

DISTRIBUTION DATA ON THE EPHEMEROPTERA AND
PLECOPTERA IN IRELAND

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INTRODUCTION AND METHODS

Information on the Ephemeroptera and Plecoptera of Ireland is contained in King & Halbert (1910), Harris (1952) and, more recently, Macan (1970) and Hynes (1958). During the course of a recent survey of lotic insect species in this country a number of additional records were discovered and these are presented here together with some remarks on the distribution of the two orders in Ireland.

During the survey 89 benthic samples were collected in a handnet (25 threads/cm.) at different points throughout the country. The sample areas measured 1 m². Details of the programme are summarised in figs. 1 and 2. The animals were removed from the detrital content of the samples under magnification and identified to species. For each species listed the total number of specimens collected during a 12 month survey are given together with the number of samples in which they occurred.

A number of records which were collected during more intense ecological work at grid reference points F.95,05 and M.35,35, are also listed.

In addition to the collection of records it was considered desirable to re-examine the National collections on which King & Halbert's paper (1910) is based and new information arising from this work is included in the results.

Similar remarks may be made about this part of the National collection as about another section (Fahy, 1970). During the present work the procedure followed was also the same.

SELECTION OF SAMPLES

The object of the survey was to collect random samples from a wide area (fig. 1). At present there is no way of checking the results for bias because there has been no national survey of hydrological conditions in this country. Much variability is known to occur, as for example, between the east and west Corrib catchments.

Figures published by the Department of Agriculture and Technical Instruction (1902) give the following altitudinal distribution of land in Ireland; above 600 m, O.D. 0.03%; between 300 and 600 m, 4.89%; between 160 and 300 m, 17.38% and between 0 and 160 m, 77.01%. Comparison of these data with fig. 2f indicates good agreement. Supporting data for gradient and current speed indicate a bias for lowland streams, which make up the majority in Ireland.

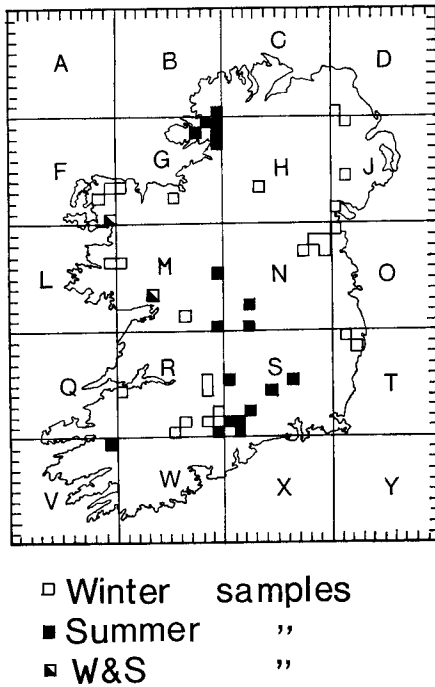


Fig. 1. The distribution of sampling points as indicated by 10 km squares.

The parameters for stream size in fig. 2 were used in an attempt to identify stream order on a $\frac{1}{4}$ inch Ordnance Survey map. On igneous and metamorphic rocks the ratio of first to fifth order streams is approximately 300:1 while on limestone the figures are 50:1. The first figure suggests a larger than representative number of second order streams were chosen while the second indicates second order streams were sampled in an appropriate proportion.

Bedrock types were chosen fairly representatively, emphasis being laid on igneous and metamorphic rocks.

