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BULLETIN OF THE IRISH BIOGEOGRAPHICAL SOCIETY
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CONTENTS

Editorial.....	1
ADDITIONAL RECORDS OF MARINE HALACARIDAE (ACARI: PROSTIGMATA) FROM IRELAND. Paul Somerfield.....	2
A PRELIMINARY SURVEY OF THE LEPIDOPTERA OF POLLARDSTOWN FEN, CO. KILDARE, INCLUDING A RECORD OF <u>COSMOPTERIX LIENIGIELLA</u> (LIENIG AND ZELLER, 1839) (COSMOPTERIGIDAE), A SPECIES NEW TO IRELAND. K. G. M. Bond.....	24
SITES OF INTERNATIONAL AND NATIONAL IMPORTANCE FOR INVERTEBRATE FAUNA - A DEFINITION PROPOSED FOR USE IN SITE SURVEYS. Jervis A. Good and Martin C. D. Speight.....	48
CRANEFLIES NEW TO IRELAND (DIPTERA: CYLINDROTOMIDAE, LIMONIIDAE, TIPULIDAE). P. Ashe, J. P. O'Connor, P. J. Chandler, A. E. Stubbs, R. I. Vane-Wright and R. E. Blackith.....	54
RECORDS OF COLEOPTERA FROM IRISH WETLAND SITES IN 1989. D. A. Lott and D. T. Bilton.....	60
CRUSTACEAN RECORDS FROM LOUGH HYNE (INE), CO. CORK, IRELAND: PART V. J. M. C. Holmes.....	73

CONTENTS (CONTINUED)

PROTURA IN IRELAND.

R. E. Blackith and J. A. Good.....84

HEMIPTERA (HETEROPTERA AND AUCHENORHYNCHA)
RECORDED FROM SOUTH-WEST IRELAND (COS CORK,
KERRY AND CLARE), SEPTEMBER 1989.

P. Kirby.....90

KIMOSINA EMPIRICA, LEPTOCERA CRYPTOCHAETA, SPELOBIA
CLUNIPES, S. NANA, S. TALPARUM, S. PALMATA AND
TELOMERINA FLAVIPES (DIPTERA: SPHAEROCERIDAE) FLIES
NEW TO IRELAND.

J. Valentine, R. E. Blackith and R. M. Blackith.....105

A REVIEW OF PUBLISHED DISTRIBUTION DATA FOR IRISH
NEUROPTERA (INSECTA), TOGETHER WITH ADDITIONAL
RECORDS AND A CHECK-LIST OF THE IRISH SPECIES.

P. C. Barnard, J. P. O'Connor and M. C. D. Speight.....109

CALYPTERATE FLIES (DIPTERA: ANTHOMYIIDAE AND
FANNIIDAE) NEW TO IRELAND (HYDROPHORIA CAUDATA,
LASIOGMA MEADI, L. ANTHOMYINUM, PEGOHYLEMYIA
PHRENIONE, PEGOMYA GENICULATA, PHORBIA SECURIS,
FANNIA NORVEGICA AND F. MELANIA).

Ruth M. Blackith and Robert E. Blackith.....124

DISTRIBUTION OF IRISH MARINE BRYOZOA, TOGETHER
WITH BIOGRAPHICAL NOTES RELATING TO THE CHIEF
RESEARCHERS IN THE GROUP.

Patrick N. Wyse Jackson.....129

CONTENTS (CONTINUED)

A FIRST LIST OF DIPTERA FROM THE MURROUGH, CO. WICKLOW,
IRELAND, INCLUDING 663 SPECIES AND 140 BREEDING
RECORDS.

R. E. Blackith, R. M. Blackith, M. C. D. Speight
and M. de Courcy Williams.....185

BOOK REVIEWS.....254

INSTRUCTIONS TO CONTRIBUTORS.....258

Bull. Ir. biogeog. Soc. No. 14 (1991)

EDITORIAL

This is the largest Bulletin ever published by the Society. Both it and Bulletin No. 13 were prepared on an IBM compatible microcomputer using WordPerfect 5.1. However this year, the texts of several articles were supplied on diskette by the authors after their papers had been accepted for publication. This considerably reduced the typing time and the associated production costs. It would be of great assistance therefore if in future, authors of large papers could adopt this procedure. However, a typed copy should always be submitted initially.

Bulletin No. 14 has been issued in two parts due to its large size. Its publication has been made possible by the help of the Society's sponsors. We are very grateful to them for their continuing support.

On behalf of the Irish Biogeographical Society, I also wish to thank Mr J. M. C. Holmes, Dr. A. McNally, our typist Mrs R. Holmes, the authors of the articles and all those who helped with the production of this Bulletin.

J. P. O'Connor
Editor

12 October 1991

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ADDITIONAL RECORDS OF MARINE HALACARIDAE (ACARI: PROSTIGMATA) FROM IRELAND.

Paul Somerfield

Abstract

Samples of algae, sediments and other substrata were taken from the littoral and the shallow sublittoral at twenty sites around the coast of Ireland. Thirty seven species of Halacaridae were present in these collections of which four, Copidognathus consimilis Bartsch, C. tricornatus (Lohmann), Thalassarachna hexacantha (Viets) and T. longipes (Trouessart) are new to the British Isles. Thalassarachna petiti (Angelier) and Scaptognathus tridens Trouessart are new to Ireland. A specimen of Thalassarachna subterranea (Viets) was found in the Halbert collection and this species is therefore added to the Irish list. The halacarid fauna of Ireland is entirely consistent with Ireland's geographical location within the zoogeographical region known as the boreal Atlantic.

Introduction

There have been several works concerned with Halacaridae from Ireland (Brady, 1875; Halbert, 1915, 1920; Bartsch, 1985a; Green and MacQuitty, 1987; Somerfield, 1988, 1989). The present paper includes further records of species already known to occur in Ireland and adds some species to the Irish fauna. Also included are new records culled from the Halbert collection in the National Museum of Ireland.

Literature used in the identification of specimens included André (1946), Bamber (1982), Bartsch (1976, 1977a, 1977b, 1979b, 1985a), Green (1960), Newell (1947), Pugh (1985) and Viets (1927).

Bull. Ir. biogeog. Soc. No. 14

Especially useful was Green and MacQuitty (1987). The classification used in this paper follows that used in their work, with the genus Copidognathus retained in the subfamily Halacarinae Viets and the generic name Thalassarachna (Packard) used in preference to Halacarellus Viets, as suggested by Newell (1945). Voucher specimens have been deposited in the National Museum of Ireland.

The following collections were made during the course of this study. The data for each collection are given as follows:

No. Vice-County: Site Name (Grid Reference).

Ecological notes and collection details.

In the list of species found in these collections, each collection will be referred to by its number alone.

Collections

1. Down (38): The Dorn (J5956).

Lichina pygmaea on stones collected from the upper shore, 15.ix.1986.

2. Down (38): Marlfield Bay (J5735).

A sheltered shore on the east side of Strangford Lough. Fucoids and other algae were collected, 16.vi.1989.

3. Down (38): Ballyhenry Island (J5752).

A sheltered shore at the northern end of the Strangford Narrows with a dense cover of fucoids attached to stones set in muddy sediments. A collection of laminarians, fucoids, other algae and sediments was made, 14.x.1986.

4. Down (38): Ballyhenry Point (J5752).

Algae were collected from a rocky shore at the western end of

Bull. Ir. biogeog. Soc. No. 14

Ballyhenry Island, 15.vi.1989.

5. Down (38): Empire Tana (J5751).
Samples of rhodophytes, ascidians, hydroids and some Laminaria digitata were collected from the vertical side of this wreck, which lies off Ballyhenry Island, at depths of two to nine metres. Below nine metres, samples of coarse sediments were taken to a depth of twelve metres. S.C.U.B.A. was used.
13.x.1986.
6. Down (38): Portaferry (J5851).
Fucoids and other algae were collected from a rocky part of the eastern shore of the Strangford Narrows, 18.vi.1989.
7. Down (38): Strangford Harbour (J5949).
Sublittoral samples of sediments and algae were taken using S.C.U.B.A., to the north of the harbour on 13.x.1986 and south of the ferry slip on 19.iii.1988.
8. Down (38): Ballyquintin Point (J6245).
A semi-exposed shore on the southern tip of the Ards peninsula. Algae, sponges and other sessile animals were collected from a rocky area, 15.x.1986.
9. Down (38): Angus Rock (J6245).
Stone gravel with shell was collected from a gully towards the south east of the rock just below the low water mark by Dr P. Boaden, 6.iv.1989.
10. Dublin (21): Bull lagoon (02136).
A sample of a thick Enteromorpha mat overlying fine anoxic mud was taken, 13.viii.1986.
11. Dublin (21): Dublin Bay (02933).

Bull. Ir. biogeog. Soc. No. 14

Samples of sediments were taken by grab from the R.V. Lough Beltra, 16.vi.1986.

12. Dublin (21): Sandycove Harbour (02528).

A small harbour on the south side of Dublin Bay. Samples of coarse shelly sand were taken, 19.viii.1986. A further collection of coarse shelly sand, and also muddy sand and stones, was also made, 24.ix.1986.

13. Dublin (21): Fortyfoot (02528).

Shelly gravels with silt were collected from depths of ten to eighteen metres using S.C.U.B.A., 27.iv.1986 and 30.iv.1986.

14. West Cork (3): Lough Hyne (W0928).

Samples of algae were collected from the shores of the Lough in squares D2, C8 and H9 (numbers from Minchin, 1987). Sublittoral samples were collected from the western shore (D10), the Goleen cliff (E10), the Glanafeen cliff (F9), the southern shore (I9) and the eastern shore (J8). Samples of coarse gravel and broken shell were taken from inside the rapids (J8). Coarse sand was collected from the base of the Whirlpool cliff (H7) at a depth of 20m. Sublittoral samples were collected by diving. 20-25.vi.1989.

15. West Cork (3): Barloge Creek (W1027).

Samples of coarse sediments were taken from the area below the Lough Hyne rapids at a depth of three metres. Littoral fucoids and other algae were also collected from the area known as "Southern's Quay". Both collection sites fall within square J10 (Minchin, 1987). 16.vi.1989.

16. West Cork (3): Carrigathorna (W1027).

An extremely exposed shore of steep southerly facing rock

Bull. Ir. biogeog. Soc. No. 14

outside the mouth of Barloge Creek. Laminarians, red algae, mussels, barnacles and Lichina were collected, 25.vi.1989.

17. West Galway (16): Kilkieran Bay (L8530).

Samples of clean and muddy Lithothamnion were collected from a depth of 20m using S.C.U.B.A., 20.iii.1988.

18. West Galway (16): Gurraig Sound (L8830).

Lithothamnion was collected from a depth of 25m by diving, 20.iii.1988.

19. West Donegal (35): Kindrum (C1942).

Samples of algae were collected from a small rocky area between the salmon hatchery and the harvesting shed of Fanad Fisheries, 4 and 5.ix.1988.

20. West Donegal (35) Moross Channel (1839).

Mixed sediments and coarse gravel containing Lima hians (sometimes referred to as "Lima ground") were collected from a depth of 5m using S.C.U.B.A., 19.iii.1988.

Results

Subfamily RHOMBOGNATHINAE Viets

Isobactrus setosus (Lohmann, 1889)

Survey records: 2, 3, 4, 6, 12, 14, 15, 19.

I. setosus is widespread in Ireland (Somerfield, 1988, 1989).

It was found to be most abundant on, but not restricted to, algae on the upper parts of sheltered rocky shores.

Metarhomboognathus armatus (Lohmann, 1893)

Survey records: 3, 4, 6, 7, 14, 15.

M. armatus was found to be locally abundant (Somerfield, 1988,

Bull. Ir. biogeog. Soc. No. 14

1989). In the course of this study, it was generally taken from upper shore fucoids.

Rhomboqnathides merrimani merrimani Newell, 1947

Survey record: 14.

Previously recorded from Ireland (Somerfield, 1988, 1989), this variety of R. merrimani Newell was found on fucoids and in coarse sediments.

Rhomboqnathides merrimani needleri Newell, 1947

Survey records: 9, 15, 16.

R. merrimani needleri occurred on Fucus spiralis and other algae and also among mussels and coarse sediments, most commonly on the upper parts of the seashore. This variety is previously recorded from Ireland (Somerfield, 1988, 1989).

Rhomboqnathides mucronatus (Viets, 1927)

Survey records: 3, 6, 16, 19.

This species is widely distributed in Ireland (Somerfield, 1988, 1989). It was usually found on fucoids and other algae on the mid-shore, but also occurred among mussels and barnacles and in sediments. A specimen in the Halbert collection labelled as "Rhomboqnathus seahami" from Blacksod Bay, Co. Mayo, Lithothamnion, 24.ix.1911, is also of this species.

Rhomboqnathides pascens (Lohmann, 1889)

Survey records: 2, 3, 4, 5, 6, 7, 9, 11, 14, 15, 16, 19, 20.

This species was found to be widespread and abundant (Somerfield, 1988, 1989), generally being found on algae but also in sediments. It occurred at all levels on the shore and in the shallow sublittoral but was most numerous on the lower shore. Halbert (1915) recorded R. pascens from Clare Island, Blacksod Bay and "at counties Dublin and Cork". Specimens in the Halbert collection are from Malahide, Co. Dublin, 14 and 15.v.1915, Ardfry, Co. Galway, 16.vi.1916 and from Clare Island, Co. Mayo on several dates.

Bull. Ir. biogeog. Soc. No. 14

Rhomboognathides seahami (Hodge, 1860)

Survey records: 2, 3, 4, 5, 6, 7, 9, 11, 14, 15, 16, 19, 20.

R. seahami was found to be widespread and often abundant on algae from all levels on the seashore and also occurred in the shallow sublittoral (Somerfield, 1988, 1989). It was also found among mussels, barnacles and coarse sediments. Halbert (1915) found this species at Howth, Co. Dublin, Sandycove, Co. Dublin, Blacksod Bay and on Clare Island, Co. Mayo. Further records from Halbert's material include Malahide, Co. Dublin, 14 and 15.v.1915, and Ardfry, Co. Galway, 16.vi.1916. A specimen in Halbert's collection labelled as this species from Blacksod Bay was reidentified as R. mucronatus.

Rhomboognathides spinipes (Viets, 1933)

Survey records: 14, 15, 19.

This species was found on F. spiralis and in coarse sediments beneath algae. It is previously recorded from Ireland (Somerfield, 1988, 1989).

Rhomboognathus notops (Gosse, 1855)

Survey records: 2, 3, 4, 5, 6, 12, 14, 15, 16, 19.

Common on the coasts of Ireland (Somerfield, 1988, 1989), R. notops was recovered from algae at all levels of the shore, also on sponges, among barnacles and mussels and in Lichina pygmaea. It was also found in the shallow sublittoral and in sediments. Halbert (1915) found this species on Clare Island. Other specimens in his collection are from Malahide, Co. Dublin, 14 and 15.v.1915.

Subfamily HALACARINAE Viets

Agauopsis brevivalpus (Trouessart, 1889)

Survey records: 1, 15.

A. brevivalpus was found in Lichina and among coarse sediments. It is previously recorded from Ireland (Halbert, 1920; Somerfield,

Bull. Ir. biogeog. Soc. No. 14

1988, 1989).

Agauopsis tricuspis Benard, 1962

Survey records: 15, 16.

This species was found in the upper intertidal among coarse sediments and in clumps of mussels. It is previously recorded from Ireland (Sommerfield, 1988, 1989).

Arhodeoporus gracilipes (Trouessart, 1889)

Survey records: 5, 9, 15, 17, 18, 20.

A. gracilipes was common and abundant in a range of sediments including gravels, sandy sediments and Lithothamnion, generally below low water neaps. All specimens are of the type variety, A. gracilipes gracilipes (Trouessart). Halbert (1915) recorded this species from Blacksod Bay, Co. Mayo and Bartsch (1985a) identified it in sediment samples from the Strangford Narrows and the adjacent Irish Sea. This species is widely distributed along the eastern shores of the North Atlantic from Norway as far south as Senegal, also in the Mediterranean and the Black Seas (Bartsch, 1983; Green and MacQuitty, 1987).

Arhodeoporus minor Bartsch, 1977

Survey record: 18.

A specimen of this species was found in Lithothamnion at a depth of 20m. Bartsch (1985a) recorded it from coarse sediments of broken shell and sea-urchin tests at a depth of 30 to 42m off the mouth of the Strangford Narrows. Other records are from Brittany and the Yorkshire coast, also in sublittoral sediments (Bartsch, 1977c, 1985b).

Copidognathus consimilis Bartsch, 1979

Survey records: 8, 14.

C. consimilis was widespread on algae and hydroids in the sublittoral of Lough Hyne. One specimen of this species was

Bull. Ir. biogeoq. Soc. No. 14

recovered at Ballyquintin in a sample of Gigartina, Chondrus and Halichondria from low on the shore. A specimen labelled "Halacarus, Kinsale Harbour, Dredge 2.5 fathoms in mud 11.5.14" in the Halbert collection is also of this species, but was almost certainly misidentified as C. oculatus. In his paper (Halbert, 1915), he records C. oculatus from Kinsale Harbour, Co. Cork and gives identical collection details, but there is no corresponding specimen. C. consimilis is only known elsewhere from the type locality near Roscoff on the French Atlantic Coast (Bartsch, 1979c) where it was recovered from sub-littoral sediments.

Copidognathus fabricii (Lohmann, 1989)

Survey records: 2, 3, 4, 6, 9, 14, 20.

C. fabricii was generally found on algae and sponges, and in sediments, on the lower shore and in shallow sublittoral. A specimen in the Halbert collection comes from Kinsale Harbour, Co. Cork (11.v.1914). C. fabricii is previously recorded from Ireland (Bartsch, 1985a; Somerfield, 1988, 1989).

Copidognathus gibbus (Trouessart, 1889)

Survey record: 14.

A specimen of C. gibbus was taken in coarse clean sand at the foot of the Whirlpool cliff in Lough Hyne at a depth of 20m. Halbert (1915) recorded it from Clew Bay, Co. Mayo at a depth of about 50m on gravel and shelly sand. Bartsch (1985a) identified it as occurring in large numbers in coarse shelly sediments at 30 to 42m off the mouth of the Strangford Narrows. The range of this species stretches from the North Atlantic to South Africa and includes the Mediterranean and the Red Seas (Bartsch, 1985a).

Copidognathus hartwigi Bartsch, 1979

Survey record: 5.

A specimen was found in coarse sediments beside the wreck. Bartsch recorded it from sediments off the mouth of the Strangford Narrows

Bull. Ir. bioqeoq. Soc. No. 14

(Bartsch, 1985a). Elsewhere it is only known from Bermuda (Bartsch, 1979d).

Copidognathus lamellosus (Lohmann, 1893)

Survey records: 5, 13, 15, 17, 18.

C. lamellosus was found in sublittoral sediments, including Lithothamnion, from low water neaps to a depth of 25m. Halbert (1915) recorded this species as C. tabellio (Trouessart) from Malahide and Howth, Co. Dublin. C. tabellio is a synonym of C. lamellosus (Bartsch, 1979c) and Halbert's specimens are definitely this species.

Copidognathus oculatus (Hodge, 1863) sensu Lohmann, 1889

Survey records: 5, 19, 20.

This species was found on a range of algae and among sediments in the shallow sublittoral. Halbert (1915) found it in Blacksod Bay, Co. Mayo, Kinsale Harbour, Co. Cork and the Malahide Inlet, Co. Dublin. The only specimen in the Halbert Collection is labelled as coming from Ardfry, Co. Galway, 16.vi.1961. Another specimen, labelled as coming from Kinsale Harbour, is actually C. consimilis.

Copidognathus rhodostigma (Gosse, 1855)

Survey records: 5, 7, 9, 11, 13, 14, 15, 20.

C. rhodostigma was found in coarse sediments and Lithothamnion from the lower shore to a depth of 25m and among mussels. It is previously recorded from Ireland (Bartsch, 1985a; Somerfield, 1988, 1989).

Copidognathus tectirostris Bartsch, 1979

Survey record: 9

This species was found in coarse shell gravel at the low water mark. Bartsch (1985a) identified it from coarse shelly sediments in the Irish Sea nearby at depths of 30 to 42m. Elsewhere it is

Bull. Ir. biogeoq. Soc. No. 14

known to occur in sediments in Brittany and the North Sea (Green and MacQuitty, 1987).

Copidogathus tricornatus (Lohmann, 1938)

Survey record: 14

This species was common and abundant on algae, hydroids and sponges in Lough Hyne from the low water mark to 20m. It has not previously been recorded from Ireland or Britain. Elsewhere it has been recorded from Brittany (Bartsch, 1979c).

Halacarus actenos Trouessart, 1889

Survey records: 14, 15, 20.

This species was taken from algae, barnacles and Halichondria on the lower shore, also on sponges and in Lithothamnion and sediments in the shallow sublittoral. It is previously recorded from Ireland (Somerfield, 1988, 1989).

Halacarus bisulcus Viets, 1927

Survey records: 5, 7, 9, 14, 15, 17, 18, 20.

An interstitial species, H. bisulcus was recovered from a range of sublittoral sediments including gravels, sand and Lithothamnion. A specimen in the Halbert collection is from Dingle Bay, Co. Kerry. Bartsch (1985a) identified it from the Strangford Narrows and from the northern Irish Sea. It is known to occur in Britain (Bartsch, 1985b; Spooner, 1959). Elsewhere its range extends from Iceland to France and into the Mediterranean (Weinstein, 1961; Motas, 1961; Bartsch, 1976).

Halacarus ctenopus Gosse, 1855 sensu Lohmann, 1893

Survey record: 16.

This species was recovered from Corallina and Ceramium low on the shore. Brady (1875) recorded this species from Westport, Co. Mayo, Birtebuy Bay and the Aran Islands, Co. Galway. Halbert (1915) repeated these records. Records of this species prior to 1893 are

Bull. Ir. biogeog. Soc. No. 14

doubtful, and specimens from the Shetland Islands referred to by Brady (1875) as H. ctenopus are in fact Thalassarachna basteri (Green and MacQuitty, 1987). On this basis, and also because H. ctenopus is rare compared to T. basteri, it seems almost certain that Brady's Irish records are erroneous. It is recorded from Britain, from both sides of the North Atlantic and from the Mediterranean (Green and MacQuitty, 1987).

Thalassarachna baltica (Lohmann, 1889)

Survey records: 2, 3, 4, 5, 6, 13, 14, 16, 19.

This species is widespread and abundant in Ireland (Somerfield, 1988, 1989). It was generally found on fucoids and other algae in the lower intertidal zone but also occurred on other substrata such as sponges, sediments, among mussels and barnacles and in clumps of L. pygmaea.

Thalassarachna basteri (Johnston, 1836)

Survey records: 2, 3, 4, 5, 6, 7, 8, 14, 15, 16, 19.

Widespread and abundant, T. basteri is the commonest halacarine on the Irish coast (Somerfield, 1988, 1989). It was found on a large range of substrata including fucoids and other algae, mussels, barnacles, hydroids, sponges and sediments. It was found at all levels on the shore and in the shallow sublittoral.

Thalassarachna capuzina (Lohmann, 1893)

Survey record: 3.

This species was found in coarse sediments beneath intertidal algae. It is previously recorded from Ireland (Bartsch, 1985a; Somerfield, 1988, 1989).

Thalassarachna hexacantha (Viets, 1927)

Survey records 3, 4, 7.

T. hexacantha was recovered mainly from algae on the lower shore, especially Fucus serratus. This species has not been recorded

Bull. Ir. biogeog. Soc. No. 14

before from Ireland or Britain, although Bartsch (1985a) identified some nymphs from nearby in the Strangford Narrows, which she called Halacarellus sp. A, which she said could be this species. The range of this species includes northern Europe from Denmark to the Kola Peninsula and the Black Sea (Viets, 1956; Vorobjeva and Yaroshenko, 1979).

Thalassarachna longipes (Trouessart, 1888)

Survey records: 14, 15.

Juveniles of this species were abundant in intertidal algae below the rapids in Lough Hyne, and also occurred on algae and in sediments inside the lough. T. longipes is very similar to Thalassarachna sp. C in Bartsch (1985a), with a few major differences. The tritorostrual setae are inserted at the base of the rostrum, which extends beyond the second segment of the palps and is slightly spatulate. The spine on the third palp is slender and directed forwards. Dorsal setae ds-6 are on the anal cusps, which extend beyond the end of the body. This species is not known from Great Britain, although it occurs in the Channel Islands (Bamber, 1987). Elsewhere it is known to inhabit the coast of Europe from France to Norway and has also been found in the Baltic and on the eastern coast of North America (André, 1946; Bartsch, 1979b).

Thalassarachna petiti (Angelier, 1950)

Survey record: 2.

Found on algae beside a freshwater seep, this species, which generally inhabits brackish water, is new to the Irish fauna. Elsewhere it has been found in Britain, Brittany, the French Mediterranean, Kiel Bay and Lake Burano in Tuscany (Green and MacQuitty, 1987; Bartsch 1976).

Thalassarachna procera (Viets, 1927)

Survey record: 12.

Bull. Ir. biogeog. Soc. No. 14

This species was recovered from coarse intertidal sediments, also in the shallow sublittoral. Two specimens on unlabelled slides in the Halbert collection are of this species. Notes in the museum suggest that one specimen was from the South Bull, Co. Dublin, Feb. 1907. Murphy and Holmes (1990) also recorded this species from Dublin Bay and Bartsch (1985a) identified it from the Strangford Narrows and the Northern Irish Sea. Although it is not recorded from Great Britain it has a similar distribution to the closely related T. capuzina (Bartsch, 1985a).

Thalassarachna southerni (Halbert, 1915)

Survey records: 9, 14.

In Lough Hyne this species was abundant in coarse clean sand from the base of the whirlpool cliff at a depth of 20m. The specimen from Angus Rock came from stone gravel and shell just below the littoral zone. Bartsch identified the species from coarse sediments at 42m, and redescribed the species (Bartsch, 1985a). The type specimen was dredged from 24 fathoms in Clew Bay, Co. Mayo, 25.v.1909. A second specimen, collected at the same time, is present in the Halbert collection on an unlabelled slide. T. southerni also occurs off the coast of Yorkshire and off Helgoland in the North Sea (Bartsch, 1985a,b).

Thalassarachna striata (Lohmann, 1889)

Survey records: 5, 14, 15.

T. striata was found in sublittoral algae and sediments and in algae on the shore. One specimen was found by Mark Holmes in his light trap in Lough Hyne (Holmes and O'Connor, in press). Bartsch (1985a) identified it from coarse sediments off the mouth of the Strangford Narrows at a depth of 30m. The species is known from the Baltic, the coast of northern Europe from Brittany to Norway and Great Britain (Viets, 1927; Moore, 1973; Bartsch, 1976).

Bull. Ir. biogeog. Soc. No. 14

Thalassarachna subterranea (Schulz, 1933)

No specimens were found in the course of this study. However a slide labelled "Halacarus Malahide Co. Dublin" in the Halbert collection proved to be of this species. Among Halbert's manuscripts are notes and drawings which show that the specimen was dredged from shallow water on 24.ix.1916. T. subterranea is generally a psammophilic species. It is new to the Irish fauna. It is known from eastern North America, western Europe from Norway to Brittany and the Black Sea (Viets, 1956; Green and MacQuitty, 1987).

Subfamily SIMOGNATHINAE Viets

Simognathus minutus (Hodge, 1863)

Survey records: 14, 18.

This species was found among algae and sediments in the shallow sublittoral. It was especially abundant in Lough Hyne. Elsewhere in Ireland it has been recovered from algae on exposed shores (Sommerfield, 1988, 1989).

Subfamily LOHMANNELLINAE Viets

Lohmannella falcata (Hodge, 1863)

Survey records: 5, 9, 14, 15, 16, 17, 18, 19, 20.

L. falcata was found on a range of substrata including algae, mussels, barnacles and L. pygmaea, generally on the lower shore. It was also common in sublittoral sediments. It is previously recorded from Ireland (Bartsch, 1985a; Sommerfield, 1988, 1989).

Lohmannella kervillei (Trouessart, 1894)

Survey record: 16.

This species was found on Laminaria digitata and rhodophytes low on the shore. It is previously recorded from Ireland (Sommerfield, 1988, 1989). Records of L. norvegica Viets from Britain (Pugh and

Bull. Ir. biogeog. Soc. No. 14

King, 1985) are also this species (Pugh, pers. comm.).

Scaptognathus tridens Trouessart, 1889

Survey records: 9, 15.

This species inhabits coarse well aerated gravels. It is not previously recorded from Ireland and the only known locality in Great Britain is from gravels near the Eddystone lighthouse (Spooner, 1959). Elsewhere it has been recorded from the coast of France (André, 1946; Green and MacQuitty, 1987).

Discussion

Newell (1947) was the first to propose that among animals of meiofaunal size the Halacaridae maybe of great use from an ecological and zoogeographical standpoint. As they possess a variety of morphological characters fundamental, as opposed to superficial, differences can be distinguished and natural species groups detected. Many Halacaridae can be transported easily from place to place on floating weed or similar substrates. Therefore the absence of a species from a given area implies more than a physical inability to reach that area. The absence of a species from an area should indicate that it cannot tolerate the conditions there, or through which it would have to pass to reach that area. Therefore it should be possible to mark the natural limits of various species' ranges with some certainty.

In consequence the littoral Halacaridae should be of considerable value in establishing natural zoogeographical boundary zones. The chief problem in 1947, as it still is, was the poor knowledge of the halacarid fauna anywhere in the world. Even though extensive studies have been made on the Halacaridae of northern France since late in the last century (e.g. Trouessart, 1889; André, 1946; Bartsch, 1979a), new species are still regularly being described from there (e.g. Bartsch, 1979c).

Bull. Ir. biogeog. Soc. No. 14

Ireland lies well within the zoogeographical region referred to as the boreal Atlantic (Ekman, 1935; Sverdrup, Johnson and Fleming, 1942), which stretches from Ushant to the White Sea on the eastern side of the North Atlantic and includes the northeastern coast of North America, Greenland and Iceland. Although Pugh and King (1985) proposed that the English Channel acts as a significant barrier to halacarids this is highly unlikely, and any species found in northwestern Europe could and should occur in Ireland. The most significant factor influencing the known fauna of a region is the intensity of collecting in that region. Thus prior to 1985 the apparent pattern of halacarid distributions in this part of northern Europe was that a high number of species occur in northern France, fewer in Britain and fewer still in Ireland. Concurrently a few species appeared to be endemic to either France, Britain or Ireland, having been found at only one locality. Examples of such species included C. consimilis from France (Bartsch, 1979c), A. poizati Bartsch from Britain (Bartsch, 1985b) and S. trouessarti Halbert from Ireland (Halbert, 1915; Abé and O'Connor, in press).

Such distributions lend credence to the idea that relatively narrow stretches of open water act as barriers to Halacaridae. This study illustrates how wrong such conclusions, based on a limited amount of work, can be. In terms of numbers the Irish halacarid fauna is comparable with that of Britain. More work in the British Isles as a whole would almost certainly increase the number of species known from the region.

A few examples will illustrate just how poor our present knowledge of halacarid distributions is. Bartsch (1985a), from relatively few samples from an environment previously examined in this country, namely coarse sediments, more than doubled the known Irish fauna. Isobactrus ungulatus, described by Bartsch as recently as 1975 (Bartsch, 1975), was found by Pugh and King

Bull. Ir. biogeog. Soc. No. 14

(1985) to be widespread in Britain. It is common in Ireland as well (Somerfield, 1988, 1989). It has a well defined habitat, among barnacles, which previous workers had generally ignored. Again from a relatively small number of sediment samples from Yorkshire, Bartsch (1985b) described two species new to science. C. consimilis, previously known from one locality in France (Bartsch, 1979c), occurred in large numbers in Lough Hyne along with the similar species C. tricorneata, also previously unknown from Britain. Lough Hyne is known to be a particularly rich environment for other organisms (e.g. Minchin, 1987; Holmes and O'Connor, in press) and the present study shows that it also has a diverse and apparently unusual halacarid fauna, yielding two species new to the British Isles and two new to Ireland.

It is likely that the commoner littoral species in Ireland have all been accounted for. Apart from I. unguulatus all the littoral species recorded as new to Ireland in this study appear to have relatively restricted distributions. Environments which should provide many additions to the Irish fauna include sublittoral sediments and open rock. The first environment is very patchy, some sediments contain dense and diverse assemblages of Halacaridae, others contain few or none; but the best collecting grounds seem to be areas with strong water movements and a low silt load, such as the Strangford Narrows, Gurraig Sound and the rapids at Lough Hyne. The water currents in these areas winnow the sediments, producing areas of very coarse, well aerated sediments which provide a substrate for the majority of the sediment-dwelling Halacaridae. The second habitat presents intriguing sampling difficulties, but these should not be insurmountable.

In conclusion, the known Irish halacarid fauna is consistent with Ireland's geographical location on the eastern side of the North Atlantic and with the amount of work that has been done in the country. A great deal of work is necessary before zoogeographical

Bull. Ir. biogeog. Soc. No. 14

statements can be made, except of taxonomic groupings at or above the level of Genus and statements about large geographical areas.

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Bull. Ir. biogeog. Soc. No. 14 (1991)

A PRELIMINARY SURVEY OF THE LEPIDOPTERA OF POLLARDSTOWN FEN, CO. KILDARE, INCLUDING A RECORD OF COSMOPTERIX LIENIGIELLA (LIENIG AND ZELLER, 1839) (COSMOPTERIGIDAE), A SPECIES NEW TO IRELAND.

K. G. M. BOND

Summary

The Lepidoptera of Pollardstown Fen, Co. Kildare, eastern Ireland, were recorded on 5 days during 1989, as well as on single visits in both 1984 and 1990. In addition to daytime recording, a mercury-vapour light trap was used on two occasions. Several fenland species scarce in Ireland were recorded, and the cosmopterigid Cosmopterix lienigiella (Lienig and Zeller, 1839) is here recorded for the first time from Ireland. The Elachistidae proved to be particularly diverse, with 11 species, or about one-third of the Irish total, and including Elachista triatomea (Haworth, 1828) the Irish occurrence of which is here recorded for the first time, although it has already been found elsewhere in Ireland. Altogether 159 species were recorded during this survey.

Zusammenfassung

Um die Schmetterlingsfauna des Moores Pollardstown Fen im östlichen Irland zu bewerten, wurde das Gebiet, hauptsächlich im Jahre 1989, insgesamt siebenmal untersucht. Dabei wurde auch ein Lichtfanggerät zweimal benutzt. Mehrere Moorlandarten, die in Irland selten sind, wurden gemeldet. Ausserdem wurde die Cosmopterigide Cosmopterix lienigiella (Lienig und Zeller, 1839) zum ersten Mal von Irland gemeldet. Besonders artenreich waren die Elachistidae mit 11 Arten oder etwa ein Drittel der irischen Arten dieser Familie, wovon Elachista triatomea (Haworth, 1829) hier zum ersten Mal von Irland gemeldet wird, obwohl die Art schon an mehreren anderen irischen Stellen gefunden wurde. Insgesamt wurden

Bull. Ir. biogeog. Soc. No. 14

159 Schmetterlingsarten festgestellt.

Introduction

This work forms part of a survey by the Irish Biogeographical Society, of the fauna of a Site of International Importance, Pollardstown Fen (also known as Newbridge Fen), Co. Kildare, eastern Ireland, the fauna of which has been virtually unstudied until recently. A description of the fen is given by Doyle (1984), and a further brief summary is provided by O'Connor et al. (1990) who record a caddisfly new to Ireland there. Speight and Vockeroth (1988) reported the discovery of a hoverfly new to Ireland and Europe at this site.

The Lepidoptera of Irish fenlands have in general been very little studied. During 1989 and 1990 a number of visits were made to the site with the aim of recording the Lepidoptera and assessing their significance. Records obtained during a visit made in 1984 are also included. A mercury-vapour light trap was used on two occasions. In all, 159 species were recorded, including several scarce Irish fenland species and Cosmopterix lienigiella (Lienig and Zeller, 1839), a species not previously recorded from Ireland.

Most of the sampling was carried out near the western margin of the fen, especially around Irish Grid Reference N773155 (UTM 29 U PU 440950), and along the margin of the gravel quarry to the west, but in 1984 the eastern margin around IGR N775160 (UTM 29 U PU 442955) was sampled. The more northern and central parts of the fen are still relatively little studied, although short visits were made to the field margins west of the coniferous plantation (N762161), and to the margin of the ditch adjacent to the plantation (N766161). The area of tufa just east of the quarry (N777153) was also sampled briefly. The preference for sampling the fen margin on windy days is understandable, and it is to be hoped that the central parts can be more fully studied on future

Bull. Ir. biogeog. Soc. No. 14

visits. The six-figure Irish Grid references are provided throughout, and the UTM equivalents were obtained from Rasmont et al. (1986). All the records were obtained in UTM 50-km quadrat 29 U PU1.

Annotated species list 1984-1990

(Nomenclature and classification follow Schnack, 1985)

Abbreviation: m.v.trap: - mercury-vapour light trap.

MICROPTERIGIDAE

Micropterix aruncella (Scopoli, 1763)

Three, N773155, 22.vi.1989; two, N766159, 10.vi.1990.

Micropterix calthella (Linnaeus, 1761)

One, N766159, 10.vi.1990.

HEPIALIDAE

Hepialus fusconebulosa (Degeer, 1778)

One, N773155, 24.vi.1989; twelve at m.v.trap, "mostly well-marked forms", N773155, 24.vi.1989; one, m.v.trap, N773155, 22.vii.1989.

OPOSTEGIDAE

Opostega crepusculella Zeller, 1839

Three, one taken, m.v.trap, N773155, 22.vii.1989. A local species of marshes, whose foodplant is unknown. Pelham-Clinton (1976) indicates records from five Irish vice-counties, not including Kildare.

NEPTICULIDAE

Stigmella hybnerella (Hübner, 1796)

Bull. Ir. biogeog. Soc. No. 14

♂ taken, genitalia checked, N775154, 1.v.1989; vacated mine on Crataegus monogyna Jacq., N770157, 10.vi.1990.

INCURVARIIDAE

Incurvaria praelatella (Denis and Schiffermüller, 1775)

♂ taken, genitalia checked, N773155, 22.vi.1989. A local species, recorded from seven Irish vice-counties in Heath and Pelham-Clinton (1976).

TINEIDAE

Tinea trinotella Thunberg, 1794

One, m.v.trap, N773155, 22.vii.1989.

GRACILLARIIDAE

Gracillaria syringella (Fabricius, 1794)

One, N775160, 15.viii.1984.

Parornix torquillella (Zeller, 1850)

Mines on Prunus spinosa L., N762172, 17.ix.1989.

Phyllonorycter nigrescentella (Logan, 1861)

♀ taken, genitalia checked, N773155, 24.vi.1989.

Phyllonorycter sp.

Mines on Salix cinerea L., N769163, 17.ix.1989.

YPONOMEUTIDAE

Argyresthia pygmaeella (Denis and Schiffermüller, 1775)

One, N774155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Yponomeuta sp. (Y. malinellus Zeller, 1838 or Y. cagnarella (Hübner, 1813))

Three at m.v.trap, N773155, 22.vii.1989.

Plutella xylostella (Linnaeus, 1758)

One, N774155, 22.vii.1989.

Orthotaelia sparganella (Thunberg, 1794)

♀ taken at m.v.trap. N773155, 22.vii.1989.

LYONETIIDAE

Lyonetia clerkella (Linnaeus, 1758)

Tenanted mines on Prunus spinosa, N762172, 17.ix.1989.

GLYPHIPTERIGIDAE

Glyphipterix simpliciella (Stephens, 1834)

Circa 10, N770157, 10.vi.1990; one, N766159, 10.vi.1990.

Glyphipterix schoenicolella Boyd, 1858

Two, ♂ taken, N775160, 15.viii.1984; ♀ taken, N778154, 10.vi.1990.

Glyphipterix thrasonella (Scopoli, 1763)

One, N774155, 22.vii.1989.

OECOPHORIDAE

Borkhausenia fuscescens (Haworth, 1828)

One, N775160, 15.viii.1984.

Carcina quercana (Fabricius, 1775)

One, m.v.trap, N773155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

ELACHISTIDAE

Elachista atricomella Stainton, 1849

♂ taken at m.v.trap, N773155, 22.vii.1989, genitalia checked.

Elachista luticomella Zeller, 1839

♂ taken, N773155, 24.vi.1989, genitalia checked; one, N772155, 10.vi.1990.

Elachista albifrontella (Hübner, 1817)

Circa 15, N773155, 22.vi.1989; one, N774155, 24.vi.1989; one, N775152, 24.vi.1989; ♀ taken, genitalia checked, N774155, 22.vii.1989; one, N766161, 10.vi.1990.

Elachista apicipunctella Stainton, 1849

♀ taken, genitalia checked, N766161, 10.vi.1990.

Elachista subnigrella Douglas, 1853

Two ♂♂ and one ♀ taken, genitalia checked, N773155, 1.v.1989; ♂ taken, genitalia checked, N773155, 22.vi.1989; ♀ taken, N773155, 24.vi.1989, genitalia checked. A very local species in Ireland. The only Irish records I am aware of are: Clare (Bradley and Pelham-Clinton, 1967); Offaly (Bond, 1984); and Dublin (Beirne, 1941; Bond, unpublished). The foodplants given are Bromus erectus Hudson, Avena and Festuca (Traugott-Olsen and Schmidt Nielsen, 1977).

Elachista rufocinerea (Haworth, 1828)

♀ taken, N773155, 1.v.1989.

Elachista argentella (Clerck, 1759)

Two, N766159, 10.vi.1990.

