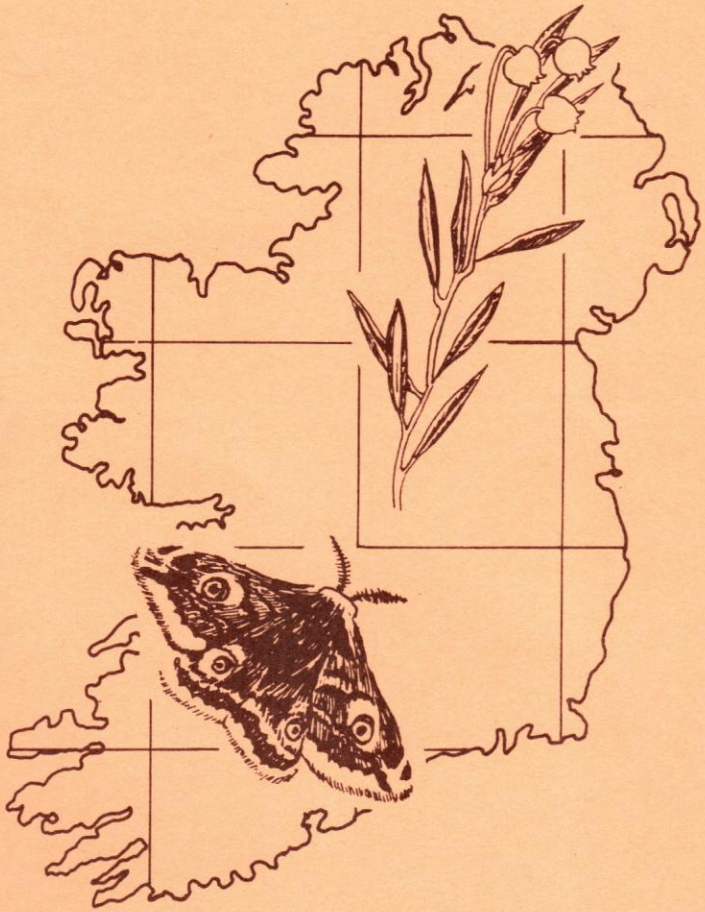
IRISH BIOGEOGRAPHICAL SOCIETY



Bulletin No. 10

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BULLETIN OF THE IRISH BIOGEOGRAPHICAL SOCIETY

Number 10

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CONTENTS (CONTD./...)

Bull. Ir. biogeog. Soc. No. 10.

EDITORIAL

The past twelve months have been a productive period for the Society's publications. With Bulletin No. 9, the Irish Biogeographical Society successfully changed its journal's page size from A4 to A5 and this new format has received much praise. During the year, our first occasional publication appeared viz. "Proceedings of The Postglacial Colonization Conference". It contains 96 pages of stimulating discussion on various aspects of the origin of the Irish flora and fauna. It will be essential reading for anyone interested in Irish biogeography. Further details concerning it will be found at the back of this Bulletin.

The Bulletin of the Irish Biogeographical Society first appeared ten years ago and in his editorial of March 1977, the Editor Dr. M. C. D. Speight remarked that "The fear has been voiced that we might compete with other journals for material for publication. That is not our intention". Nor did it happen. Instead over the last decade, the Bulletin successfully created its own niche and momentum and provided a means of publishing much valuable scientific data which otherwise might not have appeared. It is very appropriate therefore that this our tenth issue is also the largest which we have published. Bulletin No. 10 contains over 60 species new to Ireland, several of which are also new to the British Isles, and a wealth of distributional and other data on Irish plants and animals. It demonstrates the important role that the Society now plays in Irish Science.

On behalf of the Irish Biogeographical Society, I wish to thank all our authors for their most interesting contributions, our referees for their invaluable assistance and the members of the Editorial Sub-Committee and the General Committee for their enthusiastic help and encouragement. We are also deeply grateful to our sponsors for their generous support.

Manuscripts which authors wish to have considered for publication in Bulletin No. 11 should be submitted before 1st September 1987.

J. P. O'Connor
Editor

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NEW DATA ON IRISH FUNGUS GNATS (DIPTERA: MYCETOPHILOIDEA) INCLUDING 51 SPECIES NEW TO THE IRISH LIST.

P. J. Chandler

Since my preliminary list of the Irish fungus gnats (Chandler, 1976) appeared, each successive visit to Ireland has brought further additions. Without any intensive work on the group by resident collectors, increase in knowledge of the Irish fauna is likely to remain slow but the species composition of this mainly woodland oriented group is proving much richer than initially anticipated.

When I compiled the preliminary list I was able to record 165 species or about 40 per cent of the British fauna as then known (410). More recent contributions (Chandler, 1977a, 1978) brought the Irish list to 205 and one species was added by Chandler (1983). Additions to the list made here, bringing it to 257 mainly stem from the seven more recent brief collecting visits I have made to Ireland:-

3-7 October 1980	Wicklow
8 November 1980	Antrim
1-9 May 1981	Offaly, Kerry (2-8), Waterford
26-27 May 1984	Wicklow, Offaly
13 and 17 November 1984	Wicklow and Dublin respectively
10-17 June 1985	Sligo, Mayo, Westmeath, Offaly, Wicklow
10 and 12 November 1986	Wicklow, Antrim

The visit in November 1984 was especially interesting in view of the very large numbers of fungus gnats on the wing at this time of year in the Wicklow oak woodlands where 70 species were collected on 13th November, 54 of them at Glendalough alone. Indeed Glendalough (the woods adjacent to the lakes) continues to be the most productive of regularly visited localities, having now provided records of 126 species. My own collecting in Ireland has produced

During the printing of Bulletin No. 10, the bottom line of text was accidentally omitted from page 2 of P. J. Chandler's article on fungus gnats. The missing line reads "225 species and altogether 244 species have been collected since 1968. Some".

13 species from earlier times thus still await confirmation.

I have also been able to examine specimens taken in recent years by Dr. J. P. O'Connor (National Museum of Ireland, Dublin) and batches of material collected using malaise traps by Messrs. R. Nash and M. Boston of the Ulster Museum. In addition Dr. M. C. D. Speight has kindly made available some specimens collected by himself and Mr. M. de Courcy Williams in recent years which have added some interesting species to the Irish list. A re-assessment has also been made of the collections at Dublin and this has enabled some further corrections and additions to be made.

During the past decade knowledge of the British fauna of Mycetophiloidea has advanced rapidly. The first volume of the Royal Entomological Society Handbook (Hutson ET AL, 1980) has appeared and many species of Mycetophilinae, the group to be covered in the second volume, are continuing to be added to the British list. Including 35 species still awaiting formal addition, 483 species are now known to me from the British Isles. The Irish list now, nevertheless, exceeds 50 per cent of the enlarged British list and there is every prospect that the final list may be substantially higher.

As far as county lists are concerned, 172 species have now been seen from Wicklow, compared with 118 from Kerry but this may simply reflect the amount of effort given to the areas involved. Other county totals are presently below 100, e.g. 70 for Mayo, 67 for Down. Many counties have still hardly been collected. Records from Offaly stem from three brief visits in the spring to Charleville Woods, where 34 species have so far been recorded. Autumn collecting in the midland counties should add greatly to knowledge of the Irish gnats.

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Corrections and other comments on the published lists (Chandler, 1976, 1977a, 1978)

Orfelia (Neoplatyura) nigricauda (Strobl)

The female labelled discoloria (green label) and 'Ireland', 'Haliday' (NMI) mentioned under discoloria as being a Neoplatyura species (Chandler, 1976) has now been determined as N. nigricauda. This is new to Ireland. It is occasional but widespread in Britain.

Orfelia (O.) nemoralis (Meigen)

The female labelled 'Killina' (NMI) mentioned under Antlemon servulum is O. nemoralis. Asdscull Mote is thus the only known locality for A. servulum in Ireland, but it must be more widespread.

Macrocera aterrima Stackelberg

The Irish record was possibly based on a small female of M. vittata Meigen and it is considered desirable to delete this species from the Irish list.

Mycomya fimbriata (Meigen)

The two females labelled cingulata under M. trilineata (NMI) (Chandler, 1976) have now been determined as fimbriata but as they are unlocalised do not affect the known Irish distribution of either species.

Boletina nasuta (Haliday)

A further male of nasuta, which had been on public display, has now been returned to the series in Haliday's collection (NMI). Matile (1983) discussed this species and indicated that a lectotype designation was necessary. The male labelled 'Ireland' and 'Haliday' is here designated Lectotype. I am not aware that B. nasuta has been collected in the British Isles since the male

I took at Glenariff (D 2120) in 1970.

Leia bimaculata Meigen and Leia bifasciata Gimmerthal

No Irish specimens of these species have yet come to light. The 'English' female of bimaculata mentioned (1976) is confirmed as correctly named but a 'British' male labelled 'bimaculata var. fasciola' has now been found in Haliday's collection. This last specimen has proved to be bifasciata, but does not help to confirm the identity of the lost Irish specimens referred to bifasciata by Haliday.

Docosia gilvipes (Walker)

As indicated (1978: 228) the pair in Haliday's collection labelled 'Ireland' and 'Haliday', which had been placed under sciarina, probably by Edwards, are the probable type specimens of gilvipes. The male is here designated Lectotype.

Brevicornu (B.) species

The Haliday specimens of this sub-genus were not mentioned (1976). They include 4 males of B. sericoma (Meigen), two labelled 'Ireland' and one labelled 'British', one male of B. griseicolle (Staeger) which is unlocalised and two indeterminate females labelled 'Ireland'.

Cordyla species.

The Haliday material of this genus mentioned under crassicornis Meigen and fasciata Meigen was found to be in need of revision. The series under crassicornis (all bearing numbers from Edwards' identification list which is lost) was dissected and found to comprise no less than five species, three of them not hitherto recorded from Ireland. The two specimens labelled as females of fasciata have also been dissected and proved to be males of

flaviceps (Staeger). None of these specimens was labelled with locality so do not add anything to knowledge of the distribution of the genus in Ireland.

Cordyla crassicornis Meigen

Two males labelled 'Ireland', 'Haliday' (Edwards 161 and 203) and one male labelled 'Haliday' (Edwards 124) are correctly placed as crassicornis.

Cordyla brevicornis (Staeger)

Two males, labelled 'Ireland' and 'Haliday' (Edwards 193 and 194) are this species.

Cordyla pusilla Edwards

One male labelled 'Ireland', 'Haliday' and 'crassicornis' (Edwards 163). New to the Irish list.

Cordyla fusca Meigen

One female labelled 'Haliday' and 'crassicornis' (Edwards 93) is C. fusca so this species recorded by Haliday (1833) can be reinstated as Irish. A male labelled 'Ireland' and 'Haliday' (Edwards 164) lacks the abdomen but is probably fusca.

Cordyla insons Lastovka & Matile

One male labelled 'Ireland' and 'Haliday' (Edwards 204). New to Ireland This species, described from Mongolian types, was recently discovered in the Scottish Highlands (Rothiemurchus and Loch Garten) during a Diptera Recording Meeting in 1982 so its hitherto overlooked occurrence in Ireland is of some interest.

Phronia signata Winnertz

This species was recorded as Irish (1978: 230) but due to a printing error it was incorrectly cited as strenua Winnertz. The second citation under that name in fact refers to signata.

Mycetophila ruficollis Group

Available Irish material of this Group was assigned to ichneumonea Say and britannica Lastovka & Kidd (Chandler, 1977a: 14). The National Museum material has now been re-examined and it can be stated that the Santry (O 14) male and 2 ♂, 1 ♀ labelled 'Ireland' and 'Haliday' (the female also labelled biusta) are britannica. One British female in Haliday's collection is ichneumonea.

Additions to the Irish List.

Symmerus annulatus (Meigen)

This is being added in a note on Diptera new to Ireland from Charleville Woods, Co. Offaly, N 3122 (Chandler, in press).

Bolitophila pseudohybrida Landrock

Antrim: Glenariff, D 2120 8.xi.80; Wicklow: Avoca Wood, T 1979, 10.xi.86 (PJC). Not infrequent in Britain.

Asindulum nigrum Latreille

Westmeath: Scragh Bog, N 4259, 27.vii.82, ♂ at umbel flowers on floating fen (MCDS); others were seen at umbels on the same occasion.

This is a scarce species, apparently confined in Britain to the fens of East Anglia and the Somerset Levels and has not been collected in Britain since 1944. Its presence at Scragh Bog is thus of considerable interest. Like

Macrorrhyncha flava Winnertz, which has been placed in the same genus, it has a long proboscis used to probe flowers on which it has usually been found. It is larger than M. flava and entirely dark in colour.

Monocentrota lundstroemi (Landrock)

Westmeath: Lough Ballynafid, open shore, N 4160, 16.vi.85 ♀ (PJC).

Widespread in Britain but more often taken at light traps than by diurnal collecting.

Neoplatyura nigricauda (Strobl)

See above.

Mycomya tenuis (Walker)

Wicklow: Knocksink Wood, O 2117, 5.x.80, ♂; Glendalough, T 1196, 10.vi.85, 3 ♂ (PJC).

Originally recorded on females (Chandler, 1976), it was later withdrawn from the Irish list when a male of sigma Johannsen (=duplicata Edwards) was recorded. It can now be reinstated. Frequent in Britain.

Mycomya tumida (Winnertz)

Wicklow: Glendalough, T 1196, 3.x.80, ♂; Devil's Glen, T 2498, 10.vi.85, ♂; Kerry: Derrycunihy, V 9181, 7.v.81, ♂(PJC).

Frequent in Britain.

Sciophila geniculata Zetterstedt

Galway:L 7761, 1000', 4.vii.79, 2♂ (D.N. Dowling and M. de C. Williams respectively)

Cork: Kenmare/Glengarriff road, V 9059, 10 vii, 85. ♂♀ (J.P. O'Connor)

A little known species; originally recorded as British from the Isle of Arran but recently collected at a few old woodland localities in southern England. Its fungus host is unknown but is probably one of the Polyporaceae.

Dziedzickia marginata (Dziedzicki)

Wicklow: Avoca Wood, T 1979, 10.xi.86, ♂ (PJC)

A rather scarce and local northern and western species in Britain.

Leia subfasciata (Meigen)

Wicklow: Glandalough, south shore of Upper Lake, T 1196, 10.vi.85, ♂ (PJC)

A widespread but rather local species in Britain.

Docosia fumosa Edwards

Tyrone: Moy, N 8356, 8-14.x.1984, ♀, malaise trap (M. Boston).

Rarely recorded other than by rearing from bird's nests but apparently widespread and probably frequent in Britain. Now both Docosia with known larval habits, this and fungus feeding D. gilvipes, have been found in Ireland, while the more typical members of the genus, found mainly around moss and lichen covered tree trunks but of unknown life history, remain to be discovered. A special search was made in the Killarney area in May 1981 but without success.

Anatella alpina Plassmann

Wicklow: Glendalough, T 1396, 10.xi.86, ♂ (PJC).

New to the British Isles. Described by Plassmann (1977b) from the Allgau in the German Alps. A small entirely dark coloured gnat.

Anatella ankeli Plassmann

Wicklow: Enniskerry, O 2216, 10.xi.86, 2♂ (PJC).

This species, also described from the Allgau by Plassmann (1977a), was first found in Britain only in October 1986, at Cogley Wood, Somerset by A. E. Stubbs and is yet to be added to the British list. The Irish and British localities were rather similar, deep shaded gulleys in mixed deciduous woods.

Anatella flavomaculata Edwards

Monaghan: Carrickmacross, H 80, 9.vi.77, ♂, mixed woods (J. H. Cole);

Wicklow: Derrybawn, T 1495, 3.x.80, ♂, oakwood (PJC).

Frequent in Britain.

Anatella lenis (Dziedzicki)

Wicklow: Glendalough, T 1196, 13.xi.84, ♂ (PJC).

Although only recently added to the British list (Chandler, 1977b) on a specimen from Monk's Wood, Cambs., it has since been found in scattered localities in southern England (Devon, Hants., Worcs. and Gloucs.).

Anatella minuta (Staeger)

Mayo: Louisburgh, field below Old Head Hotel, L 8382, 14.vi.85, ♂ (PJC).

Widespread in Britain.

Anatella simpatica Dziedzicki

Wicklow: Devil's Glen, T 2498, 10.vi.85, ♂ by wooded stream (PJC).

Frequent and widespread in Britain.

Anatella turi Dziedzicki

Wicklow: Glendalough, T 1396, 10.xi.86, ♂ (PJC).

Widespread but occasional in Britain.

Pseudorymosia fovea (Dziedzicki)

Wicklow: Knocksink Wood, O 2117, 5.x.80, ♀ (PJC).

A few scattered localities in Britain, mainly in the north and west.

Tarnania dziedzickii (Edwards)

Wicklow: Glendalough, T 1196, 13.xi.84, ♂ in oakwood (PJC) .

Although one of the commonest species found frequenting caves in southern Europe, British records are few, all in Gloucs. and Somerset, including caves both at Symond's Yat and in the Mendips.

Exechia confinis Winnertz

Wicklow: Glendalough, T 1196, 3.x.80, ♂ (PJC).

Occasional in hilly areas in Britain, easily overlooked among the very common E. fusca (Meigen).

Exechia frigida (Boheman)

Wicklow: Glendalough, T 1396, 10.xi.86, ♂ (PJC).

Frequent but mainly in the north and west in Britain.

Exechia nigroscutellata Landrock

Antrim: Glendun, D 1626, 8.xi.80, ♂ (PJC).

Fairly common in Britain.

Exechia pseudocincta Strobl

Wicklow: Derrybawn, T 1495, 13.xi.84, ♂; Glendalough, T 1196, 13.xi.84, ♂ (PJC).

Widespread in Britain although less frequently encountered than its relatives nigroscutellata and the very common contaminata Winnertz.

Exechia repanda Johannsen

Tyrone: Moy, N 8356, 8-14.x.84, ♂, malaise trap (M. Boston).

Relatively few recent British records of this species but quite widespread; E. repandoides Caspers has recently been separated and some British records refer to that species.

Allodia (sensu stricto) pyxidiiformis Zaitzev

Wicklow: Devil's Glen, T 2498, 10.vi.85, ♂; Glendalough, T 1196, 10.vi.85, ♂; Glen of the Downs, O 2611, 5.x.80, ♂; Avondale Forest Park, T 1986, 4.x.80, ♂ (PJC). Kerry: Muckross House, beechwoods, V 9685, 5.v.81, ♂.

Recently separated from A. ornaticollis (Meigen), with which it had been confused in most collections. Both are common. Among Irish material, ornaticollis can be confirmed from Tyrone, Kerry, Mayo and several localities in Wicklow.

Allodia (Brachycampta) alternans (Zetterstedt)

Wicklow: Glendalough, T 1196, 10.vi.85, ♂; Devil's Glen, T 2498, 10.vi.85, ♂ (PJC).

Frequent and widespread in Britain.

Allodia (Brachycampta) neglecta Edwards

Offaly: Charleville Woods, N 3122, 15.vi.85, ♂ (PJC).

Rather local in England and Wales.

Brevicornu (sensu stricto) auriculatum (Edwards)

Kerry: Monk's Wood, Muckross, V 9686, 8.v.81, ♂; Wicklow: Glendalough, T 1396, 10.xi.86 ♂.

Not well known in Britain but apparently widespread.

Brevicornu (sensu stricto) proximum (Staeger)

Tyrone: Moy, N 8356, 8-14.x.84, ♂, malaise trap (M. Boston).

Rather scarce and not recently recorded in Britain.

Brevicornu (sensu stricto) serenum (Winnertz)

Wicklow: Glendalough, T 1196, 10.vi.85, 2 ♂, oakwood on south shore of Upper Lake (PJC).

Since added to the British list from Kent (Chandler, 1975) it has been found on

a few occasions in the New Forest and north Wales.

Brevicornu (sensu stricto) verralli (Edwards)

Wicklow: Avondale Forest Park, T 1986, 13.vi.84, ♂ (PJC).

Probably frequent at least in the south in Britain.

Cordyla fusca Meigen

See above.

Cordyla insons Lastovka & Matile

See above.

Cordyla pusilla Edwards

See above; Tyrone: N 8356, 8-21.x. and 29.x. 18.xi.84, altogether 25 ♂, malaise trap (M. Boston).

Not often recorded in Britain but probably overlooked.

Trichonta clavigera Lundstrom

Kerry: south shore of Muckross Lake, V 9485, 8.v.81, ♂ (PJC).

A recent addition to the British list (Gagne, 1981) and the several records are all from old forests in the south.

Trichonta falcata Lundstrom

Wicklow: Glendalough, oakwood on south shore of Upper Lake, T 1196, 10.vi.85, ♂; east end of valley, T 1396, 10.xi.86 ♂ (PJC).

Frequent in Britain.

Trichonta fragilis Gagne

Wicklow: Glen of the Downs, O 2611, 5.x.80, ♂ (PJC).

Currently being added to the British list (Chandler, in press) on the basis of several widely scattered records.

Trichonta terminalis (Walker)

Wicklow: Glendalough, T 1196, 10.vi.85, ♂ (PJC). Tyrone: Moy, N 8356, 5-11.xi.84, ♂, malaise trap (M. Boston).

Frequent in Britain.

Phronia egregia Dziedzicki

Antrim: Glendun, D 1626, 8.xi.80, ♂ (PJC).

Currently being added to the British list (Chandler, in press) on records from several well wooded districts of England and Wales.

Phronia flavipes Winnertz

Wicklow: Glendalough, T 1196, 10.vi.85, ♂; Kerry: Monk's Wood, Muckross, V 9686, 4.v.81, ♂ (PJC).

Common in Britain.

Phronia notata Dziedzicki

Tyrone: Moy, N 8356, 16 -21.x.84, ♂, malaise trap (M. Boston).

Wicklow: Enniskerry, O 2216, 10.xi.86, ♂ (PJC).

Frequent but rather local in Britain.

Mycetophila abiecta Lastovka

Wicklow: Glendalough, east end of valley, T 1396, 10.xi.86, ♀ (PJC);

Cavan: Virginia Woods, N 5987, 22.ix.85, ♀ (J. P. O'Connor).

One of the species confused under vittipes Zetterstedt until Lastovka's revision (1963). The British species are to be fully discussed in a paper under preparation. M. abiecta is a widespread but local species, much less common than vittipes itself.

Mycetophila adumbrata Mik

Down: Newcastle, J 33, 1.vii.1912, ♀ (J. J. F. X. King, Glasgow Univ. Mus.); Kerry: south shore of Muckross Lake, V 9485, 8.v.81, ♂; Ross Island, V 9488, 7.v.81, ♂ (PJC).

Uncommon but widespread in Britain.

Mycetophila dentata Lundstrom

Wicklow: Glendalough, T 1196, 13.xi.84, ♂ (PJC).

Rather local but widespread in Britain.

Mycetophila edwardsi Lundstrom

Wicklow: Avondale Forest Park, T 1986, 4.x.80, ♂; Offaly: Charleville woods, N 3122, 27.v.84, ♂ (PJC).

Common in Britain, rather surprising that it has not been recorded in Ireland before.

Mycetophila semifusca Meigen

Mayo: Lough Conn, woods on shore, G 1904, 13.vi.85, ♂ (PJC).

Usually found singly but quite widespread in Britain.

Mycetophila sumavica (Lastovka)

Wicklow: Glendalough, near waterfall, T 1196, 3.x.80, ♂; Devil's Glen, vi.75, ♀; Offaly: Charleville Woods, N 3122, 15.vi.85, ♂; Kerry: Dromore forest, 15.x.73, ♀ (PJC).

Another species of the vittipes group, very close to abiecta. Both species are widespread in Britain but yet to be added to the British list.

Mycetophila unipunctata Meigen

Wicklow: Derrybawn, T 1485; Glendalough, T 1196; Devil's Glen, T 2498;

Enniskerry, O 2216; Antrim: Glenariff, D 2120; Glenarm, J 3114; Westmeath: Lough Ballynafid carr, N 4160; Kerry: Muckross Lake, south shore, V 9485. Dates in v, vi, xi.

Common in Britain but Irish records only from 1980 onwards.

Sceptonia membranacea Edwards

Tyrone: Moy, N 8356, 19-25.xi.84, ♂, malaise trap (M. Boston); Wicklow: Avoca Wood, T 1979, 10.xi.86, ♂ (PJC).

Probably frequent in Britain; it usually requires dissection to separate it from the commoner S. nigra (Meigen).

Cordyla murina Group species B of Lastovka MS

The Glendalough male recorded by Chandler (1976) was determined by Petr Lastovka as belonging to a second British species of the murina complex, to which insons Lastovka & Matile, now recorded from the British Isles, also belongs. More recently collected Irish material of the complex has yet to be evaluated but most appear to belong to the common species A of Lastovka.

New records of other notable species and other comments.

Bolitophila occlusa Edwards

Kerry: Torc Cascade, V 9684; Monk's Wood, V 9686; Wicklow: Devil's Glen, T 2498; Knocksink Wood, O 2117.

