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Light Trap Collections of Mayflies, Caddisflies and Chironomids from Lake Winnipeg during 1969 and 1971

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Fisheries and Aquatic Sciences 2223

1994

LIGHT TRAP COLLECTIONS OF MAYFLIES, CADDISFLIES AND CHIRONOMIDS FROM LAKE WINNIPEG DURING 1969 AND 1971

by

P.S.S. Chang[1], D.G. Cobb, J.F. Flannagan and O.A. Saether[2]

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ABSTRACT

Chang, P.S.S., D.G. Cobb, J.F. Flannagan, and O.A. Saether. 1994. Light trap collections of mayflies, caddisflies and chironomids from Lake Winnipeg during 1969 and 1971. Can. Manuscr. Rep. Fish. Aquat. Sci. 2223: iv + 27 p.

Flight periods of aquatic insects were sampled in 1969 and 1971 using light traps as part of a limnological baseline survey on Lake Winnipeg, Manitoba. A total of 24 families (sub-families), 117 genera and at least 384 species of mayflies, caddisflies and chironomids was collected. Flight periods and distribution in regions of the Lake are given for each species. Mayfly and caddisfly fauna are compared with Neave's (1934) collections.

Key words: aquatic insects; emergence; flight; light traps; Lake Winnipeg; caddisflies; Trichoptera; mayflies; Ephemeroptera; chironomids; Chironomidae.

RÉSUMÉ

Chang, P.S.S., D.G. Cobb, J.F. Flannagan, and O.A. Saether. 1994. Light trap collections of mayflies, caddisflies and chironomids from Lake Winnipeg during 1969 and 1971. Can. Manuscr. Rep. Fish. Aquat. Sci. 2223: iv + 27 p.

En 1969 et en 1971, on a prélevé des échantillons d'insectes aquatiques au cours de leurs périodes de vol dans le cadre d'une étude limnologique initiale du lac Winnipeg, au Manitoba. On a capturé, à l'aide de pièges lumineux, des spécimens appartenant à un total de 24 familles (sous-familles), 117 genres et au moins 384 espèces d'éphémères, de phryganes et de moucherons. La distribution dans les régions du lac et les périodes de vol de chaque espèce sont indiquées. Les espèces d'éphémères et de phryganes prélevées sont comparées aux collections de Neave (1934).

Mots-clés: insectes aquatiques; émergence; vol; pièges lumineux; lac Winnipeg; phryganes; Trichoptères; éphémères; Éphéméroptères; moucherons; Chironomidae.

INTRODUCTION

This report presents the results of light trappings of adult Ephemeroptera, Trichoptera and Chironomidae on Lake Winnipeg, Manitoba in 1969 and 1971. Light trappings were conducted to augment benthic fauna collections from a limnological baseline survey of the Lake conducted by staff of the Freshwater Institute during 1969. The present report is one in a series on the invertebrates of the lake resulting from this survey, including: the life history, distribution and production of burrowing mayflies (Flannagan 1979; Flannagan and Cobb 1984), changes in the density and distribution of caddisflies (Flannagan and Cobb 1981), and reports on the Mollusca (Flannagan and Cobb 1991), the Oligochaeta (Chang et al. 1992), and the benthic insects (Chang et al. 1993).

Adult insects were collected to assist in species identification of immature specimens collected in benthic samples and to provide flight period information helpful in elucidating life histories. These collections also sampled insect species which inhabited areas of the Lake not sampled by ship during the 1969 cruises (depths less than 4 m), and thus help to provide a more complete species list of insect fauna for the lake.

In addition to the above cited reports, the benthic insects of Lake Winnipeg have been studied by Bajkov (1930), Neave (1932, 1933, 1934), Slack (1967), and several surveys were conducted by Manitoba Provincial Government biologists during the 1960's. This is the first report of adult insect collections from the Lake using light traps.

MATERIALS AND METHODS

DESCRIPTION OF THE STUDY AREA

Lake Winnipeg (Fig. 1), a remnant of glacial Lake Agassiz, has a surface area of 23,750 km², a mean depth ($\bar{Z}$) of 12.0 m, and a maximum depth of 36 m. Its long fetch, relatively shallow depth, and geology results in a high degree of mixing, an isothermal water column, and high turbidity (Secchi = 0.1-1.0 m south basin, 1.0-3.0 m north basin) (Brunskill 1973).

The Lake has 3 basins; The South Basin is shallower ($\bar{Z}$ = 9.7 m) than the larger North Basin ($\bar{Z}$ = 13.3 m), and the two basins are separated by The Narrows Basin ($\bar{Z}$ = 7.2 m) which, because of its width, is subject to strong currents associated with the northward drainage of the Lake, and with wind-generated seiches.

The north, west, south and southeast shores and watersheds of Lake Winnipeg are in sedimentary (Palaeozoic and Mesozoic) basins, while the eastern shore and its watersheds are on the Precambrian Shield, and are influenced by inflowing water of different chemistry than the rest of the Lake. More detailed descriptions of the Lake and its watershed are found in Brunskill et al. (1980).

Neave (1934) characterized the Lake as having distinct in-shore and off-shore zones. Much of the in-shore zone consists of rocky shores, which are wave swept most of the time, but which can be exposed and dried during fluctuations in water level (1 m in a few hours). There are also long stretches of sandy beaches and many large protected bays in the in-shore of the Lake. The off-shore consists of fine mud, mostly silts and clays (Brunskill and Graham 1979).

ADULT COLLECTIONS

In 1969, adult insects were collected in conjunction with the whole lake limnological survey. During each of the cruises (June to September) modified New Jersey light traps (Mulhern 1942) were set up at dusk, when the sampling vessel was docked for the night, and collected at dawn (Table 1, Fig. 1). The sampling schedule of the baseline survey was such that collections were made at a variety of locations and dates in June, early July, late July, and September.

To allow a more complete seasonal sampling of insect flight times, insect emergence and flight was monitored at 5 sites in the Narrows Basin of the Lake near Beaver Point in 1971 (Fig. 1). Light traps were set several times a week from early June to mid-September at Beaver Point and Calder's Dock, and from mid-July to mid-September at 20 Mile Creek, Old Fishing Dock, and Hecla Island. During peak emergence

periods, some traps overfilled, and only contents of the sample jars were collected. Forty submerged funnel emergence traps (0.10 m^2 sampling area) (Flannagan and Lawler 1972) were sampled from June to September at Washaw Bay near Beaver Point to monitor adult emergence. The traps were set in one to four meters of water depth. Lake Winnipeg is subject to heavy wave action due to the long fetches, and as a result emergence traps were often lost or damaged.

Larval rearing of several chironomid species was carried out in both 1969 and 1971 to associate adult with larval material, and to provide more complete descriptions of new species. Larvae were collected with a Birge-Ekman dredge and reared through to adults in vials, one larva per vial to allow association of larval and adult material.

RESULTS AND DISCUSSION

A total of 24 families or sub-families, 117 genera and at least 384 species of aquatic insects was collected during the two study years (Table 2). All but a few families (subfamilies) and genera and most of the commonly occurring species were distributed in each of the Lake basins. A few of the rarer species appeared to have restricted distributions, although this may be a sampling artifact.

The 1969 light trap samplings, because they followed the ship (Table 1), provided only distributional data. The 1971 results, being more systematic, provided more complete data on flight periods, emergence times and species distributions, but within a limited area of the Lake. Although abundance data is presented, it is limited by the efficiency of the sampling method. Possible variation in attraction to light traps by insect species may lead to misrepresentation of actual species abundance. In addition, adults emerging from sources other than the Lake (nearby ponds, rivers, etc.) may be attracted to the traps. The use of light trap data as an indication of voltinism is limited because wind, temperature, precipitation, humidity and even lunar phases can interfere with the collecting efficiency of these samplers giving false flight and emergence patterns. Only when benthic samples are taken in conjunction with emergence samples can life cycles and voltinism be fully understood. In spite of these shortcomings, useful information on the species composition and flight periods of aquatic insects of Lake Winnipeg resulted from these two years of study.

Ephemeroptera

A total of 8 families, 14 genera and 18 species of Ephemeroptera was collected in light traps in 1969 and 1971 (Table 2). Thirteen of these species were collected in 1969, while all but Heptagenia elegantula were represented in the 1971 collections. Heptageniidae with four genera and six species, was the most diverse family of mayflies. Ephemeridae, Caenidae and Heptageniidae made up over 90% of the specimens collected in 1971. Approximately 50% of the total mayfly catch consisted of Hexagenia, one of the dominant off-shore benthic invertebrates of Lake Winnipeg (Flannagan 1979; Flannagan and Cobb 1984; Chang et al. 1993). Caenis amica and C. latipennis together made up approximately 20% of the total catch in 1971.

Several lotic mayfly species, including Heptagenia pulla and Ecdyonurus hebe were collected in the light traps. These species are usually associated with coarse substrates in rivers; apparently, the wave-washed rocky shoreline of Lake Winnipeg provides suitable habitat for these species.

The 18 species collected in this study represents 23% of all mayfly species reported in Manitoba (Flannagan and Flannagan 1982). Neave (1934) collected 17 species (excluding those recorded only from rivers) from the Lake between 1927-1931 (Table 3, Appendix 1a), of which 13 species were also present in the 1969 and 1971 collections. The four mayfly species recorded by Neave (1934) from the Lake but not collected in the present study are: two species of Procloeon, Callibaetis ferrugineus and Leptophlebia nebulosa. C. ferrugineus closely resembles C. pallidus, differing only in coloration, a characteristic which can at times be undependable (Check 1982). Thus the records may be of the same species. Leptophlebia species emerge in spring, and may have emerged before the 1971 light trapping program. The

absence of the two species of Procloeon in the present study cannot be explained, unless these species are not attracted to light.

Mayfly flight periods ranged over the full sampling period (early June to mid-September) in 1971 (Fig. 2). Only four species had flight periods starting after July. Distinct peaks were evident for some species (e.g. Hexagenia spp.), while others showed continuous flight periods, with small peaks (e.g. Stenacron interpunctatum, H. pulla, Caenis spp.). Flight patterns with several peaks may indicate complex life cycles, or may result from a sampling artifact; benthic data would be required to establish the nature of these patterns. Flannagan (1979) reported Hexagenia limbata to follow an alternating 22 and 14 month life cycle in the South Basin, a two year life cycle in the North Basin, and a mixture of the two in the Narrows Basins of the Lake. Life history data suggested the main emergence to be in early July, with another smaller peak later in the summer. In our study, flight periods for Hexagenia spp. in the 1971 light trappings lasted from early July to late August, peaking in mid-July.