Bull. Ir. biogeog. Soc. No. 14

Elachista triatomea (Haworth, 1828)

♂ taken, N773155, 22.vi.1989. First published Irish record. There are however several earlier records, viz., Ringfad Point, Co. Down, 1979 (H. G. Heal Collection, det. Bond); Bull Island, Co. Dublin, 1984; Coolbaun, north Tipperary, 1986; Greystones, Co. Wicklow and Corballis, Co. Dublin, 1988 (all Bond, unpublished). Foodplants include Festuca ovina L. and F. rubra L. (Traugott-Olsen and Schmidt Nielsen, 1977).

Biselachista utonella (Frey, 1856)

♂ taken, N775160, 15.viii.1984, genitalia checked; ♂ taken, N773155, 22.vi.1989, genitalia checked; six, two ♂♂ taken, genitalia of one checked, N774155, 22.vii.1989; ♂ taken m.v.trap, N773155, 22.vii.1989, genitalia checked. Very local in Ireland. Beirne (1941) gives only two localities, both in south Kerry. Also recorded from Bull Island, Co. Dublin (Bond, unpublished). Traugott-Olsen and Schmidt Nielsen (1977) list various Carex and Festuca spp. as foodplants.

Biselachista albidella (Nylander, 1848)

♂ taken, genitalia checked, m.v.trap, N773155, 22.vii.1989.

Cosmiotes consortella (Stainton, 1851)

♀ taken, N773155, 24.vi.1989, genitalia checked.

COLEOPHORIDAE

Coleophora deauratella Lienig and Zeller, 1846

♀ taken, genitalia checked, N775152, 22.vi.1989; ♀ taken, genitalia checked, N773155, 24.vi.1989.

Coleophora cratipennella Clemens, 1864 (C. tamesis Waters, 1929)

♂ taken, genitalia checked, N773155, 24.vi.1989.

Bull. Ir. biogeog. Soc. No. 14

Coleophora glaucicolella Wood, 1892

♂ taken, N775152, 22.vi.1989, genitalia checked; ♀ taken, N774155, 22.vii.1989, genitalia checked.

Coleophora alticolella Zeller, 1849

♂ taken, genitalia checked, N775152, 22.vi.1989; ♂ taken, genitalia checked, N773155, 24.vi.1989.

COSMopterigidae

Cosmopterix lienigiella (Lienig and Zeller, 1839)

One ♂ taken, genitalia checked, N773155, 22.vi.1989. First Irish Record. A fenland species reported to feed on Phragmites (Emmet, 1988).

Cosmopterix orichalcea Stainton, 1861 (C. drurella auctt.)

One ♂ taken, N773155, 24.vi.1989. In Ireland this species, formerly placed in the family Momphidae, has hitherto only been found in Co. Kerry (Chalmers-Hunt, 1977: 276). The species is also reported to feed on Phragmites, but it is also recorded from Phalaris arundinacea L., Milium and Hierochloa (Emmet, 1988).

BLASTobasidae

Blastobasis lignea Walsingham, 1894

Four at m.v.trap, N773155, 22.vii.1989.

GELECHIidae

Bryotropha terrella (Denis and Schiffermüller, 1775)

Two, N775152, 22.vi.1989; ♀ taken, N774155, 22.vii.1989, genitalia checked.

Bull. Ir. biogeog. Soc. No. 14

Brachmia rufescens (Haworth, 1828)

One at m.v.trap, N773155, 22.vii.1989.

TORTRICIDAE

Pandemis cerasana (Hübner, 1786)

One, N773155, 24.vi.1989.

Pandemis heparana (Denis and Schiffermüller, 1775)

One at m.v.trap, N773155, 22.vii.1989.

Aphelia paleana (Hübner, 1793)

One, N773155, 22.vi.1989; one, N775152, 22.vi.1989; one, N774155, 24.vi.1989; one, N770157, 10.vi.1990.

Clepsis consimilana (Hübner, 1817)

One, N772154, 22.vi.1989; three at m.v.trap, N773155, 22.vii.1989.

Lozotaenia forsterana (Fabricius, 1781)

One at m.v.trap, N773155, 22.vii.1989.

Pseudargyrotoza conwagana (Fabricius, 1775)

Two, N774155, 24.vi.1989.

Cnephasia asseclana (Denis and Schiffermüller, 1775)

Two at m.v.trap, N773155, 22.vii.1989.

Cnephasia incertana (Treitschke, 1835)

♀ taken, N773155, 24.vi.1989.

Agapeta zoegana (Linnaeus, 1767)

One at m.v.trap, N773155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Aethes cnicana (Westwood, 1854)

♀ taken N775152, 22.vi.1989, genitalia checked.

Cochylidia rupicola (Curtis, 1834)

♂ taken N773155, 22.vi.1989; one, N774156, 22.vii.1989. Also found in Co. Kildare by M. de Courcy Williams (Chalmers-Hunt, 1982). Otherwise known in Ireland only from the Burren, Co. Clare (Bradley and Pelham-Clinton, 1967). Foodplant Eupatorium cannabinum L. (Emmet, 1988).

Olethreutes lacunana (Denis and Schiffermüller, 1775)

Two, N775160, 15.viii.1984; five, N773155, 22.vi.1989; five, N775152, 24.vi.1989; five, N774155, 22.vii.1989; one at m.v.trap, N773155, 22.vii.1989; one, N772155, 22.vii.1989; one N766159, 10.vi.1990.

Olethreutes olivana (Treitschke, 1830)

♂ taken, genitalia checked, N774155, 22.vii.1989. Until recently this very local species of marshy areas was known only from south Kerry, Dublin and west Mayo. It has now also been found in Tyrone (Bond et al., 1989). It is reported to feed "amongst herbaceous plants and mosses" (Emmet, 1988).

Hedya dimidioalba (Retzius, 1783)

♂ taken, N774155, 24.vi.1989, genitalia checked; ♀ taken at m.v.trap, N773155, 22.vii.1989, genitalia checked.

Endothenia marginana (Haworth, 1811)

♀ taken, N775160, 15.viii.1984, genitalia checked.

Bactra lancealana (Hübner, 1799)

One, N774155, 22.vii.1989.

Bull. Ir. bioqeoq. Soc. No. 14

Ancylis badiana (Denis and Schiffermüller, 1775)

Two, N775160, 15.viii.1984; one, N773155, 1.v.1989.

Epiblema cynosbatella (Linnaeus, 1758)

One, N775152, 24.vi.1989.

Epiblema sticticana (Fabricius, 1794) (E. farfarae (Fletcher, 1938))

♂ taken, N775152, 22.vi.1989, genitalia checked.

Epiblema cirsiiana (Zeller, 1843)

Two, N775152, 24.vi.1989; one, N766159, 10.vi.1990.

Eucosma cana (Haworth, 1811)

One, N775152, 24.vi.1989; two, N774155, 22.vii.1989; one at m.v.trap, N773155, 22.vii.1989.

Eucosma campoliliana (Denis and Schiffermüller, 1775)

One at m.v.trap, N773155, 22.vii.1989.

Cydia succedana (Denis and Schiffermüller, 1775)

Two, N775152, 1.v.1989; one N775152, 22.vi.1989.

Cydia junqiella (Clerck, 1759)

Three, N773155, 1.v.1989.

Cydia compositella (Fabricius, 1775).

♂ taken, N775152, 22.vi.1989.

Dichrorampha petiverella (Linnaeus, 1758)

♂ taken, N775152, 24.vi.1989, genitalia checked; three, ♀ taken, N774155, 22.vii.1989, genitalia checked.

Dichrorampha alpinana (Treitschke, 1830)

♀ taken, N775152, 22.vi.1989, genitalia checked; ♂ taken, N775152,

Bull. Ir. biogeog. Soc. No. 14

22.vi.1989, genitalia checked.

CHOREUTIDAE

Anthophila fabriciana (Linnaeus, 1767)

One, N772154, 22.vi.1989; four, N769163, 17.ix.1989; one, N772155, 10.vi.1990; one, N766161, 10.vi.1990; one, N777153, 10.vi.1990.

PTEROPHORIDAE

Platyptilia gonodactyla (Denis and Schiffermüller, 1775)

♀ taken, N775152, 22.vi.1989, genitalia checked.

Stenoptilia bipunctdiactyla (Scopoli, 1763)

♂ taken, N773155, 24.vi.1989, genitalia checked; two, ♀ taken, N772155, 22.vii.1989, genitalia checked; one taken, "small form", N762161, 17.ix.1989.

Adaina microdactyla (Hüber, 1813)

♂ taken, N773155, 24.vi.1989, genitalia checked. Described by Beirne (1941) as "rare and local". It has also been found in the Burren, Co. Clare. (Bradley and Pelham-Clinton, 1967). The reported foodplant is Eupatorium cannabinum L. (Emmet, 1988).

PYRALIDAE

Cataclysta lemnata (Linnaeus, 1758)

♂ taken, N774155, 24.vi.1989; two at m.v.trap, N773155, 22.vii.1989.

Chrysoteuchia culmella (Linnaeus, 1758)

One, N774155, 24.vi.1989.

Bull. Ir. biogeog. Soc. No. 14

Crambus lathoniellus (Zincken, 1817)

One, N773155, 22.vi.1989; one, N774155, 24.vi.1989; one N770157, 10.vi.1990; one N777153, 10.vi.1990.

Crambus perlella (Scopoli, 1763)

Two, N775152, 22.vi.1989.

Agriphila tristella (Denis and Schiffermüller, 1775)

Circa 20, N775160, 15.viii.1984; one, N773154, 17.ix.1989.

Agriphila straminella (Denis and Schiffermüller, 1775)

Circa 10, N775160, 15.viii.1984; circa 30, N772155, 22.vii.1989; ten at m.v.trap, N773155, 22.vii.1989.

Catoptria margaritella (Denis and Schiffermüller, 1775)

One at m.v.trap, N773155, 22.vii.1989.

Scoparia subfusca Haworth, 1811

One, m.v.trap, N773155, 22.vii.1989.

Scoparia ambigualis (Treitschke, 1892)

♂ taken, N773155, 24.vi.1989, genitalia checked.

Dipleurina lacustrata (Panzer, 1804)

One at m.v.trap, N773155, 22.vii.1989.

Eudonia pallida (Curtis, 1827)

♂ and ♀ at m.v.trap, N773155, 22.vii.1989, genitalia of ♂ checked.

Opsibotys fuscalis (Denis and Schiffermüller, 1775)

One, N774155, 24.vi.1989; one, N766159, 10.vi.1990.

Udea lutealis (Hübner, 1809)

Three, N775160, 15.viii.1984; two, N772155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Pleuroptya ruralis (Scopoli, 1763)

One, N775160, 15.viii.1984.

ZYGAENIDAE

Zygaena filipendulae (Linnaeus, 1758)

Three, pair in copula, N774155, 22.vii.1989.

This is a rather scarce species in Ireland away from the coasts.

PIERIDAE

Leptidea sinapis (Linnaeus, 1758)

Two, N774155, 24.vi.1989; six, N766159, 10.vi.1990; one, N772155, 10.vi.1990.

Pieris brassicae (Linnaeus, 1758)

Two, N775160, 15.viii.1984.

Pieris napi (Linnaeus, 1758)

Circa 10, N775160, 15.viii.1984; two, N778163, 1.v.1989; one, N773154, 1.v.1989; one, N774155, 24.vi.1989; one, N772155, 22.vii.1989; six, N774155, 22.vii.1989; one N769163, 17.ix.1989; one, N775156, 17.ix.1989; one, N766159, 10.vi.1990.

Anthocharis cardamines (Linnaeus, 1758)

Four ♂♂, N778163, 1.v.1989; six ♂♂, N773154, 1.v.1989; ♂, N772155, 10.vi.1990; two ♀♀ N766159, 10.vi.1990.

Gonepteryx rhamni (Linnaeus, 1758)

One, N772154, 17.ix.1989.

NYMPHALIDAE

Bull. Ir. biogeog. Soc. No. 14

Inachis io (Linnaeus, 1758)

Two, N775160, 15.viii.1984.

Vanessa atalanta (Linnaeus, 1758)

One, N772154, 17.ix.1989; two, N768163, 17.ix.1989.

Aglais urticae (Linnaeus, 1758)

One, N775160, 15.viii.1984.

Euphydryas aurinia (Rottemburg, 1775)

Four, N766159, 10.vi.1990. This increasingly rare and local species was found only in a small, sheltered area at the western margin of the fen.

Maniola jurtina (Linnaeus, 1758)

Two, N774155, 22.vii.1989; two, N774155, 24.vi.1989.

Aphantopus hyperantus (Linnaeus, 1758)

One, N775160, 15.viii.1984; one, N773155, 22.vi.1989; one, N774155, 24.vi.1989; five, N774155, 22.vii.1989.

Coenonympha pamphilus (Linnaeus, 1758)

Two, N773155, 22.vi.1989; one, N775152, 24.vi.1989; one, N774155, 24.vi.1989; three, N766159, 10.vi.1990; two, N770157, 10.vi.1990.

Pararge aegeria (Linnaeus, 1758)

Four, N775160, 15.viii.1984; one, N778163, 1.v.1989; one, N772154, 17.ix.1989; one, N766161, 10.vi.1990.

Lasiommata megera (Linnaeus, 1767)

Five, N775160, 15.viii.1984.

LYCAENIDAE

Bull. Ir. biogeog. Soc. No. 14

Lycaena phlaeas (Linnaeus, 1761)

One, N775160, 15.viii.1984.

Polyommatus icarus (Rottemburg, 1775)

♂, N775160, 15.viii.1984; ♀, N772154, 17.ix.1989; ♂, N766159,
10.vi.1990.

DREPANIDAE

Cilix glaucata (Scopoli, 1763)

One at m.v.trap, N773155, 22.vii.1989.

GEOMETRIDAE

Pseudoterpna pruinata (Hufnagel, 1767)

One at m.v.trap, N773155, 22.vii.1989.

Idaea biselata (Hufnagel, 1767)

One at m.v.trap, N773155, 22.vii.1989.

Idaea aversata (Linnaeus, 1758)

One, N772155, 22.vii.1989.

Scotopteryx chenopodiata (Linnaeus, 1758)

One, N775160, 15.viii.1984.

Xanthorhoe ferrugata (Clerck, 1759)

One, N775160, 15.viii.1984; one at m.v.trap, N773155, 22.vii.1989.

Xanthorhoe montanata (Denis and Schiffermüller, 1775)

Two, N775152, 22.vi.1989; one, N772154, 22.vi.1989; three,
N766161, 10.vi.1990.

Bull. Ir. biogeoq. Soc. No. 14

Epirrhoe alternata (Müller, 1764)

Three, N775160, 15.viii.1984; one, N775152, 22.vi.1989; one, N774155, 24.vi.1989; one, m.v.trap, N773155, 22.vii.1989; one, N772155, 22.vii.1989.

Camptogramma bilineata (Linnaeus, 1758)

One, N775160, 15.viii.1984; one, N775152, 22.vi.1989; one, N772154, 22.vi.1989; one, N775152, 24.vi.1989.

Anticlea badiata (Denis and Schiffermüller, 1775)

One at light, N773155, 1.v.1989.

Eulithis testata (Linnaeus, 1761)

One, m.v.trap, N773155, 22.vii.1989.

Eulithis pyraliata (Denis and Schiffermüller, 1775)

One, m.v.trap, N773155, 22.vii.1989.

Colostygia pectinataria (Knoch, 1781)

One, m.v.trap, N773155, 22.vii.1989; one, N766161, 10.vi.1990.

Perizoma alchemillata (Linnaeus, 1758)

One, m.v.trap, N773155, 22.vii.1989.

Eupithecia tenuiata (Hübner, 1813)

One ♀ taken, genitalia checked, m.v.trap, N773155, 22.vii.1989.

Eupithecia absinthiata (Clerck, 1759) f. goosensiata Mabille, 1869

One ♀ taken, N775154, 22.vi.1989, genitalia checked.

Eupithecia icterata (Villers, 1789)

One, m.v.trap, N773155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Eupithecia subumbrata (Denis and Schiffermüller, 1775)

Three, ♀ taken, m.v.trap, N773155, 22.vii.1989, genitalia checked.

Abraxas grossulariata (Linnaeus, 1758)

Two, N775160, 15.viii.1984; one at m.v.trap, N773155, 22.vii.1989.

Lomaspilis marginata (Linnaeus, 1758)

One at m.v.trap, N773155, 24.vi.1989; one at m.v.trap, N773155, 22.vii.1989; two, N766161, 10.vi.1990.

Semiothisa clathrata (Linnaeus, 1758)

One, N775160, 15.viii.1984; one, N773155, 22.vi.1989; one, N775152, 22.vi.1989; two, N774155, 24.vi.1989; one, N772155, 22.vii.1989; one "dark form", at m.v.trap, N773155, 22.vii.1989; one N766159, 10.vi.1990.

Ourapteryx sambucaria (Linnaeus, 1758)

Four, m.v.trap, N773155, 22.vii.1989.

LASIOCAMPIDAE

Lasiocampa quercus (Linnaeus, 1758)

Larvae on grasses, N769163, 17.ix.1989; larva, N762161, 17.ix.1989.

ARCTIIDAE

Thumatha senex (Hübner, 1808)

Three at m.v.trap, N773155, 22.vii.1989. A very local species of fens and marshes.

Spilosoma lutea (Hufnagel, 1766)

One at m.v.trap, N773155, 24.vi.1989.

Bull. Ir. biogeog. Soc. No. 14

Phragmatobia fuliginosa (Linnaeus, 1758)

Pair in copula, N775152, 1.v.1989.

Tyria jacobaeae (Linnaeus, 1758)

Larvae on Senecio jacobaea L., N774155, 22.vii.1989; two, N766161, 10.vi.1990.

NOCTUIDAE

Rivula sericealis (Scopoli, 1763)

One, N774155, 22.vii.1989; two, m.v.trap, N773155, 22.vii.1989.

Hypena proboscidalis (Linnaeus, 1758)

One, N775160, 15.viii.1984.

Callistege mi (Clerck, 1759)

One, N766159, 10.vi.1990.

Euclidia glyphica (Linnaeus, 1758)

Four, N766159, 10.vi.1990.

Deltote uncula (Clerck, 1759)

♂ taken, N774155, 24.vi.1989; one at m.v.trap, N773155, 22.vii.1989; two, N766159, 10.vi.1990. A very local species of fens and marshes.

Diachrysia chrysitis (Linnaeus, 1758)

One at m.v.trap, N773155, 22.vii.1989.

Plusia festucae (Linnaeus, 1758)

One at m.v.trap, N773155, 22.vii.1989.

Autographa gamma (Linnaeus, 1758)

One, N775156, 17.ix.1989.

Bull. Ir. biogeog. Soc. No. 14

Autographa pulchrina (Haworth, 1809)

Two at m.v.trap, N773155, 24.vi.1989.

Autographa jota (Linnaeus, 1758)

Six at m.v.trap, N773155, 22.vii.1989.

Autographa bractea (Denis and Schiffermüller, 1775)

Two at m.v.trap, N773155, 22.vii.1989.

Abrostola trigemina (Werneburg, 1864)

One at m.v.trap, N773155, 22.vii.1989.

Acronicta rumicis (Linnaeus, 1758)

Larva, N769762, 3.ix.1989 (Coll. J. A. Good, det. A. A. Myers).

Apamea monoglypha (Hufnagel, 1766)

Ten at m.v.trap, N773155, 22.vii.1989.

Apamea lithoxylea (Denis and Schiffermüller, 1775)

One at m.v.trap, N773155, 22.vii.1989.

Apamea remissa (Hübner, 1809)

One at m.v.trap, N773155, 22.vii.1989.

Oligia fasciuncula (Denis and Schiffermüller, 1775)

One, N775152, 22.vi.1989.

Mesapemea secalis (Linnaeus, 1758)

♂ and ♀ at m.v.trap, N773155, 22.vii.1989, genitalia of both checked.

Photedes minima (Haworth, 1809)

One at m.v.trap, N773155, 24.vi.1989; two at m.v.trap, N773155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Photedes pygmina (Haworth, 1809)

One, N769163, 17.ix.1989; one, N762161, 17.ix.1989.

Mythimna ferrago (Fabricius, 1787)

One at m.v.trap, N773155, 22.vii.1989.

Mythimna pudorina (Denis and Schiffermüller, 1775)

Two, one taken at m.v.trap, N773155, 24.vi.1989. A scarce Irish species. Apart from a 1933 record from Athy, Co. Kildare, it has only been reliably recorded from Kerry and west Cork (Baynes, 1964). The foodplants listed by Lorimer (1979) are Phragmites australis (Cav.) Trin. ex Steudel, Luzula pilosa (L.) Willd., Molinia caerulea (L.) Moench, Carex pulicaris L. and Dactylis glomerata L.

Mythimna straminea (Treitschke, 1825)

One taken, N772154, 22.vi.1989. A local species in Ireland, found mainly in coastal areas of the south. The foodplants listed by Lorimer (1979) are Phragmites and Phalaris spp.

Mythimna impura (Hübner, 1808)

Ten at m.v.trap, N773155, 22.vii.1989.

Ochropleura plecta (Linnaeus, 1761)

One at m.v.trap, N773155, 24.vi.1989; one at m.v.trap, N773155, 22.vii.1989.

Noctua pronuba (Linnaeus, 1758)

Two at m.v.trap, N773155, 22.vii.1989; one, N777153, 10.vi.1990.

Noctua janthina Denis and Schiffermüller, 1775

One at m.v.trap, N773155, 22.vii.1989.

Bull. Ir. biogeog. Soc. No. 14

Xestia triangulum (Hufnagel, 1766)

Two at m.v.trap, N773155, 22.vii.1989.

Xestia sexstrigata (Haworth, 1809)

One, N775160, 15.viii.1984; one at m.v.trap, N773155, 22.vii.1989.

Conclusions

The work so far carried out on the Lepidoptera of Pollardstown Fen cannot be considered as in any way comprehensive. For example, very little work has been carried out in the spring or the autumn. Even the fauna of the summer period has been by no means thoroughly studied. Nevertheless it is already clear that the fen contains a distinctive and highly interesting fauna, as illustrated by the fact that two species new to Ireland, and several species scarce in the Irish context were recorded in the relatively modest total of 159 species.

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Bull. Ir. biogeog. Soc. No. 14 (1991)

SITES OF INTERNATIONAL AND NATIONAL IMPORTANCE FOR INVERTEBRATE
FAUNA - A DEFINITION PROPOSED FOR USE IN SITE SURVEYS.

Jervis A. Good and Martin C. D. Speight

Introduction

Four categories are employed to rank sites where plant and animal species, or communities, deemed to be of "scientific interest", have been found to occur: International, National, Regional and Local (e.g. Anon., 1981). However, what defines these different ranks is not clear for the invertebrate component of the fauna. Sampling difficulties, lack of reference data, and seasonal variations make quantitative approaches like those detailed by Usher (1986) unusable. The need to deal with this problem became obvious during the course of an Irish Biogeographical Society site evaluation study of Newbridge Fen, and the proposed solution has been developed with such studies in mind. What we suggest is a pragmatic approach, which recognises that, for the foreseeable future, faunal inventory work is unlikely to provide more than species lists for the great majority of sites in question. Similarly, we recognise that any system of site evaluation should be as simple as possible to operate, if it is to be applied on any scale. Further problems, such as size of site (e.g. is a National Park a single site or a group of sites?), which have obvious implications for the application of the proposal, will need to be addressed at a later stage, and are beyond the scope of this paper. The approach is particularly suitable for rapid site surveys using indicator groups (See Speight, 1986).

Basis for Definition

It would be naïve to assume that any site, based entirely on the occurrence of a single species of obscure and tiny invertebrate,

Bull. Ir. biogeog. Soc. No. 14

would gain much conservation support. With the exception of a few species of aesthetic or economic interest, the conservation assessment of a site must be based on the invertebrate communities present, rather than individual species. The occurrence of two or more species, which are under threat, in the limited taxonomic range examined in any site survey, is likely to indicate the presence of further species also under threat. However, the sole use of rarity as a site assessment criterion can be criticized on the grounds that the odd and unusual would receive status at the expense of the typical (Usher, 1986). It is thus advisable to take into account the other species in the community which, though not threatened, represent a typical community and its combination of microhabitats.

Proposed Definition : Site of International Importance for invertebrate fauna

An area where two or more species occur which are under threat in Europe, together with a reasonable number of the Irish species which are representative of the biotopes present.

Proposed Definition : Site of National Importance for invertebrate fauna

An area where two or more species occur which are under threat in Ireland, together with a reasonable number of the Irish species which are representative of the biotopes present.

Interpretation of Definition

Obviously, such a definition can become ambiguous and misleading if not interpreted with care. Several points need to be acknowledged when using the definition. Information on the distribution of the species regarded as being under threat should

Bull. Ir. biogeog. Soc. No. 14

be adequate, for instance the species should not have been so recently described that insufficient data will have been gathered on their distribution. The distribution data used for all species employed in the evaluation should be published (or accepted for publication), and not have been refuted in the literature. An example of refuted Irish records are those for Rhagium inquisitor (L.) (see Speight, 1988). The threatened status of a species should be based upon the opinion of a specialist, and this opinion should be justified on the basis of distribution data and habitat threat, and should take into consideration the intensity of recording for the species in question. Publication of lists of threatened species would be helpful in this context. Species employed in the evaluation should be part of the native fauna of the region considered, and should be resident in the area in question. This will exclude accidental and vagrant species. 'Europe' is taken to mean geographic Europe (i.e. the land mass and islands west of the Urals and Caspian Sea, excluding Kazakhstan) and Turkey. The use of 'reasonable number' in the definition is unavoidable, due to the varying nature of the habitats and communities encountered. 'Reasonable' should be in the opinion of a specialist who is familiar with the ecology of the group in question, and this opinion should be justified on the basis of distribution and ecological data for the species being used.

Example

The following is an example of how the above proposal might be used in evaluating a site.

(I = International (Europe); N = National (Ireland))

Site : Scragh Bog Nature Reserve,
Co. Westmeath

Proposed status : International

Bull. Ir. biogeog. Soc. No. 14

- Taxonomic group : Diptera
- Species under threat : Acrometopia wahlbergi (Zetterstedt) [I,N]
Herina oscillans (Meigen) [I]
Pogonota barbarata (Zetterstedt) [N]
Tetanocera freyi Stack [I]
Chrysogaster virescens (Loew) [N]
Parhelophilus consimilis (Malm) [I]
Platycheirus immarginatus (Zetterstedt) [N,I]
Platycheirus pelatus (Meigen) [N]
Platycheirus perpallidus (Verrall) [I]
Chrysops sepulchralis (Fabricius) [N,I]
- Representative species list : Listed in Speight (1984)
- Data references : Chandler (1972, 1975); Chvala et al. (1972); Irwin (1977); Speight and Chandler (1983); Speight et al. (1975); Speight and Cogan (1979); Speight and Goeldlin de Tiefenau (1990).

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

CRANEFLIES NEW TO IRELAND (DIPTERA: CYLINDROTOMIDAE, LIMONIIDAE, TIPULIDAE).

P. Ashe, J. P. O'Connor, P. J. Chandler, A. E. Stubbs, R. I. Vane-Wright and R. E. Blackith

Introduction

A total of 25 taxa of craneflies are recorded from Ireland for the first time consisting of six species of Tipulidae, one species of Cylindrotomidae, 17 species and one variety of Limoniidae. This paper is the first of a series of papers on the Irish craneflies - subsequent papers will provide comprehensive records and distribution maps of all species known to occur in Ireland. Species were identified using Coe (1950), Lackschewitz and Pagast (1940-1942), Mannheims and Theowald (1951-1980) and Peus (1952).

Materials and methods

The Irish national grid reference (six or four figure reference) is included where possible followed by the Universal Transverse Mercator (UTM) 50 km grid reference in parenthesis. The method used to obtain the UTM references is described in Rasmont et al. (1986). The nomenclature for the Tipulidae and Cylindrotomidae follows Kloet and Hincks (1975) but for the Limoniidae we have followed Mendl's (1987) recent work on Irish species.

List of collectors and abbreviations used for collectors' names:-
P. Ashe = PA; R. E. Blackith = REB; P. J. Chandler = PJC; A. G. Irwin = AGI; R. Nash = RN; J. P. O'Connor = JPOC; K. C. Side = KCS; A. E. Stubbs = AES; R. I. Vane-Wright = RIVW.

Bull. Ir. biogeog. Soc. No. 14

Family Tipulidae

Nephrotoma analis (Schummel, 1833)

Cork: 16.vii.1975, Kildorrery R723106 (NT.1), AES.

Limerick: 19.vii.1975, Limerick City R575597 (NU.2), AES.

Wexford: 24.vii.1975, Strahart S958514 (PU.4), AES.

Nephrotoma appendiculata (Pierre, 1919)

Down: 8.viii.1965, Bangor J5-8- (UF.1), RN.

Tipula (Savtshenkia) signata Staeger, 1840

Mayo: 29.ix.1977, Westport Demesne L9884 (MV.3), PJC.

Roscommon: 28.ix.1977, Castlerea M6-8- (NV.1), PJC.

Sligo: 1.x.1977, Bellanascarrow G6-1- (NV.1), PJC; 1.x.1977, Templehouse G6-1- (NV.1), PJC.

Tipula (Lunatipula) cava Riedel, 1913

Cork: 17-18.vi.1970, coast between Shot Head and Trafrask V8548 (MT.4), RIVW; 18.vi.1970, Curragh, near Trafrask V8651 (MT.4), RIVW.

Tipula (Yamatotipula) couckeii Tonnoir, 1921

Antrim: 9.viii.1974, Lady Bay, Lough Neagh J0969 (PA.4), AGI.

Armagh: 31.viii.1974, Ardmore Point, Lough Neagh J0063 (PA.4), AGI.

Clare: 7.vi.1970, Lough Atorick R635960 (NU.1), RIVW; 9.vi.1970, Muckanagh Lough R370922 (NU.1), RIVW.

Cork: 16.vii.1975, Kildorrery R723106 (NT.1), AES.

Kerry: 14.vi.1970, Lough Guitane W035848 (MT.3), RIVW.

Roscommon: 14.v.1970, Lough Ree N0-4- (NV.4), PJC.

Tipula (Yamatotipula) marginella Theowald, 1980

Laois: 26.vi.1987, Annaghmore Lough N3115 (NU.3), PJC.

Waterford: 15.vii.1975, Carrickbeg S404216 (PT.1), AES.

Bull. Ir. biogeog. Soc. No. 14

Family Cylindrotomidae

Phalacrocera replicata (Linnaeus, 1758)

Westmeath: 28.vi.1987, Glen Lough N2766 (NV.4), PJC.

Family Limoniidae

Dicranomyia (Sphaeropyga) danica (Kuntze, 1919)

Wexford: 25.vii.1970, Cahore T2244 (PU.4), RIVW.

Wicklow: iv.1988, Blackditch Wood O3103 (PU.3), REB; iv.1988, x.1988, Killoughter T3199 (PU.3), REB.

Dicranomyia (Dicranomyia) lucida (de Meijere, 1918)

Wexford: 14.vii.1975, Orristown T0413 (PT.3), AES.

Dicranomyia (Dicranomyia) mitis var. affinis (Schummel, 1829)

Cork: 29.v.1974, Derreenacarrin V8851 (MT.4), KCS.

Down: 10.vi.1973, Cnocknafeola Pine Wood J2722 (PV.3), AGI.

Dicranomyia (Dicranomyia) omissinervis (de Meijere, 1918)

Cork: 16.vii.1975, Mallow W550980 (NT.1), AES.

Waterford: 15.vii.1975, Carrickbeg S404216 (PT.1), AES.

Rhipidia ctenophora (Loew, 1871)

Dublin: 27.vi.1975, Howth Woods, Dublin O2-3- (PV.4), PJC.

Helius flavus (Walker, 1856)

Kilkenny: 23.vi.1975, Jenkinstown Wood S4-6- (PU.2), PJC.

Westmeath: 28.vi.1987, Scragh Bog N4259 (PV.2), PJC.

Helius pallirostris Edwards, 1921

Wexford: 25.vii.1970, Cahore T2244 (PU.4), RIVW.

Bull. Ir. biogeog. Soc. No. 14

Pedicia (Crunobia) straminea (Meigen, 1838)

Wicklow: 16.ix.1968, near Poll an Easa Waterfall, Glendalough T1195 (PU.3), PJC.

Dactylolabis sexmaculata (Macquart, 1826)

Clare: 2.iv.1983, Burren M0904 (MU.3), JPOC.

Phylidorea abdominalis Staeger, 1840

Kerry: 29.vi.1969, Rossacroonaloo Wood W0478 (MT.3), PJC.

Neolimnophila carteri (Tonnoir, 1921)

Wicklow: 24.vi.1975, Derrybawn Woods T1-9- (PU.3), PJC.

Gonomyia bifida Tonnoir, 1920

Clare: 23.vii.1975, Bridget Lake, Tulla R556810 (NU.1), AES.

Louth: 29.vi.1975, Thomastown N9-9- (PV.3), PJC.

Lipsothrix remota (Walker, 1848)

Clare: 22.v.1970, Lisdoonvarna R1397 (MU.3), PJC.

Offaly: 26.vi.1987, wooded bank of Camcor River N2204 (NU.3), PJC.

Wicklow: 15.v.1991, Knocksink Wood O2118 (PU.3), PA.

Cheilotrichia (Cheilotrichia) imbuta (Meigen, 1818)

Cork: 4.vii.1969, Glengarriff State Forest V9257 (MT.4), PJC.

Meath: 30.v.1988, River Boyne N8768 (PV.4), JPOC.

Erioptera (Erioptera) nielseni de Meijere, 1921

Kerry: 17.vii.1975, Clonee Loughs, south-west of Kenmare V8264 (MT.4), AES; 17.vii.1975, south of Killarney V932826 (MT.3), AES; 18.vii.1975, Knockeirka V947666 (MT.4), AES.

Erioptera (Erioptera) squalida Loew, 1871

Wexford: 25.vii.1970, Cahore T2244 (PU.4), RIVW.

Bull. Ir. biogeog. Soc. No. 14

Ormosia depilata Edwards, 1938

Antrim: 24.v.1975, Glarryford Bog, near Clogh Mills D0515 (PA.3), AGI.

Down: 13.iv.1975, Rostrevor J1817 (PV.3), AGI.

Kerry: 16.x.1973, Muckross Abbey Woods V9686 (MT.3), PJC.

Tyrone: 8.v.1970, Gortin Glen National Forest Park H4881 (PA.1), PJC.

Wicklow: 8.vii.1969, below Poll an Easa Waterfall, Glendalough T1195 (PU.3), PJC.

Molophilus medius de Meijere, 1918

Wicklow: 16.ix.1968, Glendalough, by Ri Fearta Church T1296 (PU.3), PJC; 11.vii.1971, near Dunlavin N8601 (PU.3), PJC.

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

RECORDS OF COLEOPTERA FROM IRISH WETLAND SITES IN 1989.

D. A. Lott and D. T. Bilton

Introduction

Recent work by a number of entomologists on the Coleoptera of wetlands has led to the discovery of several species new to Ireland and the British Isles and shown that several types of wetland habitat, most notably fens and turloughs, have been neglected in the past. This paper, which is based on fieldwork carried out between 10th and 15th June 1989, introduces seven further species to the Irish list and gives the species of terrestrial Coleoptera recorded for a variety of fens, turloughs and rivers, that were visited. Aquatic Coleoptera from these sites are listed by Bilton and Lott (in press).

List of sites

The following list gives details of the sites visited. Each site is listed by county and given a number which appears in the species list that follows.

Wexford

1. Screen Hills A, T1029, small kettlehole marsh with Sphagnum, Juncus and Carex.
2. Screen Hills B, T1029, small kettlehole marsh covered by Sphagnum.
3. Camaross Crossroads, S8824, bed of dried up pool with Juncus and grasses.

Tipperary

4. River Aherlow, R9130, sparsely vegetated riverbank on fine sand.

Limerick

Bull. Ir. biogeog. Soc. No. 14

5. Lough Gur, R6440, mossy lakeside fen with Carex paniculata and Salix carr.

Clare

6. Lough Gash, R3967, large eutrophicated turlough with silty margins overlain with fine algal mat.
7. Near Knockaunroe, R3195, mossy turlough with marly substrate.
8. Lough Bunny (western end), R3796, grazed margins of marly lake.
9. Lough Bunny (eastern end), R3897, lake margins with sandy beaches and rocky shore with damp crevices; some flood debris.
10. Near Rinnamona, R2994, marsh with peaty substrate overlying marl.

Galway

11. Coole Lough, M4204, silty margins of pool left in deep turlough.
12. Dunkellin River, M4618, stony calcareous river margin.
13. Mossfort Turlough, M3451, on marly mud by small pool in turlough.
14. Dawros River, L7358, steep banks of torrential river.

Mayo

15. Lough Corrib, L9752, lakeside mossy flush.
16. Failmore River, L9551, riverside shingle banks.

Roscommon

17. Castleplunket Turlough, M7778, drained turlough, almost dry and heavily trampled by cattle.
18. Mullygollan Turlough, M8079, mossy and muddy margins of pool in drained turlough.

Longford

19. Cordara Turlough, N0263, mossy turlough on organic substrate.

Westmeath

20. Walshestown Fen, N3854, mossy fen in old peat cuttings.
21. Scragh Bog, N4259, mesotrophic fen.
22. Ballynafid Fen, N4160, lakeside mossy fen and willow carr.

Bull. Ir. biogeog. Soc. No. 14

Species list

The species, which were recorded, are listed below together with the number of the sites at which they were found. Species believed to be new to Ireland are asterisked. Voucher specimens of rare species are at present held by D.A.L. Nomenclature follows Pope (1977) as amended in 'British Insect Fauna' published in editions of Antenna.

CARABIDAE

Pelophila borealis: 6, 11, 18.

Nebria brevicollis: 4.

Blethisa multipunctata: 11.

Elaphrus cupreus: 13, 15, 17, 19.

Elaphrus riparius: 13.

Loricera pilicornis: 4, 11, 13.

Dyschirius globosus: 13.

Dyschirius luedersi: 6, 13, 19.

Clivina fossor: 10, 14, 16.

Trechus obtusus: 9, 14.

Bembidion aeneum: 12, 13, 17.

Bembidion assimile: 6, 19.

Bembidion atrocoeruleum: 14, 16.

Bembidion clarki: 18, 19.

Bembidion decorum: 16.

Bembidion dentellum: 11, 12.

Bembidion doris: 1, 19.

Bembidion lampros: 4.

Bembidion mannerheimi: 3, 9, 13, 15, 17.

Bembidion tetracolum: 4, 12, 14, 16.

Pterostichus anthracinus: 6, 11, 19.

Pterostichus diligens: 10.

Pterostichus gracilis: 6, 19.

Bull. Ir. biogeog. Soc. No. 14

- Pterostichus minor: 5.
Pterostichus nigrita agg.: 3, 9, 17, 19.
Pterostichus strenuus: 3, 6, 9, 10, 15, 21.
Pterostichus vernalis: 8.
Agonum albipes: 8, 9, 11, 12, 14, 16.
Agonum fuliginosum: 5.
Agonum gracile: 3, 5.
Agonum lugens: 6.
Agonum marginatum: 9, 11.
Agonum moestum: 11, 17, 19.
Agonum muelleri: 4.
Agonum piceum: 19.
Agonum thorevi: 5, 20, 21.
Agonum viduum: 19.
Trichocellus placidus: 10.
Stenolophus mixtus: 6, 19.
Acupalpus consputus: 17.
Acupalpus dubius: 3.
Chlaenius nigricornis: 6, 11.
Dromius linearis: 1.

HYDROPHILIDAE

- Cercyon unipunctatus: 5.

PTILIIDAE

- Ptenidium fuscicorne: 5, 10.
Acrotrichis atomaria: 19.
Acrotrichis brevipennis: 19.
Acrotrichis lucidula: 5, 19.
Acrotrichis sitkaensis: 9, 18.
*Acrotrichis strandi: 17.

Bull. Ir. biogeog. Soc. No. 14

SCYDMAENIDAE

Stenichnus collaris: 10.

STAPHYLINIDAE

- Lesteva heeri: 1, 5, 15, 20.
Deleaster dichrous: 11, 14.
Bledius annae: 4.
Bledius gallicus: 4.
Carpelimus corticinus: 3, 13, 17.
Carpelimus rivularis: 4, 6, 12, 13, 17.
Anotylus rugosus: 18.
Stenus bifoveolatus: 1, 5.
Stenus bimaculatus: 3.
Stenus binotatus: 19.
Stenus boops: 4, 6, 11, 13, 17, 18, 19.
Stenus brunripes: 9.
Stenus canaliculatus: 4, 9.
Stenus cicindeloides: 3, 21.
Stenus clavicornis: 9.
Stenus flavipes: 17.
Stenus fornicatus: 1, 19.
Stenus fulvicornis: 4.
Stenus fuscipes: 10, 18, 19.
Stenus glabellus: 21.
Stenus guttula: 12.
Stenus impressus: 1, 21.
Stenus junco: 1, 5, 8, 17.
Stenus latifrons: 1, 3, 5, 15, 20, 21, 22.
Stenus melanarius: 2.
Stenus nitens: 15, 20, 22.
Stenus nitidiusculus: 1, 5, 10, 20, 21.
Stenus pallitarsis: 1, 5.

