957) (Millidge, 1975). Both these species will probably prove to be widespread in Ireland.

Theridiidae

Crustulina sticta (O.P.-Cambridge). 1♀ in wet dune meadow. North Bull Island, Co. Dublin. 0/24-37-. 3.VI.1981. Coll.

R. Snazell. Uncommon in Britain, having been recorded only from 8 counties, usually in wet marshy habitats.

Theridion impressum L.Koch. 3♀ Buckroney Marsh, Co. Wicklow. T/29-79-. 7.VIII.1980. Coll. D. G. Higgins. Widespread in

Britain but has probably been confused with T. sisyphium (Clerck) in the past.

T. melanurum Hahn. 1♀ T.C.D. Botanic Gardens, Co. Dublin. 0/16-30-. 2.V.1980. Coll. D. G. Higgins.

T. bellicosum Simon. 1♂ among scree, Gt. Sugarloaf, Co. Wicklow. 0/23-12-. 4.VI.1981. Coll. R. Snazell. A spider of rocky uplands but has been taken at sea level in Scotland.

Linyphiidae

Entelecara omissa O.P.-Cambridge. 1♂ 3♀ among long, marshy vegetation near a drainage ditch. Buckroney Marsh, Co. Wicklow. T/29-79-. 7.VI.1981. Coll. R. Snazell. A rare spider of marshy habitats, recorded from a few eastern counties in England.

Pocadicnemis juncea Locket & Millidge. 1♀ among long, marshy vegetation near a canal, Louise Bridge, Co. Kildare. N/99-36-. 5.VI.1981. Coll. R. Snazell.

New County Records

Oonopidae

Oonops pulcher Templeton. Co. Wicklow. (G.S.). 4.VI.1981. Amongst scree.

Gnaphosidae

Drassodes lapidosus (Walckenaer). Co. Clare. Doolin car park. 26.VI.1980. Under a stone. Co. Dublin. Irelands Eye 0/28-42-. 7.VI.1980. Under stones.

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- D. cupreus (Blackwall). Co. Clare. Black Head. M/16-12-. 17.VII.1980.
Under stones. Co. Dublin. Irelands Eye. O/28-42-. 7.VI.1980.
Under stones. Co. Mayo. Pontoon. G/21-04-. 16.VII.1980.

Clubionidae

- Clubiona phragmitis C.L.Kock, Co. Kildare. (P.F). 5.VI.1981. In silk cells
on Phragmites,
C. subtilis L.Kock, Co. Kildare. (P.F). 5.VI.1981. In grass tussocks.

Thomisidae

- Xysticus ulmi (Hahn). Co. Kildare. (P.F). 5.VI.1981. In grass tussocks.
Oxyptila brevipes (Hahn). Co. Kildare. (P.F). 5.VI.1981. In grass tussocks.

Salticidae

- Euophrys erratica (Walckenaer). Co. Wicklow. (G.S). 4.VI.1981. Amongst scree.

Lycosidae

- Pirata piraticus (Clerck). Co. Kildare. (L.B). 5.VI.1981. In wet marshy
vegetation.
P. piscatorius (Clerck). Co. Kildare. (P.F). 5.VI.1981. At the base of wet
grass tussocks.

Theridiidae

- Theridion instabile O.P. - Cambridge. Co. Kildare. (L.B). 5.VI.1981. Swept
from long vegetation by canal.

Tetragnathidae

- Tetragnatha montana Simon. Co. Kildare. (P.F). 5.VI.1981. On bushes and
Phragmites.
Meta merianae (Scopoli). Co. Kildare. (L.B).

Araneidae

- Araneus gibbosus (Walckenaer). Co. Kildare. (L.B). 5.VI.1981. On lower branches
of trees.

Linyphiidae

- Walckenaera unicornis O.P. - Cambridge. Co. Kildare. (P.F). 5.VI.1981. In
grass tussocks.
Entelecara erythropus (Westring). Co. Wicklow. (G.S). 4.VI.1981. Amongst scree.
Erigonidium graminicola (Sundevall). Co. Wicklow. (B.M). 7.VI.1981. On Gorse.

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- Minyriolus trifrons (O.P. - Cambridge). Co. Wicklow. (B.M). 7.VI.1981. In litter amongst long, marsh vegetation.
- Maso sundevalli (Westring). Co. Kildare. (P.F). 5.VI.1981. In litter amongst tussocks.
- Oedothorax gibbosus (Blackwall). Co. Kildare. (P.F). 5.VI.1981. In litter amongst tussocks.
- Oe. tuberosus (Blackwall). Co. Kildare. (P.F). 5.VI.1981. In litter amongst tussocks.
- Oe. retusus (Westring). Co. Wicklow. (B.M). 7.VI.1981. In litter amongst long vegetation.
- Troxochrus scabriculus (Westring). Co. Wicklow. Wicklow railway station. T/31-95-. Under a stone.
- Monocephalus fuscipes (Blackwall). Co. Wicklow. (G.S). 4.VI.1981. Under stones on burnt moorland.
- Lophomma punctatum (Blackwall). Co. Kildare. (P.F). 5.VI.1981. In grass tussocks.
- Ostearius melanopygius (O.P. - Cambridge). Co. Kildare. (P.F). 5.VI.1981. Swept from long vegetation.
- Agyneta conigera (O.P. - Cambridge). Co. Dublin. Howth. 0/28-38-. 6.VI.1981. Under stones on heathland.
- Centromerita concinna (Thorell). Co. Dublin. Howth. 0/28-38-. 6.VI.1981. Under stones on heathland.
- Bathyphantes approximatus (O.P. - Cambridge). Co. Kildare. (L.B). 5.VI.1981. In long vegetation beside the canal. Co. Wicklow. (B.M). July, 1980.
- B. gracilis (Blackwall). Co. Kildare. (L.B). 5.VI.1981. Swept from long grasses.
- B. nigrinus (Westring). Co. Kildare. (L.B). 5.VI.1981. Swept from long vegetation beside the canal.
- B. setiger F.O.P. - Cambridge. Co. Kildare. (L.B). 5.VI.1981. Swept from long vegetation beside the canal.
- Kaestneria pullata. (O.P. - Cambridge). Co. Kildare. (L.B.) 5.VI.1981. In long vegetation beside the canal. Co. Wicklow. (B.M). 7.VI.1981. In long, marsh vegetation by a drainage ditch.
- Lepthyphantes mengei Kulczynski. Co. Kildare. (P.F). 5.VI.1981. In litter amongst grass tussocks.
- L. ericaeus. (Blackwall). Co. Kildare. (P.F). 5.VI.1981. Swept from long grasses.

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Microlinyphia impigra (O.P.-Cambridge). Co. Kildare. (L.B). 5.VI.1981.

In long, wet vegetation on the canal bank.

Allomengea warburtoni (O.P.-Cambridge). Co. Wicklow. (B.M). July 1980.

All nomenclature as in Locket, Millidge & Merrett, British Spiders, Vol. III.

Acknowledgements

I would like to thank the Irish Biogeographical Society for making the trip possible and all those members involved in the meeting for their hospitality during my stay. Those who contributed records were: D. Doogue, D. Higgins, D. Lynch, R. McHugh and J. Sharkey.

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THE DISTRIBUTION OF PREDATORY AND ENDOPARASITIC NEMATOPHAGOUS FUNGI IN IRELAND

N. F. Gray

Introduction

Surveys on the occurrence of nematophagous fungi have been undertaken in many parts of the world, most notably in Canada (Estey and Olthof, 1965; Barron, 1978), Europe and Scandinavia (Duddington, 1951; Shepherd, 1956; Juniper, 1957), New Zealand (Fowler, 1970; Wood, 1973) and the United States of America (Mankau and Clark, 1959; Monoson, Conway and Nelson, 1975), showing the group to widely distributed. The most extensive studies have been carried out by Duddington (1951), Shepherd (1955) and Fowler (1970). Although the former study was non-quantitative and was restricted to only five habitat categories, it remains the only detailed source of information on the habitat of nematophagous fungi from temperate soils apart from occasional notes and observations. The latest review of the nematophagous fungi concentrates solely on the biology of the group (Barron, 1977) whereas an earlier review by Duddington and Wyborn (1972) concludes that apart from laboratory studies by Cooke (1962, 1963a, 1963b, 1964) the ecology of the group remains virtually unstudied. The major problem with carrying out field surveys of nematophagous fungi have been that the isolation and subsequent identification of the fungi is extremely time consuming and in order to obtain meaningful field data on habitat and distribution a large number of samples must be studied over many months.

The aim of the present investigation is to provide a data base, which hopefully will be contributed to by future workers, for the study of nematophagous fungi. This is of particular importance in the field of biological control where the possibility of using such fungi in the control of plant-parasitic and animal parasitic nematodes has been extensively studied (Pandey, 1973; Mankau, 1980; Tribe, 1980). However, the choice of the control fungus in these studies has rarely been based on its suitability for the habitat where its potential target nematode is found, but rather on its ease of isolation and subsequent culture in the laboratory.

The paper presents the results of two field surveys carried out during 1981 and 1982 to estimate the species diversity and the extent of the distribution of nematophagous fungi in Ireland.

Methods

Due to the length of time required for samples to be fully processed, two separate collections of soil samples had to be made. The first collection of 113 samples was made between the 4 March and 27 April, 1981 and a further collection of 48 samples between 16 July and 28 August, 1982. Collections were made from a variety of habitats from sites throughout Ireland. However selected sites were concentrated in two areas to give an indication of the diversity within a more restricted area. The areas chosen for more intensive study were Phoenix Park, Co. Dublin and Naas, Co. Kildare. Areas were chosen carefully and sites which were excessively damaged or under stress due to the effects of compaction, drying-out, fire damage, deep earth disturbance or constructional work were avoided. However within suitable areas samples were taken randomly. Full details on the sampling method, isolation and identification techniques have been previously discussed (Gray, 1983a).