Trichoptera

A total of 11 families, 32 genera, and 88 species of Trichoptera was collected in the light traps (Table 2). Seventy-four of the species (84% of total) were collected in 1971, while 56 species (64% of total) were represented in the 1969 collections. The family Leptoceridae was represented by 25 species, while 18 species of Limnephilidae were collected, although often in low numbers.

Flannagan and Cobb (1981) reported that of the three off-shore caddisfly species occurring in the benthic samples, Oecetis inconspicua was alone in the South Basin and common in the Narrows, having replaced Molanna flavicornis and Phryganea cinerea in the South Basin since Neave's (1934) report. Similarly, in light traps the most commonly captured species was O. inconspicua (>10,000 specimens), representing 33% of total numbers; Molanna flavicornis was rare, except in the North Basin.

Ceraclea ancylus and C. resurgens each contributed approximately 15% of the total light trap catches. Ceraclea spp. occurred rarely in the 1969 off-shore benthic samples, so it is likely that most of its contribution to light trap collections was from in-shore populations, where Neave (1934) found this genus to be abundant.

Several caddisfly species collected in this study are considered to be lotic (e.g. Psychomyia flavida), while others are considered to be mainly lotic, but also occur in lakes (e.g. Hydropsyche alternans). While individuals of lotic species collected in our study may have originated from nearby streams, it is likely that the wave-washed shore supports a community of lotic species.

This study collected 61 species more than was recorded from the Lake by Neave (1934) (Table 3, Appendix 1b). This may reflect the efficiency of light traps in collecting adult caddisflies in the present study, combined with the difficulty in species identification of larvae and the limited searches in typical habitats of Limnephilidae by Neave (1934). In addition, Neave did not include the Hydroptilidae, here represented by 14 species. As a result, only 22 species were common to both studies, representing a 25% faunal similarity.

Flight periods of Trichoptera covered the entire light trap sampling period (early June to mid-September) (Fig. 3). The flight period for the majority of species was between late-June and mid-July, with a distinct autumn group comprised mainly of Limnephilidae. Several species had extended flight periods, with single or several peaks. Without detailed life history data, it is difficult to determine the voltinism of these species; however Hydropsyche spp., for example, can have multiple generations in a single season under the right conditions of food and temperature (MacKay 1978).

Chironomidae

Five sub-families, nine tribes, 71 genera and at least 278 species of Chironomids were collected during the two study years. The subfamily Chironominae provided most taxa: the tribe Chironomini having 83 species, the tribe Tanytarsini with at least 35 species, and the tribe Pseudochironomini with six species.
Approximately 15% of the species collected in this light trap study were collected in the 1969 Lake

Winnipeg benthic survey, which sampled only waters deeper than 4 m.

During 1971, the most abundant species caught in light traps was Chironomus decorus, comprising 85% of the total. Chironomus muratensis, and Tanytarsus confusus were next most abundant at <3% of the total. Although completely dominating the light trap catches, C. decorus was not the most common chironomid species recorded in the 1969 Lake Winnipeg limnological survey (Chang et al. 1993).

More than half the chironomid species had flight periods which commenced during June, and most of these species had flight times extending until September (Fig. 4). It was difficult to discern voltinism, but distinct peak captures in the light traps are indicated were possible. Relatively few chironomid species had flight times beginning in late summer.

Many previously unknown species were collected in the 1969 and 1971 light trap studies; descriptions of these species is currently underway and will soon be published (Saether, University of Bergen, N-5007 Bergen, Norway, pers. comm.).

CONCLUSIONS

The results of the 1969 and 1971 light trappings on Lake Winnipeg indicate a highly diverse insect fauna. There appears to be a distinct off-shore and near-shore fauna, with more species represented from the latter zone. Further studies of the life cycles and adaptations of species inhabiting the wave-swept shores of large lakes is required. These shores are highly turbulent due to wave action, often totally exposed due to water level fluctuations resulting from seiches and seasonal lake level changes, and frozen from November to May.

In spite of some of the shortcomings of light-traps as a sampling method for aquatic insects, useful information on the species diversity and distribution of Lake Winnipeg insects resulted from the two years of light trapping. This study will help to provide a base-line for documenting changes in the condition of the Lake.

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Table 1. Location, date and reference number of light trap stations during the 1969 Lake Winnipeg survey.

Location	Longitude Latitude	Sample Date	Reference Number
South Basin			
Victoria Beach	96°33'w 50°42'n	June 4	1
		July 9	7
		July 25	16
Gimli Wharf	96°57'w 50°38'n	July 24	15
		Sept 9	30
Hnausa Wharf	96°57'w 50°54'n	Sept 8	29
Gull Harbour	96°35'w 51°11'n	July 16	14
Narrows			
Pine Dock	96°52'w 51°37'n	July 10	8
		July 31	22
		Sept 2	23
Matheson Island Wharf	96°58'w 51°43'n	June 5	2
		July 26	17
McBeth Harbour	97°20'w 52°08'n	July 30	21
		Sept 7	28
McCreary Island	97°50'w 52°14'n	July 15	13
North Basin			
Reindeer Island	98°15'w 52°27'n	June 10	6
George Island	97°38'w 52°48'n	June 6	3
		July 11	9
		July 12	10
		July 27	18
Mukatawa River bouy	97°35'w 53°10'n	Sept 3	24
1.5 km off Long Point	98°25'w 53°03'n	July 14	12
		Sept 6	27
3 km off Grand Rapids	99°15'w 53°13'n	June 8	5
		July 13	11
		Sept 4	25
Grand Rapids Wharf	99°16'w 53°10'n	July 28	19
		Sept 5	26
Horse Island	99°11'w 53°19'n	June 7	4
		July 29	20

Table 2. Species list and abundance of adult Ephemeroptera, Trichoptera and Chironomidae collected from Lake Winnipeg in light traps, emergence traps and insect rearings during the 1969 baseline survey and at Beaver Point in 1971.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Order Ephemeroptera				
Family Baetidae				
Baetis cf. flavistriga McDunnough	4	-	12	4
Callibaetis pallidus Banks	-	-	-	1
Family Heptageniidae				
Ecdyonurus hebe (McDunnough)	1	-	-	7
Heptagenia elegantula (Eaton)	3	-	-	-
H. pulla (Clemens)	-	12	-	111
Heptageniidae spp.	14	2	26	234
Stenacron interpunctatum (Say)	75	59	119	379
Stenonema femoratum (Say)	19	41	30	792
Stenonema terminatum (Walsh)	3	-	2	6
Stenonema spp.	-	-	-	149
Family Leptophlebiidae				
Leptophlebia cupida (Say)	-	-	-	2
Family Ephemerellidae				
Ephemerella sp.	-	-	-	2
Family Tricorythidae				
Tricorythodes minutus Traver	-	-	-	3
Family Caenidae				
Brachycercus prudens (McDunnough)	-	-	-	2
Caenis amica Hagen	5	70	3	759
C. latipennis Banks	12	64	1632	691
Caenis spp.	-	3	15	7
Family Ephemeridae				
Ephemera simulans Walker	61	-	522	75
Hexagenia limbata Serville	9	3	24	232
H. rigida McDunnough	-	5	14	72
Hexagenia spp. (females)	1	1	14	3711
Family Polymitarcidae				
Ephoron album (Say)	1	-	-	6
Order Trichoptera				
Family Psychomyiidae				
Psychomyia flavida Hagen	189	20	50	457

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Family Polycentropodidae				
Neureclipsis bimaculatus (L.)	8	-	31	13
N. crepuscularis (Walker)	-	-	-	2
N. validus (Walker)	62	76	11	456
Nyctiophylax affinis (Banks)	71	33	63	191
Phylocentropus placidus (Banks)	-	-	-	3
Polycentropus aureolus (Banks)	3	-	-	1
P. cinereus Hagen	94	18	122	1018
P. flavus (Banks)	102	1	20	46
P. interruptus (Banks)	-	-	-	3
P. remotus Banks	3	-	4	-
Family Hydropsychidae				
Cheumatopsyche campyla Ross	157	197	41	1946
C. miniscula (Banks)	-	-	-	3
C. pettiti (Banks)	-	1	-	3
Cheumatopsyche spp	393	3699	354	-
Hydropsyche alternans (Walker)	29	12	18	2722
H. confusa (Walker)	21	10	1	-
H. morosa Hagen	-	-	6	6
H. scalaris Hagen	1	-	-	-
Hydropsyche spp	259	34	83	-
Family Hydroptilidae				
Agraylea multipunctata Curtis	8	-	8	13
Hydroptila albicornis Hagen	35	193	23	652
H. armata Ross	7	-	7	4
H. consimilis Morton	26	100	49	158
H. hamata Morton	6	32	-	144
H. spatulata Morton	14	6	45	81
H. vala Ross	1	-	-	5
H. waubesiana Betten	14	137	1274	106
H. wyomia Denning	-	-	-	21
Ithytrichia clavata Morton	-	-	-	82
Neotrichia sp.	-	-	-	59
Orthotrichia cristata Morton	-	9	-	1
Oxyethira serrata Ross	-	-	-	1
O. zeronia Ross	-	4	-	-
Family Phryganeidae				
Agrypnia glacialis (Hagen)	-	-	-	1
A. improba (Hagen)	2	3	3	-
A. straminea Hagen	-	-	2	5
Banksiola crotchi Banks	-	-	-	6
Phryganea cinerea Walker	1	1	2	12
Ptilostomis ocellifera (Walker)	-	-	-	1
P. semifasciata (Say)	-	-	-	1