Bull. Ir. biogeog. Soc. No. 14

- Stenus picipennis: 1.
Stenus picipes: 1.
Stenus pubescens: 5.
Stenus tarsalis: 13, 19.
Euaesthetus ruficapillus: 1.
Paederus riparius: 1, 2, 5, 20, 21, 22.
Lathrobium brunnipes: 3, 5, 15, 20.
Lathrobium impressum: 11.
Lathrobium quadratum: 6, 19.
Lathrobium terminatum: 1, 5, 8, 15, 20, 21, 22.
Ochtheophilum fracticorne: 21.
Xantholinus longiventris: 4, 11.
Erichsonius cinerascens: 1, 20.
Philonthus corvinus: 5.
Philonthus fumarius: 5, 21, 22.
Philonthus furcifer: 5, 11, 18.
Philonthus marginatus: 6.
Philonthus mannerheimi: 9.
Philonthus micans: 6, 8, 19.
Philonthus nigrita: 5, 21.
*Philonthus punctus: 6, 11.
Philonthus quisquiliarius: 6, 13, 18, 19.
Gabrius pennatus: 3, 13, 19.
Gabrius trossulus: 15.
Staphylinus erythropterus: 5, 21.
Quedius fuliginosus: 5, 21.
Quedius maurorufus: 1, 5, 21.
Quedius molochinus: 9.
Mycetoporus longulus: 7.
Tachinus signatus: 9.
Gymnusa brevicollis: 5, 21.
Cypha laeviuscula: 9.
Myllaena dubia: 1, 5.
Myllaena intermedia: 1.

Bull. Ir. biogeoq. Soc. No. 14

- Hygronoma dimidiata: 1.
Encephalus complicans: 5, 17.
Tachyusa atra: 6, 7, 8, 9, 11, 12, 13, 17, 18, 19.
Gnypeta carbonaria: 4, 6, 13, 17, 18, 19.
*Hydrosmeeta delicatula: 16.
Hydrosmeeta eximia: 16.
Hydrosmeeta thinobioides: 4.
Aloconota cambrica: 16.
Amischa decipiens: 18.
*Dochmonota clancula: 6.
Geostiba circellaris: 9.
Atheta (Philhygra) elongatula: 13, 17.
Atheta (Philhygra) malleus: 3, 6, 11, 13, 17, 18.
Atheta (Philhygra) melanocera: 13, 14, 17, 18.
Atheta (s. str.) graminicola: 17, 19.
*Pachnida nigella: 5.
Drusilla canaliculata: 9, 10.
Deubelia picina: 21.
Ocyusa maura: 5.
*Hygropora cunctans: 18.
Oxyopoda elongatula: 1, 5, 17.

PSELAPHIDAE

- Bryaxis bulbifer: 10, 15.
Bryaxis longicornis: 5.

SCIRTIDAE

- Cyphon hilaris: 1, 5, 21.
Cyphon palustris: 5.
Cyphon variabilis: 1, 2, 21.
Microcara testacea: 5.

Bull. Ir. biogeog. Soc. No. 14

BYRRHIDAE

Cytilus sericeus: 21.

ELATERIDAE

Zoroachros minimus: 9, 16.

CRYPTOPHAGIDAE

Atomaria mesomela: 1.

LATHRIDIIDAE

*Enicmus testaceus: 6.

CHRYSOMELIDAE

Phaedon armoraciae: 18.

Hydrothassa marginella: 18.

CURCULIONIDAE

Notaris acridulus: 13, 17.

Special notes

The following species are likely to be previously unrecorded in Ireland as they are not included in the provisional Irish list (Nash et al, unpublished):-

Acrotrichis strandi Sundt: a single specimen of this species was found at Castleplunket Turlough, Co. Roscommon and kindly

Bull. Ir. biogeog. Soc. No. 14

identified by Mr Colin Johnson. Its European distribution was described as boreal by Sundt (1971) and it is rare in Britain (Johnson, 1967).

Philonthus punctus (Gravenhorst): three specimens of this species were found on silt underneath a dried algal mat by Lough Gash, Co. Clare. Five further specimens were found on bare mud by a residual pool in Coole Lough, Co. Galway. P. punctus is widespread in Europe, but rarer in central and northern Europe, where it is confined to marshes on mud and clay along sea coasts and major river valleys (Horion, 1965). In Britain, apart from one 19th century record from south Devon, it is restricted to marshes in Kent and Essex along the Thames and the Essex coast (R. S. Key, pers. comm.), which corresponds to its distribution in northern Europe. The two known Irish localities, however, are neither coastal nor associated with large river valleys.

Hydrosmecta delicatula (Sharp): one specimen of this species was found in unvegetated riverside shingle, its typical habitat, at the Failmore River, Co. Mayo. H. delicatula is scarce throughout its range, and in Britain it is found in northern England and Scotland.

Dochmonota clancula (Erichson): two specimens of this marshland species were found at Lough Gash, Co. Clare. D. clancula is regarded as scarce in Britain and central Europe. In Britain, it is recorded from southern England north to the midlands and East Anglia.

Pachnida nigella (Erichson): two specimens of this species were found in Typha latifolia stems in lakeside fen at Lough Gur, Co. Limerick. It is usually associated with this species of plant. In Britain it is found in England, where it is not uncommon in the south and midlands.

Bull. Ir. biogeog. Soc. No. 14

Hygropora cunctans (Erichson): one specimen of this rare species was found in moss in short turf in Mullygollan Turlough, Co. Roscommon. Horion (1967) gives its distribution as northern and central Europe, where it has been found mainly in marsh litter and Sphagnum bogs. In Britain, it is very rare and only recorded from six localities in counties along the south coast of England and in Inverness-shire (Owen, 1987).

Enicmus testaceus (Stephens): the occurrence of a specimen of this species on silt by Lough Gash, Co. Clare, is somewhat puzzling because in Britain it is an uncommon species associated with slime moulds on trees in woodland.

The following notes refer to species which have been rarely recorded in Ireland:-

Agonum lugens (Duftschmid): this species was introduced to the Irish list by Anderson (1985) from two localities in Co. Clare. It has not been recorded from Britain. Two specimens found at Lough Gash, Co. Clare, constitute the third Irish record.

Acupalpus consputus (Duftschmid): this species was introduced to the Irish list by Anderson (1981) from Garryland Wood, Co. Galway. A single specimen from Castleplunket Turlough constitutes the second Irish record.

Hydrosmeeta eximia (Sharp): two specimens of this species were found with H. delicatula, mentioned above, in riverside shingle at Failmore River. H. eximia was recorded in Co. Fermanagh in 1988 (Lott and Meharg, 1989). It is not uncommon in riverside shingle in southern Scotland and northern England and it may be that it is widespread in Ireland in suitable habitats. However such habitats appear to be in decline in Ireland because of the large number of river engineering works.

Bull. Ir. biogeog. Soc. No. 14

This paper includes records of eight species of Philonthus, which are strongly associated with wetland habitats. Additional records of several of these species can be found in Lott and Foster (1990) and Lott and Meharg (1989). On the basis of their recorded habitats, it appears that they divide into two groups. Fenland species comprising P. corvinus Erichson, P. fumarius (Gravenhorst) and P. nigrita (Gravenhorst) prefer well vegetated habitats dominated by Sphagnum spp. and with a peat substrate. Marshland species comprising P. furcifer Renkonen, P. mannerheimi Fauvel, P. micans (Gravenhorst), P. punctus (Gravenhorst) and P. quisquiliarius (Gyllenhal) prefer more sparsely vegetated habitats, often grazed and often on substrates with a higher mineral content, although it should be noted that P. furcifer has been recorded at Lough Gur in a well vegetated fen. Many of these species appear to have been previously under-recorded, so a list of the counties from which they are recorded in this and the two above cited papers appears below. All these records date from 1987 onwards.

P. corvinus: Fermanagh, Limerick, Louth.

P. fumarius: Limerick, Westmeath.

P. furcifer: Galway, Limerick, Mayo, Roscommon.

P. mannerheimi: Clare.

P. micans : Clare, Longford.

P. nigrita: Fermanagh, Limerick, Tyrone, Westmeath.

P. punctus: Clare, Galway.

P. quisquiliarius: Clare, Fermanagh, Galway, Longford, Roscommon.

One further wetland species of Philonthus has been recorded in Ireland, namely P. micantoides, which was introduced to the Irish list by Good (1990) on the basis of specimens in the Bullock collection originating from the banks of the River Flesk near Killarney, Co. Kerry.

Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

CRUSTACEAN RECORDS FROM LOUGH HYNE (INE), CO. CORK, IRELAND:
PART V.

J. M. C. Holmes

This is the fifth list in a series on the crustacean fauna of Lough Hyne (Ine) (W0928), the marine nature reserve in West Cork, and reports additions to some earlier lists (Holmes, 1980, 1983, 1985, 1987).

Sampling was carried out by a variety of methods; shore collecting, sorting through weed and sponges, and taking small samples of sublittoral mud. Much of the collecting was by underwater light-trap (Holmes and O'Connor, 1988), most frequently at a site known as Station G10 (W097280), mid-way along the south shore of the lough near a submerged rocky outcrop. The station numbers are derived from a grid system figured in Minchin (1987). Other sites visited were: the Goleen (W096277), a blind inlet leading from the south-west corner of the lough, brackish in its upper reaches; the north-west corner (W092289), a brackish area where a small stream flows into the lough; the North Quay (W094288), midway along the north shore; and the Barloge, the creek leading from L. Hyne to the open sea.

The species list is laid out in the same way as the previous lists. Some of the data on the harpacticoids has already been published, albeit in a more concise form, in a general review of Irish Harpacticoids by Holmes and O'Connor (1990). New Irish Records are indicated by *. A selection of the animals collected has been deposited in the National Museum of Ireland.

Bull. Ir. biogeog. Soc. No. 14

Species List

Order PODOCOPIIDA

Semicvtherura acuticostata (G.O.Sars)

Several specimens in coarse shell gravel, Barloge, 24.vii.1986.

Xestoleberis nitida (Liljeborg)

Several specimens in light-traps, Station G10, July 1990.

Paradoxostoma pulchellum G.O.Sars

Three specimens amongst algae and sponges, Station G10, 13.viii.1989.

Order HARPACTICOIDA

Ectinosoma normani T.Scott and A.Scott

Several specimens amongst algae and sponges, Station G10, 13.viii.1989. Fresh specimens are easily recognisable by the presence of a pair of prominent red patches anteriorly.

Darcythompsonia fairliensis (T.Scott)

Abundant amongst the filamentous alga Audouinella at Station G10 and around the North Quay, August 1988.

Euterpina acutifrons (Dana)

Two specimens in light-trap, North Quay, 5m, 23.ix.1987. A characteristic planktonic species.

Tachidius discipes Giesbrecht

In littoral peaty mud in a brackish area in the upper reaches of the Goleen, 12.viii.1989. A characteristic brackish species.

Bull. Ir. biogeog. Soc. No. 14

Harpacticus obscurus T.Scott

In light-trap, Barloge, 1m, 15.vii.1990.

Harpacticus tenellus G.O.Sars

Abundant in light-traps in the lough. The record of H. gracilis from L. Hyne by Holmes (1985) should refer to this species.

Perissocope sp.

One specimen in light-trap, off the west end of Castle Island, 20m, 14.vii.1990. This problematical genus is otherwise unknown in Ireland.

Idvella exiqua G.O.Sars

Several specimens in light-trap, Station G10, 25.vii.1988, and amongst algae and sponges, 13.viii.1989, at the same site.

Tisbe reticulata Bocquet

In light-trap, 1m, Barloge, 15.vii.1990.

Porcellidium ovatum Haller

Amongst algae in shallow water throughout the lough. Specimens found on "Lithothamnium" in L. Hyne and recorded under the names P. tenuicauda and P. viride by Holmes (1985) were re-examined and should be referred to P. ovatum. This is a warm-water species widely distributed in the Mediterranean and Indo-Pacific. It may possibly have been brought to L.Hyne accidentally amongst algae attached to ships.

Porcellidium sarsi Bocquet

Amongst algae attached to a floating oil-boom, Barloge, 22.ix.1987; in light-trap, Barloge, 1m, 15.vii.1990.

Porcellidium tenuicauda Claus

One specimen in light-trap sample taken by D. Minchin, Whirlpool

Bull. Ir. biogeog. Soc. No. 14

Cliff, 22.viii.1983.

Alteutha depressa (Baird)

In light-traps, North Quay, 5m, 23.ix.1987, and in Barloge, 1m, 15.vii.1990.

Dactylopodella flava (Claus)

In coarse shell gravel, Barloge, 24.vii.1986, and amongst algae and sponges, Station G10, August 1988 and 1989.

Diarthrodes major (T.Scott and A.Scott)

In gravel under stones in shallow water, north shore, 8.vii.1982.

Parastenhelia spinosa (Fischer)

In light-trap, 2m, 25.vii.1988, and amongst algae and sponges, Station G10, July 1988 and August 1989; in peaty mud, the Goleen, August 1989.

Amphiascoides debilis (Giesbrecht)

Gravel under stones, north shore, 8.vii.1982; mud, North Quay, 5m, 3.viii.1989; peaty mud, the Goleen, 12.viii.1989.

Amphiascopsis cinctus (Claus)

Abundant in light-traps and amongst weed in shallow water around the lough. The record of this species from the plankton of L. Hyne by Holmes (1983) was based on a mis-identification and should refer to a closely related form discussed immediately below.

Amphiascopsis cinctus, sensu Sars

This striking form, with transverse purple bands and a dorsal longitudinal purple stripe, apparently yet without a name, is common in light-traps and is abundant amongst algae all round the lough. It is clearly the form illustrated by Sars (1906) under the name Amphiascus cinctus (Claus), but it is not the same as the

Bull. Ir. biogeog. Soc. No. 14

true A. cinctus of Claus, with which it co-exists in L. Hyne. The two were unjustifiably synonymised by Lang (1948).

Haloschizopera pygmaea (Norman and T.Scott)

In muddy sand, North Quay, August 1988 and 1989 and at Station G10, August 1989. Otherwise known in Ireland from Galway Bay (Moore and O'Reilly, 1989).

Paramphiascella vararensis (T.Scott)

Occasionally in small numbers; North Basin, light-trap, 15m, 14.vii.1981; Station G10, amongst algae and sponges, 15.viii.1988, 13.viii.1989.

Stenhelia gibba Boeck

Two specimens, coarse shell gravel, Barloge, 24.vii.1986; one specimen, light-trap, 2m, Station G10, 25.vii.1988.

Stenhelia giesbrechti T.Scott and A.Scott

One specimen, coarse shell gravel, Barloge, 24.vii.1986; one specimen, light-trap, 5m, North Quay, 23.ix.1987; 3 specimens, mud, 5m, north shore, 3.viii.1989.

Stenhelia normani (T.Scott)

One ♀ specimen, light-trap, 2m, Station G10, 25.vii.1988.

Stenhelia palustris (Brady)

One ♀ specimen in shallow water mud in the brackish upper reaches of the Goleen, 10.viii.1989. A characteristic brackish species.

Ameira tenella G.O.Sars

One ♀ specimen, coarse shell gravel, Barloge, 24.vii.1986. The confusion surrounding the name of this species was discussed by Holmes and O'Connor (1990).

Bull. Ir. biogeog. Soc. No. 14

Nitocra spinipes Boeck

Abundant in the north-west corner of the lough, 28.vii.1989. A characteristic brackish species.

Nitocra typica Boeck

One specimen, gravel under stones, north shore, 8.vii.1982; several specimens in peaty mud in shallow water in the upper reaches of the Goleen, 12.viii.1989.

Diarthrodella parorbiculata Wells

Several specimens in coarse shell gravel, Barloge, 24.vii.1986. (Holmes and O'Connor, 1990).

Mesochra heldti Monard

Two ♀ specimens in peaty mud in shallow water, the Goleen, 12.viii.1989. (Holmes and O'Connor, 1990).

Nannomesochra arupinensis (Brian)

Amongst algae and sponges, Station G10, August 1988 and 1989.

Orthopsyllus linearis (Claus)

One ♀ specimen, amongst algae and sponges, Station G10, 13.viii.1989 (Holmes and O'Connor, 1990).

Enhydrosoma longifurcatum G.O.Sars

Common in sublittoral mud.

Eurycetodes similis (T.Scott)

Two specimens, amongst algae and sponges, Station G10, July 1988 and August 1989.

Esola longicauda Edwards

One ♀ specimen in light-trap, 5m, off North Quay, 23.ix.1987.

Bull. Ir. biogeog. Soc. No. 14

Heterolaophonte longisetigera (Klie)

One ♀ specimen, light-trap, 5m, North Quay, 23.ix.1987 (Holmes and O'Connor, 1990).

Heterolaophonte uncinata (Czerniavski)

The Goleen, 22.ix.1987; mud, Station G10, 3.viii.1989; amongst algae and sponges, Station G10, 13.viii.1989. An examination of specimens in the Roe Collection (NMI) shows that her record (Roe, 1960) of H. stroemi var brevicaudata Monard should be referred to H. uncinata.

Laophonte elongata Boeck

Coarse shell gravel, Barloge, 24.vii.1986; North Quay, 18.viii.1988; amongst algae and sponges, Station G10, August 1988 and 1989.

Laophonte inornata A.Scott

Mud, North Quay and Station G10, 3.viii.1989. The specimen (Roe Collection, NMI) recorded by Roe (1960) as L. serrata was re-examined and identified as L. inornata.

Laophontopsis lamellifera (Claus)

Occasionally in small numbers in light-traps and in mud.

Pseudonychocamptus koreni (Boeck)

One ♀ specimen, gravel under stones, north shore, 8.vii.1982; one ♀ specimen, north-west corner, 28.vii.1989.

Order SIPHONOSTOMATOIDA

Asterocheres boeckii (Brady)

One ♀ specimen, amongst algae and sponges, Station G10, 13.viii.1989.

Bull. Ir. biogeog. Soc. No. 14

*Asterocheres parvus Giesbrecht

One ♀ specimen amongst weed and sponges, Station G10,
13.viii.1989.

*Asterocheres stimulans Giesbrecht

Four specimens, amongst algae and stones, west shore, 9.vii.1982
(not to be confused with A. simulans (T.Scott), also found in L.
Hyne (Holmes, 1983).

*Asterocheres suberitis Giesbrecht

Four specimens, from sponge, Amphilectus fucorum (Esper), Station
G10, 13.viii.1989.

*Asterocheres violaceus (Claus)

Several specimens in washings from sea-urchin Echinus esculentus
L., south shore near the Goleen, 16.vii.1990. In NMI there is a
single specimen, also in washings from Echinus esculentus, from
off Galley Cove, V7924, near Crookhaven, Co.Cork, 9.vii.1982.

Rhynchomyzon purpurocinctum (T.Scott)

One ♂ specimen, light-trap, 1m, Barloge, 15.vii.1990. Otherwise
known in Ireland from a single specimen from Ballynakill,
Co.Galway (Farran, 1913).

*Artotroqus orbicularis Boeck

One ♂ specimen, light-trap, 1m, Barloge, 15.vii.1990. No previous
published records of this species exist for Ireland but one ♂
specimen was also taken in a light-trap, 10m, 40-foot bathing
place, O259281, Sandycove, Co.Dublin, 5.ix.1982, J.M.C.H. (NMI).

*Myzopontius pungens Giesbrecht

One ♀ specimen, light-trap, 3m, Station G10, 21.vii.1990.

Bull. Ir. biogeog. Soc. No. 14

*Apodomyzon brevicorne Stock

One ♀ specimen from sponge, Station G10, 13.viii.1989.

Caligus pelamydis Krøyer

Several specimens on mackerel, Scomber scombrus L., off Bullock I., Barloge, 18.vii.1990.

Order CYCLOPOIDA

*Cyclopina esilis Brian

Several specimens, mud, near the Rapids, 20.vii.1983.

Notopterophorus papilio Hesse

Numerous specimens in the tunicate Ascidia mentula O.F.Müller, the Goleen, 3.viii.1987 and 22.ix.1987, and Station G10, 13.viii.1989.

Order ISOPODA

Gnathia dentata G.O.Sars

Three specimens amongst algae and sponges, Station G10, 15.viii.1988.

Sphaeroma serratum (Fabricius)

Several specimens under stones in the littoral zone on the east shore, 5.viii.1989.

Porcellionides cingendus (Kinahan)

One specimen of this woodlouse near the shore just outside the Renouf Laboratory, July 1990.

Order AMPHIPODA

Iphimedia nexa Myers and McGrath

Following the revision of the genus Iphimedia by Myers et al.

Bull. Ir. biogeoq. Soc. No. 14

(1987), it is clear that the specimen recorded from L.Hyne by Holmes (1980) under the name Panoploea minuta (Sars) should be referred to this species.

Iphimedia perplexa Myers and Costello

Amongst algae and gravel, the Rapids area and Barloge.

Cheirocratus intermedius G.O.Sars

Abundant in coarse shell gravel in Barloge, 26.vii.1985 and 24.vii.1986, apparently co-existing with C. sundevallii (Rathke).

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Bull. Ir. biogeog. Soc. No. 14 (1991)

PROTURA IN IRELAND.

R. E. Blackith and J. A. Good

Introduction

The Protura are the least known, and least insect-like, of the hexapods usually classified as Apterygota. Their size (1-2mm) and the need to extract them in Tullgren funnels, or by other means, from soil or detritus contribute to their apparently sparse occurrence. However, the available records are very likely to be a gross under-representation of the occurrence of Protura in Ireland; Curry (1969) recorded 6680 proturans/m in a silty clay loam soil under permanent pasture near Celbridge, Co. Kildare. As they are essentially denizens of cool damp regions, probably feeding mainly by sucking fungal mycelium, but possibly saprophytic or even predatory, an interesting Irish fauna could be expected. We offer some new records and a brief survey of the literature.

The most striking feature of the Protura is that the front legs with their specialised sensilla are carried in front of the head and serve as antennae, which are lacking throughout the group. There are rudimentary legs on the first three segments of the abdomen. The genitalia of both sexes are similar, and there is a form known as the maturus junior, which precedes sexual maturity, having 12 abdominal segments as in adults but in which genitalia cannot clearly be observed. As with other apterygotes, individual variation in the chaetotaxy can complicate identification.

Records of Protura in Ireland

Paclt (1955) lists 37 species world-wide, none being positively recorded from Ireland. Tuxen (1964) lists 214 species world-wide,

Bull. Ir. biogeog. Soc. No. 14

again with none specifically recorded from Ireland. Nosek (1973) lists a further 29 European species, three of which he records from Ireland as follows:-

Acerentomon affine Bagnall

Belfast Castle Gardens, Belvin (Kelvin?) Park in wood, May 1938, in coll. BM(NH). Known from England (under various synonyms), France, Sweden, Germany and Austria, mostly associated with woodland.

Acerentulus cunhai Condé

Adare, Co. Limerick, October 1934, in coll. BM(NH). Said by Nosek (1973) to be prevalent in Western Europe.

Acerentulus traegardhi Ionescu

Belfast Castle Gardens, May 1938, in coll. BM(NH). Known from virtually the whole of Europe, associated with woodland, scrub and heathland, in wet places, particularly those with moss cover.

The last two records are also given by Gough and Waghorne (1973) as new for the British Isles.

New records

Eosentomon transitorium Berlese (= E. armatum Stach)

Glenamoy, Co. Mayo (F8936), 1969. Twenty specimens of this species were extracted from virgin blanket bog and from moss and litter samples collected from coniferous shelter belts at the then Peatland Research Station of An Foras Taluntais. The proturans occurred in the wettest samples taken from hollows, or from Sphagnum moss samples 3-6cm deep. They were heavily outnumbered by Collembola, each core of about 7cm diameter and 9cm long yielding only one proturan on an average. Coll. R. E. and R. M. Blackith, det. R.E.B.

Bull. Ir. biogeog. Soc. No. 14

Near Riverstick, Co. Cork (W664583), 23.vii.1985. Tullgren funnel extraction, continuous winter wheat on loam soil. Two adults (1♂, 1♀). Coll. J. A. G., det. R. E. B.

E. (?)transitorium

Near Rosscarbery, Co. Cork (W327344), 10.vii.1985. Tullgren funnel extraction of soil beneath grass tussock, sand dune slack. One matus junior or pre-imago. Coll. J. A. G., det. R. E. B.

Near Rathcormack, Co. Cork, (W807901), 27.vii.1985. Tullgren extraction of soil under spring oats following pasture. One pre-imago/maturus junior. Coll. J. A. G., det. R. E. B.

Acerentulus confinis (Berlese)

Near Watergrasshill, Co. Cork, (W753830), 26.vii.1985. Tullgren funnel extraction, rough ungrazed roadside grass being invaded by Rubus. 2♂♂, 2 matus junior, from a collection of c. 50 specimens. Coll. J. A. G., det. R. E. B.

Voucher specimens of the species new to Ireland are deposited in the National Museum of Ireland.

Discussion

We now have five species of proturan identified from Ireland, the two new records being of very common European species and thus hardly surprising as additions to the Irish list. Raw (1956) comments on the lack of hard facts about their life-style, a lacuna not substantially filled when Nosek's (1973) monograph was written. The species with which Raw dealt were Proturentomon minimum (Berlese), a species said by Nosek (1973) usually to occur in grassland, and Eosetomon sp. probably E. transitorium (as E. armatum). Raw did, nevertheless, note some differences in the response of these two species to agronomic factors. According to Nosek (1973), E. transitorium is likely to be found in acid

Bull. Ir. biogeog. Soc. No. 14

grassland, often associated with coniferous or part-coniferous woodland.

Acerentulus confinis is known from almost every country in Europe except those in Scandinavia. It has a more southerly distribution than, but widely overlapping with, E. transitorium, and occurs widely in north-west Africa (down to the Sahara) and the United States of America. Nosek (1973) says that it prevails in the exoglacial regions of Europe.

Protura are generally regarded as species of undisturbed habitat, where they can be diverse and reach high population densities, for instance in permanent pasture, marshy meadows, caves, coniferous and deciduous forest (Nosek, 1975, see references in Gunnarsson, 1980, and Eisenbeis and Wichard, 1985), where several species have a preference for non-acid sites. In a study of invertebrate recolonization of reafforested coal mine spoil banks in Germany, Dunger (1989) found that Protura only recolonized after 30 years. In the absence of evidence for Protura in cultivated land (e.g. Raw, 1967), the records presented above for E. transitorium from arable land are interesting. The record from spring oats can perhaps be explained by a population surviving from the previous pasture which was only cultivated some months previously, but those from winter wheat are from a field with a history of many years of intensive cereal cropping.

All the records presented above were obtained by the use of simple open Tullgren funnels. These are adequate for qualitative work, but modified canister Tullgren funnels, Kempson bowl extractors and soil flotation (details in Southwood, 1966) are recommended by some of the aforementioned workers for quantitative work.

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

HEMIPTERA (HETEROPTERA AND AUCHENORHYNCHA) RECORDED FROM SOUTH-WEST IRELAND (COS CORK, KERRY AND CLARE), SEPTEMBER 1989.

P. Kirby

Introduction

Two weeks spent in south-west Ireland in September 1989 afforded opportunity for recording Hemiptera. A total of 22 sites were visited, and 60 species of Heteroptera and 66 species of Auchenorrhyncha were found. The lists obtained represent only a sample of the fauna present at each site. No attempt was made to record the fauna of any site exhaustively. The lists are presented here in full. Though most of the recorded species are inevitably common, the lists include four species apparently not previously reported from Ireland.

Terrestrial Heteroptera were identified using Southwood and Leston (1959), supplemented by Woodroffe (1959) for Nysius, Pericart (1972) for Temnostethus, Woodroffe (1966a) for Lygus, Woodroffe (1973) for Orthops, and Woodroffe (1966b) for separation of Saldula palustris and S. pallipes. Aquatic and semi-aquatic species of Heteroptera were identified using Macan (1965). Auchenorrhyncha were identified using Le Quesne (1960, 1965, 1969), Le Quesne and Payne (1981) and Ossiannilsson (1978, 1981, 1983). Nomenclature follows Kloet and Hinks (1964) for Heteroptera and Le Quesne and Payne (1981) for Auchenorrhyncha.

Lists of species recorded by county

	Clare	Cork	Kerry
Heteroptera			
<u>Acalypta parvula</u> (Fallén)	-	-	+
<u>Adelphocoris lineolatus</u> (Goeze)	+	-	+

Bull. Ir. biogeog. Soc. No. 14

<u>Anaptus major</u> (Costa)	-	-	+
<u>Anthocoris nemorum</u> (L.)	+	-	+
<u>Aptus mirmicoides</u> (Costa)	-	-	+
<u>Aquarius najas</u> (Degeer)	-	-	+
<u>Berytinus signoreti</u> (Fieber)	+	-	+
<u>Blepharidopterus angulatus</u> (Fallén)	-	+	+
<u>Bryocoris pteridis</u> (Fallén)	-	+	-
<u>Calocoris norvegicus</u> (Gmelin)	+	-	-
<u>Charagochilus gyllenhali</u> (Fallén)	+	-	+
<u>Coniortodes salicellus</u> (Herrich-Schaeffer)	-	-	+
<u>Cymus glandicolor</u> Hahn	-	-	+
<u>Cyrtorhinus caricis</u> (Fallén)	-	-	+
<u>Dicyphus pallicornis</u> (Meyer-Dur)	-	-	+
<u>Dolycoris baccarum</u> (L.)	-	-	+
<u>Elasmucha grisea</u> (L.)	-	+	-
<u>Eurygaster testudinaria</u> (Geoffroy)	-	+	+
<u>Gerris lacustris</u> (L.)	-	-	+
<u>G. odontogaster</u> (Zetterstedt)	-	+	-
<u>Hesperocorixa castanea</u> (Thomson)	-	+	+
<u>H. linnei</u> (Fieber)	-	+	-
<u>Hydrometra stagnorum</u> (L.)	-	+	+
<u>Lygocoris pabulinus</u> (L.)	+	+	-
<u>Lyqus ruqulipennis</u> Poppius	+	-	-
<u>L. wagneri</u> Remane	+	+	+
<u>Malacocoris chlorizans</u> (Panzer)	+	-	-
<u>Microvelia reticulata</u> (Burmeister)	-	+	-
<u>Nabicula flavomarginata</u> (Scholtz)	+	-	-
<u>N. limbata</u> (Dahlbom)	-	+	+
<u>N. lineata</u> (Dahlbom)	-	-	+
<u>Nabis ericetorum</u> Scholtz	-	-	+
<u>N. rugosus</u> (L.)	-	-	+
<u>Notonecta glauca</u> L.	-	+	+
<u>Nysius thymi</u> (Wolff)	-	-	+
<u>Orthops campestris</u> (L.)	+	-	-

Bull. Ir. bioqeoq. Soc. No. 14

<u>Q. cervinus</u> (Herrich-Schaeffer)	+	-	+
<u>Orthotylus ericetorum</u> (Fallén)	+	-	-
<u>Q. flavosparsus</u> (Sahlberg)	-	-	+
<u>Pachybrachius fracticollis</u> (Schilling)	-	-	+
<u>Palomena prasina</u> (L.)	-	+	-
<u>Pentatoma rufipes</u> (L.)	-	-	+
<u>Phytocoris varipes</u> Boheman	+	-	-
<u>Picromerus bidens</u> (L.)	-	-	+
<u>Piesma quadratum</u> (Fieber)	-	-	+
<u>Plagiognathus chrysanthemi</u> (Wolff)	+	-	-
<u>Psallus haematodes</u> (Gmelin)	-	-	+
<u>Saldula palustris</u> (Douglas)	-	-	+
<u>S. saltatoria</u> (L.)	-	+	+
<u>Sigara distincta</u> (Fieber)	-	+	-
<u>S. dorsalis</u> (Leach)	-	-	+
<u>S. scotti</u> (Fieber)	-	+	+
<u>Stenodema calcaratum</u> (Fallén)	+	-	+
<u>S. holsatum</u> (Fabr.)	-	+	+
<u>S. laevigatum</u> (L.)	+	-	+
<u>Stygocoris sabulosus</u> (Schilling)	+	+	+
<u>Temnostethus gracilis</u> (Horvath)	-	-	+
<u>Trigonotylus ruficornis</u> (Geoffroy)	-	-	+
<u>Velia caprai</u> Tamanini	-	+	-
<u>V. saulii</u> Tamanini	-	-	+

Auchenorrhyncha

<u>Agallia venosa</u> (Fallén)	+	-	+
<u>Alebra albostriella</u> (Fallén)	-	-	+
<u>Alnetoidea alneti</u> (Dahlbom)	+	-	+
<u>Aphrodes albifrons</u> (L.)	+	+	+
<u>A. makarovi</u> Zakhvatkin	+	+	+
<u>Aphrophora alni</u> (Fallén)	-	+	+
<u>A. alpina</u> Melichar	-	-	+

Bull. Ir. biogeog. Soc. No. 14

<u>Cicadella lasiocarpae</u> Ossiannilsson	-	-	+
<u>C. viridis</u> (L.)	-	+	+
<u>C. persimilis</u> (Edwards)	+	-	-
<u>C. quadrinotata</u> (Fabr.)	-	+	+
<u>Cixius cunicularius</u> (L.)	-	+	-
<u>C. nervosus</u> (L.)	-	+	-
<u>Conomelus anceps</u> (Germar)	-	+	+
<u>Conosanus obsoletus</u> (Kirschbaum)	-	+	+
<u>Cosmotettix panzeri</u> (Flor)	-	-	+
<u>Delphax pulchellus</u> (Curtis)	-	-	+
<u>Deltocephalus maculiceps</u> Boheman	-	-	+
<u>D. pulicaris</u> (Fallén)	-	+	+
<u>Edwardsiana avellanae</u> (Edwards)	+	-	-
<u>Elymana sulphurella</u> (Zetterstedt)	+	-	+
<u>Empoasca vitis</u> (Gothe)	+	-	+
<u>Euconomelus lepidus</u> (Boheman)	-	-	+
<u>Eupteryx filicum</u> (Newman)	-	-	+
<u>E. melissae</u> Curtis	-	+	-
<u>E. notata</u> Curtis	+	-	+
<u>E. stachydearum</u> (Hardy)	+	+	-
<u>Eurhadina concinna</u> (Germar)	-	-	+
<u>Euscelis incisus</u> (Kirschbaum)	+	-	+
<u>Evacanthus interruptus</u> (L.)	+	-	-
<u>Fagocyba carri</u> (Edwards)	-	-	+
<u>Forcipata citrinella</u> (Zetterstedt)	+	+	+
<u>Hauptidia maroccana</u> (Melichar)	-	+	-
<u>Hyledelphax elegantulus</u> (Boheman)	-	-	+
<u>Iassus lanius</u> (L.)	-	-	+
<u>Idiocerus confusus</u> Flor	-	+	+
<u>I. lituratus</u> (Fallén)	-	-	+
<u>I. vitreus</u> (Fabr.)	+	-	-
<u>Idiodonus cruentatus</u> (Panzer)	+	-	-
<u>Jassarqus distinguendus</u> (Flor)	+	+	+
<u>Kelisia guttula</u> (Germar)	+	-	+

Bull. Ir. bioqeoq. Soc. No. 14

<u>K. pallidula</u> (Boheman)	-	-	+
<u>K. punctulum</u> (Kirschbaum)	+	-	-
<u>K. sabulicola</u> Wagner	-	-	+
<u>K. vittipennis</u> (Sahlberg)	-	-	+
<u>Limotettix striola</u> (Fallén)	-	-	+
<u>Linnavuoriana sexmaculata</u> (Hardy)	-	+	+
<u>Macrosteles horvathi</u> (Wagner)	-	+	+
<u>M. ossiannilssoni</u> Lindberg	-	+	+
<u>M. sexnotatus</u> (Fallén)	-	+	+
<u>M. viridigriseus</u> (Edwards)	+	+	+
<u>Megamelus notula</u> (Germar)	-	-	+
<u>Mocydia crocea</u> (Herrich-Schaeffer)	+	-	+
<u>Muellerianella extrusa</u> (Scott)	-	+	+
<u>M. fairmairei</u> (Perris)	-	-	+
<u>Neophilaenus lineatus</u> (L.)	+	+	+
<u>Notus flavipennis</u> (Zetterstedt)	+	+	+
<u>Paluda vitripennis hibernica</u> (Le Quesne)	+	-	-
<u>Philaenus spumarius</u> (L.)	+	+	+
<u>Psamnotettix nodosus</u> (Ribaut)	+	+	+
<u>P. sabulicola</u> (Curtis)	-	-	+
<u>Ribautiana scalaris</u> (Ribaut)	-	-	+
<u>R. tenerrima</u> (Herrich-Schaeffer)	+	+	-
<u>Sorhoanus xanthoneurus</u> (Fieber)	-	-	+
<u>Stenocranus minutus</u> (Fabr.)	+	-	-
<u>Streptanus sordidus</u> (Zetterstedt)	+	+	-

Lists of species by sites.

CO. CLARE

Near Ailwee Cave, M2305, 15.ix.1989.

Limestone grassland bordering green lane, and tall grassland in adjacent fields.

Heteroptera: Adelphocoris lineolatus; Anthocoris nemorum;

Bull. Ir. biogeog. Soc. No. 14

Berytinus signoreti; Calocoris norvegicus; Charagochilus
gyllenhali; Lygocoris pabulinus; Lygus ruqulipennis; L. wagneri;
Malacocoris chlorizans; Orthops campestris; O. cervinus;
Orthotylus ericetorum; Phytocoris varipes; Plagiognathus
chrysanthemi; Stenodema laevigatum; Stygnocoris sabulosus.
Auchenorhyncha: Agallia venosa; Alnetoidea alneti; Aphrodes
albifrons; A. makarovi; Cicadula persimilis; Edwardsiana avellanae;
Empoasca vitis; Eupteryx notata; E. stachydearum; Euscelis
incisus; Evacanthus interruptus; Forcipata citrinella; Jassarqus
distinguendus; Kelisia guttula; Macrosteles viridigriseus; Mocytia
crocea; Muellerianella sp.; Neophilaenus lineatus; Paluda
vitripennis hibernica; Philaenus spumarius; Psammotettix nodosus;
Ribautiana tenerrima; Stenocranus minutus; Streptanus sordidus.

Ballyryan, M08/901, 16.ix.1989.

Limestone grassland near the Burren coast.

Heteroptera: Nabucula flavomarginata; Phytocoris varipes;
Stenodema calcaratum; Stygnocoris sabulosus.

Auchenorhyncha: Agallia venosa; Aphrodes makarovi; Cicadula
persimilis; Elymana sulphurella; Eupteryx notata; Euscelis
incisus; Evacanthus interruptus; Forcipata citrinella; Idiocerus
vitreus; Idiodonus cruentatus; Jassarqus distinguendus; Kelisia
guttula; K. punctulum; Muellerianella sp.; Notus flavipennis;
Neophilaenus lineatus; Philaenus spumarius; Psammotettix sp.;
Stenocranus minutus.

CO. CORK

Avaul Loughs, V9053, 10.ix.1989.

Lowland lough and bordering bog.

Heteroptera: Eurygaster testudinaria; Gerris odontogaster;
Hesperocorixa linnei; Microvelia reticulata; Notonecta glauca;
Sigara distincta; S. scotti; Stygnocoris sabulosus.

Auchenorhyncha: Cicadula quadrinotata; Notus flavipennis;

Bull. Ir. biogeog. Soc. No. 14

Ribautiana tenerrima.

Crossterry Mountain, near Barley Lake, V8857, 10.ix.1989.

Acid grassland and bog.

Heteroptera: Hesperocorixa castanea; Sigara distincta; S. scotti.

Auchenorhyncha: Cicadula quadrinotata; Conosanus obsoletus;

Macrosteles horvathi; M. ossiannilssonii; Neophilaenus lineatus;

Notus flavipennis.

Garnish Island, V8950, 10.ix.1989.

Ornamental gardens.

Heteroptera: Lygocoris pabulinus; Palomena prasina.

Auchenorhyncha: Eupteryx melissae.

Glengariff Woods, V9057, 10.ix.1989.

Sessile oak woodland.

Heteroptera: Blepharidopterus angulatus; Elasmucha grisea.

Auchenorhyncha: Aphrodes albifrons; Deltocephalus pulicaris;

Muellerianella sp.; Notus flavipennis.

Gouganebarra, W0765, 8.ix.1989.

Conifer plantation.

Heteroptera: Bryocoris pteridis; Nabucula limbata; Stenodema holsatum; Velia caprai.

Auchenorhyncha: Aphrodes makarovi; Cicadula quadrinotata; Cixius cunicularius; C. nervosus; Conomelus anceps; Deltocephalus pulicaris; Eupteryx stachydearum; Forcipata citrinella; Hauptidia maroccana; Jassarqus distinguendus; Macrosteles viridigriseus; Muellerianella extrusa; Neophilaenus lineatus; Notus flavipennis; Philaenus spumarius; Psammotettix nodosus; Streptanus sordidus.

Lough Allua, W1765, 8.ix.1989.

Sallow-and reed-fringed margin of lough.

Heteroptera: Hydrometra stagnorum; Lygus wagneri; Palomena

Bull. Ir. biogeog. Soc. No. 14

prasina; Saldula saltatoria; Sigara distincta.

Auchenorhyncha: Aphrophora alni; Cicadella viridis; Conomelus anceps; Idiocerus confusus; Kybos sp.; Linnavuoriana sexmaculata; Macrosteles sexnotatus; M. viridigriseus; Neophilaenus lineatus; Philaenus spumarius.

CO. KERRY

Clogher Head, Q3002, 12.ix.1989.

Maritime heath and grassland.

Auchenorhyncha: Agallia venosa; Conosanus obsoletus; Deltocephalus pulicaris; Elymana sulphurella; Eupteryx notata; Jassarqus distinguendus; Kelisia guttula; Limotettix striola; Macrosteles ossiannilssoni; Megamelus notula; Muellerianella extrusa; Neophilaenus lineatus; Notus flavipennis; Philaenus spumarius; Psammotettix nodosus.

Cloonee Loughs, V82/363, 5.ix.1989.

