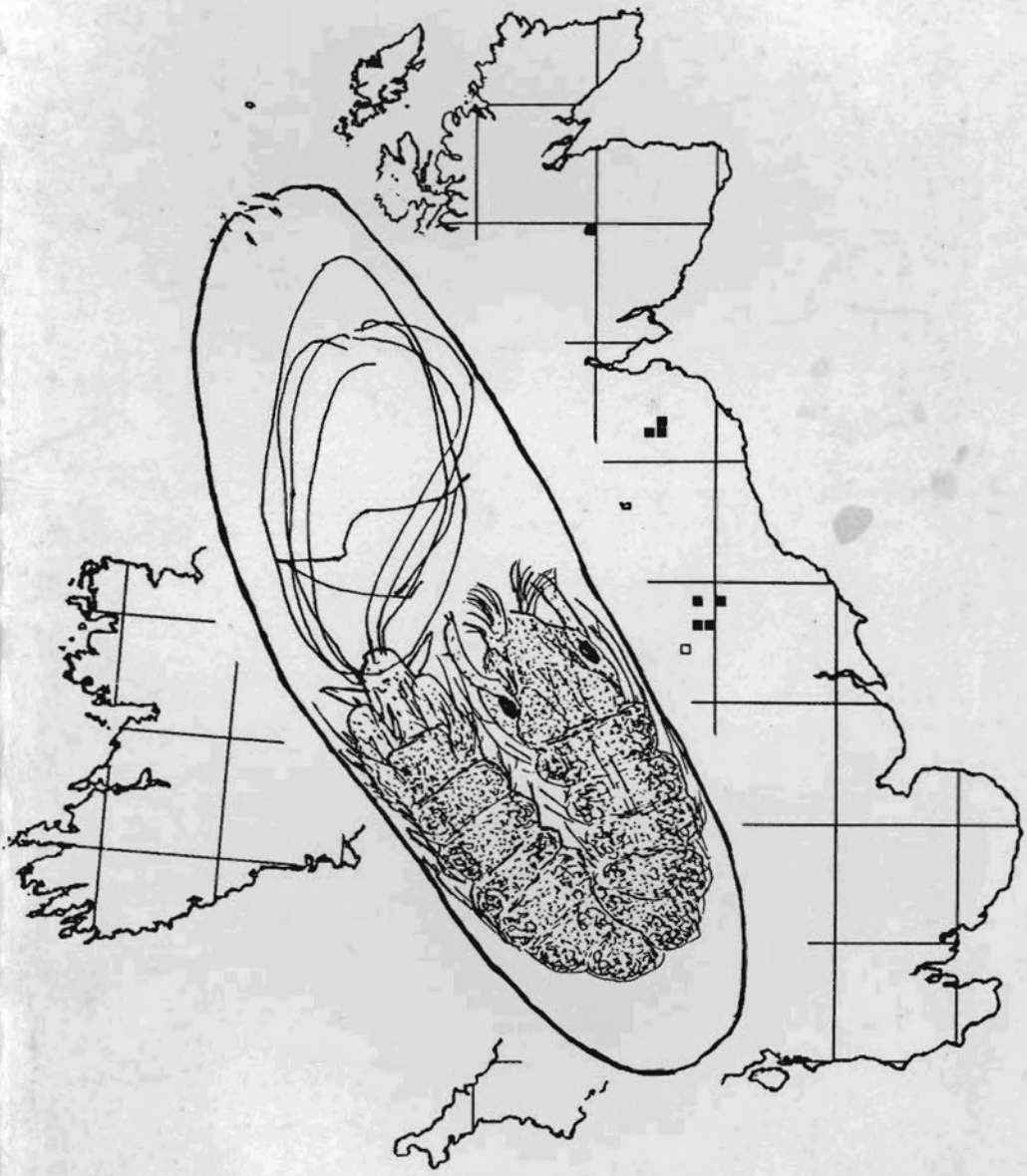
Dipterists Digest



No. 3

1990

Dipterists' Digest is a popular journal aimed primarily at field dipterists in the UK, Ireland and adjacent countries, with interests in recording, ecology, natural history, conservation and identification of British and NW European flies.

Articles may be of any length up to 3000 words. Items exceeding this length may be serialised or printed in full, depending on the competition for space. They should be in clear concise English, preferably typed double spaced on one side of A4 paper. Only scientific names should be underlined. Tables should be on separate sheets. Figures drawn in clear black ink, about twice their printed size and lettered clearly.

Enquiries about photographs and colour plates — please contact the Production Editor in advance as a charge may be made.

References should follow the layout in this issue.

Initially the scope of Dipterists' Digest will be:-

— Observations of interesting behaviour, ecology, and natural history.

— New and improved techniques (e.g. collecting, rearing etc.).

— The conservation of flies and their habitats.

— Provisional and interim reports from the Diptera Recording Schemes, including provisional and preliminary maps.

— Records of new or scarce species for regions, counties, districts etc.

— Local faunal accounts, field meeting results, and 'holiday lists' with good ecological information/interpretation.

— Notes on identification, additions, deletions and amendments to standard key works and checklists.

— News of new publications/references/literature scan.

Texts concerned with the Diptera of parts of continental Europe adjacent to the British Isles will also be considered for publication, if submitted in English.

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The Eggs of Dixella obscura Loew, D. attica Pandazis and Dixa nubilipennis Curtis (Diptera: Dixidae)

E. Kathleen Goldie-Smith

The eggs of Dixidae have rarely been collected and their structure was described in detail for the first time in an account of the eggs of *Dixella autumnalis* (Goldie-Smith 1989a). Eggs of *Dixella californica* were obtained abundantly by Hubert (1953) and of *D. autumnalis* by Peach and Fowler (1986); other records are extremely sparse (Goldie-Smith 1989a, b). Usually, the description and measurements of the "egg" have actually been those of the embryo. It has become clear in the present study that in Dixidae the egg is to he regarded as the whole structure from the outer, sculptured coat inwards, including the embryo.

Dixella obscura Loew, a species of very limited known distribution (Disney 1975) was collected in the "border country" of Scotland during the Dipterists' Field Meeting centred at Galashiels in July 1988. *Dixella attica* Pandazis was collected at several estuarine sites in the marshes of North Kent. *Dixa nubilipennis* Curtis is found, especially in the autumn, in a Rye ditch, together with *Dixa submaculata* Edwards.

Eggs of Dixella obscura and D. attica

In both *Dixella obscura* and *D. attica* the eggs are laid in clusters above the surface of the water, either directly in the meniscus or in a place where capillarity ensures continuous contact with a film of water. The whole mass is held together by a common gelatinous matrix which is attached at the base to a suitable substratum and helps to keep all the embryos orientated in the same direction. Each embryo is contained in a transparent gelatinous envelope with an outer coat which forms a well-marked mesh over the upper end; the mesh becomes less distinct towards the base. Between this coat and the embryo is a membrane which forms a sort of "capsule". The lower end of the capsule is closed but at the apex it forms, with the outer coat, a shallow micropylar cup or funnel leading towards the top of the embryo, where there is a conspicuous dark micropylar spot. A tiny mass of seminiferous residue can be seen near the embryo or in the micropylar funnel. The embryo is white, convex on the dorsal side, flattened ventrally and more blunt and rounded at the anterior end. In both species, the embryo is about 0.45 mm. in length at first, with a measurable increase by the third day. Development is synchronous throughout a clutch so that all the eggs hatch at about the same time, on the fifth day at the normal room temperatures under which the eggs were cultured, and it follows a pattern similar to that described for *Culex pipiens* by Clements (1963). After escaping from the surrounding membrane, the tiny larva, usually in the characteristic U shape, pushes against the outer egg membrane, first at one end, then at the other, repeatedly, with long periods of rest. Eventually the apex gives way and the larva emerges.

Dixella obscura

The eggs of this species are characteristically bulbous, almost spherical. The boundaries of the mesh, generally hexagonal, are not strongly thickened, so the network appears delicate, creating relatively slight pointed irregularities of the outer membrane in outline. The micropylar cup is shallow. Figs. 2 and 3 show a tiny mass of seminiferous residue lying in it; in Fig. 1 this mass lies between the cup and the embryo. In Fig 3 the edge of the cup is seen to be strikingly irregular. The "capsule" is bounded by two thin refractive membranes which are often wavy and irregular, the distance between them being very uneven in the upper region; the inner membrane is the thicker of the two.

The distinguishing feature of *D. obscura* eggs, among those of the seven species of *Dixella* which have been examined, is the presence of a third membrane, forming,

as it were, a "secondary capsule", sometimes crinkly in places, and unattached at its lower end. Furthermore, the slight thickening of the lower end of the capsule to form a hyaline "plug" to which, in other species, refractive "strings" are attached, has not been observed in *D. obscura*.

Fig. 1 shows an embryo in the short-lived "hyaline rim" stage, with shining columnar cells forming a covering layer, and a group of larger, more spherical cells at the posterior end. Figs. 4, a-h illustrate subsequent stages. By the time the eyes appear as red dots (Fig. 4,f,g) segmentation is well advanced. When the eyes have turned black, and the embryo is "humped" (Fig. 4,h), wriggling movements in the middle region may be very noticeable. The confining membrane is most often ruptured by a transverse slit near the midline, and a variety of other splits in the upper part which still bears the micropylar spot, leaving the basal part intact, thimble-shaped (Fig. 6,a-c). In some other species of *Dixella* this membrane is evidently less rigid and after a longitudinal split it collapses into longitudinal folds and creases. In both types, however, the membrane is tough and resistant, and may be seen within the empty "egg shell" many days after the escape of the tiny larva. This normally takes place through the apex, where there is a ready-made hole, though small. The lower end of the capsule must also be quite tough for the larva may be seen to push hard against it and stretch it; eventually, however, the larva breaks out through the apex. In Fig. 5 a larva ready to escape is seen with the long, black terminal bristles wrapped around the split membrane from which it has emerged.

Dixella attica

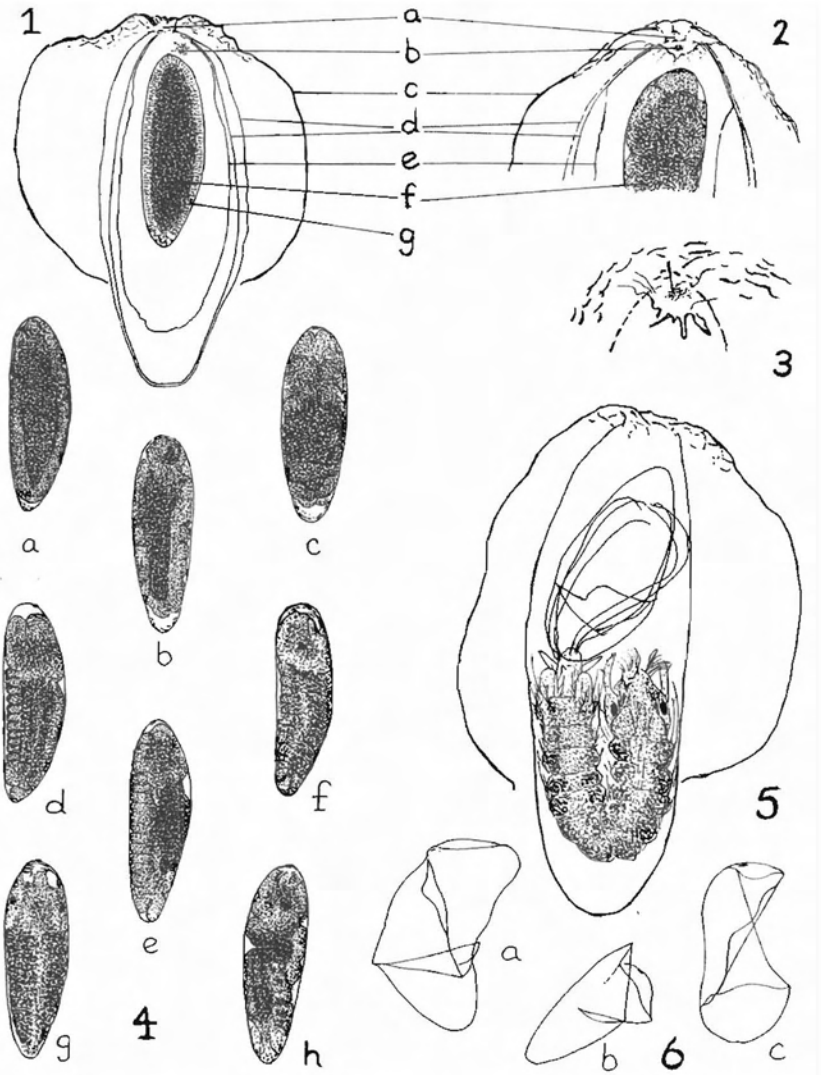
The eggs of this species are also bulbous, but generally more flattened apically than those of *D. obscura*. The network is very striking: the meshes are so sharply thickened, with the thinner parts of the membrane sagging between them, that a holly-leaf effect results, in outline (Figs. 7,8). The double wall of the capsule resembles that of D. obscura in its irregularity, but at the base there is a slight hyaline thickening (Fig. 7), sometimes scarcely perceptible (Fig. 8), from which thin refractive "strings" extend up to the apex, where they are attached. Often, the outermost strings are so distinctly continuous as to form a "secondary capsule" within the first. This may be comparable with the more robust structure in *D. obscura*, but in *D. attica* it is always attached at the base to the hyaline "plug". The development of the embryo follows a pattern similar to that of *D. obscura*. Figure 7 shows an embryo at the "hyaline rim" stage (cf. *D. obscura*). Figure 8 illustrates a later stage, where differentiation is well under way.