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Family Limnephilidae				
Anabolia consocia (Walker)	-	-	-	6
Asynarchus rossi (Leornard & Leonard)	-	-	-	1
Limnephilus canadensis Banks	-	-	-	1
L. externus Hagen	-	-	-	12
L. femoralis Kolenati	-	-	-	2
L. hyalinus Hagen	4	-	-	4
L. infernalis (Banks)	-	-	-	3
L. kennicotti (Banks)	-	-	1	1
L. minisculus (Banks)	-	1	1	-
L. moestus Banks	-	-	-	1
L. ornatus Banks	-	-	1	-
L. nimmoi Roy and Harper	-	-	-	1
L. parvulus (Banks)	-	-	1	-
L. secludens Banks	-	-	1	-
L. sericeus (Say)	-	1	2	4
L. thorus Ross	-	-	-	4
Nemotaulius hostilis (Hagen)	-	-	-	2
Pycnopsyche subfasciata (Say)	-	1	2	27
Family Lepidostomatidae				
Lepidostoma togatum (Hagen)	4	15	41	22
Family Molannidae				
Molanna flavicornis Banks	1	11	499	3
M. uniophila Vorhies	3	22	22	524
Family Helicopsychidae				
Helicopsyche borealis (Hagen)	51	12	16	79
Family Leptoceridae				
Ceraclea alagma (Ross)	-	-	-	73
C. ancylus (Vorhies)	16	60	350	6636
C. annulicornis (Stephens)	20	322	12	125
C. arielles (Denning)	-	-	-	8
C. cancellata (Betten)	-	1	-	19
C. diluta (Hagen)	1425	101	100	2072
C. erratica (Milne)	-	-	-	1
C. resurgens (Walker)	217	101	100	5788
C. tarsi-punctata (Vorhies)	16	7	1	781
C. transversa (Hagen)	12	18	17	-
Mystacides interjecta (Banks)	3	-	2	2
M. sepulchralis (Walker)	7	1	-	-
Nectopsyche albida (Walker)	-	-	-	9
N. candida (Hagen)	-	-	-	4
N. diarina Ross	-	-	-	28
N. exquisita (Walker)	-	-	-	9
Oecetis avara (Banks)	-	1	1	-
O. cinerascens (Hagen)	-	-	1	-
O. immobilis (Hagen)	3	-	1	75
O. inconspicua (Walker)	98	58	120	10837
O. ochracea (Curtis)	16	3	71	7

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Trianodes aba Milne	-	-	1	9
T. baris Ross	-	2	-	1
T. frontalis (Banks)	-	1	-	2
T. tarda (Milne)	1	-	1	14
Family Brachycentridae				
Micrasema scissum McLachlan	-	-	-	1
Order Diptera				
Family Chironomidae[1]				
Subfamily Tanypodinae				
Tribe Coleotanypodini				
Clinoptanypus (Clinotanypus) pinguis (Loew)	-	-	-	1
Tribe Macropelpiini				
Psectrotanypus dyari (Coquillett)	1	-	-	-
Tribe Procladiini				
Procladius bellus (Loew)	24	24	5	100
P. (Holotanypus) culiciformis (L.)	41	24	50	32
P. (Holotanypus) denticulatus Sublette	13	84	622	7
P. (Holotanypus) freemani Sublette	18	25	447	182
P. (Holotanypus) paragretis Roback	6	-	3	10
P. (Holotanypus) sublettei Roback	12	35	15	62
Tribe Tanypodini				
Tanypus (Tanypus) punctipennis Meigen	-	-	-	1
T. (Tanypus) vilipennis (Keiffer)	-	-	-	4
Tribe Pentaneurini				
Ablabesmyia (Karelia) illinoensis (Malloch)	3	1	1	14
A. (Karelia) pulchripennis (Lundb.)	1	-	-	17
Ablabesmyia (Ablablesmyia) aspera Roback	-	22	8	5
A. (Ablablesmyia) basalis (Walley)	1	2	1	15
A. (Ablablesmyia) mallochi (Walley)	3	1	3	23
A. (Ablablesmyia) monilis (L.)	-	1	2	26
A. (Asyia) annulata (Say)	15	8	6	756
Conchapelopia currani (Walley)	-	-	-	1
C. telema Roback	-	-	3	38
Thelopelopia okoboji (Walloch)	-	4	-	-
Hayesomyia senata (Walley)	1	-	-	-
Thienemannimyia (T.) norena (Roback)	-	1	-	7
Guttipelopia guttipennis (v.d. Wulp)	-	2	-	2
Helopelopia sp. n.	-	-	1	-
Labrundinia pilosella (Loew)	-	-	-	1
Paramerina smithae (Sublette)	-	-	1	-
Subfamily Diamesinae				
Tribe Diamesini				
Potthastia longimanus Kieffer	3	-	10	-
Subfamily Prodiamesinae				
Monodiamesa depectinata Saether	-	-	-	8

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Subfamily Orthocladiinae				
Acricotopus nitidellus (Malloch)	-	-	-	7
Baeoctenus bicolor Saether	2	-	-	-
Brilla flavifrons (Johannsen)	-	1	4	1
Camptocladius stercornarius (De Geer)	4	5	3	2
Corynoneura lobata Edwards	1	1	1	19
C. scutellata Winnertz	1	1	1	1
Corynoneura n. sp.	2	-	1	-
Cricotopus (Cricotopus) annulator Goetghebuer	6	3	9	9
C. (Cricotopus) abanus Curran	2	-	-	-
C. (Cricotopus) bicinctus (Meigen)	1	8	21	64
C. (Cricotopus) coronatus Hirvenoja	1	-	1	-
C. (Cricotopus) festivellus (Kieffer)	2	6	20	2
C. (Cricotopus) pilosellus Brundia	-	-	-	1
C. (Cricotopus) triannulatus Macguart	44	13	6	9
C. (Cricotopus) trifascia Edwards	12	103	7	605
C. (Cricotopus) varipes Coquillett	1	2	1	-
C. (Cricotopus) vierriensis Goetghebuer	-	-	-	21
C. (Isocladius) intersectus (Staeger)	281	19	31	3
C. (I.) ornatus (Meigen)[2]	-	-	-	-
C. (I.) pilitarsis (Zetterstedt)	-	1	1	-
C. (I.) sylvestris (Fabricius)	17	18	20	71
Epoicocladius flavens (Malloch)	12	11	2	-
Heterotanytarsus sp. n.	-	1	-	-
Heterotrissocladius changi Saether	-	-	14	1
Hydrobaenus johannseni (Sublette)	-	-	25	-
Limnophyes brachytomus (Kieffer)	-	-	-	1
L. margaretae Saether	-	-	-	2
L. minimus (Meigen)	2	-	-	-
L. natalensis (Kieffer)	-	-	1	-
L. ninae Saether	-	-	-	3
L. pilicistulus Saether[2]	-	-	-	-
L. pumilio (Holmgren)	1	-	-	-
Mesocricotopus thienimanni (Goetghebuer)[2]	-	-	-	-
Metriocnemus sp.n.	2	7	8	-
Nanocladius anderseni Saether	-	21	-	4
N. cf. balticus (Palmen) var.	-	1	-	1
N. distinctus (Malloch)	1	-	1	-
N. cf. parvulus (Kieffer)	2	-	1	2
Orthocladius (Eudactylocladius) dubitatus Johannsen	17	-	-	2
O. (Eudactylocladius) mixtus (Holmgren)	-	-	1	-
O. (Orthocladius) dentifer Brundin	-	-	1	-
O. (Orthocladius) manitobensis Saether	17	45	90	7
O. (Orthocladius) nigritus Malloch	-	-	2	-
O. (Orthocladius) obumbratus Johannsen	2	5	49	14
O. (Symposiocladius) lignicola Kieffer	-	2	-	5
Parakiefferella bathophila Kieffer	-	3	6	-
P. subaterrima (Malloch)	-	3	51	1
Parakiefferella sp.n.	1	-	17	-
Paraphaenocladius exagitans (Johannsen)	-	-	-	1
P. masthecus Saether	1	1	-	1

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Psectrocladius (Allopsectocladius) flavus (Joh.)	2	2	2	6
P. (Allopsectocladius) nigrus Roback	2	2	1	-
P. (Psectrocladius) barbimanus (Edwards)	-	-	10	-
P. (Psectrocladius) limbatellus (Holmgren)	1	4	8	-
P. (Psectrocladius) simulans (Johannsen)	1	4	16	2
P. (Psectrocladius) sp. A	-	3	-	-
P. (Psectrocladius) sp. B	4	4	7	-
P. (Psectrocladius) sp. C	3	1	3	-
Rheocricotopus (Psilocotopus) glabricollis (Meigen)	-	3	-	-
Smittia aterrima (Meigen)	98	1	-	3
Smittia sp.n.A	147	6	1	4
Smittia sp.n.B	-	1	-	-
Smittia sp.n.C	198	4	-	4
Synorthocladius semivirens (Keiffer)	3	1	4	55
Thienimanniella xena (Roback)	10	-	-	33
Subfamily Chironominae				
Tribe Tanytarsini				
Subtribe Zavreliina				
Stempellina sp.n. A	4	529	706	2
Stempellina sp.n. B	-	-	1	-
Stempellina sp.n. C	23	-	-	-
Subtribe Tanytarsina				
Cladotanytarsus amandus Hirvenoja[2]	-	-	-	-
C. atridorsum Kieffer	22	8	77	-
C. mancus (Walker)	5	-	6	43
C. viridiventris (Malloch)	1	2	24	12
Cladotanytarsus sp.n.[3]				
Micropsectra sp.	-	3	1	-
Neozavrelia sp.n.	-	-	1	-
Paratanytarsus laccophilus (Edwards)	-	-	-	1
Paratanytarsus sp.n.[3]				
Rheotanytarsus exiguus (Johannsen)	-	3	-	-
Tanytarsus allicis Sublette	1	42	6	-
T. confusus Malloch	2	-	-	1379
T. curticornis Kieffer	-	-	3	-
T. dendyi Sublette	-	2	2	1
T. fimbriatus Reiss & Fittkau	8	-	-	-
T. inaequalis Goetghebuer	-	2	46	-
T. medius Reiss & Fittkau	-	15	-	-
T. mendax Kieffer	2	378	4	14
T. nemorosus Edwards	-	-	-	11
T. neoflavellus Malloch	1	10	22	22
T. norvegicus Kieffer	1	1	25	-
T. recens Sublette	-	-	-	4
T. usmaensis Pagast	-	-	-	10
Tanytarsus sp.n.[4]				