Bog stream and small pools.

Heteroptera: Adelphocoris lineolatus; Aquarius najas; Eurycaster testudinaria; Gerris lacustris; Hesperocorixa castanea; Notonecta glauca; Pachybrachius fracticollis; Picromerus bidens; Sigara dorsalis; S. scotti; Stenodema holsatum; S. laevigatum; Stygnocoris sabulosus; Trigonotylus ruficornis.

Auchenorhyncha: Aphrophora alni; A. alpina; Cicadella lasiocarpae; Cicadula quadrinotata; Conomelus anceps; Conosanus obsoletus; Cosmotettix panzeri; Deltocephalus maculiceps; Forcipata citrinella; Jassarqus distinguendus; Kelisia pallidula; K. vittipennis; Limotettix striola; Macrosteles ossiannilssoni; Megamelus notula; Neophilaenus lineatus; Notus flavipennis; Philaenus spumarius; Psammotettix nodosus; Sorhoanus xanthoneurus.

Near Cornagillagh, V7965, 5.ix.1989.

Narrow band of vegetation at upper tidal limit on shingle/sand/

Bull. Ir. biogeog. Soc. No. 14

rock coast.

Heteroptera: Orthotylus flavosparsus; Piesma quadratum.

Couineenocle, V3197, 12.ix.1989.

Auchenorhyncha: Agallia sp.; Aphrodes albifrons; Hyledelphax elegantulus; Psammotettix sp.

Cummeenana, V8460/1, 5.ix.1989.

Hillside grassland and flushes.

Heteroptera: Stenodema holsatum; S. laevigatum; Trigonotylus ruficornis.

Auchenorhyncha: Aphrophora alni; Conomelus anceps; Neophilaenus lineatus; Philaenus spumarius.

Derrynaheirka, V9081, 7.ix.1989.

Sessile oak woodland and adjoining meadow.

Heteroptera: Anthocoris nemorum; Dicyphus pallicornis; Nabicula limbata; Nabis rugosus; Saldula saltatoria; Stenodema holsatum; S. laevigatum.

Auchenorhyncha: Alebra albostriella; Alnetoidea alneti; Conomelus anceps; Conosanus obsoletus; Empoasca vitis; Eurhadina concinna; Fagocyba carri; Macrosteles sexnotatus; M. ossiannilssoni; Ribautiana scalaris.

Derrynane Dunes, V5385, 6.ix.1989.

Sand dunes, grazed incipient saltmarsh and transition to sandy grassland, neglected freshwater marsh, willow scrub.

Heteroptera: Anaptus major; Anthocoris nemorum; Berytinus signoreti; Nysius thymi; Psallus haematodes; Saldula palustris; S. saltatoria; Stenodema laevigatum; Stygocoris sabulosus.

Auchenorhyncha: Agallia sp.; Aphrodes makarovi; Conosanus obsoletus; Edwardsiana sp.; Empoasca vitis; Euscelis incisus; Idiocerus confusus; I. lituratus; Jassarqus distinguendus; Kybos sp.; Megoptthalmus sp.; Mocvydia crocea; Muellerianella fairmairei;

Bull. Ir. biogeog. Soc. No. 14

Neophilaenus lineatus; Philaenus spumarius; Psammotettix nodosus;
P. sabulicola.

Dunkerron, V8772, 8.ix.1989.

Roadside verge and hedge.

Heteroptera: Anthocoris nemorum; Nabicaula limbata; Psallus haematodes; Stenodema laevigatum.

Auchenorrhyncha: Aphrophora alni; Conomelus anceps; Conosanus obsoletus; Idiocerus confusus; Linnavuoriana sexmaculata;
Neophilaenus lineatus; Philaenus spumarius.

Gap of Dunloe, V8785/6/7/8, 9.ix.1989.

Bog and wet meadow, shingle lough margins.

Heteroptera: Cymus glandicolor; Nabicaula limbata; Stenodema calcaratum; Trigonotylus ruficornis; Velia saulii.

Auchenorrhyncha: Aphrodes albifrons; Cicadella lasiocarpae; C. viridis; Cicadula quadrinotata; Conomelus anceps; Conosanus obsoletus; Kelisia vittipennis; Limotettix striola; Macrosteles horvathi; M. ossiannilssoni; M. viridigriseus; Megamelus notula; Muellerianella extrusa; Neophilaenus lineatus; Notus flavipennis;
Philaenus spumarius.

Knocknasallag, V8478, 7.ix.1989.

Bog with peat cuttings.

Heteroptera: Nabis ericetorum; Pachybrachius fracticollis;
Stenodema holsatum.

Auchenorrhyncha: Cicadella lasiocarpae; Cicadula quadrinotata;
Conomelus anceps; Conosanus obsoletus; Cosmotettix panzeri;
Eucomelus lepidus; Forcipata citrinella; Kelisia pallidula; K. vittipennis; Limotettix striola; Megamelus notula; Muellerianella extrusa;
Neophilaenus lineatus; Notus flavipennis; Sorhoanus xanthoneurus.

Lough Beg, V8981, 7.ix.1989.

Bull. Ir. biogeog. Soc. No. 14

Acid pool and surrounding bog.

Heteroptera: Anthocoris nemorum; Gerris lacustris; Nabica limbata; N. lineata; Saldula saltatoria; Sigara scotti; Stenodema holsatum; S. laevigatum; Stygocoris sabulosus.

Auchenorrhyncha: Conomelus anceps; Conosanus obsoletus; Delphax pulchellus; Macrosteles ossianilssoni; Muellerianella sp.; Sorhoanus xanthoneurus.

Lough Fadda, V7565, 6.ix.1989.

Scrub, dry grassland and rocky heath.

Heteroptera: Adelphocoris lineolatus; Anthocoris nemorum; Aptus mirmicoides; Dolycoris baccarum; Nabica limbata; Picromerus bidens; Psallus haematodes.

Muckross, V95/686, 5.ix.1989.

Sessile oak wood, grassland, marsh and willow scrub at lough margins.

Heteroptera: Anthocoris nemorum; Blepharidopterus angulatus; Coniortodes salicellus; Cyrtorhinus caricis; Hydrometra stagnorum; Lygus wagneri; Nabica limbata; Nabis rugosus; Orthops cervinus; Pentatoma rufipes; Saldula saltatoria; Stenodema laevigatum; Temnostethus gracilis.

Auchenorrhyncha: Aphrodes makarovi; Aphrophora alni; Conosanus obsoletus; Empoasca vitis; Eupteryx filicum; Eurhadina concinna; Iassus lanius; Muellerianella fairmairei; Neophilaenus lineatus; Notus flavipennis; Philaenus spumarius; Ribautiana scalaris.

Rossbehy, V6491/2, 11.ix.1989.

Sand dunes, salt marsh.

Heteroptera: Acalypta parvula; Charagochilus gyllenhali; Saldula palustris; Stenodema laevigatum; Stygocoris sabulosus.

Auchenorrhyncha: Aphrodes makarovi; Conosanus obsoletus; Kelisia sabulicola; Macrosteles viridigriseus; Megophthalmus sp., Neophilaenus lineatus; Philaenus spumarius; Psammotettix nodosus;

Bull. Ir. biogeog. Soc. No. 14

P. sabulicola.

Discussion

The timing of the visit has had a profound effect on the lists of Hemiptera obtained. Most of the Miridae were already over for the year, greatly limiting the number of Heteroptera recorded. Amongst the Auchenorrhyncha, some species were also over for the year and others were becoming scarce as adults or were represented only by females. Most of the species recorded are well-known and generally common. A few deserve special comment.

Five of the Auchenorrhyncha recorded are not included in de Courcy Williams' (1989) list of the Irish Auchenorrhyncha. One of these, Muellerianella extrusa was recorded from Ireland in Booij (1981). This appears to be the first report of the remaining four species from Ireland. Eurhadina concinna was found commonly on oak at Muckcross and at Derrynaheirka. Hauptidia maroccana occurred in numbers on foxglove (Digitalis purpurea L.) bordering a path through the conifer plantation at Gouganebarra. This insect occurs in the wild in England and Wales chiefly on foxglove and red campion (Silene dioica (L.)) in south-western counties, though more widely distributed on cultivated plants. Its discovery in south-western Ireland is therefore not surprising. Idiocerus vitreus feeds chiefly on poplars, with occasional records from willow. A single specimen was taken by sweeping on grassland at Ballyryan. No possible host plant was anywhere in sight, and the individual was clearly a stray from elsewhere. There were strong winds in the area around the date of capture, and the specimen could conceivably have travelled some distance. Sorhoanus xanthonerurus seems to be a characteristic species of lowland acid peatlands. It is widely distributed in suitable habitats in Wales. It was found in bogs bordering Lough Beg and the Cloonee Loughs, Co. Kerry. The lack of previous records of this easily recorded

Bull. Ir. biogeog. Soc. No. 14

species may indicate that it is rather local in Ireland.

Cicadella lasiocarpae was recorded from Ireland by Le Quesne (1987) on the basis of specimens for Cos Clare and Mayo in the Royal Museum of Scotland. It is a recently recognised species, previously mixed with the common C. viridis. C. lasiocarpae was the commoner of the two species in September 1989, but this may reflect as much the habitats visited and the lateness of the visit as the relative abundance of the two. Few C. viridis were found even in sites where it occurred, and it seemed that the adults of the year had probably mostly died. C. lasiocarpae appears to be a rather later species. Males had almost entirely vanished by the time of the visit, but females were still quite frequent. C. lasiocarpae was found at three sites in Co. Kerry: Cloonee Loughs, Gap of Dunloe and Knocknasallag. It seems likely that it will prove to be a quite frequent species in bogs in south-west Ireland. The only known foodplant of C. lasiocarpae is Carex lasiocarpa Ehrh. No C. lasiocarpa was certainly identified in the vicinity of any captures of C. lasiocarpae, but it may simply have been missed since it would not be easy to identify so late in the year.

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Bull. Ir. biogeog. Soc. No. 14 (1991)

KIMOSINA EMPIRICA, LEPTOCERA CRYPTOCHAETA, SPELOBIA CLUNIPES, S. NANA, S. TALPARUM, S. PALMATA AND TELOMERINA FLAVIPES (DIPTERA: SPHAEROCERIDAE) FLIES NEW TO IRELAND.

J. Valentine, R. E. Blackith and R. M. Blackith

The Sphaeroceridae of the British Isles have recently been monographed by Pitkin (1988), who records 26 species from Ireland, and 11 further species have been added by Nash (1989). This note adds a further seven species to the Irish list and records second findings of four others. The material was determined from Pitkin's (1988) monograph and we have adopted his nomenclature. Distribution records were mostly taken from Papp (1984).

Kimosina empirica (Hutton)

Wicklow: iii-iv.1989, O3103 (PU.3) 1 ♂ bred from rotten birch, Blackditch Wood, Murrough, Betula-Salix wood on fen peat; iii.1989, c. 120 mainly ♀♀ bred from dead crow and 1 ♀ from dead pigeon, Six-Mile Point O3104 (PU.3); ii.1989, c. 100 bred from dead magpie, Blackditch Wood; iv.1989, 1 ♂ bred from Phragmites stems, Killoughter, T3199 (PU.3); iii.1989, 2 ♀♀ bred from dead pigeon, Blackditch Wood. All coll. and det. REB and RMB. Pitkin (1988) notes that this is an uncommon species infesting corpses and refuse. The species has however, a wide distribution throughout Europe, and the Pacific, Neotropical and Nearctic regions (Papp, 1984).

Leptocera cryptochaeta (Duda)

Wicklow: 5-20.v.1989, 3 ♀♀, Blackditch Wood, Malaise trap, coll. REB and RMB, det. JV; v.1989, coll. and det. P. Withers. Found in damp places, among grass and under bark (Pitkin, 1988). Known from the British Isles, Germany and Hungary (Papp, 1984).

Bull. Ir. biogeog. Soc. No. 14

Spelobia clunipes (Meigen)

Wicklow: 26.i.1988, 7 ♂♂, 11 ♀♀, Killoughter, Murrough, hollow in coastal sand dunes with marram grass, coll. REB and RMB, det. JV. A very common and widespread species in England, Wales and Scotland, occurring throughout the year (Pitkin, 1988). Duda (1938) extends the distribution to decaying vegetation and dung throughout Europe, North America and Ethiopia. Papp (1984) records a wide distribution in the Palaearctic and Nearctic Regions. This species is often found on dung, and may have been attracted to rabbit droppings in the dunes at Killoughter. It is probably overlooked rather than uncommon in Ireland; indeed, if Papp's (1984) and Pitkin's (1988) synonymisation of Limosina crassimana Haliday with Spelobia clunipes is taken into account, the species is already recorded as Irish by virtue of the choice of a lectotype from Ireland for L. crassimana (Papp, 1984).

Spelobia nana (Rondani)

Wicklow: i.1988, Killoughter, 1 ♂ bred from Phragmites stems, coll. and det. REB and RMB. Uncommon, found under heather and in traps baited with meat or dung (Pitkin, 1988) and bred from a dead snail. Widely distributed in wet places in Europe (Duda, 1938) but not recorded from outside Europe (Papp, 1984).

Spelobia palmata (Richards)

Wicklow: 20.v.-3.vi.1990, 2 ♂♂ and 20.vi.-3.vii.1990, 2 ♂♂, Blackditch Wood, Malaise trap, coll. REB and RMB, det. JV. Found in abandoned wasps' nests and in bird, snail and mole corpses and various dung as well as in badger runs (Pitkin, 1988; Duda, 1938). The species is widely distributed in the Palaearctic Region (Papp, 1984).

Spelobia talparum (Richards)

Wicklow: 20.v.-3.vi.1990, 1 ♂ and 20.vi.-3.vii.1990, 1 ♂,

Bull. Ir. biogeog. Soc. No. 14

Blackditch Wood, Malaise trap, coll. REB and RMB, det. JV.
Taken in the neighbouring countries particularly in the runs and
nests of small mammals (Pitkin, 1988); a wide European
distribution (Papp, 1984).

Telomerina flavipes (Meigen)

Wicklow: iii.1989, Blackditch Wood, 1 ♀ bred from dead pigeon and
crow; v.1989, Killoughter, 1 ♂ bred from dead crow; Six mile point
1 ♂, 3 ♀♀ bred from dead crow; coll. and det. REB and RMB.
Pitkin (1988) regards this species as primarily necrophagous,
although Duda (1938) considers it fungivorous, but notes that it
was also bred from a dead dog. Common throughout Europe, its
distribution extends into Asia as far as Afghanistan (Papp, 1984).

Voucher specimens of the species recorded above are deposited in
the National Museum of Ireland.

In addition to these new Irish records we note a second finding of
the following species published as first Irish records by Nash
(1989):-

Caproica ferruginata (Stenhammar)

Wicklow: Blackditch Wood, Malaise trap, v-vi.1990, coll. REB and
RMB, det. JV. Cosmopolitan in distribution (Papp, 1984).

Copromyza similis (Collin)

Wicklow: Killoughter dunes, i.1988, coll. and det. REB and RMB.
The species has a Palaearctic distribution through to Siberia
(Papp, 1984).

Crumomyia nitida (Meigen)

Wicklow: Blackditch Wood, 1 ♀ bred from rotten birch, iv.1989,
coll. REB and RMB, det JV; Killoughter, i.1988, coll. and det. REB
and RMB; also v.1989, coll. and det. P. Withers. Widespread in

Bull. Ir. biogeog. Soc. No. 14

Europe, including Ireland (Papp, 1984).

Opacifrons coxata (Stenhammar)

Wicklow: Blackditch Wood, Malaise trap, v-vi.1990, coll. REB and RMB, det. JV. The species is widespread in Europe, Asia, the Afrotropical and Nearctic Regions (Papp, 1984).

Acknowledgement

We are most grateful to Mr P. Withers for information about his Irish records.

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Bull. Ir. biogeog. Soc. No. 14 (1991)

A REVIEW OF PUBLISHED DISTRIBUTION DATA FOR IRISH NEUROPTERA (INSECTA), TOGETHER WITH ADDITIONAL RECORDS AND A CHECK-LIST OF THE IRISH SPECIES.

P. C. Barnard, J. P. O'Connor and M. C. D. Speight

The Neuroptera, or lacewings, have received little attention in Ireland since publication of the monograph by King and Halbert (1910). The then known distribution at county level was given by Killington (1936, 1937) except for Greer (1934). Subsequent information has mostly appeared as records included in papers devoted primarily to other topics, or as the occasional note on a species added to the fauna (McClenaghan, 1955; O'Connor et al., 1990; Speight, 1976, 1979, 1983; Speight and Healy, 1977; Speight and Legrand, 1984; Stelfox, 1969). An exception is the paper by Barnard et al (1987), which detailed Irish material held in the National Museum of Ireland and the Smithsonian Institution, Washington, D. C., U. S. A.

The present text provides a review of published Irish distribution data for the Neuroptera, together with previously unpublished records, and presents a check-list of the Irish neuropteran fauna. The specimens upon which the new distribution data are based have all been determined by one or other of us and are in the National Museum of Ireland, the Natural History Museum, London, or the Speight Collection. New vice-county records are indicated by an asterisk. In reviewing the published information, we have followed the Killington format. The nomenclature used follows Barnard (1978), except for the Chrysopidae, where it follows Brooks and Barnard (1990), with the previous generic name e.g. [Chrysopa] added at the end where appropriate. Families, genera and species appear in alphabetical order.

The following abbreviations of collectors are used in the text:-

Bull. Ir. biogeog. Soc. No. 14

KGMB - K. G. M. Bond, PJC - P. J. Chandler, DD - D. Dowling,
JMOC - J. P. and M. A. O'Connor, JPOC - J. P. O'Connor, MCDS - M.
C. D. Speight, MDCW - M. de Courcy Williams.

NEW RECORDS

CHRYSOPIDAE

Chrysoperla carnea (Stephens) [Chrysopa]

*Clare (9): R8487, 3.ix.1978, MCDS, mixed woods.

Dublin (21): Royal Canal, near Luttrellstown, 00337, 28.ix.1986,
JMOC; 01138, 15.iv.1974, MCDS, in house; 02538/02738,
12.viii.1976, MCDS, salt marsh vegetation and deciduous trees
respectively; 02423, 18.vii.1978, MDCW, scrub by stream, derelict
field.

*Kildare (19): N7715, 17.viii.1979, DD, fen.

Laois (14): S3380, 5.ix.1979, DD, fen woodland.

*Meath (22): N9757, 13.iv.1975, MCDS, in house, field edge.

*Offaly (18): Clara Bog, N2429, 17.vii.1986, MCDS, Betula and on
valley bog.

*West Cork (3): W3234, 14.vii.1983, MCDS, conifer
plantation/marsh.

Westmeath (23): N4259, 13.vii.1982, MCDS, fen carr.

Wexford (12): T1124, 20.viii.1976, MCDS, on Salix, dune system.

Wicklow (20): T2979, 29.viii.1979, MCDS, beaten from Salix, dune
slack; 02207, 17.vi.1980, MCDS, Valley bog at 750ft; 02573,
9.viii.1980, MCDS, Alnus/Salix carr, by stream, swampy pasture.

Chrysopidia ciliata (Wesmael) [Chrysopa]

*Westmeath (23): Lough Slevig (north of Mullingar), N4556,
28.vi.1986, PJC, Betula/Alnus.

Wexford (12): Killoughrim Forest, S9041, 27.v.1987, JPOC.

Bull. Ir. biogeog. Soc. No. 14

Cunctochrysa albolineata (Killington) [Chrysopa]

- Dublin (21): O2738, 10.vi.1973, MCDS, on Acer, mixed woods.
*Kildare (19): N7715, 13.vii.1979, DD, beaten from Salix fen.
*Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC.
Laois (14): S4282, 16.vii.1979, DD, deciduous woods (Quercus);
N5208, 28.vi.1979, MDCW, mixed woods.
*Meath (22): N9757, 19.vi.1977, MCDS, beaten from Alnus/Fraxinus
by stream.
*Offaly (18): N5623, 6.vi.1976, MCDS, on Salix scrub at edge of
cut-over valley.
*South East Galway (15): M4103 Garryland Wood, 4.vii.1978, MCDS,
deciduous woods on limestone pavement.
*Waterford (6): Portlaw Estate, S4315, 16.vii.1987, JPOC.
*West Cork (3): Falls of Donemark, W0050, 10.vii.1985, JPOC.
*Wicklow (20): O2215, 14.vi.1975, MCDS, flying in young deciduous
woods by stream; O2606, 19.vi.1978, MCDS, mixed woods by stream;
O2217, 3.viii.1978, MCDS, beaten from deciduous scrub also
2.viii.1979, DD; O2610, 8.viii.1979, DD, Quercus woods by stream.

Mallada ventralis (Curtis) [Chrysopa]

- Wexford (12): T1124, 2.vii.1976, MCDS, on Alnus, dune slack.
*Wicklow (20): T2980, 11.vii.1979, DD, beaten off Salix carr.

Nineta flava (Scopoli) [Chrysopa]

- Dublin (21): O1627, 31.vii.1979, MCDS, beaten from Quercus in
garden.
East Cork (5): Fota Island, W7871, light trap 15.v.-12.vii
(1986, 1987), KGMB.
*Meath (22): N9965, 23.vi.1978, MCDS, beaten, deciduous woods.

N. vittata (Wesmael) [Chrysopa]

- Wicklow (20): O1616, 20.vii.1972, MCDS, on Quercus by stream in
deciduous woods; O2117, 3.viii.1978, DD, mixed deciduous woods by
stream.

Bull. Ir. biogeog. Soc. No. 14

CONIOPTERYGIDAE

Coniopteryx tineiformis Curtis

*Dublin (21): O1627, 7.vi.1976, MCDS, beaten from Quercus, garden;
O2738, 10.vi.1973, MCDS, on Acer, deciduous woods.

HEMEROBIIDAE

Hemerobius humulinus L.

*Clare (9): M3204, 15.viii.1980, MCDS, Corylus woods on limestone.

*Dublin (21): Howth, O2738, 10.vi.1973, MCDS, on Acer, mixed
woods.

*Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC.

Laois (14): N5704, 5.v.1974, MCDS, on Betula, edge of conifer
plantation.

*Leitrim (29): N1091 Clooncoe, 27.v.1986, MCDS, Betula.

*West Cork (3): Leap, Myross Wood, W23, 12.vii.1976, J. E.
Chainey.

*Westmeath (23): Lough Slevig (north of Mullingar), N4556,
28.vi.1986, PJC, Betula/Alnus.

Wexford (12): Killoughrim forest, S9041, 27.v.1987, JPOC.

Wicklow (20): Powerscourt, waterfall area, O2012, 3.v.1987, JPOC;
O2117, 25.iv.1975, MCDS, deciduous woods.

H. lutescens Fabricius

*Down (38): Crawfordsburn Country Park, J48, 3.vii.1987, PJC.

Dublin (21): Royal Canal near Luttrellstown, O0337, 28.ix.1986,
JMOC; O1627, 20.viii.1978, MCDS, garden, beaten under Quercus;
O2738, 10.vi.1973, MCDS, on Acer, mixed woods.

*Kildare (19): N7715, 13.vii.1979, MCDS, beaten from Salix, canal-
side fen.

*Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC.

West Donegal (35): C0834, 1.vi.1975, MCDS, mixed woods.

Wexford (12): Killoughrim forest, S9041, 27.v.1987, JPOC.

Bull. Ir. biogeog. Soc. No. 14

H. marginatus Stephens

- *Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC.
Waterford (6): Portlaw Estate, S4315, 16.vii.1987, JPOC.
West Donegal (35): C0018, 10.viii.1978, MCDS, beaten from Quercus,
deciduous woods by lake.
*Westmeath (23): Lough Slevig (north of Mullingar), N4556,
28.vi.1986, Betula/Alnus, PJC.
Wicklow (20): Glen of the Downs, O2611, 3.x.1986, JMOC; O2217,
16.viii.1976, MCDS, beaten from Fraxinus, deciduous woods by
stream; O2610, 8.viii.1979, DD, beaten, Quercus woods.

H. micans Olivier

- *Down (38): Crawsfordsburn Country Park, J48, 3.vii.1987, PJC.
Dublin (21): O1723, 4.vi.1973, MCDS, conifer plantation at 800ft;
O2738, 10.vi.1973, MCDS, on Acer, mixed woods; O2224,
31.viii.1977, MDCW, beaten from Alnus by stream.
*Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC;
S5753, 19.vi.1982, MCDS, beaten from Ulmus, pasture.
North Kerry (2): Blue Pool, Killarney, V9886, 30.viii.1987, JPOC.
*Offaly (18): Charleville Wood, near Tullamore, N3122, 26.vi.1987,
PJC; Cloghan Demesne, M9712, 27.vi.1987, edge of wood, PJC.
*West Cork (3): Falls of Donemark, W0050, 10.vii.1985, JPOC.
West Donegal (35): C0834, 1.vi.1975, MCDS, swept from damp
grassland at the edge of a conifer plantation.
West Galway (16): L8349, 26.vii.1978, MDCW, beaten, Quercus woods.
Westmeath (23): Scragh Bog, near Mullingar, N4259, 28.vi.1987,
conifer plantation, PJC; Lough Slevig, north of Mullingar, N4556,
28.vi.1986, Betula/Alnus, PJC.
Wexford (12): Killoughrim Forest, S9041, 27.v.1987, JPOC.
Wicklow (20): Powerscourt, waterfall area, O2012, 3.v.1987, JPOC;
T1985, 22.viii.1978, MDCW, mixed deciduous woods along a stream;
O2611, 22.ix.1982, MCDS, Quercus woods.

Bull. Ir. biogeog. Soc. No. 14

H. simulans Walker

- *Antrim (39): Glenariff County Park, D22, 12.xi.1986, PJC.
West Donegal (35): C0018, 10.viii.1978, MCDS, beaten from Betula, deciduous woods by lake.
Wicklow (20): Russelstown Park, N9610, 16.viii.1981, JMOC; T1196, 31.vii.1980, MCDS, swept, Betula, deciduous woods by lake; T1985, 22.viii.1978, MDCW, beaten from mixed deciduous woods by streams.

H. stigma Stephens

- Dublin (21): O1624, 21.iv.1972, MCDS, on Pseudotsuga covered in adelgids, 750ft.
*Waterford (6): Knockaderry Reservoir, S4905, 19.vii.1987, JPOC.
*West Cork (3): V9157, 6.vi.1975, MCDS, deciduous woods.
*West Mayo (27): M0968, 20.iv.1973, MCDS, beaten, conifer plantation.
Wexford (12): T1124, 24.v.1975, MCDS, swept, dune slack.

Micromus angulatus (Stephens)

- Kildare (19): N7715, 26.vii.1979, MCDS, fen meadow.
Wicklow (20): O2117, 16.viii.1976, MCDS, beaten
Salix/Fraxinus/Acer scrub at trackside, deciduous woods.

M. paganus (L.)

- Dublin (21): O0438, 19.v.1977, J. Shackleton, canal bank.
*East Cork (5): Fota Island, W7871, light trap 1.vi-12.vii (1986. 1987), KGMB.
Wicklow (20): T1985, 24.viii.1978, MDCW, beaten from mixed deciduous woods by stream.

M. variegatus (Fabricius)

- Dublin (21): Royal Canal near Luttrellstown, O0337, 28.ix.1986, JMOC; O1627, 20.viii.1978, MCDS, malaise trap, garden.
Meath (22): N9757, 5.ix.1981, MCDS, swept hay field.
South East Galway (15): M4517, 20.viii.1974, MCDS, swept meadow.

Bull. Ir. biogeog. Soc. No. 14

South Kerry (1): Mountain Shore, Lower Lake, Killarney, V9188, 27.viii.1987, JPOC.

Wexford (12): Nethertown, T1205, 2.vi.1987, JPOC; Curracloe, T1127, 28.v.1987, JPOC.

Wesmaelius betulinus (Ström)

*Kilkenny (11): Ballykeefe Wood, S4151, 25.vi.1987, PJC.

*Offaly (18): near Annaghmore Lough, N3015, 26.vi.1987, PJC, bog and Betula scrub; N2429, 17.vii.1980, MCDS, Clara Bog, Betula wood on valley bog.

Westmeath (23): Lough Slevig (north of Mullingar), N4556, 28.vi.1986, PJC, Betula/Alnus.

Wexford (12): Killoughrim Forest, S9041, 27.v.1987, JPOC.

*Wicklow (20): Powerscourt, Waterfall area, O2012, 3.v.1987, JPOC; O1508, 14 July 1980, MCDS, on trunk of Betula, open mixed woods, sheltered lake at 800ft.

W. subnebulosus (Stephens)

*Antrim (39): Belfast, 1895, C. G. Barrett.

*East Cork (5): Fota Island, W7871, light trap 1.vi.1986, 25.vii.1986, 5.viii.1986, 13.v.1987, KGMB.

Dublin (21): O1627, 5.viii.1978 and 7.viii.1981, MCDS, in malaise trap, garden.

*West Galway (16): Barna, M2423, 27.viii.1979, D. McGrath.

OSMYLIDAE

Osmylus fulvicephalus (Scopoli)

*Waterford (6): Glashra R., S3022, 8.vii.1989, JMOC, swept from river-side vegetation.

SISYRIDAE

Bull. Ir. biogeog. Soc. No. 14

Sisyra fuscata (Fabricius)

*Antrim (39): Belfast, 1895, C. G. Barrett

*Clare (9): R3487, 20.v.1976, MCDS, beaten from Salix, lake-side fen.

Laois (14): S3380, 22.v.1976, MCDS, fen woodland, swept by lake.

*Leitrim (29): N0489, 15.vii.1978, MCDS, lake-side pasture.

*Longford (24): N0882, 16.vii.1978, MCDS, lake-side fen.

South East Galway (15): M8303, 11.vii.1976, MCDS, swept lake-side fen; M4103, 4.vii.1978, MCDS, turlough/lake/stream.

South Kerry (1): O'Sullivan's Cascade, Killarney, V9188, 27.viii.1987, JPOC; River Laune Exit, Lower Lake, Killarney, V8991, 26.viii.1987, JPOC.

S. terminalis Curtis

South Kerry (1): V9088, 16.viii.1978, MDCW, beaten, lake-side Quercus woods.

CHECK-LIST OF THE IRISH NEUROPTERA

CHRYSOPIDAE

1. Chrysopa abbreviata Curtis

Dublin and Wicklow.

A rare and local species.

(2. C. perla L.

Certainly Irish according to Haliday ms (King and Halbert, 1910) but there have been no records since. The presence of this species in Ireland requires confirmation).

3. Chrysoperla carnea (Stephens) [Chrysopa]

As Chrysopa vulgaris Schneider in King and Halbert (1910).

Clare, Cork, Down, Dublin, Galway, Kerry, Kildare, Laois, Mayo, Meath, Offaly, Westmeath, Wexford and Wicklow.

Bull. Ir. biogeog. Soc. No. 14

Widely distributed.

4. Chrysopidia ciliata (Wesmael) [Chrysopa]

As Chrysopa alba (L.) in King and Halbert (1910).

Donegal, Down, Galway, Kerry, Mayo, Roscommon, Sligo, Tyrone,
Westmeath, Wexford and Wicklow.

Widely distributed.

5. Cunctochrysa albolineata (Killington) [Chrysopa]

As Chrysopa tenella Schneider in King and Halbert (1910).

Armagh, Carlow, Cork, Dublin, Galway, Kildare, Kilkenny, Laois,
Meath, Offaly, Waterford and Wicklow.

Widely distributed.

6. Mallada flavifrons (Brauer) [Chrysopa]

Mayo.

A local species with no recent records.

7. M. ventralis (Curtis) [Chrysopa]

As Chrysopa prasina Rambur and C. ventralis Curtis in King and
Halbert (1910).

Armagh, Cork, Dublin, Monaghan, Westmeath, Wexford and Wicklow.

Probably widespread.

8. Nineta flava (Scopoli) [Chrysopa]

Armagh, Cork, Dublin, Kerry, Kildare, Louth, Mayo, Meath,
Monaghan, Sligo, Waterford, Westmeath, Wexford and Wicklow.

Widely distributed.

9. N. vittata (Wesmael) [Chrysopa]

Donegal, Galway, Louth, Roscommon,, Tyrone, Westmeath and Wicklow.

Probably widespread.

Bull. Ir. biogeog. Soc. No. 14

CONIOPTERYGIDAE

10. Conwenzia psociformis (Curtis)

Down, Dublin, Kerry, Kildare and Waterford.

Evidently a species which has been largely overlooked in Ireland.

11. Coniopteryx tineiformis Curtis

Donegal, Dublin, Galway, Kerry, Mayo, Roscommon and Westmeath.

Status similar to C. psociformis.

HEMEROBIIDAE

12. Hemerobius atrifrons McLachlan

Galway and Westmeath.

A local species with no recent records.

13. H. humulinus L.

Clare, Cork, Donegal, Dublin, Kerry, Kilkenny, Laois, Leitrim, Mayo, Westmeath, Wexford and Wicklow.

Widely distributed.

14. H. lutescens Fabricius

Armagh, Cork, Donegal, Down, Dublin, Galway, Kerry, Kildare, Kilkenny, Mayo, Meath, Sligo, Westmeath, Wexford and Wicklow.

Widely distributed.

15. H. marginatus Stephens

Cork, Donegal, Kerry, Kilkenny, Mayo, Waterford, Westmeath and Wicklow.

Probably widespread.

16. H. micans Olivier

Armagh, Clare, Cork, Donegal, Down, Dublin, Galway, Kerry, Kildare, Kilkenny, Laois, Mayo, Offaly, Westmeath, Wexford and

Bull. Ir. biogeog. Soc. No. 14

Wicklow.

Widely distributed.

17. H. nitidulus Fabricius

Kerry and Kildare.

A local species.

18. H. pini Stephens

Wicklow.

Only recently recorded in Ireland (Speight, 1979), H. pini is probably more widespread than the single present record would indicate.

19. H. simulans Walker

As H. orotypus Wallengren in King and Halbert (1910).

Antrim, Armagh, Donegal, Dublin, Kerry, Laois, Westmeath and Wicklow.

Widely distributed.

20. H. stigma Stephens

Cork, Down, Dublin, Galway, Kerry, Kildare, Mayo, Waterford, Westmeath, Wexford and Wicklow.

Widely distributed.

21. Micromus angulatus (Stephens)

Cork, Dublin, Kerry, Kildare, Laois, Wexford and Wicklow.

Only recorded from the southern half of Ireland.

22. M. paganus (L.)

Armagh, Clare, Cork, Dublin, Kerry, Kildare, Sligo, Tyrone, Waterford, Wexford and Wicklow.

Widely distributed.

Bull. Ir. biogeog. Soc. No. 14

23. M. variegatus (Fabricius)

Armagh, Cavan, Clare, Donegal, Dublin, Galway, Kerry, Kildare, Mayo, Meath, Tipperary, Waterford, Wexford and Wicklow.

Widely distributed.

24. Psectra diptera (Burmeister)

Donegal and Wexford.

Only known from three specimens.

25. Wesmaelius betulinus (Ström)

As Hemerobius nervosus Fabricius in King and Halbert (1910).

Antrim, Armagh, Dublin, Kildare, Kilkenny, Offaly, Westmeath, Wexford and Wicklow.

26. W. subnebulosus (Stephens)

Antrim, Armagh, Cork, Donegal, Down, Dublin, Galway, Kerry, Kildare, Sligo and Westmeath.

Widely distributed.

27. W. quadrifasciatus (Reuter)

Wicklow.

Only recently recorded in Ireland (Speight, 1976) and it may be more widespread than the present single record would indicate.

OSMYLIDAE

28. Osmylus fulvicephalus (Scopoli)

Antrim, Cork, Dublin, Galway, Kerry, Kilkenny, Tyrone, Waterford, Wexford and Wicklow.

Probably widespread wherever suitable habitats occur.

SISYRIDAE

29. Sisyra dalii McLachlan

Dublin, Galway, Kerry and Wexford.

Bull. Ir. biogeog. Soc. No. 14

There have been no recent records.

30. S. fuscata (Fabricius)

Antrim, Armagh, Clare, Donegal, Dublin, Galway, Kerry, Laois, Leitrim, Longford, Mayo, Meath, Monaghan, Waterford, Westmeath and Wexford.

Widely distributed.

31. S. terminalis Curtis

Dublin and Kerry.

Evidently a local species.

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

CALYPTERATE FLIES (DIPTERA; ANTHOMYIIDAE AND FANNIIDAE) NEW TO IRELAND (HYDROPHORIA CAUDATA, LASIOMMA MEADI, L. ANTHOMYINUM, PEGOHYLEMYIA PHRENIONE, PEGOMYA GENICULATA, PHORBIA SECURIS, FANNIA NORVEGICA AND F. MELANIA).

Ruth M. Blackith and Robert E. Blackith

Anthomyiidae

The anthomyid flies of Ireland have not, as Chandler (1982) comments, received specialist attention, but two species have recently been added to the Irish list (Blackith, et al. 1990). Chandler recorded Pegomya rubivora (Coquillett) as an Irish species and suggested that it might be widespread where meadowsweet (Filipendula ulmaria (L.) Maxim) grows under light shade. We can confirm that it is common in Blackditch Wood on the Murrough, Co. Wicklow, where meadowsweet is abundant.

There is a useful, if incomplete, key to both sexes of the Anthomyiidae in Karl (1928), but the main source of identifications, descriptions and such biological information as exists is in the 3-volume monograph of Hennig (1976) whose keys apply to males only, but who deals with the entire Palaearctic fauna. Most of the published information in this note stems from Hennig's (1976) and Ferrar's (1987) monographs, and much of it is summarised in Stubbs and Chandler (1978).

Nomenclature for the Fanniidae follows Pont (1986) in the "Catalogue of Palaearctic Diptera". For the Anthomyiidae the relevant volume is not yet available. Voucher specimens of species marked NMI have been deposited in the National Museum of Ireland.

Hydrophoria caudata (Zetterstedt)

Wicklow: 6-19.v.1990, ♂, O309034 (PU.3) Blackditch Wood, Murrough,

Bull. Ir. biogeog. Soc. No. 14

in malaise trap, Betula-Salix woods on fen (NMI). An essentially northern European species, known widely from Scandinavia, but also from England and southwards as far as northern France and Czechoslovakia. Its life-history is unknown but it is said to be hygrophilic and to have been collected in arable fields in north Germany. Those of its congeners whose larval habits are known live on such diverse animal matter as owl pellets and lepidopterous larvae (Ferrar, 1987).

Lasiomma meadei (Kowarz)

Wicklow: Blackditch Wood, bred from dead pigeon exposed 1-6.ix.1988, 1 ♂ emerged 22.x.1988; bred from rotten birch log collected 1.1989, 2 ♂♂ emerged 22.x.1989 (NMI).

This species has essentially the same northern distribution as H. caudata, including Scandinavia, Iceland, England, northern France and Germany. The nominal form is replaced in Mediterranean lands by a subspecies L. meadei apenninum Hennig. This species infests the nests of various species of bird and also breeds in human excrement; other species of the genus live on the seeds of conifers and in faecal matter. In Blackditch Wood, L. meadei breeds in both animal and plant material, but we are uncertain why so few adults emerged in either instance.

Lasiomma anthomyinum (Rondani)

Wicklow: 20.v.1989, hand netted, other data as for H. caudata (NMI).

The larvae of this species are said to infest clusters ("nests") of processionary caterpillars (Cnethocampa processionaria (Pandellé) and C. pitiocampa (Séguy)) in Germany. The species is said to be a characteristic inhabitant of vantage points (possibly lecking sites) with a view over lower terrain but intermediate between mountains and valleys. The distribution of the species runs from Sweden to England, France (including Corsica), Germany, Hungary, and the whole of Italy, as well as the Canary Islands.

Bull. Ir. bioqeoq. Soc. No. 14

Pegohylemyia phrenione (Séguy)

Wicklow: v.1988, T305992 (PU.3) Killoughter, marshy field, hand netted; iv.1988, Blackditch Wood, other data as for H. caudata (NMI).

The larvae are said to infest accumulations of the fungus Epichloe typhina (Pers.). Several species of this genus infest grasses and can be exploited by dipterous larvae (Ferrari, 1987). The adult flies of P. phrenione, though rare in collections, are apparently widely distributed in Europe.

Pegomya geniculata (Bouché)

Wicklow: 26.vi-11.vii.1990, other data as for H. caudata (NMI). Virtually nothing appears to be known of the life cycle of this species, except that there may be two generations a year, one in summer and the other in autumn (Hennig, 1976). Pegomya is a large genus including species whose larvae feed on fungi and those which are leaf-miners (Ferrari, 1987).

Phorbia securis Tiensuu

Wicklow: vi.1988, T307981 (PU.3) Clonmannon Wood, hand netted; Blackditch Wood, vi.1988, hand netted, other data as for H. caudata (NMI).

Another species with two generations a year, at least in the warmer parts of its range from south Scandinavia to north Africa. The females lay their eggs under the coleoptyle of Gramineae, one of its many synonyms being P. tritici Rubtsov; to agricultural entomologists in Continental Europe it is one of the complex of flies infesting cereals confused under the name P. genitalis auctt. However, Hennig (1976) considers P. genitalis Schnabl to be distinct but very closely related to P. securis and the specimen reported here is clearly P. securis on the basis of Hennig's figures of the surstyli of these two species. This appears to be the first published record of any Phorbia species in Ireland, other species of the genus are pests of cereals in warmer summer

Bull. Ir. biogeog. Soc. No. 14

climates but little is known of the life-style of most species.

Fanniidae

The specific identification of fanniids is assured by keys and figures of the characteristic male genitalia published by Fonseca (1968) and by Hennig (1964), who also give such details as are known of their biology. A check-list of Irish Fanniidae was published by Nash (1979), 24 species then being known, of which 16 have now been found on the Murrough.