Results and Discussion

Full details of the survey are presented in Table 1, with the date of collection, habitat description, location of sampling site, grid reference as well as the nematophagous fungi recovered from each sampling site listed. A total of 32 species were isolated (Table 2), 11 endoparasites and 20 predators. Endoparasites with thalli and producing motile zoospores were classified into the broad group Myzocyttium. This was due to the problem of identifying species of this group and low degree of variation between species, although Catenaria anguillulae Sorokin and Protascus sublififormis Dang were positively identified.

The survey is the first of its type in Ireland and represents the first examination of the group from Irish soils. Although all 31 species are new records to Ireland, they have all been previously recorded from temperate soil (Duddington, 1951; Cooke and Godfrey, 1964). No new species of nematophagous fungi were isolated. Morphologically the Irish isolates are extremely similar to those recorded in Britain and America, however some differences in conidial shape and size have been observed and a full taxonomic appraisal is given by Gray and Duff (1982) and Gray (1983b, 1983c, 1983d).

The survey of 161 samples of soil/plant material collected from sites throughout Ireland has shown that a rich diversity of nematophagous fungi

exist from a wide range of soil and vegetation types including moss cushions, leaf litter and dung. Samples were collected from 13 out of the 32 counties of Ireland and nematophagous fungi were found from all these areas. A total of 205 records were made with 70% of the sites examined containing nematophagous fungi. A greater frequency of occurrence of the fungi were recorded from Ireland in comparison with a similar survey of British soil (Duddington, 1951). In Britain moss cushions yielded the highest number of isolations, while in Ireland peatland and coniferous leaf litter had the greatest incidence of fungi (Table 3).

All types of trapping mechanism were represented except predators with non-constricting rings. Dactylella bembicodes which captures its prey by constricting traps was the commonest predator while Myzocyttium spp. and Acrostalagmus obovatus were the most frequently recorded endoparasites. All three methods of infection were observed, with endoparasites with adhesive conidia being the commonest form of infection isolated (Table 4).

The present investigation represents the largest single field survey of nematophagous fungi to be carried out in temperate soil to date, and provides a unique data base for the future study of the group which are widely distributed, and extremely important and successful components of terrestrial ecosystems.

However in mycological surveys, species are easily overlooked, and the present survey does not represent a comprehensive list of species in Irish soils. It is apparent from the work of Duddington (1951) and from the present survey that many species of nematophagous fungi have a very restricted or patchy distribution and that long intensive searching is necessary before all the species of a region can be isolated and identified. At present our knowledge of the west European flora is very incomplete with only a few surveys having been carried out. Indeed the large number of new species of endoparasites discovered by Barron in Ontario since 1969 have yet to be found in Europe, and suggest that many nematophagous fungi have yet to be isolated.

In view of the moist mild climate and unique geographical position of Ireland at the junction of north European, south European and north Atlantic regions, a rich diversity of nematophagous fungi should be present. Compared to surveys in other regions of the world (Gray et al., 1982; Fowler, 1970; Wood, 1973) this appears to be the case. However Ireland does not seem to be

any more diverse in its nematophagous mycoflora than other western European countries (Duddington, 1951; Shepherd, 1956). The biotic and abiotic factors affecting the distribution are discussed elsewhere (Gray, 1983e).

Summary

An extensive survey of nematophagous fungi isolates the group for the first time from Irish soil. One hundred and sixty one collections of soil and plant material from 13 counties, representing a wide and diverse range of terrestrial habitats, resulted in 205 records comprising 11 endoparasitic and 20 predatory species. The survey demonstrates that Ireland has a rich and diverse flora of nematophagous fungi but indicates that many new species have yet to be isolated.

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Table 1: Detailed analysis of sample sites and diversity of nematophagous fungi recorded

<u>Date</u>	<u>Habitat</u>	<u>Location</u>	<u>Grid Reference</u>	<u>Nematophagous fungi recorded</u>
4.3.81	Partly revegetated dung (Cattle)	Phoenix Park, Co. Dublin	01236	None
4.3.81	Partly revegetated dung (Cattle)	Phoenix Park, Co. Dublin	01236	None
4.3.81	Coniferous leaf litter	Phoenix Park, Co. Dublin	01236	<u>Acrostalagus obvatus</u> <u>Cephalosporium balanoides</u> Unidentified predator
4.3.81	Moss cushion on rotten wood	Phoenix Park, Co. Dublin	01236	<u>Spicaria coccospora</u> <u>Dactylella bemicodes</u> Unidentified net-forming predator
4.3.81	Old dung (Cattle)	Phoenix Park, Co. Dublin	01236	Unidentified predator with adhesive branches
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	<u>Dactylella cionopaga</u>
4.3.81	Old dung (Cattle)	Phoenix Park, Co. Dublin	01236	<u>Nematoctonus leiosporus</u>
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	None
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	<u>Arthrobotrys robusta</u> Unidentified endoparasite
4.3.81	Cultivated land	Phoenix Park, Co. Dublin	01236	<u>Dactylella bemicodes</u> Unidentified endoparasite
4.3.81	Old dung (Cattle)	Phoenix Park, Co. Dublin	01236	<u>Myzocyctium</u> sp. Unidentified predator with sticky knobs Unidentified endoparasite
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	Unidentified endoparasite
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	<u>Nematoctonus</u> sp.
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	Unidentified constricting-ring predator

Table 1. Continued

4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	<u>Dactylella cionopaga</u>
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	<u>Dactylella cionopaga</u> <u>Myzocytiium sp.</u>
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	<u>Meria coniospora</u>
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	<u>Dactylella bembicodes</u> <u>Harposporium lilliputanum</u>
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	Unidentified net-forming predator
4.3.81	Cultivated land	Phoenix Park, Co. Dublin	01236	<u>Dactylella bembicodes</u>
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	<u>Dactylella cionopaga</u> Unidentified endoparasite
4.3.81	Permanent grassland	Phoenix Park, Co. Dublin	01236	None
4.3.81	Moss cushion	Phoenix Park, Co. Dublin	01236	None
12.3.81	Permanent pasture	Monettia Bog, Co. Laois	N3515	<u>Dactylella cionopaga</u>
12.3.81	Temporary agricultural grassland	Monettia Bog, Co. Laois	N3515	<u>Dactylella mammillata</u> <u>Dactylella ellipsozona</u> Unidentified net-forming predator
12.3.81	Deciduous leaf litter (Oak/Ash)	Charleville, Co. Laois	N3421	<u>Nematoctonus leiosporus</u>
12.3.81	Deciduous leaf litter (Oak/Ash)	Charleville, Co. Laois	N3421	<u>Harposporium anguillulae</u> Unidentified net-forming predator
12.3.81	Deciduous leaf litter (Oak/Hazel)	Charleville, Co. Laois	N3421	<u>Dactylella lobata</u> <u>Cystopage lateralis</u>
12.3.81	Deciduous leaf litter (Oak)	Charleville, Co. Laois	N3421	None
12.3.81	Peatland	Clonaslee, Co. Laois	N3307	<u>Acrostalagmus obovatus</u> Unidentified endoparasite
12.3.81	Peatland	Clonaslee, Co. Laois	N3307	<u>Nematoctonus leiosporus</u> <u>Spicaria coccospora</u> Unidentified endoparasite

Table 1. Continued

12.3.81	Permanent pasture-fen	Clonaslee, Co. Laois	N3307	<u>Dactylella cionopaga</u> <u>Acrostalagmus obovatus</u> <u>Acrostalagmus goniodes</u>
12.3.81	Permanent pasture-fen	Clonaslee, Co. Laois	N3307	<u>Dactylella cionopaga</u>
17.3.81	Permanent pasture-very damp	Clara, Co. Wicklow	T1694	None
17.3.81	Bracken dominated pasture	Clara, Co. Wicklow	T1694	<u>Dactylella ellipospora</u> Unidentified endoparasite
17.3.81	Coniferous leaf litter	Clara, Co. Wicklow	T1694	<u>Verticillium sphaerosporum</u> Unidentified constricting ring predator Unidentified stalked adhesive knob predator Unidentified endoparasite
17.3.81	Coniferous leaf litter	Clara, Co. Wicklow	T1694	<u>Dactylella bembicodes</u> Unidentified stalked adhesive knobs predator Unidentified endoparasite
17.3.81	Coniferous leaf litter	Clara, Co. Wicklow	T1694	<u>Dactylella bembicodes</u> <u>Dactylella mammillata</u> Unidentified stalked adhesive knob predator Unidentified endoparasite
17.3.81	Deciduous leaf litter (Oak/Hazel)	Clara, Co. Wicklow	T1694	<u>Harposporium helicoides</u>
17.3.81	Deciduous leaf litter (Oak)	Clara, Co. Wicklow	T1694	<u>Dactylella mammillata</u> <u>Dactylella ellipospora</u> <u>Harposporium anguillulae</u>
17.3.81	Temporary agricultural grassland	Clara, Co. Wicklow	T1694	<u>Dactylella cionopaga</u>
25.3.81	Deciduous leaf litter	Glenealy, Co. Wicklow	T2491	<u>Spicaria coccospora</u> <u>Dactylella mammillata</u>