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Tribe Pseudochironomini				
Pseudochironomus articaudus Saether	6	9	-	1
P. badius Saether	-	1	69	-
P. crassus Townes	-	-	1	-
P. fulviventris (Johannsen)	13	982	68	25
P. middlekauvfi Townes	-	-	-	2
P. rex Hauber	26	127	104	389
Tribe Chironomini				
Axarus scopula (Townes)	44	53	190	-
Chironomus (Camptochironomus) pallidivittatus Mall.	-	1	1	16
C. (Camptochironomus) tentans Fabricius	1	20	16	69
C. (Chaetolabis) atroviridis (Townes)	-	3	1	-
C. (Chironomus) anthracinus (Zetterstedt)	-	-	2	-
C. (Chironomus) atrella Townes	-	-	1	-
C. (Chironomus) atritibia Malloch	-	-	10	4
C. (Chironomus) crassicaudatus Malloch	3	34	-	167
C. (Chironomus) decorus Johannsen	7	42	172	48923
C. (Chironomus) maturus Johannsen	-	-	2	1
C. (Chironomus) muratensis Ryser, Scholl & Wulker	331	567	9168	1645
C. (Chironomus) plumosus (L.)	-	-	80	1
C. (Chironomus) riparius Meigen	-	-	1	1
C. (Chironomus) staegeroi Lundbeck	-	-	1	-
C. (Chironomus) tuxis Curran	-	-	-	3
Cladopelma viridula (L.)	1	45	1	-
Cryptochironomus blarina Townes	-	-	-	3
C. digitatus (Malloch)	228	144	180	43
C. psittacinus (Meigen)	103	222	39	57
Cryptochironomus sp.n. A	69	509	224	292
Cryptochironomus sp.n. B	1	-	-	6
Cryptochironomus sp.n. C	4	20	9	12
Cryptochironomus sp.n. D	-	-	-	1
Cryptotendipes casuarius (Townes)	1080	348	267	824
C. darbyi (Sublette)	342	40	55	252
C. emorsus (Townes)	-	-	-	4
C. pilicuspis Saether	-	1	-	22
Demicryptochironomus cuneatus (Townes)	3	19	4	32
Dicrotendipes botaurus (Townes)	-	-	5	-
D. leucoscelis (Townes)	-	1	-	-
D. milleri (Townes)	-	1	-	1
D. modestus (Say)	-	4	7	153
D. neomodestus (Malloch)	14	8	15	41
D. nervosus (Staeger)	1	1	2	7
Endochironomus nigricans (Johannsen)	2	6	32	7
E. subtendens (Townes)	8	1	81	74
Einfeldia synchrona Oliver	-	-	-	1
E. sp. A	-	4	-	-
E. sp. B	-	2	-	1
Harnischia curtilamellata (Malloch)	263	464	1146	205
Microchironomus nigrovittatus (Malloch)	75	2	1	8
Microtendipes caducus Townes	-	-	5	5
M. pedullus pedullus (DeGeer)	3	46	30	197

Table 2. Cont'd.

Taxa	1969 Survey South	Narrows	North	Beaver Point
Nilothauma sp. n.	-	-	5	-
Pagastiella ostanso (Webb)	-	31	-	1
Paracladopelma galaptera (Townes)	-	-	1	-
P. undine (Townes)	-	5	1	3
Parachironomus abortivus (Malloch)	27	71	26	50
P. digitalis Edwards	-	-	1	-
P. elodeae (Townes)	-	1	-	-
P. frequens (Johannsen)	154	42	143	78
P. parilis (Walker)	-	-	-	1
P. potamogeti (Townes)	-	8	8	12
P. tenuicaudatus (Malloch)	-	5	-	2
P. vitiosus (Goetghebuer)	12	15	19	8
P. sp. n. A	1	-	-	-
P. sp. n. B[2]	-	-	-	-
Paralauterborniella nigrohalterale (Malloch)	-	-	-	3
Paratendipes albimanus (Meigen)	7	31	17	7
Phaenopsectra flavipes (Meigen)	-	-	-	3
P. obediens (Johannsen)	-	-	-	2
P. punctipes (Wiedemann)	-	-	-	1
Polypedilum (Pentapedilum) sordens (v.d. Wulp)	-	-	2	60
P. (Pentapedilum) tritum (Walker)	-	-	-	3
P. (Pentapedilum) sp. n.	-	-	1	2
Polypedilum (Polypedilum) braseniae (Leathers)	-	-	-	1
P. (Polypedilum) fallax Johannsen	-	-	-	5
P. (Polypedilum) illinoense (Malloch)	-	-	-	2
P. (Polypedilum) laetum (Meigen)	-	-	-	4
P. (Polypedilum) nubeculosum (Meigen)	-	-	2	9
P. (Tripodura) albinodus Townes	-	2	5	-
P. (Tripodura) digitifer Townes	4	3	2	43
P. (Tripodura) griseopunctatum (Malloch)	-	2	-	-
P. (Tripodura) halterale (Coquillett)	-	-	-	5
P. (Tripodura) scalaneum (Schrank)	-	3	1	-
P. (Tripodura) simulans (Townes)	688	684	197	201
Saetheria tylus (Townes)	-	-	-	2
Stenochironomus (Stenochironomus) hilaris (Walker)	-	-	-	1
Stictochironomus devinctus (Say)	3	-	-	9
S. pictulus (Meigen)	1	7	-	11
S. rosenschoeldi (Zetterstadt)	2	17	15	2
Synendotendipes impar (Walker)	-	-	-	1
Tribelos jucundum (Walker)	3	1	1	34
Xenochironomus xenolabis (Kieffer)	9	4	-	25

1. Totals of males only unless otherwise specified.
2. Females or laboratory reared specimens.
3. 6 new species to be described.
4. 9 new species to be described.

Table 3. Comparison of numbers of taxa of Lake Winnipeg Ephemeroptera and Trichoptera collected in 1969 and 1971 with that reported by Neave (1934) for 1927 to 1931. Similarity of communities were calculated excluding species reported from rivers by Neave (1934), as these habitats were not sampled in 1969 and 1971.

	Neave 1927-31					1969 and 1971			Shared fauna	
	Open	In-shore	Rivers	Total	Total[a] (less rivers)	Open	Open/ Shore	Total[b]	Number[c]	% Similarity[1]
Ephemeroptera										
Family	1	6	10	10	7	1	8	8	7	88
Genus	1	12	14	17	12	1	14	14	11	73
Species	2	17	15	22	17	2	18	18	13	62
Trichoptera										
Family	2	8	9	10	8	5	11	11	8	73
Genus	2	17	15	23	17	9	31	32	17	58
Species	2	26	23	40	27	11	87	88	22	25

[1] % Similarity = c/((a-c)+(b-c)+c)·100, where:
c = Number of species in common.
a = total number species from Neave (1934).
b = total number species from present study.

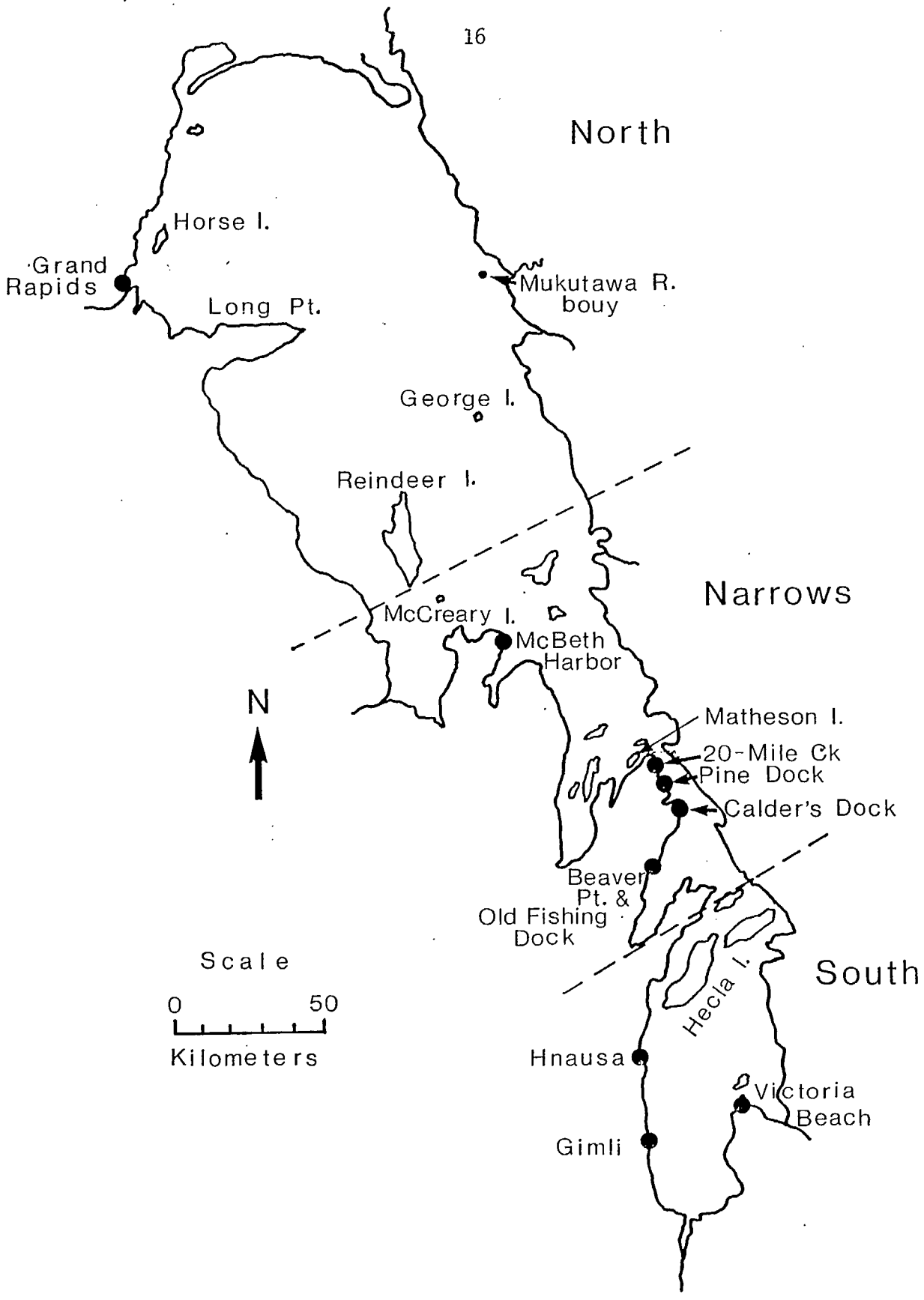


Fig. 1. Map of Lake Winnipeg showing the three lake basins, and the sampling stations of the 1969 and 1971 light trappings.

Fig. 2. Seasonal succession of adult Ephemeroptera collected in light traps from Lake Winnipeg during 1971. Dark lines indicate peak periods of occurrence.