Bolitophila spinigera Edwards

The Cork locality (Chandler, 1976) was incorrect; it should have been Kerry: Dromore Forest (on same date). New records: Kerry: Killarney, Ross Island, V 9488; Wicklow: Glendalough, T 1196; Woodenbridge, T 1877; Dublin: Malahide, O 2245.

Neoplatyura flava (Macquart)

Cork: Glengarriff, V 9057, 7.vii.85, ♀ (J. P. & M. O'Connor).

Orfelia pallida (Staeger)

Cork: Glengarriff, V 9057, 6.vii.85, ♂ (J. P. O'Connor).

Macrocera lutea Meigen

Kerry: Monk's Wood, 5.v.81 (PJC); Down: Newcastle, 1.vii.1912 (King, Glasgow Mus.).

Macrocera phalerata Meigen

Down: Newcastle, J 33, 1.vii.1912, ♀; Wexford: Wexford, T 02, 5.vii.1902, ♀ (King, Glasgow Mus.).

Macrorrhyncha flava Winnertz

Kerry: Kenmare, V 97, 16.vii.1902, ♀; Down: Newcastle, J 33, 13.vii.1912, ♀ (King, Glasgow Mus.).

Mycomya circumdata (Saeger)

Kerry: Muckross, V 9686; Wicklow: Devil's Glen, T 2498; Avondale Forest Park, T 1986.

Mycomya parva (Dziedzicki)

Kerry: Muckross House grounds, beechwood, V 9685, 5.v.81, ♂ (PJC).

Allocotocera pulchella (Curtis)

Cork: Glengarriff, V 9057, 12.vii.85 ♂ (J. P. & M. O'Connor).

The first Irish record since those from Torc Cascade by Curtis and Haliday.

Polylepta guttiventris (Zetterstedt)

Sligo: Beltra, G 6030; Kerry: Muckross, V 9686.

Phthinia humilis Winnertz

The Irish specimen from Glendalough, T 1196, (Chandler, 1976) and a second from Muckross (V 9686) are females. As indicated by Hutson et al., (1980) there are two species confused under humilis; their humilis has been recognised as a new species, plassmanni Caspers, while their 'humilis var.' is the true humilis (Caspers, 1984). At present males are necessary for determination.

Phthinia winnertzi Mik

Wicklow: Glen of the Downs, O 2611, 5.x.80, ♀; Kerry: Muckross, Monk's Wood, V 9686, 4.v.81, ♂ (PJC).

Sciophila lutea Macquart

Tyrone: Moy, N 8356, x-xi.84, malaise trap, ♂, 3 ♀ (M. Boston).

Acnemia longipes Winnertz

Kerry: Derrycunihy, V 9181, 7.v.81, ♂ (PJC).

Monoclona rufilatera (Walker)

Waterford: Cappoquin, S 0800, 9.v.81, ♂ running on laurel foliage (PJC);

Antrim: Rea's Wood, J 8514, x.84, 2 ♂, v.85, ♂ ♀ (R. Nash & M. Boston).

Speolepta leptogaster (Winnertz)

Kerry: Killarney shore of Upper Lake, V 9491, 5.v.81, ♂, Ross Island, V 9488, 7.v.81, ♂, Monk's Wood, Muckross, V 9686, 8.v.81, ♀ (PJC).

Coelophthinia thoracica (Winnertz)

Wicklow: Glendalough; T 1196, Devil's Glen; T 2498, Woodenbridge: T 1877, x, xi (PJC).

Boletina griphoides Edwards

Antrim: Glendun, D 1626, 8.xi.80, ♂ (PJC).

Boletina lundstroemi Landrock

Kerry: Muckross House grounds, beechwood, V 9685, 5.v.81, ♂ (PJC).

Boletina plana Walker

Wicklow: Devil's Glen, T 2498; Kerry: Cloghereen Pool Wood, V 9786; shore of Muckross Lake, V 9485 (PJC).

Boletina nitida Grzegorzek

Down: Rostrevor, T 1817, 31.v.75, oakwood, ♂ (A. G. Irwin, Ulster Museum).

Saigusaia flaviventris Strobl

This was transferred from Boletina by Matile (1983). New records: Mayo: oakwood by River Erriff, L 9668; Lough Conn, G 1904; Westport Demesne, L 9884; Kerry: Ross Island; Offaly, V 9488; Offaly: Charleville Woods, N 3122.

Anatella ciliata Winnertz

This has now been found in Leitrim, Mayo, Sligo and several localities in Wicklow.

Anatella setigera Edwards

Kerry: Muckross Lake, south shore, V 9485, 8.v.81, ♂ (PJC).

Anatella unguigera Edwards

Wicklow: Devil's Glen, T 2498, 10.vi.85, ♂ (PJC).

Rymosia virens Dziedzicki

Wicklow: Glendalough, T 1196, 18.xi.84, ♂; 10.vi.85, 2 ♂, 1 ♀; Ballard's Wood, 3.x.80, ♂; Mayo: oakwood by River Erriff, L 9668, 14.vi.85, ♀ (PJC).

Tarnania fenestralis (Meigen)

Wicklow: Derrybawn, T 1495, 13.xi.84, ♂ ♀ ; Devil's Glen, T 2498, 10.vi.85, ♂ (PJC).

Exechia dizona Edwards

Tyrone: Moy, N 8356, 29.x.-4.xi.84, ♂, malaise trap (M. Boston). This remains a very little known species.

Exechia festiva Winnertz

Mayo: Drummin Wood, G 2404; Wicklow: Devil's Glen, T 2498; Glendalough, T 1196 (PJC).

Excehia nigra Edwards

Antrim, Wicklow and Tyrone are new county records.

Exechia parva Lundstrom

Wicklow: Glendalough, T 1196 (PJC); Tyrone: Moy, N 8356 (M. Boston).

Exechiopsis clypeata (Lundstrom)

Wicklow: Avondale Forest Park, T 1986, 13.xi.84, ♂ (PJC).

Exechiopsis hammi (Edwards)

Wicklow: Devil's Glen, T 2498, 4.x.80, ♂ (PJC).

Exechiopsis indecisa (Walker)

Mayo: oakwood by River Erriff, L 9668, 14.vi.85, ♂ (PJC).

Exechiopsis intersecta (Meigen)

Wicklow: Derrybawn, T 1495, 13.xi.84, ♂ (PJC).

Exechiopsis jenkinsoni (Edwards)

Wicklow: Derrybawn, T 1495, 13.xi.84, ♂ (PJC).

Exechiopsis pulchella (Winnertz)

Wicklow: Glendalough, T 1196, 13.xi.84, ♂ (PJC).

Exechiopsis unguiculata (Lundstrom)

Kerry: Monk's Wood, V 9686, 4.v.81, 2 ♂, 2 ♀ (PJC).

Exechiopsis (Xenexechia) leptura (Meigen)

Offaly, Kerry, Wicklow and Sligo are new county records.

Pseudexechia aurivernica Chandler

Wicklow: Avondale Forest Park, T 1986, 4.x.80, ♂; Glendalough, T 1196, 13.xi.84, ♂; Kerry: Cloghereen Pool Wood, V 9786, 8.v.81, ♂ (PJC).

Pseudexechia trivittata (Staeger)

Dublin, Antrim and several localities in Wicklow.

Allodia lundstroemi Edwards

Wicklow: Devil's Glen, T 2498, 4.x.80, ♂ (PJC).

Allodia truncata Edwards

Offaly, Kerry and Wicklow are new county records.

Brevicornu (B.) fissicauda (Lundstrom)

Tyrone: Moy, N 8356, 15-21.x., 12-25.xi.84, 3 ♂ (M. Boston).

Brevicornu (B.) fuscipenne (Staeger)

Wicklow: Derrybawn, T 1495; Avondale Forest Park, T 1986; Antrim: Glenariff, D 2120 (PJC); Tyrone: Moy, N 8356 (M. Boston)

Brachypeza armata Winnertz

Kerry: Torc Cascade, V 9684, 10.ix.81, ♀ (J. P. O'Connor).

Trichonta foeda Loew

Antrim: Glenariff, D 2120; Wicklow: Glendalough, T 1196 (PJC).

Trichonta atricauda (Zetterstedt) and T. melanura (Staeger)

Gagne (1981) has shown that these names have been applied incorrectly and their usage is now reversed.

Phronia signata Winnertz

New county records are Wicklow and Kerry.

Phronia basalis Winnertz

Down and several localities in Wicklow.

Phronia braueri Dziedzicki

Wicklow: Glendalough, T 1196, 10.vi.85, 3 ♂; Kerry: wood by Muckross Abbey, V 9786, 7.v.81, ♂ at sycamore flowers (PJC).

Phronia conformis (Walker)

Mayo: Westport Demesne, L 9884, 14.vi.85, 2 ♂ (PJC).

Phronia biarcuata (Becker)

Mayo, Offaly and Westmeath are new county records.

Phronia nitidiventris (Wulp)

Wicklow and Kerry are new county records.

Phronia triangularis Winnertz

Wicklow: Devil's Glen, T 2498, 10.vi.85, ♂ (PJC).

Mycetophila blanda Winnertz

Laois: The Derries, N 5805, 20.ix.82, 1 ♂, 2 ♀ (J. P. O'Connor).

Mycetophila forcipata Lundstrom

Mayo: Lough Conn, G 1904; Kerry: Monk's Wood, V 9686; new finds at both Wicklow localities (PJC).

Mycetophila formosa Lundstrom

New records from Sligo, Mayo and Offaly.

Mycetophila fraterna Winnertz

New records from Mayo and Offaly.

Mycetophila hetschkoi Landrock

Mayo: Westport Demesne, L 9884, 14.vi.85, ♂; Offaly: Charleville Woods, N 3122.

27.v.84, ♂; 15.vi.85, 5 ♂; Wicklow: Enniskerry, O 2216, wood by deep gulle, 10.xi.86, ♂ (PJC).

Mycetophila magnicauda Strobl

Kerry: Monk's Wood, Muckross, V 9686, 4.v.81, 3 ♂, 1 ♀; 8.v.81, ♂, ♀; south shore of Muckross Lake, V 9685, 8.v.81, ♂; Torc Cascade, V 9684, 8.v.81, ♀ (PJC).

Mycetophila occultans Lundstrom

Kerry: Ross Island, V 9488, 7.v.81, ♂ (PJC).

Mycetophila sigillata Dziedzicki

Wicklow: Glendalough, T 1196, 8.xi.82, ♀ (J. P. O'Connor); Offaly: Charleville Woods, N 3122, 27.v.84, ♀ (PJC).

Mycetophila sordida Wulp

Wicklow: Ballard's Wood, 3.x.80, ♂; Kerry: Monk's Wood, V 9686, 4.v.81, 2 ♂; Muckross House grounds, beechwood, V 9685, 5.v.81, ♂ (PJC).

Mycetophila trinotata Staeger

Offaly: Charleville Woods, N 3122, 27.v.84, ♀ (PJC).

Mycetophila unicolor Stannius

Antrim: Glenariff, D 2120, 8.xi.80, 2 ♂ (PJC).

Zygomyia notata (Stannius)

Wicklow: Devil's Glen, T 2498, 10.vi.84, ♂ (PJC)

Zygomyia pictipennis (Staeger)

Wicklow: Devil's Glen, T 2498, 10.vi.85, ♂; Woodenbridge, T 1877, 13.xi.84.

♀; Offaly: Charleville Woods, N 3122, 15.vi.85, ♀ (PJC).

Zygomyia vara (Staeger)

Dublin, Tyrone and several localities in Wicklow.

Sceptonia costata (Wulp)

Wicklow: Glendalough, T 1196, 3.x.80, 13.xi.84, ♂, ♀ (PJC); Tyrone: Moy, N 8356, x-xi.84, 2 ♂, 1 ♀, malaise trap (M. Boston).

Sceptonia fumipes Edwards

New county records are Roscommon, Mayo, Sligo and Tyrone.

Sceptonia nigra (Meigen)

Tyrone is a new county record.

Platurocypta punctum (Stannius)

Kerry and Wicklow are new county records.

Platurocypta testata (Edwards)

Wicklow and Tyrone are new county records.

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STUDIES ON THE MURROUGH, CO. WICKLOW, IRELAND. 1: THE CHEMISTRY AND PHYTOPLANKTON OF POOLS.

Anthony McNally

Introduction

The Murrough is a marshland which occupies a narrow coastal strip stretching from Ballygannon near Kilcoole south to Wicklow town, a distance of about 14 km (figure 1). In some areas the marsh is less than 150 m wide, while its maximum width at Blackditch is approximately 825 m. The entire marshland complex covers an area of almost 600 ha (Anon., 1980).

Drainage directly to the sea is impeded along most of the marsh by a high shingle bank along which the Dublin and South Eastern Railway runs. The northern half of the marsh (lying north of Five Mile Point approximately) discharges to the sea between Kilcoole and Newcastle at the Breaches. The southern part of the marsh flows into Broadlough and thence to the sea at Wicklow.

Floristically the area contains a number of wetland associations in the alliances Phragmition, Magnocaricion and Caricion davallianae (White and Doyle, 1982). There are also some fragmentary woodlands with *Salix atrocinerea, Alnus glutinosa and Betula pubescens. The Murrough is rated as a site of national importance by the Forest and Wildlife Service (Curtis, pers. comm.). The marshes and contiguous shoreline support a number of species which are protected under the Wildlife Act 1976. These include Crambe maritima, Lathyrus palustris, Orobanche rapum-genistae, Salvia horminoides, Trifolium glomeratum and

*Nomenclature for the higher plants follows Scannell and Synnott (1972), and Belcher and Swale (1976) for algae.

T. subterraneum. Several rare and threatened species also occur in this area including Vicia lathyroides, Trifolium scabrum and Mertensia maritima, although this latter may now be extinct locally.

The area of the marshland has been reduced in recent years by drainage, which continues to threaten the integrity and scientific value of the site. The Irish Biogeographical Society has therefore suggested that it is an appropriate site for investigation to assess its present status.

In this study attention was focussed on the Blackditch area of the complex (between Five Mile Point and Six Mile Point approximately) since here there is an extensive tract (ca. 110 ha) of intact marsh. Many of the communities found throughout the Murrough are also well represented in this area. There is little information available on the aquatic communities of the marsh. This paper presents some preliminary notes on the chemistry and phytoplankton of shallow pools which occur at Blackditch. Crustacean collections made at these pools by other members of the IBS will be published separately.

Site

Three semi-permanent pools located at National Grid Reference O 312028 were visited on June 14, 1986. Water depth ranged from 5 to 20 cm, and the pool bottoms were composed of deep, organic rich muds. Chara sp. was abundant in pool number 1.

The vegetation around all the pools was similar. Cladium, Phragmites and Schoenus were dominant. Species occurring abundantly included Agrostis stolonifera, Molinia caerulea, Juncus subnodulosus, J. articulatus, Carex flacca,

C. panicea, Succisa pratensis, Angelica sylvestris, Lythrum salicaria, Potentilla erecta and Filipendula ulmaria.

Methods

Water temperature, dissolved oxygen and pH were measured electrometrically in situ. Samples were also taken for measurement of total alkalinity, conductivity, chloride, colour, ammoniacal nitrogen (phenate method) and soluble orthophosphate (ascorbic acid reduction to molybdenum blue) (Greenberg et al., 1985).

An estimate of total phytoplankton abundance was obtained by measuring chlorophyll-a (acetone extraction), and an indication of the physiological condition of this standing crop was given by estimating phaeopigment concentration (Youngman, 1978).

The abundance of individual plankters was estimated by quantitative filtration of a sample through a membrane with an effective pore size of 0.45 μm. The membrane was cleared with immersion oil, and individual taxa counted. The counting units were colonies, filaments, or in unicellular types, individual cells. Therefore abundance estimates bear no direct relationship to biomass.

Results and Discussion

Physico-chemical attributes of each pool, and abundance estimates for taxa identified are presented in table 1.

Water reaction is alkaline. Conductivities are somewhat high, largely as a result of high chloride concentration, which is approximately 5% that of seawater. This suggests therefore that there is some slight incursion of marine water into the marsh. Bicarbonate is not a major contributor to these high conductivities, since the measured alkalinities are moderate, and not unduly excessive for surface waters in this area (cf. alkalinities of 20 - 30 mg/l CaCO3 for the Vartry River; Morrissey, pers. comm.).

Chlorophyll and phosphate data indicate that the pools are hypereutrophic systems (OECD, 1982). The water sample from pool number 1, the smallest and shallowest pool, contained substantial amounts of phaeopigments (degradation products of chlorophyll). This may indicate degeneration of the phytoplankton community due to adverse effects of a reduction in pool size as the water table fell to summer levels.

There is little difference in composition of the plankton in the three pools. The communities are typical of small, eutrophic bodies of water. Members of the Chlorococcales (Scenedesmus, Pleurococcus) are well represented, and some benthic forms (e.g. Pinnularia, Gyrosigma and Oscillatoria) contribute significantly to the phytoplankton.

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TABLE 1. Physico-chemical properties, and abundances of taxa in the phytoplankton in three pools at Blackditch. Abundances in the table are estimated from the number of units of a taxon per millilitre as follows: abundance 1 = 1-10 units/ml; abundance 2 = 10-100 units/ml; abundance 3 = 100-1000 units/ml; abundance 4 = 1000-10000 units/ml.

	Pool 1	Pool 2	Pool 3
Area (sq.m)	4	10	30
Temp. (°c)	26.9	28.6	27.2
Dissolved Oxygen (% Sat.)	140	190	189
Colour (mg/l Pt/Co)	150	225	>250
pH	7.85	9.00	8.64
Chloride (mg/l)	982.4	674.2	558.6
Conductivity (µS/cm @ 20°C)	3998	2340	1956
Alkalinity (mg/l CaCO3)	200	121	52
NH3-N (mg/l)	0.06	0.13	0.08
PO4-P (mg/l)	0.08	0.07	0.04
Chlorophyll-a (µg/l)	32.1	21.4	21.4
Phaeopigments (µg/l)	20.3	0.0	0.0

Taxon	Abundance	Rating	
Scenedesmus	4	3	
Pleurococcus	3	4	4
Melosira	3	3	2
Mougeotia	1	3	4
Navicula		4	3
Oscillatoria		2	3
Peridinium	2	2	2
Gyrosigma	2	3	
Synedra	3	2	2
Pinnularia	2	2	
Meridion	2		
Anabaena	2		
Chroococcus		3	
Pandorina	1		
Spirogyra			2
Nitzschia			2

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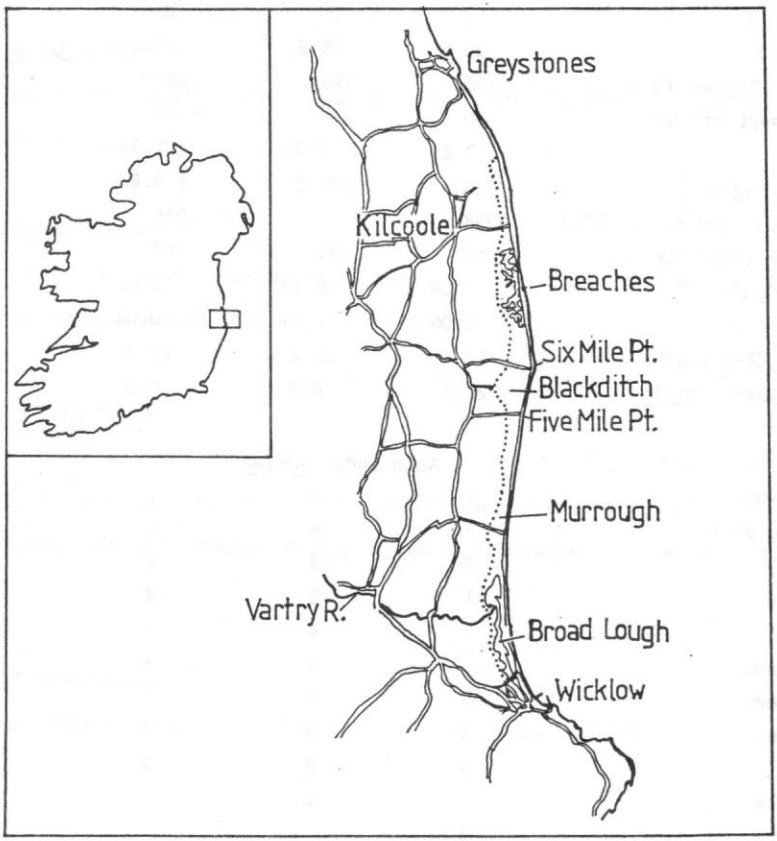
FIGURE 1. The general location of the Murrough complex is shown in the inset by the box. The approximate boundary of the Murrough is shown on the map of the Wicklow coast by the dotted line, and the location of the Blackditch area is also indicated.



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STUDIES ON THE MURROUGH, CO. WICKLOW, IRELAND. 2: THE FLESH-FLIES (DIPTERA: SARCOPHAGINAE).

Ruth Blackith and Robert Blackith

Introduction

The Murrough, Co. Wicklow, is an open area of marsh, fen and rough grazing lying inside the narrow sandy coastal strip carrying the Dublin - Wexford railway. As part of the Irish Biogeographical Society's survey of the Murrough, we have looked at the flesh - flies (Sarcophaginae) of the area. These are medium to large flies with a silver and black striped thorax ; some species of these calypterates have red genitalia in the male. Identifications are based on Day (1948), Day and Fonseca (1955) and van Emden (1954). The adults, which are viviparous, can be netted while basking on insolated stones, gates, timber and rubbish, together with the flowers of many Umbelliferae. There is confusion as to the details of the food of the larvae, a confusion probably made worse by misidentification of the adult flies. Most live on carrion, vertebrate and invertebrate, some may be parasitic, and there are records of emergence from rotting vegetable matter. The distribution of the Irish species extends across Europe and, for some species, into Africa and Asia. Taxonomic nomenclature in this note follows Verves (1986).

Methods

Our survey extends beyond the area properly called the Murrough because Sarcophaginae are strong fliers and adjacent areas seemed likely to prove interesting. We included Wicklow Head in our sampling. Collections were made by netting adults on 6 days between 14.vi.1986 and 7.ix.1986, and the specimens

were examined microscopically. Table 1 shows the numbers of each species collected at the 7 sites we selected, as shown in Fig. 1. The sites are as follows:-

A ..... Coastal strip near 6 - mile Point ; short grass on sandy loam (O 317037).

B ..... Coastal strip near 5 - mile Point ; essentially vegetated as site A (O 312024).

C ..... Old railway sidings on coast north of Wicklow Town. Mixed grasses and weeds (T 315943).

D ..... Rough pasture inland from 6 - mile Point ; hedges and weedy grassland (O 313040).

E ..... South margin of wood between roads leading to 5 - mile and 6 - mile Points ; fen, marsh and woodland (O 309034).

F ..... Shore of Broad Lough; hogweed and broken stone walls (T 308959).

G ..... Wicklow Head, southeastern slopes; rough pastures and stone walls (T 341920).

Results

Among the general conclusions stemming from the results in Table 1 are the fact that, with one exception, all the sarcophagine species known from this island occur in the Murrough. The exception is Pierretia soror (Rondani) nec Rohdendorf which is an essentially Mediterranean species confined in this country, so far as is known, to the Burren of Co. Clare (Richards, 1960).

Pierretia clathrata (Meigen), which was found at site E, is new to Ireland. According to Verves (1986) this species has been found in Ireland but we are unable to trace any documentation for the record and believe it to be a slip.

P. clathrata is said by Day (1948) to breed in egg-masses of spiders and to be a rare woodland species in Britain.

Comparing the sites we see that Parasarcophaga aratrix (Pandellé), which Day (1948) notes is an uncommon inhabitant of woods and marshes, is absent from the strictly coastal sites A, B and C, but occurs in the relatively inland sites D, E and F. As these latter sites are less than 1 km from the coast, and the strictly coastal sites are only a few metres wide, the aversion of P. aratrix is strikingly defined. It is, moreover, confirmed by our collecting records for other parts of Ireland and Wales. We have reared this species from a wide range of vertebrate and invertebrate corpses including the snails and slugs common on the strictly coastal sites, so that the absence of P. aratrix cannot solely be due to the lack of suitable hosts. It is a species whose early larvae kill competing larvae of other sarcophagines or calliphorids within hosts, so that its adults may emerge from corpses preempted by other calypterates (Blackith and Blackith, 1984).

Throughout the sampling area there is a marked lack of Sarcophaga carnaria L. and S. subvicina Rohdendorf, the females of which are not separable unless taken in cop. Whereas at some other sites in Ireland, such as the Howth peninsula and the Vartry reservoir, these species constitute some 80% of the individuals taken, they rarely exceed 40% of the catch anywhere in the area under investigation here. Numbers of the inseparable species (females only) are placed in brackets between the lines for the two species. The two most obviously comparable sites are reassuringly similar in their sarcophagine faunas. The 7 species found in B are also found in A in roughly the same proportions. Parasarcophaga teretirostris (Pandellé) constitutes about one-third of the catch in each place, being the most numerous species.

Perhaps the most remarkable single conclusion is that wherever more than 10 specimens were taken they are distributed in at least 6 different species (excepting Wicklow Head where 4 species were found). This result means that several species are represented by a very few individuals, so that there is inevitably appreciable sampling variation in the numbers of species found. Nevertheless, at several sites up to 10 species co-exist in a restricted area, rarely more than 1 sq.km. This conclusion poses the question of how these species differ in their demands on the environment, a question we hope to address by experiments to be reported later.