Eggs of three species of Dixa

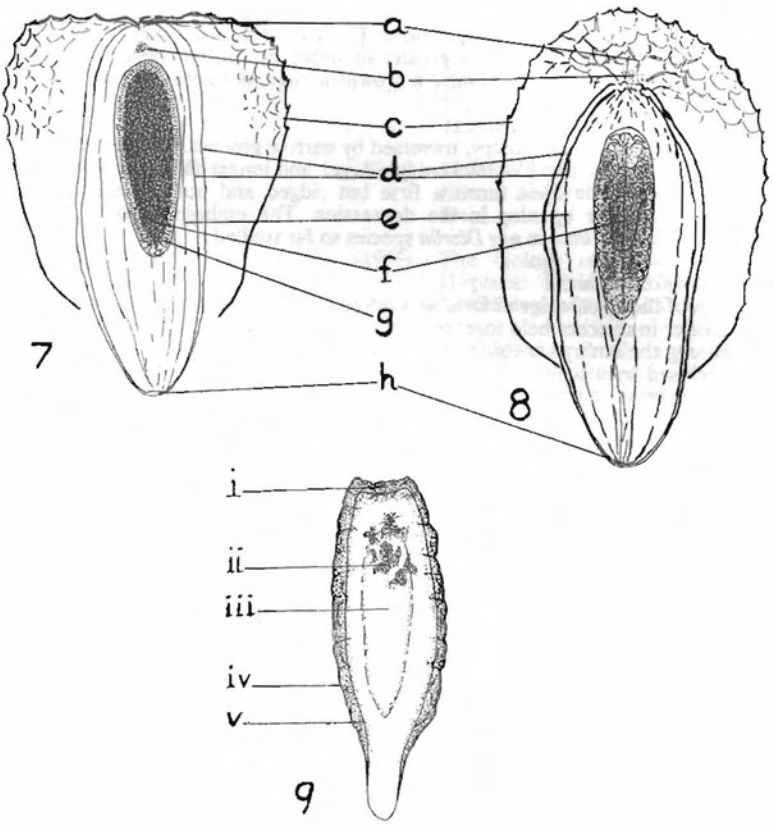
Egg clutches have been obtained in cultures of *Dixa nebulosa*, *D. nubilipennis* and *D. submaculata*. They showed great similarity. and many obvious differences from *Dixella* egg clutches. They all aborted at an early stage and it seems likely that they were unfertilized, a theory supported by the observation that the tiny masses of seminiferous residue so characteristic of *Dixella* eggs have not been seen in eggs of *Dixa* species. *Dixa* eggs, however, are less transparent than *Dixella* eggs on account of the coarse sculpturing and brown colouration. A further argument is that whereas copulation readily takes place in laboratory cultures of *Dixella*, in this study it has never been observed in similar cultures of *Dixa*. It is noteworthy that Peach (1983) also failed to get viable eggs of a *Dixa* (*D. nebulosa*) under conditions in which *Dixella autumnalis* produced them abundantly (Peach and Fowler 1986). It seems likely, therefore, that mating in a confined space does not take place in *Dixa*, and that swarming is necessary in this genus.

Eggs of Dixa nubilipennis

Dixa nubilipennis eggs (Fig. 9) are deeply embedded in a thick jelly of a much tougher consistency than that of the matrix of *Dixella* species. They are more or less cylindrical, with a blunt and irregular apex, the capsule is drawn out to a



Figs. 1-6. **Dixella obscura**. Fig. 1. Whole egg, with embryo at early "hyaline rim" stage. Fig. 2. Apical region of egg with differentiating embryo. a. Micropyler cup. b. Seminiferous residue. c. Outer coat. d. Outer and inner membranes of capsule. e. "Secondary capsule", characteristic of this species. f. Embryo. g. Surface layer of shining columnar cells.Fig. 3. Impression of a micropyler cup with rough edges. Fig. 4. a-h. Embryos at successive stages of development. Fig. 5. Larva ready to hatch, its long terminal bristles wrapped around the membrane from which it has emerged. Fig. 6. a-c. Membranes from which larvae have emerged.



Figs. 7, 8. Dixella attica. Fig. 7. Side view of the whole egg with embryo at "hyaline rim" stage. Fig. 8. View over the top of egg with embryo at more advanced stage. a. Micropylar cup. b. Seminiferous residue. c. Outer coat. d. outer and inner membranes of capsule. e. refractive "strings". f. Embryo. g. Surface layer of shining columnar cells. h. Hyline "plug".

Fig.9. Dixa nubilipennis. i. Micropylar cup. ii. purplish-red patches. iii. Embryo. iv. Outer coat. v. Capsule.

blunt point posteriorly. Although appearing white under a hand lens, under the microscope the eggs are seen to have a strong brown colour, often with purplish-red patches (Fig. 9, ii) on the upper third. This colour has been seen in all three of the *Dixa* species studied, to a greater or lesser extent, but never in *Dixella*. Eggs of some species of *Dixella* have a brownish tinge, but never the deep brown colour of *Dixa* eggs.

The surface is rough and bumpy, traversed by narrow grooves. The outer layer is striated with shining peg-like thickenings, larger and longer than any sculpturing seen in *Dixella*. The apex forms a firm but ridged and bumpy cup, with an irregular, crack-like opening in the depression. The embryo is more sharply pointed posteriorly than in any *Dixella* species so far studied.

Concluding remarks

The eggs of the ten species of Dixidae studied are all laid at or above the surface of the water in clutches held together at the base by a common gelatinous matrix. In each egg the embryo is contained in a gelatinous capsule itself surrounded by jelly enclosed by a sculptured membrane. Each of the seven species of *Dixella* studied, however, is recognisable by such distinguishing features as the overall shape of the egg, the type of sculpturing of the outer coat, and the structure of the capsule. The eggs of the three species of *Dixa*, on the other hand, closely resemble each other and are markedly different from the eggs of any species of *Dixella*. Furthermore, there is evidently a highly significant difference in the reproductive habits of the two genera. When these are better understood, and the culture requirement supplied, it may be possible to study the development and hatching of *Dixa* eggs as readily as those of *Dixella*.

This study is continuing, with the assistance of a grant from the Professor Hering Memorial Research Fund awarded in 1988 by the British Entomological and Natural History Society.

Under the tutelage of Dr. R. H. L. Disney the author has taken over the organisation of the Distribution Mapping Scheme for Dixidae run by the Biological Records Centre. She would be very glad to receive further distribution records.

Acknowledgements

Grateful thanks are due to Dr. R. H. L. Disney (Cambridge) and Dr. W. R. Nowell (California, U.S.A.) for assistance and encouragement; to the Nature Conservancy Council, the National Trust, the Royal Society for the Protection of Birds, the Kent Trust for Nature Conservation, the Sussex Wildlife Trust, the Wardens and Management Committee of the Rye Harbour LNR and SSSI, and all the owners of property where collections have been made; and to a number of other people who give help in a variety of ways.

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Anomoia purmunda (Harris, 1780) (Diptera: Tephritidae) in South Cumbria (VC 69)

On 26 July 1977 I found a female specimen of *A. purmunda* at rest on a wall of my former home at Kendal Wood, New Hutton, Cumbria (34/542913). I do not collect Tephritidae systematically but the rather unusual appearance of this species caused me to pin and mount it. Identification was readily effected from "Flies of the British Isles" by Colyer and Hammond (p. 188 and plate 57 fig.1 - where the species is referred to as *permunda).* On the walls of Kendal Wood are extensive shrubs of *Cotoneaster horizontalis* Decne. and presumably these provided the necessary pabulum for my specimen.

Colyer and Hammond give no indication of the distribution or frequency of the species and I assumed it would be common and widespread - as indeed it may prove to be. However the recent acquisition of "Tephritid Flies" by I.M. White (Handbooks for the Identification of British Insects Vol.10, Pt 5a, published by the Royal Entomological Society of London) indicates a more restricted and discontinuous distribution than I had assumed. Various south English counties are listed and also "Inverness". I have not been able to find any published records of the occurrence of *purmunda* in northern England hence it was felt worthwhile putting my capture on record.

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Distribution Maps for Dixidae in Great Britain and Ireland

E. Kathleen Goldie-Smith

Maps prepared by the Biological Records Centre of the Institute of Terrestrial Ecology were presented by Disney (1975) for fourteen British species, with habitat notes for each species. He commented that "all maps indicate the great need for further collecting and recording", that "seasonal occurrence requires more detailed analysis", and "the notes on habitat are likewise crude and much work remains to be done on the factors controlling distribution patterns and habitat preferences". The following maps, also prepared by the Biological Records Centre, but under the new designation, Environmental Information Centre, show that we now have a better knowledge of distribution, but our understanding of the factors controlling it is still very limited. There have been some extensions of the recorded phenology of larvae and adults. The habitat notes follow the pattern set by Dr. Disney and in many places are word for word the same! I am greatly indebted to him, therefore, for permitting this reproduction of his work with a new set of maps.

Out of a list of about eighty recorders of Dixidae over the years, the following have each contributed more than ten records:

G. Abbott	R. H. L. Disney	A. Irwin
Sir C. H. Andrews	C. M. Drake	W. J. Peach
P. Ashe	F. W. Edwards	C. H. W. Pugh
A. Brindle	W. A. Ely	E. H. Smith
H. Britten	A. P. Foster	A. E. Stubbs
P. W. Brown	J. H. Fowler	P. Withers
J. H. Cole	E. K. Goldie-Smith	Lt.-Col. Yerbury

All the records of Dixidae were computerised by B. R. C. up to October 1984. Since that date, more than 400 records have been added, both by individuals and as a result of surveys organised by the Nature Conservancy Council such as:

Welsh Peatland Invertebrate Survey in 1987 (Dr. P. R. Holmes); some of the specimens and a large proportion of the determinations were sent in by A. E. Stubbs. *Dixella martinii* was predominant.

Essex Coastal Grazing Marshes Survey in 1988 (Dr. C. M. Drake). *Dixella attica* was widespread and abundant.

East Anglia Invertebrate Survey in 1988 (Dr. A. P. Foster). A pleasing number of *Dixella serotina* specimens, nearly always mixed with *D. autumnalis* (and *D. amphibia*).

On these surveys, water-traps are frequently used with considerable success.

The Dipterists' Field Week in the Border Country around Galashiels in July 1988 was also very productive. The rare *Dixella obscura*, which had been previously recorded in the area by M. Nelson, was found at several sites. With encouragement from Alan Stubbs, the author took every opportunity to bring the Dixidae to the notice of other Dipterists, and welcomed the chance to prepare a video of the complete life history, from egg to adult, for the Annual Meeting later in the year.

All records received are transferred by the author to individual pink cards, and a duplicate is retained for reference. White cards are acceptable from collectors,

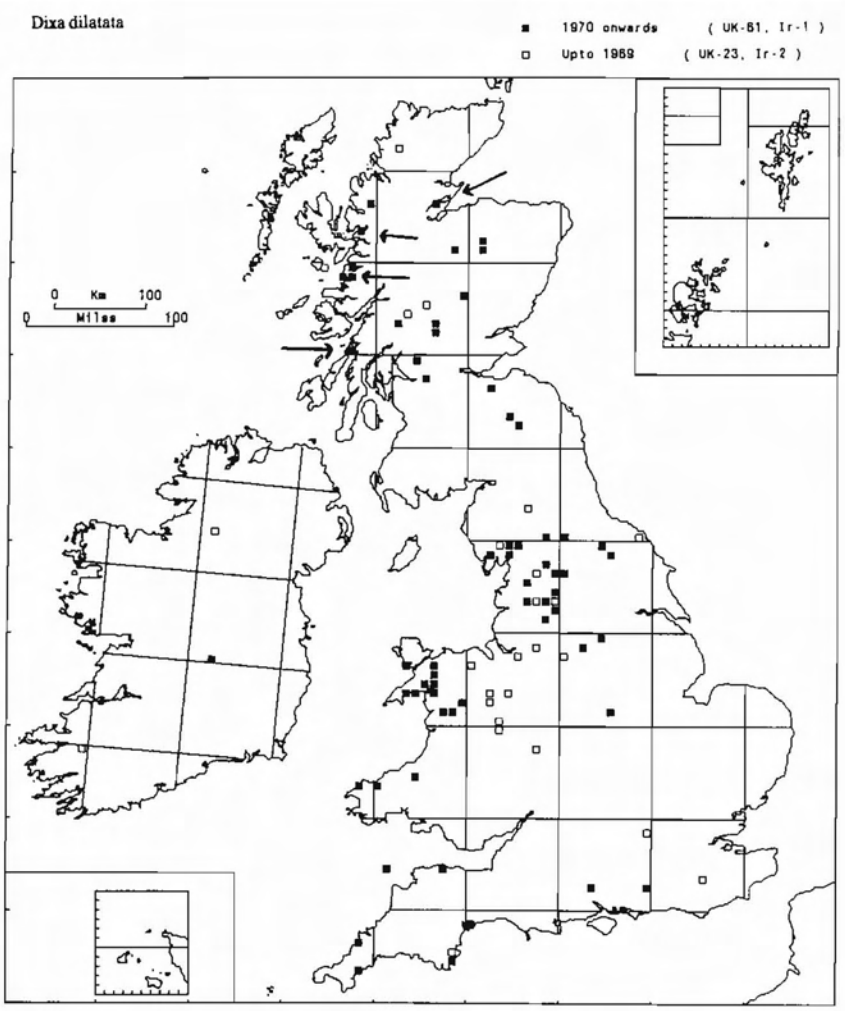
preferably GEN 13 rather than GEN 7 cards, as these provide space for a brief comment on habitat. Many of the more recent collectors have become particularly helpful in submitting a habitat note and sometimes even the Vice-county, together with the basic essentials: Grid Reference, locality , date, and name of recorder. Some, however, are still providing less than the minimum and do not even state, for instance, whether larvae or adults were collected. Details in certain published papers, furthermore, indicate when a collector has omitted helpful, even essential, data from the record cards sent in. It can be two years before the data appear in print! Only by the compilation of such data can we eventually reach an understanding of the factors controlling the distribution of Dixidae, and hope, therefrom, to give protection in the current growing crisis of habitat destruction or degradation.

A useful contribution to our understanding of dixid biology has been made by Dr. J. A. Fowler and W. J. Peach (see literature list) and much of this interesting work remains unpublished (Peach 1984). The ready production of eggs by *Dixella autumnalis* was recorded by Peach and Fowler (1986) and the detailed structure of the eggs of seven species of *Dixella* and three of *Dixa* has been studied by the author (Goldie-Smith 1989a, b, *et seq.*). Scanning electron micrographs have been made in collaboration with Dr. Julian Thorpe at Sussex University. Since the eggs of all the *Dixella* species studied hatched abundantly, and those of *Dixa* species always aborted under the conditions of the investigation, it is clear that there is a significant difference in the biology of these two genera, possibly in their mating requirements, linked with differences in their habitat preferences. There are also outstanding differences in the structure of the eggs of *Dixella* and *Dixa*, particularly in the sculpturing. Within the genus *Dixella*, the form and structure of the eggs of *D. amphibia* and *D. filicornis* set these two species apart from the other five species studied. These observations are in agreement with the provisional cladogram provided for Dixidae by Disney (1983).