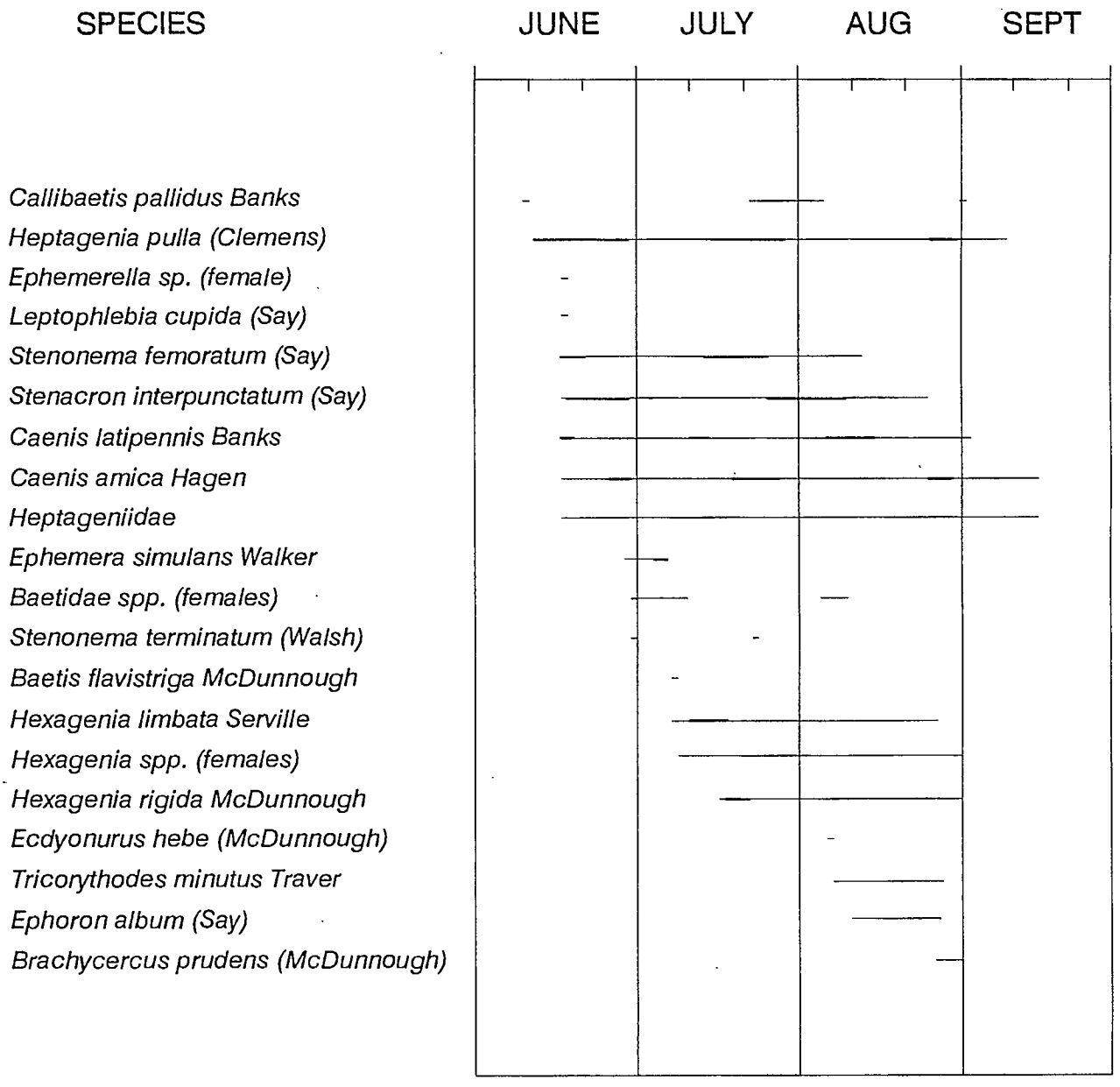
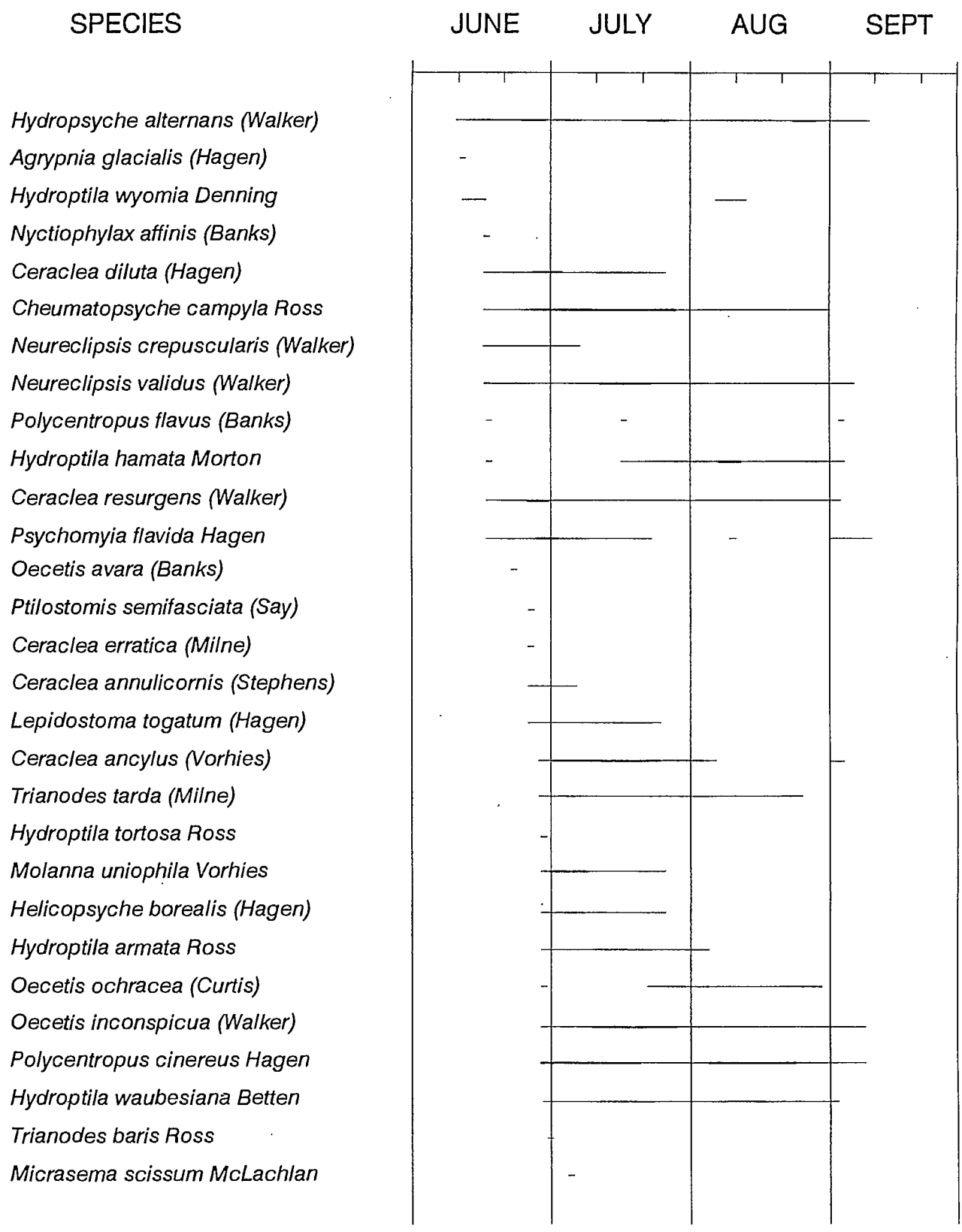
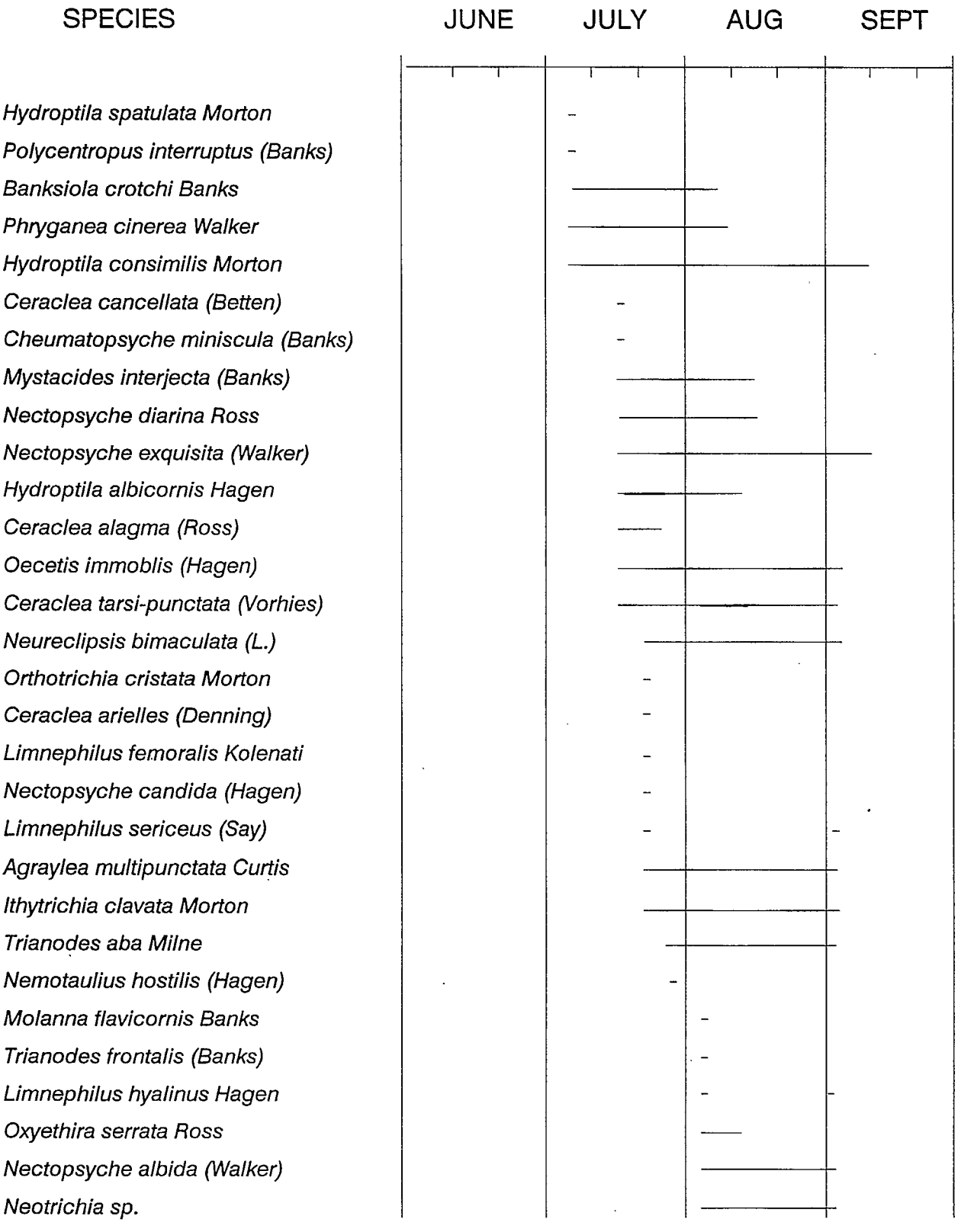


Fig. 3. Seasonal succession of adult Trichoptera collected in light traps from Lake Winnipeg during 1971. Dark lines indicate peak periods of occurrence.