Table 1. Continued

25.3.81	Moss cushions	Glenealy, Co. Wicklow	T2491	Unidentified constricting-ring predator
25.3.81	Deciduous leaf litter	Glenealy, Co. Wicklow	T2491	<u>Dactylella bembicodes</u>
25.3.81	Deciduous leaf litter	Glenealy, Co. Wicklow	T2491	<u>Dactylella mammillata</u> Unidentified constricting-ring predator Unidentified endoparasite
25.3.81	Coniferous leaf litter	Glenealy, Co. Wicklow	T2491	<u>Dactylella mammillata</u> Unidentified endoparasite
25.3.81	Coniferous leaf litter	Glenealy, Co. Wicklow	T2491	<u>Dactylella mammillata</u>
25.3.81	Moss cushion	Woodenbridge, Co. Wicklow	T1674	Unidentified stalked adhesive knob predator Unidentified endoparasite
25.3.81	Two year old dung (Cattle)	Woodenbridge, Co. Wicklow	T1674	<u>Harposporium anguillulae</u> Unidentified constricting-ring predator
25.3.81	Two year old dung (Cattle)	Woodenbridge, Co. Wicklow	T1674	<u>Acrostalagmus obovatus</u> <u>Harposporium anguillulae</u> <u>Dactylella doedycoides</u>
25.3.81	Moss cushion	Woodenbridge, Co. Wicklow	T1674	<u>Dactylella bembicodes</u> <u>Verticillium sphaerosporum</u>
25.3.81	Agricultural grassland	Woodenbridge, Co. Wicklow	T1674	<u>Cystopage cladospora</u> Unidentified constricting-ring predator
25.3.81	Cultivated land	Coolgreany, Co. Wexford	T1969	<u>Nematoctonus</u> sp.
25.3.81	Partly revegetated dung	Coolgreany, Co. Wexford	T1969	None
25.3.81	Cultivated land	Coolgreany, Co. Wexford	T1696	None
25.3.81	Temporary agricultural grassland	Kilmanagh, Co. Wexford	T1242	<u>Dactylaria gracilis</u> Unidentified endoparasite

Table 1. Continued

25.3.81	Cultivated land	Kilmanagh, Co. Wexford	T1242	Unidentified net-forming predator
25.3.81	Permanent pasture-agricultural	Rathdrum, Co. Wicklow	T1893	None
25.3.81	Deciduous leaf litter	Rathdrum, Co. Wicklow	T1893	<u>Harposporium anguillulalae</u>
25.3.81	Moss cushion	Rathdrum, Co. Wicklow	T1893	<u>Dactylella bembicodes</u> <u>Dactylella mammillata</u>
25.3.81	Moss cushion	Rathdrum, Co. Wicklow	T1893	Unidentified predator with stalked adhesive knobs Unidentified endoparasite
25.3.81	Deciduous leaf litter	Rathdrum, Co. Wicklow	T1893	Unidentified constricting-ring predator
25.3.81	Moss cushion	Rathdrum, Co. Wicklow	T1893	<u>Acrostalagmus obovatus</u>
25.3.81	Moss cushion	Rathdrum, Co. Wicklow	T1893	None
25.3.81	Moss cushion	Rathdrum, Co. Wicklow	T1893	None
25.3.81	Coniferous leaf litter	Rathdrum, Co. Wicklow	T1893	<u>Dactylella ellipospora</u> Unidentified endoparasite
25.3.81	Coniferous leaf litter	Rathdrum, Co. Wicklow	T1893	<u>Acrostalagmus obovatus</u>
25.3.81	Coniferous leaf litter	Rathdrum, Co. Wicklow	T1893	<u>Dactylella bembicodes</u> <u>Dactylella mammillata</u> Unidentified endoparasite
25.3.81	Peatland	Straghmore, Co. Wicklow	02105	<u>Dactylella ellipospora</u> <u>Arthrobotrys anthonia</u> Unidentified endoparasite
26.3.81	Deciduous leaf litter	Crosshaven, Co. Cork	W7961	None
26.3.81	Coniferous leaf litter	Ballyfeard, Co. Cork	W7156	<u>Dactylella bembicodes</u>
26.3.81	Coastal vegetation	Ballinluska, Co. Cork	W7959	None
2.4.81	Temporary agricultural grassland	Naas, Co. Kildare	N9622	Unidentified predator with adhesive mycelium

Table 1. Continued

2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9622	None
2.4.81	Cultivated land	Naas, Co. Kildare	N9828	<u>Dactylella megalospora</u>
2.4.81	Cultivated land	Naas, Co. Kildare	N9325	None
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9623	None
2.4.81	Cultivated land	Naas, Co. Kildare	N9829	None
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9829	None
2.4.81	Cultivated land	Naas, Co. Kildare	N9629	Unidentified net-forming predator
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9728	<u>Stylopage leiohypha</u>
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9728	None
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9827	Unidentified predator with sticky knobs
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9426	None
2.4.81	Permanent pasture-agricultural	Naas, Co. Kildare	N9427	Unidentified predator with sticky knobs Unidentified predator with adhesive mycelium
2.4.81	Permanent pasture	Naas, Co. Kildare	N9329	None
2.4.81	Permanent pasture	Naas, Co. Kildare	N9525	None
2.4.81	Permanent pasture	Naas, Co. Kildare	N9522	None
2.4.81	Cultivated land	Naas, Co. Kildare	N9523	None
2.4.81	Recent dung (Horse)	Naas, Co. Kildare	N9523	None
10.4.81	Decomposing shavings	Botanic Gardens, Dublin	01731	None
10.4.81	Decomposing shavings	Botanic Gardens, Dublin	01731	None
14.4.81	Top of compost heap	Drogheda, Co. Louth	00574	Unidentified stalked adhesive knob predator

Table 1. Continued

15.4.81	Permanent grassland-parkland	Drogheda, Co. Louth	00574	Unidentified stalked adhesive knob predator
15.4.81	Deciduous leaf litter (Beech)	Drogheda, Co. Louth	00574	<u>Acrostalagmus obovatus</u> <u>Cephalosporium balanoides</u> <u>Dactylella mammillata</u> Unidentified constricting-ring predator
15.4.81	Permanent pasture-lawn	Drogheda, Co. Louth	00574	Unidentified constricting-ring predator Unidentified endoparasite
15.4.81	Moss cushion	Drogheda, Co. Louth	00574	<u>Dactylella bembicodes</u> <u>Acrostalagmus obovatus</u>
15.4.81	Garden compost	Drogheda, Co. Louth	00574	None
15.4.81	Permanent pasture-parkland	Drogheda, Co. Louth	00574	<u>Harposporium anguillulae</u>
15.4.81	Coniferous leaf litter	Drogheda, Co. Louth	00574	<u>Cephalosporium balanoides</u> <u>Dactylella bembicodes</u> <u>Harposporium lilliputanum</u>
27.4.81	Coastal heath	Dunmore East, Co. Waterford	S6901	Unidentified adhesive knob predator
27.4.81	Coastal heath	Dunmore East, Co. Waterford	S6901	<u>Verticillium sphaerosporum</u> <u>Dactylella mammillata</u> <u>Dactylella ellipsospora</u> <u>Harposporium lilliputanum</u>
27.4.81	Coastal heath	Dunmore East, Co. Waterford	S6901	Unidentified endoparasite
27.4.81	Coastal grassland	Dunmore East, Co. Waterford	S6901	Unidentified constricting-ring predator
27.4.81	Coastal heath	Dunmore East, Co. Waterford	S6901	<u>Dactylella bembicodes</u>
27.4.81	Coastal heath	Dunmore East, Co. Waterford	S6901	<u>Dactylella ellipsospora</u>
27.4.81	Permanent pasture	Rochestown, Co. Waterford	S6620	None

Table 1. Continued

27.4.81	Permanent pasture	Rochestown, Co. Waterford	S6620	None
27.4.81	Permanent pasture	Rochestown, Co. Waterford	S6620	None
27.4.81	Permanent pasture	Rochestown, Co. Waterford	S6620	None
27.4.81	Deciduous leaf litter	Rochestown, Co. Waterford	S6620	Unidentified endoparasite
27.4.81	Deciduous leaf litter	Rochestown, Co. Waterford	S6620	None
16.7.82	Immature wheatfield	Maynooth, Co. Kildare	N9436	<u>Myzocyttium sp.</u> <u>Acrostalagmus obovatus</u>
16.7.82	Old dung heap (Horse)	Clonsilla, Co. Dublin	00538	<u>Cephalosporium balanoides</u> <u>Harposporium anguillulae</u> <u>Nematoconus leiosporus</u> Unidentified net-forming predator
16.7.82	Old dung heap (Horse)	Clonsilla, Co. Dublin	00538	<u>Myzocyttium sp.</u>
16.7.82	Partly revegetated dung (Horse)	Clonsilla, Co. Dublin	00538	<u>Harposporium anguillulae</u>
16.7.82	Recent dung (Horse)	Clonsilla, Co. Dublin	00538	<u>Myzocyttium sp.</u> <u>Harposporium anguillulae</u>
16.7.82	Compost heap (garden refuse)	Clonsilla, Co. Dublin	00538	<u>Meria coniospora</u>
16.7.82	Compost heap (garden refuse)	Clonsilla, Co. Dublin	00538	<u>Myzocyttium sp.</u> <u>Meria coniospora</u>
16.7.82	Base of compost heap (garden refuse)	Clonsilla, Co. Dublin	00538	<u>Meria coniospora</u> <u>Dactylaria gracilis</u> <u>Dactylella acrochaeta</u>
16.7.82	Permanent pasture-paddock	Clonsilla, Co. Dublin	00538	<u>Myzocyttium sp.</u> <u>Arthrobotrys robusta</u>
16.7.82	Old dung heap (Horse)	Clonsilla, Co. Dublin	00538	None
16.7.82	Deciduous leaf litter (Oak/Beech)	Phoenix Park, Co. Dublin	01236	<u>Dactylaria gracilis</u>
16.7.82	Deciduous leaf litter (Oak/Beech)	Phoenix Park, Co. Dublin	01236	None
16.7.82	Permanent pasture-parkland	Phoenix Park, Co. Dublin	01236	None