We should end with a warning that total numbers, and possibly proportions, of species taken are strongly dependent on the weather, and perhaps also on the near-simultaneous emergence of individuals from a corpse or faecal material locally. However, we believe that our results show that sarcophagines do tend to remain substantially within recognisable small areas of the Murrough even though they are presumably capable of traversing the whole of it.

Acknowledgement

We are grateful to a referee for confirming that P. clathrata is new to Ireland.

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TABLE 1. The distribution of sarcophagines in and around the Murrough

(nos of individuals)

SPECIES	SITE (see text) A	B	C	D	E	F	G
Helicophagella crassimargo (Pandellé)	1	3	1	-	-	-	2
H. melanura (Meigen)	3	7	6	-	2	-	-
Heteronychia haemorrhoa (Meigen)	-	-	1	-	1	-	-
H. vagans (Meigen)	-	-	2	-	2	3	-
H. vicina (Macquart)	-	-	-	-	-	3	-
Parasarcophaga aratrix (Pandellé)	-	-	-	8	4	2	-
P. teretirostris (Pandellé)	10	29	5	-	7	4	5
Pierretia clathrata (Meigen)	-	-	-	-	2	-	-
P. nigriventris (Meigen)	3	2	2	-	-	-	-
Sarcophaga carnaria L.	8	21	-	1	10	-	-
S. subvicina Rohdendorf	4	8 (1)	-	-	2 (6)	-	- (1)
Sarcotachinella sinuata (Meigen)	-	-	-	-	1	1	-
Thyrsocnema incisil obata (Pandellé)	2	18	2	-	6	3	9
Totals	31	89	19	9	43	16	17
Nos. of species	7	7	7	2	10	6	4

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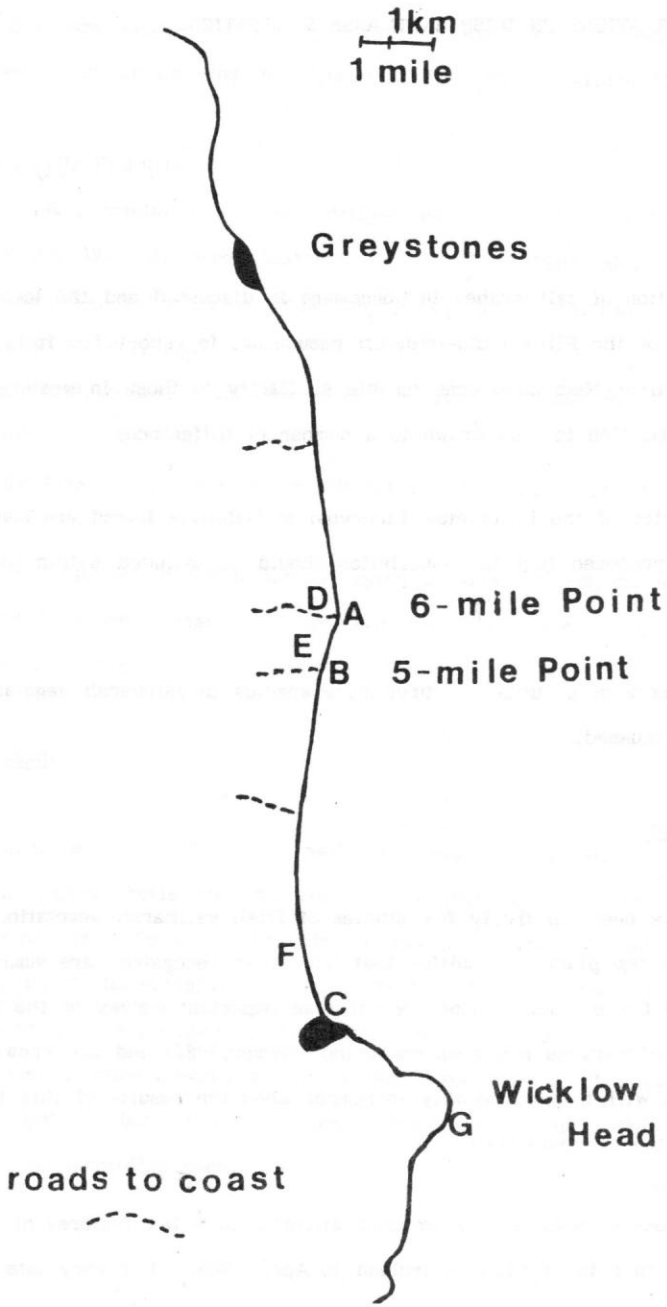
FIGURE 1. Sketch - map of area between Greystones and Wicklow Head.



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SOME OBSERVATIONS ON IRISH SALTMARSH VEGETATION.

Paul Adam

Abstract

The vegetation of saltmarshes in Connemara is discussed and the local occurrence of the Filipendulo-Iridetum pseudacori is reported. It is suggested that the saltmarshes have considerable similarity to those in western Scotland although attention is also drawn to a number of differences.

The affinities of the Limonietum binervosi at Malahide Island are considered and it is proposed that the association should be included within the Frankenio-Armerion.

The occurence of a number of bryophyte species in saltmarsh vegetation is briefly discussed.

Introduction

There have been relatively few studies of Irish saltmarsh vegetation; accounts describing the plant communities that have been recognised are summarised in White and Doyle (1982). More recently an important survey of the phytosociology of Irish saltmarshes has been conducted (Wymer, 1984) and our knowledge of the vegetation will be considerably increased when the results of this thesis investigation are published.

The purpose of this note is to draw attention to a few features of interest observed on a brief visit to Ireland in April 1986. The very late spring, and

consequent retarded development of the vegetation, made the making of releves impractical; some aspects of the vegetation nevertheless were sufficiently obvious as to merit comment. In Connemara a number of sites on the shores of Bertraghboy, Ballyconneely, Mannin and Streamstown Bays were investigated. On the east coast the two major areas of saltmarsh visited were at Malahide Island and Bull Island.

Although there are few extensive stands of saltmarsh in Ireland, the total area of the habitat is considerable. Saltmarsh in many parts of northern Europe is under threat of reclamation or severe modification. In view of this, the Irish saltmarshes are likely to become an increasingly valuable component of the total range of north European marshes. Irish marshes, because they are poorly documented, receive only slight mention in Dijkema (1984). If the full range of their variation is to be conserved it is important that the current status of the vegetation be assessed.

The flora of saltmarshes is made up of two components; a halophytic element of species for which saltmarsh is the sole or chief habitat and a glycophytic element for which saltmarshes are but one of several habitats in which they occur (it is probable that for many species in this element saltmarsh populations are genetically distinct). In Britain the halophytic element is fairly small, comprising some 40-50 species (the exact number depending upon whether certain species found at the upper fringe of saltmarshes are included, and upon the taxonomic treatment adopted in certain critical groups). The glycophytic element is much larger; I have records for over 350 species, of which over 100 occur widely and can be regarded as characteristic of certain saltmarsh plant communities. The relative proportions of the halophytic and

glycophytic elements vary considerably both between communities and between sites (Adam, 1978, 1981).

With the exception of a few species restricted to south-east England, the majority of the halophytic element in Britain also occurs in Ireland, as does the majority of the glycophytic. A priori it would seem likely that most of the plant communities recorded from British saltmarshes would also occur in Ireland. However, it is possible that different environmental conditions acting on a different range of genotypes may have resulted in some species assemblages different from those in Britain.

In Britain different geographic distribution patterns of species and communities allow the recognition of a number of distinct types of saltmarsh (Adam, 1978). The differences between these marsh types have been heightened by grazing pressure but the underlying pattern is determined by variations in sediment types and, very strongly, by climate. Data on the distribution of species (Perring and Walters, 1976) suggest that similar distinctions in terms of flora and vegetation can be made between east and west coasts in Ireland as have been made previously in Britain, and that the very strong east-west climatic gradient may be largely responsible for the differences.

Comparison of saltmarshes in western Ireland and Scotland.

Saltmarshes in western Scotland are very distinctive in terms of their flora and vegetation (Adam, 1978, 1981), and can be regarded as part of a Boreo-Atlantic assemblage, extending somewhat further south than suggested by Géhu and Rivas-Martinez (1984). I have previously speculated that a number of plant communities characteristic of western Scotland would also occur in western Ireland, and that marshes in the two regions would be similar (Adam, 1978, 1981; Adam et al., 1977).

Observations of a number of saltmarshes on the Connemara coast suggest that these speculations are in part correct, but that there are also some interesting differences.

Saltmarshes in western Scotland (Type C marshes in Adam, 1978) are characterised by high floristic diversity; most of this diversity, however, is provided by glycophytic species, and the halophytic element is small. The lowest saltmarsh community is the Puccinellia-turf fucoid nodum, which is a variant of the very widespread Puccinellietum maritimae. The community is distinguished from other Puccinellietum communities by the presence of a near continuous carpet of diminutive, free-living fucoids. The community was first described from Clare Island by Cotton (1912) and the alga concerned was given the taxonomic status of a variety (var muscoides) of Fucus vesiculosus. It is possible, however, that this particular growth form and habit may be adopted by several species of fucoid (Hiscock, 1979). Whatever the correct taxonomic identity, this form of fucoid was abundant on all marshes investigated on the Connemara coast. However, compared with its occurrences in Scotland, it is less restricted to low elevation marshes. As well as being found in a community in which Puccinellia maritima is a frequent component, it also forms a carpet in stands from which Puccinellia is absent and in which the dominant vascular plants are Plantago maritima and Armeria maritima. This community, but for the fucoid carpet, corresponds closely to the Plantago-Armeria nodum described in Adam (1981). Diminutive fucoids are also found, although not forming continuous carpets, in some stands of the Juncetum gerardii. Mixed with the fucoids at most sites was the small red alga Bostrychia scorpioides.

In the upper marsh in western Scotland the most widespread community is the Filipendulo-Iridetum pseudacori Adam 1976 (see Adam et al., 1977; Adam, 1981). This community, which frequently transgresses the tidal limit, although

usually dominated by Iris pseudacorus contains a rich flora including both nitrophilous and fen elements, and provides a habitat for a number of species which are rare, or local, in their distribution in Scotland.

At the sites visited in Connemara the most extensive upper marsh community is dominated by Juncus maritimus. Patches of Iris pseudacorus are not infrequent close to the sea, but in positions clearly above the storm tide limit and in a community which is a modified pasture rather than the Filipendulo-Iridetum. However, at two sites, one in Ballyconneely Bay and the other in Streamstown Bay, stands referable to the Filipendulo-Iridetum were observed. In both cases the main driftline was within the stand but both were subject to freshwater flushing from the hinterland. Both stands were small, only several hundred square metres; much less extensive than many Scottish examples. Associated species included Rumex acetosa, R. crispus, Mentha aquatica, Cardamine pratensis, Caltha palustris, Montia fontana, Senecio aquaticus and Potentilla anserina, although unfortunately it was too early in the season to record full species lists. Each stand, however, supported at least one species which is comparatively local in western Ireland - Apium graveolens in the stand on the east side of Ballyconneely Bay (at L 6442) and Oenanthe crocata at the head of Streamstown Bay (L 6553). It is possible that more extensive stands of the Filipendulo-Iridetum occur elsewhere. The most extensive stands in Scotland occur where there is a very gradual transition between saltmarsh and the poorly-drained raised beach platform; at most of the Connemara sites visited the upper limit of saltmarsh was more sharply defined by a break in slope and the potential habitat for Filipendulo-Iridetum was correspondingly of limited extent.

The widespread presence and extensive area occupied by stands dominated by Juncus maritimus afford striking differences from marshes in western

Scotland. J. maritimus is widespread but local in Scotland, becoming increasingly rare with increasing latitude. J. maritimus can dominate stands at a range of elevations on saltmarshes, and, although conventionally regarded as an upper marsh species, is frequently found in the lower zones (Adam, 1977). In Connemara J. maritimus occupies a large proportion of the vegetated intertidal zone, and it is probable that a number of distinct communities, each characteristic of a more limited range of elevation, could be recognized later in the season. In general terms, however, the behaviour of J. maritimus appears similar to that described from Arran (Adam et al., 1977).

The mid-marsh community in Connemara, either forming a continuous zone or else as patches between clones of J. maritimus, is the Juncetum gerardii. The Juncetum gerardii is a community of variable species composition although the nature of the variation makes formal recognition of sub-associations difficult. The range of variation within the association in Connemara is similar to that described from Arran (Adam et al., 1977) At the highest levels on the shore Juncetum gerardii stands in western Scotland are often interrupted by patches of more open vegetation, normally on a gravelly substrate, with abundant sedges and other Cyperaceae; this type of vegetation is still poorly characterised but is very distinctive (Adam, 1981; Adam et al., 1977). Similar vegetation was not observed in Connemara, the habitat of shallow gravels flushed by freshwater being absent from the upper marsh. However, it is possible that this type of vegetation is found elsewhere in western Ireland.

The substrate of saltmarshes in Connemara differs from that of loch-head marshes in western Scotland. In Scotland many of the saltmarshes occur on peaty substrates; these are relatively shallow, often containing abundant coarse gravel and sand, and the majority of organic material in the soil appears

to be remains of saltmarsh vegetation. In western Ireland saltmarsh frequently occurs on deep peat deposits but, as Doyle (1982) points out, the peat was not formed under saltmarsh but represents the record of terrestrial communities overwhelmed by rising sea level. At Streamstown Bay the saltmarsh is underlain by a moraine deposit which once supported forest vegetation, a fact to which numerous sub-fossil tree stumps bear witness. The forest was overwhelmed by the formation of peat which accumulated to a dept of about 1.5m. The upper surface of the peat is marked by discontinuous lenses of gravel, possibly representing a beach deposit. The upper 20-30cm of the profile, overlying the peat, represent sediment laid down during the course of saltmarsh development. In the upper marsh, under Juncus maritimus, the surface layers of soil are organic but in the lower marsh the soil is essentially a silty sand. Thus only the uppermost 30cm of the profile is analogous to the sediment under Scottish loch head marshes. Similarly deep peat deposits with entombed tree stumps were also observed around Bertraghboy Bay and in Mannin Bay.

To what extent differences in the vegetation of saltmarshes between western Scotland and western Ireland reflect differences in their post-glacial history and development remains to be investigated.

Despite some differences, the sites visited in Connemara were more similar to the Scottish Type C marshes (Adam, 1978) than to either of the other two marsh types recognized in England and Wales. It may be appropriate to recognize a distinct sub-type of type C marshes in western Ireland but not to add a new Type D category to the existing scheme.

The Limonietum binervosi and its affinities

Ní Lamhna (1982) described a very distinctive community, the Limonietum

binervosi, from the saltmarshes enclosed by the recurved spits at the southern tip of Malahide Island. This community occupies the higher elevations of the marsh and has a substrate of gravelly sand. The vegetation is relatively open with only sparse cover of subsidiary species between the raised bosses developed from the Limonium rootstocks.

The presence within the community of Puccinellia maritima, Halimione portulacoides and Salicornia europaea agg. led Ní Lamhna (1982) to include it within the alliance Puccinellion maritimae. Alliance boundaries within the Glauco-Puccinellietalia are, however, difficult to define on floristic grounds in the British Isles (Adam, 1981), but by reference to both ecological and floristic criteria an alternative placement within the Frankenio-Armerion may be suggested.

In terms of physiographic situation, substrate type and general appearance of the vegetation, the Malahide Island saltmarshes are remarkably similar to the much studied marshes of the north Norfolk coast, as was noted by Proctor (1984). In north Norfolk a distinctive series of saltmarsh communities occurs on coarse sand and gravel between sand dune spits. The characteristic species include Suaeda vera, Frankenia laevis, Limonium binervosum and L. bellidifolium (see Chapman, 1960). These communities can be assigned to the alliance Frankenio-Armerion Géhu and Géhu-Franck (1975).

In South Wales the saltmarsh to sand dune transition at several sites is marked by vegetation virtually identical to the Limonietum binervosi stands at Malahide (see Gillham, 1982). At one locality in South Wales Frankenia laevis occurs (Waldren, 1982); the vegetation in which it grows being, but for the presence of F. laevis, Limonietum binervosi. However, a relevé from this stand could also be regarded as a depauperate example of the Halimiono-Frankenietum

laevis Adam 1976 (Adam, 1981) and would be included within the range of variation shown in stands in north Norfolk.

In view of this link between the Limonietum binervosi and the Halimiono-Frankenietum laevis, and of the similarities between the situation of the Limonietum at Malahide and of Frankenio-Armerion communities in North Norfolk, I would propose the transfer of the Limonietum to the Frankenio-Amerion. The presence within the Limonietum of Halimione portulacoides, Puccinellia maritima and Salicornia europaea agg. is not incompatible with an assignment to the Frankenio-Armerion; these species are frequent within the associations in the alliance (Adam, 1981; Géhu and Géhu-Franck, 1975). The alliance thus comprises four associations in the British Isles -

Suaedo-Limonietum binervosi Adam 1976
Halimiono-Frankenietum laevis Adam 1976
Limonio vulgaris-Frankenietum laevis Géhu and Géhu-Franck 1975
Limonietum binervosi Ní Lamhna 1982

As far as it is known the Limonietum binervosi is restricted in Ireland to Malahide Island. L. binervosum occurs more widely but in different communities. At North Bull Island for example scattered plants of L. binervosum are found in the marsh/dune transition but in a heavily-grazed, closed turf of Festuca rubra rather than in the open community found at Malahide.

Both the Bull Island and Malahide saltmarshes fall into the Type A category of Adam (1978). In Britain this marsh type is mainly restricted to southern and eastern coasts. A feature of Type A marshes is that communities of the Puccinellion occupy much of the marsh, whilst the Armerion is of limited

extent. In Britain a major species at the highest elevations in Type A marshes is Elymus pycnanthus (Agropyron pungens), which is curiously rare in Ireland and is not a feature of either Bull Island or Malahide.

Changing distribution patterns of saltmarsh species

There is evidence that the distribution of saltmarsh plants can change rapidly. Spartina anglica is now a major low-marsh species in northern Europe (including Ireland) - although man played a major part in its initial establishment there has subsequently been extensive natural spread and consolidation. On North Bull Island in recent decades Halimione portulacoides has progressed from being a rarity (O'Reilly and Pantin, 1957) to the most abundant species on the saltmarsh. Halimione is still local in occurrence around the Irish coast (Akeroyd and Preston, 1984), but it would be interesting to discover whether in addition to increases in local populations there has also been colonisation of new sites.

At both North Bull Island and Malahide there are rather open stands of Halimione on coarse shelly sand at low levels on the shore. In south-east England similar stands afford a habitat for Salicornia perennis. Currently there is only a single locality known for this species in Ireland but there is no immediately apparent reason why it is so restricted and it is conceivable that it may turn up at other localities.

The distribution of Frankenia laevis is concentrated in south east England where it is widespread but local in its occurrence (Brightmore, 1979). In addition to occurring on saltmarshes it is also found in undercliff habitats (Rose, 1964). There are also two recent records of F. laevis from saltmarshes in South Wales (Waldren, 1982) and Anglesey (Roberts, 1975). There is no

evidence for deliberate introduction at either locality but how Frankenia arrived and became established is unknown, but it is known that F. laevis seeds float in seawater (Brightmore, 1979) and that seawater treatment does not prevent subsequent germination. Given that F. laevis is now well established on the eastern coast of the Irish Sea it may not be too far-fetched to suggest that sea heath is a potential colonist of Irish saltmarshes.

Bryophytes in Irish saltmarshes

I have previously discussed the occurrence of bryophytes in saltmarsh vegetation in Britain (Adam, 1976). Although mosses are rarely a major component of saltmarsh plant communities there is a suite of species which is characteristic of the upper parts of the Juncetum gerardii and other upper marsh communities.

In saltmarshes in Connemara a number of species were recorded: Amblystegium serpens, A. riparium, Calliergon cuspidatum, Campylium polygamum, Cratoneuron filicinum, Drepanocladus aduncus, Tortella flavovirens and T. tortuosa. The Juncetum gerardii and related upper marsh grasslands provides the main habitat for these species although Calliergon, Cratoneuron and Drepanocladus may also be locally abundant in stands of J. maritimus. Amblystegium riparium, Calliergon, Cratoneuron and Drepanocladus are most frequent in poorly-drained microsites, the other species being more characteristic of drier, better-drained areas.

The assemblage of moss species is in general similar to that recorded from saltmarshes in north-west England and Scotland (Adam, 1976). Tortella tortuosa, which was the most abundant acrocarpous species at several sites, had not previously been recorded from British saltmarshes. In Britain the

most widespread pleurocarpous species recorded by Adam (1976) is Eurhynchium praelongum which was apparently absent from the sites investigated in Connemara.

One of the most interesting features of saltmarshes in western Scotland is the occurrence of Schistidium maritimum growing on soil; elsewhere it is a species of coastal rocks. I did not observe Schistidium on any of the Connemara saltmarshes. However, around Dog's Bay there are small fragmentary patches of Juncetum gerardii (patches between $0.25m^2$ and $1m^2$) amongst coastal rocks. These have very shallow peaty soils only 2-5cm deep. In a few of these patches Schistidium is a component of the vegetation.

In saltmarshes of Type A bryophytes are generally absent except at the very limit of the tides, where a small number of acrocarpous species may occur in the saltmarsh/sand-dune transition. Mosses are absent from most of the communities on the saltmarshes at North Bull Island and Malahide Island except for the Sagino nodosae-Tortelletum flavovirentis Ní Lamhna 1982 which forms a very narrow zone between dune and marsh.

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THE IRISH ASILID (DIPTERA) FAUNA.

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Introduction

Only 3 species of Asilidae or robber flies, are known from Ireland. By contrast, 26 species occur in Great Britain, 12 of which reach Scotland. In countries along the Atlantic seaboard of Europe with a temperate climate (essentially Denmark round to and including Northern France), nearly 50 species of asilid are known (see Appendix 1). Distribution, range and habitat of the three Irish asilid are considered in this account and possible reasons for the depauperate nature of the Irish asilid fauna are discussed.

Machimus cowini (Hobby, 1946)

M. cowini frequents open ground in the vicinity of scrub, at localities on sandy soil. Towards the north edge of its range, which appears to be reached in the Netherlands and Ireland, it is almost confined to coastal dune systems.

The known distribution of M. cowini in Ireland is shown in Fig. 1, Map 1, and may be compared with that for the other Irish duneland asilid Philonicus albiceps (Meigen) (see Fig. 1, Map 3). It is reasonable to suppose that in Ireland M. cowini may be largely restricted to east coast dune systems, as records suggest, because the more extensively known distribution of P. albiceps demonstrates that collecting in Irish dune systems outside the known range of M. cowini has probably been sufficient to detect M. cowini were it to be present. M. cowini has so far only been recorded from Ireland, the Isle

of Man, Northern France, the Friesian Islands (Netherlands), Northern Germany and Hungary. The taxonomic status and distinguishing features of this fly have recently been reviewed by Speight (in press). Its larva remains undescribed, but it is possible that the data for the larva of M. cingulatus (Fabricius), given in Melin (1923) refer to M. cowini rather than M. cingulatus.

Neoitamus cyanurus (Loew, 1849)

Neoitamus species are woodland insects, and N. cyanurus is the only Irish woodland asilid. N. cyanurus is an extremely agile and wary fly, the adults of which frequent sun-lit paths or stream-sides within deciduous woodland. Their habit of resting motionless on path-side vegetation at head-height or higher renders them difficult to detect. The known distribution in Ireland of N. cyanurus is shown in Fig. 1, Map 2. This fly is widespread in continental Europe, being known from Scandinavia to the Mediterranean and from Ireland through to the USSR. Neoitamus species are not easy to determine, but the males of European species can be identified using the key in Hradsky (1962) or van der Goot (1985). The larva of N. cyanurus has been described by Melin (1923).

Philonicus albiceps (Meigen, 1820)

The adults of this fly frequent bare sand and the species becomes progressively confined to coastal sand-dune systems as one approaches the northern edge of its European range. All known Irish localities for P. albiceps are coastal dune systems. Irish distribution is shown in Fig. 1, Map 3. Further south in Europe this asilid can be found inland. It occurs in most parts of the Palaearctic from Scandinavia to North Africa and from

Ireland to Japan. N. albiceps can easily be determined using Oldroyd (1969) or van der Goot (1985). Its larvae are described by Melin (1923).

Faunal comparisons

The Scottish and Welsh asilids and their habitats are listed in Appendix 2. Among the species not known in Ireland but recorded from Scotland are the dune system asilids Dysmachus trigonus (Meigen), Machimus cingulatus and Pamponerus germanicus (L.), all of which also occur round the Welsh coast as far as Anglesey (Morgan, op. cit.). Furthermore, P. germanicus is known from the Isle of Man. If, as the available data suggest, these dune-land species are truly absent from Ireland, their absence is remarkable.