RESULTS

Identifications were made without difficulty and approximately 2% of the Ephemeroptera and less than 1% of the Plecoptera could not be determined because of poor condition or small size. It was not possible to distinguish between the species *Baetis vernus* and *B. tenax*. Macan (1950) has given characters which distinguish the nymphs of *Baetis scambus* from those of *fuscatus* (L.) and samples collected during the summer and autumn months of the survey contained nymphs of this grouping. Several from each sample were dissected to

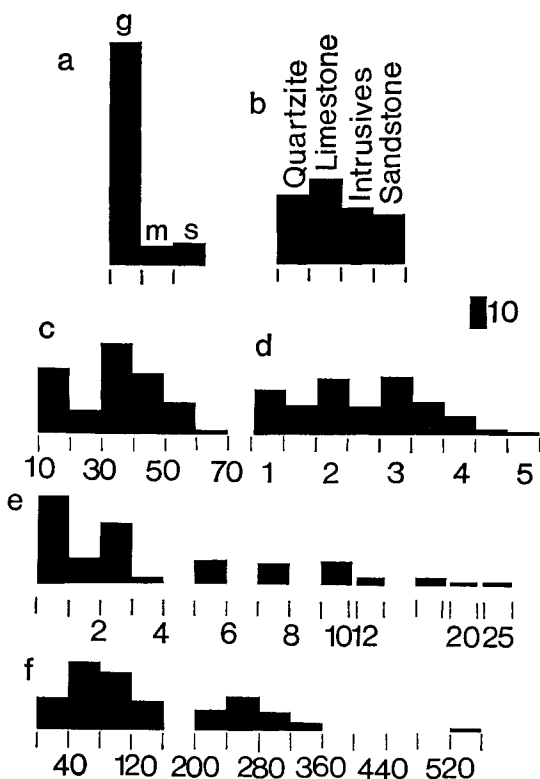


Fig. 2. A diagrammatic representation of the variation of certain abiotic factors in the course of a national survey: (a) gradient: g—gentle, m—moderate, s—steep; (b) bedrock types; (c) stream depth—cm. midpoint; (d) current speeds (arbitrary scale); (e) stream width—m.; (f) height O.D.—m.

facilitate examination of the mouthparts and all were found to correspond to the descriptions of *scambus*. This result may be misleading, however, as not every specimen belonging to the group was dissected.

The results are summarised in Table I and a more detailed account of the grid references at which each species was collected is contained in a thesis from which these results are taken.

Summarising distribution data, much of the information in the form of grid reference points is insufficient to give any indication of a distribution pattern. The more common species, however, appear to be widespread. Beirne (1952) suggests that a species which is distributed in north-west Britain is frequently widespread in Ireland. This has been found to be the case for certain lotic insects, *Simulium*

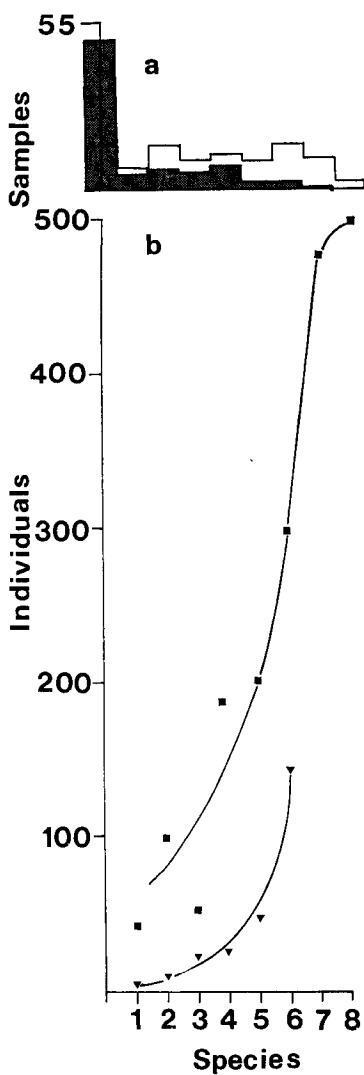


Fig. 3. (a) the number of species per sample of Plecoptera (stippled) and Ephemeroptera taken during a national survey of lotic organisms and (b) the number of individuals per species of Ephemeroptera (■) and Plecoptera (▼) taken.