Fannia norvegica Ringdahl

Wicklow: Blackditch Wood, Malaise trap, vii.1989, other data as for H. caudata (NMI).

According to Hennig (1964) a distinctively northern species known only from Norway and Scotland. However, Fonseca (1968) adds several localities in England and Wales, and comments that the species is rare.

Fannia melania (Dufour)

Wicklow: Blackditch Wood, data as for H. caudata (NMI). The name melania has priority over ciliata Stein of which it is a synonym, despite the doubts expressed by Hennig (1964). The species is widely distributed in Europe (Scandinavia, Scotland, England, France, Germany, the Baltic States and Italy) but is mainly northern. Pont (1986) adds that its distribution extends through Asia to Japan. Fonseca (1968) regards it as scarce in the British Isles. The larvae infest fungi and the adults seek honey-dew on flowering plants, particularly Golden Rod, Solidago virgaurea L.

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Bull. Ir. biogeog. Soc. No. 14 (1991)

DISTRIBUTION OF IRISH MARINE BRYOZOA, TOGETHER WITH BIOGRAPHICAL NOTES RELATING TO THE CHIEF RESEARCHERS IN THE GROUP.

Patrick N. Wyse Jackson

Introduction

Zoological research into the Phylum Bryozoa, relative to other invertebrate groups, has been limited. Present taxonomic definition, and understanding, of bryozoans owes much to three 'Irish' researchers. 'Irish' is used in the most flexible sense and includes naturalists of foreign birth who have conducted their investigations along Ireland's shores.

One such naturalist first recognised members of the phylum as animals, and refuted the long supposed floral affinities of the group; another erected the phylum Polyzoa into which they were placed; while a third worker defined and described two of the presently recognised three Classes. These researchers were John Ellis, John Vaughan Thompson, and George James Allman respectively.

This paper outlines the lives of these men, and several others important in Irish bryozoology, and focuses on the important, salient aspects of their work. It also provides a provisional list of Irish marine bryozoans, together with their presently known distribution, and lists the important bryozoological papers relating to Ireland.

Bibliographies and synopses of contributions to bryozoology

Bryozoology may be said to date from the 1750's, with the publication of John Ellis' paper Observations on a remarkable coralline published by the Royal Society of London in 1754, the

Bull. Ir. biogeog. Soc. No. 14

same year that its author was elected a Fellow of that Society. In this paper Ellis solved the taxonomic difficulties that several early naturalists had encountered with bryozoans. Most of these workers had considered them to be plants. Ellis, however, placed them into a grouping called the 'corallines', and described them as having 'plant-like' colonies that possessed 'sea snails or tentacled bodies' [on branches]. His was a crude, but nevertheless important, description of bryozoan polypides, and he recognised their animal affinity for the first time.

He followed this short paper with a book An essay towards a natural history of the corallines and other marine productions of the like kind, commonly found on the coasts of Great Britain and Ireland (1755), in which he described and illustrated many species, including at least one from Dublin. Thus research on Irish bryozoans commenced with the publication of this book. Ellis' observations on the group were expanded in the volume Natural History of Curious and Uncommon Zoophytes, which appeared ten years after his death. Editing of this volume was undertaken by Daniel Solander, assistant naturalist to Sir Joseph Banks on Captain Cook's first voyage of 1768 to 1771.

Ellis was born in Ireland; the date of his birth is unclear: Desmond (1977) gives it as 1705, while Praeger (1949) cites 1710. Ellis later moved to London where he became a noted merchant. He acted as London agent for the importation of goods from the American colonies of West Florida and Dominica, from where he acquired seeds for distribution in English gardens. Ellis corresponded with Linnaeus, who in his own book Systema naturae (1758) incorporated many of the former's ideas. Linnaeus erected the class Zoophyta into which elements he considered partially plant, including bryozoans and coelenterates, were placed. Ellis died in London on 15th October 1776 by which time the animal nature of bryozoans was universally accepted.

Bull. Ir. biogeog. Soc. No. 14

Nearly 60 years elapsed before further work was carried out on bryozoans of Ireland. In 1816 an English-born surgeon John Vaughan Thompson (19th November 1779 - 21st January 1847) moved to Cork when he was appointed District Medical Officer. Hitherto Thompson had had a varied medical career: he was an Assistant Surgeon in the 37th Regiment of the British Army which saw action at the fall of Demerara in 1803; he remained in the Caribbean until 1809, after which he spent 5 years on the Indian Ocean islands of Madagascar and Mauritius. He developed his naturalistic talents around his home town of Berwick-on-Tweed, and published a check-list of plants found in its vicinity in 1808. He spent 19 years in Cork during which time he investigated the marine invertebrates of the southern coast of Ireland. Arising from these studies he penned a slim volume Zoological researches, and illustrations; or natural history of nondescript animals, in a series of memoirs which was published in 1830. In it he described feather stars, Crustacea, and Bryozoa.

Thompson (1830) working in West Cork during the early nineteenth century and Ehrenberg (1831) independently erected a taxonomic group into which bryozoans were placed. Although Thompson's work was published a year earlier than Ehrenberg's his name 'Polyzoa' is not now in general use, because he had loosely defined the group, placing it into the order Mollusca. Ehrenberg proposed the name 'Bryozoa' for the group, and as his definition is fairly rigidly defined it takes preference over Thompson's name. Thompson left Ireland in 1835 to take up an appointment at the Convict Medical Department in Sydney, Australia where he lived for the remainder of his life.

Soon after Thompson's departure from Ireland, George James Allman (1812-1898) began his researches into bryozoans. By the time he died Allman had made significant contributions to the presently accepted bryozoan taxonomic hierarchy, as well as working up the

Bull. Ir. biogeog. Soc. No. 14

neglected freshwater forms.

Allman was born in Cork, and went through a variety of careers; he trained as a barrister, then as a medical doctor, before turning to natural science. In 1844 he succeeded his father as Professor of Botany at Trinity College, Dublin, and subsequently moved to Edinburgh in 1856 as Professor of Natural History. He was elected a Fellow of the Royal Society in 1854 and was one-time President of the Linnaean Society.

Although he was employed professionally in Dublin as a botanist, Allman's major research was carried out on Bryozoa and in particular freshwater faunas. He described all known freshwater species in a Ray Society monograph (1856) in which he erected the classes Phylactolaemata and Gymnolaemata for forms that possessed or lacked a oral epistome respectively. These two classes number two of the three into which all bryozoans have been placed; the Stenolaemata, being the third, mainly comprises fossil forms.

Allman also was interested in the physiology of the Phylum and described musculature (1842, 1851), the nervous system (1850) and the larval production and locomotion (1846) of its members.

Contemporary workers of Allman included Arthur Hill Hassall, Rev. Thomas Hincks (1818-1899), H. W. Macintosh and William Thompson.

W. Thompson (1805-1852), a Belfast man, was one of Ireland's foremost naturalists, who is best remembered for his 4 volume The Natural History of Ireland (1849-1856). The last volume contains records of Bryozoa observed by him and others including R. L. Allman of Bandon, Co. Cork (possibly a brother of G. J. Allman), Anne Elizabeth Ball (1808-1872) of Youghal and a Mrs Hancock of Sligo.

Bull. Ir. biogeog. Soc. No. 14

Hassall was born in Middlesex on 13th December 1817 and died in Remo, Italy 76 years later on 9th April 1894. He qualified as a medical doctor in 1851 and was a prolific amateur naturalist. He published two papers which were simply faunal lists of bryozoans recorded from the Dublin region (Hassall, 1840, 1841a), and also described briefly two new genera and a few new species (Hassall, 1841b, 1842). Many of his taxa were subsequently regarded as synonymous (Nichols, 1908). As well as his papers cited above he published an important work on freshwater algae of Britain in 1845.

Hincks was the son of a Professor of Natural History in Cork, and like his father and grandfather before him was a Unitarian minister. He served in Dublin, Cork and England, and found time to write monographs on hydroids and Bryozoa. He added several species to the Irish fauna based on specimens dredged by the Belfast Dredging Committee of 1857-1859, and made available to him by George Crawford Hyndman (1796-1867). Hincks' chief contribution was his book A History of the British Marine Polyzoa (1880). It contains over 600 pages and 83 plates of clear descriptions and good illustrations of taxa from the British Isles. However, many of his taxonomic groupings have been subsequently split. According to Ryland (1969, p. 207) "The importance of Hincks' book lies in the fact that so many of today's genera and their types have been based on his descriptions and plates".

After 1880 the number of bryozoan papers increased through the work of several naturalists including William Hellier Bailly (1819-1888), Nathaniel Colgan (1851-1919) who is better known for his Flora of County Dublin, Alfred Cort Haddon (1855-1940), Professor of Zoology at the Royal College of Science for Ireland, founder of the Dublin Naturalists' Field Club in 1886 and noted anthropologist, C.H. Hurst, Laura Thornely, Albert Russell Nichols (1859-1933), and James Edwin Duerden (? - 1937). The majority of

Bull. Ir. biogeog. Soc. No. 14

these studies resulted from dredging expeditions, which following the Challenger expeditions of 1872-1876, seemed to be the favoured mode of zoological collecting of the period (Hurst, 1896; Nichols, 1911; Thornely, 1897). One such expedition of note was that to Rockall in 1896 which is recounted in Praeger's (1937) The Way that I Went. This expedition was written up in a large volume, published by the Royal Irish Academy, and included a note on the bryozoans by Laura Thornely (1897). She records 42 species of which 18 were recorded from Irish waters for the first time. Although the present territorial claims on Rockall are complex and unresolved the paper and its records is included here for completeness.

The papers of this period generally consisted of faunal listings and few species were adequately described. However, some of the papers by Nichols and Duerden merit mention.

J. E. Duerden came to Dublin in the early 1890's when he took up an appointment at the Royal College of Science for Ireland. He soon started to sample bryozoans and hydroids from Irish waters. Many of these he exhibited at meetings of the Dublin Naturalists' Field Club and the Dublin Microscopical Club. Details of his findings, notably new and unusual Bryozoa, were published by the Royal Irish Academy (1893), the Royal Dublin Society (1895) and in a number of short papers and in reports of various Society activities which appeared in The Irish Naturalist between 1892 and 1894. Included in the latter journal is a list of bryozoans dredged from various of up to 72 fathoms of Belfast Lough, co-authored with William Swanston (1841-1932) a leading light in the Belfast Naturalists' Field Club.

Duerden remained in Dublin until 1896 when he accepted the post of Curator of the Museum in Kingston, Jamaica. He kept in touch with Dublin and his former colleagues, and sent geological material to

Bull. Ir. biogeoq. Soc. No. 14

Grenville Cole (1859-1924), Professor of Geology, Royal College of Science for Ireland. After spending a few years in the United States, Duerden returned to England where he became engaged in research in wool at the University of Leeds. He apparently did not return to bryozoological studies after his departure from Ireland.

1909 is a significant date as it marks the onset of field studies carried out by many Irish, British and Continental naturalists on and around Clare Island, County Mayo during the summers of 1909-1911. This survey, which followed the earlier and smaller survey of Lambay in 1906, was organised and coordinated by Robert Lloyd Praeger (1865-1953) under the auspices of the Royal Irish Academy. The bryozoans from both islands were investigated by A. R. Nichols of the Museum of Science and Art, Dublin, who listed 35 species from Lambay (1907) and 76 species from Clare Island (1912).

Nichols was an Englishman who rose to be Keeper of Natural History in what is now the National Museum. He collected bryozoans from various parts of Ireland, and like Duerden exhibited the more unusual species at the monthly meetings of the Dublin Microscopical Club (DMC), of which he was President from 1910 to 1912. He also was a participant in the dredging expedition of the s.s. Lord Bandon of 1886. In all his original bryozoan research papers number only seven, excluding the two reports of DMC meetings where he displayed bryozoan material, of which most are meritorious. They included papers on the bryozoan fauna of the west of Ireland (1886), Lambay Island, Co. Dublin (1907), Dublin (1908), Clare Island, Co. Mayo (1912) and Blacksod Bay, Co. Mayo (1915). He also wrote a large paper in which he described bryozoans from many stations off the Irish coast (1911).

Nichols later became interested in ornithology and published lists of Irish birds, issued by the Museum of Science and Art. Nichols

Bull. Ir. biogeog. Soc. No. 14

was also a member of the Royal Irish Academy and died in Dublin on 21st February 1933.

Between 1912 and 1975 few papers describing the occurrence of bryozoans in Irish waters have appeared. Some of these are derived from the exhaustive ecological research carried out in and around Lough Hyne, Co. Cork in the 1940s and 1950s (Ebling et al., 1948; Sloane et al., 1957). Shorter papers such as those by Humphries (1953) and O'Riordan (1968, 1971, 1973) record small numbers of species from the south west of Ireland. A number of papers resulted from research carried out in County Galway, by workers from University College, Swansea and the Institute for Marine Environmental Research, Plymouth (Ryland and Stebbing, 1971; Ryland and Nelson-Smith, 1975; Stebbing 1972).

Since 1975 there has been an increase in the papers that record bryozoans from Irish waters, and the authors of these papers examine distribution patterns in more detail than did their predecessors.

There are a numbers of reasons for this increase in activity. One is the notably series Littoral and benthic investigations on the west coast of Ireland published by the Royal Irish Academy who continue to sponsor their long-standing tradition in Irish marine studies. To this series has recently been added another concerning the south coast of Ireland (Dineen et al., 1986; Keegan et al., 1987). Another factor is the development of marine studies at University College Galway, and the Department of Zoology, Queen's University, Belfast. The research and work of these two departments has led to an increased knowledge of bryozoan distribution and ecology around Ireland's shores.

Bull. Ir. biogeog. Soc. No. 14

Distribution of bryozoans around Ireland

This list contains 192 species (31 cyclostomes; 24 ctenostomes; 58 anascan cheilostomes; 79 ascophoran cheilostomes) together with their distribution in Irish waters. The near-shore records are categorised according to the Biological Vice-County scheme (Webb, 1980, and references within); the offshore records are listed citing the sea basin or bank in which they occur (e.g., Fastnet Basin, Porcupine Basin, Rockall Trough, Rockall Bank).

The listing can only be regarded as provisional, and is presented as a base for future taxonomic and distributional studies. All known sources have been checked for records of bryozoans from Irish waters. Where necessary taxonomic names have been updated, but the accuracy of the original identification has not been checked. Some records are considered doubtful and are marked with '?' preceding the reference. Papers of some early authors (e.g., Hassall, 1840, 1841a, 1841b, 1842; Thompson, 1856) record taxa which cannot be correlated with presently accepted species; these records are excluded from this listing. In many cases the present whereabouts of older collections is not known. Nomenclature is based on Ryland and Hayward (1977), Hayward and Ryland (1979, 1985), and Hayward (1985).

CLASS STENOLAEMATA

Order CYCLOSTOMATA

Filicrisia geniculata (Milne Edwards)

WEST MAYO (27): Nichols, 1912.

Crisidia cornuta (Linnaeus)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Nichols, 1886; Duerden, 1893a.

Bull. Ir. biogeog. Soc. No. 14

MID CORK (4): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Thompson, 1856; Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Ball in Thompson, 1856; Macintosh, 1878; Duerden, 1893a; Nichols, 1907.

WEST MAYO (27): Thompson, 1856; Nichols, 1911, 1912.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856; Hincks, 1859; Thornely, 1902.

Crisia eburnea (Linnaeus)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Duerden, 1893a; Nichols, 1886; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Ball in Thompson, 1856; Collins, 1980.

WEXFORD (12): Nichols, 1911; Keegan et al., 1987.

WEST GALWAY (16): Ball in Thompson, 1856; Ryland and Nelson-Smith, 1975; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Macintosh, 1878; Duerden, 1893a; Colgan, 1905; Nichols, 1907; Massey, 1912.

MEATH (22): Duerden, 1894a.

LOUTH (31): Nichols, 1911; Massey, 1912.

WEST MAYO (27): Nichols 1911, 1912, 1915.

DOWN (38): Swanston and Duerden, 1893; Thornely, 1902; Seed and Harris, 1980.

ANTRIM (39): Hincks, 1859, 1880; Hurst, 1896; Thornely, 1902.

Crisia aculeata Hassall

SOUTH KERRY (1): Collins, 1980.

MID CORK (4): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hassall, 1840, 1841a; Thompson, 1856; Duerden, 1893a; Nichols, 1907.

Bull. Ir. biogeog. Soc. No. 14

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856; Swanston and Duerden, 1893.

Crisia ramosa Harmer

SOUTH KERRY (1): Collins, 1980.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Duerden, 1893a, 1893c.

Crisia denticulata (Lamarck)

MID CORK (4): Collins, 1980.

EAST CORK (5): Collins, 1980.

WEST GALWAY (16): Könnecker and Keegan, 1983.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Macintosh, 1878; Duerden, 1893a.

ANTRIM (39): Thornely, 1902.

?Crisia luxata

EAST CORK (5): Ball in Thompson, 1856.

WATERFORD (6): Ball in Thompson, 1856.

ANTRIM (39): Thompson, 1856.

Stomatoporina incurvata (Hincks)

ANTRIM (39): Hincks, 1859, 1860a, 1880.

Oncousoecia dilatans (Johnston)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

DOWN (38): Hincks, 1880.

ANTRIM (39): Thompson, 1856.

Oncousoecia diastoporides (Norman)

WEST CORK (3): Dinneen et al., 1986.

Bull. Ir. bioqeoq. Soc. No. 14

MID CORK (4): Dinneen et al., 1986.

Tubulipora liliacea (Pallas)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Nichols, 1907, 1911; Massey, 1912.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Thornely, 1902; Nichols, 1911.

FASTNET BASIN: Nichols, 1911.

PORCUPINE BASIN: Kirkpatrick, 1889; Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Tubulipora phalangea Couch

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

DUBLIN (21): Macintosh, 1878; Nichols, 1912.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856; Seed and Harris, 1980.

ANTRIM (39): Thompson, 1856; Swanston and Duerden, 1893.

Tubulipora plumosa Thompson in Harmer

WEST CORK (3): Ebling et al., 1948.

Tubulipora lobifera Hastings

DUBLIN (21): ?Hassall, 1841a.

ANTRIM (39): Thornely, 1902.

Tubulipora penicillata (Fabricus)

WEST MAYO (27): Nichols, 1912.

Bull. Ir. biogeog. Soc. No. 14

Tubulipora expansa Packard

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

Idmidronea atlantica (Forbes in Johnston)

SOUTH KERRY (1): Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Plagioecia patina (Lamarck)

SOUTH KERRY (1): Nichols, 1911.

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Ball in Thompson, 1856; Macintosh, 1878.

WEST MAYO (27): Nichols, 1912, 1915.

ANTRIM (39): Thompson, 1856; Hincks, 1859; Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Plagioecia sarniensis (Lamarck)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

Berenicea suborbicularis (Hincks)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

Diplosolen obelia (Johnston)

SOUTH KERRY (1): Nichols, 1911.

MID CORK (4): Thompson, 1856.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Haddon, 1886.

WEST MAYO (27): Nichols, 1911, 1912.

Bull. Ir. biogeoq. Soc. No. 14

DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1859; Thornely, 1902.
DERRY (40): Thompson, 1856.
ROCKALL BANK: Thornely, 1897.

Tervia irregularis (Meneghini)

PORCUPINE BASIN: Nichols, 1911.

Annectocyma major (Johnston)

WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Nichols, 1911; Konnecker and Keegan, 1983.
DOWN (38): Thompson, 1856; Hincks, 1880.
ANTRIM (39): Thompson, 1856; Hincks, 1859, 1880.
ROCKALL BANK: Thornely, 1897.

Entalophoroecia deflexa (Couch)

WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911, 1912.
DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1880.
ROCKALL BANK: Thornely, 1897.

Hornera lichenoides (Linnaeus)

WEST GALWAY (16): Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Stigmatoechos violacea (M. Sars)

ROCKALL BANK: Thornely, 1897.

Lichenopora radiata (Audouin)

WEXFORD (12): Keegan et al., 1987.

Bull. Ir. biogeog. Soc. No. 14

Lichenopora verrucaria (Fabricius)

ANTRIM (39): Hincks, 1880.

Disporella hispida (Fleming)

SOUTH KERRY (1): Nichols, 1911; Collins, 1980.

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Macintosh, 1878; Nichols, 1907.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856; Thornely, 1902; Nichols, 1911.

PORCUPINE BASIN: Kirkpatrick, 1889.

ROCKALL BANK: Thornely, 1897.

Conronopora truncata (Fleming)

WEST GALWAY (16): Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Filifascigera fasciculata (Hincks)

ANTRIM (39): Hincks, 1880.

CLASS GYMNOLEAMATA

Order CTENOSTOMATA

Alcynonidium albidum Alder

ROCKALL BANK: Thornely, 1897.

Alcynonidium gelatinosum (Linnaeus)

SOUTH KERRY (1): Weiss, 1900.

WEST CORK (3): Dinneen et al., 1986.

Bull. Ir. biogeog. Soc. No. 14

- MID CORK (4): Dinneen et al., 1986.
EAST CORK (5): Ball in Thompson, 1856.
WEXFORD (12): Keegan et al., 1987.
SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975; d'Hondt and Goyffon, 1987.
WEST GALWAY (16): Könnecker and Keegan, 1983; d'Hondt and Goyffon, 1987.
DUBLIN (21): Hassall, 1841a, 1841b; Macintosh, 1878; Massey, 1912; Hayward, 1985.
MEATH (22): Massey, 1912.
WEST MAYO (27): Nichols, 1912.
LOUTH (31): Massey, 1912.
DOWN (38): Thompson, 1856; Boaden et al., 1975.
ANTRIM (39): Thompson, 1856.

Alcyonidium hirsutum (Fleming)

- SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Allman in Thompson, 1856; Collins, 1980; Dinneen et al., 1986.
MID CORK (4): Collins, 1980; Dinneen et al., 1986.
EAST CORK (5): Ball in Thompson, 1856; Collins, 1980.
WEXFORD (12): Keegan et al., 1987.
SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.
WEST GALWAY (16): Thompson, 1856; Nichols, 1911.
DUBLIN (21): Hassall, 1840, 1841a, 1841b; Macintosh, 1878; Nichols, 1907.
WEST MAYO (27): Nichols, 1912, 1915.
DOWN (38): Boaden et al., 1975; O'Connor and Lamont, 1978.

Alcyonidium mamillatum Alder

- ROCKALL BANK: Thornely, 1897.

Alcyonidium mytili Dalyell

- WEST CORK (3): Dinneen et al., 1986.

Bull. Ir. biogeog. Soc. No. 14

MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
DUBLIN (21): Duerden, 1894b.
WEST MAYO (27): Nichols, 1911, 1912, 1915.
PORCUPINE BASIN: Kirkpatrick, 1889.

Alcyonidium parasiticum (Fleming)

WEXFORD (12): Keegan et al., 1987.
DUBLIN (21): Hassall, 1840, 1841a; Thompson, 1856; Macintosh,
1878; Nichols, 1911; Massey, 1912.
MEATH (22): Duerden, 1894a; Massey, 1912.
LOUTH (31): Massey, 1912.

Flustrellidra hispida (Fabricius)

SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Collins, 1980.
MID CORK (4): Collins, 1980.
EAST CORK (5): Collins, 1980.
DUBLIN (21): Nichols, 1907.
SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.
WEST MAYO (27): Nichols, 1912, 1915.
DOWN (38): Boaden et al., 1975; O'Connor and Lamont, 1978; Seed
and Harris, 1980.

Arachnidium fibrosum Hincks

ROCKALL BANK: Thornely, 1897.

Arachnidium simplex Hincks

PORCUPINE BASIN: Kirkpatrick, 1889.

Nolella dilatata (Hincks)

WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Könnecker and Keegan, 1983.

Bull. Ir. biogeog. Soc. No. 14

ANTRIM (39): Hincks, 1859, 1860a, 1880.

Walkeria tremula (Hincks)

WEXFORD (12): Keegan et al., 1987.

Walkeria uva (Linnaeus)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hassall, 1840, 1841a; Macintosh, 1878;

Duerden, 1894b; Nichols, 1907.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856; Hurst, 1896.

ANTRIM (39): Thompson, 1856; Hincks, 1880; Hurst, 1896.

Triticella flava Dalyell

WEST CORK (3): Busk, 1874; Hincks, 1880; Duerden, 1893a, 1893b.

PORCUPINE BASIN: Kirkpatrick, 1889.

Triticella koreni Sars

SOUTH KERRY (1): Duerden, 1895.

WEST CORK (3): Duerden, 1893b.

Triticella pedicellata (Alder)

SOUTH KERRY (1): Duerden, 1895.

WEST CORK (3): Duerden, 1893b.

WEST GALWAY (16): Duerden, 1895.

Farrella repens (Farre)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

DUBLIN (21): Hassall, 1841a.

DOWN (38): Thompson, 1856.

Bull. Ir. biogeog. Soc. No. 14

Hypophorella expansa Ehlers

WEST MAYO (27): Nichols, 1906.

?Penetrantia densa Silén

EAST CORK (5): Ball in Thompson, 1856.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856.

Vesicularia spinosa (Linnaeus)

WEXFORD (12): Nichols, 1911; Keegan et al., 1987.

DUBLIN (21): Hassall, 1840, 1841a; Thompson, 1856; Macintosh, 1878; Nichols, 1907; Massey, 1912.

MEATH (22): Duerden, 1894a; Massey, 1912.

LOUTH (31): Nichols, 1911; Massey, 1912.

DOWN (38): Hurst, 1896.

ANTRIM (39): Hurst, 1896.

Amathia lendigera (Linnaeus)

WEST CORK (3): Collins, 1980.

MID CORK (4): Collins, 1980.

EAST CORK (5): Ball in Thompson, 1856.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hassall, 1840; Macintosh, 1878; Nichols, 1907, 1911; Massey, 1912.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856; Hurst, 1896.

ANTRIM (39): Thompson, 1856; Hurst, 1896; Thornely, 1902.

Bowerbankia imbricata (Adams)

WEST GALWAY (16): Thompson, 1856; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1841a; Macintosh, 1878; Haddon, 1886; Colgan, 1905.

MEATH (22): Duerden, 1894a.

Bull. Ir. biogeog. Soc. No. 14

WEST MAYO (27): Johnston, 1847; Thompson, 1856; Nichols, 1912, 1915.

DOWN (38): Boaden et al., 1975.

Bowerbankia gracilis Leidy

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Haddon, 1886.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Hurst, 1896.

ANTRIM (39): Hurst, 1896.

Bowerbankia pustulosa (Ellis and Solander)

EAST CORK (5): ?Ball in Thompson, 1856.

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hassall, 1841a; ?Thompson, 1856.

Bowerbankia citrina (Hincks)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

Order CHEILOSTOMATA

Suborder ANASCA

Aetea anquina (Linnaeus)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

WEST MAYO (27): Nichols, 1912.

WEXFORD (12): Keegan et al., 1987.

ANTRIM (39): Hincks, 1859.

Bull. Ir. biogeog. Soc. No. 14

Aetea sica (Couch)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Nichols, 1911, 1912.
WEST MAYO (27): Nichols, 1912.
DOWN (38): Thompson, 1856.
ANTRIM (39): Thompson, 1856.

Aetea truncata (Landsborough)

- DUBLIN (21): Haddon, 1886.
ANTRIM (39): Swanston and Duerden, 1893.
EAST CORK (5): Ball in Thompson, 1856.

Scruparia ambigua (d'Orbigny)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.

Scruparia chelata (Linnaeus)

- SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Allman in Thompson, 1856; Nichols, 1886; Sloane et al., 1957.
MID CORK (4): Collins, 1980.
EAST CORK (5): J. V. Thompson in Johnston, 1847; Thompson, 1856.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Thompson, 1856; Hincks, 1880; Nichols, 1911, 1912, 1915; Könnecker and Keegan, 1983.
WICKLOW (20): Nichols, 1911.
DUBLIN (21): Duerden, 1894b; Nichols, 1907.
MEATH (22): Duerden, 1894a.
WEST MAYO (27): Nichols, 1912.
SLIGO (28): Hancock in Thompson, 1856.
DOWN (38): Thompson, 1856; Hurst, 1896; Boaden et al., 1975.
ANTRIM (39): Thompson, 1856; Hurst, 1896.
DERRY (40): Thompson, 1856.

Bull. Ir. biogeog. Soc. No. 14

Eucratea loricata (Linnaeus)

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911.

DUBLIN (21): Hassall, 1840; Colgan, 1905; Nichols, 1907, 1911; Massey, 1912.

MEATH (22): Duerden, 1894a; Massey, 1912.

LOUTH (31): Massey, 1912.

DOWN (38): Swanston and Duerden, 1893; Hurst, 1896.

ANTRIM (39): Hincks, 1859; Hurst, 1896; Thornely, 1902.

Membranipora membranacea (Linnaeus)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Nichols, 1886; Sloane et al., 1957; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Nichols, 1907.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912, 1915.

DOWN (38): Thompson, 1856; Boaden et al., 1975; O'Connor and Lamont, 1978; Seed and Harris, 1980.

ANTRIM (39): Thompson, 1856.

DERRY (40): Thompson, 1856.

Membranipora tuberculata (Bosc)

DUBLIN (21): Hassall, 1841a.

Conopeum reticulum (Linnaeus)

WEST CORK (3): Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

Bull. Ir. biogeoq. Soc. No. 14

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

Electra pilosa (Linnaeus)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Nichols, 1886; Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Ball in Thompson, 1856; Collins, 1980.

WEXFORD (12): Nichols, 1911; Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Nichols, 1907.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1911, 1912, 1915.

DOWN (38): Thompson, 1856; Boaden et al., 1975; O'Connor and Lamont, 1978; Seed and Harris, 1980.

ANTRIM (39): Thompson, 1856; Hincks, 1859; Swanston and Duerden, 1893; Thornely, 1902.

PORCUPINE BASIN: Kirkpatrick, 1889.

Carbasea carbasea (Ellis and Solander)

DUBLIN (21): Thompson, 1856; Hincks, 1880.

SLIGO (28): Hancock in Thompson, 1856.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856.

Pyripora catenularia (Fleming)

WEST CORK (3): Thompson, 1856; Nichols, 1886; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Thompson, 1856.

DUBLIN (21): Hassall, 1840.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Swanston and Duerden, 1893.

Bull. Ir. biogeog. Soc. No. 14

ANTRIM (39): Thompson, 1856; Swanston and Duerden, 1893; Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Flustra foliacea (Linnaeus)

WEST CORK (3): Allman in Thompson, 1856.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Thompson, 1856; Baily, 1888; Nichols, 1906.

MEATH (22): Massey, 1912.

DOWN (38): Thompson, 1856; Swanston and Duerden, 1893; Hurst, 1896

ANTRIM (39): Thompson, 1856; Thornely, 1902.

DERRY (40): Thompson, 1856.

Chartella papyracea (Ellis and Solander)

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Nichols, 1907.

WEST MAYO (27): Nichols, 1912.

Chartella barleei (Busk)

South Kerry (1): Duerden, 1895.

Securiflustra securifrons (Pallas)

SOUTH KERRY (1): Nichols, 1911.

WEST GALWAY (16): Nichols, 1911.

DUBLIN (21): Massey, 1912.

WEST MAYO (27): Nichols, 1911.

DOWN (38): Hurst, 1896.

ANTRIM (39): Hincks, 1880; Hurst, 1896.

FASTNET BASIN: Nichols, 1911.

PORCUPINE BASIN: Nichols, 1911.

Bull. Ir. biogeog. Soc. No. 14

Hincksina flustroides (Hincks)

DOWN (38): Swanston and Duerden, 1893.

Callopora lineata (Linnaeus)

SOUTH KERRY (1): Nichols, 1911; Collins, 1980.

WEST CORK (3): Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.

WEST GALWAY (16): Nichols, 1911, 1912, 1915; Ryland and Nelson-Smith, 1975; Könnecker and Keegan, 1983.

WICKLOW (20): Hassall, 1841a.

DUBLIN (21): Thompson, 1856; Nichols, 1907.

WEST MAYO (27): Thompson, 1856; Nichols, 1911.

DOWN (38): Seed and Harris, 1980.

Callopora dumerilii (Audouin)

SOUTH KERRY (1): Nichols, 1911.

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

WEST MAYO (27): Nichols, 1912, 1915.

ANTRIM (39): Swanston and Duerden, 1893.

ROCKALL BANK: Thornely, 1897.

Callopora aurita (Hincks)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Hincks, 1880.

Bull. Ir. biogeog. Soc. No. 14

Callopora rylandi Bobin and Prenant

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3) Ryland and Stebbing, 1971; Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

CLARE (9): Ryland and Stebbing, 1971.

WEST GALWAY (16): Ryland and Stebbing, 1971.

WEST MAYO (27) Ryland and Stebbing, 1971.

Callopora discreta (Hincks)

ANTRIM (39): Hincks, 1880.

Alderina solidula (Hincks)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST GALWAY (16): Könnecker and Keegan, 1983.

ANTRIM (39): Hincks, 1859, 1860a, 1880.

Alderina imbellis (Hincks)

SOUTH KERRY (1): Nichols, 1911.

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1911.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1860a, 1880.

PORCUPINE BASIN: Nichols, 1911.

Cauloramphus spiniferum (Johnston)

SOUTH KERRY (1): Collins, 1980.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Hincks, 1859.

Bull. Ir. biogeoq. Soc. No. 14

Amphiblestrum fleminqii (Busk)

- SOUTH KERRY (1): Nichols, 1911.
WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
WEST MAYO (27): Nichols, 1911, 1912.
DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Thompson, 1856; ?Thornely, 1902.
FASTNET BASIN: Nichols, 1911.
PORCUPINE BASIN: Kirkpatrick, 1889.
ROCKALL BANK: Thornely, 1897.

Amphiblestrum solidum (Packard)

- WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Amphiblestrum minax (Busk)

- WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
WEST MAYO (27): Nichols, 1911.
PORCUPINE BASIN: Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Megapora ringens (Busk)

- WEST MAYO (27): Nichols, 1911.

Ammatophora nodulosa (Hincks)

- ANTRIM (39): Hincks, 1880.

Larnacicus corniger (Busk)

- WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.

Bull. Ir. biogeog. Soc. No. 14

Membraniporella nitida (Johnston)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
DUBLIN (21): Hassall, 1841a.
WEST MAYO (27): Nichols, 1912.
DOWN (38): Thompson, 1856; Swanston and Duerden, 1893.
ANTRIM (39): Thompson, 1856; Hincks, 1859; Thornely, 1902

Micropora coriacea (Johnston).

- WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1912.
ANTRIM (39): Hincks, 1880.

Mollia rosselii (Audouin)

- WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.
ANTRIM (39): Hincks, 1880.

Cellaria sinuosa (Hassall)

- SOUTH KERRY (1): Nichols, 1886, 1911.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Könnecker and Keegan, 1983.
DUBLIN (21): Hassall, 1840; Thompson, 1856; Swanston and Duerden, 1893; Colgan, 1905; Nichols, 1907, 1911; Massey, 1912.
MEATH (22): Duerden, 1894a.
LOUTH (31): Massey, 1912.
DOWN (38): Thompson, 1856; Swanston and Duerden, 1893; Hurst, 1896.
ANTRIM (39): Thompson, 1856; Hurst, 1896; Thornely, 1902.
FASTNET BASIN: Nichols, 1911.
PORCUPINE BASIN: Bourne, 1890.

Bull. Ir. biogeoq. Soc. No. 14

Cellaria fistulosa (Linnaeus)

- SOUTH KERRY (1): Nichols, 1911.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
DUBLIN (21): Thompson in Swanston and Duerden, 1893; Massey, 1912.
MEATH (22): Massey, 1912.
WEST MAYO (27): Nichols, 1911.
DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1880; Thornely, 1902; Nichols, 1911.
FASTNET BASIN: Nichols, 1911.

Cellaria salicornioides Lamouroux

- DUBLIN (21): ?Thompson, 1856.
DOWN (38): ?Thompson, 1856.
ANTRIM (39): ?Thompson, 1856; Thornely, 1902
FASTNET BASIN: Nichols, 1911.
PORCUPINE BASIN: Bourne, 1890.

Caberea boryi Audouin

- WEST CORK (3): Humphries, 1953.

Caberea ellisii (Fleming)

- DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1880; Thornely, 1902.

Notoplites jeffreysii (Norman)

- WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.

Scrupocellaria reptans (Linnaeus)

- SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Nichols, 1886; Sloane et al., 1957; Collins, 1980;
Dinneen et al., 1986.
MID CORK (4): Collins, 1980; Dinneen et al., 1986.

Bull. Ir. biogeog. Soc. No. 14

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Stebbing, 1972; Ryland and Nelson-Smith, 1975; Könnecker and Keegan, 1983.

DUBLIN (21): ?Hassall, 1840; Nichols, 1907.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912, 1915.

Scrupocellaria scrupea Busk

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Haddon, 1886.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Thornely, 1902.

Scrupocellaria scruposa (Linnaeus)

SOUTH KERRY (1): Nichols, 1911; Collins, 1980.

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Nichols, 1911; Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

WICKLOW (20): Nichols, 1911.

DUBLIN (21): ?Hassall, 1840; Colgan, 1905; Nichols, 1907; Massey, 1912.

MEATH (22): Duerden, 1894a; Massey, 1912.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Hurst, 1896.

ANTRIM (39): Hincks, 1859; Swanston and Duerden, 1893; Hurst, 1896; Thornely, 1902.

PORCUPINE BASIN: Bourne, 1890; Nichols, 1911.

Scrupocellaria inermis Norman

WEST GALWAY (16): Könnecker and Keegan, 1983.

Bull. Ir. biogeog. Soc. No. 14

Bicellariella ciliata (Linnaeus)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): ?Hassall, 1840; Duerden, 1894b; Nichols, 1911; Massey, 1912.

WEST MAYO (27): Nichols, 1911, 1912.

Bicellarina alderi (Busk)

SOUTH KERRY (1): Duerden, 1895.

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1911.

Beania mirabilis Johnston

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Hincks, 1860b, 1880.

Bugula avicularia (Linnaeus)

WEXFORD (12): Nichols, 1911; Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911.

DUBLIN (21): Ellis, 1755; Hassall, 1840, 1841a;

Colgan, 1905; Nichols, 1907, 1911; Massey, 1912.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Swanston and Duerden, 1893.

PORCUPINE BASIN: Nichols, 1911.

Bugula flabellata (Thompson in Gray)

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Colgan, 1905; Nichols, 1911; Massey, 1912.

MEATH (22): Massey, 1912.

DOWN (38): Hurst, 1896.

Bull. Ir. biogeog. Soc. No. 14

ANTRIM (39): Hincks, 1859; Hurst, 1896.

?Bugula neritina (Linnaeus)

DOWN (38): Thompson, 1856.

Bugula plumosa (Pallas)

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hassall, 1840.

WEST MAYO (27): Nichols, 1912.

DOWN (38): ? Thompson, 1856; Hurst, 1896.

ANTRIM (39): Hurst, 1896.

Bugula purpurotincta Norman

WEXFORD (12): Keegan et al., 1987.

DUBLIN (21): Hincks, 1860b, 1880.

?Bugula simplex Hincks

ANTRIM (39): Hincks, 1859.

Bugula stolonifera Ryland

DOWN (38): Boaden et al., 1975.

Bugula turbinata Alder

DUBLIN (21): Hincks, 1860b, 1880.

WEST GALWAY (16): Könnecker and Keegan, 1983.

Dendrobeania murrayana (Bean in Johnston)

DUBLIN (21): Johnston, 1847; Thompson, 1856; Hincks, 1880.

Kinetoskias smitti (Danielssen)

PORCUPINE BASIN: Nichols, 1911.

Bugulella fragilis Verrill

PORCUPINE BASIN: Nichols, 1911 (see Ryland, 1969, p.260).

Bull. Ir. biogeog. Soc. No. 14

Suborder ASCOPHORA

Cribilina punctata (Hassall)

WEST CORK (3): Collins, 1980; Dinneen et al., 1986

MID CORK (4): Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911.

DUBLIN (21): Hassall, 1841a; Duerden, 1894b; Nichols, 1907.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Ryland and Stebbing, 1971.

ANTRIM (39): Ryland and Stebbing, 1971.

Cribilina cryptooecium Norman

WEST CORK (3): Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

CLARE (9): Ryland and Stebbing, 1971.

WEST GALWAY (16): Nichols, 1912.

DUBLIN (21): Ryland and Stebbing, 1971.

WEST MAYO (27): Ryland and Stebbing, 1971.

DOWN (38): Ryland and Stebbing, 1971.

ANTRIM (39): Ryland and Stebbing, 1971.

Cribilina annulata (Fabricius)

ANTRIM (39): Hincks, 1880.

Cribilaria radiata (Moll)

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

WEST MAYO (27): Nichols, 1911.

ANTRIM (39): Hincks, 1880.

Bull. Ir. biogeog. Soc. No. 14

Cribrilaria innominata (Couch)

WEST GALWAY (16): Nichols, 1911.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856.

Puellina setosa (Waters)

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Hincks, 1880; Hayward and Ryland, 1979.

Figularia figularis (Johnston)

WEST GALWAY (16): Nichols, 1911.

ANTRIM (39): Hincks, 1880.

Umbonula oviceolata Hastings

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Thornely, 1902.

Umbonula littoralis Hastings

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Collins, 1980.

MID CORK (4): Collins, 1980.

EAST CORK (5): Collins, 1980.

Escharoides coccinea (Abildgaard)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Nichols, 1886; Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): ?Hassall, 1841a; Nichols, 1907.

WEST MAYO (27): Nichols, 1912, 1915.

DOWN (38): Thompson, 1856.

Bull. Ir. biogeog. Soc. No. 14

PORCUPINE BASIN: Nichols, 1911.