SPECIES
JUNE
JULY
AUG
SEPT
Hydroptila spatulata Morton
Polycentropus interruptus (Banks)
Banksiola crotchi Banks
Phryganea cinerea Walker
Hydroptila consimilis Morton
Ceraclea cancellata (Betten)
Cheumatopsyche miniscula (Banks)
Mystacides interjecta (Banks)
Nectopsyche diarina Ross
Nectopsyche exquisita (Walker)
Hydroptila albicornis Hagen
Ceraclea alagma (Ross)
Oecetis immoblis (Hagen)
Ceraclea tarsi-punctata (Vorhies)
Neureclipsis bimaculata (L.)
Orthotrichia cristata Morton
Ceraclea arielles (Denning)
Limnephilus femoralis Kolenati
Nectopsyche candida (Hagen)
Limnephilus sericeus (Say)
Agraylea multipunctata Curtis
Ithytrichia clavata Morton
Trianodes aba Milne
Nemotaulius hostilis (Hagen)
Molanna flavicornis Banks
Trianodes frontalis (Banks)
Limnephilus hyalinus Hagen
Oxyethira serrata Ross
Nectopsyche albida (Walker)
Neotrichia sp.

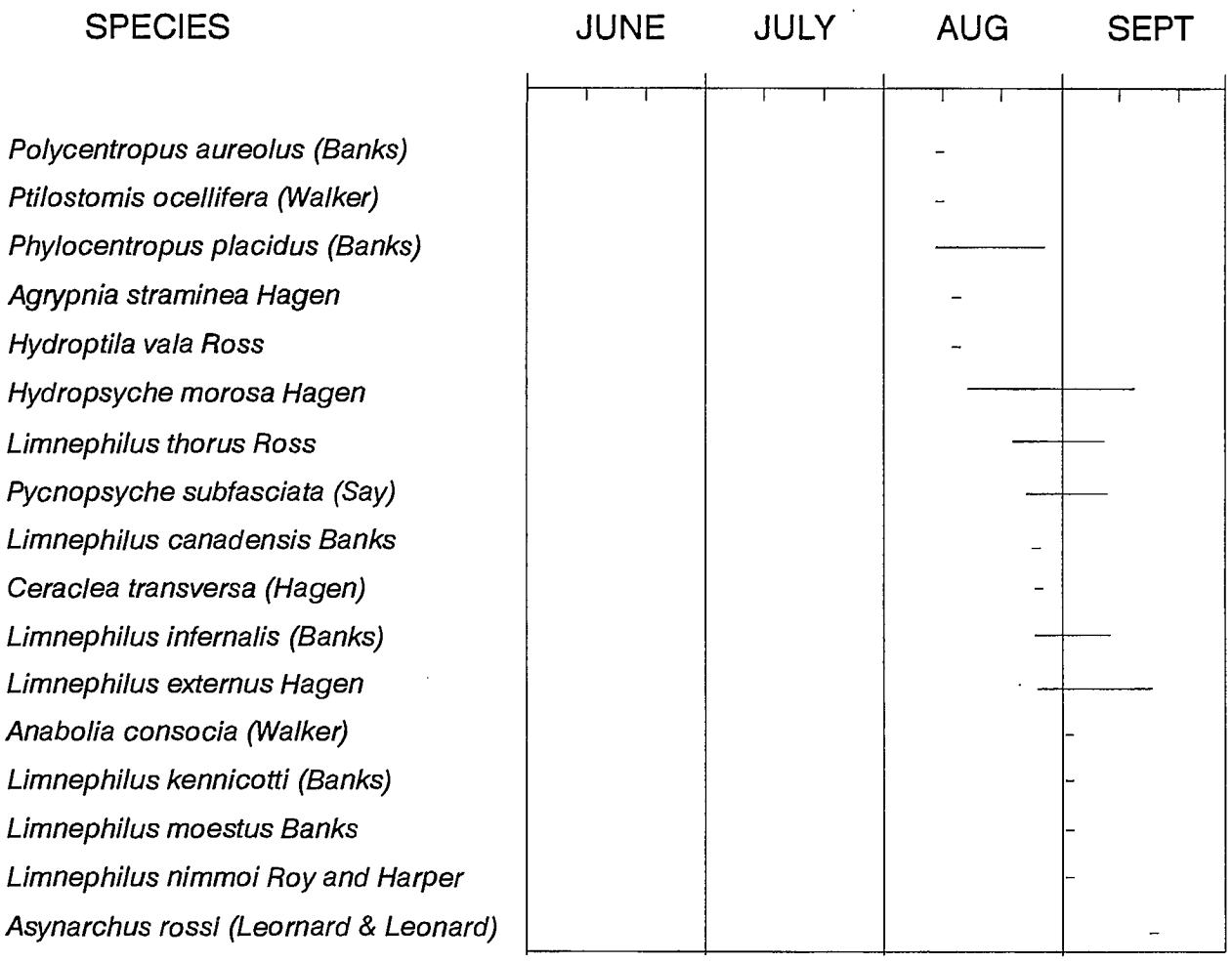
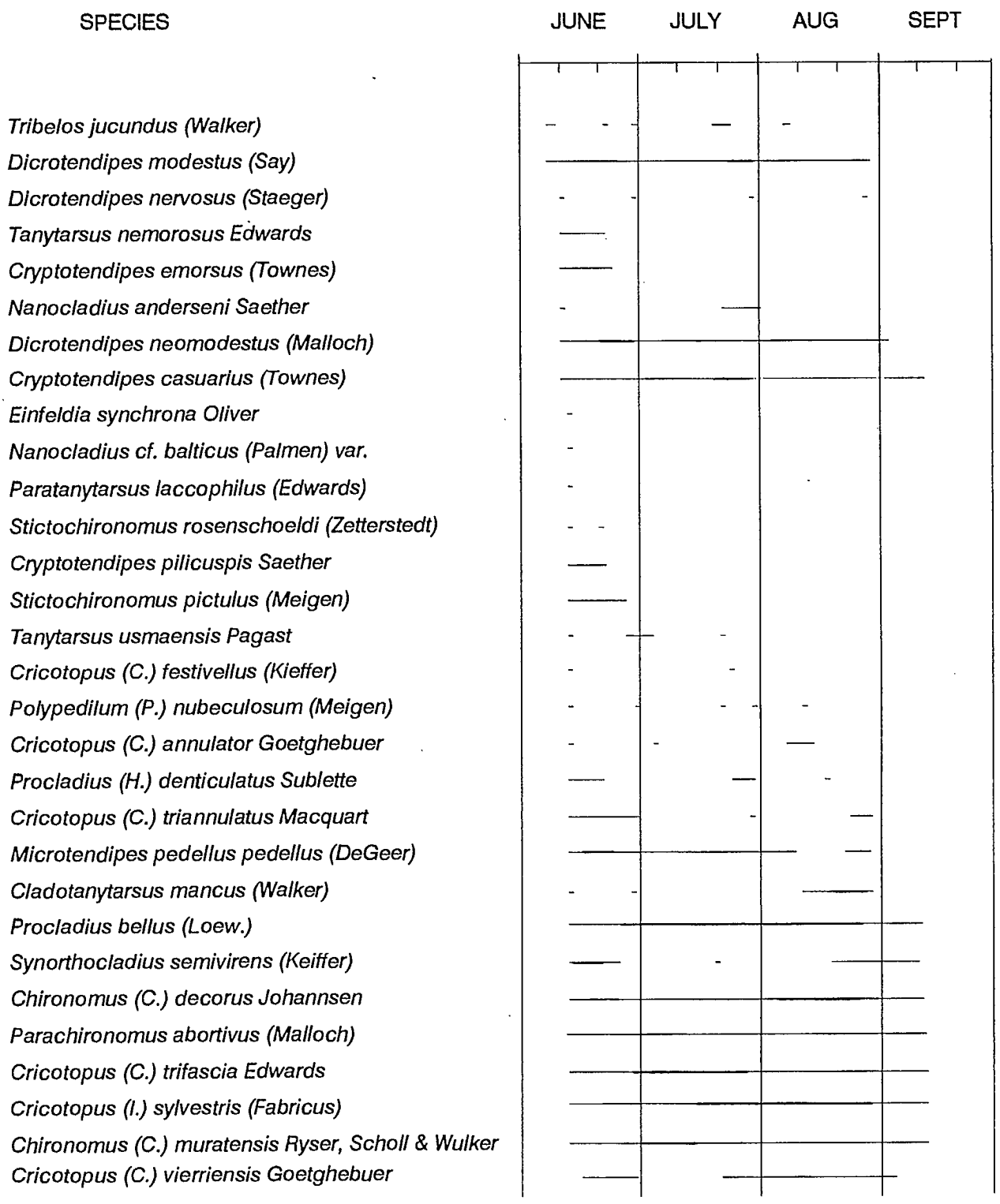
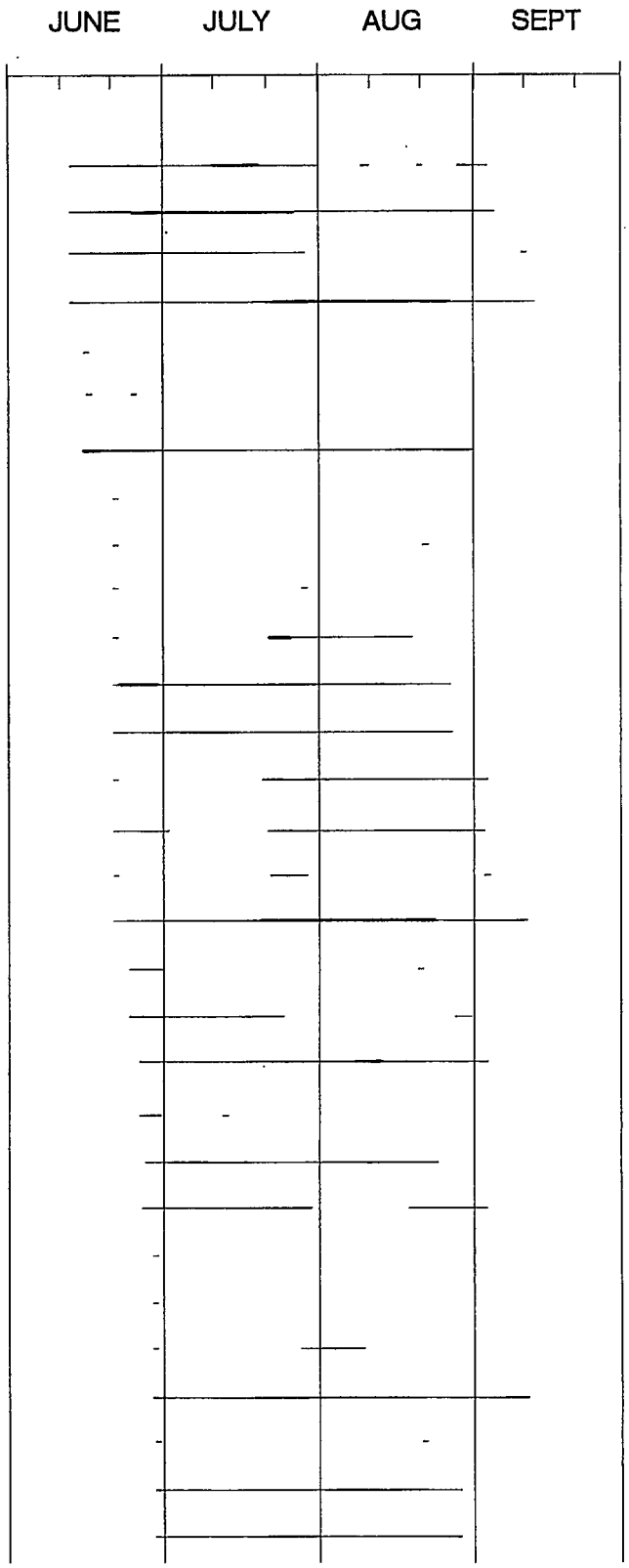