TABLE I

| Ephemeroptera | Total numbers taken | Number of samples containing species | Occurrence at F. 95, 05 | Occurrence at M. 35, 35 |
|--|----------------------------|---|--------------------------------|--------------------------------|
| New county records | | | | |
| <i>Caenis rivulorum</i> Etn. | 243 | 6 | * | |
| <i>Paraleptophlebia submarginata</i> (Steph.) | 14 | 5 | * | |
| <i>P. tumida</i> Bengtss | 1 | 1 | | |
| <i>P. cincta</i> Retz. | | | * | |
| <i>Baetis scambus</i> Etn. | 772 | 28 | * | |
| <i>B. vernus</i> Curt. & <i>tenax</i> Etn. group | 98 | 5 | | |
| <i>Ecdyonurus insignis</i> (Etn.) | | in National collections | | |
| Other species | | | | |
| <i>Caenis moesta</i> Bengtss | 969 | 10 | | |
| <i>Leptophlebia vespertina</i> (L.) | 21 | 1 | | |
| <i>Ephemerella ignita</i> (Poda) | 2,333 | 36 | * | * |
| <i>Ecdyonurus venosus</i> (Fabr.) | 141 | 14 | * | * |
| <i>E. dispar</i> (Curt.) | 151 | 20 | | |
| <i>Rhithrogena semicolorata</i> (Curt.) | 483 | 24 | * | * |
| <i>Heptagenia lateralis</i> (Curt.) | 17 | 4 | * | |
| <i>H. sulphurea</i> (Mull.) | 59 | 16 | * | |
| <i>Centroptilum luteolum</i> (Mull.) | 71 | 7 | * | |
| <i>Baetis muticus</i> (L.) | 1,949 | 42 | * | |
| <i>B. rhodani</i> (Pict.) | 7,290 | 87 | * | * |
| Plecoptera | Total numbers taken | Number of samples containing species | Occurrence at F. 95, 05 | Occurrence at M. 35, 35 |
| New county records | | | | |
| <i>Nemoura cambrica</i> (Steph.) | 7 | 2 | | |
| <i>N. erratica</i> Claassen | 1 | 1 | | |
| Other species | | | | |
| <i>Brachyptera risi</i> (Mort.) | 3 | 2 | * | |
| <i>Protonemura praecox</i> (Mort.) | 6 | 1 | * | |
| <i>P. meyeri</i> (Pict.) | 151 | 13 | * | |
| <i>Amphinemura sulcicollis</i> (Steph.) | 256 | 24 | * | |
| <i>Nemoura cinerea</i> (Retzius) | 4 | 1 | * | |
| <i>Leuctra inermis</i> Kempny | 417 | 13 | * | |
| <i>L. hippopus</i> (Kemp.) | 131 | 17 | * | |
| <i>L. fusca</i> (L.) | 278 | 22 | * | |
| <i>Capnia bifrons</i> (Newman) | — | — | * | |
| <i>Isoperla grammatica</i> (Poda) | 179 | 28 | * | |
| <i>Dinocras cephalotes</i> (Curtis) | 1 | 1 | | |
| <i>Perla bipunctata</i> Pict. | 36 | 10 | * | |
| <i>Chlorperla torrentium</i> (Pict.) | 217 | 36 | * | * |
| <i>C. tripunctata</i> (Scopoli) | 42 | 3 | | |

The summarised occurrence of Ephemeroptera and Plecoptera in Ireland as determined by recent survey work.

nitidifrons Edwards (Diptera, Simuliidae) being a good example (accounts of its distribution in the British Isles are given in Fahy (1972) and Davies (1968)). Another species which demonstrates a similar distribution pattern is *Esolus parallelepipedus* (Mullant) (Coleoptera, Elminthidae) (accounts of its distribution are given in Fahy, in press and Holland (1972)).

In fig. 3 the relationship between the number of species and number of individuals in both orders is examined. The graphs should be considered with fig. 2 which summarises some of the abiotic conditions under which collections were made. The majority were taken at low altitude and the stream size from which they were collected was small. Information contained in fig. 3 suggests that Ephemeroptera are numerically more significant in Ireland, a phenomenon which results from the low altitude at which the bulk of the material was collected (see Langford & Bray (1969)).

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