Table 1. Continued

16.7.82	Permanent pasture-marsh	Phoenix Park, Co. Dublin	01236	<u>Arthrobotrys robusta</u>
16.7.82	Permanent pasture-parkland	Phoenix Park, Co. Dublin	01236	<u>Myzocyttium</u> sp.
27.7.82	Permanent pasture	Drumree, Co. Meath	N9553	<u>Arthrobotrys robusta</u>
27.7.82	Moss	Drumree, Co. Meath	N9553	None
27.7.82	Temporary agricultural grassland	Drumree, Co. Meath	N9553	<u>Myzocyttium</u> sp. <u>Nematoctonus</u> sp. <u>Trichothecium cystosporium</u>
27.7.82	Permanent pasture-riverbank	Leixlip, Co. Kildare	00337	None
27.7.82	Permanent pasture	Leixlip, Co. Kildare	00337	None
27.7.82	Permanent Pasture-riverbank	Liexlip, Co. Kildare	00337	None
27.7.82	Coniferous leaf litter (Laurel)	Clonsilla, Co. Dublin	00538	None
27.7.82	Permanent pasture-lawn	Clonsilla, Co. Dublin	00538	<u>Arthrobotrys robusta</u>
27.7.82	Permanent pasture	Clonsilla, Co. Dublin	00538	<u>Myzocyttium</u> sp.
27.7.82	Base of compost heap (garden refuse)	Clonsilla, Co. Dublin	00538	None
27.7.82	Compost heap (garden refuse)	Clonsilla, Co. Dublin	00538	<u>Meria coniospora</u>
28.7.82	Temporary agricultural pasture	Manners Town, Co. Donegal	C3719	<u>Meria coniospora</u>
28.7.82	Cultivated land-semi derelict	Manners Town, Co. Donegal	C3719	<u>Cystopage lateralis</u>
28.7.82	Permanent pasture	Manners Town, Co. Donegal	C3719	<u>Arthrobotrys robusta</u>
28.7.82	Heather moor	Manners Town, Co. Donegal	C3719	None
28.7.82	Permanent pasture-hayfield	Manners Town, Co. Donegal	C3719	None
28.7.82	Deciduous leaf litter	Ballybofey, Co. Donegal	H1494	<u>Dactylella ellipsospora</u> Unidentified endoparasite
28.7.82	Deciduous leaf litter	Ballybofey, Co. Donegal	H1494	<u>Dactylaria scaphoides</u>
28.7.82	Deciduous leaf litter	Ballybofey, Co. Donegal	H1494	None
28.7.82	Deciduous leaf litter	Ballybofey, Co. Donegal	H1494	<u>Dactylella ellipsospora</u>

Table 1. Continued

16.8.82	Coastal vegetation-peaty soil	Great Saltee Island, Co. Wexford	X9597	<u>Myzocyttium</u> sp. <u>Harposporium lilliputanum</u> <u>Arthrobotrys oligospora</u>
16.8.82	Coastal vegetation-rocky soil	Great Saltee Island, Co. Wexford	X9597	<u>Myzocyttium</u> sp. <u>Acrostalagmus obovatus</u> <u>Harposporium anguillulae</u> <u>Verticillium sphaerosporum</u> Unidentified stalked adhesive knob predator
16.8.82	Coastal vegetation-peaty soil	Great Saltee Island, Co. Wexford	X9698	<u>Acrostalagmus obovatus</u> <u>Verticillium sphaerosporum</u>
16.8.82	Coastal vegetation-peaty shore grassland	Great Saltee Island, Co. Wexford	X9698	<u>Myzocyttium</u> sp. <u>Acrostalagmus obovatus</u> <u>Cephalosporium balanoides</u>
16.8.82	Coastal vegetation-peaty shore grassland	Great Saltee Island, Co. Wexford	X9698	<u>Dactylella ellipospora</u>
18.8.82	Permanent grassland	Johnstown Castle, Co. Wexford	T0318	<u>Arthrobotrys musiformis</u>
18.8.82	Permanent grassland	Johnstown Castle, Co. Wexford	T0318	<u>Arthrobotrys musiformis</u> <u>Arthrobotrys oligospora</u> <u>Dactylaris haptotyla</u> <u>Trichothecium cystosporium</u>
18.8.82	Permanent grassland	Johnstown Castle, Co. Wexford	T0318	<u>Arthrobotrys musiformis</u>
18.8.82	Permanent grassland	Johnstown Castle, Co. Wexford	T0318	<u>Arthrobotrys musiformis</u>
22.8.82	Permanent pasture	Aglish, Co. Clare	R3292	None
22.8.82	Deciduous leaf litter (mixed)	Clifden Hill, Co. Clare	R2789	<u>Stylopage hadra</u> Unidentified net-forming predator
22.8.82	Deciduous leaf litter (Beech)	Dromore, Co. Clare	R3686	<u>Myzocyttium</u> sp. <u>Stylopage hadra</u>
22.8.82	Deciduous leaf litter (Oak)	Darragh, Co. Clare	R3069	None
22.8.82	Farmyard soil	Clifden Hill, Co. Clare	R2789	<u>Myzocyttium</u> sp. <u>Nematoctonus leisporus</u> <u>Athrobotrys robusta</u>

Table 2: Species of endoparasitic and predatory nematophagous fungi recovered, and the mode of infection or trapping mechanism employed

ENDOPARASITES	MODE OF INFECTION
<u>Myzocytyium</u> sp.	Encystment of motile zoospores
<u>Nematoctonus leiosporus</u> Drechsler	Adhesive spores
<u>Acrostalagmus goniodes</u> Drechsler	Adhesive spores
<u>Acrostalagmus obovatus</u> Drechsler	Adhesive spores
<u>Cephalosporium balanoides</u> Drechsler	Adhesive spores
<u>Harposporium anguillulae</u> Zopf	Spores ingested
<u>Harposporium helicoides</u> Drechsler	Spores ingested
<u>Harposporium lilliputanum</u> Dixon	Spores ingested
<u>Meria coniospora</u> Drechsler	Adhesive spores
<u>Spicaria coccospora</u> Drechsler	Adhesive spores
<u>Verticillium sphaerosporum</u> Goodey	Adhesive spores

PREDATORS	TRAPPING MECHANISM
<u>Arthrobotrys anchonia</u> Drechsler	Constricting ring
<u>Arthrobotrys musiformis</u> Drechsler	Adhesive nets
<u>Arthrobotrys oligospora</u> Fresenius	Adhesive nets
<u>Arthrobotrys robusta</u> Duddington	Adhesive nets
<u>Cystopage cladospora</u> Drechsler	Adhesive hyphae
<u>Cystopage lateralis</u> Drechsler	Adhesive hyphae
<u>Dactylaria gracilis</u> Duddington	Constricting rings
<u>Dactylaria haptotyla</u> Drechsler	Adhesive knobs
<u>Dactylaria scaphoides</u> Peach	Adhesive nets
<u>Dactylella acrochaeta</u> Drechsler	Constricting rings
<u>Dactylella bembicodes</u> Drechsler	Constricting rings
<u>Dactylella cionopaga</u> Drechsler	Adhesive branches
<u>Dactylella doedycoides</u> Drechsler	Constricting rings
<u>Dactylella ellipsospora</u> Grove	Adhesive knobs
<u>Dactylella lobata</u> Duddington	Adhesive branches
<u>Dactylella mammillata</u> Dixon	Adhesive knobs
<u>Dactylella megalospora</u> Drechsler	Adhesive nets
<u>Stylopage hadra</u> Drechsler	Adhesive hyphae
<u>Stylopage leiohypha</u> Drechsler	Adhesive hyphae
<u>Trichothecium cystosporium</u> Duddington	Adhesive nets

Table 3: Distribution of isolations of nematophagous fungi among different types of soil and plant material.

SOIL/VEGETATION TYPE	NO. OF SAMPLES	NO. OF ISOLATIONS	MEAN ISOLATIONS PER SAMPLE
Deciduous leaf litter	24	32	1.33
Coniferous leaf litter	12	24	2.00
Dung - old and partly revegetated	15	25	1.67
Grassland - permanent pasture	48	37	0.77
Grassland - temporary agricultural pasture	8	15	1.88
Cultivated land	12	10	0.83
Moss cushions	17	22	1.29
Decaying vegetation and compost	9	8	0.89
Peatland	4	9	2.25
Coastal vegetation	12	23	1.92

Table 4: Most frequently occurring predatory and endoparasitic nematophagous fungi and the percentage frequency of occurrence.

ENDOPARASITES	FREQUENCY (% SAMPLES)
<u>Myzocyium</u> spp.	9.3
<u>Acrostalagmus obovatus</u>	6.8
<u>Harposporium anguillulae</u>	6.2
<u>Meria coniospora</u>	3.7
<u>Neamtoctonus leoisporus</u>	3.1
<u>Cephalosporium balanoides</u>	
<u>Verticillium sphaerosporum</u>	
<u>Harposporium lilliputanum</u>	2.5

PREDATORS	FREQUENCY (% SAMPLES)
<u>Dactylella bembicodes</u>	8.7
<u>Dactylella mammillata</u>	6.8
<u>Dactylella ellipsospora</u>	6.2
<u>Dactylella cionopaga</u>	5.0
<u>Arthrobotrys robusta</u>	4.4
<u>Arthrobotrys musiformis</u>	2.5

NOTES ON INSECT PESTS RECEIVED FOR IDENTIFICATION BY THE NATIONAL MUSEUM
OF IRELAND: A SECOND REPORT

J. P. O'Connor

Since the compilation of the first report (O'Connor, 1983), dealing with the period April 1975 to May 1981, further specimens have been submitted to the National Museum for identification. This paper lists therefore these additional records for the period June 1981 to May 1983. The format is similar to that of the first report except that where possible grid references are given. The nomenclature mainly follows Seymour (1979). The relevant orders and authority names are listed in Appendix I. Taxa not listed in the first report are indicated with an asterisk.