Escharoides mamillata (Wood)

ANTRIM (39): Hincks, 1880.

Reptadeonella violacea (Johnston)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1912.

DERRY (40): Hyndman in Thompson, 1856.

Anarthopora monodon (Busk)

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1911.

Cryptosula pallasiana (Moll)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Collins, 1980.

MID CORK (4): Collins, 1980.

EAST CORK (5): Collins, 1980.

WEST GALWAY (16): Nichols, 1912.

DUBLIN (21): Nichols, 1907, 1912.

WEST MAYO (27): Nichols, 1912, 1915.

Hippoporina pertusa (Esper)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST GALWAY (16): Nichols, 1910.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Nichols, 1910.

ANTRIM (39): Hincks, 1880; Nichols, 1910.

Bull. Ir. biogeog. Soc. No. 14

Pentapora foliacea (Ellis and Solander)

- SOUTH KERRY (1): O'Riordan, 1968, 1971.
WEST CORK (3): Nichols ms in O'Riordan, 1968.
WATERFORD (6): Nichols ms in O'Riordan, 1968.
WEST GALWAY (16): Könnecker and Keegan, 1983.
MAYO (27): O'Riordan, 1973.

Smittina landsborovii (Johnston)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911.
ANTRIM (39): Hincks, 1859, 1860a, 1880.
ROCKALL BANK: ? Thornely, 1897.

Smittina crystallina (Norman)

- WEST GALWAY (16): Nichols, 1911.
ANTRIM (39): Hincks, 1880.

Smittina affinis (Hincks)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.

Prenantia cheilostoma (Manzoni)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.

Prenantia bella (Busk)

- WEST MAYO (27): Nichols, 1912.

Smittoidea reticulata (J. Macgillivray)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Könnecker and Keegan, 1983.

Bull. Ir. biogeog. Soc. No. 14

WEST MAYO (27): Nichols, 1912.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks 1880; Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Smittoidea amplissima Hayward

WEST GALWAY (16): Hayward and Ryland, 1979.

Parasmittina trispinosa (Johnston)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST MAYO (27): Nichols, 1912.

ANTRIM (39): Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Porella compressa (J. Sowerby)

WEST CORK (3): Nichols, 1886.

WEST GALWAY (16): Hincks, 1880; Nichols, 1911; Könnecker and Keegan, 1983.

WEST MAYO (27): Nichols, 1911, 1912.

ANTRIM (39): Hincks, 1880.

ROCKALL BANK: Thornely, 1897.

PORCUPINE BASIN: Kirkpatrick, 1889.

Porella concinna (Busk)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1911, 1912.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1859, 1880; Thornely, 1902.

DERRY (40): Hyndman in Thompson, 1856.

ROCKALL BANK: Thornely, 1897.

Bull. Ir. biogeog. Soc. No. 14

Porella minuta (Norman)

ANTRIM (39): Hincks, 1880.

Porelloides struma (Norman)

WEST GALWAY (16): Nichols, 1911.

Palmicellaria skenei (Ellis and Solander)

WEST GALWAY (16): Nichols, 1911.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1880.

ROCKALL BANK: Thornely, 1897.

Escharella immersa (Fleming)

WEST CORK (3): Thompson, 1856; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Thompson, 1856; Nichols, 1907.

WEST MAYO (27): Nichols, 1911, 1912, 1915.

ANTRIM (39): Thompson, 1856; Thornely, 1902.

PORCUPINE BASIN: Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Escharella labiosa (Busk)

DOWN (38): Thompson, 1856; Swanston and Duerden, 1893; Hurst, 1896.

ANTRIM (39): Thompson, 1856; Hurst, 1896.

Escharella octodentata (Hincks)

ROCKALL BANK: Thornely, 1897.

Escharella ventricosa (Hassall)

WEST CORK (3): Dinneen et al., 1986.

Bull. Ir. biogeog. Soc. No. 14

MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
DUBLIN (21): Hassall, 1842; Swanston and Duerden, 1893.
WEST MAYO (27): Nichols 1911, 1912.
DOWN (38): Swanston and Duerden 1893.
ANTRIM (39): Hincks 1859; Swanston and Duerden 1893; Thornely,
1902.

Escharella variolosa (Johnston)

WEST CORK (3): Thompson, 1856; Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
DUBLIN (21): Hassall, 1840, 1841a.
WEST MAYO (27): Nichols, 1911, 1912.
DOWN (38): Thompson, 1856; Swanston and Duerden, 1893.
ANTRIM (39): Thompson, 1856; Hincks, 1859; Thornely, 1902.
FASTNET BASIN: Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Escharella abyssicola (Norman)

WEST GALWAY (16): Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Escharella laqueata (Norman)

WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.

Hemicyclopora polita (Norman)

WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1911.
PORCUPINE BASIN: Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Bull. Ir. biogeog. Soc. No. 14

Hemicyclopora microstoma (Norman)

- WEST MAYO (27): Nichols, 1911.
PORCUPINE BASIN: Nichols, 1911.
ROCKALL BANK: ? Thornely, 1897.

Hemicyclopora multispinata (Busk)

- WEST MAYO (27): Nichols, 1911.
PORCUPINE BASIN: Nichols, 1911.

Phylactella labrosa (Busk)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
ANTRIM (39): Hincks, 1880; Thornely, 1902.
DERRY (40): Hyndman in Thompson, 1856.

Phylactellipora collaris (Norman)

- DOWN (38): Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1880.

Phylactellipora eximia (Hincks)

- WEST GALWAY (16): Nichols, 1911.
ANTRIM (39): Hincks, 1859, 1860a, 1880.

Schizoporella unicornis (Johnston in Wood)

- SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Collins, 1980; Dinneen et al., 1986.
MID CORK (4): Collins, 1980; Dinneen et al., 1986.
EAST CORK (5): Collins, 1980.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.
DUBLIN (21): Duerden, 1894b; Nichols, 1907.
WEST MAYO (27): Nichols, 1911, 1912, 1915.
DOWN (38): Thompson, 1856; Boaden et al., 1975; Seed and Harris,

Bull. Ir. biogeog. Soc. No. 14

1980.

ANTRIM (39): Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Schizomavella auriculata (Hassall)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1842.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Thornely, 1902.

Schizomavella linearis (Hassall)

WEST CORK (3): Nichols, 1886; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1841a; Nichols, 1907.

WEST MAYO (27): Nichols, 1912, 1915.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Thompson, 1856; Thornely, 1902.

ROCKALL BANK: Thornely, 1897.

Schizomavella linearis var. hastata (Hincks)

ROCKALL BANK: Thornely, 1897.

Schizomavella discoidea (Busk)

ANTRIM (39): Hincks, 1860a, 1880.

Schizobranchiella sanguinea (Norman)

WEST CORK (3): Dinneen et al., 1986.

Bull. Ir. biogeoq. Soc. No. 14

MID CORK (4): Dinneen et al., 1986.

Escharina vulgaris (Moll)

WEST GALWAY (16): Nichols, 1911.

ANTRIM (39): Swanston and Duerden, 1893.

Escharina johnstoni (Quelch)

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856; Hincks, 1880; Thornely, 1902.

Escharina hyndmanni (Johnston)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST GALWAY (16): Nichols, 1911.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1880.

Escharina dutertrei (Audouin)

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1911.

ANTRIM (39): Hincks, 1880.

ROCKALL BANK: Thornely, 1897.

Phaeostachys spinifera (Johnston)

WEST CORK (3): Collins, 1980.

MID CORK (4): Collins, 1980.

WEST MAYO (27): Nichols, 1912, 1915.

ANTRIM (39): Hincks, 1880; Thornely, 1902.

Hippoporidra lusitania Taylor and Cook

WEST GALWAY (16): Nichols, 1911, 1912 (recorded as H. edax

(Busk)).

Bull. Ir. biogeog. Soc. No. 14

Hippopodinella lata (Busk)

DOWN (38): Thompson, 1856.

Microporella ciliata (Pallas)

SOUTH KERRY (1): Nichols, 1911; Collins, 1980.

WEST CORK (3): Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Thompson, 1856; Nichols, 1911; Ryland and Nelson-Smith, 1975; Könnecker and Keegan, 1983.

DUBLIN (21): ?Hassall, 1840; Nichols, 1907.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thompson, 1856; Swanston and Duerden, 1893; Thornely, 1902.

DERRY (40): Hyndman in Thompson, 1856.

PORCUPINE BASIN: Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Fenestrulina malusii (Audouin)

SOUTH KERRY (1): Nichols, 1911.

WEST CORK (3): Nichols, 1886; Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911.

WEST MAYO (27): Nichols, 1912, 1915.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Thornely, 1902.

FASTNET BASIN: Nichols, 1911.

?Diporula verrucosa (Peach)

DUBLIN (21): Ball in Thompson, 1856.

Bull. Ir. biogeoq. Soc. No. 14

Haplopoma impressum (Audouin)

- SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Collins, 1980.
EAST CORK (5): Collins, 1980.
WEXFORD (12): Keegan et al., 1987.
DUBLIN (21): Nichols, 1907.
WEST MAYO (27): Nichols, 1912.

Haplopoma graniferum (Johnston)

- SOUTH KERRY (1): Collins, 1980.
EAST CORK (5): Collins 1980.

Haplopoma bimucronatum (Moll).

- DUBLIN (21): ?Hassall, 1841a.
WEST MAYO (27): Nichols, 1912.

Chorizopora brongniartii (Audouin)

- WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
DUBLIN (21): Swanston and Duerden, 1893; Nichols, 1907.
WEST MAYO (27): Nichols, 1912.
ANTRIM (39): Swanston and Duerden, 1893.

Chorizopora annulata (Lamouroux)

- WEST GALWAY (16): Nichols, 1911.

Tessaradoma boreale (Busk)

- WEST MAYO (27): Nichols, 1911.
PORCUPINE BASIN: Nichols, 1911.
ROCKALL BANK: Thornely, 1897.

Hippothoa divaricata Lamouroux

- WEST CORK (3): Thompson, 1856; Dinneen et al., 1986.

Bull. Ir. biogeog. Soc. No. 14

MID CORK (4): Dinneen et al., 1986.
WEXFORD (12): Keegan et al., 1987.
WEST GALWAY (16): Thompson, 1856; Nichols, 1911.
DUBLIN (21): Thompson, 1856.
WEST MAYO (27): Nichols, 1912.
DOWN (38): Thompson, 1856.
ANTRIM (39): Thompson, 1856; Hincks, 1880; Thornely, 1902.
FASTNET BASIN: Nichols, 1911.

Hippothoa flagellum Manzoni

SOUTH KERRY (1): Nichols, 1911.
WEST CORK (3): Dinneen et al., 1986.
MID CORK (4): Dinneen et al., 1986.
WEST GALWAY (16): Nichols, 1911.
WEST MAYO (27): Nichols, 1912.
DOWN (38): Hincks, 1880; Swanston and Duerden, 1893.
ANTRIM (39): Hincks, 1880.
FASTNET BASIN: Nichols, 1911.

Celleporella hyalina (Linnaeus)

SOUTH KERRY (1): Collins, 1980.
WEST CORK (3): Ebling et al., 1948; Sloane et al., 1957; Collins, 1980; Dinneen et al., 1986.
MID CORK (4): Collins, 1980; Dinneen et al., 1986.
EAST CORK (5): Collins, 1980.
WEXFORD (12): Keegan et al., 1987.
SOUTH EAST GALWAY (15): Ryland and Nelson-Smith, 1975.
WEST GALWAY (16): Thompson, 1856; Nichols, 1911; Ryland and Nelson-Smith, 1975; Könnecker and Keegan, 1983.
WICKLOW (20): Hassall, 1841a.
DUBLIN (21): Hassall, 1840; Nichols, 1907.
MEATH (22): Duerden, 1894a.
WEST MAYO (27): Nichols, 1912, 1915.
DOWN (38): Swanston and Duerden, 1893; Boaden et al., 1975;

Bull. Ir. biogeog. Soc. No. 14

O'Connor and Lamont, 1978; Seed and Harris, 1980.

ANTRIM (39): Thornely, 1902.

Sertella beaniana (King)

SOUTH KERRY (1): Duerden, 1893a; Nichols, 1911.

WEST CORK (3): Allman in Thompson, 1856; Duerden, 1893a.

WEST GALWAY (16): Nichols, 1911; Könnecker and Keegan, 1983.

WEST MAYO (27): Duerden 1893a; Nichols, 1911.

ROCKALL BANK: Thornely, 1897.

Sertella couchii (Hincks)

SOUTH KERRY (1): Duerden, 1893a; Nichols, 1911;

O'Riordan, 1971.

WEST CORK (3): Duerden, 1893a.

ROCKALL BANK: Thornely, 1897.

Schizotheca fissa (Busk)

WEST MAYO (27): Nichols, 1912.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1880.

Schizotheca divisa (Norman)

ANTRIM (39): Hincks, 1880.

Rhynchozoon bispinosum (Johnston)

ROCKALL BANK: Thornely, 1897.

Cellepora pumicosa (Pallas)

SOUTH KERRY (1): Collins, 1980.

MID CORK (4): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Hassall, 1840; Baily, 1888; Nichols, 1907, 1911;

Massey, 1912.

Bull. Ir. biogeog. Soc. No. 14

MEATH (22): Duerden, 1894a; Massey, 1912.

WEST MAYO (27): Nichols, 1912, 1915.

WEST DONEGAL (35): Hughes, 1990.

DOWN (38): Thompson, 1856.

ANTRIM (39): Thornely, 1902.

Celleporina hassallii (Johnston)

SOUTH KERRY (1): Collins, 1980.

WEST CORK (3): Collins, 1980; Dinneen et al., 1986.

MID CORK (4): Collins, 1980; Dinneen et al., 1986.

EAST CORK (5): Collins, 1980.

WEXFORD (12): Keegan et al., 1987.

WEST GALWAY (16): Nichols, 1911, 1912; Könnecker and Keegan, 1983.

DUBLIN (21): Nichols, 1907, 1911; Massey, 1912.

WEST MAYO (27): Nichols, 1912, 1915.

DOWN (38): Boaden et al., 1975.

ANTRIM (39): Thornely, 1902.

Celleporina hassallii var. tubulosa Hincks

WEST GALWAY (16): Könnecker and Keegan, 1983.

Turbicellepora avicularis (Hincks)

WEST CORK (3): Dinneen et al., 1986.

MID CORK (4): Dinneen et al., 1986.

WEST GALWAY (16): Könnecker and Keegan, 1983.

DUBLIN (21): Colgan, 1905; Nichols, 1907, 1911; Massey, 1912.

MEATH (22): Duerden, 1894a.

WEST MAYO (27): Nichols, 1912.

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Hincks, 1860a, 1880; Thornely, 1902.

PORCUPINE BASIN: Kirkpatrick, 1889.

ROCKALL BANK: Thornely, 1897.

Bull. Ir. biogeog. Soc. No. 14

Turbicellepora tubigera Busk

'Off' KERRY (1 or 2): Hayward, 1978.

Turbicellepora armata (Hincks)

ANTRIM (39): Hincks, 1859, 1880.

Omalosecosa ramulosa (Linnaeus)

SOUTH KERRY (1): Nichols, 1911.

WEST CORK (3): Nichols, 1886.

EAST CORK (5): Ball in Thompson, 1856.

WEST GALWAY (16): Nichols, 1911.

DUBLIN (21): Hassall, 1841a; Thompson, 1856.

DOWN (38): Thompson, 1856; Hincks, 1880; Swanston and Duerden, 1893.

ANTRIM (39): Thompson, 1856; Hincks, 1880; Thornely, 1902.

FASTNET BASIN: Nichols, 1911.

PORCUPINE BASIN: Kirkpatrick, 1889; Bourne, 1890.

ROCKALL BANK: Thornely, 1897.

Buskea dichotoma (Hincks)

DOWN (38): Swanston and Duerden, 1893.

ANTRIM (39): Thornely, 1902.

PORCUPINE BASIN: Bourne, 1890.

Pasythea eburnea (Smitt)

WEST MAYO (27): Nichols, 1911.

PORCUPINE BASIN: Nichols, 1911.

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The following papers are listed alphabetically by author. A guide to their content is given in parentheses e.g. (D)= distribution; (E)= ecological studies; (K)= key to identification; (P)=

Bull. Ir. biogeog. Soc. No. 14

physiological studies; (T)= taxonomic studies.

Additional papers which are contained in the text, but do not contain records of bryozoa from Irish marine waters are marked \$.

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\$Allman, G. J. (1846) On the larva state of Plumatella. Proc. R. Ir. Acad. 3: 218-222. (P)

\$Allman, G. J. (1850) On the nervous system and certain other points in the anatomy of the Bryozoa. Rep. Br. Ass. Advmt Sci. 2: 71-72. (P)

\$Allman, G. J. (1851) On the structure of the muscular fibre in the Polyzoa. Proc. R. Ir. Acad. 5: 68-69. (P)

\$Allman, G. J. (1856). A monograph of the fresh-water Polyzoa, including all the known species, both British and foreign. Monoqr. Ray Soc. (D) (T)

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Colgan, N. (1905) Notes on the invertebrate fauna of Skerries, County Dublin. Ir. Nat. 14: 205-213. (D) (T)

Collins, S. P. (1980) Notes on the distribution and ecology of marine Polyzoa from some shores in Cork and Kerry. Scient. Proc. R. Dubl. Soc. (A) 6: 373-383. (D) (E)

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d'Hondt, J. L. and Goyffon, M. (1987) Comparative electrophoretic

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14 (1991)

A FIRST LIST OF DIPTERA FROM THE MURROUGH, CO. WICKLOW, IRELAND,
INCLUDING 663 SPECIES AND 140 BREEDING RECORDS.

R. E. Blackith, R. M. Blackith, M. C. D. Speight
and M. de Courcy Williams

Summary

The results of a survey of the dipteran fauna of an area of freshwater wetland and polder known as the Murrough (Co. Wicklow, Ireland) are presented. More than 650 species, representing 61 families, are listed with their dates of capture. The account incorporates a bibliography of relevant faunistic and taxonomic literature for the Irish fauna of the families surveyed. Implications of the unevenness of the state of knowledge for different families of the Diptera in Ireland are explored in relation to the production of site lists. Although this list is the longest published for the Diptera of any Irish site, its length is not unexpected for the sort of area surveyed, given that there is evidence that 20-25% of the Irish dipteran fauna are generally distributed in the island.

Introduction

The coastal strip of partly drained fen known locally as the Murrough, between Kilcoole and Wicklow town (Fig. 1) (described briefly by McNally, 1987) is an area of special concern to the Irish Biogeographical Society and its dipterous fauna is being surveyed. The Murrough list is the most extensive list for Diptera so far published for any Irish site. The only other list of Diptera published for any east coast Irish locality is that included in Jeffrey et al. (1977). We report here a list of 663 species bred or otherwise taken from the mosaic of habitats on the Murrough. The arrangement is alphabetical. Some families have been

Bull. Ir. biogeog. Soc. No. 14

fairly fully collected and identified whereas others are almost unrepresented in the list because we have not felt confident of our ability to identify them.

The preponderance of records (more than 75% of the total) from Blackditch Wood reflects the diversity of the wetland habitats represented in this "unmanaged" woodland, the oldest trees within which are dated by Dr D. Kelly of Trinity College Botany Department as being about 96 years of age. There is no indication of such a wood on the 1911 Ordnance Survey maps (6 inches to 1 mile) of the area and we have no information suggesting the presence of woodland there earlier; we presume that the wood developed since 1911. An important asset for us has been the possibility of using a Malaise Trap for long periods in these private woodlands; it is impracticable to run such traps for long in most areas to which the public has access but the advantage of long runs is shown by the high proportion of species recovered from the trap.

All flies collected by REB and RMB during months vi-xi.1989 and iv-vii.1990 were taken in a Malaise Trap, except where stated otherwise. The trap was set up within the eastern arm of Blackditch Wood in the wet area immediately west of the pond, an area fed by an upwelling of fresh water probably seeping eastward through partly calcareous gravel deposits underlying superficial glacial till (Dr D. Daly, Geological Survey, pers. comm.).

We have also made a particular effort to rear flies from suitable media found on the Murrough, but it should be remembered that larvae may have entered the media for pupation and did not necessarily feed there. Breeding from Phragmites involved material emerging from the dry aerial stems and also from the stem bases/roots and some associated mud. Other collecting techniques used were sweep netting and hand netting on flower heads,

Bull. Ir. biogeoq. Soc. No. 14

particularly those of umbels and corn marigolds, and a 'Silent Cop' fly trap, designed to catch blowflies, which is baited with liver covered with a slurry of calcium sulphide which emits the attractant hydrogen sulphide gas. The recovery of flies from small corpses laid out as bait within the area is detailed by Blackith and Blackith (1990b).

The following symbols represent the collecting localities with Irish grid references:- BDW: Blackditch Wood (O3103); BL: Broad Lough (T3196); BR: The Breaches (O3106); CW: Clonmannon Wood (T3098); FMP: Five-Mile Point (O3102); K: Killoughter fen (T3199); K marigolds: a cereal field between Killoughter and Clonmannon colonised by Chrysanthemum segetum L.; KMF: Killoughter Marsh Field (T3199); KS: Killoughter, "soak" opposite old Station House (T3199); SMP: Six-Mile Point (O3104).

Nomenclature follows that of Soós and Papp's (1984-incomplete) Catalogue of Palaearctic Diptera except where a more recent revision of a particular group has become available or the relevant volume of that Catalogue is not yet published. The name changes made necessary by the use of this catalogue, particularly those involving the 'Harris names' for Muscidae and Fanniidae, result in unfamiliar names being substituted for familiar ones. Users of this list should therefore beware of assuming that certain common Calyptrates have not been found on the Murrough. A few very familiar names have been retained in the list as synonyms of the names used in the Palaearctic Catalogue, but no attempt to present a full synonymy has been made as to do so would have greatly lengthened the list.

Records are listed as follows:- Locality, e.g. BDW; date (month and year); collector (unspecified for REB and RMB); identifier (unspecified for REB and RMB). Records are separated by semi-colons and where data are not shown for a particular record,

Bull. Ir. biogeog. Soc. No. 14

other than the first for a species, they are as for the preceding record. References appended to individual records give the source of the record, or, if preceded by "cf.", a source of relevant information but not the record in question.

Illustrative example

Clusiodes albimana (Meigen): BDW, bred from rotten birch, v.1989, det. MCDS; CW, v.1988; vi-vii.1990, det. MCDS.

Interpretation

C. albimana emerged in May 1989 from rotten birch wood collected in Blackditch Wood by the Blackiths and determined to species by Speight. It was hand-swept in Clonmannon Wood by the Blackiths in May 1988 and determined by them. The same species was also taken in a Malaise Trap inside Blackditch Wood run by the Blackiths during the period June-July 1990 and again determined by Speight.

Under each family heading, in addition to those references used for identification or containing major reviews, are included other useful references which are introduced by the phrase "see also". In the list the abbreviation NMI following locality data indicates that a specimen of that species has been deposited in the National Museum of Ireland, Dublin 2.

Names of species which may be considered threatened at the European level are preceded by two asterisks (**) in the list. Names of species which may be considered as threatened in Ireland are preceded by one asterisk (*). More species could probably be so marked were adequate data available for all the species in the list. Names of species which have been added to the Irish fauna, based entirely or partly on specimens collected during this survey are preceded by the symbol N in the list. Names of species added to the Irish list in the present paper are indicated by insertion of the phrase "New to Ireland" following the locality data for the

Bull. Ir. biogeog. Soc. No. 14

species.

Discussion: some features of the Murrough Diptera list

Appendix 1 lists those of the dipteran families surveyed that are sufficiently well known in Ireland for a list of their Irish species to have been published. The Murrough species belonging to these families comprise two thirds of all the Diptera we have recorded from the Murrough. Comparisons between the Irish lists for these families and their corresponding Murrough lists highlight features of this survey, features of the Murrough fauna and features of Irish species lists for Diptera.

Prior to the Murrough survey, the known Irish fauna belonging to the dipteran families listed in Appendix 1 comprised 1208 species. Ashe et al. (1988) estimate that the total Irish dipteran fauna comprises approximately 4000 species, so that the families listed in Appendix 1 represent one third of the Irish dipteran fauna, which for purposes of discussion is an adequate sample. This survey has recorded from the Murrough 485 species belonging to these families, including among them 25 species new to Ireland. This would seem to suggest that, in any reasonably comprehensive site survey based on Diptera, 5% of the species encountered might be expected to be new to Ireland.

However, Ashe et al. point out that the way in which Irish lists have been compiled for individual families affects their reliability. According to these authors, in lists compiled by non-resident specialists the Irish fauna comprises, on average, less than 40% of the corresponding British fauna, whereas in lists compiled entirely or largely by resident specialists the Irish fauna comprises nearly 60% of the British fauna. In Appendix 1 we indicate to which of these two categories each family belongs. Re-assessing the Murrough data with this factor taken into

Bull. Ir. biogeog. Soc. No. 14

consideration reveals that, in families for which non-resident specialists have compiled the Irish list, an average of 7% of the Murrough species were new to the Irish fauna. In this category the Sphaeroceridae represent an extreme, 20% of the Murrough species being additions to the Irish fauna. Conversely, in families for which Irish lists have been compiled largely by resident specialists, the Murrough fauna included on average less than 4% of species new to the Irish list. This latter figure would probably be still lower if the only families considered were those whose Irish species lists were based on both examination of museum material and a significant fieldwork effort. For instance, the Irish list of Tachinidae, whose 60 known Irish species represent circa 25% of the British fauna, is based primarily on examination of museum material. The Irish list of Syrphidae, whose 170 species represent circa 70% of the British fauna, is based on considerable field-work, as well as on examination of museum material. The Murrough survey added 3 species to the Irish tachinid list but added no species to the Irish syrphid list. Returning to the fact that 5% of the Murrough Diptera list comprises species new to the Irish fauna, it could be said that this reflects an inadequate state of knowledge of the Diptera in Ireland. But, from the preceding paragraphs, it is also apparent that our knowledge of the Irish dipteran fauna is not uniform for all families. Once it is recognised that dipteran families are characteristically treated separately, each family receiving attention from its own specialist, this heterogeneity in the state of our knowledge becomes understandable. It is, then, probably more realistic to say that site surveys such as those we have conducted on the Murrough demonstrate great disparities in the state of our knowledge of different families of Diptera in Ireland and can result in a 20% increase in the Irish list for some families (e.g. Sphaeroceridae), even if they result in little or no increase in the Irish list for others.

Bull. Ir. biogeog. Soc. No. 14

The implication of this conclusion for anyone conducting site surveys of the dipteran fauna in Ireland is that national species lists can only be regarded as provisional and species may be found that are not on the national list. Coupled with the observation by Speight (1988) that in some Irish biotopes one in a hundred of the insect species encountered can be expected to be species which do not occur in Great Britain and will not be included in British taxonomic literature, there is a clear warning that the survey should be conducted using continent-wide taxonomic revisions and that both Irish and British species lists should only be used as a guide to what might be found. In this context it is relevant to note that during the Murrough survey we collected one species of Diptera not previously known in the British Isles.

Of the families listed in Appendix 1, approximately 40% of the Irish dipteran fauna occurs on the Murrough. At first acquaintance this figure perhaps seems surprisingly high. However, using the family Syrphidae as an example, Speight (1986b) has pointed out that a quarter of the Irish fauna is compatible with the almost ubiquitous animal-farming land-use practised, and encouraged by the relatively homogenous geology and climate. If the constitution of the Murrough fauna were to reflect this situation approximately one quarter of the Irish dipteran fauna should be present on the site and the great majority of the species present should be generally distributed farmland insects. The Murrough syrphid fauna has been investigated as a test of this idea. To this end, in Appendix 2, the Murrough Syrphidae are listed showing general habitat preferences and distribution status in Ireland.

The total number of species of Syrphidae known in Ireland is 170 and 39 (23%) of these can be regarded as generally distributed, i.e. they are known from 75% or more of the 50 Km UTM grid squares covering the island, that is to say from 34 or more 50 Km squares. In Ireland, nearly all of these 39 species are characteristic of

Bull. Ir. biogeog. Soc. No. 14

poorly drained pasture incorporating hedges and ditches, almost wherever this combination occurs and 30 of them occur on the Murrough.

An additional 10 Murrough syrphid species, all of them known in Ireland from between 50% and 75% of the 50 Km squares, are also anthropogenic farmland insects. Perhaps this latter group is not so favoured by the Irish climate as others which occur in farmland here, but certainly they are favoured by the sort of animal farming regimes prevalent in Ireland. So the Murrough syrphid list contains 40 species characteristic of farmland and 22 species of other types. Of these 22, 15 are wetland or wet woodland species, 5 are characteristic of woodland in general, one is an open ground insect and one is eurytypic but probably limited in Ireland to the South-east by climatic factors.

Returning to the notion that the Murrough fauna might be expected to include a quarter of the Irish syrphid list, because 23% of the Irish syrphid fauna occurs throughout the island, most of this generally distributed fauna does indeed occur on the Murrough and comprises half the Murrough syrphid list (see Appendix 2).

Further, the generally distributed syrphids which occur on the Murrough are, all of them, characteristically pasturage species in Ireland. The generally distributed species not recorded from the Murrough are mostly woodland insects (see Appendix 2). While these figures do not fully support the contention that quite one quarter of the Irish fauna might be expected on the Murrough list, they do support the principle involved, namely that there is a generally distributed fauna of predominantly pasturage insects in Ireland which can be expected to figure prominently in any local list. In the case of the Murrough, if the constitution of the entire Diptera list for the area reflects the constitution of the Murrough syrphid list, then half of the entire Murrough Diptera list can be expected to comprise generally distributed pasturage

Bull. Ir. biogeog. Soc. No. 14

insects, representing between them approximately one fifth (rather than one quarter) of the species on the Irish list.

Unfortunately, both ecological and distribution data are insufficient, for many of the Diptera recorded from the Murrough, to make such a general assessment possible. Indeed, a quarter of the species belong to families for which not even an Irish species list is available, so that the significance of their occurrence on the Murrough is very difficult to assess. But the syrphid data alone are sufficient to demonstrate that for a local list like that from the Murrough to include 40% of the Irish Diptera fauna may well be far less exceptional than it appears to be at first sight, since the presence of 20% or more of the Irish species might be expected if 20-25% of the Irish fauna are generally distributed insects characteristic of poorly drained pasturage.

In general, the utility of species lists is much underestimated. In part this may be due to a lack of editorial appreciation of the need to ensure that authors provide adequate evidence for the reliability of their determinations and a clear statement of nomenclatorial sources, before accepting a list for publication. We have gone to some effort to say what taxonomic literature we have used, who has helped with species determinations we have not undertaken ourselves, and what sources of nomenclature we have used.

Indeed, we have provided the essential bibliographic data necessary for anyone wishing to begin studying, in Ireland, the fly families we have surveyed on the Murrough. However, providing adequate evidence that the species in a list have been reliably identified is only part of what is needed to make a list useful. A second essential ingredient is data, especially biological and distributional data, on the species listed. All too frequently such data is not available either to those who compile such lists

Bull. Ir. biogeog. Soc. No. 14

or to those who might use them.

In the preceding paragraphs we have selected for discussion but two from a multitude of issues which might have been addressed using the sort of complementary data we have employed. This has enabled us to show that it cannot be assumed that the length of the Murrough Diptera list of itself demonstrates that there is anything exceptional about the Murrough, but rather that the list is of a length that should be expected.

Similarly, we have shown that for many purposes the Diptera cannot be taken as "a unit" for discussion in Ireland, since the differing extents to which individual families have been studied here makes it necessary for them to be considered individually. Our intention has been to point out that lists can be interpreted meaningfully provided that other data on the species listed are accessible. There is, of course, a final ingredient necessary to the interpretation of lists; that is to decide what problem or question to address through the use of the list. As perceived by the Irish Biogeographical Society the Murrough survey, of which this account of the dipteran fauna forms part, addressed only the general question of what fauna and flora the area supports. We cannot anticipate what questions will be asked of this list of Diptera, and do not discuss hypothetical issues, but we hope the list can now play a part in whatever analyses are undertaken.

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Bull. Ir. biogeog. Soc. No. 14

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AGROMYZIDAE

Determined from Spencer (1972).

Agromyza pseudoreptans Nowakowski: BDW, iv-v.1990 (NMI).

Liriomyza flaveola (Fallén): BDW, vi.1989.

N Napomyza lateralis (Fallén): BR, bred from fen peat, vi.1989, (NMI).

Phytomyza aprilina Goureau: BDW, vii.1989; v.1989, coll. et det. P.Withers.

N Phytomyza anemones Hering: BDW, iv.1990, swept; BDW, iv-v.1990, (NMI).

Phytomyza crassiseta Zetterstedt: BDW, i.1988.

Phytomyza milii Kaltenbach: BDW, v.1989, coll. et det. P.Withers.

Phytomyza scolopendri Goureau: BDW, date lost.

ANISOPODIDAE

The Irish Anisopodidae are reviewed by Ashe (1987, 1988); our material was identified from Coe, Freeman and Mattingly (1950).

Sylvicola cinctus (F.): BDW, bred from hollow birch, ix.1989; iv.1989; CW, bred from rotten potatoes (Blackith and Blackith, 1989); iii.1988, det. P. Ashe.

Sylvicola punctatus (F.): BDW, vi.1989; x.1989; iv.1990; vi-vii.1990; K, viii.1951, coll. et det. K. G. V. Smith (1952a).

ANTHOMYIIDAE

Determined from Hennig (1976).

Bull. Ir. biogeog. Soc. No. 14

- Anthomyia pluvialis (L.): KMF, viii.1988.
- Craspedochaeta pullula (Zetterstedt): BDW, iv.1990.
- Delia brassicae (Hoffmannsegg in Wiedemann): BDW, vii.1989; KMF, v.1988; K marigolds, vi.1988; K, iv.1990.
- Delia florilega (Zetterstedt): K marigolds, vi.1988.
- Delia platura (Meigen): FMP, on flowers of Smyrnum olusatrum, iii.1990; BDW, iv.1990.
- N Eustalomyia festiva (Zetterstedt): BDW, viii.1989 (Blackith et al., 1990) (NMI).
- Fucellia maritima (Haliday): FMP, on flowers of Smyrnum olusatrum, iii.1990.
- Hydrophoria ambigua (Fallén): BDW, vi.1988; vii.1989.
- N Hydrophoria caudata (Zetterstedt): BDW, v.1990 (Blackith and Blackith, 1991) (NMI).
- Hydrophoria conica (Wiedemann): BDW, vi.1988; vi.1989; iv.1990.
- Hydrophoria ruralis (Meigen): BDW, vi.1988; vii.1988; K, iv.1990; KMF, viii.1988.
- Hylemya nigrimana (Meigen): BDW, vii.1989.
- Hylemya strenua Robineau-Desvoidy: BDW, x.1988; iv-v.1989; iii.1990; KMF, viii.1988.
- Hylemya variata (Fallén): K, iv.1990; SMP, iii.1991.
- N Lasiomma anthomyinum (Rondani): BDW, v.1990 (Blackith and Blackith, 1991) (NMI).
- N Lasiomma meadei (Kowarz): BDW, bred from rotten birch, vii.1989; BDW, bred from dead pigeon, x.1988 (Blackith and Blackith, 1991); iv-v.1990 (NMI).
- Mycophaga testacea (Gimmerthal): BDW, vi-vii.1990.
- Nupedia aestiva (Meigen): K marigolds, vi-viii.1988; K, iv.1990.
- Nupedia infirma (Meigen): BDW, vi.1988; vii.1989; iv.1990.
- Paregle radicum (L.): K marigolds, vi.1988.
- Pegohylemyia fugax (Meigen): BDW, iv.1989; iv.1990.
- N Pegohylemyia phrenione (Séguy): BDW, iv.1988; KMF, v.1988 (Blackith and Blackith, 1991) (NMI).
- Pegohylemyia striolata (Fallén): BDW, iv-v.1990.

Bull. Ir. biogeog. Soc. No. 14

N Pegomya caesia Stein: BDW, vi-vii.1990 (female).

N Pegomya geniculata Bouché: BDW, vi-vii.1990 (Blackith and Blackith, 1991) (NMI).

Pegomya rubivora (Coquillett): BDW, bred from canes of Filipendula ulmaria, iii-iv.1990; BDW, swept, iii.1990 (cf. Chandler, 1982) (NMI).

Pegomya zonata (Zetterstedt): BDW, vii.1989.

N Phorbia securis Tiensuu: BDW, vi.1988; CW, vi.1988 (Blackith and Blackith, 1991) (NMI).

Pseudonupedia intersecta (Meigen): BDW, swarming at edge of wood, iii.1989; swept in wood, iii.1990; iv.1990; K, iv.1990 (NMI).

ANTHOMYZIDAE

Determined from Czerny (1928b) and Collin (1944a).

Paranthomyza nitida (Meigen): BDW, vii.1988 (NMI).

ASILIDAE

Determined from Oldroyd (1969); the Irish fauna is surveyed by Speight (1987a); see also Chandler (1975). The taxonomic status of M. cowini is reviewed by Speight (1987a, 1987b).

**Machimus cowini (Hobby): SMP, viii.1984, coll. et det. MdeCW.

BIBIONIDAE

The Irish Bibionidae were reviewed by D'Arcy-Burt and Chandler (1987). Our material was determined from Freeman and Lane (1985).

Bibio clavipes Meigen: BDW, iv-xi.1989.

Bibio johannis (L.): FMP, (dunes), iii.1990.

Bibio leucopterus (Meigen): BDW, v.1990 (NMI).

Bibio marci (L.): ubiquitous, vi.annual.

Dilophus febrilis (L.): K marigolds, viii.1988; BDW, iv.1990.

Bull. Ir. bioqeoq. Soc. No. 14

Dilophus femoratus Meigen: K marigolds, vi.1988.

BOMBYLIIDAE

Determined from Oldroyd (1969). The Irish species are reviewed by Chandler (1975).

Villa modesta (Meigen): FMP, on Daucus flowers, viii.1987; viii.1984, coll. et det. MdeCW; SMP, viii.1978, coll. et det. MdeCW.

CALLIPHORIDAE

Determined from Zumpt (1956) and van Emden (1954).

Calliphora vicina Robineau-Desvoidy: ubiquitous, all months; K, bred from frog, viii.1988; BDW, bred from pigeon, viii.1988.

Calliphora vomitoria (L.): ubiquitous, all months.

Bellardia agilis (Meigen): BL, iv.1987; K marigolds, vi.1988.

Bellardia pandia (Walker): K marigolds, vi.1988; BDW, vii.1979, coll. et det. MdeCW.

Lucilia caesar (L.): BDW, bred from magpie, iv.1989; BL, all months; K marigolds, vi.1988.

Lucilia illustris (Meigen): BDW, bred from mice, ix.1988.

Lucilia sericata (Meigen): BDW, bred from pigeon, iv.1989; K marigolds, vi.1988; viii.1988.

Lucilia silvarum (Meigen): BL, vi.1987; K.vi.1987 (NMI).

Melinda cognata (Meigen): K marigolds, vi.1988.

Pollenia rudis-group: BDW, vii.1989.

Pollenia varia-group: BDW, vii.1989.

N Protophormia terraenovae (Robineau-Desvoidy): K, bred from crow, ix.1988; K, bred from badger, ix.1988; K marigolds, all months (Blackith et al., 1990) (NMI).

CERATOPOGONIDAE

Specimens were determined to genus from Boorman and Rowland

Bull. Ir. biogeog. Soc. No. 14

(1988), and where practicable to species or species-group from Havelka (1976), Edwards (1926) or Campbell and Pelham-Clinton (1960), as appropriate. Determinations within the economically important genus Culicoides can be particularly difficult.

Culicoides obsoletus (Meigen): CW, bred from rotten potatoes (Blackith and Blackith, 1989), iv.1988.

Culicoides pulicaris-group: K, bred from Phragmites stem bases, v.1988.

Forcipomyia sp.indet.: BDW, bred from rotten birch, iv.1989.

Palpomyia fulva (Macquart): BDW, vi-vii.1990 (NMI).

Serromyia femorata (Meigen): BDW, vii.1989.

Serromyia morio (F.): BDW, v-vii.1989; bred from mossy woodland litter, v.1989; K, bred from Phragmites stem bases, v.1989 (NMI).

CHAMAEMYIIDAE

Determined from Czerny (1936) and Smith (1963).

Chamaemyia flavipalpis (Haliday): BDW, bred from soil under birch, v.1989.

CHLOROPIDAE

Determined from Collin (1946) and Duda (1932-1933).

N Calamoncosis aprica (Meigen): K, bred from Phragmites dry stems, v.1988 (NMI).

Diplotoxa messoria (Fallén): KS, vi.1988.

Elachiptera brevipennis (Meigen): K, i.1988.

Elachiptera cornuta (Fallén): K, i.1988; KS, vi.1988; BDW, iv-v.1990.

Melanum laterale (Haliday): KS, vi.1988.

Thaumatomyia notata (Meigen): BDW, bred from bracket fungus on birch, vi.1989 (cf. Nash, 1989).

Bull. Ir. biogeog. Soc. No. 14

CLUSIIDAE

Determined from Stubbs (1982). The Irish species are reviewed by Chandler (1978b); see also Speight and Cogan (1979).

Clusia flava (Meigen): BDW, bred from rotten birch, v.1988, det. MCDS; vi-vii.1990, det. MCDS.

Clusiodes albimana (Meigen): BDW, bred from rotten birch, v.1989, det. MCDS; CW, v.1988; vi-vii.1990 det. MCDS.

Clusiodes gentilis (Collin): BDW, xi.1989, det. MCDS; vi-vii.1990, det. MCDS.