Other interesting observations on dixid biology have been recently made:-

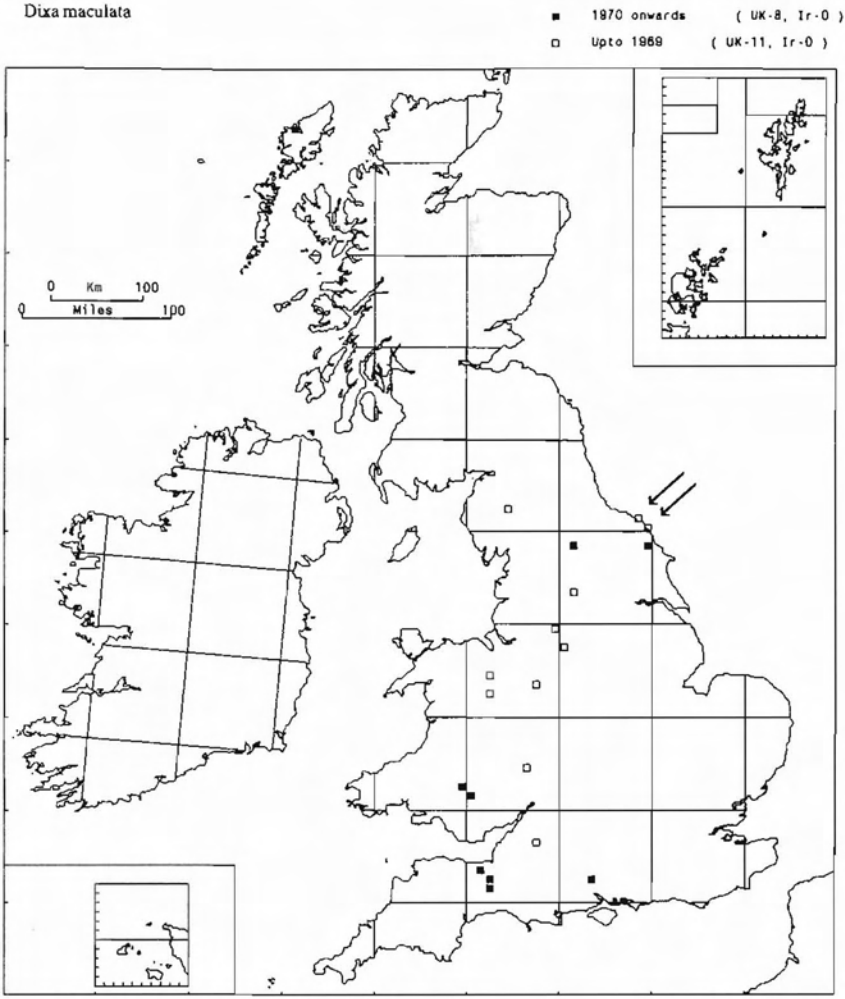
Parasites
Dixidae are not known to carry human diseases; they have, however, been shown to be highly susceptible to a virus tentatively identified as a cytoplasmic polhedrosis virus (Goldie-Smith 1987) which is easily transmitted to Culicidae and Chironomidae. Jones (1965) and Disney (1975) had noted the occurrence of red larval mites, usually *Arrenurus*, on adult Dixidae. Stechmann (1977, 1980) found that larvae of *Arrenurus truncatellus* and *A. globatur* parasitise adults of Dixidae, and that infestation takes place on the pupae. Mites were observed by the author on *Dixella amphibia* in a Welsh wetland collection. Predation by other insects on the eggs of Dixidae was detected by Hinton (1981): "*Clinocerοides glaucescens* is very common in the early spring in southern England. The female alights on a stone that projects out of the stream. It then crawls beneath the water to the underside of the stone, where it lays its eggs in the egg-mass of *Dixa* and other flies or in the egg-masses of Trichoptera" (p. 756). He said that the incubation period is very short, and the young larva feeds upon the eggs of its hosts.

Drifting of larvae
According to Elliot and Tullet (1977), larvae of *Dixa*, especially *D. puberula*, usually in the fourth instar, show a "definite diel periodicity" in their drifting, which usually increases at night. The drift rate is usually greater when they are searching for suitable pupation sites. These authors suggest that fourth instar larvae "may need to move into areas of fast current to ensure an ample supply of food" which they filter from the water. They observed that "the larvae avoid direct

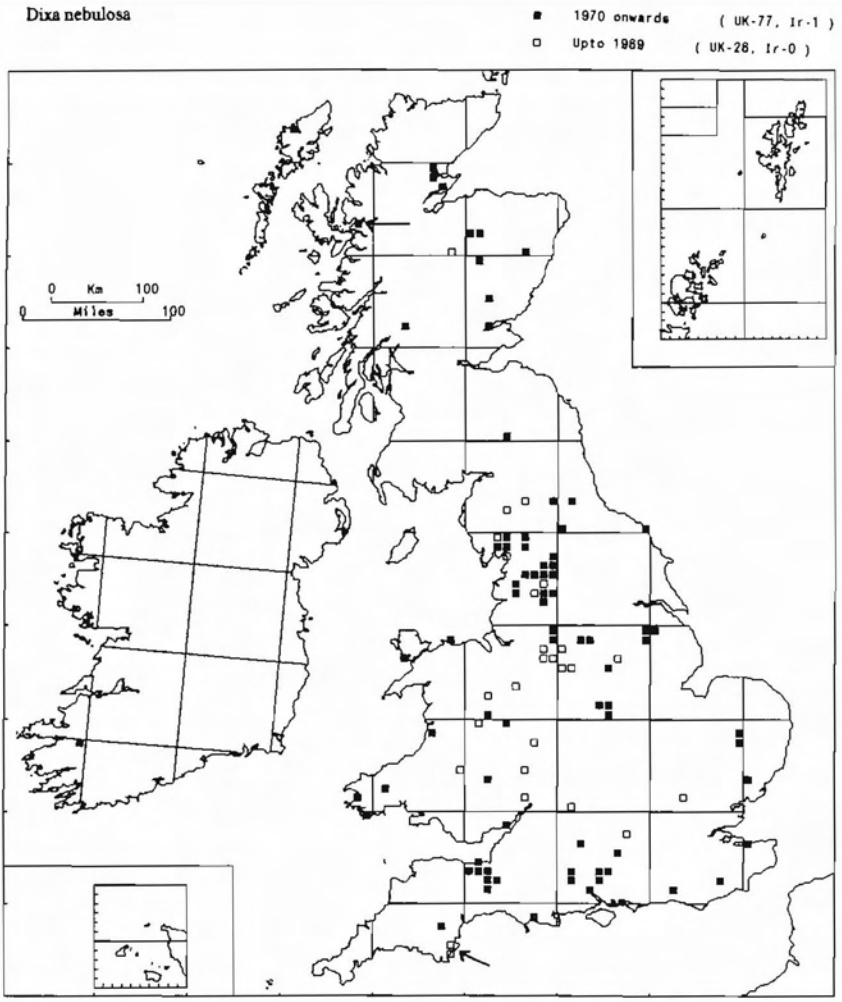


1. Dixa dilatata
Larvae recorded: March-October.
Adults recorded: March-November.
Larval habits recorded: trickles and small streams, sometimes fast, with emergent stones, rushes, sedges (*Carex riparia*), or dead leaves of trees; a moorland stream in a rocky gorge; a basin in a *Phragmites* swamp; a stream through acid common; a soligenous flush; an iron-stained stony stream in peat; peat pools; a spring flush; *Juncus* swamp; a stream through a boggy clearing in a birch wood; alder carr; grazed, sedge-rich fen.

Also marginal situations of larger streams. Typically, the habitat is in open, exposed country, but also recorded from a shady woodland pond and a heavily shaded trickle, and from a muddy pool in a cave, at pH 7.1.

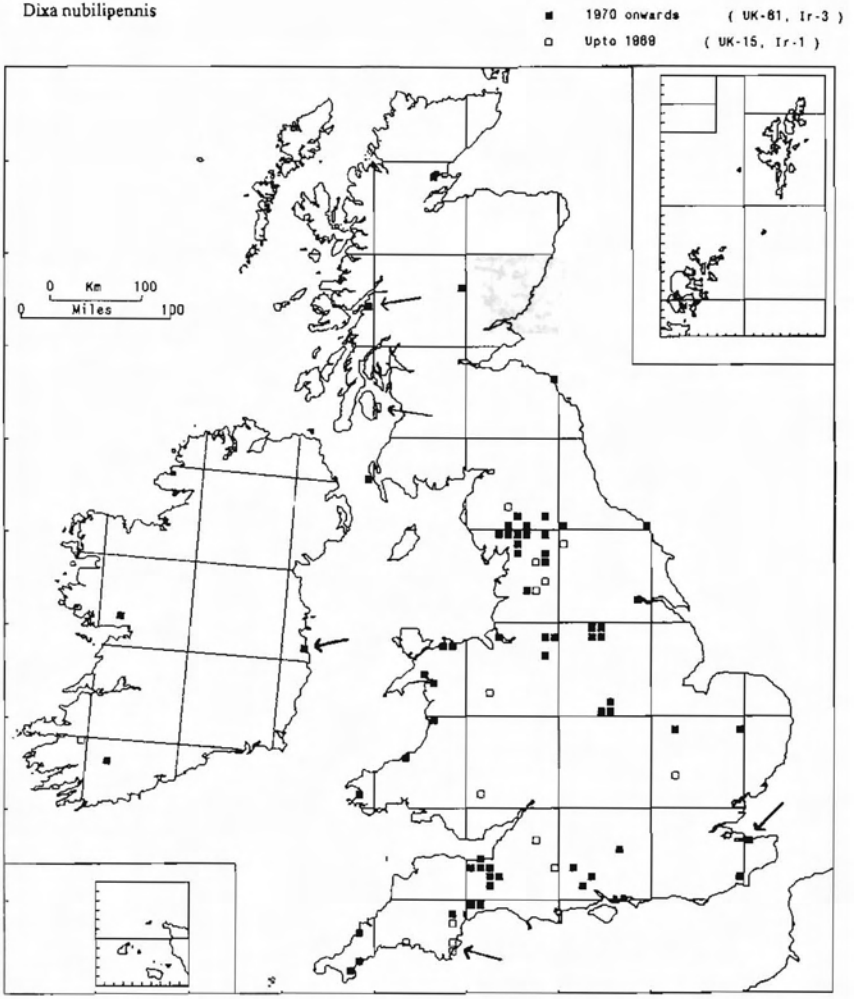


2. Dixa maculata
Larvae recorded: May, August-October.
Adults recorded: January-March, May, June, August-October.
Larval habitats recorded: stony woodland streams and becks. Point of discharge of a piped stream into a canal.

