

THE CORIXIDAE OF TWO SHROPSHIRE MERES

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Most of the lakes in England, Scotland and Wales are the result of the glaciation of unproductive mountainous areas poor in lime. It is these lakes to which freshwater biologists have devoted most attention. The productive lowland lake is a type which is not common in Britain except in Shropshire and Cheshire, where small examples occur frequently. These have been studied much less than the mountain lakes, but the establishment of a Field Centre at Preston Montford has stimulated regular work on them (Sinker, 1962). Dr. C. R. Kennedy has made a preliminary survey of two meres not far from the Centre, and it seemed that the Corixidae in them might repay investigation, since Macan (1955) has claimed that the species found indicate the general nature of a lake. Crose Mere and Sweat Mere, into which it runs, are two typical, if small, rich lowland lakes lying close together in a well cultivated moraine area. Crose Mere, some 4 hectares in extent, is ringed by a narrow band of *Phragmites*, except along much of the exposed north shore where the bottom is stony. At the outflow end of this shore there is a sandy bay. At what must be called the inflow end, though the inflow is little more than a seepage, there is an *Alnus* wood, broader *Phragmites* than elsewhere and water-lilies off the reed-swamp. Sweat Mere has reached a more advanced stage of evolution and the small area of open water, mostly overgrown with water-lilies, is fringed by a broad zone of *Typha angustifolia* surrounded by *Alnus* wood. There is *Carex paniculata* between the wood and the reedswamp, and, at one place, *Carex acutiformis* and a few plants of *Typha latifolia* adjoin the open water.

I spent much of 6 November 1961 round Crose Mere and the morning of 24 February 1962 on Sweat Mere collecting Corixidae.

The best-known lakes of this type, lying in a great moraine area to the south of the Baltic Sea, have been studied by workers in Denmark, Germany and Poland. Of these the Danish Esrom Lake has been surveyed with particular care by Berg (1938). Any comparison must, however, take into account the smaller size of the Shropshire meres.

In the reed-beds of the main basin of Esrom Lake, *Sigara striata*, whose ecological place is taken by *S. dorsalis* in most of Britain, was the most numerous species by a big margin. *S. falleni* came next in abundance, and there were a few specimens of *Callicorixa praeusta*, *Hesperocorixa linnei* and *H. sahlbergi*. In a more sheltered part of the lake, *S. falleni* was more numerous than *S. striata* but it was scarce at every station (Macan, 1954a). Excluding the small *Micronecta*, *S. striata* or *S. dorsalis* is the corixid generally found in the most exposed places; *C. falleni* is evidently less tolerant of wave action. Collections in some nearby Danish lakes showed that there is a succession:

S. striata → *H. linnei* → *H. sahlbergi*

as organic matter accumulates in *Phragmites* beds. *S. striata* extends from where the bottom is exposed enough to be sandy to where it is covered with

organic matter, but it is gradually replaced by *H. linnei* as this accumulates. With further development *H. linnei* gives way to *H. sahlbergi*, which is the commonest species where reed-bed becomes fen; *S. falleni* is not invariably associated with this succession. It is generally found where conditions are moderately exposed and particularly where fine organic matter can fall to the bottom. In Denmark it was numerous in a bay cut in reeds to make a harbour for boats and in a ditch flowing into the lake. Data from British waters (Macan, 1954b) add no more to an understanding of the habitat of this species, except that it occurs mainly in lakes and rivers with hard water.

There are other successions of species of corixids with accumulation of organic matter, according to whether evolution is tending in the direction of bog or fen. Another species that has proved difficult to fit exactly into the scheme is *C. praeusta*. It is associated with productive conditions but only in lakes below a certain size. It was, for example, scarce in the Danish lakes investigated, and in the Lake District it is numerous in Blelham (0.11 sq. km.) but not in the larger (1.0 sq. km.), but otherwise similar, Esthwaite. The few other examples known are discussed by Macan (1954b).

Before the findings in the Shropshire Meres are presented, an unfortunate taxonomic discrepancy must be explained. Comparison of Danish and British material led to the conclusion that the name *Sigara striata* was being applied to two species. I gave the name *S. lacustris* to the one found in Britain, believing it to be new, and unfortunately it is so referred to in all the papers quoted here. In fact the correct name is *S. dorsalis*, which Leach gave to a British specimen in 1818 but which had been regarded by later workers as synonymous with *S. striata*.

I collected at 10 stations in Crose Mere but the variation from station to station was so slight that it will suffice to quote the total catch:

<i>Sigara falleni</i>	145
<i>Callicorixa praeusta</i>	74
<i>S. dorsalis</i>	20
<i>S. lateralis</i>	13
<i>S. distincta</i>	6
<i>S. concinna</i>	2
<i>S. fossarum</i>	1
<i>Arctocorixa germari</i>	1
<i>Corixa punctata</i>	1

The *Corixa punctata* was taken in a pool formed beside the lake by a spring, and was not therefore in a true lake-biotope. *S. lateralis*, an unusual species to find in a lake, occurred in the sandy bay, a favourite resort of cattle. The resulting fouling may have attracted this species, which is often very numerous in small polluted ponds. *S. distincta* and *S. fossarum* tend to replace *S. dorsalis* as organic matter accumulates in lakes such as Windermere, where the water is soft and production no more than moderate. Their scarcity in both the Shropshire Meres and the Danish lakes is striking.

C. praeusta was the commonest species at two stations, *S. falleni* at the rest, excluding the sandy bay and one in the alder swamp where no corixids were taken. Nothing that would account for this difference was seen.

S. falleni is to be expected in abundance in this rich calcareous lake. The numbers of *C. praeusta* are, if earlier interpretations are correct, related not only to the productive nature of the mere but also to its relatively small size. The success of both these species relative to *S. dorsalis* may be bound up with the size of the lake and the less intense wave action than in a larger one.

Results from Sweat Mere were more diverse and the collections at four stations are set out in Table 1. No specimens were found in the deepest part of the mere. In or near the open water the species were the same as those in Crose Mere and they were present in similar proportions. In the middle of the reed-swamp occurred *H. sahlbergi*, *H. linnei* and the pond species *C. punctata*. Further in still, mainly *H. sahlbergi* was found. If we ignore *C. punctata*, on the grounds that its presence is related to the small size of Sweat Mere, the succession in these English meres is very like that found in Denmark.

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Table 1. Collections at four stations in Sweat Mere.

	<i>dorsalis</i>	<i>falleni</i>	<i>distincta</i>	<i>praeusta</i>	<i>punctata</i>	<i>linnei</i>	<i>sahlbergi</i>
Edge of <i>Typha</i>	6	14	3	2	—	—	—
Open bottom and edge of <i>Carex acutiformis</i>	5	9	1	1	—	—	3
Middle of <i>Typha</i>	—	—	—	2	5	5	8
Pools between <i>Carex</i> <i>paniculata</i>	—	—	—	—	—	1	7

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