American cockroach (Periplaneta americana)

Offaly (N 3425): numerous adults and nymphs were discovered in a container with cotton imported from West Africa. The cockroaches caused consternation amongst the workers of the relevant factory when the container was opened. The staff threatened to go on strike unless the infestation was eliminated.

Australian cockroach (P. australasiae)

Cork (W 67): in bananas in supermarket.

Donegal (C 1611): in bananas.

Dublin (O 13): nymph in bananas in market.

Louth (N 9590): nymph in box containing groceries in local shop.

Australian spider beetle (Ptinus tectus)

Dublin (O 13): adults were found in tubes of antiseptic ointment manufactured in Ireland. The empty tubes, before filling, had been stacked in a warehouse with open end upright and had acted as pit-fall traps; in warehouse; in roll of carpet, with Anobium punctatum purchased by convent; in rice of a curry in a Chinese restaurant.

Bacon beetle (Dermestes lardarius)

Dublin (O 13): adults and larvae in flat crawling about on mouldy carpet behind cooker, fungi growing on the carpet; adult and larva behind fridge in restaurant. Both records submitted in May.

Bed bug (Cimex lectularius)

Dublin (O 13): adults infesting students' flat and biting occupants; nymph bit woman while in her bed in flat.

Wexford (T 0521): infesting hotel and attacking visitors.

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Biscuit beetle (Stegobium paniceum)

Cork (W 67): in animal food of animal house of hospital.

Dublin (O 13): found in house on nectarine while making fruit salad.

Black ant, common (Lasius niger)

Wexford (S 7227): winged adults invaded house.

*Bluebottle (Calliphora vicina)

Sligo (G 6936): almost mature larva noticed crawling about in jar of beef paste when opened.

*Body louse (Pediculus humanus)

Dublin (O 13): in head hair of child.

Brown house moth (Hofmannophila pseudospretella)

Donegal: two larvae occurred in a disposable nappy.

Kerry: larvae attacking carpet in living room of dwelling house.

Wexford (T 0521): larvae in dwelling house.

Cat flea (Ctenocephalides felis)

Dublin (O 1534): large numbers infesting Government Department and biting civil servants; (O 13) in house for three years and biting occupants. In both these instances, populations of feral cats were reported in the vicinity.

*Cellar beetle, a (Blaps mucronata)

Dublin (O 13): adult in bathroom of house.

Clothes moth, common (Tineola bisselliella)

Dublin (O 13): infesting clothing store; eating red fox furs in warehouse.

Cluster fly (Pollenia rudis)

Wexford: in late October large numbers entered a dwelling house in a rural area. Dasyphora cyanella also present.

Cockchafers (Melolontha melolontha, M. hippocastani)

Numerous records of adults were received. M. melolontha was the commoner.

Two instances were reported by fire brigades.

Cockroach (Dictyoptera)

Dublin (O 13): remains in bread.

*Daddy-long-legs, a (Pedicia rivosa)

Donegal (C 1611): larva came out of water tap of domestic premises, c. 3 May.

*Devil's coach-horse beetle (Staphylinus olens)

Wexford (T 0521): adults occurred in bathroom of house, suspected of biting children.

*Elephant hawk-moth (Deilephila elpenor)

Kildare (N 7212): caterpillar feeding on woodbine outside factory and thought to be imported pest.

*European chicken flea (Ceratophyllus gallinae)

Donegal (H 3398): biting occupants of house, the infestation probably arose from a disused chimney containing birds' nests.

*Fever fly (Dilophus febrilis)

Wexford (T 0521): numerous adults reported on walls of house and surrounding garden walls during August.

*Fly-in-the-eye beetle (Anotylus tetracarlinatus)

Dublin (O 1533): adults in ground floor w.c. and another room of an office. The beetles appeared after an adjoining restaurant had been cleaned.

Fur beetle (Attagenus pelli)

Dublin (O 13): adult in office; (O 1533) two live adults in shipment of cotton goods from North America.

Furniture beetle, common (Anobium punctatum)

Dublin (O 13): adults infesting toilet; numerous adults in old-person's flat (breeding in wood under kitchen sink); with Ptinus tectus in roll of carpet purchased by convent.

*Garden tiger moth (Arctia caja)

Dublin (O 1938): adult discovered in office during December, believed to have been imported in hardwood/softwood timber.

German cockroach (Blattella germanica)

Sligo (G 6936): adults inhabiting kitchen unit.

Giant wood wasp (Urocerus gigas)

Numerous specimens submitted through curiosity. The following caused problems. Dublin (O 13): terrified people in house; adult found in wooden crate containing foil for tablets imported by pharmaceutical firm.

Globular spider beetle (Trigonogenius globulus)

Dublin (O 1633): adults inhabiting beds in public building. The rooms, which were seldom used, were being prepared for a visit by foreign dignitaries.

*Green cluster fly (Dasyphora cyanella)

Wexford: in dwelling house with Pollenia rudis (see above).

Hawthorn shieldbug (Acanthosoma haemorrhoidale)

Dublin (O 13): two separate cases of people being frightened by adults which had entered houses during January.

*Honey bee (Apis mellifera)

Dublin (O 13): specimen in canned mandarin oranges of Spanish origin.

*Longhorn beetle, a (Rhagium bifasciatum)

Wexford (S 9603): adult crept out of bunch of foreign grapes, January.

Mealworm beetle, yellow (Tenebrio molitor)

Dublin (O 2426): larva in commercial premises; (O 1832) adult obtained in flour in bakery.

Milkbottle scuttle fly (Spiniphora bergenstammi)

Kildare: pupa in milk bottle.

*Non biting midge, a (Microchironomus deribae)

Dublin: adults were a fuel contaminant in helicopter (Murray and O'Connor, 1982).

*Norwegian wasp (Dolichovespula norwegica)

Wexford (S 9739): a small nest probably referable to this species was found on the ceiling of a boiler house during September.

*Plaster beetle, a (Aridius nodifer)

Dublin (O 13): large numbers in new kitchen extension.

*Plaster beetle, a (Lathridius minutus)

Cork (W 4954): in mouldy grain with Oryzaeophilus surinamensis.

*Psocids (Psocoptera)

Only in one case specimens were identified to species.

Dublin: in library. The relevant species were Badonnelia titei,

Psyllipsocus ramburi and Lepinotus patrelis (O'Connor and Smithers, 1982);

infesting pharmaceutical products (industrial); in packages of flour (houses); infesting clothes in wardrobe of new house.

Sligo: in clothes and bedrooms of new house.

Waterford: in baking products being especially plentiful near flour and sugar (commercial).

Saw-toothed grain beetle (Oryzaephilus surinamensis)

Cork (W 4954): in mouldy grain with Lathridius minutus.

*Sciarid flies (Bradysia sp.)

Dublin (O 1633): evidently breeding amongst old mouldy leather goods.

Sewage fly (Leptocera caenosa)

Dublin (O 1530): dead flies occurred on window ledges in shop. They probably gained entry via the doors from the outside of the building.

Silverfish (Lepisma saccharina)

Dublin (O 13): in towel; specimen swimming in bowl containing canned peaches (frightened old lady) (houses).

*Stable fly (Stomoxys calcitrans)

Kildare (N 937266): bit human standing outside farm outhouse.

*Steel-blue wood wasp (Sirex cyaneus)

Dublin (O 1130): a female in premises of firm manufacturing signs.

Vine weevil (Otiorhynchus sulcatus)

Dublin (O 13): in potted plant; remains in kitchen; on plant (all adults and houses).

Wicklow (O 2618): twelve adults collected in house from double glazing covering pot plants, also on dining room ceiling, stairs and walls.

Wharf borer (Naccerdes melanura)

Dublin (O 1833): abundant in house near sea, in bedrooms and living rooms during June (adults). One-year old suite and new wall cabinet eaten. House circa 100 years old with rising and penetrating damp and unsatisfactory ventilation.

*Window gnat, common (Sylvicola fenestralis)

Dublin (O 1530): adults in house, probably originated from compost-heap in back garden, June.

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Woodboring weevil, a (Euophryum rufum)

Dublin (O 1534): live adult crawling on window ledge of public house.
The window frame was rotten.

*Woodboring weevil, a (E. confine)

Dublin (O 1732): large numbers of adults reported from premises, even crawling about on beds. Very damp conditions prevailed and the weevils were apparently inhabiting skirting boards; in bath of flat.

Waterford: (S 6012): adult first found embedded in bar of soap and subsequently live adult obtained in wash-hand basin of "digs".

Yellow underwing moth, large (Noctua pronuba)

Dublin (O 13): adult terrified people in car-park at night; adult thought to be pest species inhabiting office.

Acknowledgements

I am very grateful to all who brought the above specimens to my attention especially the staff of the various health boards. I also wish to thank B. O'Ríordáin and C. E. O'Riordan for their help and encouragement; L. O'Neill and D. Murphy for their assistance.

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APPENDIX I: Classification of cited species

THYSANURA

Lepisma saccharina (L.)

DICTYOPTERA

Blattella germanica (L.), Periplaneta americana (L.), P. australasiae (Fabricius).