A second group of Scottish and Welsh asilids not known from Ireland comprises inhabitants of ancient pasture and scrub woodland. They might be expected to occur in the extensive, low-lying mosaic of hazel scrub and open limestone pavement covering the Burren hinterland or in the South-East of Ireland, or on the well-drained, scrub-scattered pastures of the midland esker ridges. The asilids which fall into this group comprise Asilus crabroniformis L., Dioctria cothurnata Meigen, D. hyalipennis (Fabricius), D. rufipes (Degeer), Leptarthrus brevirostris (Meigen), Leptogaster cylindrica (Degeer), L. guttiventris Zetterstedt and Machimus atricapillus Meigen .

The remaining 3 asilids known from Wales and/or Scotland, but not found in Ireland are woodland species. Two of them, Laphria flava (L.) and Rhadiurgus variabilis (Zetterstedt) are characteristically inhabitants of old Pinus sylvestris forest; the third, Dioctria oelandica (L.) is a species of ancient deciduous woodland.

In the barcharts of Fig. 2 all of the species listed in Appendix 1 have been

consigned to one or other of two loose groups. From these barcharts it is immediately obvious that there is a progressive decrease in the open country and scrub asilids as one proceeds northward and westward from Northern France. Among the more truly woodland species, however, this trend is less pronounced.

I have remarked elsewhere (see Speight, 1986) on the general under-representation of open ground and pasture species in Ireland's invertebrate fauna. The Asilidae, with so many species characteristic of old pasture and scrub, provide an extreme example of this phenomenon. Extensive areas of open ground, scrub and heathland have not been climax communities in Western temperate Europe for more than 7000 years (i.e. since before the post-glacial climatic optimum). So most of these asilids have to be regarded as an anthropogenic element of the fauna, enabled to move into these parts of Europe by man's forest-clearing activities. The exceptions are those asilids able to survive in coastal dune systems.

Adult asilids are predatory on other flying insects and their larvae are saprophages. These flies are noted for their frequency in old pasture on well-drained sites. Today in Western temperate Europe, permanent pasture has well-nigh disappeared and open-country asilids have disappeared synchronously. Asilus crabroniformis, Machimus arthriticus (Zetterstedt) and M. rusticus (Meigen) are all examples of such disappearing species. It might be assumed that to such flies the importance of the grazing animals was that they maintained a close-cropped sward and patches of bare ground along their tracks. But given the habitat of asilid larvae it is as likely that the dung of grazing stock is also important to the survival of these flies (see Oldroyd, 1964).

Climatic limitation of range manifest through inadequate ground-surface temperatures can be regarded as restricting the potential Irish open-ground and scrub asilid fauna to the group of species that reach Denmark. The chronology of human activity in the post-glacial period is then the factor most likely to have further restricted the Irish asilid fauna. Forest clearance in Great Britain only began to occur on a significant scale towards the end of the post-glacial climatic optimum, some 5000 years ago. This would have effectively barred immigration of open-ground and scrub asilids into western and northern Britain during the period that climatic conditions were most suitable and probably accounts for the absence from Ireland of most of those species occurring in south-eastern parts of Great Britain today. This factor would also account for the absence from Ireland of some of those species known in Denmark that may have been present in Great Britain earlier in the post-glacial period and subsequently died out there. For instance, there is no obvious reason why Antipalus varipes Meigen and Molobratia teutonus L. should not have occurred in Great Britain in the past. The presence of Machimus cowini in Ireland, though it is apparently absent from Great Britain today, would certainly seem to be evidence that some asilids have reached Great Britain during the post-glacial, only to die out there before their presence could be recorded.

It is more of a mystery why certain of the species that have reached Wales or Scotland e.g. Asilus crabroniformis, Dioctria spp., Dysmachus trigonus, Leptogaster spp. and Machimus atricapillus have not reached Ireland. There is no obvious mechanism that would prevent colonisation of Ireland by these species yet allow colonisation by other asilids like Neoitamus cyanurus. It is to these species that one should probably look for potential additions to the Irish list. But if these species are not in Ireland already is there any reason to suppose they might arrive at

some point in the future? With the exception of Dysmachus trigonus and Machimus cingulatus, which can survive in dune systems, I would think it highly unlikely that any of these species might colonise Ireland from now on. The reason is simply that, being dependent upon permanent pasture and scrub, all of these species are now more in danger of being eliminated by loss of habitat than they are likely to colonise new territory. Some of them indeed may well have been present in Ireland in the past and if they are recorded here at some future date it would seem more likely that they have simply been overlooked todate, rather than that they are recent immigrants to Ireland.

Turning to the three woodland asilids known from Scotland or Wales, but absent from Ireland, none of them would be expected here today due to lack of appropriate habitat, though they may have been present in the past. I have argued earlier (Speight, 1985) that the indigenous Irish Pinus sylvestris fauna has virtually died out with the indigenous P. sylvestris. Commercial conifer plantations are unlikely to provide alternative habitat. For instance, the larvae of Laphria flava characteristically live in the well-rotted wood of pines that have died in situ of old age. The larvae of Dioctria oelandica are similarly associated with old deciduous trees.

The deciduous woodland asilids known from southern parts of Great Britain but not known from Ireland are typified by species such as Laphria marginata and Neoitamus cothurnatus. L. marginata is associated with old forests and thus unlikely to be found in Ireland today. It is also now very rare in Great Britain. Only two of these deciduous woodland species, Dioctria cothurnata and D. linearis (Fabricius), are not particularly ancient woodland insects. They are more species of woodland close to water. Why such insects should be absent from Ireland is not clear.

The Irish asilid fauna comprises only 3 species. As such it lacks the majority of the most widely distributed and most frequently encountered species occurring in adjacent parts of Europe. It is all the more remarkable then that one of three Irish species, Machimus cowini, has been found in only a very few European countries and is not known from Great Britain. It has in fact been recorded from more Irish localities than continental European localities. Unless future collecting activity on the continent causes some substantial change in the species' status, M. cowini would appear to be an endangered relict of some sandy soil scrub biotope that has all but disappeared over much of the European range of this insect. This would make M. cowini of both biogeographical and conservation interest in Ireland. Information on the larval biology of this fly would therefore be highly desirable.

The distribution and habitat information tabulated here are derived from Lyneborg (1968), Morgan (1981), Oldroyd (1969), Seguy (1927) and van der Goot (1985), augmented by the author's own experiences in Ireland, Great Britain and on the continent. It has not been possible to give any habitat data for five of the species listed.

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APPENDIX 1: The Asilidae of some temperate atlantic seaboard countries of western Europe, and their habitats.

	IRL	GBE	GB	GBS	NF	N	DK	d	p	s	w
Antipalus varipes Mg.	-	-	-	-	P	+	+		+		
Asilus crabroniformis L.	-	+	+	-	+	+	+		+	+	+
Cerdistus geniculatus Mg.	-	-	-	-	+	+	-				+
Cyrtopogon lateralis (Fal.)	-	-	-	-	-	-	+				+
Dasypogon diadema (Fab.)	-	(+)	-	-	+	-	-				+
Dioctria atricapilla Mg.	-	+	-	-	+	+	+			+	
D. bicincta Mg.	-	-	-	-	+	+	-		+	+	
D. cothurnata Mg.	-	+	-	+	+	+	+		+	+	
D. hyalipennis (Fab.)	-	+	+	-	P	+	+			+	+
D. lateralis Mg.	-	-	-	-	P	-	+			+	
D. linearis (Fab.)	-	+	-	-	P	+	+			+	+
D. longicornis Mg.	-	-	-	-	P	+	-		+		
D. oelandica Macqt.	-	+	+	+	+	+	+				+
D. rufipes (Deg.)	-	+	+	+	+	+	+		+	+	
Dysmachus picipes (Mg.)	-	-	-	-	+	+	+				+
D. rufibarbis (Mg.)	-	+	-	-	P	+	+			+	
D. trigonus (Mg.)	-	+	+	+	+	+	+	+	+		
Erax punctatus (Mg.)	-	-			+	+	-		+		
Laphria dioctriaeformis (Mg.)	-	-	-	-	+	+	-			+	
L. ephippium (Fab.)	-	-	-	-	-	-	+				+
L. flava (L.)	-	-	+	+	+	+	+				C
L. gibbosa (L.)	-	-	-	-	-	+	-				C
L. gilva (L.)	-	+	-	-	P	+	+				C
L. marginata (L.)	-	+	-	-	+	+	+				+

APPENDIX 1: The Asilidae of some temperate atlantic seaboard countries of western Europe, and their habitats. (contd.)

	IRL	GB	GBW	GBS	NF	N	DK	d	p	s	w
Lasiopogon cinctus (Fab.)	-	+	-	-	P	+	+		+		
Leptarthrus brevirostris (Mg.)	-	+	+	+	P	-	+			+	
Leptogaster cylindrica (Deg.)	-	+	+	-	+	+	+		+		
L. guttiventris (Zett.)	-	+	-	+	+	+	+		+		
L. hispanica Mg.	-	-	-	-	+	-	-				
Machimus arthrithicus (Zett.)	-	+	-	-	-	+	+			+	
M. atricapillus (Fal.)	-	+	+	-	+	+	+		+	+	
M. chrisitis Mg.	-	-	-	-	+	-	-				+
M. cingulatus (Fab.)	-	+	+	+	+	+	+	+	+		
M. cowini (Hobby)	+	-	-	-	P	+	-	+			
M. fimbriatus (Mg.)	-	-	-	-	+	-	-				
M. gonastites (Zell.)	-	-	-	-	-	-	+		+		
M. pyragra (Zell.)	-	-	-	-	+	-	-	+		+	
M. rusticus (Mg.)	-	+	-	-	+	+	-				
M. setibarbus (Zell.)	-	-	-	-	-	-	+				
M. setulosus (Zell.)	-	-	-	-	+	+	-	+			
Molobratia teutonus L.	-	-	-	-	P	+	(+)				+
Nemochtherus pallipes (Mg.)	-	-	-	-	P	+	-		+		
Neoitamus cothurnatus (Mg.)	-	+	-	-	+	+	+				+
N. cyanurus (Loew)	+	+	+	+	+	+	+				+
Pamponerus germanicus (L.)	-	+	+	+	+	+	+	+	+	+	
Philonicus albiceps (Mg.)	+	+	+	+	+	+	+	+			
Rhadiurgus variabilis (Zett.)	-	+	-	+	+	+	+				C

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APPENDIX 1: The Asilidae of some temperate atlantic seaboard countries of western Europe, and their habitats. (contd.)

COLUMN HEADINGS:

DK = Denmark; GB = Great Britain; GBS = Scotland; GB W = Wales; IRL = Ireland; N = Netherlands; NF = North France (Channel coast Departments + Paris Basin). d = coastal dune systems (including dune grassland and dune scrub); p = old pasture and grassy heathland; s = scrub; w = mature woodland.

COLUMN ENTRIES:

C = conifer forest species; P = species not known in France, North of the Paris Basin; + = species present; (+) = species believed extinct; - = species not recorded.

APPENDIX 2: Habitats of Welsh and Scottish asilids not known in Ireland.

1. Species whose habitat is unlikely to be present in Ireland:
   Laphria flava, Rhadiurgus variabilis = species of old conifer forest;
   Dioctria oelandica = species of old deciduous forest.

2. Species whose habitat appears to be present:
   Asilus crabroniformis, Dioctria hyalipennis, D. rufipes, Leptogaster cylindrica, L. guttiventris, Machimus atricapillus = open ground/old pasture.

3. Species whose presence in Ireland would be expected:
   Dysmachus trigonus, Pamponerus germanicus = dune species;
   Dioctria cothurnata, Leptarthrus brevirostris = scrub.

APPENDIX 3: Irish distribution records of Asilidae, additional to those published in Chandler (1975).

Machimus cowini (Hobby)

Wexford: 2 July 1976 T 1124 Raven Pt.; abundant on track-side vegetation within conifer plantation; on dune grassland, coll. and det. MS.

Wicklow: 29 August 1979 T 2979 Mizen Hd.; within fixed dune grassland, on patches of bare sand along paths and on rabbit scrape, coll. and det. MS.

Neoitamus cyanurus (Loew)

Down: 26 June 1925, female, J 1718, Rostrevor, coll. W.F. Johnson, det. MS, in collns. NMI.

Kerry: 27 June 1975, male, V 9088 Killarney, Quercus woods, coll. and det. MS.

Offaly: 5 July 1984, male, N 3122 Charleville Wd., Quercus woods, coll. and det. MS.

Tipperary: 18 July 1979 R 9219, Glengarra Wd., mixed woods along stream, coll. D.N. Dowling, det. MS.

Wexford: 14 June 1982, males, S 8840 Ballyhighland, mixed woods, coll. J. O'Connor, det. MS, in collns, NMI.

Wicklow: 6 August 1973, T 0368, conifer plantation, coll. and det. MS; 14 July 1976 O 2117, Knocksink Wd., Quercus/Fraxinus woods, coll. and det. MS; 16 July 1977, female, T 1191, mixed woods, coll. and det. MS; 2 August 1982, male, T 2598, mixed woods, coll. and det. MS; 27 June 1984, T 1890, Quercus woods, coll. and det. MS; 26 June 1925, male, O 21 Glencullen, coll. A.W. Stelfox, det. MS, in collns, NMI; August 1907 O 1116 Powerscourt, coll. J.N. Halbert, det. MS, in collns. NMI.

Philonicus albiceps (Meigen)

Cork: 14 July 1983 W 3234, coastal dunes, coll. and det. MS.

Dublin: 30 August 1972 O 2453, coastal dunes, coll. and det. MS; 29 August 1978 O 2538 Bull Island, coll. and det. M. de C. Williams.

Kerry: 2 July 1980, Q 6117, Castlegregory penninsula, dune grassland, coll. and det. MS.

Wexford: 2 July 1976 T 1124 Raven Pt., dune grassland, coll. and det. MS.

Wicklow: 28 August 1971. T 3184, coastal dunes, coll. and det. MS; 28 August 1979 T 2979, dune grassland, coll. and det. MS.

FIGURE 1: Maps showing known range in Ireland of asilid species. Map 1 = Machimus cowini; Map 2 = Neoitamus cyanurus; Map 3 = Philonicus albiceps. Mapped on UTM grid using 50 km sq. unit.

These distribution data are derived from Chandler (1975) and the additional records given in Appendix 3 of the present text.

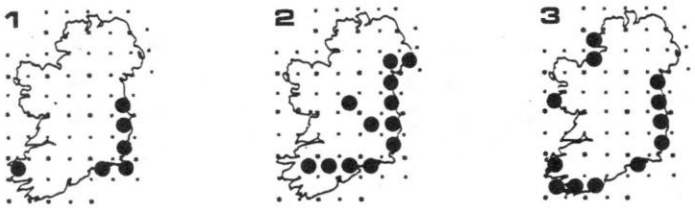
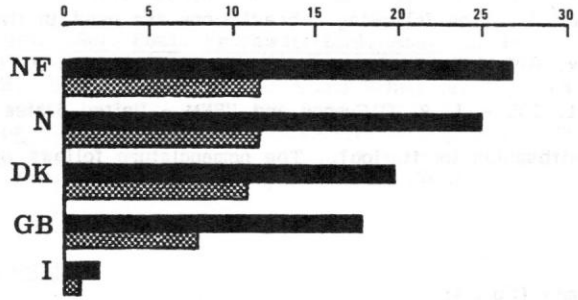


FIGURE 2. Bar chart showing the number of species of Asilidae in different parts of Western Europe. Solid black bars indicate species characteristic of dunes, grassland, heath and scrub. Stippled bars indicate species characteristic of mature and ancient woodland. The scale indicates number of species.

DK = Denmark; GB = Great Britain; I = Ireland; N = Netherlands; NF = Northern France.



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SOME RECORDS OF IRISH NEUROPTERA (INSECTA).

P. C. Barnard, J. P. O'Connor and M. A. O'Connor

During a recent visit to the National Museum of Ireland, the senior author examined the Irish Neuroptera preserved in the National Collections. The opportunity was also taken to identify other Irish material collected by the O'Connors and specimens on loan from the Smithsonian Institution (U.S.N.M.), Washington, U.S.A. This study has yielded numerous new distributional records and these are given below. Unless otherwise stated, specimens are deposited in the National Museum of Ireland. New vice-county records are indicated by an asterisk. The following abbreviations are used in the text:- AWS - A. W. Stelfox, BPB - B. P. Beirne, JMOC - J. P. and M. A. O'Connor, JNH - J. N. Halbert, JOC - J. P. O'Connor and USNM - United States National Museum (Smithsonian Institution). The nomenclature follows Barnard (1978).

Conwentzia psociformis (Curtis)

Down (38): Tollymore J 3532, A. H. Haliday.

Dublin (21): Dundrum O 171280, viii. 1909, J. Scharff; Seapoint O 225292, 27.vi.1938, BPB.

Kildare (19)*: Rye Water O 005363, 9.viii.1981, JMOC, beaten from holly.

North Kerry (2): Killarney V 98, 14-15, 18.vii.1887, J. J. F. X. King.

Waterford (6): Lismore X 047988, vii.1894, JNH; Cappoquin X 095995, 24-25.vii.1902, J. J. F. X. King.

Since the publication of King and Halbert's (1910) list, it has been discovered that the genus Conwentzia contains two species in the British Isles namely C. psociformis and C. pineticola Enderlien. All the examined material proved to be the former species which was recorded by King and Halbert (op. cit.).

Osmylus fulvicephalus (Scopoli)

Dublin (21): Slade of Saggart O 033245, 18.vii.1982, JMOC, taken on bank of small stream flowing through deciduous wood.

North Kerry (2): Muckross, Killarney V 9786, 31.v.1935, Donovan sisters.

Wexford (12): Oaklands wood S 715255, 18.vi.1982, JMOC, swept from Quercus growing beside a small stream.

Wicklow (20)*: Clara T 1792, 22.vi.1925, Rev. G. Foster; Devil's Glen T 2499, 17.vi.1928, A. A. Lisney; Glen of the Downs O 2511, v.1935, JNH, 28.v.1935, 15.vi.1935, 13.vii.1937, all BPB, 11.iii.1984, larvae in bank of small stream, I. D. Wallace, JMOC.

Sisyra fuscata (Fabricius)

Dublin (21): Gollierstown O 014320, 28.vii.1952, AWS.

Laois (14)*: Wheelahan's Bridge N 596111, 6.viii.1950, AWS (USNM); Woodbrook N 517092, 21.viii.1949, AWS (USNM).

Meath (22)*: near Oldbridge O 044761, 24.viii.1986, JOC.

North Kerry (2): Middle Lake, Killarney V 960846, 8.vii.1986, JOC.

South East Galway (15)*: Doorosbeg pier, Lough Derg R 786946, 8.ix.1978, JOC.

Waterford (6)*: Ballymacaw cove X 648991, 6.vii.1984, JMOC.

Wexford (12): Mount Garrett Wood S 720305, 17.vi.1982, JMOC.

Micromus variegatus (Fabricius)

Cavan (30)*: beside Lough Dargan N 604929, 23.viii.1982, JMOC.

Clare (9)*: Ballyeighter loughs R 346940, 29.v.1984, JOC; Lough Luogh R 058936, 31.v.1984, JOC, moorland and bog.

Dublin (21): Gollierstown O 014320, 23.vi.1950 AWS (USNM), 28.vii.1952, AWS. Jobstown O 0324, 9.ix.1949, AWS; Saggart O 0324, 30.v.1935, AWS.

East Donegal (34)*: Finner G 8461, 11.viii.1938, AWS (USNM).

Kildare (19)*: Carton N 9638, 30.v.1948, AWS (USNM); Rye Water O 005363, 9.viii.1981, JMOC.

Meath (22)*: Slane Castle N 942731, 24.viii.1986, P. C. Barnard, JMOC.

North Kerry (2): Kenmare Demense, Killarney V 9590, JNH; Muckross, Killarney V 9786, vi.1905, JNH.

West Galway (16): Bundouglas L 6360, 23.vii.1982, JMOC; Rossleague House, Letterfrack L 688578, 24.vii.1982, JMOC.

Wexford (12): Mount Garrett Wood S 720305, 17.vi.1982, JMOC; Lady's Island Lake T 108074, 30.viii.1980, JOC.

Wicklow (20)*: Bellevue O 2611, 17.viii.1949, AWS; Manor Kilbride O 0217, 19.vii.1950, 27.v.1953, AWS (USNM).

M. angulatus (Stephens)

Dublin (21)*: Portrane O 2549, 20.vii.1950, AWS (USNM).

Kildare (19)*: Landerstown N 853246, 14.viii.1949, AWS (USNM), 25,ix.1949, AWS.

Laois (14)*: Woodbrook N 517092, 21.viii.1949, AWS (USNM).

West Cork (3)*: Glengarriff Forest V 920565, 7.vii.1985, JMOC.

Wicklow (20)*: Powerscourt (O 21), 25.viii.1927, JNH.

This species was previously only known from Kerry and Wexford.

M. paganus (L.)

Clare (9)*: Ballyeighter loughs R 346940, 29.v.1984, JOC; near Ennis, R 292796, 30.v.1984, JOC, in hazel wood; Ballynalackan M 103005, 31.v.1984, JOC.

Dublin (21)*: Malahide O 2243, 1921, JNH.

Waterford (6)*: Lismore X 047988, vii.1896, JNH.

Wexford (12)*: Ballyhighland wood S 882407, 14.vi.1982, JMOC.

Wicklow (20): Glen of the Downs O 263110, 27.viii.1981, JOC.

Hemerobius humulinus L.

North Kerry (2)*: Kenmare Estate, Killarney V 945905, 8.ix.1981, JOC.

Wexford (12)*: Ballyhighland wood S 882407, 14.vi.1982, JMOC; Oaklands wood S 718259, 18.vi.1982, JOC; The Raven T 1126, 4.vi.1986, JOC, swept from conifers.

Wicklow (20): Deputy's Pass T 2390, 1.v.1932, AWS; Glen of the Downs O 2611, 30.iv.1954, AWS (USNM); Russborough N 9611, 16.iv.1982, JMOC; Russellstown Park N 964109, 7.viii.1982, JOC.

King and Halbert (1910) only give records from Donegal, Mayo and Wicklow.

H. simulans Walker (orotypus Wallengren)

Dublin (21)*: Glendhu O 139209, 1909, JNH; Slade of Saggart O 033245, 1.xi.1981, JMOC.

Laois (14)*: The Derries N 586050, 20.ix.1982, JOC.

North Kerry (2): Cloghereen stream, Killarney V 977867, 10.ix.1981, JOC.

Wicklow (20)*: Russellstown Park N 964109, 19.ix.1982, JOC.

H. stigma Stephens

Down (38)*: Tollymore J 3532, 4.iv.1957, AWS; Tullybrannigan J 369308, 31.iii.1960, AWS (USNM).

Dublin (21): Furry Glen, Phoenix Park O 0935, 10.iii.1936, AWS.

Kildare (19)*: Newbridge Fen N 767166, 12.iv.1982, JMOC.

Wicklow (20): Avoca mines T 1981, 18.iii.1934, AWS.

H. nitidulus Fabricius

Kildare (19)*: Brockagh N 7826, 29.viii.1948, AWS (USNM); west of Sallins N 8922, 4.viii.1939, AWS.

King and Halbert (1910) considered this species to be "apparently rare" in Ireland, having obtained it at only two sites in Killarney, Co. Kerry.

H. micans Olivier

Clare (9)*: near Ennis R 292796, 30.v.1984, JOC.

Dublin (21): Phoenix Park O 096358, 17.iv.1982, JMOC, swept from Crataegus and Fraxinus; Slade of Saggart O 033245, 7.viii.1981, JOC, 18.vii.1982, JMOC.

Kildare (19)*: Carton N 9638, 30.v.1948, AWS; Castletown House N 975345, 8.viii.1982, JMOC, mixed wood.

Laois (14)*: The Derries N 586050, 20.ix.1982, JOC, mixed wood.

Wexford(12)*: Ballyhighland wood S 882407, 14.vi.1982, JMOC.

Wicklow (20): Bushy Park O 224157, 7.xii.1955, AWS (USNM); Glen of the Downs O 263110, 27.viii.1981, JOC; Russellstown Park N 964109, 16.viii.1981, JMOC.

H. lutescens Fabricius

Dublin (21): Glenasmole O 1119, 20.v.1949, AWS (USNM); Jobstown O 0827, 5.ix.1948, AWS; Malahide O 2243, 1921, JNH.

Meath (22)*: Slane Castle N 942731, 24.viii.1986, P. C. Barnard, JMOC.

Wexford (12): Lady's Island Lake T 108074, 30.viii.1980, JOC; Rosslare T 091179, 13.v.1981, JOC.

Wicklow (20): Manor Kilbride O 0217, 1.vi.1949, AWS (USNM).

H. marginatus Stephens

North Kerry (2): Muckross, Killarney V 9786, vi.1935, the Donovan sisters.

Waterford (6)*: Ballymacaw cove X 648991, 6.vii.1984, JMOC.

West Cork (3)*: Glengarriff Forest V 915570, 4.vii.1985, JOC.

Wicklow (20): Glen of the Downs O 263110, 27.viii.1981, JOC.