SPECIES
JUNE
JULY
AUG
SEPT
Polycentropus aureolus (Banks)
Ptilostomis ocellifera (Walker)
Phylocentropus placidus (Banks)
Agrypnia straminea Hagen
Hydroptila vala Ross
Hydropsyche morosa Hagen
Limnephilus thorus Ross
Pycnopsyche subfasciata (Say)
Limnephilus canadensis Banks
Ceraclea transversa (Hagen)
Limnephilus infernalis (Banks)
Limnephilus externus Hagen
Anabolia consocia (Walker)
Limnephilus kennicotti (Banks)
Limnephilus moestus Banks
Limnephilus nimmoi Roy and Harper
Asynarchus rossi (Leornard & Leonard)

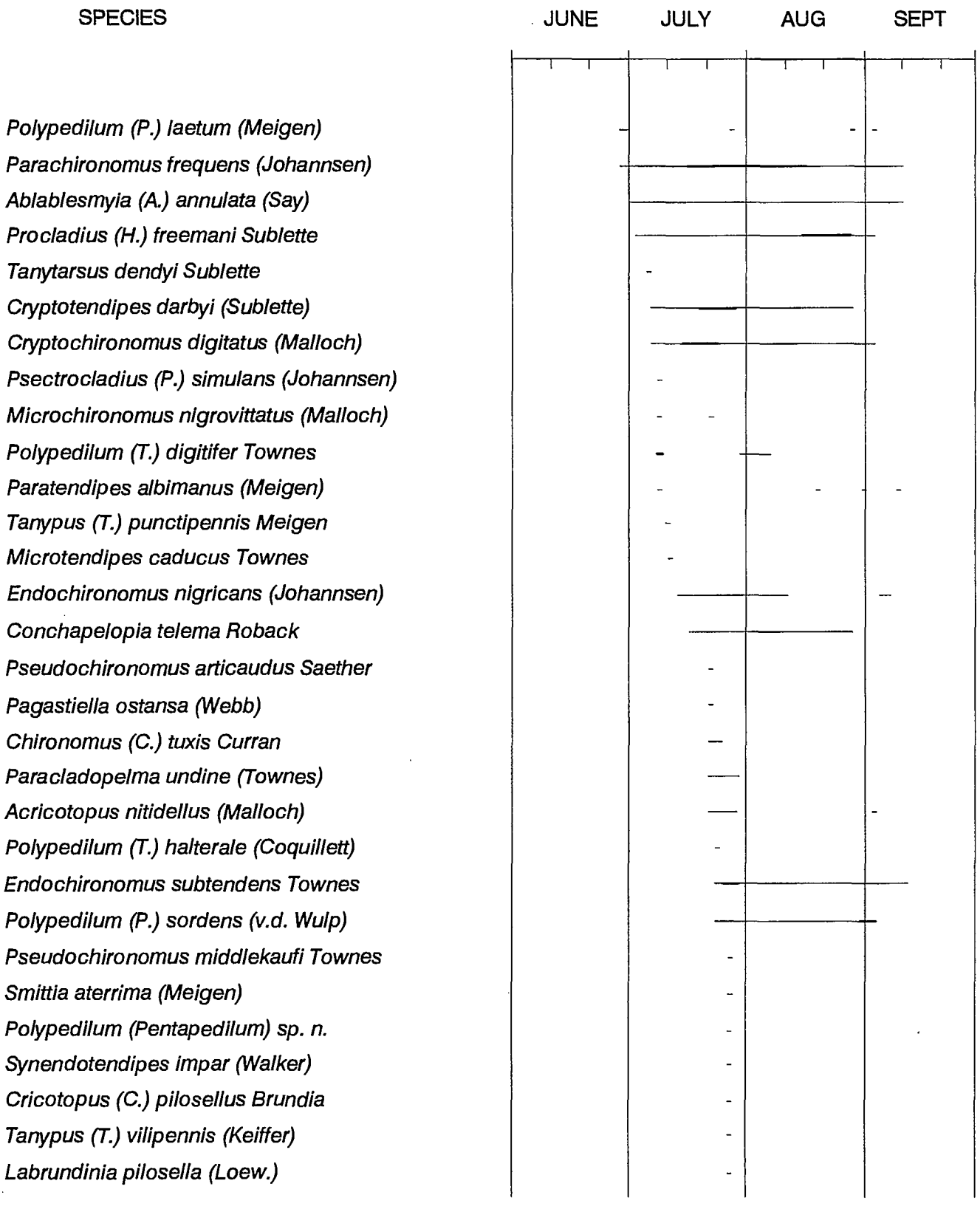
Fig. 4. Seasonal succession of adult Chironomidae collected in light traps from Lake Winnipeg during 1971. Dark lines indicate peak periods of occurrence.