PSOCOPTERA

Badonnelia titei Pearman, Lepinotus patrelis Pearman, Psyllipsocus ramburi Selys-Longchamps

PHTHIRAPTERA

Pediculus humanus L.

HEMIPTERA

Acanthosoma haemorrhoidale (L.), Cimex lectularius L.

LEPIDOPTERA

Arctia caja (L.), Deilephila elpenor (L.), Hofmannophila pseudospretella (Stainton), Noctua pronuba (L.), Tineola bisselliella (Hummel)

DIPTERA

Calliphora vicina Robineau-Desvoidy, Dasyphora cyanella (Meigen), Dilophus febrilis (L.), Leptocera caenosa Rondani, Microchironomus deribae (Freeman), Pedicia rivosa L., Pollenia rudis (Fabricius), Spiniphora bergenstammi (Mik), Stomoxys calcitrans (L.), Sylvicola fenestralis (Scopoli).

SIPHONAPTERA

Ceratophyllus gallinae (Schrank), Ctenocephalides felis (Bouche)

HYMENOPTERA

Apis mellifera L., Dolichovespula norwegica (Fabricius), Lasius niger (L.), Sirex cyaneus Fabricius, Urocera gigas (L.)

COLEOPTERA

Anobium punctatum (Degeer), Anotylus tetracarinatus (Block), Aridius nodifer (Westwood), Attagenus pelli (L.), Blaps mucronata Latreille, Dermestes lardarius L., Euophryum confine (Broun), E. rufum (Broun), Lathridius minutus (L.), Melolontha hippocastani Fabricius, M. melolontha (L.), Nacerrdes melanura (L.), Oryzaephilus surinamensis (L.), Otiorhynchus sulcatus (Fabricius), Ptinus tectus Boieldieu, Rhagium bifasciatum Fabricius, Staphylinus olens Muller, Stegobium paniceum (L.), Tenebrio molitor L., Trigonogenius globulus Solier.

THE FLORA OF THE MAGHAREE ISLANDS, CO. KERRY (H1)

J. A. N. Parnell, P. S. Wyse Jackson and J. R. Akeroyd

Abstract

The Flora of the Magharee Islands, Co. Kerry is presented for the first time and a description of the islands is given. The floristic results are analysed and comments offered on the distribution and ecology of certain species. The flora consists of eighty-eight taxa of vascular plants, a number of which represent new records for Co. Kerry (V.C. H1). The plant community *Atriplici-Betetum perennis* J.-M. et J. Géhu is reported for the first time from Ireland.

Introduction and Description

The Magharee Islands or Seven Hogs lie about 2 km off the north end of Castlegregory or Magharee Peninsula, Co. Kerry (V.C. H1, S. Kerry) - (Fig. 1). They have received little attention from botanists and were not described in detail by Scully (1916) in his Flora of Co. Kerry.

The Magharees are low-lying with very little land over 30 m above sea level. They are all relatively small and the largest two (Illauntannig and Illaunimmil) each cover about 18 acres. Geologically they are formed of folded Lower Carboniferous limestone. All have a covering of glacial boulder-clay except Inishtooskert and Gurrig Island. On the former there is one small patch of peaty soil in a hollow in the centre, whilst Gurrig is almost devoid of soil deposits.

Illauntannig and Illaunimmil were at one time inhabited; the former was deserted about 20 years ago, and the latter has not been occupied this century. Both hold traces of early Christian, monastic settlements. The farm at the east side of Illantannig is still maintained in a state of repair. Most of this island is under pasture, grazed by sheep and cattle, with fields divided by dry stone walls. Immediately south of the farm buildings are traces of former 'lazy beds' where vegetables were cultivated. On Illaunimmil there are no farm settlements, but it is grazed by sheep and the only population of rabbits on the islands.

The other islands are not used for agriculture but support large colonies of breeding sea birds. Their vegetation is considerably disturbed and

modified by the trampling and guano of the gulls.

On 6th June, 1982 we visited the islands with the Dublin Naturalists' Field Club. We recorded the flora of Illauntannig and its adjacent islands, Reenafardarrig and Illaunboe. Later, on 1st August, 1982, two of us (J.A.N.P. & P.S.W. J.) recorded the flora of three further islands, Illaunimmil, Inishtooskert and Gurrig Island. The only remaining island of the group, Mucklaghbeg, a small sea-washed islet with very little permanent vegetation, was not visited.

Vegetation

The dominant vegetation on Illauntannig is a moderately grazed pasture, dominated by Lolium perenne, Festuca rubra, Poa subcaerulea, Agrostis stolonifera, Ranunculus repens, Bellis perennis and Trifolium repens. Beside the walls taller species such as Cirsium vulgare and Rumex crispus are common. Much of the pasture is disturbed and in such places weed species are a major component of the flora. Along the shores there is some limestone grassland over rocks and on drift banks. At the landing place a low gently sloping bank of blown sand is dominated by Elymus farctus ssp. boreali-atlanticus and Honkenya peploides. On Illaunimmil the pasture and grazing is rougher with Holcus lanatus, Festuca rubra and Rumex crispus occasionally dominant. On the three most westerly islands (Innistooskert, Illaunimmil and Gurrig Island) there is a marked difference in the composition of the vegetation of their western and eastern coasts. For example, on Inishtooskert the western shore is dominated by an unusual community of Salicornia europaea and Beta vulgaris ssp. maritima, both growing in rock crevices with virtually no soil; however on the eastern shore a grassy sward of Festuca rubra and Armeria maritima predominates. This marked, west/east, patterning effect is due to the prevailing westerly wind carrying larger amounts of salt spray onto the western sides of the islands. On Illaunboe an interesting and unusual plant community occurs with Matricaria maritima contributing 60% of the vegetation cover and Beta vulgaris ssp. maritima 20%. This plant community seems to correspond with the Atriplici-Betetum perennis association of Géhu which has not previously been recorded from Ireland (White, 1982).

Annotated Species List

A total of 88 taxa were recorded on the six islands visited.

The islands are designated as follows:

Gurrig Island	-	G
Illaunboe	-	I
Illauntannig	-	Il
Illaunimmil	-	In
Inishtooskert	-	It
Reenafardarrig	-	R

Agrostis stolonifera L. (Il, In, R)

Anagallis arvensis L., var. arvensis. With scarlet corolla; growing in disturbed places in pasture (Il).

var. carnea Schrank. With flesh-coloured corolla; growing on blown sand by landing place. Widely distributed on the coasts of Ireland and SW England, often on dunes (Il).

Armeria maritima L. (G, I, Il, In, It, R)

Artemisia vulgaris L. (In)

Aster tripolium L. (In, It)

Atriplex patula L. (It)

A. cf. glabriuscula Edmondston (G, I, Il, In, It, R)

Bellis perennis L. (Il, R)

Beta vulgaris, ssp. maritima (L.) Arcangeli. Strandlines and in disturbed, guano-enriched plant communities associated with gull colonies (G, I, Il, In, It, R).

Brachypodium sylvaticum (Huds.) Beauv. Very rare, on wall of collapsed sea-cave (In).

Brassica rapa L. Only on wall of collapsed sea-cave (In).

Bromus hordeaceus L. (Il)

Capsella bursa-pastoris L. Disturbed soil by farm buildings (Il).

Cardaria draba (L.) Desv. One small colony, 100 m north of landing place on drift bank and amongst shingle at top of strand. A very local introduced

ruderal species in Ireland, occurring mainly on the east coast. The first record from V.C. H1: a specimen has been lodged in TCD (I1).

Centaureum erythraea Rafn. Scarce on west side of Illauntannig, in short coastal sward; very common on east side of Illaunimmil (I1, In).

Cerastium fontanum Baumg. (I1, In)

C. glomeratum Thuill. (I1, It, R)

Chamomilla suaveolens (Purch.) Rydb. (I1)

Cirsium arvense L. (I1, In)

C. vulgare L. (I1, In, R)

Cochlearia danica L. (I, I1, R)

C. officinalis L. (G, I1, In, It)

C. scotica Druce. A species of exposed coastal localities on the north and west coasts of Ireland and Scotland. As in most of its Irish localities plants of intermediate morphology were also found between this taxon and C. officinalis (I1).

C. officinalis x danica. Base of wall on west side of Illauntannig (I1). Both Cochlearia hybrids were intermediate in morphology between their parent species. All the Cochlearia plants seen on the islands had white flowers. C. danica often has mauve flowers but this colour sometimes fades as the season progresses. This is the first record for both hybrids from V.C. H1.

Coronopus didymus (L.) Sm. Disturbed ground, on wall of collapsed sea-cave (In).

Coronopus squamatus (Forsk.) Aschers. Robust plants growing in disturbed, manured ground, mainly around farm buildings. Recorded as present on Illauntannig in 1888 by Scully (1916)(I1).

Crithmum maritimum L. (I1, In, It, R) Rare on Illauntannig, though common on Illaunimmil.

Dactylis glomerata L. (I1)

Desmazeria marina (L.) Druce. (I1)

Elymus farctus (Viv.) Runemark ex Meldevis ssp. boreali-atlanticus (Simonet & Guinochet) Melderis. Blown sand by landing place (I1).

Euphorbia helioscopia L. A few plants, on blown sand by landing place (Il).

Festuca rubra L. (G, I, Il, In, It, R)

Galium aparine L. Rare, in crevices of walls on west side of Illauntannig (Il).

G. verum L. (Il, In)

Geranium dissectum L. (Il)

G. molle L. (Il, R)

Glaux maritima L. (In, It)

Heracleum sphondylium L. (Il, In)

Holcus lanatus L. (Il, In)

Honkenya peploides (L.) Ehrh. On blown sand by landing place (Il).