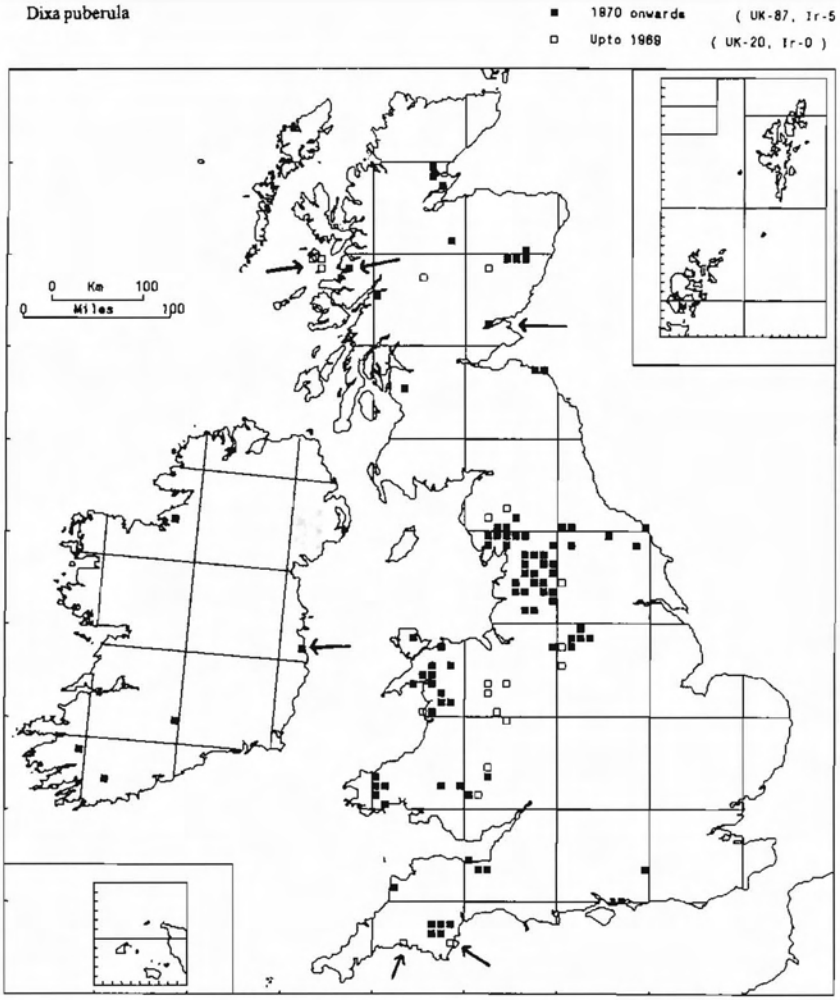


3. Dixa nebulosa

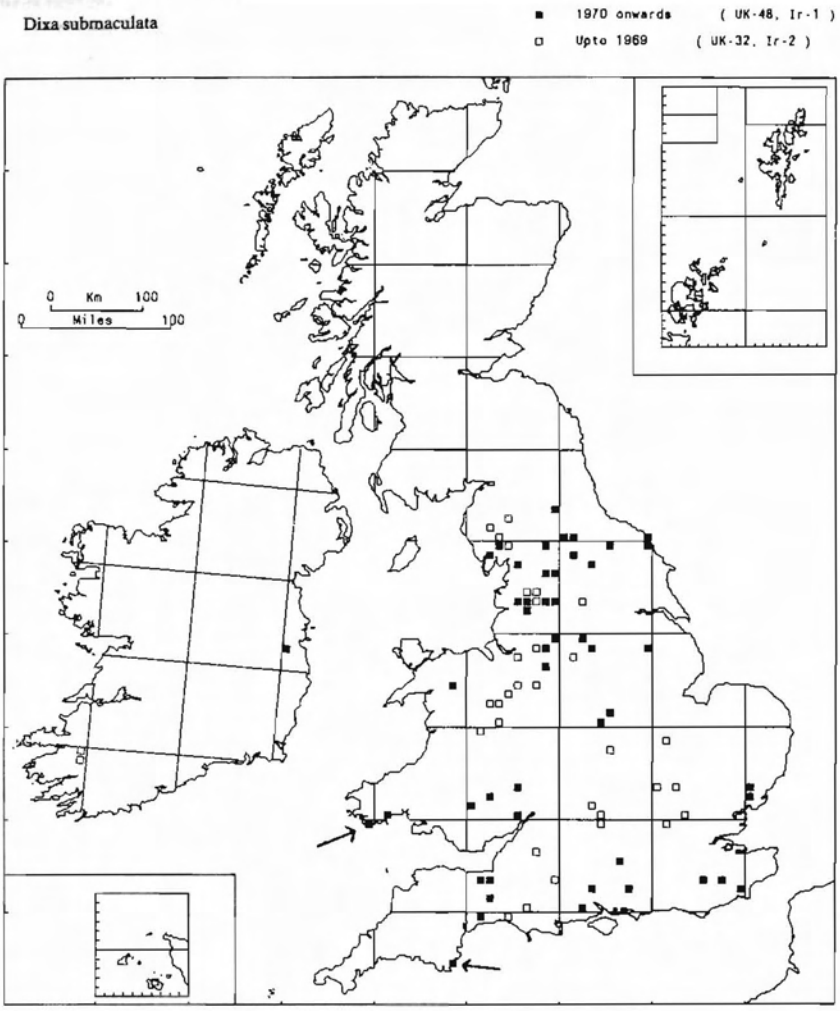
Larvae recorded: March-December.
Adults recorded: March, May-December.
Larvae habitats recorded: a wide range of habitats from stony woodland streams to reed-beds of rivers in the open, including a roadside stream with dense vegetation; a calcareous stony stream; rocky river banks; a wooded river gorge; and a large lake on Weald clay. Perhaps most characteristic of the emergent and trailing beds of grasses that fringe many small streams and dykes. Also recorded in canals, a deep castle moat full of large fish, a fishing and swimming pool dug in clay, watercress beds, waterlogged willowherb, and on emergent stones at the edge of upland torrent streams. Often associated with *Juncus effusus* and *Agrostis stolonifera*.



4. Dixa nubilipennis
Larvae recorded: January-December.
Adults recorded: March-November.
Observed to peak in September-November, in Leicestershire.
Larval habitats recorded: typically on dead leaves of trees or stones in shallow, shaded streams (especially in woodland); in ditches, a roadside streamlet, a small stream beneath a road, a moorland stream in a rocky gorge, a fast inlet through a watercress bed, a calcareous spring, and a spring-fed but brackish ditch. Also recorded on emergent vegetation at point of discharge of piped stream into a canal.
Sometimes occurring as casuals amongst *D. submaculata* or *D. nebulosa*.



5. **Dixa puberula**
Larvae recorded: January-December.
Adults recorded: March-December.
Larval habitats recorded: The most characteristic species of stony torrent streams and small stony rivers both in woodland and in the open; in moorland streams; a rocky gorge; a wooded river gorge; a stream through wet meadow; and in Ireland in a stream at 700 ft. Once recorded in a sedge bed some distance downstream of the change from a stony-bottomed to muddy-bottomed stream. Found on emergent stones, accumulations of dead leaves caught against stones etc., marginal emergent grasses, mosses and so on.

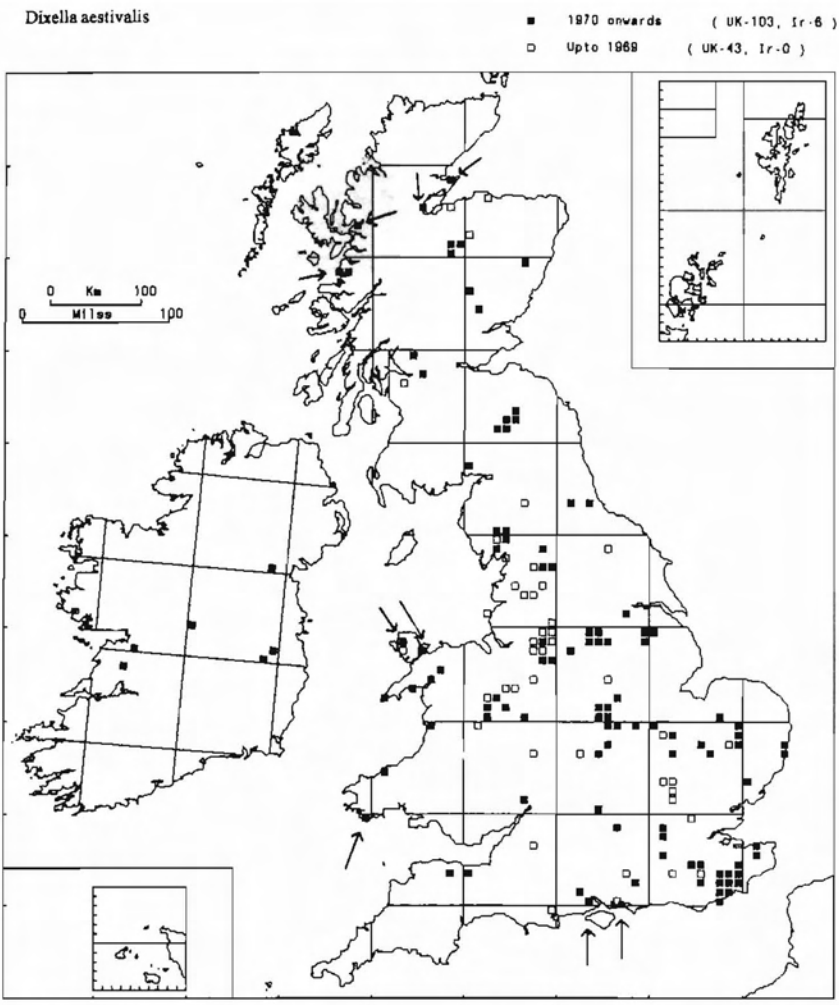


6. Dixa submaculata

Larvae recorded: January, March, May-December. Observed to peak in November.

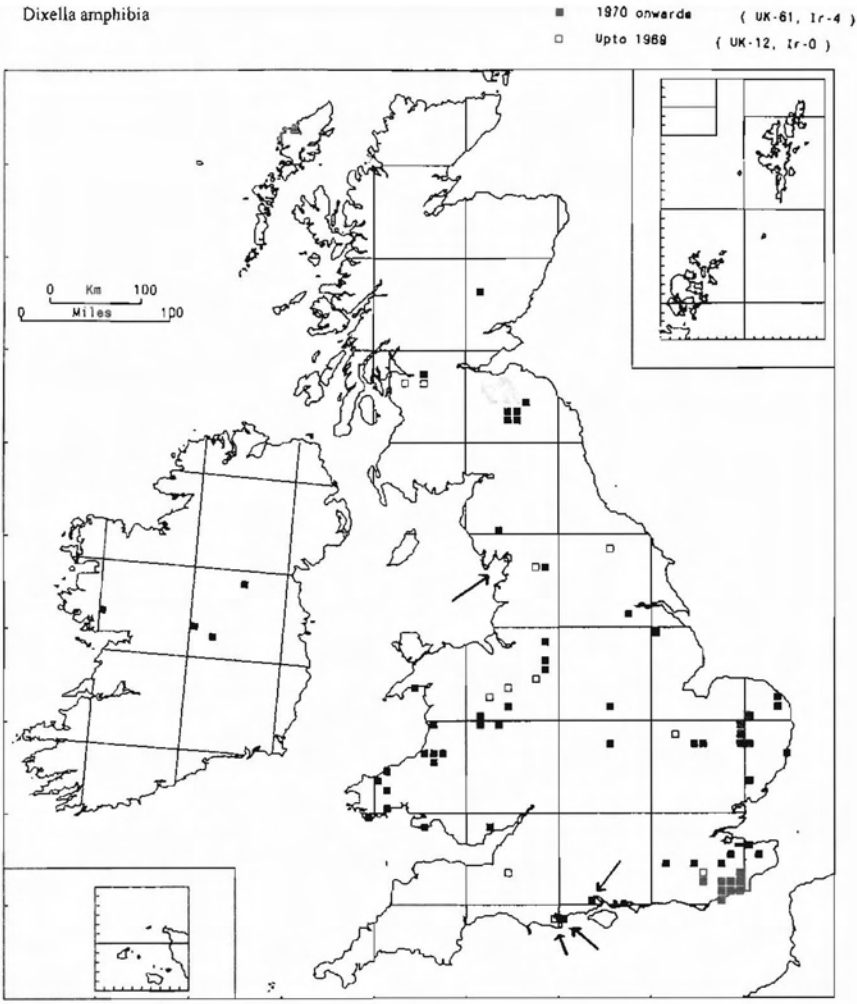
Adults recorded: January-October.

Larval habitats recorded: On emergent stones and dead leaves of trees in shallow streams both in woodland and in the open. Streams sometimes rapid; a roadside "gutter" stream; a trickle beside a lake outfall stream; a moorland stream in a rocky gorge; a base rich stream in a base-poor moorland. Also found on sedges in slow-flowing water in woodlands and on marginal trailing grasses fringing small streams; on a river bank; and in a slow-moving, spring-fed but brackish ditch. Also recorded on dead leaves in iron-rich water; and on emergent vegetation at the point of discharge of a piped stream into a canal.



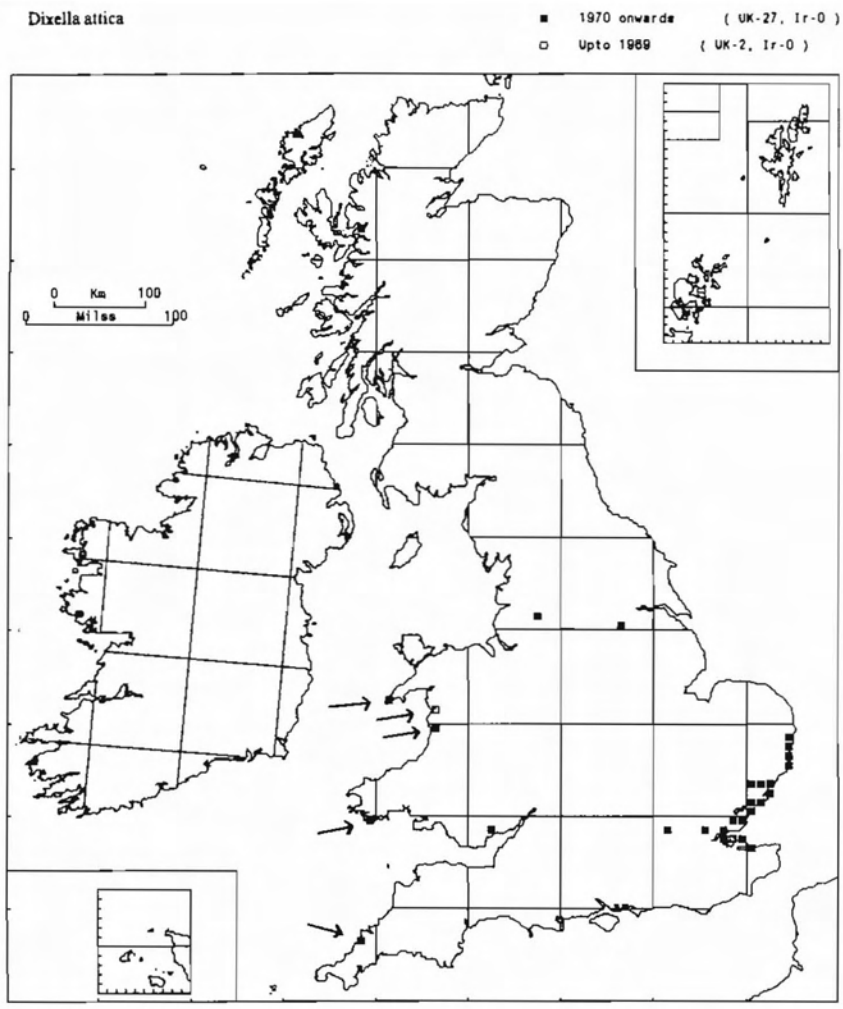
7. Dixella aestivalis

Larvae recorded: April-November. Observed to peak June-September.
Adults recorded: April-December.
Larval habitats recorded: found in beds of emergent vegetation (grasses, sedges, rushes, reeds) in habitats ranging widely from acid oligotrophic peat pools to alkaline eutrophic canals. Situations recorded include woodland hydrosere swamps, river margins and backwaters, lake margins, dykes and a range of pools, ponds and swamp-filled hollows. Often in roadside- or pathside ditches. In a base-rich ancient fen. On dead leaves of trees, especially in eutrophic ponds. Associated plants include: *Phragmites, Juncus effusus, Carex pendula, Typha, Sparganium erectum, Equisetum, Glyceria fluitans* and *G. maxima, Potamogeton, Elodea.*