Wesmaelius betulinus (Strom) (nervosus Fabricius)

Dublin (21): Phoenix Park N 096358, 17.iv.1982, JMOC, swept from Crataegus and Fraxinus.

Kildare (19)*: Carton N 9638, 30.v.1948, AWS (USNM).

Wexford (12)*: Lady's Island Lake T 108074, 30.viii.1980, JOC.

W. subnebulosus (Stephens)

Dublin (21): Harold's Cross O 1432, 13.vii.1950, 15.vii.1950, AWS (USNM);

Seapoint O 225292, 12.vii.1937, BPB.

North Kerry (2)*: Kenmare Estate, Killarney (V 945905), 8.ix.1981, JOC.

West Donegal (35)*: Ards Coast, 17.vi.1955, AWS.

Chrysopa flava (Scopoli)

Dublin (21): Ballyboden O 1227, 13.vi.1928, F. T. Riley.

Kildare (19)*: Castletown House N 975345, 8.viii.1982, JMOC.

North Kerry (2): Killarney V 98, 1921, v.1926, E. F. Bullock.

C. vittata Wesmael

West Galway (16)*: Bundouglas L 6360, 23.vii.1982, JMOC.

C. ciliata Wesmael (alba (L))

Down (38)*: Donard Lodge J 367298, 4.vii.1945, AWS (USNM).

Wexford (12): Mount Garrett Wood S 720305, 17.vi.1982, JOC.

C. albolineata Killington

Carlow (13)*: Fenagh, 19.iv.1926, cocoon found under stone, imago emerged 27.v.1926.

Dublin (21): Fairview O 1763, 16.vii.1984, J. Lyons.

Killington (1936, 1937) reports this species from Armagh and Dublin.

C. carnea Stephens (vulgaris Schneider)

Down (38)*: Tullybrannigan (J 369308), 25.ix.1958, AWS (USNM).

Dublin (21): Cruach Wood O 1422, 18.iv.1977, E. P. Kelly; Malahide Castle O 2243, 13.x.1985, JMOC; Slade of Saggart O 033245, 9.iv.1982, JMOC.

Laois (14)*: The Derries N 586050, 20.ix.1982, JOC.

North Kerry (2)*: Galway's Bridge, Killarney V 912804, 9.ix.1981, JOC; Kenmare Estate, Killarney V 945905, 8.ix.1981, JOC; near Doo Lough, Killarney V 952862, 11.ix.1981, JOC.

South Kerry (1)*: Skelligs Lighthouse V 26, 22.ix.1943, D. P. Sullivan.

West Galway (16)*: Rossleague Manor, Letterfrack L 688578, 24.vii.1982, JMOC.

Wexford (12): Ballyteige S 9605, 12.vi.1982, JMOC, sand-dunes; Curracloe T 1127, 12.vi.1982, JMOC, sand-dunes; Stoneyford T 106098, 5.ix.1980, JOC, to light in caravan.

Wicklow (20)*: Coolattin T 018692, 14.ix.1984, JOC, swept from Quercus; Russborough N 9611, 16.iv.1982, JMOC; The Murrough, Newcastle O 315045, 29.v.1928, AWS.

Inexplicably, there are few published Irish records of this apparently common species.

C. ventralis ventralis Curtis

Armagh (37)*: Mullinure, 25.vi.1885, W. F. Johnson.

C. abbreviata Curtis

Dublin (21): Portrane, North O 2549, 9.vii.1930, AWS (USNM). This species confirmed as Irish by O'Connor (1983).

Discussion

The high number of new vice-county records given above is an indication of how little work has been carried out on the Irish Neuroptera since King and Halbert's (1910) list. They recorded 28 species definitely for Ireland and recently Speight (1976, 1979) added another two viz. Hemerobius pini Stephens and Wesmaelius quadrifasciatus (Reuter). This total of 30 species

contrasts with the 57 known from Great Britain. This difference is undoubtedly artificial and is due to the lack of intensive collecting. In addition, the present data demontrate how little is known about the distribution of the Irish species. King and Halbert (1910) for example only record C. carnea from three sites (in toto) in counties Dublin, Westmeath and Wexford yet in our experience the species is widespread in Ireland. It is possible that it may be a recent arrival that is spreading throughout the island.

Acknowledgement

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THE CLADOCERA (CRUSTACEA) OF COUNTY OFFALY, IRELAND.

Catherine Duigan

Introduction

Little work has been carried out to date on the cladoceran fauna of County Offaly. This county, which straddles the catchments of the River Shannon and Boyne has been described by Praeger (1937) as "the most bog-covered part of the Central Plain". No less than one-fifth of its was at one time buried under a mantle of peat. The soils of the intervening areas are composed of glacial drifts derived from the underlying Carboniferous limestone. The protective covering of peat has largely prevented the development of limestone lakes, as in Westmeath. Aquatic biologists have tended to concentrate studies in areas containing large lakes and rivers and a result the aquatic fauna of Offaly has been neglected.

The Cladocera of the neighbouring county of Laois have been studied by McCall (1983). Kane (1900) described an attempt to collect in an unspecified very shallow lake near Clonmacnoise, possibly Fin Lough or the even shallower Lough Nanag, but "owing to the boat having but one oar it was impossible to reach the deeper water and Eurycercus lamellatus was almost the only species taken". Reynolds (1986) reported on the crustacea of Lough Roe, Clara Bog. Fitzmaurice (1977) included four sites in County Offaly (Pallas Lough, Raheen Lough, Gloster Lake and Derryadd Lake) in his study of the Freshwater Cladocera of Ireland and their relative abundance in the diet of fishes.

In the present study collections were taken from 11 sites in the autumn of 1984 and 1985. Qualitative samples were taken with a hand-held plankton net (mesh size = 0.2mm) in the littoral regions of lakes to a depth of 2m, and in small pools. A brief description of each sampling locations is given below. Samples were fixed in 40% formalin in the field. The taxonomic keys of Scourfield and Harding (1966) and Flössner (1972) were used for identification. All samples examined during the study will be deposited in the National Museum of Ireland, Dublin.

Sampling locations

1. Daingean Bog. near Ballycommon (N 423281).

Raised bog.

Collections were taken from two habitats:

(a) Small pools lined with Spnagnum sp. on bog surface.

(b) Large ditch at base of peat cutting terrace. Water brown in colour. Rooted macrophytes such as Potamogeton sp., Lemna sp. floating on water surface.

Sampling date: 29 Sept. 1984.

2. Clara Bog (N 256299).

Raised bog, south of Clara. Quoted as "the best known remaining Atlantic European example of a bog with a soak system of lakes on the peat surface" (van Eck et al., 1984).

Collections were taken from three habitats:

(a) Occasional pools lined with Sphagum sp. on bog surface.

(b) Shallow drainage ditches cut into the peat in 1984. Floating clumps of Utricularia vulgaris (L.) present.

(c) Large pool surrounded by floating platform of Sphagnum sp., Menyanthes

sp. and sedges. Located directly east of lay-by on bisecting road.
Sampling dates: 5 Nov. 1984, 11 Oct. 1985, 10 Nov. 1985 and 18 Nov. 1985.

3. Mongan's Bog (N 028302).
Raised bog near Clonmacnoise. Bordered by an esker on the north side. Sampled in shallow drainage ditches which were damed every 3m. Sphagnum sp. was dominant vegetation.
Sampling date: 11 Oct. 1985.

4. Lough Nanag (N 002286).
Small shallow lake situated on boundary between developed peatland and esker ridge. Extensive growth of filamentous green algae in water. Also, Potamogeton sp. present.
Sampling dates: 5 Nov. 1984 and 11 Oct. 1985.

5. Fin Lough (N 034296).
This lake, on the peat-glacial drift boundary, is currently diminishing in size by encroaching mixed beds of Juncus sp., Typha sp., Phragmites sp. and Equisetum sp. Myriophyllum sp. in open water.
Sampling dates: 5 Nov. 1984 and 11 Oct. 1985.

6. Rathdrum House Pond (N 417281).
Small shaded pond with a dense growth of broad-leaved Iris. Usually dry in summer.
Sampling date: 12 Oct. 1985.

7. Pallas Lake (N 277194).
Limestone Lake. First sample taken in marginal marsh of Phragmites sp. and Equisetum sp. Second sample taken in flooded grassland.

Sampling dates: 5 Nov. 1984 and 11 Oct. 1985. Also sampled by Fitzmaurice (1977) on 21 May 1969 and 20 May 1970.

8. Charleville Lake (N 316232).

Located on Charleville Castle Demesne, south of Tullamore. Bordered by Typha sp. and sedges. Lemna sp. on water surface.

Sampling dates: 5 Nov. 1984 and 11 Oct. 1985.

9. Raheen Lough (N 464185).

Small lake with stony substrate, south-east of Geashill. Stands of Equisetum sp. and Juncus sp.. Extensive growth of filamentous green algae in water.

Sampling date: 5 Nov. 1984. Also sampled by Fitzmaurice (1977) on 13 March 1972 and 15 March 1973.

10. Birr Castle Lake (N 052050).

Lake created by Sir William Parsons in the 1780's in marsh land through which the River Camcor flowed. Water level artifically controlled. Bottom covered with coarse Chara sp.. Beds of Scirpus lacustris away from shore.

Sampling dates: 27 Nov. 1984 and 12 Oct. 1985.

11. Lake in Glassderry Wood, Gloster (S 009942).

Small lake north-west of Roscrea, completely surrounded by mixed woodland. Leaf debris on lake bottom. Sample taken in extensive Equisetum bed.

Sampling date: 27 Nov. 1984. Also sampled by Fitzmaurice (1977) on 6 May 1966 and 19 June 1972.

12. Derryadd Lough (N 130140).

Small lake with average depth of 5m. west of Kilcormac.
Sampled only by Fitzmaurice (1977) on 23 June 1964, 20 Dec. 1972, 19 June 1972 and 19 Dec. 1972.

Results and discussion

The total species list for the sites sampled in County Offaly is presented in Table 1. The dual nature of the terrain in the county, with it's peatlands and glacial drift, has resulted in a bipartite cladoceran community. Streblocerus serricaudatus (Fischer), Acantholeberis curvirostris (O. F. Muller), Chydorus ovalis Kurz and to a lesser extent Alona rustica Scott are species characteristic of bog habitats (Fryer, 1984) and in this study they occurred most abundantly at locations 1, 2 and 3 (Table 1). Cladoceran communities from acid peatland environments have relatively few species whose distribution varies between microhabitats. C. ovalis, only recorded at locations 1, 2 and 4, can survive in small pools that dry up during the summer and it has been recovered from a depth of 10cm in the turf on a North Mayo bog (McCall, 1983). Simocephalus vetulus (O. F. Muller), Alona guttata Sars, Alonella nana (Baird), A. excisa (Fischer) and Chydorus cf. sphaericus were recorded by Gurney (1921) from another area of the Bog of Allen at Newbridge, Co. Kildare.

In contrast to these peatland environments, the limestone based Pallas Lake has the greatest diversity of Cladocera with 7 non-chydorid and 17 chydorid species (Table 1). The community structure here is characterised by species favouring more open water conditions, such as members of the genus Pleuroxus with four species recorded and Acroperus harpae (Baird) which "swims jerkily among weeds or in relatively open water but not in muddy pools"

(Scourfield and Harding, 1966). Graptoleberis testudinaria (Fischer) seems to favour beds of wide leaved macrophytes which act as the ideal flat substrate suited to its method of vacuum feeding (Fryer, 1968).

Gamogenetic cladoceran populations have not been reported in previous Irish studies. During this investigation gamogenesis was observed at a number of locations (Table 2). Autumn is considered to be the most favourable time for the isolation of gamogenetic populations of Cladocera because in permanent water bodies males only appear with the advent of deteriorating environmental conditions. Concurrently, some females develop ephippia and after fertilisation, diploid resting eggs are released into these modified brood pouches. Ephippia can survive complete dessication and freezing and, also, enable population dispersal.

The production of ephippia is not an exclusive autumnal phenomenon and some cladoceran populations survive in areas where water is not present all year round as demonstrated by the results from Rathdrum House Pond (location 6). It appears likely that the three cladoceran populations found here have the ability to produce ephippia before the summer drought (Table 1). Gamogenetic populations of C. sphaericus sensu.str. and Daphnia pulex (De Geer) were also recorded in a temporary pool in the Murrough, Co. Wicklow on 14 June 1986. The seasonal initiation and duration of gamogenesis within a certain species or population is certain to vary with local and annual environmental conditions but comparison with data from other parts of Ireland collected during this study shows that Alona rectangula Sars is usually the first chydorid species to produce males and ephippial females within it's populations on the approach of autumn.

The co-occurrence of cladocera with the rootless bladderwort, Utricularia vulgaris (L.), in the shallow drainage channels on the surface of Clara Bog (location 2b) is of interest. This plant can survive where natural mineral salts are lacking by obtaining nourishment from decaying animals. It's common name is derived from a series of translucent teardrop shaped bladders which have a cluster of small trigger hairs at one end. When an animal touches one of these hairs a trap door opens, releasing a partial vacuum within the bladder and resulting in an inflow of water and prey (Lloyd, 1942). Meyers and Strickler (1978) have described the association between C. cf. sphaericus and U. vulgaris which serves as a feeding substrate and predator. Digestive enzymes are not secreted by the plant but rather the soluble products are absorbed by the plant on decomposition of the prey. Then the water and any animal remains are pumped out and the trap is reset.

The taxon Chydorus sphaericus in Ireland is now known to contain at least two different morphotypes (Duigan and Murray, in press). Both C. sphaericus sensu.str. and a type with a dimpled carapace co-exist at location 2c in Clara Bog but at all other locations in this study only C. sphaericus sensu.str. was encountered.

A total of 47 taxa (composed of 23 genera, including 41 species and one variety of cladocera is now known for County Offaly. The commonest species of Cladocera all occur in County Offaly but some rare species such as Monospilus dispar Sars and Oxyurella tenuicaudis (Sars) have also been found. As more wet habitats within the county are investigated it is likely that additional species will be encountered.

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TABLE 1. Cladocera identified from 12 locations in County Offaly. P=Present.

* = records by Fitzmaurice (1977). He also recovered Sida crystallina from the River Camcor, at Shannonbridge, Co. Offaly.

Location Number	1		2			3	4	5	6	7	8	9	10	11	12
	a.	b.	a.	b.	c.										
Eurycercus lamellatus (O. F. Muller).					P.		P.	P.		P.*	P.	P.	P.	P.*	*
Graptoleberis testudinaris (Fischer).					P.			P.		P.	P.			P.	
Alona rectangula Sars.		P.			P.		P.	P.		P.	P.	P.	P.	P.	
guttata Sars.	P.			P.	P.			P.		P.	P.				*
rustica Scott.			P.		P.	P.	P.				P.			P.	
costata Sars					P.			P.		P.		P.	P.		
affinis (Leydig).					P.		P.	P.		P*	P.	P.*	P.		*
quadrangularis (O. F. Muller).							P.			P.					
intermedia Sars.								P.							
Alonella nana (Baird).	P.	P.		P.	P.	P.	P.	P.		P.	P.				
excisa (Fischer).			P.		P.	P.	P.	P.		P.	P.		P.	P.	
exigua (Lilljeborg).							P.	P.		P.					
Pleuroxus trigonellus (O. F. Muller).		P.					P.	P.	P.	P.*	P.				
laevis Sars							P.	P.			P.				
truncatus (O. F. Muller).					P.			P.		P.	P.				
aduncus (Jurine).								P.			P.				
Chydorus sphaericus sensu. str. (O. F. M.)	P.	P.	P.	P.	P.	P.	P.	P.	P.	P.*	P.	P.*	P.	P.	*
cf. sphaericus.					P.										

TABLE 1 (Contd).

Location Number	1		2			3	4	5	6	7	8	9	10	11	12
	a.	b.	a.	b.	c.										
ovalis Kurz.	P.			P.	P.		P.								
piger Sars.							P.							P.	
Acroperus harpae (Baird).							P.	P.		P.	P.	P.	P.	P.	*
elongatus (Sars).															*
Disparalona rostrata (Koch).							P.			P.					
Pseudochydorus globosus (Baird).								P.		P.	P.			P.	
Monospilus dispar Sars.										P.				P.	
Oxyurella tenuicaudis (Sars).											P.				
Daphnia sp.							P.			P.	P.	P.			*
hyalina s.str. Leydig.															
var. lacustris Sars.										*				*	
Daphnia pulex Leydig.							P.		P.	P.*				*	
Bosmina sp.											P.	P.	P.		
Bosmina longirostris (O. F. Muller).														P.	*
Ceriodaphnia sp.				P.	P.		P.			P.	P.		P.		
megalops Sars.	P.													*	
pulchella Sars.														*	*
quadrangula (O. F. Muller).														*	

TABLE 1 (Contd).

Location	1		2			3	4	5	6	7	8	9	10	11	12
	a.	b.	a.	b.	c.										
Scapholeberis sp.						P.	P.	P.							
mucronata (O. F. Muller).				P.							P.				
Simocephalus serrulatus (Koch).								P.					P.		
vetulus (O. F. Muller).	P.						P.	P.		P.*	P.			P.	*
Sida crystallina (O. F. Muller).										P.					*
Latona setifera (O. F. Muller).								P.							
Lathonura rectirostris (O. F. Muller).										P.	P.		P.		
Streblocerus serricaudatus (Fischer).			P.	P.	P.	P.									
Acantholeberis curvirostris (O. F. Muller).				P.	P.	P.									
Polyphemus pediculus (L.).							P.			P.	P.				*
Ilyocryptus sp.			P.		P.										

TABLE 2. The occurrence and location of gamogenetic cladoceran populations in the autumns of 1984 and 1985 in Co. Offaly. Gamogenesis is defined as the presence of males and/or ephippial females within a single population.

Sampling dates :	29 Sept. 1984	5 Nov. 1984	27 Nov. 1984	11 Oct. 1985	12 Oct. 1985	10 Nov. 1985	18 Nov. 1985
Daphnia pulex					6.		
Ceriodaphnia sp.		4.7.8.		4.7.8.		2b.	
Scapholeberis sp.				3.			
Scapholeberis mucronata.		8.					
Streplocerus serricaudatus.				2b.3.			
Acantholeberis curvirostris.				3.			
Graptoleberis testudinaris.			11.				
Alona rectangula.	1b.	9.			10.		
costata.		7.		7.	10.		
Alonella nana.		2c.				2c.	2c.
excisa.		2a. 5.		2c.3.7.		2c.	2c.
Pleuroxus truncatus.		2c.5.7.8.		5.7.8.		2c.	
Chydorus sphaericus sensu str.				3.			
ovalis.		2c.				2c.	2c.

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THE AQUATIC VEGETATION OF DERRYLEA LAKE, WEST GALWAY, IRELAND, WITH SPECIAL REFERENCE TO THE MOSSES, FISSIDENS POLYPHYLLUS WILS. EX BR. EUR. AND CALLIERGON TRIFARIUM (WEB. AND MOHR) KINDB.

J. Caffrey and D. M. Synnott

As part of a biological investigation on Derrylea Lake (L 7150) (undertaken by the Central Fisheries Board) samples of the aquatic flora were collected and returned to the laboratory for identification. Among the samples, the mosses Fissidens polyphyllus Wils. ex br. Eur. and Calliergon trifarium (Web. & Mohr) Kindb. were present. Both species are rare and the Derrylea L. finds are an interesting addition to the Irish bryological record.

Derrylea Lake covers an area of 63 acres. It lies at an elevation of 150m. The surrounding land consists primarily of blanket bog. The lake is a deep-water system where maximum depth reaches 25 metres. Shallow marginal areas are restricted to two bays, one at the eastern end and one at the western end of the lake. Elsewhere depth falls sharply to 5m, leaving a very narrow marginal zone in which submerged aquatics can establish and grow. The substrate along the steep margins is of a rocky nature. In the sheltered bays a thin layer of fine silt carpets the lake floor.

The water in Derrylea Lake is soft (20-30mg/1 CaCO3) and has an acidic pH (6.2). Phosphate and nitrate levels are low (0.003 and 0.05 mg/l respectively). Transparency was low (1-5m) on both sampling occasions, February and May 1986.

The aquatic flora is restricted to the shallow bays at either end of the lake

and to a very narrow marginal band elsewhere. The dominant macrophyte is Isoetes lacustris L. This plant carpets the more silted margins and often forms pure stands. In places it grows with Littorella uniflora (L.) Aschers. Beyond the Isoetes/Littorella zone, small and often isolated stands of Nitella sp. are present.

In the more sheltered areas of the lake a healthy community of bryophytes is present. The most conspicuous member of this community is Calliergon cuspidatum (Hedw.) Kindb., although in all four samples taken F. polyphyllus was also present. In only one sample however, taken from the western end of the lake, was C. trifarium present. At that site C. trifarium grew with C. cuspidatum and F. polyphyllus.

F. polyphyllus is already known from Wicklow, Waterford, Cork, Kerry and Sligo. Its presence in West Galway is not therefore unexpected. (D.S. has seen specimens of this species collected on Inishboffin in the 1960's but the record remains unpublished). The species occurs also in S.W. England, Wales, and Western Scotland and in Southern Norway, France, Spain, Portugal and Macaronesia. Ratcliffe (1968) classifies it as a Southern Atlantic species in Europe together with some ten other mosses which include Cyclodictyon laete-virens (Hook and Tagl.) Mitt. and Orthotrichum rivulare Turn. and seventeen hepatics which include Adelanthus decipiens (Hook.) Mitt. and Porella pinnata L.

Smith (1978) states that, in Britain and Ireland, F. polyphyllus grows on soil or rocks by streams and rivers and on flushed rocks; in Norway it grows on wet or submerged rocks (Nyholm, 1954-1969). Ratcliffe (op. cit.) includes F. polyphyllus in a list of Atlantic bryophytes that grow on wet rocks in

shady places.

C trifarium was already known in Ireland only from the Burren, Co. Clare and Errisbeg Mt., Co. Galway. The first Irish record was from the dried floor of a turlough, south of Mullagh More, Co. Clare, 1953, M. C. F. Proctor (Warburg, 1954). Dr. Proctor subsequently discovered it in "peat cuttings with open cover of Carex nigra (L.) Reichard, Potentilla palustris (L.) Scop., etc., N.E. of Little Templebannagh L., Co. Clare, 1959" (specimen in DBN). The species was collected from the south side of Errisbeg Mt. by Dr. Asbjorn Moen, during the International Vegetation Meeting in July 1980. At Errisbeg, C. trifarium grows in rich carpet vegetation together with Drepanocladus revolvens (Sw.) Warnst. and Scorpidium scorpioides (Hedw.) Limpr. (Moen and Synnott, 1983). Errisbeg Mt. is just 10km due south of Derrylea Lough. There have been a number of finds of C. trifarium remains in peat of Boreal age in Ireland; at Tigh Mochua (Timahoe) Co. Kildare (Barry and Synnott, 1970 and 1984), Fore, Co. Westemath (Synnott, 1982) and at Ballydermot, Co. Offaly (specimen in DBN).

In Great Britain C. trifarium is confined to Scotland where it grows in basic mountain flushes. It occurs in North and Central Europe, Iceland, Faroes, Central Asia, North America, and Greenland (Smith, 1978). In Fennoscandia it grows in rich fens, often associated with Drepanocladus species and Scorpidium in the forest up to the middle alpine region of the mountains. In Eastern North America it is reported from similar fen habitats and grows often emergent from the shallow water of pools (Crum and Anderson, 1981). On the Pacific side of North America it is a species of calcareous habitats, often completely submerged, from the lowlands to 2,400 m or higher (Lawton, 1971).

While F. polyphyllus is a Southern Atlantic species in Europe, C. trifarium shows a northern and continental tendency. Ratcliffe (op. cit.) observes that this intermingling of northern and southern bryophytes is to be expected in the same way as the overlapping of similar geographical elements of the vascular flora: in the areas of overlap the climate is so equable that the temperatures lie within the tolerances of both groups, with summers which are never too warm for the northern species and winters which are never too cold for the southern species.

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Bull. Ir. biogeog. Soc. No. 10

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

J. M. C. Holmes

This is the fourth in a series on the crustacean fauna of Lough Hyne (Ine) (W 0928), a sea lough in West Cork, and reports interesting additions to the earlier lists (Holmes, 1980, 1983, 1985b). Many scientific papers (e.g., Kitching & Thain, 1983), including the three previous works in this series, have used the name 'Lough Ine'. However, the title 'Lough Hyne (Ine)' will now be used in this paper and further ones in the series, following the example of Maggs et al. (1983) and Wilson (1984). The area investigated in this crustacean survey included the lough itself with its North and South Basins and Western Trough, the Goleen, the Whirlpool Cliff area, and also the Rapids and Barloge Creek out as far as the open sea.

Sampling was carried out by a variety of methods; shore collecting, sorting through weed and gravel, and by means of an underwater light trap. New Irish Records are indicated by *. A selection of the animals collected has been deposited in the National Museum of Ireland.

Species List

Order PODOCOPIDA

Paradoxostoma abbreviatum G. O. Sars: Males occasionally in light traps. Horne and Whittaker's (1985) revision of the genus Paradoxostoma has facilitated the identification of these ostracods. A search through material collected by the author in previous years has yielded four species. Another, P. tenuissima (Norman), has already been recorded by Holmes (1985b) in the

genus Machaerina.