Hyoscyamus niger L. Recorded in 1888 by Scully (1916) as abundant on the east shore of Illauntannig, but not present now.

Juncus bufonius L. (sensu lato) In damp disturbed ground on west side of Illauntannig (Il).

Lavatera arborea L. Very common on Illaunimmil. A common species around the nearby harbour at Scraggan Bay (Fig. 1). It is probably native on some islands off the Kerry coast such as the Skelligs (Scully, 1916) and may be so here (G, Il, In, It).

Lolium perenne L. (Il)

Lotus corniculatus L. (Il, In, It, R)

Lycopersicon esculentum Miller. (G)

Matricaria maritima L. Only on the west strand of Illauntannig, but common in gull nesting sites on other islands (G, I, Il, In, It, R).

Papaver lecoquii Lamotte. Amongst monastic ruins. Scully (1916) recorded P. dubium as occurring 'sparingly on Illauntannig' (1888-1907). This record may refer to P. lecoquii as it is only afforded varietal rank in his work (Il).

Plantago coronopus L. (Il, In, R)

P. lanceolata L. (Il)

P. major L. (Il)

Poa annua L. (G, Il)

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P. pratensis L. (G, Il, In, It)

P. subcaerulea Sm. (Il, In)

P. trivialis L. (Il)

Polygonum aviculare L. (sensu stricto) Disturbed ground. Most plants were very robust, procumbent to erect with large (to 5 x 2 cm), elliptic, obtuse leaves (Il, In, G).

Polypodium vulgare L. (sensu lato) The only pteridophyte recorded; it occurred only in very inaccessible rock crevices at two sites on Illaunimmil (In).

Potentilla anserina L. (Il)

Ranunculus repens L. Abundant in pastures (Il), R. bulbosus L., a common species on calcareous grassland on the adjacent mainland, was not observed on the islands.

Rhinanthus minor L. ssp. minor (Il, R)

Rubus fruticosus agg. (Il, In)

Rumex acetosa L. Forms a dominant part of the vegetation of Illaunimmil (Il, It, R).

R. crispus L. On strands, in pastures and amongst buildings (G, Il, In, It, R).

R. obtusifolius L. Common in monastery ruins, but not seen elsewhere (Il).

Sagina maritima Don. Rocky ground and banks by strands (Il, In, R).

S. procumbens L. (Il)

Salicornia europaea L. On rocks on west side Innistooskert (It).

Sambucus nigra L. A few dwarf individuals growing on retaining wall of monastic ruins (Il) and on edge of collapsed sea-cave (In). No other shrubs or trees were observed on the islands we visited (Il, In).

Senecio jacobaea L. (Il, In, R)

S. vulgaris L. (Il)

Silene vulgaris L. (Moench) Garck. ssp. maritima Love. Rocky shores and in gull nesting sites. Considerable variation was noted in scape length, calyx colour (pink to green) and corolla size (G, I, Il, In, It, R).

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Silybum marianum (L.) Gaertn. Two plants observed amongst monastic ruins. An introduced ruderal, this species is rare and scattered in Ireland, tending to occur on the coast, often amongst ancient ruins. Previously reported (Scully, 1916) from Illauntannig, from Kilshannig on the adjacent peninsula and from various sites in the north part of Tralee Bay: more recently, from Banna (V.C. H2) (McCallum Webster, 1953), and Dingle Town ('garden', 29.10.1969; M. Long DBN) (Il).

Solanum dulcamara L. Amongst farm buildings only.

Var. marinum Bab. was recorded by Scully (1916) on Illauntannig in 1889 and 1905 but we found no trace of it; it is a prostrate plant with fleshier leaves than the type and generally occurs on shingle beaches (Il).

Sonchus arvensis L. (Il)

S. asper (L.) Hill. (Il, It)

S. oleraceus L. (G, Il, In, It)

Spergularia marina (L.) Griseb, (G)

Spergularia rupicola Lebel. (G, I, Ir, In, It, R)

Stellaria media (L.) Vill. Disturbed ground on Illauntannig and in bird nesting sites on Reenafardarrig (G, Il, In).

Suaeda maritima (L.) Dum. (In)

Taraxacum officinale agg. (Il)

Thymus praecox (Il)

Trifolium pratense L. (Il)

T. repens L. (Il, In, R)

Tussilago farfara L. (Il)

Urtica dioica L. Two colonies, one by farm buildings, the other by wall at north end of Illauntannig (Il, In).

U. urens L. Disturbed ground amongst farm buildings (Il).

Discussion

Though the flora of these islands seem small, it is in fact relatively large when compared, on the basis of area, with published lists for other Irish islands (Barrington, 1884). Thus the Magharees have approximately 35 times the number of species/acre of the nearby Blasket Islands and approximately 100 times the numbers of species/acre of the Aran Islands. The relative richness of the flora is largely due to the underlying limestone rocks combined with the survival of some plants probably introduced by man, e.g. Urtica dioica. However there are a number of plants absent from the flora which one might reasonably expect to record.

Firstly, Pteridium aquilinum did not occur. This widespread plant is common in some west coast islands, e.g. Inishmurray, Co. Sligo, which are no longer under intensive agriculture. Its absence is probably due to the generally basic nature of the soil and the high degree of exposure on the Magharees, P. aquilinum being generally rare on limestone and intolerant of exposure (Clapham et al, 1962).

Secondly, there is a marked absence of certain genera of Compositae (i.e. Crepis, Hieracium, Hypochaeris and Leontodon) despite there being habitats on the islands for representatives of many of these genera to become established. No single convincing explanation of their absence is evident, though the isolation and small size of the islands combined with prevailing winds towards the mainland must restrict their colonisation potential.

Acknowledgements

The authors wish to thank the members of the Dublin Naturalists' Field Club who accompanied them on their first visit and Messrs. Michael and John Kennedy who very kindly transported them to and from the islands in their boats. They would also like to thank Professor D. A. Webb for his useful comments on the manuscript and Dr. I. K. Ferguson who identified the Salicornia specimens.

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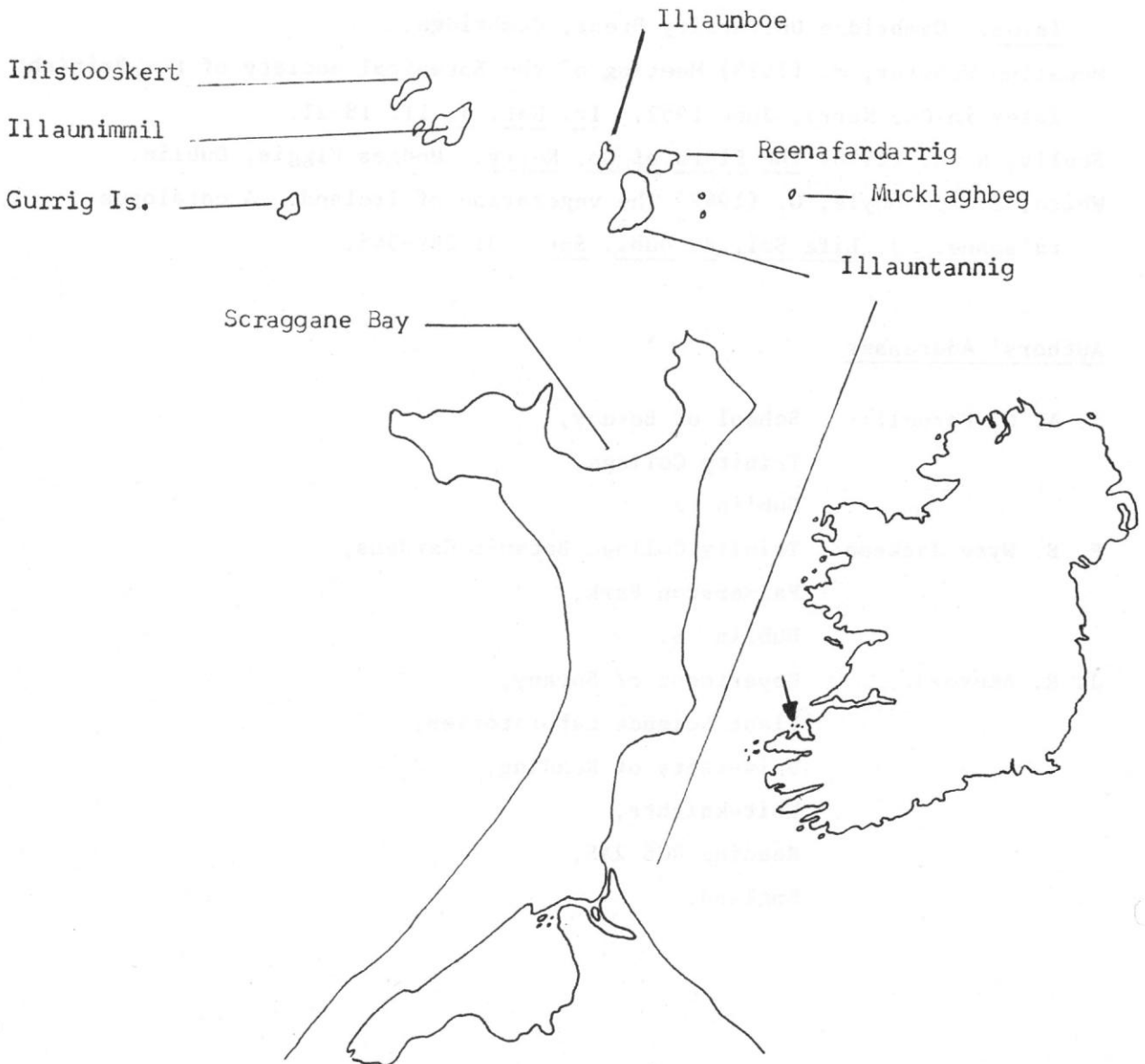