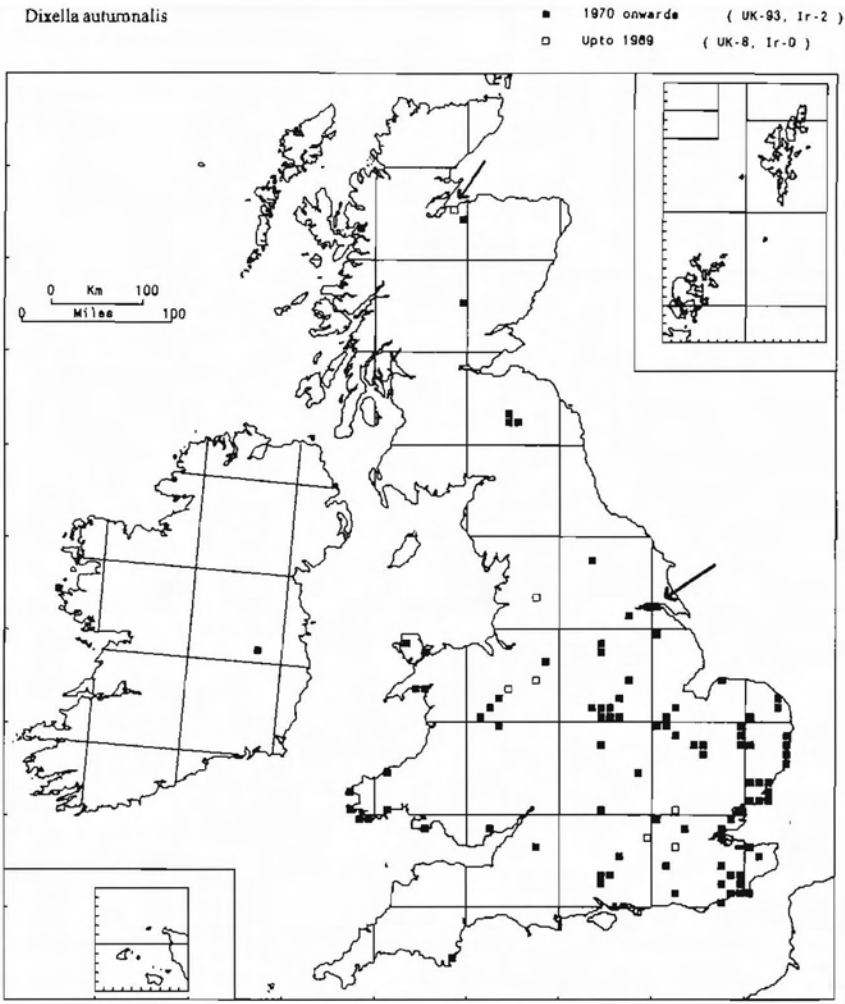


8. Dixella amphibia

Larvae recorded: January-December.
Adults recorded: March-November.
Larval habitats recorded: in sedge and reed, and rush/reed swamps and *Iris* beds in conditions ranging from woodland hydrosere to acid bog pools and dykes, often on marginal emergent vegetation or fallen tree leaves. Sites include: a pond on Wealden clay; an old duckpond, a village roadside pond; under overhanging brambles, in a farmyard pond, man-made ponds in woodland and at the side of a lake; a spring-fed but brackish ditch; an old brick pit; an alder marsh; in marginal vegetation in peat diggings, surrounded mostly by *Typha*; amongst *Glyceria maxima* in a canal; river fen with *Glyceria;* basin mire; raised bog; flood plain; soligenous flush; *Juncus/Molinia* bog; *Equisetum* squidge. Other associated plants include: *Phragmtes, Carex riparia* and *C. rostrata, Oenanthe, Myrica, Menyanthes, Potamogeton* and watercress.



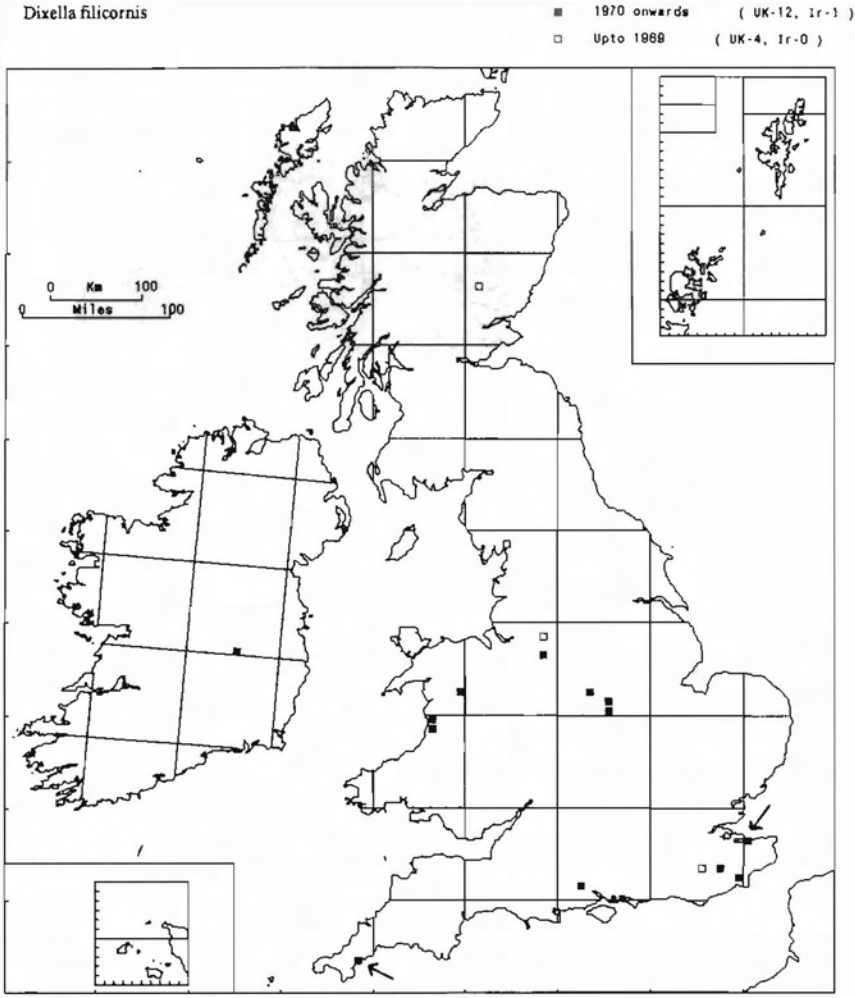
9. Dixella attica
Larvae recorded: February-May, July-October.
Adults recorded: February, March, June, August-September.
Larval habitats recorded: primarily from sites near the coast or estuaries, but also recorded more than 10 km. from tidal waters (Williams & Fowler 1986). In brackish or slightly brackish ditches, with *Eleocharis* and *Apium*, or *Scirpus maritimus*, and in a brackish puddle with *Ranunculus baudottii*; in a sedge-lined pool. Also in freshwater ditches, sometimes floristically diverse, sometimes with *Eleocharis. Berula, Phragmites, Juncus, Glyceria fluitans* and *G. maxima.* In withy beds (sedge/willow); among watercress in a pool in a meadow.



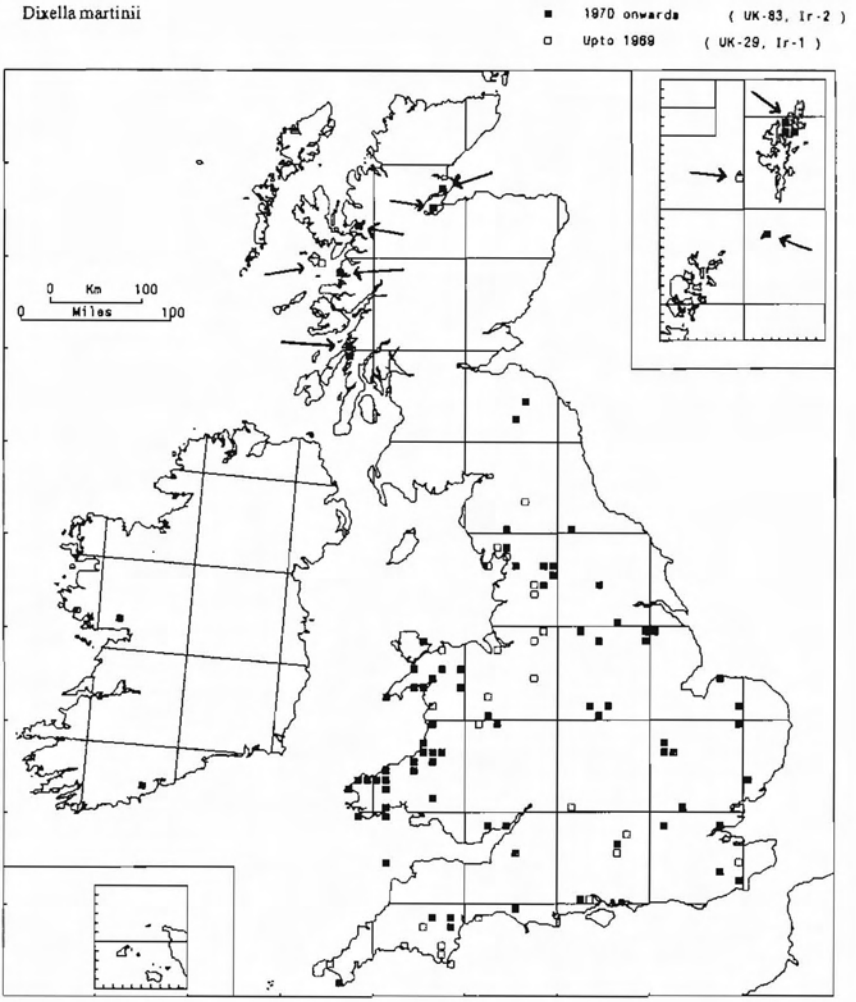
10. Dixella autumnalis

Larvae recorded: January-December. Observed to peak in March-May.
Adults recorded: January-November.
Larval habitats recorded: widely distributed and often abundant in swamps of rushes, reeds, grasses or sedges in situations that include lake and loch margins, ponds, canals, ditches, river margins, dune slacks, fen swamps and more acid conditions. Sites include: freshwater drainage channels and roadside ditches; also brackish ditches and brackish pools close to the sea. Ponds of various kinds: weedy, in sheep pasture; entirely exposed, or overhung by trees; on Low Weald clay; in woodlands; forming part of an ancient moat. Small sluggish streams. In emergent vegetation at the side of rivers and canals. In shaded sedge swamp; among *Phragmites* or sedges in a flooded gravel-pit; in an old brick pit; in a base-rich ancient fen. Also in a peat pool on a moor and in a basin in a peaty swamp. Associated plants recorded include: *Phragmites*, sometimes recently burnt; a *Juncus/Iris* meadow; *Equisetum/Carex* basin fen; *Iris* swamp at edge of ley; *Carex* spp. and *Iris pseudacorus* in an old gravel-pit; *Glyceria* in a river fen; *Glyceria maxima* at edge of canal; a fringe of *Sparganium erectum*; watercress; and *Elodea*.

An adult was taken in a light trap on the roof of the Bangor School of Agriculture; and one was found resting in a culvert pipe at a canal.

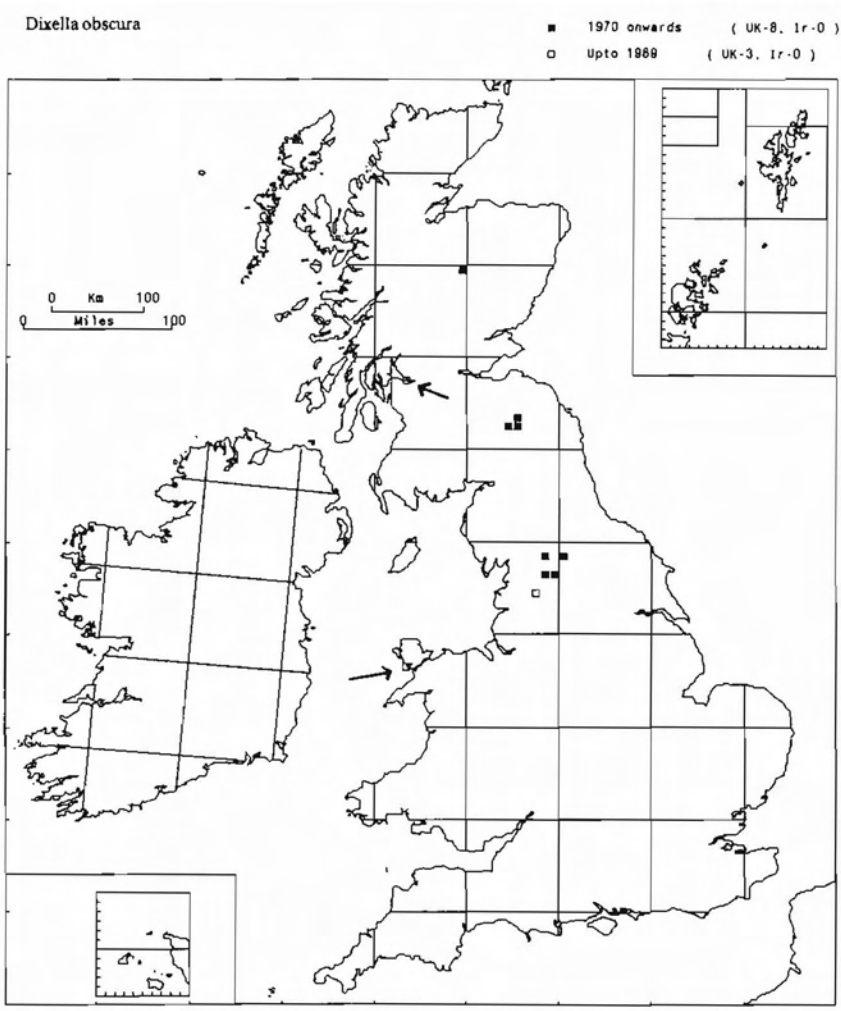


11. Dixella filicornis
Larvae recorded: January-November.
Adults recorded: January, March, August-November.
There are additional records for April-June which do not state the stage.
Larval habitats recorded: swamp of rushes etc. at margin of eutrophic lake fringed with trees. Hydrosere sedge swamp in woodland. Narrow stream in woods. Marshy pool with watercress. Marginal vegetation in peat diggings. In both a stagnant river backwater and a flooded limestone quarry dying leaves of *Deschampsia caespitosa* were trail;ing over a bank in deep shade from alder, *Alnus glutinosa*, trees. Also found in a drainage culvert. An unshaded shallow stony roadside ditch has been described as "an unusual habitat" (Fowler 1987).