Paradoxostoma normani Brady: Occasionally in light traps.

Paradoxostoma sarniense Brady: In washings from the purple sea urchin, Paracentrotus lividus (Lamarck), July 1982.

*Paradoxostoma trieri Horne and Whittaker: One specimen in light trap in North Basin, July 1982.

Pontocypris trigonella G. O. Sars: One specimen in light trap in North Basin, July, 1981.

Order CALANOIDA

*Pseudocyclopia stephoides I. C. Thompson: In coarse shell gravel in Barloge, July 1985.

*Platycopia perplexa G. O. Sars: One female specimen in fine shell gravel in Barloge, July 1985.

Order HARPACTICOIDA

Phyllopodopsyllus bradyi (T. Scott): In fine shell gravel in Barloge, July 1985.

Order SIPHONOSTOMATOIDA

Dyspontius striatus Thorell: Two males in light trap, Whirlpool Cliff, August 1983.

Order CYCLOPOIDA

Cyclopina gracilis Claus: In gravel in shallow water in the North Basin.

*Halicyclops neglectus Kiefer: In gravel in shallow water in the North Basin.

Doropygus pulex Thorell: four specimens from ascidian Pyura microcosmus (Savigny), Whirlpool Cliff, July 1980.

Enterocola sp: Male specimens occasionally in light traps.
A number of species of Enterocola are known as females living in tunicates. The males are free-living. The present material corresponds as far as can be observed to the male of E. fulgens van Beneden, as described by Canu (1982) under the name E. betencourti. However the males of several enterocoline species remain to be described.

Haplostoma brevicauda (Canu): One female specimen from ascidian Sydnium turbinatum Savigny, August 1985.

*Haplostoma mizoulei Monniot: Three specimens, a male and two females, from ascidian, S. turbinatum, August 1985.

Order POECILOSTOMATOIDA

*Scambicornus armoricanus (Bocquet, Stock & Kleeton): One male specimen in light trap near rapids, July 1983.
A female copepod recorded as S. finmarchicus (T. Scott) by Holmes (1985b) may correspond to the unknown female of S. armoricanus. However, since the two species were described only from opposite sexes, their precise relationship awaits a taxonomic reappraisal.

Conchyliurus cardii Gooding: One specimen in light trap in Barloge, July 1985. Discovered too late for inclusion in a summary of clausidiid records by Holmes (1986).

Hersiliodes latericia (Grube): Three juvenile specimens in light traps, July 1981.

Anchistrotos lucipetus Holmes: Frequently taken in light traps in the North Basin, and on gobies.

This species was originally described from Lough Hyne (Ine) by the author (Holmes, 1985a). At that time, few specimens had been found and little was known about their habits. Since then, additional information has come to hand.

A. lucipetus belongs to a family, the Taeniacanthidae, parasitic on fish and echinoderms (Dojiri and Humes, 1982). The members of the genus Anchistrotos are all fish parasites and it was presumed that A. lucipetus would be likewise. The first specimens were collected by light trap and the host was unknown.

In July 1985 it was discovered, jointly with Dr. Dan Minchin, that A. lucipetus is a parasite of gobies. Specimens were discovered in small numbers on the following fish: Black goby (Gobius niger L.), Red mouthed goby (Gobius cruentatus Gmelin), Rock goby (Gobius paganellus L.), Couch's goby (Gobius couchi Miller), Fries' goby (Lesueurigobius friesii (Collett)).

A. lucipetus was not found with : Transparent goby (Aphia minuta (Risso)), Two-spot goby (Chaparrudo flavescens (Fabricius)), Painted goby (Pomatoschistus pictus (Malm)).

The parasites were not observed in situ. It is probable that they move freely about in the oral cavity and gill regions of their host, but they are loosely attached and drop off at the slighest irritation. The specimens recovered from fish were covered in mucus, and this may account for their having been overlooked previously.

Also in July 1985, for the first time, live specimens of A. lucipetus were examined and the following notes made. The body colour was pale white with scattered brown and yellow spots. The eyes were bright red, situated close together on the dorsal side. The colours faded rapidly on preservation and had not been observed before.

*Leposphilus labrei Hesse: one female specimen from the lateral line of a Corkwing wrasse Crenilabrus melops (L.) captured by Dr. Dan Minchin in July 1981.

Order AMPHIPODA

Eulimnogammarus obtusatus (Dahl): Under stones at low tide level in Barloge, near the Rapids, July 1986.

In the Collections of the National Museum there are some specimens of this species labelled "Lough Hyne. A. R. Nichols, N.M.I. 190.1895", but despite much searching it was not until 1986 that it was possible to confirm its presence within the area .

Pontocrates arenarius (Bate): One specimen in light trap at the Whirlpool Cliff, June 1984.

Colomastix pusilla Grube: Two specimens in mud near the Rapids, one in July 1983, and the other in July 1985.

Stenothoe elachistoides Myers and McGrath: In coarse shell gravel in Barloge, July 1985. Otherwise only known from Kilkieran Bay, Co. Galway (Myers and McGrath, 1980). This is only the second known locality for the species since its description.

Liljeborgia kinahani (Bate): Abundant in weed and coarse shell gravel in Barloge, July 1985.

Tritaeta gibbosa (Bate): One specimen in light trap at the seaward end of Barloge, July 1986.

Corophium acutum Chevreux: Amongst weed in shallow water along the south shore of the lough, August, 1985.

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Bull. Ir. biogeog. Soc. No. 10

THE FAMILIES ANISOPODIDAE AND THAUMALEIDAE (DIPTERA: NEMATOCERA) IN IRELAND WITH COMMENTS ON RELEVANT HALIDAY MANUSCRIPTS.

Patrick Ashe

Introduction

A detailed account of the distribution and faunal composition of the families Anisopodidae and Thaumaleidae in Ireland has never previously been published. There are few Irish records in the literature relating to either family and many of these published records are incomplete regarding locality and/or date collected. The identity of all the pinned material of these families in the National Museum of Ireland has been rechecked with the exception of some female Anisopodidae.

Distribution records

For all recent records the Irish national grid reference (six or four figure reference) is given followed by the Universal Transverse Mercator (UTM) 50 km grid reference in parenthesis. In the case of older records only the UTM grid reference is given, when possible, because locality information was often very imprecise. The inclusion of the UTM grid references is to facilitate the eventual incorporation of data on Irish insects into the European Invertebrate Survey distribution map scheme. Where records have been taken from the literature the relevant reference is cited (followed by an * if the original material has not been seen).

Bull. Ir. biogeog. Soc. No. 10

CHECKLIST OF IRISH ANISOPODIDAE AND THAUMALEIDAE

(* = species new to Ireland)

ANISOPODIDAE

*Sylvicola cinctus (Fabricius, 1787)

S. fenestralis (Scopoli, 1763)

S. punctatus (Fabricius, 1787)

*S. zetterstedti (Edwards, 1923)

Mycetobia pallipes Meigen, 1818

THAUMALEIDAE

Thaumalea testacea Ruthé, 1831

T. verralli Edwards, 1929

Nomenclature follows Kloet and Hincks (1976).

List of collectors and abbreviations used for collectors' names:-

P. Ashe = PA; B. P. Beirne = BPB; K. Bond = KB; G. H. Carpenter = GHC;

F. W. Edwards = FWE; J. A. Good = JAG; J. N. Halbert = JNH;

A. H. Haliday = AHH; W. F. Johnson = WFJ; I. Lansbury = IL;

P. Makings = PM; J. P. O'Connor = JPOC; M. A. O'Connor = MAOC;

W. Ruttledge = WR; K. Smith = KS; M. C. D. Speight = MCDS;

A. W. Stelfox = AWS.

Family Anisopodidae

This family of insects is common in Ireland though only sporadically reported in the literature. There are now five Irish species contained in two genera, Sylvicola with four species and Mycetobia with a single species. The Anisopodidae is now the largest family of Diptera in Ireland which possesses the full compliment of species occurring in Great Britain. The most useful taxonomic works for identifying the species occurring in Ireland are Freeman (1950) and Pedersen (1968).

At various times in the past three alternative generic names have been used for Sylvicola, i.e. Anisopus, Phryne and Rhyphus. The family group name in use at a particular time depended on which of the generic names was regarded as valid and in the literature records may be listed under Anisopodidae, Rhyphidae, Phryneidae or Sylvicolidae. The family name Anisopodidae has priority over the other family group names even though Sylvicola is now the valid generic name (Hutson and Vane-Wright, 1969). In the literature prior to the late 1920's Mycetobia was usually regarded as belonging to the Mycetophilidae based on adult characters but a detailed comparison of the immature stages of Anisopodidae and Mycetophilidae (Edwards, 1928) has shown that its affinities are with the Anisopodidae where it has been included since that time.

The first report of the occurrence of this family in Ireland is contained in a paper by Haliday (1833) who records three species, i.e. Rhyphus punctatus, R. fenestralis and R. ochraceus Curtis. Walker (1856) lists three species from Ireland, i.e. Mycetobia pallipes, R. nigricans L. (with fuscatus Fabricius and fuscus Meigen as synonyms) and R. cinctus (with fenestralis, annulata L., nebulosus Meigen and ochraceus as synonyms) based on information supplied or published by Haliday. Other published Irish records are in Beirne (1949), Grimshaw (1912), Hogan and Haliday (1855), Lansbury (1965) and Smith (1952).

The pinned Anisopodidae collection in the National Museum of Ireland has been rearranged and the identifications checked by me. All the new material has been identified by me except that material collected by Dr. M.C.D. Speight which has been identified by him and retained in his collection. Female adults of cinctus/fenestralis can only be satisfactorily identified from slide mounts of the genitalia. Identified female specimens of cinctus

and fenestralis in the National Museum of Ireland have been retained under cinctus and fenestralis respectively until the identifications can be checked by genitalia mounts. All the material collected by me is preserved in 70% alchol. Slide preparations of four species mounted in Euparal have been made (♂ and ♀ of cinctus, fenestralis and punctatus and ♂ of zetterstedti). All this material is now in the National Museum of Ireland.

Sylvicola cinctus (Fabricius)

Cavan: 22 September 1985, Virginia wood, N 5987 (PV.1), JPOC.

Cork: 29 July 1924, Glengarriff, (MT.4), JNH.

: 1 July 1985, Garnish Island, Bantry, V 936560 (MT.4), JPOC & MAOC

Dublin: 23 July 1937, Seapoint, (PV.4) BPB.

: 1 April 1981, Dundrum, O 1627 (PV.4), MCDS.

: 10 March 1984, Deerpark, Howth, O 279380 (PV.4), KB (hatched from leaf litter), ♂ and ♀ on slide.

: 14-25 May 1984, Beech Park Crescent, Castleknock, O 089377, (PV.4), JPOC & MAOC.

Kerry: 25 June 1979, Mangerton Road, near Killarney, V 983861 (MT.4), PA, ♀ on slide.

Leitrim: 20 June 1986, Clooncoe, N 1091 (NV.3),MCDS (hatched from rotting wood in living Betula collected on 27 May 1986).

Westmeath: 16 March 1982, Lough Derravaragh, N 400660, (PV.2), JPOC.

Wicklow: July 1929, Arklow District, (PU.3), AWS.

: 28 March 1982, Glen of the Downs, O 260114 (PU.3), JPOC & MAOC.

: 15 March 1983, Glen of the Downs, O 2611 (PU.3), MCDS.

It is surprising that cinctus, which is a relatively common species, often found on windows in houses, has not previously been reported in the literature as occurring in Ireland. Rhyphus ochraceus, which may be a

synonym of cinctus, was reported as occurring near Holywood, Co. Down by Haliday (1833) but no specimens under this name exist in the Haliday collection in the National Museum of Ireland. Both cinctus and fenestralis are valid species but Walker (1856 : 341) regarded cinctus as a senior synonym of fenestralis. Walker's (op. cit.) record of cinctus occurring in Ireland is based on the fact that fenestralis, which was known to occur in Ireland (Haliday, 1833), was falsely synonymised with cinctus.

All the above records of cinctus are based on adult males unless otherwise stated. Female specimens can be identified using Pedersen (1968) if slide preparations of the genitalia are made.

Sylvicola fenestralis (Scopoli)

Cork: 3 May 1958, Ballintemple, Cork City, (NT.1), PM.

Dublin: 7 March 1981, Dundrum, O 1627 (PV.4), MCDS (in Malaise trap).

: 26 August 1983, Howth Head, O 294368 (PV.4), PA, ♀ on slide.

: 1 May 1984, Zoology Dept., Trinity College, O 164338 (PV.4), PA, ♀ on slide.

: 2 March 1986, Public House, Baggot Street, O 164333 (PV.4), PA, ♂ and ♀ on slide.

Wexford: 15 May 1976, near Curracloe, T 1126 (PU.4), MCDS.

Wicklow: 10 March 1983, near Newcastle, O 2717 (PU.3), MCDS.

: June-July 1986, Glen of the Downs, O 2611 (PU.3), MCDS (hatched from fungus ridden rotten wood in trunk base of live Fagus).

As with cinctus the above records of fenestralis are based on male adults (unless otherwise stated).

Of the three species of this genus recognised by Haliday (1833) material of

only one, fenestralis, appears to exist. Two female Haliday specimens are included under fenestralis in the National Museum of Ireland but their identity cannot be checked until the material is mounted on slide. In the Clare Island survey Grimshaw (1912) recorded fenestralis based on two female specimens - one damaged specimen, with the abdomen missing, is in the National Museum of Ireland but its identity cannot be checked due to the loss of the abdomen. Beirne (1949) includes fenestralis in a list of species from Dublin and Kerry but because no collecting date or locality information is given the record is not included here - the material has not been seen but it may be in the British Museum (Natural History).

Sylvicola punctatus (Fabricius)

Cavan : 29 April 1984, near Virginia, N 5987 (PV.1), JPOC & MAOC.

Clare: September 1960, Roughan House, near Killinaboy, R 26-925 (MU.3), IL (Lansbury, 1965*).

: 3 July 1976, Dromore, R 3487 (MU.3), MCDS.

: 9-11 July 1980, Liscannor, R 063883 (MU.3), JPOC, ♀ on slide.

: 17 July 1981, River Caher, Burren, M 1509 (MU.3), JPOC & MAOC.

: 3 October 1981, saltmarsh near Ennis, R 3368 (MU.4), MCDS.

: 21 April 1982, Croagh, M 202049 (MU.3), JPOC.

: 21 April 1982, Croagh, M 204050 (MU.3), JPOC.

: 4 September 1983, Clifden House, Corrofin, R 264892 (MU.3), PA.

: 31 May 1984, moorland bog, Lough Luogh, R 058936 (MU.3), JPOC.

: 21 May 1985, Lough Bunny, R 3696 (MU.3), JPOC & MAOC.

: 22 May 1985, near Formoyle, M 161066 (MU.3), JPOC & MAOC.

: 23 May 1985, near Corker Pass, M 308107 (MU.3), JPOC & MAOC.

: 24 May 1985, near Fanore, M 137075 (MU.3), JPOC & MAOC.

Dublin : 19 August 1894, Dublin, (PV.4), GHC.

: 18 August 1895, Dublin (PV.4), JNH.

: 2 May 1909, woods above waterworks, Howth, (PV.4), JNH.

: 2 August 1915, Malahide, (PV.4), (JNH).

: 21 August 1930, Harolds Cross, (PV.4), AWS.

: 21 July 1937, Seapoint, (PV.4), BPB.

: 19 August 1951, Tymon Castle, near Tallagh, (PV.4), KS, (Smith, 1952*).

: 17 April 1982, Phoenix Park, O 096358 (PV.4), JPOC & MAOC.

: 14-25 May 1984, Beech Park Crescent, Castleknock, O 089377 (PV.4), JPOC & MAOC.

Galway : September 1960, Kilmurvy, Inishmore Island, L 82510- (MU.1), IL, (Lansbury, 1965*)

: 7 August 1976, near turlough at Garryland, M 4103 (NU.1), MCDS.

: 23 July 1982, Rosleague House, Letterfrack, L 688578 (MV.2), JPOC & MAOC.

Kildare: 12 September 1982, Grand Canal, N 933263 (PV.4), JPOC & MAOC.

Laois: 20 September 1982, The Derries, N 586050 (PU.1), JPOC.

Leitrim: 27 May 1986, woodland near Clooncoe Lake, N 110912 (NV.3), PA.

Louth: 19 July 1924, Termonfeckin, (PV.3), WFJ.

Mayo: June 1909, Westport Demesne, (MV.3), JNH, (Grimshaw, 1912).

: July 1910, Belclare, near Wesport, (MV.3), JNH, (Grimshaw, 1912).

: 17, 18 & 19 September 1922, Hollymount, (MV.4), WR.

Offaly: 30 April 1984, ditch at edge of Clara bog, N 256295 (NV.4), PA, ♂ on slide.

27 September 1986, All Saints Bog, N 0010 (NU.3), MCDS.

Waterford: 27-1 July-August 1918, Tramore, (PT.1), JNH.

Wexford: 27 August 1980, Carnsore Point, T 121 038 (PT.3), JPOC.

: 12 June 1982, sand-dunes near Curracloe, T 1127 (PU.4) JPOC & MAOC.

Wicklow: July 1929, Arklow District, (PU.3), AWS.

: 12 October 1930, Meeting of the Waters (PU.3), AWS.

: 15 August 1951, Killoughter, (PU.3), KS, (Smith, 1952*).

: 20 May 1986, woodland near Glendalough, T 135964 (PU.3), PA.

Sylvicola zetterstedti (Edwards)

Kildare: 12 April 1982, Newbridge Fen, N 767166 (PU.1), JPOC & MAOC, ♂ on slide.

The above record of zetterstedti is based on a single adult male specimen which is now mounted on a slide. This species was originally described by Edwards (1923) and from the available published records in Britain (Freeman, 1950) appears to be quite rare.

Mycetobia pallipes Meigen

Cork: (?) 18 July 1835, Glengarriff, (MT.4), AHH.

Kerry: August 1854, Killarney, (MT.3), AHH, (Hogan and Haliday, 1855).

The first published record of this species in Ireland is in Hogan and Haliday (1855: 55). The only other published record is in Walker (1856: 49-50) but no date or locality information is given but it was probably included based on information supplied by Haliday. Walker (op. cit.) regards pallipes as a rare species and Edwards (1928: 25) states that the adults "are not very commonly met with".

In the National Museum of Ireland there is a single pinned Haliday specimen (female) of this species with no collecting date or locality label but with the following labels: a green 'Ireland' label; a white label with 'pallipes' in Haliday's writing; a museum accession label with 'Haliday 20.2.'82' and

a pink label with '9.' (the labelling system on Haliday specimens is explained in O'Connor and Nash (1982)). There is no way of telling which locality the single museum specimen came from. The relative rarity of this species has enabled me to discover the probable date on which the Glengarriff material was collected by consulting manuscript and published sources. The MSS preserved in the National Museum of Ireland include Haliday's 'Catalogue of Irish Insects'. The exact date of commencement of this MS is unknown at present but it has been annotated over a number of years evident from different types of ink used and the range of dates of specimens collected by Haliday. In this MS, on page 206, among the mycetophilid genera (Fig. 1) is included 'Mycetobia pallipes ⊕ ha Glengariff' in the original brown ink followed by 'July' in black ink but the year is not given. Also in the museum is an interleaved copy of Curtis (1837) which is annotated, apparently by Thomas Coulter of Trinity College Dublin, with the following statements in his writing at the beginning of the work: 'Species marked in catalogue, as Irish, July 1st 1838'; 'a star, *; or cross, X; after the specific name, implies that the species is determined, & certainly Irish' and 'The No. in pencil after the generic names refer to Dr. Haliday's manuscript Catalogue (p.p. of July 1838)'. A cross, as described by Coulter, is marked opposite pallipes. The Haliday catalogue that Coulter mentions is the 'Catalogue of Irish Insects' which is confirmed by a comparison of comments by Haliday and Coulter regarding certain species. This means that the original brown ink writing in Haliday's catalogue was commenced in or before July 1838 and that pallipes was known to occur in Ireland prior to that date. An earlier Haliday MS list of Irish insects exists 'Entomological MS. NOS. 2-3' with the following inside the front cover of NO.3 in Haliday's writing 'This Catalogue was made out by me at Dr Coulter's request and sent to him for the use of the University Museum. A H Haliday Nov 27th 1855' - Coulter died on the 26 November 1943. From the list of species in this MS it appears to be comtemporary with Haliday's 'Catalogue of Irish Insects'

and that Haliday reacquired it in 1855. M. pallipes is included in both Haliday MSS of Irish Insects but is not mentioned as an Irish species in a list of Diptera species (Haliday, 1833) from Holywood in Co. Down. The majority of Haliday's specimens were collected near Holywood, Co. Down where he lived for most of his life and it is unlikely that he made many trips to Cork. In the summer of 1835 Curtis and Haliday met in Cork and went on an entomological collecting trip visiting Killarney, Glengarriff, Limerick, the Shannon, Connemara and Roundstone (Nash, 1983). Haliday and Curtis were in Glengarriff on the 18th July as Curtis's comment on Cleodora cytisella testifies: "I took a specimen of this distinct species the 18th July on a hill at Glengarriff in Ireland" (British Entomology. Folio 671, December 1, 1837). There is no evidence to indicate that Haliday had made an earlier trip to Glengarriff and the 18 July 1835 is the probable date of capture of the pallipes record from Glengarriff.

Family Thaumaleidae

This family in Europe, consists of about 60 species many of which are apparently endemic to particular mountain ranges and islands (Vaillant, 1981), especially in more southern latitudes. In Great Britain only three species, all belonging to the genus Thaumalea, are known to occur, i.e. T. testacea, T. truncata Edwards and T. verralli (Vaillant, 1978).

The Irish entomologist, A. H. Haliday, was one of the first to discover the adults of this family for which he erected a new genus and species, Orphnephila devia, based on material collected in Ireland (Haliday, 1832). For many years the generic name Orphnephila and the family name Orphnephilidae was used but Bezzi (1913) showed that Thaumalea Ruthé, described in 1831, had priority. In addition O. devia is a junior synonym

of Ruthé's species, T. testacea. The National Museum of Ireland possesses type material of O. devia and Edwards (1929a) reports the presence of additional Haliday type material (2♂, 1♀) in the Loew Collection in the Berlin Museum. Haliday (1833) includes some distribution information on O. devia and in a brief note on two Irish Diptera (Haliday, 1856) discusses the species without including any distribution data but includes illustrations of the internal anatomy of the adults. Haliday (1857) records the species from Arklow Head, Co. Wicklow and Walker (1856: 264-265) records it from "Connor Hill, near Dingle" (Co. Kerry). Nearly one hundred years after Haliday first recorded the family in Ireland Edwards (1929b) added a second species, T. verralli, to the Irish list. There are no other published records of this family in Ireland. The third British species, T. truncata, was not discovered in the present survey but it may be found with more intensive collecting.

The adults are rather secretive and are not normally taken in general collections and must be searched for close to the larval habitat. They are not strong fliers and are usually found resting on marginal vegetation or rocks along shaded streams, brooks, waterfalls and seepages. The larvae are found on vertical surfaces of wet rocks in thin water film habitats where the water is not deep enough to cover them, in situations ranging from waterfalls to small permanent seepages and on the splash zone of emergent rocks in mountain streams.

The adult males and females can be identified using Edwards (1929a) or the more recent keys of Vaillant (1977, 1981). Adult material collected in the present survey is preserved in 70% alcohol - a few specimens are mounted on slides in Euparal. All this material has been deposited in the National Museum of Ireland. Extensive larval collections have been made but there is at present no key for identifying the immature stages.

Thaumalea testacea Ruthé

Clare: 11 September 1986, stream-side on Slieve Carran, M 3204 (MU.3), MCDS.

Cork: 29 June 1984, road-side seepage near Kilbrittain, W 535456 (NT.2), PA & JAG.

: 2 July 1984, coastal stream near Ballymekeagh, X 036686 (NT.4), PA.

Down: 1827-1831, Holywood, (UF.1), AHH, (Haliday, 1832; 1833).

Dublin: 27 March 1983, small brook at Bohernabreena, O 094223 (PV.4), PA.

Galway: October 1827-1831, no locality, AHH, (Haliday, 1832; 1833).

Kerry: July 1854, Connor Hill, near Dingle, (MT.1), AHH, (Walker, 1856).

Leitrim: 30 July 1983, Glencar Waterfall, G 763437 (NA.2), PA.

Sligo: 30 July 1983, mountain stream near Clogh, G 730468 (NA.2), PA.

: 31 July 1983, stream near Kings Mountain, G 726442 (NA.2), PA.

Wicklow: 1831-1832, "Vale of Clara; Avondale, and the Seven Churches". (PU.3), AHH, (Haliday, 1833).

: August 1856, Arklow Head, (PU.3), AHH, (Haliday, 1857).