Fig. 1: The Magharee Islands

FIELD NOTES

SOME FRESHWATER CRUSTACEAN RECORDS FROM THE ROYAL CANAL, ASHTOWN, CO. DUBLIN

J. M. C. Holmes

On 17 May, 1981, an Irish Biogeographical Society field trip, led by J. P. and M. A. O'Connor, examined the aquatic fauna of the Royal Canal and the River Tolka near Ashtown, Co. Dublin. The author made two sweeps with a hand net in the Royal Canal (O 111374) from the north bank about 200 m east of Ashtown Bridge. The following crustacean species were taken:

CLADOCERA: Ceriodaphnia megops Sars; C. pulchella Sars; C. quadrangula (Müller); C. reticulata (Jurine); Alona guttata Sars; Simocephalus vetulus (Müller); Polyphemus pediculus (L.);

PODOCOPA: Cypridopsis vidua (Müller); Candona sarsi Hartwig; Notodromas monacha (Müller);

HARPACTICOIDA: Attheyella trispinosa (Brady); Bryocamptus pygmaeus (Sars); Canthocamptus staphylinus (Jurine);

CYCLOPOIDA: Eucyclops speratus (Lilljeborg); Macrocyclops albidus (Jurine); M. fuscus (Jurine); Megacyclops latipes (Lowndes); Paracyclops poppei (Rehberg);

ISOPODA: Asellus aquaticus (L.)

Voucher specimens have been deposited in the National Museum of Ireland.

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FIELD TRIP TO THE GEARAGH, MACROOM, CO. CORK 19-21 AUGUST, 1983

H. N. McGough

Ten members and friends attended this meeting to investigate the relic of The Gearagh woodland. We were lucky to have as our guide Tim Hickey, the 1983 Aer Lingus Young Scientist, whose project on the Gearagh has focussed attention on the site. This once extensive woodland covered a dissected

alluvial terrace with a braided channel system. The woodland was believed to be virtually clear-felled and drowned in the 1950's in association with the River Lee hydro-electric scheme. The I.B.S. party set out encouraged by reports that some of the least accessible areas remained unfelled, and that extensive regeneration had occurred in other areas.

The first stop of the meeting was near Annahala Bridge to view the mass of blackened tree stumps exposed by the unusually low level of the reservoir. The original network of channels and islets was also revealed. This unplanned stop proved fortuitous as the green sward which dominated all of the exposed mud of the reservoir bed (several km² in extent) proved to be made up of Limosella aquatica and Elatine hexandra. An interesting community of Polygonum species was also noted at the normal reservoir high water line. The remaining pools and channels were clogged with Elodea canadensis and numerous pondweeds: Potamogeton gramineus, P. berchtoldii, P. perfoliatus, P. praelongus and P. natans being among those collected.

Encouraged by our early finds, though slightly dampened by the increasing "softness" of the day, our party moved on to investigate the relic woodland east of Toon Bridge. Here the islets were wooded with dense Corylus avellana and frequent Fraxinus excelsior, Quercus robur, Betula pubescens, Salix atrocinerea and Viburnum opulus. Alnus glutinosa was a rare associate. Abundant bulbs of Allium ursinum suggested that it formed a lush sward in spring and early summer. However, the field layer was quite open and characterized by the presence of Hedera helix, Ajuga reptans, Carex remota and Caltha palustris. Euphorbia hyberna was frequent throughout the woodland as was Oenanthe crocata, especially near the channel margins. Ferns were well represented and included Osmunda regalis, Athyrium filix-femina, Blechnum spicant, Dryopteris dilatata, D. filix-mas and D. pseudomas. A search for Equisetum hyemale, previously found by Tim Hickey, proved fruitless. By this time the soft day had matured into a torrential downpour and the group needed little encouragement to accept an offer of hospitality from Tim. We quickly retired to his home, and while admiring his project work were plied with food and warming medicinal liquors by his parents.

The next morning the party regrouped and under Tim's guidance visited the woodland S.E. of Toon Bridge. Here too, Corylus was dominant, but the party was immediately struck by the less disturbed nature of the woodland. The canopy was much higher, Quercus robur more frequent and, in general, the arboreal

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species were more mature than those seen the day before. It seemed likely that this area suffered little, if at all, in the "clear-felling" of the 1950's. The channels were deeper and caused problems for those who lacked the added protection of waders. The species composition was similar overall, but additional species included: Carex paniculata, Deschampsia caespitosa, Salix aurita, Dryopteris aemula and Phyllitis scolopendrium.

The last stop of the meeting was at the reservoir margin south of Sleveen East. Here we went in search of Pilularia globulifera. Again, the reservoir bed was covered by a Limosella-Elantine sward with, alas no sign of Pilularia. The meeting then broke up with most of the party heading back to Dublin.

I would like to express my thanks to Tim Hickey for his guidance throughout the meeting, and also to his parents for their generous hospitality which, combined with the uniqueness of the Gearagh, made the meeting memorable for everyone present.

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REPORTS FROM CONFERENCES, SYMPOSIA ETC.

POSTGLACIAL COLONISATION CONFERENCE, UNIVERSITY COLLEGE CORK,

15-16 October, 1983

Martin C. D. Speight

The various speakers at this conference demonstrated an unexpected accord in both the main focus of their attention and their conclusions. Essentially, the conference revolved around the question of whether or not there was, at any point in the postglacial, a land-bridge linking Ireland with Great Britain, over which Ireland's present flora and fauna had arrived. Speaker after speaker demonstrated that the "pro-land-bridge lobby" had based its conclusions on either inadequate or misinterpreted data, concluding that as of now there is no convincing evidence, either geological, floristic or faunistic, for the presence of a land-bridge linking Ireland with Great Britain since the onset of climatic amelioration some 10,000 years ago. Equally, however there is no unequivocal evidence demonstrating the absence of a land-bridge. Given appropriate geological survey work in the northern reaches of the Irish sea it is expected that the land-bridge question could be finally and very quickly resolved, and it was evident that participants regarded this work as an urgent priority, so that the mythical land-bridge could be "laid to rest" as quickly as possible. Certainly, unless there was a "soggy" land-bridge (consisting primarily of migrant sand-bars and incorporating freshwater wetlands) strung across between Scotland and Ireland via Islay, there was no land-bridge at all. Hypotheses postulating land-bridge locations elsewhere are evidently now untenable, on good geological evidence. There was a general, but grudging, consensus that faunistic and floristic evidence is too confused, contradictory and complicated by subsequent immigration and extinction events to provide clear answers to the land-bridge question. Fixation upon the small number of organisms thought to be incapable of arrival in Ireland in the absence of a land-bridge was rather perjoratively dubbed the "pygmy shrew syndrome", due to the central place of this small mammal in such argument. Essentially, the difficulty with arguing that there had to be a land-bridge in order to explain the presence in Ireland of species like the pygmy shrew is that such a very small fraction of the flora and fauna requires a land-bridge to explain its presence and so many other species that would have been expected to cross such a land-bridge are not

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present in Ireland, The latter group includes such organisms as the elk (Alces) and the mole (Talpa),

Having sunk the land-bridge, the conference moved on, in its Sunday discussion session, to consideration of the history of the flora and fauna in Ireland during the post-glacial, whatever means of arrival it employed, and to the identification of research priorities in this general area,

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SYMPOSIUM ON INVOLUNTARY TRANSPORT OF PLANTS AND ANIMALS, GALWAY, April, 1983.

Abstracts of two of the papers given at this symposium are presented below. Both deal with the marine environment. The symposium was sponsored by the Society.

OCEAN CURRENTS

Edward C. Monahan and Michael C. Spillane

The long-term mean motion of the surface waters of the eastern North Atlantic Ocean is due primarily to the direct action of the prevailing winds upon the sea, and, to a lesser extent, to the interplay of the earth's rotation, gravity, and the field of fluid density. Our knowledge of these mean currents is sufficient to enable us to explain the recorded coastwise distribution of Irish land-falls of drift-seeds in terms of the transport of these seeds by these average currents on the last leg of their long journey from their tropical origins.

We are not however in a position to trace backward the detailed trajectory of a particular drift-seed to its source, even when we know the date of its stranding, and hence the winds that prevailed while the seed was adrift. This inability stems from our lack of knowledge of the specific transient meso-scale phenomena, such as oceanic eddies, which each have associated

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with them velocities capable of causing particular drift-seeds to follow paths markedly at variance with the aforementioned long-term mean current pattern,

The distribution of drift-bottle land-falls along the west coast of Ireland which is now emerging from the multi-year coastal current survey being conducted by University College, Galway, should prove of interest to those biogeographers who search for stranded drift-seeds,

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MARINE INVERTEBRATES

David McGrath

This account dealt with invertebrate animals carried to Irish coasts, particularly in the Galway Bay area in recent years, by wind and current. A large number of species are considered to be transported to Ireland in this way, including, among others, goose barnacles, the snail Janthina, the Gulf weed crab, Planes minutus, the by-the-wind sailor Velella, and crustaceans found among flotsam at sea, such as the amphipod Hyale grimaldii and the isopod Idotea metallica. Particular attention was paid to Velella which the author has been recording stranded on Irish shores regularly since 1976. This species exists in two mirror image forms, that is with the diagonally placed sail in one or other of its two possible configurations. The dominant form in Irish and British seas is said to be the left sailing form, and present observations are in agreement with this. The role of wind sorting in determining the type of Velella in any area was discussed. The transporting of two other species, I. metallica and H. grimaldii, both recently collected by the author in Galway Bay was considered, and the possible role of the North Atlantic Drift in this discussed.

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