Clusiodes verticalis (Collin): BDW, vii.1989, det. MCDS; vi-vii.1990, det. MCDS.

COELOPIDAE

Determined from Hennig (1937).

Coelopa frigida (F.): BDW, xi.1989.

CONOPIIDAE

Determined from Smith (1969b). The Irish species are reviewed by Smith (1952b): see also Speight (1975, 1978).

Sicus ferrugineus (L.): BDW, vii.1978, coll. et det. MdeCW.

CULICIDAE

The known Irish fauna has recently been reviewed by Ashe et al. (1991).

Anopheles (Anopheles) claviger (Meigen): BDW (Ashe et al., 1991).

Aedes (Ochlerotatus) detritus (Haliday): SMP, BL, BDW (Ashe et al., 1991).

Aedes (Ochlerotatus) dorsalis (Meigen): K (Ashe et al., 1991).

Aedes (Ochlerotatus) rusticus (Rossi): BDW (Ashe et al., 1991).

Bull. Ir. biogeog. Soc. No. 14

Culiseta (Culicella) morsitans (Theobald): BDW (Ashe et al., 1991).

Culiseta (Culiseta) annulata (Schrank): BDW (Ashe et al., 1991).

DIASTATIDAE

Determined from Duda (1934) and Chandler (1986, 1987c). The Irish species are reviewed by Chandler (1986).

Campichoeta punctum (Meigen): BDW, vii.1989, det. MCDS.

Diastata adusta Meigen: BDW, vi.1988 (NMI).

DIXIDAE

Determined from Coe, Freeman and Mattingly (1950); the Irish fauna of 11 known species is reviewed by Ashe (1985); Ashe and O'Connor (1990).

Dixa nubilipennis Curtis: BDW, x.1989.

Dixella serotina Meigen: K, i.1988 (cf. Ashe and O'Connor, 1990).

DOLICHOPODIDAE

Determined from Fonseca (1978), Parent (1938) and Stackelberg and Negrobov (1930-1971). The Irish fauna of 122 species at the time was reviewed by Dyte (1969) and since then several species have been added to the list; it is likely that further species will be found to occur in this country, both from wider collecting and when taxonomic problems have been resolved.

Achalcus flavicollis (Meigen): BDW, bred from rotten birch, viii.1988; K, bred from Phragmites stem bases, viii.1988; BDW, vi.1990 (NMI).

Anepsiomyia flaviventris (Meigen): BDW, vi.1988; vi.1989.

Arqyra argentina (Meigen): BDW, vii.1978, coll. et det. MdeCW; vi-vii.1990 (NMI).

Bull. Ir. biogeoq. Soc. No. 14

- Arqyra diaphana (F.): KMF, v.1988 (NMI).
- Arqyra leucocephala (Meigen): BDW, v.1989 (NMI).
- Arqyra perplexa Becker: BDW, vi.1988; vii.1978, coll. et det. MdeCW; vi-vii.1990 (NMI).
- Arqyra vestita (Wiedemann): BDW, vii.1979, coll. et det. MdeCW; vi-vii.1990 (NMI).
- Campsicnemus armatus (Zetterstedt): BDW, x.1988; SMP, v.1988.
- Campsicnemus curvipes (Fallén): BDW, vi.1988; KS, vi.1988.
- Campsicnemus loripes (Haliday): BDW, vi-x.1988.
- Campsicnemus scambus (Fallén): BDW, vi-x.1988.
- Chrysotus gramineus (Fallén): BDW, vi.1988, det. MCDS; KMF, viii.1988 (NMI).
- Chrysotus microcerus Kowarz: BDW, vii.1978, coll. et det. MdeCW.
- Chrysotus neglectus (Wiedemann): BDW, v-vii.1990 (NMI).
- Diaphorus oculus (Fallén): BDW, vii.1979, coll. et det. MdeCW.
- Dolichopus brevipennis Meigen: BDW v.1988; SMP, vi.1988.
- Dolichopus diadema Haliday: BL, viii.1981, coll. et det. MCDS.
- Dolichopus discifer Stannius: BDW, vii.1978, coll. et det. MdeCW.
- Dolichopus festivus Haliday: BDW, vi.1988; viii.1978, coll. et det. MdeCW.
- Dolichopus griseipennis Stannius: BDW, vii.1989, det. MCDS (NMI).
- Dolichopus latipennis Fallén: BDW, vi.1989, swept at ditch edge, coll. et det. MCDS.
- Dolichopus nitidus Fallén: KMF, vi.1988.
- Dolichopus nubilus Meigen: BDW, vi.1988; SMP, v.1988; BDW, vii.1978, coll. et det. MdeCW.
- Dolichopus pennatus Meigen: BDW, v.1988; KMF, v-vi.1988.
- Dolichopus picipes Meigen: BDW, v.1988.
- Dolichopus plumipes (Scopoli) nec Haliday: BDW, vi.1988.
- Dolichopus popularis Wiedemann, BDW, vi.1988.
- Dolichopus simplex Meigen: BDW, v-vi.1988; vii-viii.1978, coll. et det. MdeCW.

Bull. Ir. bioqeoq. Soc. No. 14

- Dolichopus trivialis Haliday: BDW, vi.1988; vii.1978, coll. et det. MdeCW.
- Dolichopus unguulatus (L.): BDW, vi.1988.
- Dolichopus urbanus Meigen: BDW, vi.1988; vii.1978, coll. et det. MdeCW.
- Hercostomus aerosus (Fallén): BDW, vi.1990.
- Hercostomus cupreus (Fallén): BDW, vi.1988; SMP, v.1988.
- Hercostomus metallicus (Stannius): BDW, bred from rotten birch, v.1989.
- N Hercostomus nanus (Macquart): CW, vi.1988 (Speight, Blackith and de Courcy Williams, in press) (NMI).
- Hercostomus nigripennis (Fallén): BDW, viii.1978, coll. et det. MdeCW.
- Hydrophorus balticus (Meigen): KMF, x.1988; ix.1983, coll. et det. MdeCW.
- Hydrophorus bipunctatus (Lehmann): BDW, iii.1989, coll. et det. MCDS.
- Hydrophorus oceanus (Macquart): BL, viii.1981, coll. et det. MCDS.
- N Hypophyllus crinipes (Staeger): BDW, vi.1988; vi-vii.1990 (Blackith, Blackith and Speight, 1989) (NMI).
- Hypophyllus obscurellus (Fallén): BDW, vii.1989.
- Medetera abstrusa Thünberg: BDW, vi-vii.1990.
- Poecilobothrus nobilitatus (L.): BDW, vi.1988; vii.1978, coll. et det. MdeCW.
- Rhaphium appendiculatum (Zetterstedt): BDW, vi-vii.1990 (NMI).
- Rhaphium consobrinum Zetterstedt: SMP, v.1988.
- Rhaphium crassipes (Meigen): BDW, iv-vi.1990 (NMI).
- Rhaphium fasciatum Meigen: CW, vi.1988; BDW, vi-vii.1990 (NMI).
- Rhaphium monotrichum Loew: BDW, v-vi.1990 (NMI).
- Sympycnus pulicarius (F.): BDW, v.1988.
- Syntormon aulicus (Meigen): KMF, vi-viii.1988 (NMI).
- Syntormon denticulatus (Zettstedt): BDW, vi.1989; KMF, x.1988; BDW, v.1989, coll. et det. P.Withers (NMI).

Bull. Ir. biogeog. Soc. No. 14

Syntormon miki Strobl: BDW, iv-v.1988; viii.1988; KMF, vi.1988; KS, iv.1990; BDW, viii.1978, coll. et det. MdeCW; K, ii.1987; K, bred from Phragmites dry stems, i.1988 (Speight, 1986a); KMF, vii.1988 (NMI).

Syntormon pallipes (F.): BDW, iv.1988; KMF, x.1988; BDW, ix.1983, coll. et det. MdeCW.

Syntormon pumilus (Meigen): KS, vi.1988 (NMI).

N**Syntormon setosus Parent: BDW, iv.1988 (Speight and Mueffels, 1989), coll. et det. MCDS (NMI).

Teucophorus spinigerellus (Zetterstedt): KMF, vi.1988 (NMI).

N Thrypticus bellus Loew: BDW, vi.1988 (Blackith, Blackith and Speight, 1989) (NMI).

DROSOPHILIDAE

Determined from Duda (1934-1935) and Fonseca (1965b); Irish species list in Downer (1967).

Drosophila acuminata Collin: BDW, vii.1989, det. MCDS.

Drosophila andalusiaca Strobl: BDW, vii.1989, det. MCDS; v.1989, coll. et det. P. Withers.

Drosophila busckii Coquillett: BDW, vii.1989, det. MCDS.

Drosophila cameraria Haliday: BDW, vii.1989, det. MCDS.

Leucophenga maculata (Dufour): BDW, v.1990, det. MCDS.

Scaptomyza flava (Fallén): BDW, viii.1988, coll. et det. MdeCW; K, i.1988.

Scaptomyza graminum (Fallén): BDW, xi.1989.

Scaptomyza pallida (Zetterstedt): BDW, vii.1989, det. MCDS; v.1989, coll. et det. P. Withers; viii.1985, coll. et det. MdeCW; K, i.1988 (Blackith and Blackith, 1990a).

DRYOMYZIDAE

Determined from Czerny (1930-1931).

Dryomyza analis Fallén: BDW, xi.1989; KMF, viii.1988, det. MCDS.

Bull. Ir. biogeog. Soc. No. 14

Dryomyza flaveola (F.): BDW, bred from woodland litter, v.1989;
BDW, vi.1988.

EMPIDIDAE

Determined from Collin (1961) and Engel and Frey (1938-1956).
Chandler (1978a) gives a list of Irish species; Lavery et al. (in
prep.) update our knowledge of the Irish empid fauna.

Aclonempis albohirta Collin: CW, vi.1988.

Chelifera precatória (Fallén): BDW, xi.1989.

Coptophlebia albinervis (Meigen): BDW, vii.1978, coll. et det.
MdeCW.

Dolichocephala guttata (Haliday): BDW, vi.1988; vii.1989;
iv.1990.

Dolichocephala irrorata (Fallén): KS, x.1988.

Empis aestiva Loew: BDW, vii.1989.

N Empis bicuspidata Collin: BDW, vi-vii.1990 (Lavery et al., in
prep.) (NMI).

Empis chioptera Meigen: BDW, bred from rotten birch, v.1989.

Empis nuntia Meigen: SMP, v.1988.

Euempis tessellata (F.) K, vi.1988.

Hilara litorea (Fallén): BDW, iv-vii.1990, det. T. Lavery.

Hilara lundbecki Frey: SMP, vi.1988; BR, vi.1988.

Hilara maura (F.): BDW, iv.1990.

Hilara monedula Collin: BDW, vi.1989; common in BDW.

Holoclera caligiosa Collin: BDW, vi.1989.

Holoclera lamellata Collin: BDW, vi.1989; CW, vi.1989; K, bred
from Phragmites stem bases, v.1989.

Holoclera umbripennis (Meigen): BDW, bred from rotten birch,
vi.1988; v-vi.1990; CW, vi.1988.

Hydrodromia stagnalis (Haliday): BDW, x.1988; KS, x.1988.

Kowarzia bipunctata (Haliday): BDW, x.1989.

Kritempis livida (L.): BDW, vi.1989; vii.1978, coll. et det.
MdeCW.

Bull. Ir. biogeog. Soc. No. 14

Leptempis grisea (Fallén): BDW, vi.1989.

Megacyttarus crassirostris (Fallén): K, bred from Phragmites stem bases, iv.1988; KMF, v.1988; BR, vi.1988; BDW, bred from mossy litter, iv.1990.

Megacyttarus maculipennis (Zetterstedt): SMP, v.1988.

Pachymeria femorata (F.): KMF, vi.1989; BR, vi.1989.

Pararhamphomyia caesia (Meigen): SMP, v.1988.

Pararhamphomyia geniculata (Meigen): BDW, vi-vii.1990 (NMI).

Pararhamphomyia simplex (Zetterstedt): BR, vi.1988; CW, vi.1988 (NMI).

Pararhamphomyia tibiella (Zetterstedt): BDW, iv-vii.1990, det. T. Lavery.

Phyllodromia melanocephala (F.): CW, vi.1988; vi-vii.1990.

Rhamphomyia sulcata (Meigen): BDW, iv-vii.1990, det. T. Lavery.

Xanthempis stercorea (L.): BDW, bred from rotten birch, vii.1989; BDW, vi-vii.1990.

Xanthempis trigramma (Wiedemann in Meigen): BDW, bred from rotten birch, v.1989, common v-vi annually.

EPHYDRIDAE

Determined from Canzoneri and Meneghini (1983) and Becker (1926). The Irish species in the Haliday collection have been reviewed by de Courcy Williams (1989).

Coenia palustris (Fallén): BDW, viii.1985, coll. et det. MdeCW.

Hydrellia modesta Loew: BDW, viii.1985, coll. et det. MdeCW.

Limnellia quadrata (Fallén): BDW, viii.1985, coll. et det. MdeCW.

Ochthera mantis (DeGeer): BDW, ix.1983, coll. et det. MdeCW.

Paracoenia fumosa (Stenhammar): BDW, ix.1983, coll. et det. MdeCW.

Parydra coarctata (Fallén): BDW, ix.1983, coll. et det. MdeCW; vi.1989.

Parydra quadripunctata (Meigen): BDW, vi.1989.

Bull. Ir. biogeog. Soc. No. 14

Philygria flavipes (Fallén): BDW, viii.1985, coll. et det.
MdeCW.

N Psilopa nitidula (Fallén): BDW, viii.1985, coll. et det. MdeCW.

Scatella stagnalis (Fallén): BDW, ix.1983, coll. et det. MdeCW.

FANNIIDAE

Determined from Hennig (1964) and Fonseca (1965a); Nash (1979a) gives a check-list of 27 Irish species.

Fannia armata (Meigen): BDW, vi.1988.

Fannia canicularis (L.): SMP, v.1989; BDW, bred from pigeon,
v. 1989.

Fannia fuscula (Fallén): BDW, vii.1990.

Fannia genualis (Stein): BDW, vii.1989.

Fannia lepidula (Wiedemann): BDW, viii.1988.

Fannia lustrator (Harris): BDW, vi-vii.1990 (NMI).

Fannia manicata (Meigen): BDW, bred from crow, iii.1989; SMP,
bred from crow, v.1989.

N Fannia melania (Dufour) = Fannia ciliata (Stein): BDW, vii.1989,
(Blackith and Blackith, 1991) (NMI).

Fannia mollissima (Haliday in Westwood): K, iv.1990 (NMI).

Fannia norvegica Ringdahl: BDW, vii.1989 (Blackith and Blackith,
1991) (NMI).

Fannia polychaeta (Stein): BDW, bred from rotten birch litter,
v.1989; vii.1989.

Fannia postica (Stein): BDW, vii.1989.

Fannia rondanii (Strobl): BDW, v.1989 (NMI).

Fannia scalaris (F.): BDW, bred from crow, x.1988.

Fannia serena (Fallén): KMF, v.1988; BDW, bred from woodland
litter, v.1989; vii.1990.

Fannia similis (Stein): BDW, v.1989.

Fannia sociella (Zetterstedt): BDW, v-vii.1989; K, bred from
Phragmites stem bases, iv.1989.

N Fannia umbrosa (Stein): BDW, bred from birch log, iv.1989;

Bull. Ir. bioqeoq. Soc. No. 14

vii.1989 (Blackith et al., 1990).

Piezura graminicola (Zetterstedt): BDW, vii.1989.

HELCOMYZIDAE

Determined from Czerny (1927).

Heterocheila buccata (Fallén): BL, bred from wrack, v.1988
(Blackith and Blackith, 1990a).

HELEOMYZIDAE

Determined from Czerny (1927), Collin (1943) and Withers (1987);
see also Speight (1988a).

Heteromyza oculata Fallén: BDW, xi.1989; K, bred from Phragmites
dry stems, i.1988.

Heteromyza rotundicornis (Zetterstedt): BDW, vii.1989, det.
MCDS.

Heteromyza commixta Collin: BDW, vi.1990, det. MCDS.

Neoleria inscripta (Meigen): BDW, bred from pigeon, v.1989, det.
MCDS; SMP, bred from crow, iv.1989, det MCDS (NMI).

Suillia atricornis (Meigen): BDW, xi.1989, det. MCDS. cf.
Withers (1987).

Suillia bicolor (Zetterstedt): BDW, vii.1989, det. MCDS (NMI).

Suillia fuscicornis (Zetterstedt): BDW, viii.1988, det. MCDS.

Suillia variegata (Loew): BDW, vii.1989, det. MCDS; iii.1990;
v.1978, coll. et det. MdeCW; v.1979, coll. et det. MdeCW.

Tephrochlamys rufiventris (Meigen): BDW, bred from pigeon,
iv-v.1989 (Blackith and Blackith, 1990b).

Tephrochlamys tarsalis (Zetterstedt): BDW, bred from pigeon,
iv-v.1989 (Blackith and Blackith, 1990b; Speight et al., 1990).

HYBOTIDAE

Determined from Chvála (1975, 1983), Engel and Frey (1956), and
Collin (1961). Chandler (1978) gives a list of Irish species.

Bull. Ir. biogeog. Soc. No. 14

Lavery et al. (in prep.) provide an updated list.

Bicellaria simplicipes (Zetterstedt): BDW, vii.1978, coll. et det. MdeCW.

Bicellaria vana Collin: BDW, vi.1988; CW, vi.1988 (NMI).

Crossopalpus curvipes (Meigen): SMP, ix.1984, coll. et det. MdeCW; K, i.1988.

Elaphropeza ehippiata (Fallén): BDW, viii.1978, coll. et det. MdeCW.

Hybos culiciformis (F.): BDW, vi.1988.

Hybos femoratus (Müller): BDW, vi.1988; vii.1989.

Leptopeza flavipes (Meigen): BDW, vi.1989.

Ocydromia glabricula (Fallén): BDW, vi.1988.

Oedalea flavipes Zetterstedt: BDW, v-vi.1988; vii.1989; bred from rotten birch, v.1989; BDW, vi.1979, coll. et det. MdeCW.

Oedalia stigmatella Zetterstedt: BDW, vi-vii.1990, det. T. Lavery.

Oedalea tibialis Macquart: BDW, vi.1989.

Platypalpus albocapillatus (Fallén): BDW, vi.1989.

Platypalpus candicans (Fallén): BDW, vi.1988.

N Platypalpus cursitans (F.): BDW, vi.1988; K marigolds, viii.1988, det. T. Lavery.

Platypalpus longicornis (Meigen): KMF, v.1988; BDW, vii.1978, coll. et det. MdeCW.

Platypalpus minutus (Meigen): BDW, vii.1989; CW, vi.1988; BR, ix.1988.

Platypalpus notatus (Meigen): BDW, ix.1988.

Platypalpus pallidiventris (Meigen): BDW, vii.1989; vi-vii.1990.

Platypalpus pectoralis (Fallén): BDW, iv.1990.

Platypalpus pseudofulvipes (Frey): BDW, vi.1988, det. T. Lavery.

Stilpon graminum (Fallén): BDW, vi-vii.1990, det. T. Lavery.

Tachydromia aemula (Loew): BDW, vi.1989.

Tachypeza nubila (Meigen): BDW, vii.1989.

Trichina bilobata Collin: BDW, vi.1989.

Bull. Ir. biogeog. Soc. No. 14

Trichina clavipes Meigen: BDW, vi.1989.

Trichina elongata Haliday: BDW, vii.1989.

N Trichina pallipes (Zetterstedt): K, bred from Phragmites stem bases, v.1989, conf. T. Lavery (NMI).

LAUXANIIDAE

Determined from Czerny (1932) and Collin (1948).

Calliopum aeneum (Fallén): CW, vi.1988.

N Calliopum elisae (Meigen): BDW, vii.1978, coll. et det. MdeCW; viii.1988, det. MCDS (Speight, Blackith and de Courcy Williams, in press) (NMI).

Lyciella decempunctata (Fallén): BDW, vii.1978, coll. et det. MdeCW.

Lyciella decipiens (Loew): BDW, vii.1989.

Lyciella rorida (Fallén): BDW, vii.1989; vi-vii.1990.

Minettia inusta (Meigen): BDW, v.1989, coll. et det. P. Withers.

Minettia longipennis (F.): BDW, bred from birch litter, iv.1989; vi.1989.

Peplomvza litura (Meigen): BDW, vi-vii.1990 (NMI).

Sapromvza sordida Haliday: BDW, vii.1989.

Trigonometopus frontalis (Meigen): K, iii-vi.1988 (Blackith and Blackith, 1990a; Chandler, 1987a).

LIMONIIDAE

Determined from Coe, Freeman and Mattingly (1950), Pierre (1924), and Lackschewitz and Pagast (1940-1942); some new Irish records are given by Mendl (1987).

Astrolimnophila ochracea (Meigen): BDW, iv-x.1988; bred from mossy woodland litter, v-vi.1989; bred from rotten birch, vi-vii.1988; KMF, v.1988; CW, vi.1988.

Brachylimnophila nemoralis (Meigen): BDW, v-vi.1988; bred from mossy woodland litter and mud, v.1989; KMF, vi.1989.

Bull. Ir. biogeoq. Soc. No. 14

Dicranomyia autumnalis (Staeger): BDW, v-x.1988; KMF, iv.1988; KS, x.1988.

Dicranomyia chorea (Meigen): BDW, iv-x.1988.

N Dicranomyia danica (Kuntze): BDW, iv.1988; KMF, x.1988; KS, iv.1988 (NMI).

Dicranomyia modesta (Meigen): BDW, vi-x.1988; KMF, v-x.1988.

Dicranomyia sera (Walker): BDW, viii.1988 (Mendl, 1987).

Eloeophila apicata (Loew): BDW, viii.1988.

Erioptera fuscipennis Meigen: BDW, iv-ix.1988; KMF, iv.1988.

Erioptera trivialis Meigen: BDW, v.1988; KMF, iv-x.1988; KS, vi-x.1988; CW, bred from rotten potatoes, v.1988 (Blackith and Blackith, 1989).

Euphylidorea fulvonervosa (Schummel): BDW, iv-vi.1988; bred from Phragmites stem bases, v.1988.

Idioptera fasciata (L.): BDW, viii.1988.

Ilisia maculata Meigen: KMF, iv.1988.

Limonia macrostigma (Schummel): BDW, v-x.1988; KMF, iv.1988.

Limonia nubeculosa Meigen: BDW, iv-x.1988; KMF, iv.1988.

Limonia tripunctata (F.): BDW, iv-vi.1988.

Limonia trivittata (Schummel): BDW, iv-vi.1988.

Ludicia claripennis (Verrall): KMF, vi.1988.

Molophilus ater (Meigen): BDW, iv.1988, coll. et det. P. Withers.

Molophilus griseus (Meigen): BDW, vi-x.1988; KMF, v-vi.1988.

Molophilus ochraceus (Meigen): BDW, v-viii.1988; KMF, v-vi.1988.

Molophilus pleuralis De Meijere: BDW, x.1988; bred from rotten birch wood, v.1989; K, bred from Phragmites stem bases, v.1988.

Ormosia hederæ (Curtis): BDW, x.1988; bred from wet soil under birch, iv.1989; CW, vii.1988.

Paradelphomyia senilis (Haliday): BDW, iv-vi.1988; bred from rotten birch, v.1989.

Pedicia rivosa (L.): BDW, iv-x.1988; KMF, iv-x.1988.

Pilaria discicollis (Meigen): BDW, iv-viii.1988.

Platytoma cinerascens (Meigen): BDW, iv-x.1988; KMF, iv.1988.

Bull. Ir. biogeog. Soc. No. 14

Phylidorea ferruginea (Meigen): BDW, vi-viii.1988; bred from mossy woodland litter, v.1989; KMF vi.1988.

Rhipidia duplicata (Doane): BDW, iv-x.1988; CW, vi.1988.

Symplecta stictica (Meigen): BDW, iv-ix.1988; KMF, iv-x.1988; BR, bred from peaty soil, v.1989; KMF, iv.1988.

Tasiocera murina (Meigen): BDW, vi.1988; bred from rotten birch wood, v.1989; K, bred from Phragmites stem bases, v.1989.

Tricyphona immaculata (Meigen): BDW, iv-x.1988; KMF, iv-x.1988; K, bred from Phragmites stem bases, v.1989.

Ula sylvatica (Meigen): BDW, iv.1988.

LONCHAEIDAE

Determined from Morge (1967); see also Speight (1988a).

Lonchaea chorea (F.): BDW, vi.1988; BDW, vii.1989; vi-vii.1990.

LONCHOPTERIDAE

Determined from Smith (1969a).

Lonchoptera furcata (Fallén): KS, x.1988.

Lonchoptera lutea Panzer: BDW, common, annually; K, bred from Phragmites stem bases, vi.1989; BDW, iii.1990; v.1989, coll. et det. P. Withers.

MICROPEZIDAE

Determined from Czerny (1930) and Collin (1945a).

Compsobata cibaria (L.): BDW, ix.1989; vi-vii.1990, det. MCDS; CW, ix.1988.

MICROPHORIDAE

Determined from Collin (1961) and Engel and Frey (1956). The Irish species are listed by Lavery et al. (in prep.).

Bull. Ir. biogeog. Soc. No. 14

Microphor holosericeus (Meigen): BDW, iv.1990; CW, vi.1988, det. T. Lavery.

MUSCIDAE

Determined from Hennig (1964) and Fonseca (1965a); Nash (1979a) gives a list of 156 species recognised as Irish.

Acanthiptera rohrelliformis (Robineau-Desvoidy): BDW, ii.1988.

Alloqnota agromyzina (Fallén): BDW, vi.1990.

Azelia cilipes (Haliday): BDW, vi.1988.

Azelia nebulosa Robineau-Desvoidy: BDW, xi.1989; iv-v.1990.

Azelia zetterstedtii Rondani: BDW, vii.1988.

Caricea erythrocerata Robineau-Desvoidy: BDW, i.1988; K, ii.1991 (NMI).

Coenosia intermedia (Fallén): BDW, vii.1989; SMP, viii.1987.

Coenosia mollicula (Fallén): BDW, vii.1989.

Coenosia pumila (Fallén): BDW, vi.1988.

Coenosia tigrina (F.): BDW, vi-viii.1988; K marigolds, vi.1988.

Dexiopsis ruficornis (Macquart): BR, ix.1968, coll. et det. P. J. Chandler (Nash and Chandler, 1978).

Eudasyphora cyanella (Meigen): BDW, vii.1987; vii.1989; K, ii.1991; vii.1988.

Graphomya maculata (Scopoli): BDW, vi-vii.1990.

Haematobosca stimulans (Meigen): BDW, vi.1988.

Hebecnema fumosa (Meigen): BDW, xi.1989.

Hebecnema nigricolor (Fallén): BDW, vii.1989.

Hebecnema umbratica (Meigen): BDW, bred from rotten birch, vii.1989; vii.1989.

Hebecnema vespertina (Fallén): BDW, vi-x.1988; vii.1989.

Helina allotalla (Meigen): BDW, bred from pigeon, iii.1989 (Blackith and Blackith, 1990b).

Helina depuncta (Fallén): BDW, viii.1988; vii.1989.

Helina evecta (Harris): BDW, ii.1988; vi.1988; vii.1989; FMP, vi.1987.

Bull. Ir. biogeoq. Soc. No. 14

- Helina impuncta (Fallén): BDW, vii.1989.
- Helina laetifica (Robineau-Desvoidy): SMP, iii.1991.
- Helina maculipennis (Zetterstedt): KMF, vi.1988.
- Helina obscurata (Meigen): BDW, iv-vi.1988; KMF, vi.1988; vii.1989; BDW, vii.1979, coll. et det. MdeCW; FMP, vi.1987.
- Helina reversio (Harris): BDW, viii.1988; K marigolds, vi.1988; vii.1989; BDW, swept, iii.1990; BL, viii.1987.
- Hydrotaea albipuncta (Zetterstedt): KMF, vii.1988.
- Hydrotaea dentipes (F.): BDW, vii.1988; bred from rabbit, viii.1988 (Blackith and Blackith, 1990b); K, bred from crow, viii.1988.
- Hydrotaea diabolus (Harris): BDW, vi.1989; SMP, viii.1987.
- Hydrotaea ignava (Harris): CW, bred from badger, viii.1988.
- Hydrotaea irritans (Fallén): BDW, vi.1988; vii.1989.
- Limnophora tigrina (Am Stein): K, viii.1951 (Smith, 1952a).
- Lispe pygmaea Fallén: K, viii.1951 (Smith, 1952a).
- Lispe tentaculata (DeGeer): BDW, ditch edgeing, vi.1988.
- Lispocephala alma (Meigen): BDW, vii.1989; iv.1990; iv-v.1990; SMP, iii.1991.
- Lophosceles cinereiventris (Zetterstedt): BDW, vii.1989.
- Lophosceles mutatus (Fallén): BDW, vi-vii.1990.
- Mesembrina meridiana (L.): ubiquitous, all months.
- Morellia aenescens Robineau-Desvoidy: BDW, viii.1988; v.1990; BL, viii.1987 (NMI).
- Morellia hortorum (Fallén): BDW, vii.1989; BL, viii.1987; K, vi.1988.
- Morellia simplex (Loew): BDW, vi.1989.
- Muscina levida (Harris) = Muscina assimilis (Fallén): BDW, x.1988; K, bred from crow, xi.1988 (Blackith and Blackith, 1990b).
- Muscina prolapsa (Harris) = Muscina pabulorum (Fallén): BDW, bred from crow, magpie, iv.1988; BL, bred from snails, vii.1987; K, bred from rabbit, viii.1988 (Blackith and Blackith, 1990b).
- Mydea ancilla (Meigen): BDW, vi.1988; vii.1989.

Bull. Ir. biogeog. Soc. No. 14

- Mydea anicula (Zetterstedt): BDW, vii.1989.
Mydea orthonevra (Macquart): BDW, vi-vii.1990.
Mydea setifemur Ringdahl: BDW, vi.1988; vii.1989.
Mydea urbana (Meigen): BDW, iv-viii.1988; KMF, v.1988; v.1989; BL, viii.1987; vii.1989.
Myospila meditabunda (F.): BDW, vii.1989; K, on sheep dung, ix.1988; iv.1990; FMP, viii.1987.
Neomyia cornicina (F.) = Orthellia viridis (Wiedemann): BDW, viii-x.1988; K marigolds, vi.1988; vi.1989.
Phaonia angelicae (Scopoli): BDW, vi.1988; vii.1989; BL, vii.1989.
Phaonia basalis (Zetterstedt): BDW, vi.1988; vii.1989; BL, vii.1989.
Phaonia errans (Meigen): BDW, vii.1989.
Phaonia falleni Michelsen: BDW, vii.1989.
Phaonia incana (Wiedemann): BDW, vi-viii.1988; vii.1989.
Phaonia palpata (Stein): BDW, viii.1988; vi-vii.1989.
Phaonia perdita (Meigen): BDW, iv.1990.
Phaonia rufiventris (Scopoli): BDW, ii.1988; v-viii.1988.
Phaonia serva (Meigen): BDW, iv-v.1990.
Phaonia subventa (Harris): BDW, bred from rotten birch, v-vi.1989; v.1989; iv.1990 (abundant).
Phaonia tuguriorum (Scopoli): BDW, ii.1988; vi-viii.1988; vii.1989; iv.1990.
Polietes domitor (Harris): BDW, vii.1989.
Polietes lardaria (F.): BDW, vii.1989; K, vii.1987.
Pseudocoenosia solitaria (Zetterstedt): KMF, vi.1988.
Schoenomyza litorella (Fallén): BR, v.1988.
Spilogona denigrata (Meigen): BDW, vii.1989.
Spilogona litorea (Fallén): BDW, iv.1988; KMF, vi.1988.
Thricops diaphanus (Wiedemann): BDW, vii.1988; vii.1989.

MYCETOPHILIDAE

Specimens not belonging to the sub-family Mycetophilinae can be

Bull. Ir. biogeog. Soc. No. 14

determined from Hutson, Ackland and Kidd (1980). The Irish mycetophilid fauna is reviewed by Chandler (1987b). The world Keroplatinae are reviewed by Matile (1990); see also Edwards (1924).

Apolephthisa subincana (Curtis): BDW, iv.1990.

Acnemia nitidicollis (Meigen): BDW, xi.1989.

Bolitophila cineria Meigen: BDW, xi.1989.

Diadocidia ferruginosa (Meigen): BDW, xi.1989; iv.1990.

Diadocidia spinulosa Tollet: BDW, x.1989.

Mycomya parva (Dziedzicki): BDW, x.1989.

Monoclona rufilatera (Walker): BDW, xi.1989.

Sciophila lutea Macquart: BDW, x.1989.

OPOMYZIDAE

Determined from Czerny (1928b), Collin (1945b) and Greve (1981); see also Gibbs (1989).

Geomysa tripunctata Fallén: K, ii.1988; KS, x.1988; BDW, vii.1989.

Opomyza germinationis (L.): BDW, vi.1988; KMF, viii.1988, det. MCDS.

Opomyza petrei Mesnil: BDW, vii.1989, swept at ditch edge, det. MCDS; KS, x.1988.

OTITIDAE

Determined from Hennig (1939) and Lyneborg (1964); see also Clements (1990). The Irish species are reviewed by Speight and Chandler (1983).

*Ceroxys urticae (L.): CW, v.1988, bred from rotten potatoes (Blackith and Blackith, 1989); vii.1978, coll. et det. MdeCW.

Herina frondescantiae (L.): BDW, vi.1989.

**Herina oscillans (Meigen): BDW, vi.1989, swept at ditch edge,

Bull. Ir. biogeog. Soc. No. 14

det. MCDS.

Seioptera vibrans (L.): BDW, vii.1989, swept at ditch edge,
det. MCDS; vi-vii.1990.

PALLOPTERIDAE

Determined from Morge (1967, 1974); Speight (1979a) has reviewed
the species known to be included in the Irish fauna.

Palloptera muliebris (Harris): BDW, vii.1989, det. MCDS.

Palloptera quinquemaculata (Macquart): BDW, vii.1989, det. MCDS.

Palloptera saltuum (L.): BDW, vii.1988, det. MCDS.

Palloptera scutellata (Macquart): BDW, vii.1989, det. MCDS.

Palloptera trimacula (Meigen): BDW, vii.1989.

Palloptera umbellatarum (F.): BDW, viii.1988, det. MCDS (NMI).

Palloptera ustulata Fallén: BDW, vii.1989, det. MCDS; vii.1978,
coll. et det. MdeCW.

PHORIDAE

Determined from Disney (1983); the Irish species were reviewed by
Schmitz (1938).

Conicera floricola Schmitz: BDW, v.1989, det. P. Withers.

PIOPHILIDAE

Determined from Hennig (1943) and Zusta and Lastovka (1965).

Parapiophila vulgaris (Fallén): BDW, bred from pigeon, iii.1989
(Blackith and Blackith, 1990b).

Piophila varipes Meigen: BDW, vi-vii.1990, det. MCDS.

PIPUNCULIDAE

Determined from Coe (1966); provisional determinations only; see
also Speight (1986a).

Bull. Ir. biogeog. Soc. No. 14

Pipunculus thomsoni Becker: BDW, vii.1989.

Verralia aucta (Fallén): BDW, vii.1978, coll. et det. MdeCW;
vii.1988, coll. et det. MdeCW.

PLATYPEZIDAE

Determined from Chandler (1973); the Irish fauna of 15 species has been reviewed by Chandler (1976).

Opetia nigra Meigen: BDW, bred from woodland litter, iv-vi.1989 (NMI).

N Polyporivora picta (Meigen): BDW, bred from rotten birch, iv.1989 (Speight, Blackith and Blackith, 1990) (NMI).

PSILIDAE

Determined from Hennig (1941), Collin (1944b) and Lyneborg (1964); a provisional list of the 19 known and 3 possible Irish species is provided by Speight et al. (1984).

Chamaepsila nigromaculata (Strobl): FMP, vii.1978, coll. et det. MdeCW (Speight et al., 1984); BDW, vii.1978, coll. et det. MdeCW; vii.1988, coll. et det. MdeCW.

Chamaepsila obscuritarsis (Loew): BDW, vi.1988, det. MCDS.

Chamaepsila rosae (F.): BDW, iv-v.1990.

Loxocera albisetata (Schrank): BR, ix.1971, coll. et det. MCDS.

Loxocera aristata (Panzer): BR, ix.1971, coll. et det. MCDS;
BDW, vii.1978, coll. et det. MdeCW; KMF, viii.1988.

PSYCHODIDAE

Determination and nomenclature from Withers (1989); Irish species are listed by Withers and O'Connor (in preparation).

Boreoclytocerus ocellaris (Meigen): K, bred from Phragmites stem bases, iv.1989, det. P. Withers.

Pericoma blandula Eaton: BDW, 1990, det. P. Withers.

Bull. Ir. biogeog. Soc. No. 14

- Pericoma nubila (Meigen): BDW, v.1989, coll. et det. P. Withers.
Pericoma palustris (Meigen): BDW, 1990, det. P. Withers.
Pericoma pilularia Tonnoir: BDW, 1990, det. P. Withers.
Pericoma pseudexquisita Tonnoir: BDW, vii.1989, det. P. Withers.
Pericoma trivialis Eaton: BDW, v.1989, coll. et det. P. Withers.
Peripsychoda auriculata (Curtis): BDW, 1990, det. P. Withers.
Psychoda albipennis Zetterstedt: BDW, vii.1989, det. P. Withers.
N Psychoda alternata Say: CW, bred from rotten potatoes, v.1988
(Blackith and Blackith, 1989).
Psychoda brevicornis Tonnoir: BDW, 1990, det. P. Withers.
Psychoda cineria Banks: BDW, vii.1989, det. P. Withers; bred
from mossy woodland litter, iii.1990, det. P. Withers.
N Psychoda erminea Eaton: BDW, bred from mossy woodland litter,
iii.1990, det. P. Withers.
Psychoda grisescens Tonnoir: BDW, bred from mossy woodland
litter, iii.1990, det. P. Withers.
Psychoda phalaenoides (L.): BDW, vii.1989, det. P. Withers.
Psychoda setigera Tonnoir: BDW, 1990, det. P. Withers.
Psychoda trinodulosa Tonnoir: BDW, 1990, det. P. Withers.
Sycorax silacea Curtis in Haliday: BDW, 1990, det. P. Withers.
Telmatoscopus albifacies Tonnoir: BDW, 1990, det. P. Withers.
Telmatoscopus denticulatus Krek: BDW, 1990, det. P. Withers.
Telmatoscopus morulus Eaton: BDW, 1990, det. P. Withers.
Telmatoscopus notabilis Eaton: BDW, vii.1989, det. P. Withers.
Telmatoscopus pseudolongicornis (Wagner): BDW, 1990, det. P.
Withers.

PTYCHOPTERIDAE

Determined from Coe, Freeman and Mattingly (1950); Speight and
O'Connor (1981) review the Irish Ptychopteridae.

Ptychoptera albimana (F.): BDW, x.1988, det. MCDS; v.1989, coll.
et det. P. Withers; KMF, v.1988.

Bull. Ir. biogeog. Soc. No. 14

RHAGIONIDAE

Determined from Oldroyd (1969); see also Speight (1981a); the group needs revision, while obscura may require redefinition.

Chrysopilus auratus (F.): BDW, bred from rotten birch, vi.1989; BDW, vi.1988; vii-viii.1978, coll. et det. MdeCW.

Ptiolina obscura (Fallén): BDW, vi-vii.1990 (NMI).

Rhagio lineola F.: BDW, bred from rotten birch, vi.1989; BDW, vi.1989.

Rhagio scolopaceus (L.): BDW, bred from rotten birch, v.1989; BDW, viii.1988; K, bred from Phragmites stem bases, iv.1989; BDW, vii-viii.1978, coll. et det. MdeCW.

RHINOPHORIDAE

Determined from van Emden (1954); Irish species list in Nash (1985); see also Speight (1988b).

Tricogena rubricosa (Meigen): BL, viii.1987.

SARCOPHAGIDAE

Determined from van Emden (1954), and Pape (1987); see also Blackith and Blackith (1987, 1990b).

Brachycoma devia (Fallén): KMF, vii.1988; SMP, vii.1987; BL, vii.1989.

Helicophagella crassimargo (Pandellé): FMP, viii.1986; SMP, vii.1986.

Helicophagella melanura (Meigen): K marigolds, vi.1988; BL, vii.1986; FMP, vi.1986.

Heteronychia haemorrhoea (Meigen): CW, vi.1988; K, vii.1986; BDW, viii.1986.

Heteronychia vagans (Meigen): KMF, vii.1988; BL, viii.1986.

Heteronychia vicina (Macquart): BL, vii.1986.

Parasarcophaga aratrix (Pandellé): KMF, bred from magpie,

Bull. Ir. biogeoq. Soc. No. 14

v.1989; SMP, vii.1986.

Parasarcophaga teretirostris (Pandellé): FMP, vii.1986; SMP, viii.1986.

Pierretia nigriventris (Meigen): K, bred from house-martin, v.1988; SMP, vii.1988.

N*Pierretia sexpunctata (F.) = Pierretia clathrata (Meigen): BDW, vi.1986.

Sarcophaga carnaria (L.): BDW, vii.1990; vii.1986; FMP, vii.1986.

Sarcophaga subvicina Rohdendorf: BDW, viii.1988; FMP, viii.1986.

Sarcotachinella sinuata (Meigen): BDW, viii.1988; BL, vii.1986; FMP, vii.1986.

Thyrsocnema incisilobata (Pandellé): K marigolds, vi.1988; FMP, vii.1986.