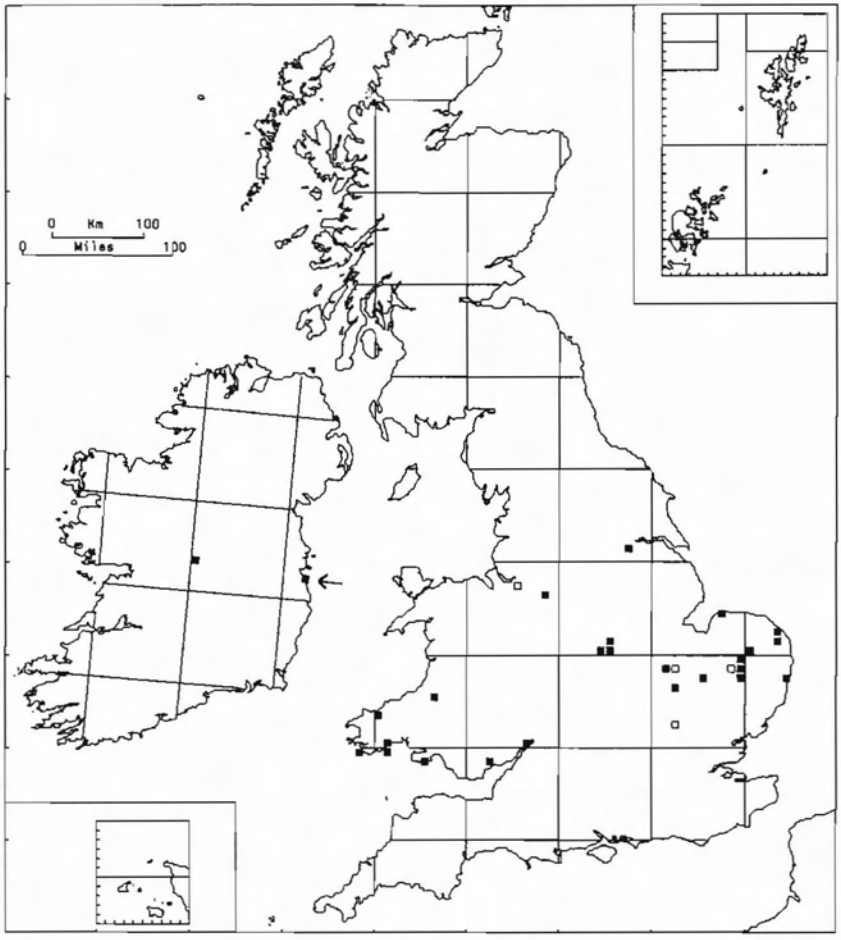


12. Dixella martinii

Larvae recorded: February-December.
Adults recorded: March-December.
Larval habitats recorded: A range of swamps of rushes, reeds, sedges and grasses as well as in rich-fen vegetation and watercress beds; acid to alkaline; relatively oligotrophic to eutrophic. Ponds, including a tiny one only a year old; dykes and ditches, including a spring-fed but brackish one; lake and river margins, and a river backwater; dune slacks; wet seepages. The site may be grazed or ungrazed, burnt or unburnt. Also in basin mire, a soligeneous flush, and *Juncus/Iris* meadow. Other associated plants recorded include: *Phragmites, Carex riparia* and *C. paniculata, Schoenus, Typha, Juncus, Glyceria fluitans, Molinia, Potentilla, Oenanthe, Myrica, Menyanthes.*
It is possible that, in Scotland at least, the absence of competition from other species, particularly of *Dixa,* enables *D. martinii* to extend its range into hill streams (Fowler 1984b).
Adults have been recorded from a cave and a mine.



13. Dixella obscura
Larvae recorded: April-September.
Adults recorded: March-October.
Larval habitats recorded: *Carex rostrata* swamps in calcareous waters. Sedge swamps in ponds, seepages and so on, particularly, it seem, in situations representing the transition of fen vegetation to more acid conditions (with bog bean, fen *Sphagna*, etc. in evidence). Peaty basin mire. Reed- and sedge-lined loch. Pond with emergent grass. Small streams among sedges.



14. Dixella serotina
Larvae recorded: March-May, August-October, December. Peak observed in April-May.
Adults recorded: April-December.
Larval habitats recorded: *Phragmites* swamps. Hydrosere swamp of reeds, rushes, grasses, *Iris,* etc. Reedbeds; wet sedgebeds, including a coastal but not brackish one. Roadside ditch. Pond margin. "Pingos"- small glaciated hollows with tufts of *Carex*. Calcareous valley fen with *Carex elata* tussocks. Also associated with *Carex riparia*. Frequently with *D. autumnalis*, but a homogeneous population was recorded in Leicestershire, between *Phragmites australis* and *Carex riparia* in marginal beds overshadowed by alder trees (Fowler 1984a).

sunlight and follow the shadows as the day progresses. If the larvae cannot find shade they drift downstream onto another stone".

Dixidae as ecological indicators

Disney (1975) has already pointed out that the presence of certain species of Dixidae may indicate particular wildlife values or other significant qualities of a site. Furthermore, Dixidae are sensitive to disturbance; the author has observed instances where human interference has depleted, if not destroyed, an established Dixidae habitat. The loss of *Dixa puberula* from certain sites in France is regarded by Thomas (1980) as an index of pollution due to tourism.

It is clear that Dixidae still offer scope for a variety of studies. Possibly the light shed on their distribution by these up-to-date maps will help to stimulate such research.

Acknowledgements

I an particularly indebted to Dr. R. H. L. Disney (Field Studies Council Research Fellow, Zoology Department, Cambridge University) for his guidance and encouragement in this work of collecting and annotating the records, so much of which is his own! The maps were prepared by Mr. Brian Eversham (Environmental Information Centre) who has patiently and enthusiastically responded to pleas for information or photocopies of the records, and also sent out the Dixidae Newsletters Nos. 1 and 2 prepared by the author. Dr. W. R. Nowell (California, U. S. A.) has been, as always, magnaminous in his assistance with the literature and friendly advice.

I wish to thank everyone who has contributed records, and all who have permitted, and even encouraged, sampling on their land, especially the Wardens and Management Committee of the Local Nature Reserve and S.S.S.I. at Rye Harbour, where the fascination of Dixidae first entranced me.

Special thanks are due to Dr. C. M. Drake and Dr. A. P. Foster for submitting to me the Dixidae from the N.C.C. samples from Essex and E. Anglia respectively; also to Mr. M. Nelson for helpful correspondence concerning Dixidae.

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E. Kathleen Goldie-Smith, Wrens Cottage, New England lane, Playden, Rye, E. Sussex TN31 7NT.

Observation of Platystoma seminationis.

On the 2nd. July 1988 at about noon I took a sequence of colour slides of a pair of Platystomid flies in copula on the South Downs near Storrington, Sussex (Grid ref. TQ 064115). On eventually examining the slides I realised that they showed the clasping together of the respective mouthparts of the two individuals, presumably to make the coupling more stable. The species was later identified for me by Peter Chandler as *Platystoma seminationis.*

The accompanying sketch is drawn from a print of the slide. Some detail has been omitted for clarity.

Andy Callow.

Notes on Macrocera Meigen (Mycetophiloidea, Keroplatidae including M. nigropicea Lundstrôm new to Britain

Peter Chandler

Macrocera is an easily recognised genus of "fungus gnats" by reason of its long slender antennae, practically as long or often longer than the body. Several of the 22 species on the British list are very common in woods but about two thirds of the species are apparently rather local or uncommon. Some of these, however, occur chiefly on moorland or bogs and have evidently been under recorded because of an upland distribution. The few known larvae spin webs on rotten wood (*M. stigma* Curtis), in grass tussocks (*M. phalerata* Meigen) or in caves and cellars (*M. fasciata* Meigen) and are presumed to be carnivorous like other Keroplatidae; none are known to be habitually associated with fungi.

The only *Macrocera* added to the British list since Edwards'(1925, 1927, 1933, 1941) contributions on the British Mycetophiloidea, was *aterrima* Stackelberg by Hutson & Kidd (1974), who also drew attention to a distinct upland form of *parva* Lundstrôm. Chandler (1978) provided some additional data on the latter form as well as *aterrima* and some other species. Identification of the 22 species and the variety of *parva* is facilitated by the key provided by Hutson, Ackland & Kidd (1980), who gave county records but did not comment on habitats. Also the lack of recent records of several species was not apparent.

My attention was drawn to the under recording of upland species in 1979 when Dr. J. Coulson submitted to me material collected in pitfall traps as part of a survey of moorland sites in northern England. Batches from seven localities in Cumbria, Durham and North Yorkshire included *Macrocera estonica* Landrock in good numbers. The only other record of *estonica* known to me since the Cheshire and Norfolk localities given by Edwards (1941) is from moorland on the Newcastle Hills, Dumfries, 3.ix.1975 (A. E. Stubbs).

The material received from Dr. Coulson also included two females from Cumbria with faintly marked wings, which were initially supposed to be *bipunctata* Edwards, only known as British from the three males in Edwards' type series, collected in Tilberthwaite Ghyll, Lancs. and Bowness, Cumbria (Edwards 1925). However, they differed in several respects, such as the smaller size, darker body colour and faintly darkened wing tip. The discovery of corresponding males in material collected on a Nature Conservancy Survey of Welsh Peatland Sites during 1987, has permitted their identification as *M. nigropicea* Lundstrôm (1906). This was described from one male collected in Russian Lapland (Murmansk district) and since recorded only from a bog in Iceland (Lindroth 1931, Nielsen, Ringdahl & Tuxen 1954)

Recognition of Macrocera nigropicea Lundstrôm, 1906:
M. nigropicea appears closest to *maculata* Meigen, to which it runs in the key by Hutson, Ackland & Kidd (1980). It differs in the entirely dark body and fainter wing markings which are similarly distributed. The marks over the base of Rs, in the constriction of the posterior fork and before the tip of R1 are most distinct; the wing tip is only faintly tinged with brown. The antennae are a little longer than the body in the male and a little shorter in the female, while they are longer than the body in both sexes in *maculata.* The few specimens examined have the wing length 3.8-4.0 mm (males) and 3.0-3.7 mm (females).

Material examined
Cumbria: Merlewood, Burns Beck, 12.ix.1978, female; Moorhouse, Bog End, 18.vii.1978, female (J. Coulson), Dyfed (Ceredigion): Rhos Rydd, 30.vii.1987, 2 males, ungrazed/burnt basin mire and 1 male, *Molinia* bog; Gwynedd

(Caernarvon): Migneint, blanket bog, 4.viii.1988, male (P. Holmes, D. Boyce & D. Reed).

Some other little known species

Thus *bipunctata* has not been reported from Britain since 1925; its synonymy with *inversa* Loew is proposed below. Also the three species for which Devon only is cited by Hutson, Ackland & Kidd (1980) had not until recently been found here since the original records based on single specimens. Two of these, *fastuosa* Loew and *longibrachiata* Landrock were found on the same day, 3rd August 1927 at Clovelly, on the North Devon coast by Mr. H. Womersley (Edwards 1927). They were found on a wooded slope with several small streams overgrown with sedges. The only more recent record of either species is of 1 male *M. fastuosa*, swept by the stream in Shelf Held Coppice, Wyre Forest, Worcs, 7.viii.1988 (Chandler).

Womersley's discovery was quite remarkable and any further discovery of either of these species in this district or elsewhere would be most interesting. I have twice visited the woods around Clovelly but have not been able to confirm their continued existence there. The habitat has evidently changed but the precise requirements of the two *Macrocera* species are unknown. The general tidiness of these woods and removal of dead wood may have been detrimental to their survival.

M. propleuralis Edwards (1941) remains known only from the evidently wind blown example found in a beach shelter at Sidmouth, South Devon. Other species are poorly known because of restrictions to high mountains; this applies to *aterrima* and also to *zetterstedti* Lundström. The latter was recorded from two Perthshire localities (Edwards 1933) and taken by Edwards near Aviemore in May 1934. The only more recent record known to me of *zetterstedti* was one female from moorland on Cairngorm, 16.vi.1984 (J. H. Cole) until one female was obtained in a water trap laid at Gors Maen Llwyd in Clwyd (Denbigh), 13.x.1988. (Holmes, Boyce and Reed), but this small dark species will probably be found elsewhere on the Scottish and Welsh mountains.

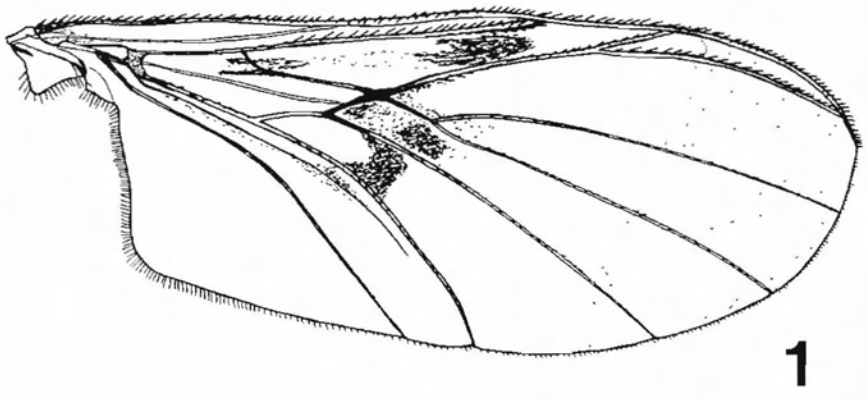
M. fascipennis Staeger has been recorded mainly from lowland bogs in wooded districts (Chandler 1977). One earlier record, cited from Cheshire by Kidd (1959), must be corrected as the specimen (in Manchester University Museum) is *phalerata* Meigen. Several Welsh records have, however, recently been obtained for this species, from Anglesey: Cors Goch, 7.vii.1976 (J. W. Ismay); Cors Graianog, 8.vii.1976 (A. E. Stubbs); Amlwch, Afon Goch, bog, 9.vii.1987 (W. Ely); Gwynedd (Merioneth) Cors Barfog, 25.vii.1988, and Dyfed (Pembroke): Dowrog Common, humid heath, 21.vii.1987 (P. Holmes, D. Boyce & D. Reed).

