

Immature Insects (Plecoptera, Trichoptera, and Ephemeroptera) Collected from Deep Water in Western Lake Superior¹

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Five species of aquatic insects — two plecopterans, two trichopterans, and one ephemeropteran — usually found in streams or ponds were collected in water 32-100 m deep in western Lake Superior. All appear to be new records for the lake and all were collected from far greater depths than previously recorded for these forms.

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Cinq espèces d'insectes aquatiques — deux plécoptères, deux trichoptères et un éphémère — ordinairement trouvés dans des cours d'eau ou des étangs ont été capturés à des profondeurs de 32 à 100 mètres dans le lac Supérieur occidental. Ce semble être des mentions nouvelles pour ce lac, et toutes les espèces ont été capturées à des profondeurs beaucoup plus grandes que celles déjà signalées pour ces formes.

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THIS report presents information on five species of aquatic insects collected during routine sampling in the Apostle Islands region of Lake Superior, in water 32-100 m deep. The limited published information on the aquatic insects of Lake Superior consists mostly of observations in relatively shallow water. The species discussed here — two plecopterans, two trichopterans, and one ephemeropteran — appear to be new records for the lake.

Materials and methods — Most of the insects collected were found clinging to gillnets or entrapped by debris in the cod ends of bottom trawls. Mayfly nymphs were taken in special sampling devices that consisted of hardware-cloth boxes, about 20 × 20 × 40 cm, containing beach stones. Six samplers were lowered on buoy lines to depths of 25-100 m on a steep bank at station 9 (Fig. 1) on June 23, 1972, and recovered on August 9.

Specimens were obtained only from water 32-100 m deep (Table 1) although gillnets and trawls were often fished in shallower water and in other areas of the lake. Most of the specimens were collected from areas with a stony bottom, although two trichopterans collected at

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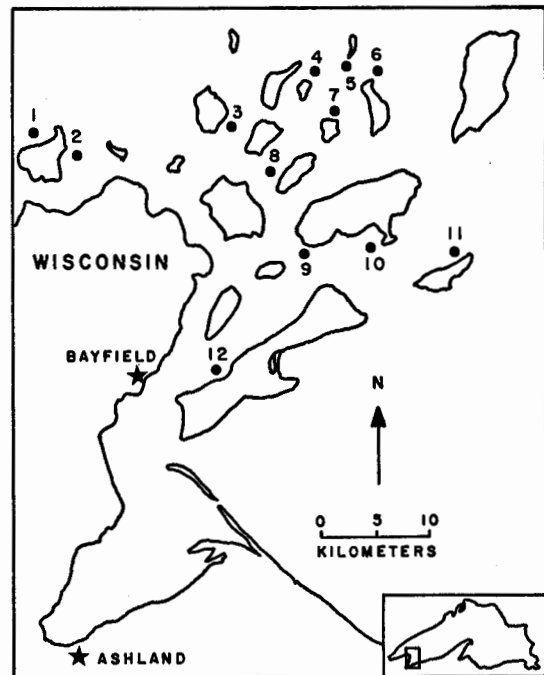


FIG. 1. The Apostle Islands region of western Lake Superior, showing the 12 stations (Table 1) where aquatic insects were collected in 1971-72.

100 m came from a trench bottom covered with organic debris. None of the species were taken in extensive sampling with benthic grabs.

Species — The Plecoptera include 64 nymphs of *Isoperla bilineata* (Say) and a single female nymph of *Isogenus* (*Isogenoides*), probably *Isogenus krumholzi* Ricker. *Isoperla bilineata* is common in some large Wisconsin streams, although it has not previously been recorded from the northern part of the state (W. L. Hilsenhoff personal communication). *Isogenus krumholzi* is known from adults taken in Minnesota and Michigan, but its nymph has not been described (W. E. Ricker personal communication). Although the specimen collected could not be positively separated from *Isogenus olivaceus* Walker, it differed in the banding of the anterior abdominal segments (W. E. Ricker personal communication) and in size — it was larger than *I. olivaceus* collected in Wisconsin (W. L. Hilsenhoff personal communication).

The larval Trichoptera included 29 *Phryganea cinerea* Walker and 10 *Agrypnia straminea* Hagen, although several of the specimens of *Agrypnia* may be of a different species whose key characteristics are unknown (G. B. Wiggins personal communication). *Phryganea cinerea* and *A. straminea* are northern species that frequent glacial lakes and marshes (Ross 1944). In Wisconsin, species of *Phryganea* and *Agrypnia* are fairly common in lakes, ponds, and sluggish streams (Hilsenhoff 1970).

The Ephemeroptera nymphs are probably *Heptagenia pulla* (Clemens), although they were too young for positive identification. In Wisconsin, *H. pulla* has been collected in two northern rivers tributary to Lake Superior, and on rocks near the shoreline of Green Bay, Lake Michigan (W. L. Hilsenhoff personal communication).

Characteristics of the habitat — The five species were all collected from depths far greater than those at which they have previously been reported.

TABLE 1. Dates and localities of collection for five species of aquatic insects, Apostle Islands region of Lake Superior, 1971–72.

Order, species, and date	Number collected	Station number (Fig. 1)	Depth (m)	Gear ^a
Plecoptera				
<i>Isoperla bilineata</i>				
May 11, 1971	1	10	36–43	G
June 30, 1971	7	1	32–50	G
July 1, 1971	11	3	32–45	G
July 8, 1971	33	4,7	32–45	G
July 9, 1971	9	9	35–68	G
Aug. 11, 1972	3	9	36–48	G
<i>Isogenus</i> (<i>Isogenoides</i>) <i>krumholzi</i> ^b				
May 11, 1971	1	10	36–43	G
Trichoptera				
<i>Agrypnia straminea</i>				
July 1, 1971	1	3	32–45	G
July 8, 1971	9	5	34–41	G
<i>Phryganea cinerea</i>				
May 11, 1971	2	10	36–43	G
June 28, 1971	7	2	36–43	G
Nov. 8, 1971	1	8	43	T
Nov. 16, 1971	10	6	45	T
Nov. 17, 1971	6	12	36	T
July 17, 1972	1	10	54	T
Aug. 31, 1972	2	10	100	T
Ephemeroptera				
<i>Heptagenia pulla</i> ^b				
Aug. 9, 1972	2	9	50	S

^aG = gillnet; T = trawl; S = substrate sampler.

^bTentative identification.

The following characteristics may contribute to the suitability of the deepwater environment for these insects in the Apostle Islands region: currents among the islands are frequently swift; the water is clear (average Secchi disc reading about 6–10 m); dissolved oxygen is always near saturation; and water temperature fluctuates only from about 4 to 6 C at the depths of collection. The heavily wooded islands and mainland shore provide a substantial quantity of allochthonous organic material which serves as case-building material (for Trichoptera) or as food.

Acknowledgments—Plecoptera were identified by W. E. Ricker, Fisheries Research Board of Canada,

Nanaimo, B.C., and W. L. Hilsenhoff, Department of Entomology, University of Wisconsin, Madison, Wisc.; Trichoptera by G. B. Wiggins, Department of Entomology and Invertebrate Zoology, Royal Ontario Museum, Toronto, Ont.; and Ephemeroptera by R. W. Flowers, Department of Entomology, University of Wisconsin, Madison, Wisc.

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