SCATHOPHAGIDAE

Determined from Sack (1937), Collin (1958) and Hackman (1956). The Irish species are reviewed by Chandler (1974). See also Irwin (1975) and Speight (1983).

Ceratinostoma ostiorum (Haliday in Curtis): BDW, vii.1989, det. MCDS.

Cleigastra apicalis (Meigen): BDW, swept at ditch edge, vi.1989, coll. et det. MCDS; iv-vi.1990.

Cordilura aemula (Collin): BDW, vii.1978, coll. et det. MdeCW.

Cordilurina albipes (Fallén): BDW, vii.1989, det. MCDS; iv-v.1990.

Leptopa filiformis Zetterstedt: BDW, vii.1989, det. MCDS; vi.1990.

Nanna fasciata (Meigen): CW, vi.1988, conf. MCDS; vi.1990.

Norellisoma spinimanum (Fallén): BDW, vii.1989, det. MCDS; v.1989, coll. et det. P. Withers; iv-v.1990.

Parallellomma vittata (Meigen): BDW, v.1989, coll. et det. P. Withers; iv-v.1990.

Bull. Ir. biogeog. Soc. No. 14

Scathophaga analis (Meigen): BDW, iv-vi.1990, det. MCDS.

Scathophaga furcata (Say): BDW, ii.1988, det. MCDS; vii.1989, det. MCDS.

Scathophaga litorea (Fallén): FMP, ix.1983, coll. et det. MdeCW.

Scathophaga stercoraria (L.): ubiquitous, all months; BDW, vii.1978, coll. et det. MdeCW.

Scathophaga suilla (F.): BDW, vii.1989, det. MCDS; vii.1978, coll. et det. MdeCW.

SCATOPSIDAE

The Irish fauna was reviewed by D'Arcy-Burt and Chandler (1987); our material was determined from Freeman and Lane (1985). See also Speight (1988a).

Coboldia fuscipes (Meigen): CW, bred from rotten potatoes, vi.1988 (Blackith and Blackith, 1989); K, bred from Phragmites stems (dry). Apparently the first Irish record since Haliday (1833) (NMI).

N Rhegmoclema coxendix (Verrall): BDW, bred from rotten birch, vi.1988; K, bred from Phragmites stem bases, vi.1988 and iv.1989; K, vi.1988 (NMI).

Rhegmoclema verralli (Edwards): K, bred from Phragmites stem bases, vi.1989; the first Irish record was in D'Arcy-Burt and Chandler (1987) (NMI).

Scatopse notata (L.): BDW, ix.1989; CW, bred from rotten potatoes, v.1988 (Blackith and Blackith, 1989).

Swammerdammella sp. (female): BDW, vi-vii.1990 (NMI).

SCIARIDAE

Determination and nomenclature from Freeman (1983).

N Bradysia pullula (Winnertz): BDW, v.1989, coll. et det. P. Withers.

Bradysia sp. indet. (female only): K, bred from Phragmites stem

Bull. Ir. biogeog. Soc. No. 14

bases, v.1988.

Bradysia fimbricauda Tuomikoski: BDW, v.1990, det. P. Withers.

N Corynoptera forcipata (Winnertz): BDW, v.1989, coll. et det. P. Withers; BDW, bred from rotten birch, v.1989.

Dolichosciara flavipes (Meigen): BDW, bred from rotten birch, vi.1989; BDW, v.1989, coll. et det. P. Withers.

Epidapus atomaria (DeGeer): BDW, bred from rotten birch, iv.1989.

Lycoriella mali Fitch: CW, bred from rotten potatoes, v.1988, (Blackith and Blackith, 1989, as L. solani (Winnertz)).

N Scaptosciara pusilla (Meigen): BDW, v.1989, coll. et det. P. Withers.

Spathobdella nobilis (Winnertz): BDW, vi.1990, det. P. Withers.

N Trichosia caudata (Walker): BDW, v.1989, coll. et det. P. Withers.

Trichosia pilosa (Staeger): BDW, bred from pigeon, v.1989.

N Xylosciara lignicola (Winnertz): BDW, v.1989, coll. et det. P. Withers.

Zygoneura sciarina Meigen: BDW, v.1989, coll. et det. P. Withers.

SCIOMYZIDAE

Determined from Rozkošný (1984) and Knutson and Lyneborg (1965); a check-list of the 46 known Irish species is provided by Speight (1979b). The Murrough contains well over half this number; see also Chandler (1972) and Speight (1982, 1988b).

N*Antichaeta brevipennis (Zetterstedt): BDW, vii.1989, det. MCDS (Speight et al., 1990).

Coremacera marginata (F.): BDW, vii.1988, det. MCDS; viii.1978, coll. et det. MdeCW (NMI).

Elgiva cucularia (L.): BDW, ii.1978, coll. et det. MdeCW; v.1979, coll. et det. MdeCW.

Hydromya dorsalis (F.): BDW, vii.1989, det. MCDS; swept

Bull. Ir. biogeog. Soc. No. 14

- iii.1990; vii-viii.1978, coll. et det. MdeCW.
- Knutsonia albiseta (Scopoli): BDW, vii.1978, coll. et det. MdeCW; KMF, viii.1988.
- Knutsonia lineata (Fallén): SMP, viii.1975, coll. et det. MCDS; BDW, vii.1978, coll. et det. MdeCW; viii.1979, coll. et det. MdeCW.
- Limnia paludicola Elberg: BDW, vi.1988, det. MCDS.
- Pherbellia albocostata (Fallén): BDW, vii.1989, det. MCDS; vii.1988, coll. et det. MdeCW.
- Pherbellia cinerella (Fallén): BDW, viii.1978, coll. et det. MdeCW.
- Pherbellia dubia (Fallén): BDW, bred from rotten birch, v.1989, det. MCDS; bred from soil, iv.1989, det. MCDS; KMF, viii.1988.
- Pherbellia griseola (Fallén): BDW, vi.1990, det. MCDS.
- Pherbellia schoenherri (Fallén): BDW, swept at ditch edge, vi.1989, coll. et det. MCDS; v.1989, coll. et det. P. Withers; viii.1978, coll. et det. MdeCW; v.1979, coll. et det. MdeCW.
- Pherbellia scutellaris (von Roser): BDW, vii.1989, det. MCDS.
- Pherbellia ventralis (Fallén): BDW, vii.1989; det. MCDS; v-vi.1979, coll. et det. MdeCW.
- Pherbina corvleti (Scopoli): SMP, viii.1975, coll. et det. MCDS.
- N Psacadina verbekei Rozkošný: BDW, v.1990, det. MCDS; BDW, v.1979, coll. et det. MdeCW; (Speight et al., in press) (NMI).
- Pteromicra angustipennis (Staeger): BDW, vi.1989, conf. MCDS.
- Pteromicra leucopeza (Meigen): BDW, vii.1989, det. MCDS.
- Renocera pallida (Fallén): BDW, vi.1989, det. MCDS; v.1989, coll. et det. P. Withers; vi.1989.
- *Sciomyza dryomyzina Zetterstedt: BDW, iv.1989, det. MCDS; xi.1989, det. MCDS.
- Sepedon sphegea (F.): BDW, swept at ditch edge, vii.1989, coll. et det. MCDS.
- Tetanocera arrogans Meigen: BDW, vii.1989, det. MCDS.
- Tetanocera elata (F.): BDW, x.1989, det. MCDS; vii-viii.1978, coll. et det. MdeCW.

Bull. Ir. biogeog. Soc. No. 14

Tetanocera ferruginea Fallén: BDW, swept at ditch edge, vi.1989, coll. et det. MCDS; vii.1978, coll. et det. MdeCW.

Tetanocera fuscinervis (Zetterstedt) = Tetanocera unicolor Loew: FMP, viii.1975, coll. et det. MCDS (Speight and Nash, 1977); BDW, vii.1989, det. MCDS.

Tetanocera hyalipennis von Roser: BDW, viii.1988, det. MCDS; vii.1989, det. MCDS (NMI).

Tetanocera robusta Loew: BDW, vii.1989, det. MCDS; vii-viii.1978, coll. et det. MdeCW.

SEPSIDAE

Determined from Pont (1979) and Hennig (1949). An Irish species list is incorporated into Pont (1979).

Nemopoda nitidula (Fallén): BDW, bred from crow, iv.1989; KMF, viii.1988.

Saltella spondylia (Schrank): BDW, bred from crow, v.1989, det. MCDS.

Sepsis fulgens Meigen: BDW, bred from pigeon, v.1989; KS, vi.1988; K, i.1988.

Sepsis punctum (F.): KMF, viii.1988.

Themira minor (Haliday): BDW, vii.1979, coll. et det. MdeCW.

Themira pusilla (Zetterstedt): KS, vi.1988 (NMI).

SIMULIIDAE

Determined from Davies (1966).

Simulium (Eusimulium) aureum-group: BDW, vi-vii.1990 (NMI).

Simulium (Eusimulium) latipes-group: BDW: vi-vii.1990 (NMI).

Simulium (Simulium) ornatum Meigen: BDW, vi-vii.1990 (NMI).

SPHAEROCERIDAE

Determined from Pitkin (1988) and Duda (1938). An Irish species list is incorporated into Pitkin (1988). See also Nash (1989) and

Bull. Ir. biogeoq. Soc. No. 14

Valentine et al. (1991).

Borborillus vitripennis (Meigen) = B. longipennis (Haliday):
BDW, bred from rotten birch, iv.1989.

Coproica ferruginata (Stenhammar): BDW, v-vi.1990, det. J.
Valentine (NMI).

Copromyza equina Fallén: Killougher Dunes, i.1988, det. J.
Valentine (NMI).

Copromyza similis (Collin): K dunes, i.1988.

Crumomyia fimetaria (Meigen): BDW, v.1990, det. J. Valentine;
BDW, bred from rotten birch, iii.1989; vi.1990; K, i.1988 (NMI).

Crumomyia nitida (Meigen): BDW, bred from rotten birch, iv.1989;
K, i.1988.

Crumomyia pedestris (Meigen): K, bred from beef bait, iii.1988;
K, i.1988.

Halidayina spinipennis (Haliday): BDW, vi.1990, det. J.
Valentine (NMI).

N Kimosina empirica (Hutton): BDW, bred from soil round birch,
iii-iv.1989; bred from pigeon, iii.1989; bred from crow,
iii.1989; K, bred from Phragmites stem bases, iv.1989
(Valentine et al., 1991) (NMI).

N Leptocera cryptochaeta (Duda): BDW, v.1989, coll. et det. P.
Withers; BDW, vi-vii.1990, det. J. Valentine (Valentine et al.,
1991) (NMI).

Leptocera fontinalis (Fallén): BDW, v.1989, coll. et det. P.
Withers; K, i.1988.

Leptocera fuscipennis (Haliday): BDW, bred from rotten birch,
iv.1989; bred from birch litter, iv.1989.

Leptocera lutosa (Stenhammar): BDW, v-vi.1990, det. J. Valentine
(NMI).

Limosina silvatica (Meigen): KMF, viii.1988.

Lotophila atra (Meigen): K, on sheep dung, viii.1988.

Minilimosina vitripennis (Zetterstedt): BDW, bred from soil at
birch base, iv.1989 (NMI).

Bull. Ir. biogeoq. Soc. No. 14

Opacifrons coxata (Stenhammar): BDW, v-vi.1990. det. J. Valentine (NMI); BDW, ii.1988; KS, vi.1988 (NMI).

Opacifrons humida (Haliday): BDW, v-vi.1990, det. J. Valentine (NMI).

Pullimosina moesta (Villeneuve): BDW, vi.1990, det. J. Valentine (NMI).

Spelobia baezi (Papp): BDW, bred from mud in waterhole under roots of prostrate birch, iv.1989 (NMI).

N Spelobia clunipes (Meigen): Killoughter Dunes, i.1988; BDW, v.1990, det. J. Valentine (NMI).

Spelobia luteilabris (Rondani): BDW, bred from crow, ix.1988.

N Spelobia nana (Rondani): K, bred from Phragmites dry stems, i.1988 (Valentine et al., 1991) (NMI).

N Spelobia palmata (Richards): BDW, v-vii.1990, det. J. Valentine (Valentine et al., 1991) (NMI).

N Spelobia talparum (Richards): BDW, v-vi.1990, det. J. Valentine (Valentine et al., 1991) (NMI).

N Telomerina flavipes (Meigen): BDW, bred from pigeon, iii.1989; bred from crow, iii.1989; K, bred from crow, v.1989 (Valentine et al., 1991) (NMI).

Thoracochaeta zosteræ (Haliday): BL, bred from wrack, v.1988.

STRATIOMYIDAE

Determined from Roskòсны (1982, 1983). Chandler (1975) reviews the Irish species. See also Speight (1981b).

Beris chalybata (Förster): BDW, bred from birch litter, v.1989, det. MCDS; vi.1990, det. MCDS.

Beris fuscipes Meigen: BDW, vii.1989, det. MCDS.

Beris vallata (Förster): K, bred from Phragmites stem bases, v-vi.1989; BDW, vii.1978, coll. et det. MdeCW.

Chloromyia formosa (Scopoli): BDW, vii.1978, coll. et det. MdeCW.

Microchrysa cyaneiventris (Zetterstedt): BDW, vii.1989, det.

Bull. Ir. biogeog. Soc. No. 14

MCDS; vii.1978, coll. et det. MdeCW.

Microchrysa flavicornis (Meigen): BDW, vii.1978, coll. et det. MdeCW; BDW, vi-vii.1990, det. MCDS.

Microchrysa polita (L.): CW, bred from rotten potatoes, v.1988 (Blackith and Blackith, 1989).

Microchrysa splendens (Meigen): BDW, vii.1978, coll. et det. MdeCW.

Nemotelus notatus Zetterstedt: SMP, viii.1975, coll. et det. MCDS; BDW, vii-viii.1978, coll. et det. MdeCW.

Nemotelus uliginosus (L.): BDW, swept at ditch edge, vii.1989, coll. et det. MCDS; BDW, vii-viii.1978, coll. et det. MdeCW.

Oplodontha viridula (F.): BDW, vii-viii.1978, coll. et det. MdeCW.

Oxycera morrisii Curtis: BDW, vii.1978, coll. et det. MdeCW.

Oxycera nigricornis Olivier: BDW, vii.1978, coll. et det. MdeCW.

Oxycera pygmaea (Fallén): BDW, vii.1978, coll. et det. MdeCW.

Sargus iridatus (Scopoli): BDW, vii.1989, det. MCDS; vii.1978, coll. et det. MdeCW.

Stratiomys singularior (Harris): BDW, vii.1978, coll. et det. MdeCW.

SYRPHIDAE

Determined from Coe (1953) and van der Goot (1981); further possible additions to the Irish list have been specified by Speight (1988c); see also Speight et al. (1975) and Speight (1978b) for nomenclature.

Anasimyia lineata (F.): FMP, vii.1978, coll. MdeCW, det. MCDS.

Baccha elongata (F.): BDW, vi.1989; vii.1989, det. MCDS; v-vi.1990, det. MCDS.

Cheilosia albipila Meigen: FMP, v.1978, coll. MdeCW, det. MCDS.

Cheilosia albitarsis Meigen: FMP, v.1978, coll. et det. MCDS; BDW, v-vi.1990, det. MCDS.

Cheilosia bergenstammi Becker: FMP, v.1978, coll. MdeCW, det.

Bull. Ir. biogeoq. Soc. No. 14

MCDS.

Cheilosia impressa Loew: FMP, viii.1978, coll. MdeCW, det. MCDS; BDW, vii.1989, det. MCDS.

Cheilosia pagana (Meigen): FMP, viii.1978, coll. MdeCW, det. MCDS; BDW, vi-vii.1990, det. MCDS.

Cheilosia scutellata (Fallén): FMP, vi.1978, coll. MdeCW, det. MCDS.

Cheilosia vernalis (Fallén): FMP, viii.1978, coll. et det. MCDS.

Chrysogaster coemiteriorum (L.): FMP, vii.1978, coll. MdeCW, det. MCDS.

Chrysogaster solstitialis (Fallén): BDW, vii.1989, det. MCDS.

Chrysotoxum bicinctum (L.): FMP, vii.1978, coll. MdeCW, det. MCDS; BDW, vi.1989, det. MCDS.

Epistrophe eligans (Harris): FMP, v.1978, coll. MdeCW, det. MCDS.

Episyrphus balteatus (DeGeer): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS; BDW, v-vii.1990, det. MCDS.

Eristalinus sepulchralis (L.): BDW, swept at ditch edge, vii.1989, coll. et det. MCDS.

Eristalis abusivus Collin: BR, viii.1971, coll. et det. MCDS.

Eristalis arbustorum (L.): BR, viii.1971, coll. et det. MCDS; CW, bred from rotten potatoes, iv.1988 (Blackith and Blackith, 1989).

Eristalis interrupta (Poda): FMP, v.1978, coll. MdeCW, det. MCDS.

Eristalis intricarius (L.): FMP, vii.1978, coll. MdeCW, det. MCDS.

Eristalis pertinax (Scopoli): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS; BDW, v-vii.1990, det. MCDS.

Eristalis tenax (L.): SMP, ix.1968, coll. P. J. Chandler, det. MCDS.

Eumerus strigatus (Fallén): SMP, viii.1975, coll. et det. MCDS.

Eupeodes corollae (F.): BDW, vii.1989, det. MCDS; BDW, vi.1990, det. MCDS.

Eupeodes latifasciatus (Macquart): SMP, viii.1975, coll. et det.

Bull. Ir. biogeoq. Soc. No. 14

MCDS.

Eupeodes luniger (Meigen): BR, viii.1971, coll. et det. MCDS.

Helophilus hybridus Loew: BDW, swept at ditch edge, vii.1989, coll. et det. MCDS.

Helophilus pendulus (L.): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS; BDW, v-vii.1990, det. MCDS.

Lejogaster metallina (F.): FMP, viii.1987, coll. et det. MCDS; BR, viii.1979, coll. MdeCW, det. MCDS.

Leucozona lucorum (L.): FMP, vii.1978, coll. MdeCW, det. MCDS; BDW, vi.1989, det. MCDS; v-vi.1990, det. MCDS.

Melanqyna arctica (Zetterstedt): BDW, vi-vii.1990, det. MCDS.

Melanqyna lasiophthalma (Zetterstedt): BDW, iv-v.1990, det. MCDS.

Melanostoma mellinum (L.): FMP, vi.1979, coll. MdeCW, det. MCDS; BDW, vi.1990, det. MCDS.

Melanostoma scalare (F.): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS; v-vi.1990, det. MCDS.

Meliscaeva auricollis (Meigen): BDW, vi-vii.1990, det. MCDS.

Myathropa florea (L.): BDW, vi.1989, det. MCDS.

Neoscia podagrica (F.): FMP, viii.1979, coll. MdeCW, det. MCDS.

Neoscia tenur (Harris): SMP, viii.1975, coll. et det. MCDS.

Orthonevra splendens (Meigen): FMP, vii.1978, coll. MdeCW, det. MCDS.

Paragus haemorrhous Meigen: FMP, vii.1978, coll. et det. MCDS.

Parhelophilus versicolor (F.): BR, vii.1918, coll. J. N. Halbert, det. MCDS.

Platycheirus angustatus (Zetterstedt): BDW, vi.1989, det. MCDS.

Platycheirus albimanus (F.): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS; BDW, iii-vii.1990, det. MCDS.

Platycheirus clypeatus (Meigen): BDW, vi.1989, det. MCDS; vi.1990, det. MCDS.

Platycheirus fulviventris (Macquart): BDW, vii.1989, det. MCDS.

Platycheirus granditarsus (Förster): FMP, vii.1978, coll. MdeCW, det. MCDS.

Bull. Ir. biogeog. Soc. No. 14

Platycheirus manicatus (Meigen): BR, vii.1971, coll. et det. MCDS.

Platycheirus occultus Goeldlin, Maibach and Speight: FMP, vii.1978, coll. MdeCW, det. MCDS.

Platycheirus peltatus (Meigen): BDW, vi.1990, det. MCDS.

Platycheirus rosarum (F.): FMP, vii.1978, coll. MdeCW, det. MCDS.

Platycheirus scutatus (Meigen): BDW, vi.1989, det. MCDS; vii.1989, det. MCDS.

Rhingia campestris Meigen: FMP, v.1978, coll. MdeCW, det. MCDS; vi.1989, vi.1990, det. MCDS.

Scaeva pyrastris (L.): FMP, vii.1976, coll. MdeCW, det. MCDS.

Sericomyia silentis (Harris): BDW, vi.1989, det. MCDS.

Sphaerophoria interrupta (F.): FMP, v.1978, coll. et det. MCDS.

Sphegina clunipes (Fallén): BDW, vi.1989, det. MCDS; BDW, vi-vii.1990, det. MCDS.

Sphegina elegans Schummel: BDW, vi-vii.1990, det. MCDS.

Svritta pipiens (L.): CW, bred from rotting potatoes, v.1988, det. MCDS (Blackith and Blackith, 1989).

Syrphus ribesii (L.): BDW, vi.1989, det. MCDS; v-vii.1990, det. MCDS.

Syrphus vitripennis Meigen: BDW, vi-vii.1990, det. MCDS.

Trichopsomyia flavitarse (Meigen): FMP, v.1978, coll. MdeCW, det. MCDS.

Tropidia scita (Harris): BDW, vii.1989, det. MCDS; vi-vii.1990, det. MCDS.

Xylota seqnis (L.): CW, bred from rotting potatoes, v.1988, det. MCDS (Blackith and Blackith, 1989); vi.1990, det. MCDS.

TABANIDAE

Determined from Oldroyd (1969) and Chvála et al. (1972); see also Chandler (1975) and Irwin (1977).

Chrysops relictus Meigen: CW, vi.1988; KMF, vi.1988.

Bull. Ir. bioqeoq. Soc. No. 14

Haematopota pluvialis (L.): BDW, ix.1989; vii.1978, coll. et det. MdeCW; KMF, vii.1988.

TACHINIDAE

Determined from van Emden (1954) and Mesnil (1965-1979); a check-list of known Irish species was published by Nash (1979b).

Actia crassicornis (Meigen): BDW, vii.1989.

N Blondelia nigripes (Fallén): BL, vii.1986 (NMI).

Epicamocera succincta (Meigen): BDW, v.1990 (NMI).

Eriothrix rufomaculata var. monochaeta Wainwright: BDW, viii.1986; FMP, viii.1987; BL, viii.1987 (NMI).

Eurithia connivens (Zetterstedt): BDW, vii.1989.

Exorista larvarum (L.): KMF, vii.1988.

Gymnocheta viridis (Fallén): BL, v.1988; BDW, v.1989.

Lydella stabulans (Meigen): SMP, vii.1987.

Macquartia dispar (Fallén): BR, v.1988; BDW, vii.1989.

N Medina luctuosa (Meigen): BDW, bred from rotten birch, v.1988; BDW, vi.1989; vii.1989; v.1990 (NMI).

Phebellia qlirina (Rondani): BDW, vii.1989.

Phryxe nemea (Meigen): BDW, v.1990.

Policheta unicolor (Fallén): BL, ix.1987; K marigolds, vi.1988.

Siphona sp.: BDW, vii.1988.

Thelaira nigripes (F.): SMP, vii.1987 (NMI).

Triarthria spinipennis (Meigen): BL, bred from puparia in stems of Heraclium, iv.1988 (NMI).

N Voria ruralis (Fallén): BDW, xi.1989.

TEPHRITIDAE

Determined from White (1988); a preliminary list of the 24 known Irish species is given by Chandler and Speight (1982); see also Chandler (1987d).

Mvoleja caesio (Harris): BDW, vii.1989, det. MCDS.

Bull. Ir. biogeog. Soc. No. 14

Paroxyna plantaginis (Haliday): SMP, vii.1988, coll. et det. MdeCW.

Tephritis bardanae (Schrank): BDW, vii.1989.

Tephritis vespertina (Loew): BDW, v.1979, coll. et det. MdeCW.

N Terellia ruficauda (F.): BDW, vii.1978, coll. et det. MdeCW.

Xyphosia miliaria (Schrank): BDW, vii.1978, coll. et det. MdeCW.

TIPULIDAE

Determined from Coe, Freeman and Mattingly (1950) and Mannheims and Theowald (1951-1980). See also Speight (1975).

Dictinedia bimaculata (L.): BDW, bred from woodland litter, v.1988 (cf. O'Connor and Speight, 1987).

Nephrotoma flavipalpis (Meigen): KMF, v.1988.

Nephrotoma quadrifaria (Meigen): BDW, vi.1988; KMF, vi.1988.

Tipula (Acutipula) fulvipennis DeGeer: BDW, vi-ix.1988.

Tipula (Acutipula) luna Westhoff: BDW, vi.1988; KMF, iv-vi.1988; CW, iv.1988; K, bred from Phragmites stem bases, iv.1989.

Tipula (Beringotipula) unca Wiedemann: BDW, vi.1988; KMF, x.1988.

Tipula (Lunatipula) fascipennis Meigen: BDW, vi.1988; KMF, vi.1988; CW, vi.1988.

Tipula (Lunatipula) lunata L.: BDW, bred from rotten birch, v.1989.

Tipula (Savtschenkia) marmorata Meigen: CW, vii.1988.

Tipula (Savtschenkia) obsoleta Meigen: BDW, xi.1989.

Tipula (Savtschenkia) staeqeri Nielsen: BDW, x.1988; KMF, x.1988.

Tipula (Tipula) oleracea L.: ubiquitous, annual.

Tipula (Tipula) paludosa Meigen: BDW, vi-ix.1988.

Tipula (Vestiplex) scripta Meigen: BDW, vi-viii.1988; vii.1989; bred from birch litter, vii.1989.

Tipula (Yamatotipula) montium Egger: BDW, bred from rotten birch, v.1989.

Bull. Ir. biogeoq. Soc. No. 14

TRICHCERIDAE

The Irish trichocerid fauna of 6 species has been reviewed by Ashe and O'Connor (1989).

Trichocera annulata Meigen: BDW, x.1988; KMF, x.1988.

Trichocera hiemalis (DeGeer): K, i.1988.

Trichocera major Edwards: K, bred from Phragmites stem bases, ii.1988.

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Bull. Ir. biogeog. Soc. No. 14

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Bull. Ir. biogeog. Soc. No. 14

APPENDIX 1: the dipteran families surveyed on the Murrough which are sufficiently well-known in Ireland for their Irish species to have been reviewed.

Families for which a review of the Irish fauna has been carried out largely or entirely by specialists resident in Ireland are indicated by an asterisk *. The number of species known in Ireland prior to the Murrough survey (column 2) is derived from Ashe et al. (1988) except where species have been added to the Irish list subsequent to that publication, as in the Dolichopodidae, or where an Irish species list became available subsequent to Ashe et al., as for the Psychodidae.

Family	No. spp. in Ireland prior to Murrough survey	No. spp. in Murrough survey	Spp. new to Ireland in Murrough survey
Anisopodidae *	5	2	0
Asilidae *	3	1	0
Bibionidae *	13	6	0
Bombyliidae *	4	1	0
Clusiidae	5	4	0
Conopidae	12	1	0
Diastatidae	4	2	0
Dixiidae *	11	2	0
Dolichopodidae	147	57	4
Empididae	97	32	1
Fanniidae *	24	19	2
Hybotidae	71	27	2
Limoniidae	90	33	1
Lonchaeidae	9	1	0
Microphoridae	2	1	0

Bull. Ir. biogeog. Soc. No. 14

APPENDIX 1 (cont.)

Family	No. spp. in Ireland prior to Murrough survey	No. spp. in Murrough survey	Spp. new to Ireland in Murrough survey
Muscidae *	165	68	0
Otitidae *	6	4	0
Palloppteridae *	10	7	0
Platypezidae	16	2	1
Psilidae *	19	5	0
Psychodidae	41	23	2
Ptychopteridae *	6	1	0
Rhagionidae	10	4	0
Rhinophoridae	3	1	0
Scathophagidae *	31	13	0
Scatopsidae *	15	5	1
Sciomyzidae *	49	27	2
Sepsidae	18	6	0
Sphaeroceridae	26	27	5
Stratiomyiidae	31	16	0
Syrphidae *	170	62	0
Tabanidae	10	2	0
Tachinidae *	60	17	3
Tephritidae *	25	6	1
<hr/>			
TOTALS	1208	485	25

The total Irish fauna for families included in this table = 1233

Bull. Ir. bioqoeq. Soc. No. 14

APPENDIX 2A: Syrphidae recorded from the Murrough showing for each species the number of 50 Km UTM squares from which it is known in Ireland and the type of environment in which it occurs in Ireland.

SPECIES	NUMBER OF RECORDS	ENVIRONMENTAL CATEGORY
<u>Anasimvia lineata</u>	33	w
<u>Baccha elongata</u>	31	p
<u>Cheilosia albipila</u>	9	f/w
<u>C. albitarsis</u>	42	p
<u>C. bergenstammi</u>	32	p
<u>C. impressa</u>	5	f/w
<u>C. pagana</u>	38	p
<u>C. scutellata</u>	8	f
<u>C. vernalis</u>	23	p
<u>Chrysogaster coemiteriorum</u>	27	w
<u>C. solstitialis</u>	31	f/w
<u>Chrysotoxum bicinctum</u>	39	p
<u>Epistrophe eligans</u>	30	p
<u>Episyrphus balteatus</u>	45	p
<u>Eristalinus sepulchralis</u>	38	p
<u>Eristalis abusivus</u>	31	w
<u>E. arbustorum</u>	46	p
<u>E. interrupta</u>	43	p
<u>E. intricarius</u>	43	p
<u>E. pertinax</u>	45	p
<u>E. tenax</u>	42	p
<u>Eumerus strigatus</u>	13	e
<u>Eupeodes corollae</u>	31	p
<u>E. latifasciatus</u>	33	w
<u>E. luniger</u>	26	p

Bull. Ir. biogeog. Soc. No. 14

APPENDIX 2A (cont.)

SPECIES	NUMBER OF RECORDS	ENVIRONMENTAL CATEGORY
<u>Helophilus hybridus</u>	35	p
<u>H. pendulus</u>	46	p
<u>Lejogaster metallina</u>	42	p
<u>Leucozona lucorum</u>	39	p
<u>Melanomyia arctica</u>	19	f
<u>M. lasiophthalma</u>	31	f
<u>Melanostoma mellinum</u>	44	p
<u>M. scalare</u>	45	p
<u>Meliscaeva auricollis</u>	17	f
<u>Mvarthrops florea</u>	37	p
<u>Neoascia podagrica</u>	44	p
<u>N. tenur</u>	36	p
<u>Orthonevra splendens</u>	25	w
<u>Paragus haemorrhous</u>	14	o
<u>Parhelophilus versicolor</u>	13	w
<u>Platycheirus albimanus</u>	46	p
<u>P. angustatus</u>	29	p
<u>P. clypeatus</u>	29	p
<u>P. fulviventris</u>	18	w
<u>P. granditarsus</u>	42	p
<u>P. manicatus</u>	39	p
<u>P. occultus</u>	14	w
<u>P. peltatus</u>	10	w
<u>P. rosarum</u>	35	p
<u>P. scutatus</u>	34	p
<u>Rhingia campestris</u>	46	p
<u>Scaeva pyrastris</u>	32	p
<u>Sericomyia silentis</u>	43	p
<u>Sphaerophoria interrupta</u>	28	p

Bull. Ir. bioogeog. Soc. No. 14

APPENDIX 2A (cont.)

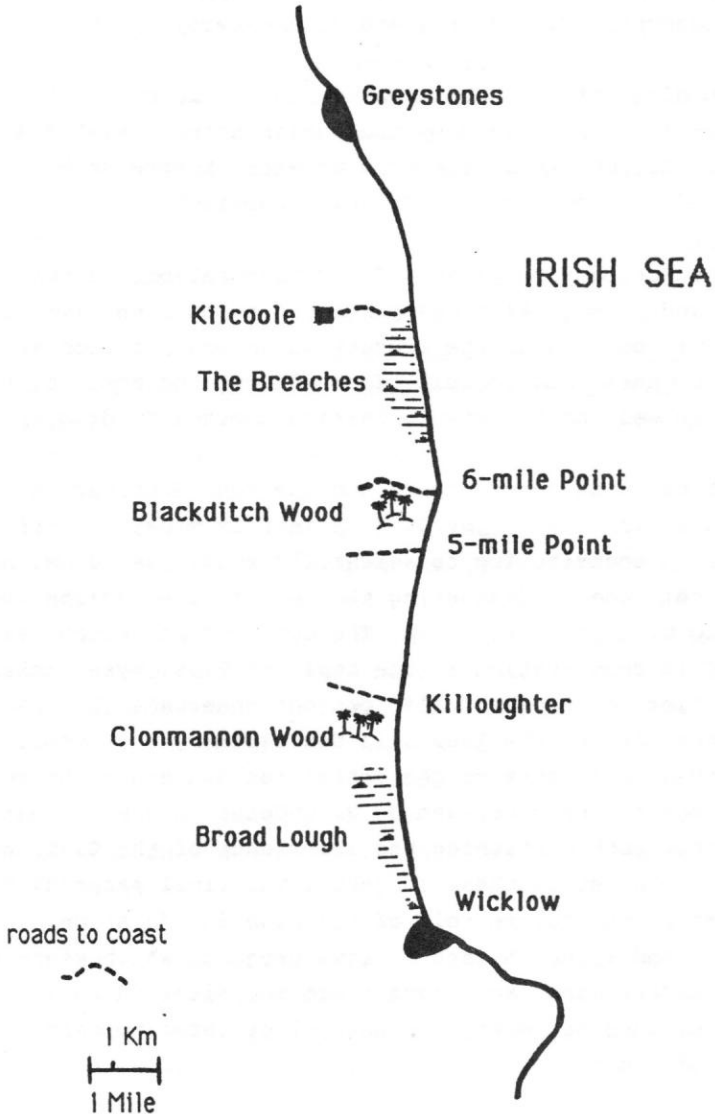
SPECIES	NUMBER OF RECORDS	ENVIRONMENTAL CATEGORY
<u>Sphegina clunipes</u>	31	f
<u>S. elegans</u>	7	f
<u>Syrpitta pipiens</u>	48	p
<u>Syrphus ribesii</u>	45	p
<u>S. vitripennis</u>	36	p
<u>Trichopsomyia flavitarse</u>	20	w
<u>Tropidia scaeta</u>	28	w
<u>Xylota segnis</u>	41	p

APPENDIX 2B: Syrphids generally distributed in Ireland but not recorded from the Murrough.

SPECIES	NUMBER OF RECORDS	ENVIRONMENTAL CATEGORY
<u>Cheilosia illustrata</u>	38	p
<u>Dasysyrphus albostrigatus</u>	35	f
<u>Eristalis horticola</u>	42	p
<u>Leucozona glaucia</u>	37	f
<u>Melanoqaster hirtella</u>	40	p
<u>Meliscaeva cinctella</u>	36	f
<u>Syrphus torvus</u>	34	f
<u>Volucella bombylans</u>	43	f/w
<u>V. pellucens</u>	37	f

Categories:- e = eurytopic; f = forest; f/w = forest/wetland; p = pasture; w = wetland; o = open ground.

FIGURE 1: sketch-map of the Murrough, Co. Wicklow showing collecting localities.



Bull. Ir. biogeog. Soc. No. 14 (1991)

BOOK REVIEWS

IN THE FIELD OF THE NATURALISTS.

P. S. Wyse Jackson, C. Moriarty and J. R. Akeroyd.

71pp. Proceedings of the Dublin Naturalists' Field Club Seminar, 27 September 1986. Published by the Dublin Naturalists' Field Club, 1989. IR£5.00. Available from Mr Patrick Wyse Jackson, Department of Geology, Trinity College, Dublin 2.

In 1986, the Dublin Naturalists' Field Club celebrated their centenary, and this booklet was published to mark the event. Indeed, it not only marks the success of an organization which has survived 100 years, but is full of the vigour and activity that show it to be well on the way to lasting another hundred.

The booklet contains seven papers and the Hon. Secretary's report for 1986. The first paper, by D. E. Allen, examines the role of the amateur in contributing to scientific knowledge. J. R. Akeroyd expands on this theme, discussing the role of field clubs and societies in biological research. The achieved and potential role of the DNFC in conservation is the topic of P. S. Wyse Jackson's paper. The flora of County Dublin project undertaken by the DNFC in the latter half of the 1980's is described by S. Reynolds. C. Moriarty gives an account of the activities and contribution of ornithologists to the club, and J. P. O'Connor likewise that of entomologists, both mentioning the importance of the Club in encouraging interest in these subjects. The final paper by D. Doogue looks at the future role of the Club in education, conservation and research, and reviews projects which might be worthwhile undertaking. Most papers are botanical in basis; the contributions on ornithology and entomology refer to past activities of the club.

Bull. Ir. biogeog. Soc. No. 14

Allen provides a stimulating and interesting paper, but the conflict between the amateur naturalist and professional biologists is somewhat overemphasized. ("Science as a profession finds much of its professionalism in being exclusive"; "Life offers few more exhilarating challenges than...beating the professional at his or her own game"). A closely related conflict, however, that of descriptive natural history vs. experimental natural philosophy, is not found wanting of mention either by Allen or Akeroyd. Natural history, according to Allen, is descriptive: "...theories come a poor second to the amassing of data - for its essence lies in capturing the pattern in nature, not in understanding how nature works". The attitude that natural history is "stamp-collecting", its publications "bed-time reading", and its ethos "Victorian", is held by many theoretical and experimental biologists partially because their interest is in understanding how nature works, in process rather than pattern. To them the apparent amassing of data for its own sake with no particular application in mind is not the method which advances their subject or provides them with grants. This attitude is, of course, unjustified, though "mindless square-bashing" and "rarity spotting" have not helped dispel such views. Well-organised systematic field recording does result in good science. An example is the Common Bird Census organised by the BTO in Great Britain. The well-organised and executed Flora of County Dublin project described in this publication by Reynolds is a further example of this - when completed it will be an important source of data for county planning. As Akeroyd points out, the amateur contribution to biological databases has vast potential. In particular, the systematic long-term recording at the same site provides very useful data out of reach of the short-term funding characteristic of much of biology.

The contributions, and particularly that by Doogue, pose many problems universal to field natural history organizations,

Bull. Ir. biogeog. Soc. No. 14

especially the balance between research, conservation and education (or is it entertainment?). It is good reading, and in places, not without humour. While it is a pity that there is no geological/geomorphological contribution, the booklet must be recommended to any one interested in natural history.

Jervis Good.

HEATHER IN ENGLAND AND WALES

R. T. Bunce (Editor)

40pp + 4pp colour illustrations. Institute of Terrestrial Ecology publication No. 3. Published by H.M.S.O., London, 1989. £5.90 Sterling. ISBN. 0-11-701422-2.

This slim book (A4 size) contains a report of research into the feasibility of mapping changes in the extent of heathlands in England and Wales by combining study of satellite photographs with field studies. It concludes with regional assessments of the decline in, and current threats to heathlands. A useful work, it is blighted by weak writing and poor editing.

Bradbury and his co-authors discuss the production of maps and the estimating of areas of heathland, and show that while Landsat TM imagery can be used to delimit heathland, it is impossible (without field work) to distinguish that dominated by heathers (Calluna vulgaris, and Erica spp.) from other types, particularly mountain heath dominated by crowberry (Empetrum nigrum) and bilberry (Vaccinium myrtillus). They provide useful data on the distribution of heathlands: for example, of the area of "heather" [sic.] in national parks in England and Wales. The regional

Bull. Ir. biogeog. Soc. No. 14

assessments have little direct relevance to Ireland, but grant insights into the status of heathlands in Britain south of Hadrian's Wall.

The value of this work lies in the discussion of methods of vegetation mapping and assessment. I was not impressed by the editing; confusion arising from the use and misuse of "heather" as a technical term is substantial and should have been corrected by the editor. For a scientific publication, the authors' failure to use botanical names when required instead of vernacular ones is regrettable. Furthermore the use of ordinary English is often woeful. This produces some hilarious results. "Assessment of the area of heather in England and Wales depends on the definition chosen" (Definition of what - the satellite photographs?). In some places "heather" is a single, usually nameless species ("As a species, heather occurs throughout Europe although it is less common in Mediterranean countries") and sometimes it becomes an entire ecosystem. The editor's own contribution contain non-sequiturs which are disgraceful and at times his paragraphs descend into pure gibberish. Having stated that in Norway and Scotland "it is a dominant species in its own right..." a few lines further on you can read what should become an immortal sentence: "The lowland heaths of southern Britain and northern Europe are thus anthropomorphic, and heather would probably have been restricted to exposed locations on sea cliffs".

I wait agog to see an anthropomorphic heather, or even an anthropomorphic heathland.

E. Charles Nelson.

Bull. Ir. Biogeog. Soc. No. 14

INSTRUCTIONS TO CONTRIBUTORS

1. Manuscripts should follow the format of articles in this Bulletin.
2. Manuscripts should be submitted as typed copy on A4 paper, using double-spacing and 2.5cm (1 inch) margins.
3. Figures should be submitted in a size suitable for reduction to A5 without any loss of detail.
4. Records: please ensure that, when possible, the following information is incorporated in each record included in a manuscript:-
 - (a) latin name of organism.
 - (b) statement of reference work used as the source of nomenclature employed in the text. The describer's name should be also given when a zoological species is first mentioned in the text.
 - (c) locality details including at least a four figure Irish grid reference (e.g. N3946), county, vice-county number and some ecological data about the collection site, plus date of capture.
 - (d) collector's name and determiner's name (where different from collector's name), and
 - (e) altitude data should be included where relevant.
- (5). Manuscripts should be submitted to the Editor, Dr J. P. O'Connor, at the following address:- National Museum of Ireland, Kildare Street, Dublin 2, IRELAND.