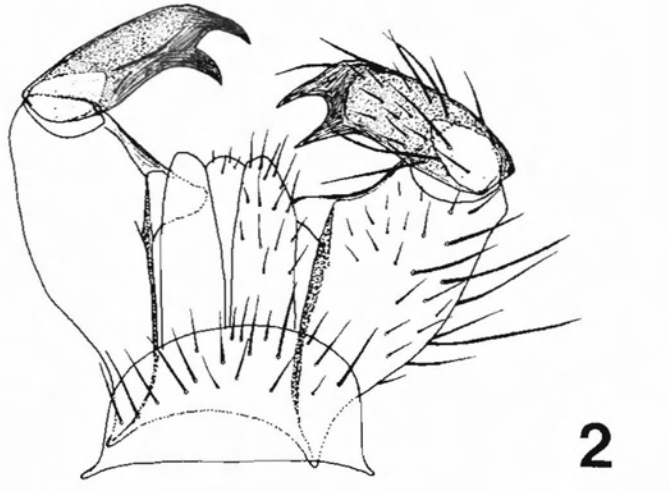
The Survey by Holmes, Boyce and Reed also produced two new records and a new habitat association for *M. pusilla* Meigen (synonymy with *nana* Macquart recognised below), previously reported from drier woodland edge (hedgerow and garden) habitats in Oxon., Herts., Cambs. and Yorks. The new material is from raised bog in Dyfed (Ceredigion): Cors Caron, 27.vii.1987, 8 males, 2 females and hlanket bog in Powys (Montgomery); Llanbrinmair Moor, 1.viii.1988, 3 males, 1 female.

Summary of habitats of British Macrocera species

Woodland, usually damp ground or near streams: *fasciata* Meigen, *vittata* Meigen, *angulata* Meigen, *phalerata* Meigen, *stigma* Curtis, *stigmoides* Edwards, *tusca* Loew, *fastuosa* Loew*, *longibrachiata* Landrock*, (*parva* Lundström, *anglica* Edwards).

Drier woodland: *anglica* Edwards, *lutea* Meigen, *crassicornis* Winnertz, (*tusca* Loew, *centralis* Meigen).





Figs. 1-2 Macrocera nigropicea **Lundström**, 1. Male wing; 2. Dorsal view of male genitalia.

Woodland edge and hedgerows adjacent to meadowland: *maculata* Meigen, *nana* Macquart*, (*crassicornis* Winnertz).
Bogs, usually in woodland: *fascipennis* Staeger*.
Bogs, moorland or fen in more open situations: *parva* Lundström, *inversa* Loew*, *estonica* Landrock*, *nigropicea* Lundström*, (*nana* Macquart*).
Moorland on high mountains: *aterrima* Stackelberg*, *parva* Lundström variety*, *zetterstedti* Lundström*.
Habitat uncertain: *propleuralis* Edwards*.
*Known from ten or fewer British localities.

New synonymy for the British list
Macrocera nana Macquart, 1826: 110.
Macrocera pusilla Meigen, 1830: 293, syn.
Macquart's description agrees with that of Meigen and Macquart himself (1834) synonymised his name with *pusilla* Meigen. This synonymy was accepted by Matile (1977).

Macrocera inversa Loew, 1869: 16.
Macrocera bipunctata Edwards, 1925: 520, syn. n.
Matile (1980) recorded *inversa* from France and Italy, citing earlier records from Czechoslovakia, Germany and Holland. He suggested the above synonymy, which is confirmed by the genitalia figures given by Hutson, Ackland and Kidd (1980) for *bipunctata* and by Landrock (1926) for *inversa*.

Acknowledgements
I am grateful to all collectors whose names are mentioned above for referring their material to me, and to Colin Johnson for facilitating examination of material in the Manchester University Museum.

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Sphaerophoria bankowskae Goeldlin, 1989 (Syrphidae) recorded in mainland Britain

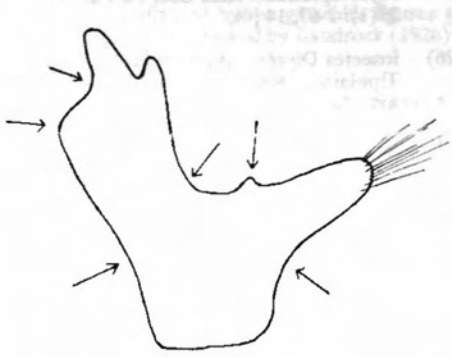
Colin W. Plant

Commenting upon Goeldlin's description of four new species of *Sphaerophoria*, Speight (1989) predicted that both *S. bankowskae* and *S. laurae* may both occur in the British Isles. It is, therefore, particularly pleasing to place on record the fact that the first mentioned species has now been found in England, in the vice county of North Essex. The details are as follows:

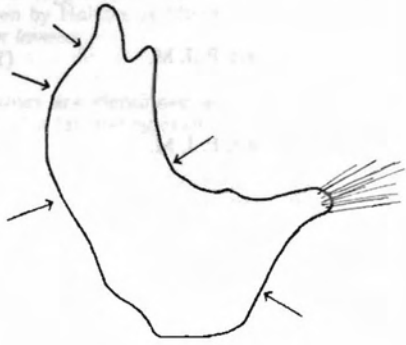
1 male 9 July 1986 Canfield Hart, North Essex at TL 564196 by sweeping vegetation. C.W.Plant

The specimen does not key out using Stubbs and Falk (1983) though the genitalia are close to *S. fatarum* (= *abbreviata*). A number of other dipterists examined the insect to no avail before I placed it in a store box with a number of other flies which required further work. Upon publication of a revised key to the genus by Speight (1988) I once again examined the specimen. Using this work it runs to couplet 7 (*rueppellii/philanthus*) but is clearly neither of these species. Accordingly I sent the specimen to Martin Speight to whom all credit for the correct identification should be directed.

S. bankowskae is superficially similar to *S. philanthus* having paired spots on tergite 2 and small areas at the bases of the second basal and anal cells without microtrichia. It is at once separated from this species, however, by the quite different shape of the genitalia. These genitalia come closest to *S. fatarum* amongst the other known British species. The drawings below, which conform to the orientation used by Stubbs and Falk (1983), should serve to separate the two. In my specimen the wings are infuscated brownish. Wing length 6.5mm.



Sphaerophoria bankowskae Goeldlin
Canfield Hart, Essex, 1986.
C. W. Plant



Sphaerophoria fatarum Goeldlin
(= abbreviata sensu Stubbs & Falk)
Glencas, Leitrum, Eire, 1985.
M. C. D. Speight

Canfield Hart is an area of former woodland on the pleistocene chalky boulder clay which covers much of Essex. The soil is thus heavy clay and is frequently waterlogged but is alkaline in places and has a flora typical of many of the woods in this part of Essex. The wood was onee dominated by elms *Ulmus* spp. incorporating many oaks as well as other broad-leaved species. It was largely clear felled in about 1978, though a peripheral ring of trees was left untouched to provide shelter for the herd of fallow deer *Dama dama* resident in the area. The central, cleared area soon became dominated by brambles *Rubus fruticosus* agg. though the rides were maintained open for pheasant shooting by periodic mowing. *Sphaerophoria bankowskae* was swept from vegetation dominated by low-growing grasses and rushes along the edge a narrow ride between the dense brambles and the woodland ring. A number of other noteworthy hoverflies are recorded in the same locality, notably the only Essex record of *Xylota tarda* and the only recent record of *Volucella inflata*.

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Some Scottish records of Tipula limbata Zetterstedt (Diptera; Tipulidae)

Since Edwards introduced *Tipula limbata* to the British list in 1926 (**Ent. mon. Mag., 62**: 34, as *T. vafra* Riedel) based on specimens from Logie, Morayshire, there have been few other references to its occurrence in the British Isles. Coe (1950, **R.E.S. Handbook, 9**: 21) adds Austwick, Yorkshire, and Lawmuir, Lanarkshire, is a third record (Dobson, 1974, **J. Animal Ecol.,43**:514). I can add two more Scottish records. One was amongst pitfall trap material sent to me for determination from Crianlarich, Argyll, collected by Ian McGowan, and the other I collected by sweeping at Merkland Burn, Brodick, Arran, The dates of capture in this country are from August to October which correspond with its flight period elsewhere. Its known distribution is throughout the northern palaearctic to the Bering Straits and in the alpine parts of central Europe.

E. Geoffrey Hancock

ASPECTS OF OVERWINTERING ACTIVITY IN DIPTERA

Robert and Ruth Blackith

Summary

In a *Phragmites* fen and birch woodland 24 families of Diptera were recorded during January - February, 1988. Only 6 families occurred in both habitats, 12 lived only in the fen, and 6 lived only in the woodland. Whereas flies up to 2 cm long dwelt in the woodland, those in the fen, with one exception, were restricted to less than 0.5 cm, the approximate size of entry holes made in the reed stems by Wainscot moths. A helcomyzid whose larvae live in large wet masses of wrack on beaches during the summer was found to breed in small masses during the winter. The complexity of the interlocking factors determining winter survival is stressed.

Sommaire

Pendant l'hiver (Janvier - Février, 1988) 24 familles de diptères étaient collectionnées ou dans une boulaie ou dans un marais de *Phragmites*. Il y avait 6 familles inféodées à la boulaie, tandis que 12 en étaient au marais. Pas plus que 6 familles partagaient les deux milieux. La plus grande mouche dans la boulaie était de 2 cm quoique celle du marais était normalement de 0.5 cm, effectivement la largeur des trous creusés dans les tiges de *Phragmites* par certaines lepidoptères qui y vivent. Une espèce de Helcomyzidae dont les larves habitent de gros amas de varech en été a survécu dans des brins de varech l'hiver durant. L'enchevêtrement des facteurs reglant la survivance hivernale des diptères est mis en relief.

Introduction

Hibernation, in the sense of an obligatory diapause , triggered in many instances by photoperiodic clues, is but a small part of the general problem of overwintering. Such diapause is seen in Sarcophagidae whose larvae diapause if produced after mid-August. At another extreme, adults of *Calliphora* become torpid, and in our experiments remarkably long-lived, even when deprived of food and water during the winter. They can take advantage of temporary fine weather at any time, becoming active possibly to oviposit on carcasses left lying around by severe weather. There is a complete range of tactics from true hibernation (diapause) to intermittent temperature -controlled activity (Stubbs, 1978). Winter is the time of heavy mortality for birds and small mammals, when corpses that are not 'stolen' lie around for a long time, a resource for carrion insects to exploit when it is warm enough for eggs to develop. The risk is that having left shelter the fly may be caught out by the sudden onset of bad weather. The selection of shelter is not well understood, but among other desiderata must be dryness to avoid fungal attack and low ventilation to avoid dehydration. This balance may be met by creeping into confined spaces just big enough to accommodate the fly, with the implication that big flies need different hibernacula from small ones. We test this hypothesis by comparing the Diptera of woodland and reed beds in winter. The hollow stems of reeds afford shelter access to which is through holes of about 0.4 cm diameter bored by various species of Wainscot moth (South, 1948).

Dehydration of the larval substrates during winter is lower than in summer, and we explored the dipterous larvae in wrack in winter. Egglishaw (1961) found that in summer the helcomyzid *Heterocheila buccata* (Fallén) bred in large damp masses of wrack, being replaced in small masses by *Helcomyza ustulata* Curtis.

Our winter surveys were conducted on the Murrough, Co. Wicklow, Ireland, a strip of fenland separated from the sea by a shingle beach capped with a thin sand-dune ridge.The 3 sites chosen were a reed-bed near Killoughter (Irish grid reference T 309989); Blackditch Wood O 309033), mainly scrub birch and willow on the margins but with a core of birch and some ash trees up to about 96 years old; and a length of shingle beach (T 309960). Winter baits (35 pieces of beef) were laid in various habitats from Broadlough (T 309960) to Blackditch Wood during January - February and the fate of each piece noted.

Winter surveys of Diptera are rare. Andrews (1945) was surprised to find 21 species distributed in 14 families in woodland in south-east England in November, when stragglers from the summer could still be numerous. Overwintering in Ireland, because of the maritime climate, may differ from that in parts of Britain and the Continent. The anecdotal account by Morgan (1939) is still useful. We have not felt competent to identify all the Diptera and so we compare families numerically in the wood and fen.

Results and discussion

Table 1 shows the adult flies recovered by sweeping from Blackditch Wood and the *Phragmites* beds. Few species are shared by both habitats, representatives of only 6 families shelter in both the reed-beds and the woodland, whereas 12 families shelter only in the reeds, and 6 only in the woodland.

The flies in the woodland range up to 2 cm in length, whereas thos in the reeds are less than 0.5 cm, with the exception of the small muscid *Lispocephala erythrocera* , which is 3.5 mm long, and the sphaerocerid *Crumomyia nitida* (Meigen) which is 4 mm long, but was taken near, not on, the fen. On the evidence of our work, woodland does not accommodate all Diptera requiring winter shelter. Possibly appropriately diverse shelter suitable for overwintering endangered Diptera should be included in the desiderata of reserves.

Only 9 of the winter baits were not 'stolen' and no calliphorid eggs or larvae were found on them, although adults were seen feeding on baits when these were in direct sunlight. It appears that midwinter oviposition is too risky, possibly because of the high rate of 'theft' and the slow hatch of the eggs.

These winter baits also attracted the drosophilid *Parascaptomyza disticha* Duda which was also taken by sweeping the reeds (Table 1) and larvae of sphaerocerids which were reared from these baits on the edge of the fen proved to be *Crumomyia nitida*, a large and distinctive species apparently new to Ireland (*cf.* Pitkin, 1988), *C. pedestris* (Meigen) , which is recorded from *Phragmites* beds in Yorkshire, and *C. fimetaria* (Meigen).