I have not yet been able to determine exactly when the records from Down, Galway and Wicklow, mentioned in Haliday (1832, 1833), were collected. The original type-localities for Haliday's O. devia, which is a synonym of testacea, are 'Holywood' in Co. Down and 'county Galway' as given in Haliday (1832). Walker (1856: 264-265) includes a record from "Connor Hill, near Dingle" attributed to Haliday but no date is given. However, an account of Haliday's visit to the Dingle Peninsula and "Conner Hill" is given in Hogan and Haliday (1855: 52-53) who collected insects there in July 1854. A 'Blarney' record is mentioned on page 202 of Haliday's 'Catalogue of Irish Insects' but I cannot yet confirm when that Co. Cork record was collected. There are seven Irish Haliday specimens in the National Museum of Ireland but only one with Co. Kerry on a label bears any locality

information and none have the collecting date - at least two of the specimens may have been used for drawing the figures in Plate XV in Haliday (1832).

Thaumalea verralli Edwards

Cork: 2 July 1984, coastal stream near Ballymakeagh, X 036686 (NT.4), PA.

Kerry: 24-27 May 1929, Killarney District, (MT.3), FWE, (Edwards, 1929b*).

: 30 June 1984, waterfall on stream on Carrauntoohil Mountain, V 810848 (MT.1), PA.

: 1 July 1984, waterfall on stream on Carrauntoohil Mountain, V 810848 (MT.1), PA.

Sligo: 31 July 1983, stream near Kings Mountain, G 726442 (NA.2), PA.

The specimens collected in the Killarney region by Edwards (1929b) have not been seen but they are probably preserved in the collections of the British Museum (Natural History).

Acknowledgements

I am grateful to Dr. J. P. O'Connor, National Museum of Ireland, for his help with the museum collection, for comments on this paper and for access to the Anisopodidae collected by himself and his wife Mary. I also wish to thank Dr. M. C. D. Speight, Forest and Wildlife Service, Bray, for a list of records of Anisopodidae identified by him and for some specimens; Dr. E. C. Nelson, Botanic Gardens, Dublin, for discussions on Haliday and Coulter MSS; and Ken Bond and Jervis Good, Zoology Department, University College Cork for providing specimens.

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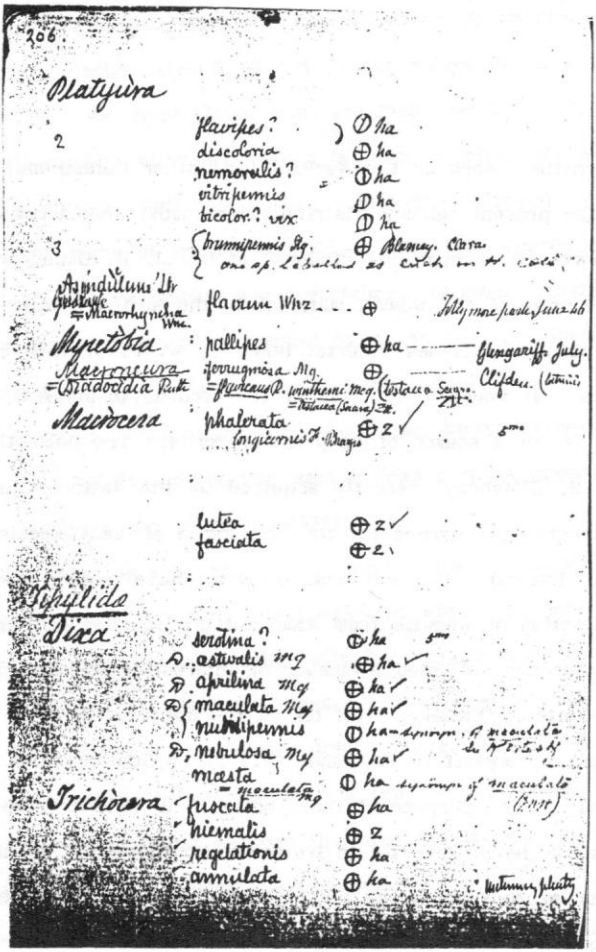
FIGURE 1: Record of Mycetobia pallipes on page 206 of Haliday's MS 'Catalogue of Irish Insects'.



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NEW VICECOUNTY RECORDS OF WEEVILS (COLEOPTERA: CURCULIONOIDEA) FROM IRELAND.

M. G. Morris

Introduction

Although only intermittent work on the Weevils (and other Coleoptera) of Ireland has been done in the present century distribution records have accumulated from several diverse sources. Through the kindness of Dr. J. P. O'Connor I was able recently to examine some of the weevil material in the National Collection. The general collection mainly comprises material taken by W. F. Johnson and other early Irish workers. It vouches for many of the records in Johnson and Halbert (1902) but is not a source of many new records. The collections of E. F. Bullock and E. O'Mahony, recently acquired by the National Museum, prove to contain specimens vouching for the occurrence of many species in unrecorded parts of Ireland. Dr. and Mrs. O'Connor have made a small but interesting collection of weevils from some out of the way locations. Dr. M. C. D. Speight has collected a number of interesting weevils, mostly from Irish wetland sites. Finally, I am taking the opportunity of recording a few captures made by myself in 1970 and 1971, but which have not been published previously. The purpose of these notes is to help to give a clearer picture of the distribution of weevils in Ireland. No biological or habitat data are recorded, in order to shorten the text. In the case of the Bullock and O'Mahony collections this kind of data has not been recorded in any case. A good deal of critical work on the Irish weevil fauna remains to be done, particularly in the light of recent studies in Great Britain and the continent of Europe. It is hoped that some of this work will be reported elsewhere.

A notable feature of most of the collections formed by Irish coleopterists, or those living in Ireland, such as E. F. Bullock, is that they are collections from the entire British Isles, not just Ireland. Extreme care must therefore be taken not to include English specimens inadvertently as Irish. This is particularly true when data labels are poor or difficult to decipher. Collectors in the nineteenth and early twentieth centuries tended to attach only the minimum of data to their specimens and to rely more than is usual nowadays on supporting information in notebooks. Unfortunately these have often been lost. In several cases it is difficult to identify localities from data labels. Some collectors used local names of very small features, such as a house, without any additional information. The new records are given under the standard vicecounty names and numbers. Locality data and dates are also given. Irish Grid References are given only for those records where the collector included them i.e. they have not been supplied for old records from the locality data. The initial referring to collectors are: EFB, E. F. Bullock; MGM, M. G. Morris; JP&MAO'C, J. P. & M. A. O'Connor; EO'M, E. O'Mahony; MCDS, M. C. D. Speight; AWS, A. W. Stelfox. The names of species follow Kloet and Hincks (1977).

Family Anthribidae

Araecerus fasciculatus (Degeer)

Specimens of this almost cosmopolitan stored-products species, taken from cocoa-beans, imported from the Gold Coast, in Dublin (H 21) on 19 June 1950, are in the National and O'Mahony collections.

Family Attelabidae

Rhynchites germanicus Herbst

Wicklow (H20) Knocksink Wood, O 2117, 21 June 1977 (MCDS).

R. tomentosus Gyllenhal

West Cork (H3) Streamhill, Ballyhourd; a specimen in the O'Mahony collection bears no other data.

Deporaus betulae (L.)

Laois (H14) Abbeyleix, 17 May 1926 (RAP) (?); (near Ballybrittas), N 5704, 5 May 1974 (MCDS); Westmeath (H23) Ballyhealy, 26 May 1940 (AWS); Sligo (H28) Trawalua, G 6955, 21 May 1985 (MCDS).

Family Apionidae

Apion curtirostre Germar

Carlow (H13) Ballon, near Tullow, S 8466, 21 July 1971 (MGM).

A. hydrolapathi (Marsham)

West Galway (H16) Ballyconneely, L 6345, 26 July 1970 (MGM); Kildare (H19) Rye Water, O 005363, 9 August 1981 (JP&MAO'C).

A. violaceum Kirby

Wexford (H12) Shelmaliere Commons, S 9818, 20 July 1971 (MGM).

A. radiolus (Marsham)

Kildare (H19) near Maganey, S 7384, 21 July 1971 (MGM).

A. ulicis (Forster)

Laois (H14) Knockaroe, S 2887, 21 July 1971 (MGM); Kildare (H19) Leixlip, 18 May 1928 (EO'M); West Mayo (H27) Kilmore (L. Mask), M 0358, 1 August

1970 (MGM); Monaghan (H32) Drumgoole, H 7036, 28 August 1971 (MGM).

A. cruentatum Walton

Clare (H9). Specimens erroneously determined as A. frumentarium (Paykull) were recorded from Lough Goller, 13 June 1965 (Morris, 1967) and Fisherstreet, the Burren, R 0597, 24 July 1971 (Morris, 1974); these should be referred to A. cruentatum, which was long regarded as a subspecies of A. frumentarium (Kloet and Hincks, 1945). Dublin (21) Kilbarrack, 15 May 1927 (EO'M).

A. frumentarium (Paykull)

Carlow (H13) Ballon, near Tullow, S 8466, 21 July 1971 (MGM).

A. miniatum Germar

Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM).

A. aethiops Herbst

Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM); Kildare (H19) Graney, S 8184, 21 July 1971 (MGM); Monaghan (H 32) Coolcorragh, H 6229, 28 July 1971 (MGM).

A. ervi Kirby

Laois, Kildare and Monaghan: records exactly as for A. aethiops.

A. gyllenhali Kirby

Kildare (H19) Leixlip, 11 October 1942 (AWS).

A. loti Kirby

Dublin (H21) North Bull, 28 May 1943 (EO'M); there do not seem to be other

records of this common species from Co. Dublin.

A. viciae (Paykull)

Dublin (H21) St. Annes, 5 August 1925 (in coll. EO'M); another common species apparently unrecorded from Co. Dublin.

A. subulatum Kirby

West Cork (H3) Sherkin Island, 22 September 1981 (R. Moore) (possibly only a confirmatory record).

A. apricans Herbst

Waterford (H 6) near Villierstown, X 1393, 20 September 1969 (MGM); Meath (H22) Kinnegad, N 6044, 28 July 1971 (MGM)

A. dichroum Bedel

Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM); Kildare (H19) Graney, S 8184, 21 July 1971 (MGM); Meath (H22) near Kinnegad (Co. Offaly), N 6044, 28 July 1971 (MGM); Monaghan (H32) Drumgoole, H 7036, 28 July 1971 (MGM).

A. nigritarse Kirby

Kildare (H19) Leixlip 11 October 1942 (AWS); Graney, S 8184, 21 July 1971 (MGM)

Family Curculionidae

Otiorhynchus singularis (Mueller)

Kilkenny (H11) (near Inistioge), S 6535, 3 June 1973 (MCDS); Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM); Kildare (H19) Graney, S 8184,

21 July 1971 (MGM); Wicklow (H20) Powerscourt, 14 May 1926 (?AWS); Kilpeddar Wood, O 2606, 19 June 1978 (MCDS); Wicklow Mountains, T 0694, 25 February 1982 (MCDS); Meath (H22), Green Park Bridge, N 9757, 19 June 1977 (MCDS); Leitrim (H29) Clooncoe Lough, N 1091, 27 May 1986 (MCDS); Cavan (H30) Virginia, N 593877, 30 May 1982 (JP&MAO'C).

O. sulcatus (F.)

Kildare (H19) Newbridge Fen, N 7715, 6 May 1980 (MCDS); Wicklow (H20) Kilcoole, O 313075, 25 August 1971 (MCDS).

Trachyphloeus bifoveolatus (Beck)

South Kerry (H1) 'Ballast Pit', Killarney, July 1927 (EFB).

Phyllobius oblongus (L.)

Wexford (H12) Raven Point, T 1124, 6 May 1977 (MCDS); Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM); Meath (H22) Green Park Bridge, N 9757, 16 June 1977 (MCDS).

P. pyri (L.)

Laois (H14) Emo Castle, N 5306, 2 June 1973 (MCDS).

P. roboretanus Gredler

Kildare (H19) Graney, S 8184, 21 July 1971 (MGM); Wicklow (H20) Clara 5 June 1932 (EO'M); Meath (H22) near Kinnegad (Co. Offaly), N 6044, 28 July 1971 (MGM).

Polydrusus pterygomalis Boheman

Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM).

P. undatus (F.)

Wicklow (H20) Clara 5 June 1932 (EO'M) and 28 April 1942 (AWS).

Barypeithes araneiformis (Schrank)

Clare (H9) near Ennis, R 292796, 30 May 1984 (JPO'C).

B. pellucidus (Boheman)

Wexford (H12) Oaklands, S 718259, 18 June 1982 (JP&MAO'C).

Sciaphilus asperatus (Bonsdorff)

Monaghan (H32) Drumgoole, H 7036, 28 August 1971 (MGM).

Strophosomus melanogrammus (Forster)

Wexford (H12) Shelmaliere Commons, S 9818, 20 July 1971 (MGM); Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM).

Liophloeus tessulatus (Mueller)

North Kerry (H2) Lough Gill, Q 6113, 1 July 1980 (MCDS); Leitrim (H29) Rinn Lough, N 1091, 24 May 1985 (MCDS).

Barynotus moerens (F.)

East Cork (H5) Castlelyons 10 August 1928 (AWS).

Tropiphorus terricola (Newman)

Wicklow (H20) Powerscourt 26 June 1926 (JNH) and 2 June 1929 (EO'M).

Sitona hispidulus (F.)

Kildare (H19) (no other data; in coll. EO'M).

S. lepidus Gyllenhal

Wexford (H12) Cahore 6 August 1930 (EO'M); Kildare (H19) (near Kill), N 933263, 12 September 1982 (JP&MAO'C); Wicklow (H20) (near Sugar Loaf), O 2514, 15 August 1982 (JP&MAO'C).

S. regensteinensis (Herbst)

South Tipperary (H7) Lough Diheen May 1944 (?AWS; in coll. EO'M).

Hypera nigrirostris (F.)

Wicklow (H20) Greystones, 17 May 1924 (AWS); Cavan (H30) Virginia, N 586882, 30 May 1982 (JP&MAO'C).

H. rumicis (L.)

Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM).

H. venusta (F.)

Kildare (H19) Newbridge Fen, N 7715, 26 July 1979 (MCDS).

Alophus triguttatus (F.)

Down (H38) Millisle, June 1925 (AWS).

Hylobius abietis (L.)

Wicklow (H20) Glendalough, T 113965, 20 April 1971 (MCDS).

Leiosoma deflexum (Panzer)

Westmeath (H23) (near Crookedwood), N 4562, 16 May 1985 (MCDS).

Anoplus plantaris (Naezen)

Wicklow (H20) Arisaig, 9 July 1939 (AWS).

Caulotrupodes aeneopiceus (Boheman)

West Cork (H3) (near Rathmore), W 0928, 3 March 1983 (MCDS).

Cryptorhynchus lapathi (L.)

Leitrim (H29) Clooncoe Lough, N 1091, 29 May 1985 (MCDS).

Acalles roboris Curtis

Carlow (H13) Kilcarry, 1 May 1929 (AWS).

Hydronomus alismatis (Marsham)

South Kerry (H1) Cahirnane, Killarney, July 1928 (EFB).

Dorytomus taeniatus (F.)

Kildare (H19) Newbridge Fen, N 7715, 7 January 1980 (MCDS).

Notaris acridulus (L.)

South Kerry (H1) Killarney, March 1921 (EFB); Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM); Kildare (H19) Newbridge Fen, N 767166, 12 April 1982 (JP&MAO'C); Sligo (H28) Lough Garpa, M 7198, 11 June 1986 (MCDS); West Donegal (H35) Glenveagh, C 0018, 9 August 1978 (MCDS).

N. aethiops (F.)

Longford (H24) (Lough Forbes), N 0882, 16 July 1978 (MCDS); Leitrim (H29) Clooncoe Lough, N 1091, 30 May 1985 (MCDS).

Thryogenes nereis (Paykull)

North Kerry (H2) Castlemaine (no other data; coll. EFB); Sligo (H28) Doonweelin Loughs, G 64, 23 May 1985 (MCDS).

Grypus equiseti (F.)

Laois (H14) Derries Wood, N 5705, 4 May 1977 (MCDS); Kildare (H19) Newbridge Fen, N 7715, 1980 (MCDS).

Orthochaetes setiger (Beck)

South Kerry (H1) Flesk, Killarney, no date (EFB).

Micrelus ericae (Gyllenhal)

Wexford (H12) Shelmaliere Commons, S 9818, 20 July 1971 (MGM).

Cidnorhinus quadrimaculatus (L.)

Carlow (H13) Ballyellin Crossroads, S 6953, 3 June 1970 (MGM); Meath (H22) near Kinnegad (Co. Offaly), N 6044, 28 July 1971 (MGM).

Ceutorhynchus contractus (Marsham)

Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM).

C. erysimi (F.)

Wexford (H12) The Raven, T 110260, 4 June 1986 (JP&MAO'C); South Kerry (H1) Killarney, no date (EFB).

C. floralis (Paykull)

Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM).

C. marginatus (Paykull)

Wicklow (H20) Knocksink Wood, O 2117, 21 June 1977 (MCDS).

C. pleurostigma (Marsham)

South Kerry (H1) Killarney (no other data, EFB).

C. pollinarius (Forster)

Wicklow (H20) Glen o'the Downs, O 263110, 27 August 1981 (JP&MAO'C); Meath (H22) near Kinnegad (Co. Offaly), N 6044, 28 July 1971 (MGM); Monaghan (H32) Monaghan city, H 6633, and Drumgoole, H 7036, 28 July 1971 (MGM).

C. punctiger Gyllenhal

South Kerry (H1) Flesk, Killarney, July 1936 (EFB).

C. quadridens (Panzer)

Carlow (H13) Ballon, near Tullow, S 8466, 21 July 1971 (MGM); Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM).

C. terminatus (Herbst)

South Kerry (H1) Ballast Pit, Killarney (no other data; EFB).

C. viduatus (Gyllenhal)

South Kerry (H1) Flesk, Killarney (no date; EFB).

Rhinoncus pericarpius (L.)

Wicklow (H20) Knocksink Wood, O 2117, 21 June 1977 (MCDS).

R. perpendicularis (Reich)

North Kerry (H2) Castlemaine, February 1934 (EFB).

Poophagus sisymbrii (F.)

Laois (H14) Maganey Bridge, S 7184, 21 July 1971 (MGM); Cavan (H30) Virginia, N 586882, 30 May 1982 (JP&MAO'C).

Anthonomus bituberculatus Thomson

Dublin (H21) Dundrum, 1928 (EFB).

A. pomorum (L.)

South Kerry (H1) Cahirnane, Killarney, August 1929 (EFB).

Curculio pyrrhoceras Marsham

South Kerry (H1) Killarney (no other data; EFB); Wexford (H12) near Crossabeg, T 0026, 21 July 1971 (MGM).

C. salicivorus Paykull

Laois (H14) near Ballickmoyler, S 6379, 21 July 1971 (MGM).

Miccotrogus picirostris (F.)

South Kerry (H1) Killarney (no other data: EFB).

Ellescus bipunctatus (L.)

Laois (H14) (near Ballybrittas), N 5704, 5 May 1974 (MCDS).

Rhynchaenus foliorum (Mueller)

North Kerry (H2) Castlemaine, May 1932 (EFB).

R. quercus (L.)

West Galway (H16) Derry Clare Wood, L 8349, 27 July 1978 (MCDS).

R. salicis (L.)

Laois (H14) (near Ballybrittas), N 5704, 5 May 1974 (MCDS).

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FIELD NOTES

FIELD EXCURSION TO CLARA BOG, CO. OFFALY - 16 AUGUST 1986.

Peter J. Foss

Six members and friends attended the field excursion to examine the vegetation (and associated water chemistry) of the eastern section of Clara bog.

Clara bog (N 2630) lies 1km south of Clara town Co. Offaly, and covers an area of 665 ha. The eastern half of the bog has long been recognised as an area of scientific importance (Anonymous, 1981, 1986; Reynolds, 1985), as it contains one of the last soak systems to be found on Irish raised bogs. The large soak area on the bog, known as Lough Roe, is a feature that was once common on the larger midland raised bogs. A soak is produced by internal water drainage in the raised bog and upwelling of mineral rich ground water which produce mineral enriched, more aerated aquatic habitats. These areas support a variety of plant species not usually associated with ombrotrophic peatland habitats.

Apart from the L. Roe soak complex, the bog dome also has a large number of typically small bog pools, and near the eastern edge of the bog ten lakes occur in a rough line running in an NE/SW direction. These pools do not contain the same species rich vegetation assemblages found at L. Roe, probably due to the less minerotrophic water regime.

A total of 76 species were recorded on the bog, in L. Roe and in the series of pools at the eastern end of the bog. The species found included typical

ombrotrophic raised bog plants and mosses and species characteristic of mineral enriched or flushed areas in peatlands (White and Doyle, 1982). The species recorded are listed in Table 1. Of these species, 35 are characteristic of mineral enriched or flushed areas on ombrotrophic bogs. Two moss species, namely Sphagnum squarrosum and Calliergon stramineum, usually found in enriched habitats, were recorded in the area of open water at L. Roe. These finds represent new vice-county records for these moss species in Offaly (H18) (O'Connell and Foss, in press). The presence of these species further highlight the scientific importance of this unique peatland.

A series of water pH and % oxygen readings were taken electrometrically along a transect running from the western end to the eastern end of the Lough Roe. The pH along this transect varied from 4.71, furthest from L. Roe, to 5.31 in the open water area of L. Roe. The pH values recorded along the L. Roe transect were higher than those found on the general surface of the bog (typical values recorded varied from 3.8 to 4.3) and in the sequence of ten pools found at the eastern edge of the bog (values varied from 4.59 to 4.96). These data indicate that the water in L. Roe is minerally enriched. This feature is probably important in producing the unique vegetation found in this soak area on the bog.

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TABLE 1. Taxa recorded from Clara bog, Co. Offaly listed in alphabetical order. Nomenclature for higher plants and bryophytes follows Halliday and Beadle (1983) and Corley and Hill (1981) respectively. Lichen nomenclature follows Dobson (1979). (E) denotes epiphytic species. * indicates species which are usually found in mineral enriched and well aerated areas on ombrotrophic peatlands.

* Agrostis canina
* Agrostis stolonifera
Andromeda polifolia
* Angelica sylvestris
* Anthoxanthum odoratum
* Aulacomnium palustre
* Betula pubescens
Calliergon cuspidatum
* Calliergon stramineum
Calluna vulgaris
Calypogeia fissa
Calypogeia muellerana
* Carex curta
* Carex echinata
* Carex nigra
* Carex rostrata
Cladonia portentosa
* Dactylorhiza maculata
* Drepanocladus revolvens
Drosera rotundifolia
* Dryopteris carthusiana
* Dryopteris dilatata
* Empetrum nigrum
* Epilobium obscurum
Erica tetralix
Eriophorum angustifolium
Eriophorum vaginatum
Eurhynchium praelongum
Evernia prunastri (E)
* Festuca rubra
* Galium palustre
* Galium saxatile
* Holcus lanatus
* Hydrocotyle vulgaris
Hylocomium brevirostre
Hylocomnium splendens
Hypnum jutlandicum
Hypogymnia physodes (E)
* Juncus effusus
Lepraria incana (E)
Lophocolea cuspidata
* Luzula multiflora

* Lychnis flos-cuculi
Menyanthes trifoliata
Mnium hornum
Molinia caerulea
* Myrica gale
Narthecium ossifragum
Odontoschisma sphagni
* Osmunda regalis
Parmelia caperata (E)
Parmelia glabratula (E)
Parmelia sulcata (E)
Pleurozium schreberi
* Polytrichum alpestre
* Polytrichum commune
Potentilla erecta
* Potentilla palustris
Pseudoscleropodium purum
Rhytidiadelphus squarrosus
Rhytidiadelphus triquetrus
* Rumex acetosa
Scirpus cespitosus
Sphagnum capillifolium
Sphagnum cuspidatum
Sphagnum magellanicum
Sphagnum palustre
Sphagnum papillosum
Sphagnum recurvum
* Sphagnum squarrosum
Sphagnum subnitens
* Succisa pratensis
Thuidium tamariscinum
* Typha latifolia
Usnea subfloridana (E)
* Vaccinium oxycoccus

BRYOPHYTE FIELD MEETING TO POLLARDSTOWN FEN, CO. KILDARE, 3RD MAY 1986.

N. D. Lockhart

Pollardstown Fen (N 7716) is probably the largest (220 ha) remaining spring-fed fen in Ireland (Ryan and Cross, 1984). Situated in a shallow depression about 2km north of the Curragh, Co. Kildare, the fen is fed by a series of over forty springs from around its margins (Doyle, 1984). These mineral-rich ground water flushes can support unusual bryophyte communities and formed

the focus for this meeting.

Despite fairly dismal weather, eight members turned out to attend. The party assembled at the southern end of the fen, where the road from Newbridge comes closest to the fen boundary, and proceeded westward along the margin. Traversing the relatively dry Molinia caerulea dominated grassland, beside the Milltown Stream, many of the typical fen bryophytes (such as Campylium stellatum, Fissidens adianthoides and Ctenidium molluscum) were ticked off the field card. Much of this area had been drained in the past and in the old field drains the more hydrophilous Drepanocladus revolvens was found mixed amongst Chara (Stonewort) species. Heaped-up spoil along the banks of the Milltown Stream provided a suitable niche for a variety of small acrocarpous species, including Pohlia nutans, Bryum pseudotriquetrum and Ceratodon purpureus. Here too was found the thallose liverwort Preissia quadrata. The diminutive Campylium elodes was spotted on the vertical banks of the channel itself.