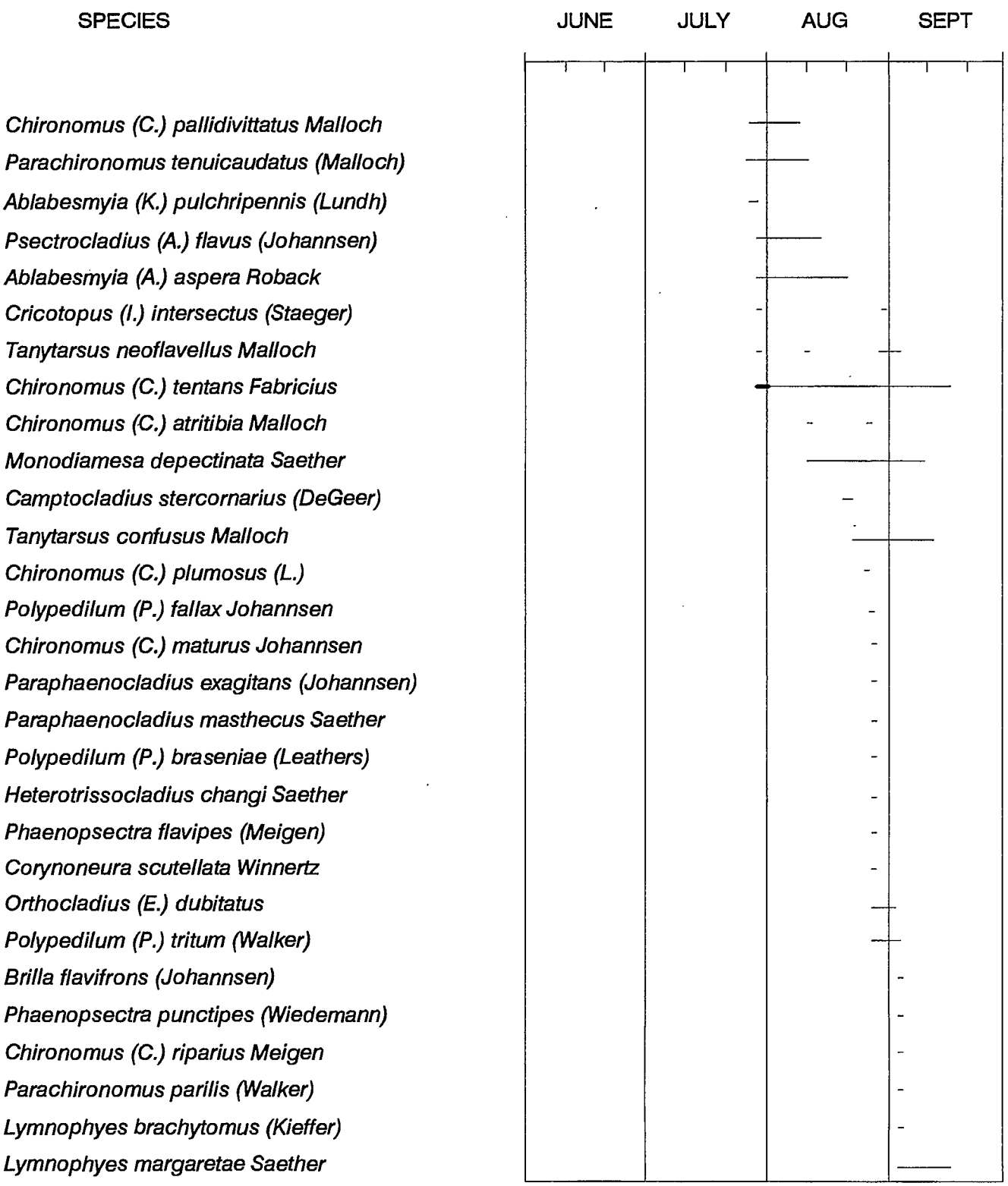


SPECIES



Polypedilum (T.) simulans (Townes)
Chironomus (C.) crassicaudatus Malloch
Ablablesmyia (A.) manilis (L.)
Procladius (H.) sublettei Roback
Cryptochironomus blarina Townes
Phaenopsectra obediens (Johannsen)
Cryptochironomus stylifera (Johannsen)
Clinotanypus (C.) pinquis (Loew)
Cladotanytarsus viridiventris (Malloch)
Saetheria tylus (Townes)
Thienimanniella xena (Roback)
Pseudochironomus rex Hauber
Ablablesmyia (A.) mallochi (Walley)
Ablablesmyia (K.) illoensis (Malloch)
Orthocladius (O.) manitobensis Saether
Parachironomus potamogeti (Townes)
Cricotopus (C.) bicinctus (Meigen)
Paralauterborniella nigrohalterale (Malloch)
Orthocladius (O.) obumbratus Johannsen
Harnischia curtilamellata (Malloch)
Pseudochironomus fulviventris (Johannsen)
Xenochironomus xenolabis (Kieffer)
Corynoneura lobata Edwards
Polypedilum (P.) illoense (Malloch)
Stictochironomus devinctus (Say)
Guttipelopia guttipennis (v.d. Wulp)
Parachironomus vitiosus (Goetghebuer)
Nanocladius cf. parvulus (Kieffer)
Demicryptochironomus cuneatus (Townes)
Procladius (H.) culiciformis (L.)


SPECIES
JUNE
JULY
AUG
SEPT
Polypedilum (P.) laetum (Meigen)
Parachironomus frequens (Johannsen)
Ablablesmyia (A.) annulata (Say)
Procladius (H.) freemani Sublette
Tanytarsus dendyi Sublette
Cryptotendipes darbyi (Sublette)
Cryptochironomus digitatus (Malloch)
Psectrocladius (P.) simulans (Johannsen)
Microchironomus nigrovittatus (Malloch)
Polypedilum (T.) digitifer Townes
Paratendipes albimanus (Meigen)
Tanypus (T.) punctipennis Meigen
Microtendipes caducus Townes
Endochironomus nigricans (Johannsen)
Conchapelopia telema Roback
Pseudochironomus articaudus Saether
Pagastiella ostansa (Webb)
Chironomus (C.) tuxis Curran
Paracladopelma undine (Townes)
Acricotopus nitidellus (Malloch)
Polypedilum (T.) halterale (Coquillett)
Endochironomus subtendens Townes
Polypedilum (P.) sordens (v.d. Wulp)
Pseudochironomus middlekaufi Townes
Smittia aterrima (Meigen)
Polypedilum (Pentapedilum) sp. n.
Synendotendipes impar (Walker)
Cricotopus (C.) pilosellus Brundia
Tanypus (T.) vilipennis (Keiffer)
Labrundinia pilosella (Loew.)


SPECIES
JUNE
JULY
AUG
SEPT
Chironomus (C.) pallidivittatus Malloch
Parachironomus tenuicaudatus (Malloch)
Ablabesmyia (K.) pulchripennis (Lundh)
Psectrocladius (A.) flavus (Johannsen)
Ablabesmyia (A.) aspera Roback
Cricotopus (I.) intersectus (Staeger)
Tanytarsus neoflavellus Malloch
Chironomus (C.) tentans Fabricius
Chironomus (C.) atritibia Malloch
Monodiamesa depectinata Saether
Camptocladius stercornarius (DeGeer)
Tanytarsus confusus Malloch
Chironomus (C.) plumosus (L.)
Polypedilum (P.) fallax Johannsen
Chironomus (C.) maturus Johannsen
Paraphaenocladius exagitans (Johannsen)
Paraphaenocladius masthecus Saether
Polypedilum (P.) braseniae (Leathers)
Heterotrissocladius changi Saether
Phaenopsectra flavipes (Meigen)
Corynoneura scutellata Winnertz
Orthocladius (E.) dubitatus
Polypedilum (P.) tritum (Walker)
Brilla flavifrons (Johannsen)
Phaenopsectra punctipes (Wiedemann)
Chironomus (C.) riparius Meigen
Parachironomus parilis (Walker)
Lymnophyes brachytomus (Kieffer)
Lymnophyes margaretae Saether

Appendix 1a. Revision of Neave's (1934) Ephemeroptera species list with current taxonomic status. Numbers are used for cross-reference. Species were collected by Neave in habitats designated by the letter (O = open water, S = shore-line, R = river). Species collected in the present study are indicated by an asterisk.

Neave (1934)	Present taxonomic position
Ephemeridae	Ephemeridae
1. Ephemera simulans Walker (S)*	1, 2, 3, unchanged
2. Hexagenia limbata Serville (SOR)*	Polymitarcidae
3. H. rigida McDunnough (SOR)*	4. unchanged
4. Ephoron album (Say) (SR)*	Leptophlebiidae
Baetinae	5. Leptophlebia cupida (Say)
5. Blasturus cupidus (Say) (SR)*	6. L. nebulosa (Walker)
6. B. nebulosus (Walker) (S)	Ephemerellidae
7. Ephemerella bicolor (Clemens) (R)	7. unchanged
8. Caenis forcipata McDunnough (S)*	Caenidae
9. C. simulans McDunnough (SR)*	8. Caenis latipennis Banks
10. Baetis spp. (SR)*	9. C. amica Hagen
11. Centroptilum quaesitum McDunnough (S)	Baetidae
12. C. infrequens McDunnough (S)	10. unchanged
13. Callibaetis ferrugineus (Walsh) (SR)	11. Procloeon quaesitum (McDunnough)
14. Baetisca bajkovi Neave (R)	12. P. pennulatum (Eaton)
Heptageniidae	13. unchanged
15. Isonychia sp.(R)	Baetiscidae
16. Siphlonurus alternatus (Say) (R)	14. Baetisca lacustris McDunnough
17. Siphloplecton basale (Walker) (R)	Siphlonuridae
18. Heptagenia hebe McDunnough (S)*	15, 16. unchanged
19. H. pulla (Clemens) (SR)*	Metrotopodidae
20. Stenonema tripunctatum Banks (SR)*	17. unchanged
21. S. terminatum (Walsh) (S)*	Heptageniidae
22. S. interpunctatum Walsh (SR)*	18. Ecdyonurus hebe McDunnough
	19. unchanged
	20. Stenonema femoratum (Say)
	21. unchanged
	22. Stenacron interpunctatum (Say)

Appendix 1b. Revision of Neave's (1934) Trichoptera species list with current taxonomic status. Numbers are used for cross-reference. Species were collected by Neave in habitats designated by the letter (O = open water, S = shore-line, R = river). Species collected in the present study are indicated by an asterisk.

Neave 1934	Present taxonomic position
Phryganeidae	Phryganeidae
1. Phryganea cinerea Walker (SO)*	1. unchanged
2. Prophryganea straminea Hagen (S)*	2. Agrypnia straminea Hagen
3. P. bradorata Milne (S)	3, 4. Agrypnia colorata (Hagen)
4. P. colorata Hagen (S)	5,6,7,8. unchanged
5. Banksiola concenata Walker (R)	9. Fabria inornata (Banks)
6. Ptilostomis ocellifera Walker (R)*	Limnephilidae
7. P. postica Walker (SR)	10,11,12. unchanged
8. P. semifasciata Say (S)*	13,16. Limnephilus parvulus (Banks)
9. Neuronia inorata Banks (S)	14. unchanged
Limnephilidae	15. Platycentropus radiatus (Say)
10. Limnephilus externus Hagen (R)*	17. Phanocelia canadensis (Banks)
11. L. hyalinus Hagen (R)*	Philopotamidae
12. L. ornatus Banks (R)*	18. Chimarra aterrima Hagen
13. L. roberti Banks (S)*	Brachycentridae
14. Anabolia bimaculata Walker (R)	19. unchanged
15. Platycentropus maculipennis Kolenati (R)	Helicopsychidae
16. Apolopsyche pallida Banks (S)*	20. unchanged
17. Apatania canadensis Banks (R)	Lepidostomatidae
Philopotamidae	21. unchanged
18. Chimarrha aterrima Hagen (R)	Molannidae
Sericostomatidae	22. unchanged
19. Brachycentrus sp. (R)	Leptoceridae
20. Helicopsyche borealis Hagen (SR)*	23. Ceraclea resurgens (Walker)
21. Lepidostoma sp. (S)*	24. C. ancylus (Vorhies)
Molannidae	25. C. tarsi-punctata (Vorhies)
22. Molanna flavicornis Banks (OSR)*	26. unchanged
Leptoceridae	27,28. Nectopsyche albida (Walker)
23. Leptocerus resurgens Walker (S)*	29. O. inconspicua (Walker)

Appendix 1b. Cont'd.

Neave 1934	Present taxonomic position
24. L. ancylus Vorhies (S)*	30. O. ochracea (Curtis)
25. L. tarsi-punctatus Vorhies (SR)*	31,32. unchanged
26. Trianodes sp. (S)*	Hydropsychidae
27. Leptocella albida Walker (R)*	33. unchanged
28. L. uwarowii Koltenati (S)*	34. Hydropsyche morosa Hagen
29. Oecetis incerta Walker (S)*	35. H. alternans (Walker)
30. Oecetis vicaria Neave (S)*	36. unchanged
31. Mystacides sepulchralis Walker (S)*	37. Cheumatopsyche speciosa (Banks)
32. M. sp.(S)	38. unchanged
Hydropsychidae	Polycentropodidae
33. Hydropsyche alternans Walker (R)*	39. Polycentropus cinereus (Hagen)
34. H. chlorotica Hagen (R)*	40. P. flavus (Banks)
35. H. recurvata Banks (SR)*	41. P. sp
36. H. scalaris Hagen (SR)*	42,43. Phylocentropus placidus (Banks)
37. Hydropsychoides speciosa Banks (R)	44. Neureclipsis validus (Walker)
38. H. sp. (R)	
Polycentropodidae	
39. Plectrocnemia canadensis Banks (S)*	
40. Holocentropus flavus Banks (S)*	
41. H. sp.(S)	
42. Phylocentropus maximus Vorhies (R)*	
43. P. placidus Banks (S)*	
44. Neureclipsis signata Banks (SR)*	