TABLE 1

Taxon	Dwellers in *Phragmites* Fen	Woodland
Trichoceridae		
Trichocera hiemalis (Degeer)	+	
Trichocera major Edwards	+	
Dixidae		
Dixella serotina Meigen	+	
Culicidae		
Aedes sp.		+
Chironomidae		
Smittia sp.	+	+
Mycetophilidae		
Exechia sp.	+	+
Sciaridae		
Trichosia sp.	+	
Cecidomyidae		
(?) *Campylomyza* sp.	+	+
Empididae		
Crossopalpus curvipes (Meigen)	+	
Dolichopodidae		
Campsicnemus scambus (Fallén)	+	
Syntormon miki Strobl	+	
Syntormon pallipes (Fabricius)	+	
Lonchopteridae		
Lonchoptera lutea Panzer	+	+
Syrphidae		
Episyrphus balteatus (Degeer)		+
Lauxaniidae		
Trigonometopus frontalis (Meigen)	+	
Heleomyzidae		
Heteromyza oculata Fallén	+	
Sepsidae		
Sepsis fulgens Meigen	+	+
Sphaeroceridae		
Crumomyia fimetaria (Meigen)	+	
" *nitida* (Meigen)	+	
" *pedestris* (Meigen)	+	
Copromyza equina Fallén	+	
Leptocera fontinalis (Fallén)	+	
Opacifrons coxata (Stenhammar)		+
Spelobia clunipes (Meigen)	+	
Opomyzidae		
Geomyza tripunctata Fallén	+	

Ephydridae			
4 spp. indet.	+		
Drosophilidae			
Scaptomyza flava (Fallén)	+		
Parascaptomyza pallida (Zetterstedt)	+		
" *disticha* Duda	+		
Drosophila sp.			+
Agromyzidae			
Phytomyza crassiseta (Fallén)			+
Chloropidae			
Elachiptera brevipennis (Meigen)	+		
" *cornuta* (Fallén)	+		
Calliphoridae			
Calliphora vicina Robineau-Desvoidy			+
Scathophagidae			
Scathophaga furcata (Say)			+
" *stercoraria* (L.)			+
Anthomyiidae			
Hylemya strenua Robineau - Desvoidy			+
1 sp. Anthomyini (female)			+
Muscidae			
Helina laetifica (Robineau-Desvoidy)			+
Lispocephala erythrocera			
(Robineau-Desvoidy)	+		+
Phaonia populi (Meigen)			+
" *signata* (Meigen)			+
Spilogona sp.			+

We found that small masses of wrack (about 1 kg) on an exposed shingle beach supported numerous (35 specimens) of *H. buccata* whereas no *H. ustulata* were found. We also noted that the Oligochaeta thriving in the wrack disappeared when the fly larvae entered the 3rd instar, possibly indicating a switch to predation. The helcomyzids were accompanied by the sphaerocerid *Thoracochaeta zosterae* (Haliday) , a common strand-line fly.

In addition to the factors we have touched upon, and the well-worked factor of cold-hardiness, we share the views of Kiritani, Hokyo and Kimura (1966) who emphasise the complexity of interactions between weather, shelter and physiological conditions determining survival during over-wintering. Some of these factors are subtle. For instance, prolonged cold can impair the memory of insects and their ability to perform simple tasks such as moving from shade into sunlight, tasks which may be essential for individual survival (Hunter, 1932). The concept of shelter implies protection from predators as well as weather, but in the reed stems we found large numbers of immature spiders as well as the Diptera and lesser numbers of Hemiptera, Collembola and other insects.Because collecting in winter is so sensitive to the weather, we probably failed to catch many overwintering species. In particular, we suspect that we missed numerous small flies overwintering in leaf litter below spiky vegetation where netting is impracticable. Some apparently uncommon ones were nevertheless taken in the reed-beds, among them the Mediterranean and N. African dolichopodid *Syntormon miki* Strobl (Speight, 1986) which has been taken in marshy fields and dykes in the neighbourhood of the fen by Dr. de Courcy Williams and ourselves in summer, and the lauxaniid *Trigonometopus frontalis* (Meigen) (Chandler, 1986). Neither fly has long been on the Irish lists. *T. frontalis* was by far the commonest insect in the fen in winter, but was uncommon later in the summer. The winter females of *T. frontalis* contained fresh white fat-body and undeveloped ovaries.

Although a female of the muscid *Phaonia signata* (Meigen) contained fresh white fat body and undeveloped eggs , one of *P. populi* (Meigen) contained well-developed eggs. Out of 5 females of the anthomyid *Hylemya strenua* R.-D., 4 contained a single large larva occupying about half the abdominal cavity, but still enclosed in the oviduct. These larvae were all apparently at the point of moulting from the 1st to the 2nd instar, at which stage they are deposited on various types of dung (Ferrar, 1987).

All collecting is subject to various forms of bias, winter collecting perhaps more than most, but we believe that our major findings are reasonably well-founded.

We are grateful for stimulating discussions of these issues with Dr. Martin Speight and Dr. Patrick Ashe, and to Dr. Daniel Kelly for estimating the age of the oldest trees in Blackditch Wood.

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OVERWINTERING IN SOME BRITISH TEPHRITIDAE

Laurence Clemons

As an appendix to the RES Handbook on Tephritidae published in 1988 Dr. Ian White summarizes knowledge of the life-history of British Tephritidae. There is some evidence that all *Tephritis* species together with *Trypeta zoe* and *Dioxyna bidentis* overwinter as adults, although data for *Tephritis formosa, T. praecox* and *T. separata* are based on non-British sources. I can confirm that *Tephritis formosa* does overwinter as an adult in Britain and would like to take the opportunity of presenting the records of this and other species of *Tephritis* which I have encountered between the months of October and April in East Kent.

Tephritis cometa (Loew)

16.iv.1983	Ellenden Wood, nr. Whitstable 61/102609 1 male swept from *Calluna*.

T. formosa (Loew)

16.iv.1983	Ellenden Wood, nr. Whitstable 61/102609 1 female swept from *Calluna*.
4.xi.1984	Stodmarsh NNR 61/232617 1 male by general sweeping.
29.iii.1989	Selling 61/045561 1 female swept from *Chamaecyparis*.

T. neesii (Meigen)

12.iii.1983	Ellenden Wood, nr. Whitstable 61/102609 1 male swept from *Calluna*.
30.iv.1983	Thornden Wood, nr. Whitstable 61/1463 1 female swept from *Calluna*.
23.x.1983	Thornden Wood, nr. Whitstable 61/1463 1 male swept from *Calluna*.
11.ii.1984	Gorham Wood, Bicknor, nr. Sittingbourne 51/854585 1 male swept from *Taxus*.

T. ruralis (Loew)

5.iii.1989	Coombe Down, Dover 61/303426 2 males swept from *Ulex*.

T. vespertina (Loew)

4.iv.1982	Bysing Wood, nr. Faversham 51/995615 1 male by general sweeping.
30.iv.1983	Thornden Wood, nr. Whitstable 1 female swept from *Calluna*.

My earliest records for other species of *Tephritis* are given below as it is possible that these represent the last surviving individuals of the previous year's generation:

T. bardanae (Schrank)

17.v.1983	Queendown Warren, Hartlip 51/828628 1 male.

T. hyoscyami (Linnaeus)

14.v.1983	Queendown Warren, Hartlip 51/828628 1 female.

Culiseta subochrea (Edwards) in Cornwall

Ray Poulding

On 22 February 1989 I caught an adult male *Culiseta subochrea* in a greenhouse at Trew, Breage, nr Helston, Cornwall (SW/616296). The modified greenhouse with open vents is used primarily as an insect trap and is sited in a corner of a garden bordered by pasture and a spring. Trew is approximately 3 km from the coast to the south and 20 km from Lizard Point on the Lizard, the most southerly part of the British Isles. Identification was confirmed by K. N. Chetwyn FRES at the Department of Military Entomology, Royal Army Medical College, London, from the mounted specimen and slide preparation of the hypopygium. Determination was based on the dorsal scaling of the abdominal tergites which showed many scattered scales in the dark areas, and also by 3, possibly 4, spines on the basal lobes of the gonocoxite. A number of pale scales were visible with the dark scales on the 5th vein.

C. subochrea is a scarce mosquito in the British Isles being largely confined to a few localities in southern counties. Cornwall is not listed as one of these either by Marshall (1938) or Cranston et. al. (1987), and no Cornish records of this species are held by the Cornish Biological Records Unit.

I am indebted to Mrs. Stella M. Turk of the CBRU, and to Dr K. S. Hocking, for information on the status of *C. subochrea* in Cornwall.

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Bibio lepidus Loew in Scotland (Diptera; Bibionidae)

One example of this species was collected at Ardmore Point, Dunbartonshire, on 12 October 1987. Ardmore Point is about 400km north of currently known localities for this particular fly. This site harbours other invertebrates of an otherwise more southerly distribution although the general lack of recording in the southwest of Scotland as well as the Western Isles cannot rule out the existence of populations of *B. lepidus* in other Scottish localities. The area is described by Crowson (**Glasgow Naturalist, 18**: 457-57) and it benefits from its position in having milder nights in particular compared with inland sites in the Clyde district. Some Coleoptera he suggests could be relicts of the post glacial climatic optimum. Without knowledge of the larval habits and food preferences of *B. lepidus* it may or may not be a candidate for such an explanation and more field work is needed to explain its presence in Scotland at this particular place.

E. Geoffrey Hancock

The breeding site of Brachyopa pilosa (Diptera; Syrphidae)

Ian F. G. McLean and Alan E. Stubbs

Whilst in the New Forest on 6 June 1986 we visited the Gritnam area, near Bank. Just south of New Forest House we came across a large log about 4ft. in diameter and about 12 ft. long, the residual part of a sawn up beech (*Fagus*) tree. The log was exposed to the full heat of the sun within a glade, and our observations took place between 16.30 and 17.00 BST under cool but mostly sunny conditions.

Between one and three adults occurred at any one time, except during times of undue disturbance or when the sun was obscured by cloud. They sat on the surface of the bark or were seen hovering within a few inches, especially on the shaded east side of the log.

One of us (AES) had previously found a puparium at Ranmore Common, Surrey, which had been reared through to produce *B. pilosa*. That puparium was found not under bark but under a thin outer flake of the bark surface on a large fallen beech. As decay proceeds, the rather smooth outer surface of the bark cracks and scaling locally develops such that a flake only 1-3 mm thick becomes easily detached.

Within a short time an apparently similar empty puparium was located at our New Forest log, also under an outer flake of bark in a position near the top of the log which was very exposed to the heat of the sun. Further search over an area about 30 cm square in this proximity failed to reveal further puparia, the rest of the log surface not yet having loose enough scaling of the bark surface. Under the bark scales, there was at most a thin layer of detritus which hardly seemed enough to support a hoverfly larva. Turning back the bark on the edge of the log failed to reveal puparia, and the opportunities for a mature larva to come out of a fissure from within the log or its bark in order to pupate under a surface scale seemed unlikely.

Patience was rewarded when we observed a female, on the shaded side of the log, extending and inserting its ovipositor into fissures in the bark surface where early steps in the development of scaling of the bark were under way. It was not possible to be sure that oviposition had taken place but having observed this behaviour for a total of at least 5 minutes it is reasonable to infer, in conjunction with location of the puparium, that the breeding site of *B. pilosa* is beneath bark scales on beech logs.

Some *Brachyopa* species, most certainly *insensilis*, are specialists on sap runs on live trees. It has been clear for some while that *B. pilosa* was associated with dead trees, beech in particular, but it is intriguing that the breeding site should be in a sterile and seemingly rather arid situation (though the detritus under the bark scales can be surprisingly moist, despite exposure to the sun). One advantage of this niche is that predators seem to be absent, or are likely to be infrequent.

REVIEW

A Preliminary Survey of Dolichopodidae (Diptera) in Scotland by I. MacGowan, Nature Conservancy Council, undated, 48pp.

This report brings together present knowledge of the status and distribution of Scottish Dolichopodidae. Much of the information is new, and older records are evaluated in the light of what has been learned since they were published. There is a full bibliography. In all 187 species in 29 genera have been reported from Scotland. However, this total includes 16 species for which there have not been any Scottish records during the last seventy years. There are eleven species which are known from Scotland but have not as yet been found elsewhere in the British Isles. The occurrence of each of these is discussed in detail, with comments on their biology and distribution overseas.

The species list is annotated with information on flight dates and the habitats in which the individual species are likely to be found. In addition each species is given a status rating according to the number of 10km grid squares in Scotland from which it has been recorded. The categories Uncommon, Common, and Very Common, are used for species known from 16-30, 31-50 and over 50, 10km squares respectively. These three categories together comprise 64 species, or just over a third of those known from Scotland. All of them occur elsewhere in Britain, except *Hydrophorus rufibarbis* Gerst. which is a montane species categorised as uncommon.

Species known from less than sixteen 10km squares are given status ratings of 1, 2, or 3, according to whether they have been recorded from 1-5, 6-10 or 11-15 10km squares. Most species fall into one of these categories, so that in the Scottish Dolichopodid fauna species with a limited known distribution predominate. Seventy one species are known to occur in no more than five 10km squares, and these include forty known only from one or two 10km squares. As the author points out, species frequenting habitats little visited by entomologists, or those whose habits mean they are rarely caught by traditional methods like sweeping, may well be under recorded. One wonders whether some British species not yet known from Scotland await discovery for similar reasons. Species of *Systenus* which are most readily obtained by rearing from tree-hole debris or sap wounds may be an example.

The report includes distribution maps for 17 selected species, and a further map showing the widespread origin of the nearly 3500 records used to categorise the distribution patterns. There is also an indication of the assemblages of the more common species likely to be found in nine different habitat types.

The author and the N.C.C. are to be congratulated on producing an excellent account of Scottish Dolichopodidae. Because of the biological information included its value is not confined to those with a special interest in the Scottish fauna. Indeed, comparably useful studies are available for few other European countries. Expense tends to prohibit the publication of surveys of this nature in the formal scientific literature. Despite this they entail a lot of work and have permanent scientific value. In view of this the lack of an indication of precisely where and when this survey was produced is a defect. It makes difficulties for bibliographers and librarians, and although the survey will still be relevant in twenty years time it may then be difficult for students to locate copies in libraries.

C. E. Dyte.

Survey report received June 1988. Enquiries to *I. MacGowan, Nature Conservancy Council, 9 Culduthel Road, Inverness.*

CONTENTS

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