Just west of the Milltown Stream, to the south of a forestry plantation, an extensive patch (c.20 x 20m) of Homalothecium nitens was found growing with Aulacomnium palustre, Dicranum bonjeanii and Thuidium delicatulum in a Schoenus nigricans/Carex panicea flush. H. nitens was first found growing at Pollardstown by Reg Parker in 1957 (King, 1957). Although its fossil remains have been found in peat cores from a number of raised bogs (King, 1956; Barry and Synnott, 1970), H. nitens is now very rare in Ireland and is only known elsewhere from a few small blanket bog flushes in north Mayo (Forest and Wildlife Service, unpublished data), Bellacorick Iron Flush, Co. Mayo (King, 1957) and Scragh Bog, Co. Westmeath (O'Connell, 1981).

Some springs at the margin, immediately south of this H. nitens flush, yielded further additions to the bryophyte list, most notably Pohlia wahlenbergii, Philonotis calcarea and fruiting specimens of Physcomitrium pyriforme. The latter has not previously been recorded from Pollardstown.

Further west again, another Homalothecium nitens flush was encountered, this time growing amongst Carex lasiocarpa. A careful scrutiny of the plants here produced the most important find of the day - a single sporophyte of H. nitens. Although seen in fruit by the author on one previous visit to Pollardstown (1981), fertile plants of this species are very rare in Britain and Ireland (Smith, 1980). Well satisfied with this find and with hand-lenses steaming-up from the continual rain the party retired for much needed refreshments to the Hanged Mans Arch.

Nomenclature for vascular plants follows Webb 1977; nomenclature for mosses and liverworts follows Smith 1980 and Watson 1981 respectively.

Acknowledgements

My thanks to Donal Synnott, National Botanic Gardens, Dublin, for co-leading this meeting and Daniel Kelly, Trinity College, Dublin, for confirming some bryophyte identifications.

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ANNOUNCEMENT: CHARTER ON INVERTEBRATES

RECOMMENDATION NO. R(86)10 OF THE COMMITTEE OF MINISTERS TO MEMBER STATES CONCERNING THE CHARTER ON INVERTEBRATES.
(ADOPTED BY THE COMMITTEE OF MINISTERS OF THE COUNCIL OF EUROPE ON 19 JUNE 1986 AT THE 398TH MEETING OF THE MINISTERS' DEPUTIES).

The Committee of Ministers, under the terms of Article 15.b of the Statute of the Council of Europe,

Considering that the aim of the Council of Europe is to achieve a greater unity between its members;

Having regard to the resolutions of the European Ministerial Conferences on the Environment;

Considering the Recommendations by the Committee of Ministers of the Council of Europe and particularly the one related to the reintroduction of wild indigenous species (No R(85)15);

Considering that the diversity of wildlife is essential to the maintenance of the biological balance of the biosphere and that invertebrates here play a vital role;

Considering that the too often harmful effects of human activity on the environment in Europe as elsewhere in the world urge us to revise our relationships with nature and demand severe controls on such activity with the aim of avoiding damage or reducing it to a minimum;

Considering that concerted action at an international level is necessary, because plant and animal life, primary productivity - plant - and secondary productivity - animal - depend directly and indirectly on the existence of a diversified invertebrate fauna and that in consequence, the perenniality of its existence is essential to the survival of mankind,

Recommends to the Governments of the member States that, when drawing up their management policies for the natural environment, they should take account of the appended Charter.

Appendix to Recommendation No R(86)10

CHARTER ON INVERTEBRATES

1. Invertebrates are the most important component of wild fauna, both in number of species and biomass

The number of scientifically identified invertebrate species in the world is well in excess of a million, whereas there are only some 51,000 species of vertebrates. In Europe the invertebrate fauna can be put at between 150,000 and 200,000 species, while the vertebrate fauna includes 902 species.

Invertebrates comprise microscopic protozoa (25,000 species), worms (20,000), molluscs (over 100,000), arthropoda (925,000 known species) which include spiders (34,000), crustaceans (25,000), myriapoda (10,000) and insects (approximately 850,000).

However, it is now believed that the tropical arthropod group alone may in reality consist of at least 30 million species (including 22 million insect species)

or 600 times the total number of vertebrate species. Every year science discovers and describes 15,000 - 20,000 new species of invertebrates.

The greatest animal production (biomass) can be ascribed to soil invertebrates; in Europe it may be as much as one tonne per hectare, well in excess of the average biomass of wild vertebrates. This is an enormous potential of which man knows and uses only a tiny part, but, on the other hand, destroys to a large extent.

To these terrestrial invertebrates may be added the biomasses of flying invertebrates, which may exceed 100 kg per hectare in a temperate European forest zone, and marine invertebrates whose quantity defies calculation, between 9 and 10 million tonnes of which are fished every year for human food (molluscs and crustaceans).

These huge quantities of invertebrate biomass consist largely of species which degrade and mineralise primary (plant) and secondary (animal) organic matter, putting it back into circulation for biological use.

2. Invertebrates are an important source of food for animals

Terrestrial and aquatic invertebrates are the principal source of food for large groups of vertebrates, including many species of fish, amphibians, reptiles, birds and mammals.

They are therefore a basic element in the food chains and networks which underlie the general balance of nature. Their existence and full development are essential for the overall biological equilibrium.

3. Invertebrates may also constitute a source of food for mankind

Particularly in tropical regions arthropoda and other invertebrates may constitute a large direct food reserve for man, either in normal times or, especially in case of shortage. Marine and freshwater crustaceans (crabs, lobsters, crayfish, etc), marine molluscs (mussels, oysters, clams, octopus, cuttlefish, etc) and terrestrial molluscs (snails) are universally employed as foodstuffs and sustain considerable farming, harvesting and commercial activity.

Termites, grasshoppers, the larva of wood beetles and butterflies, spiders of the Mygale family, etc are invertebrates widely used for human consumption in four continents. Honey, which is produced by insects, is also of great importance as a foodstuff.

4. Invertebrates are vital to the fertility and to the fertilisation and production of the vast majority of cultivated plants

In both temperate zones and tropical climates invertebrates are preponderant among terrestrial fauna and are vital to the formation of the soil and humus and to keeping them fertile; invertebrates which bury the carcasses of small animals help in both this and the cleansing of the environment.

Approximately eighty per cent of plants cultivated for the production of fruit and vegetables, textile fibres, medicinal preparations and various other things are fertilised via invertebrates (especially by bees, but also by many other pollen-bearing insects).

Furthermore, invertebrates are one of the crucial factors in plant productivity,

through their physical action on soil or their elimination of processes which restrict soil productivity.

For instance, the effect of earthworms on the soil stimulates grass growth, which is necessary for conserving the soil, rearing domestic animals and preserving wild fauna: transplanting them from Europe to Australia has improved the production of grassland and boosted stockbreeding results. Dung beetles break up and consume the excrement of wild and domestic mammals,which would otherwise form a layer, choking the soil and slowing down production.

Coral reefs and atolls are formed from invertebrates, and their importance for humanity cannot be overlooked.

Since invertebrates encourage vegetation, they are of irreplaceable benefit to all agriculture, forestry and animal husbandry and enhance the richness and variety of wild fauna, soil conservation and the beauty of the landscape, the regulation of water systems atmosphere purity and the fitness of the environment for habitation.

5. Invertebrates are useful in protecting farming, forestry, animal husbandry, human health and water purity

Biological pest control, which exploits natural patterns of competition between living organisms, is an effective system of defence for limiting damage by harmful animals and plants. For instance, red wood ants, which prey on tree-damaging insects, protect forests and can be mass produced and transplanted for the purpose of such protection. In Europe, they destroy 700,000 tonnes of forest insects, the majority of which are harmful.

The minute insect Prospaltella berlesei, introduced into Europe to act as a control against the Diaspis pentagona ladybird, which destroyed the mulberry tree and accordingly spelt the end of silkworm breeding, has wiped out the Diaspis and saved the silk industry.

The undisturbed presence of invertebrates is fundamental for preserving the purity of surface and groundwaters.

6. Invertebrates are valuable aids for medicine, industry and crafts

Invertebrates may be the source of medicinal preparations; in this respect they are still a poorly known and under-exploited resource. There is, for instance, the European coleoptera Paederus fuscipes, which produces pederin, a substance used successfully in homeopathic doses in the treatment of ulcers, or bee toxin used in articular diseases, royal jelly, manna, and the use of such invertebrates as leeches in certain medical therapy.

Many species play an important part in industry and crafts: silk and beeswax; earthworms and other species used in agriculture and for fishing, or as protein in fish-farming; pearls, coral, mother-of-pearl, etc. for the manufacture of jewellery and trinkets; the fishing and harvesting of natural sponges, etc. Invertebrates are also highly sensitive indicators of environmental quality.

7. Many invertebrates are of great aesthetic value

Butterflies and dragonflies are very often taken as symbols of beauty and many other invertebrates are of great aesthetic value.

The large number of species and their great morphological variations make invertebrates a major source of inspiration for both ordinary people and artists.

8. Some invertebrates may harm human activities but their populations may be controlled naturally by other invertebrates

Periodic pullulations of certain species of plant-eating invertebrates, especially defoliator insects, may result in major damage to crops and forests; in addition, the harmfulness of certain invertebrates as parasites and in the transmission of diseases to man, domestic animals and cultivated plants is recognised and justifies measures for the defence of human interests.

However, such measures can be implemented in such a way as to respect as far as possible the integrity of the environment and of its plant, animal and human components.

Ninety-eight per cent of the arthropoda potentially harmful in the above-mentioned areas are in fact kept under control by other arthropoda which are their predators or parasites, permanent, free and non-polluting natural factors in biological equilibria and biological pest control. The following are examples:

Ladybirds destroy plant lice, and cochineals, which are immensely harmful to agricultural crops. Coleoptera of the Calosoma species are an effective brake on the pullulation of lepidoptera which defoliate forests in Europe. Certain species of microhymenoptera protect the olive tree from Ceratitis capitata diptera, which is a parasite of such trees in the Mediterranean region.

9. Mankind can benefit greatly from enhanced knowledge of invertebrates

In the field of biology, medicine, chemistry, physics, and so on, invertebrates lend themselves to research in aquatic, terrestrial and aerial environments both on and in animals and plants and to educational operations; they have remarkable possibilities for adaptation, sensibilisation and reaction; they may often be easily bred to great quantities and they have little bulk. The qualities have encouraged basic research, experiments and their practical applications and will enable new research to be conducted on a vast scale.

In particular, the known successes achieved by the use of invertebrates to control harmful animals and plants biologically, hold out the greatest hopes of further achievements, and research in this field should be encouraged, promoted and given every support. It is also worth noting the case of cave-dwelling animals and their importance when it comes to studying changes in climate and fauna in the different continents, such animals being genuine examples of live fossils.

10. Terrestrial, aquatic and aerial invertebrates should be protected from possible causes of damage, impairment or destruction

Invertebrates provide humanity with important irreplaceable sources of food, work and welfare. Their presence must therefore be protected and preserved from all causes of damage or destruction or must be promoted by development, i.e. by the reintroduction of sutiable species according to the principles approved by the Council of Europe.

The natural fauna of invertebrates is diminishing continually and many species have either disappeared or are in the process of disappearance because of

man's action, without man even having been aware of their existence or having studied their characteristics and possible uses.

As the equatorial forests are destroyed at an estimated rate of 30 hectare per minute (160,000 km^2 per annum), without being replaced, millions of animal species are doomed. In temperate zones too, owing to urbanisation and other action with a disturbing effect on the land (fertilisers, agriculture, monoculture, consolidation and division of land holdings, deforestation, fires , hydrographical changes, insecticides, weedkillers, pollution, etc), the wild fauna of invertebrates is constantly dwindling and is in danger of extinction. A single example suffices: 96 species of butterflies are threatened with extinction out of a total of 380 European species. This situation calls for urgent protective measures.

Places where the fauna of invertebrates is threatened, or is of interest for other reasons, should be protected, because species cannot survive unless their habitats and environment are preserved. A considerable proportion of the conservation measures to be taken will therefore relate to the establishment of nature reserves (primitive forests with specific fauna, wetlands where threatened insect species are found, etc); areas constituting the habitats of a fauna of invertebrates unique in Europe will have to be given special priority.

In the fields of spatial planning, urban development, agriculture, forestry, animal husbandry, health, industry, trade and recreation, methods of intervention should be devised which interfere as little as possible with the environment in order to spare wildlife; including invertebrates.

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In the fight against invertebrates which are prejudicial to human interests, preference should be given, wherever possible to systems of biological control based on natural patterns. Other, ie chemical or physical types of intervention, must be reduced to a minimum, practised as selectively as possible and entail the adoption of methods which are strictly and solely aimed at the target agent and have short-lived effects. Where invertebrates have been exterminated, they should be reintroduced in accordance with the approved principles for the reintroduction of species. In view of their practical value to mankind, research on invertebrates in all branches of science must be encouraged.

No animal or plant species must be allowed to disappear because of man's activities.

Supplied by

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THE IRISH BIOGEOGRAPHICAL SOCIETY: CONSTITUTION

Constitution as approved by the committee of the Society on the 13th March 1976, and amended by the first, second, third, fourth, seventh, ninth, tenth and eleventh Annual General Meetings.

1. NAME

The name of the society shall be the Irish Biogeographical Society.

2. OBJECTIVES

(a) The recording and study of the distribution of the Irish flora and fauna.

(b) To encourage an interest in biological recording and studies in Ireland, by way of field trips, courses, lectures, and other means.

(c) To issue and publish information on the Irish flora and fauna, and to facilitate the exchange of information with other interested groups.

3. THE MANAGEMENT OF THE AFFAIRS OF THE SOCIETY

(a) The affairs of the Society shall be managed by a committee of eleven elected members, including five officers.

(b) The committee shall have the power to co-opt a maximum of two additional members for one term of office, and also to appoint regional representatives as observers, who shall be ex-officio members of the committee.

(c) The officers shall be, the Chairman, the Hon. Secretary, the Hon. Treasurer, the Hon. Field Meetings Secretary, and the Hon. Editor.

(d) The duties of the Chairman shall be the chairing of the meetings of the committee and all general meetings.

The duties of the Hon. Secretary will be to carry out all normal secretarial duties.

The duties of the Hon. Treasurer shall be to manage the finances of the Society, and to keep membership records.

The duties of the Hon. Field Meetings Secretary shall be to deal with the general planning and organisation of all field meetings.

The duties of the Hon. Editor shall be to supervise production of Society publications.

4. ELECTION OF THE COMMITTEE AND OFFICERS

(a) The election of members of the committee shall take place only at Annual General Meetings, as committee vacancies arise.

(b) Election shall be by secret ballot.

(c) The term of office of committee members shall be two years and members shall be eligible for immediate re-election. All nominations shall be in writing signed by two members of the Society with the written consent of the candidate to serve if elected. Nominations for election to the committee shall be given to the Hon. Secretary at or before the Annual General Meeting.

(d) Immediately after the Annual General Meeting there shall be a committee meeting at which the Society's officers shall be elected by the committee for a term of two years and shall be eligible for immediate re-election.

(e) Temporary appointments may be made by the committee to fill vacancies arising during a term of office.

(f) The committee shall be empowered to appoint sub-committees from among members of the Society.

(g) In all Society elections proxy votes shall not be valid, and only Society members may participate in elections.

5. MEETINGS OF THE SOCIETY

5A Committee Meetings

(a) The Hon. Secretary shall be authorised to call meetings of the committee.

(b) Alternatively any five committee members, acting in concert, may call a committee meeting.

(c) All committee members must be informed in writing of the date, time and venue of any forthcoming committee meeting at least seven days in advance of that committee meeting.

(d) Within two months of the Annual General Meeting there shall be a committee meeting at which the Hon. Secretary must provide a written list of names and addresses of all committee members and a copy of the Society's Constitution to each committee member.

(e) A quorum at the meeting of the committee shall consist of five elected members.

(f) Members of the committee who fail to attend three consecutive meetings of the committee shall cease to be members of it, unless reinstated by a majority vote of the committee.

(g) The decisions of the committee shall be taken by a majority vote. The Chairman shall not vote except in the event of a tie.

5B General Meetings

(a) The Annual General Meeting shall be held at approximately annual intervals, at such time and place as shall be decided by the committee.

(b) The Hon. Secretary shall at the direction of the committee, be empowered to call a Gereral Meeting for the consideration of the business of the Society.

(c) The Hon. Secretary shall give all members of the Society not less than two weeks notice of the date, time and place of any General Meeting.

(d) A quorum of any General Meeting shall be the number of elected members of the committee plus one.

(e) Decisions shall be taken by a simple majority vote with the Chairman having a casting vote in the event of a tie.

(f) Voting shall be by ballot.

6. FINANCES OF THE SOCIETY

The funds of the Society shall be in the name of the Society and shall be operated by the Hon. Treasurer, who will be accountable to the Society and shall produce accounts at the Annual General Meeting. The accounts of the Society shall be audited.

7. PUBLICATIONS OF THE SOCIETY

(a) The Society shall publish a Bulletin in each calendar year.

(b) The Bulletin shall be open to receive papers on:

I. Reports of work carried out on Society Field Meetings.

II. Contributed papers of biogeographical interest.

(c) The production and editing of the Bulletin shall be managed by an editorial sub-committee consisting of five members of the committee, including the Hon. Editor, and under the chairmanship of the Chairman. This sub-committee may refer papers received to referees for their opinion of the scientific value of the submitted work.

8. MEMBERSHIP OF THE SOCIETY

The following shall be the categories of membership:

(i) Ordinary membership. This is open to all persons interested in the aims of the Society.

(ii) Student Membership. All full-time students shall be entitled to Student Membership.

(iii) Group Membership. This is open to all groups, institutions and Societies.

(iv) Honorary Membership. Honorary members shall be elected by a two-thirds majority of the members of the committee. Persons shall be elected to honorary membership, if, in the opinion of the committee, they have contributed in an outstanding way over a long period of time to the advancement of biology in Ireland. As honorary members they shall be entitled to the full benefits of ordinary membership for life.

Note: All members of the Society on the 8th March 1980 and who paid their annual subscription for the year beginning 1st March 1980 shall be Founder Members of the Society.

9. ANNUAL SUBSCRIPTION

(a) The annual subscription shall be decided by the Committee.

(b) The annual subscription shall be payable on the 1st January of each year by all members other than honorary members. Student members shall pay half of the annual subscription and shall enjoy full privileges of membership.

(c) Membership shall lapse if the current annual subscription is not paid by April 1 of each year.

10. PRIVILEGES OF MEMBERSHIP

Members shall be entitled to:

(a) receive the circulars and all regular publications of the Society.

(b) submit papers, notes and letters for consideration for publication by the Society.

(c) attend and vote at meetings and to attend courses and field meetings run by the Society. In the case of Group members, to appoint a representative who shall be entitled to one vote.

11. AMENDMENTS AND ALTERATIONS TO THE CONSTITUTION

(a) No rule shall be made, altered or deleted from this constitution, except at a general meeting. Any member is entitled to suggest an amendment, prior to the general meeting, by submitting the suggested change to the Hon. Secretary.

(b) The Hon. Secretary shall notify members of any suggested amendment before the general meeting at which it is to be considered. A majority of two-thirds in favour of the amendment shall authorise the amendment.

(c) Amendments proposed before a general meeting may be amended themselves during the general meeting, with the consent of the proposer of the original amendment and a simple majority of those present at the general meeting.

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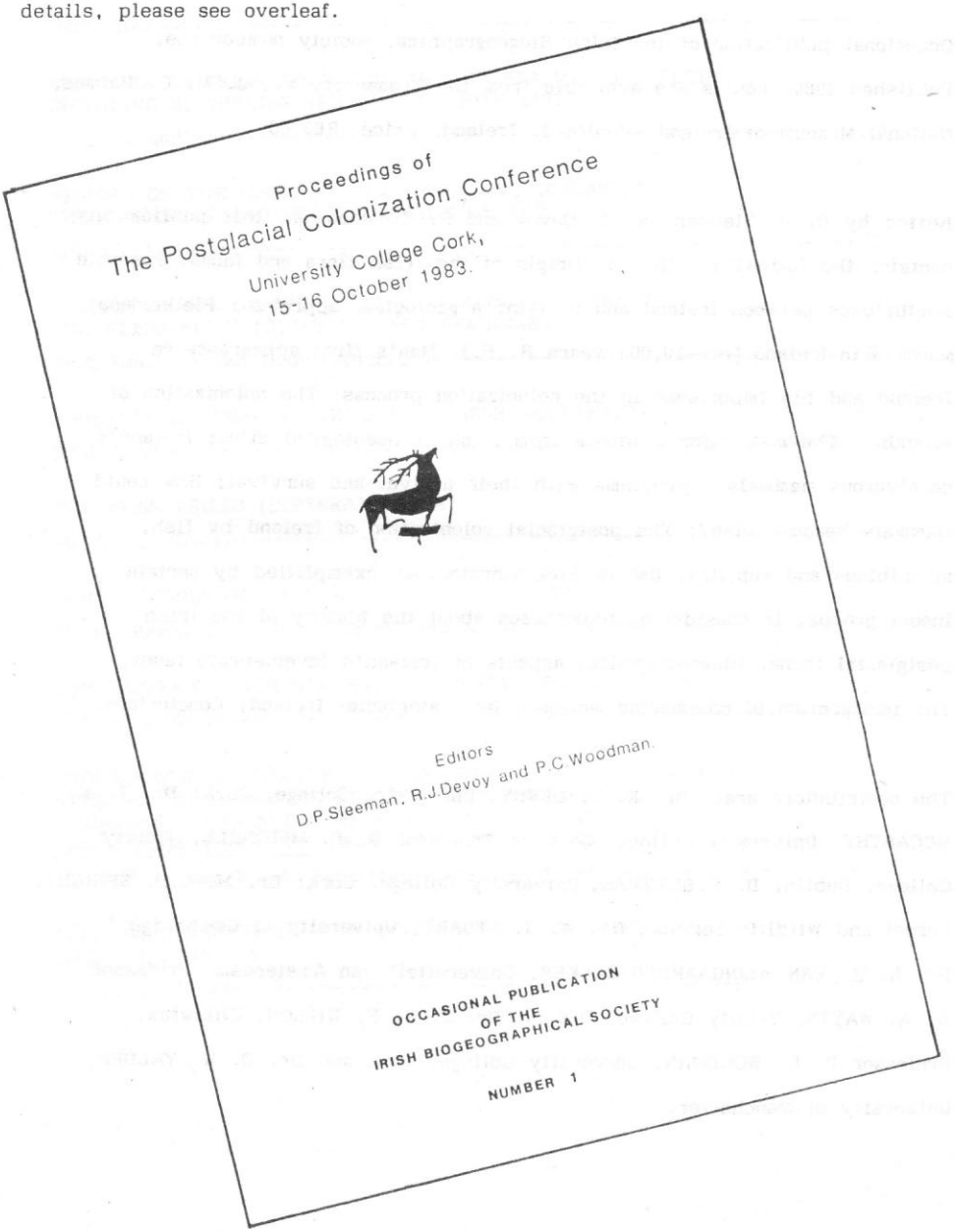
PROCEEDINGS OF THE POSTGLACIAL COLONIZATION CONFERENCE: for further details, please see overleaf.



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PROCEEDINGS OF THE POSTGLACIAL COLONIZATION CONFERENCE.

Occasional publication of the Irish Biogeographical Society number one. Published 1986, copies are available from the Treasurer, Mr. J. M. C. Holmes, National Museum of Ireland, Dublin 2, Ireland, price IR£3.00.

Edited by D. P. Sleeman, R. J. Devoy and P. C. Woodman, this publication contains the following articles:- Origin of the Irish flora and fauna; Possible landbridges between Ireland and Britain: a geological appraisal; Pleistocene mammals in Ireland (pre-10,000 years B. P.); Man's first appearance in Ireland and his importance in the colonization process; The colonization of islands: The mammalian evidence from Irish archaeological sites; Ireland's carnivorous mammals - problems with their arrival and survival; How could mammals become Irish?; The postglacial colonization of Ireland by fish, amphibians and reptiles; Use of invertebrates, as exemplified by certain insect groups, in considering hypotheses about the history of the Irish postglacial fauna; Biogeographical aspects of Ireland's invertebrate fauna; The immigration of non-marine mollusca into lateglacial Ireland; Conclusions.

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INSTRUCTIONS TO CONTRIBUTORS

1. Manuscripts should follow the format of articles in Bulletin No. 10.

2. Manuscripts should be submitted as typed copy on A4 paper, using double-spacing and 2.5 cm (1 inch) margins.

3. It helps if the copy is clean and not embellished with a mass of super-imposed corrections.

4. Figures should be submitted in a size for reduction to A5 without any loss of detail.

5. Records: please ensure that, at minimum, 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. M 0978), 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.

6. 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.

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