

No. 15

REPORTS OF THE JASPER PARK LAKES INVESTIGATIONS, 1925-26
IV. AQUATIC INSECTS

BY

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The following records are based on material collected at Jasper Park in 1925 and 1926 by parties of investigators working under the direction of Professor Chas. H. O'Donoghue at the request of the Biological Board of Canada. The stone-flies and aquatic beetles of this region have been dealt with already in previous reports. Owing to the small number of collectors and the wide scope of the work in which they were engaged, it was found impossible to devote an equal amount of attention to all the orders of aquatic insects. The present paper deals mainly with the Ephemeroptera and Trichoptera, two orders which were found to be of special importance as food for trout (see Report No. V, Food and growth of Jasper Park Fishes, Neave and Bajkov) but a few records of Odonata, Hemiptera and Diptera are also included.

The determination of most of these insects has been kindly made by, or through the agency of, the Dominion Entomological Branch. Individual acknowledgments are made under the headings of the different orders.

EPHEMEROPTERA

Between 30 and 40 species were collected and have been kindly examined by Dr. J. H. McDunnough. The distribution of the adults was as follows:

Ephemera sp. (probably *simulans* Walk.) Pyramid Lake.

Leptophlebia debilis Walk. Lac Beauvert.

L. pallipes Hag. Maligne Lake.

Leptophlebia sp. Lakes Edith, Beauvert, Pyramid.

Leptophlebia sp. Maligne Lake; Medicine Lake.

Blasturus cupidus Say. Annette Lake.

Ephemerella infrequens McD. Annette Lake.

E. doddsi Needh. Medicine Lake; Maligne Lake.

E. tibialis McD. Maligne Lake 29, viii, 26, female.

Drunella grandis Eat. Maligne Lake.

Drunella sp. Jacques Lake; Medicine Lake.

Baetis parvus Dodds. Caledonia Creek.

Baetis sp. Maligne Lake.

Pseudocloeon sp. Medicine Lake.

Callibaetis coloradensis Dodds (?) Oldfort Pt.; Lac Beauvert; Lake Annette; Athabasca River; Buffalo Prairie Lake.

C. tessellatus Hag. (?) Pyramid Lake; Annette Lake and distr.

C. pallidis Bks. (?) Pyramid Lake.

Siphonurus occidentalis Eat. Abundant at Medicine Lake, Jacques Lake and Maligne Lake but not frequent at lower altitudes. (See note under "Nymphs").

- Ameletus subnotatus* Eat. Maligne Lake.
A. velox Dodds. Maligne Lake.
A. valilus McD. Maligne Lake.
A. similior McD. Jacques Lake 4, ix, 26 (Holotype).
Ameletus sp. Medicine Lake; Maligne Lake; Lake Cavell.
Ametropus neavei McD. Oldfort Pt., 25, vii, 26, a single female (Holotype).
 This genus has not previously been recorded from North America.
Iron tollandi Dodds. Maligne River below Medicine Lake, 12, ix, 26.
I. longimanus Eat. Medicine Lake; Maligne Lake.
I. grandis McD. Maligne Lake.
Iron sp. Summit Lake.
Rhithrogena doddsi McD. Maligne Lake.
Rhithrogena brunnea Hag. Maligne Lake.
Cinygma ramaleyi Dodds. Maligne River below Medicine Lake, 12, ix, 26;
 Jacques Lake.

Nymphs

Specific determinations of the nymphs is impossible at present in view of the very limited knowledge concerning these immature forms. Baetine nymphs of some sort occur in practically all the waters of the region.

- Ephemera* sp. Common in Pyramid Lake, being frequently dredged from a depth of several metres.
Leptophlebia sp. Wabasso Creek, 25, viii, 26.
Blasturus sp. Common along the stony shores of Annette Lake.
Ephemerella. Members of this genus were collected from creeks flowing into Jacques Lake and Medicine Lake, the Upper Maligne River, Minaga Creek and the Fraser River at Lucerne, B.C.
Caenis sp. Oldfort Point and district.
Baetis. Nymphs belonging to this genus occurred in Caledonia Creek, Maligne River and at Yellowhead Lake.
Callibaetis. Found commonly in waters at comparatively low altitudes, such as Buffalo Prairie Lake and the beaver dams at Oldfort Point. The only locality in which it was observed above 4,000 ft. was a beaver pool near Medicine Lake which was shallower and contained more vegetation than the natural lakes at this altitude.
Siphonurus occidentalis Eat. The early stages of this species received some attention because of their great abundance at the localities mentioned previously, and owing to the fact that they constitute a very large proportion of the food of the Dolly Varden trout at Jacques Lake. The nymphs inhabit both still and running water and though commonly feeding at the bottom can execute rapid, fish-like darting movements. The emergence of the subimagines takes place over a long period (beginning of July to end of August at Jacques Lake and Medicine Lake). In these two localities they are so abundant that the abandoned skins of the last nymphal instar form a continuous incrustation over rocks, herbage, etc., along the shore-line. In the case of Medicine Lake, the

level of the water falls rapidly during the summer, and since the nymphs do not emerge from the water during the night, a series of bands of these nymphal skins is thus left above the receding water, each band corresponding to one day during the period of emergence. The insect remains in the subimaginal condition for two or three days, according to temperature, etc., and the total aërial life of one bred specimen extended over eleven days.

Siphonurus sp. Caledonia Lake; Buffalo Prairie Lake.

Ameletus. Lake Cavell; Upper Maligne River; Medicine Lake; Annette Lake(?).

In addition to the above, unidentified Baetinae were collected from Buffalo Prairie Lake, Lac Beauvert and a glacial creek flowing into the upper end of Maligne Lake.

Heptageninae were common in the rapid streams flowing into Medicine Lake and Jacques Lake (including *Iron* sp.), the Upper Maligne River and also along the wave-beaten shores of Maligne Lake and Yellowhead Lake.

TRICHOPTERA

The following determinations were made by Professor C. Betten.

Imagines

Phryganeidae. This family, the larvae of which are addicted to still water containing vegetation, does not appear to be well represented in the district.

Phryganea improba Hag. Summit Lake, 9, viii, 26. Fragments of a member of this family were found in the stomach of a rainbow trout from Caledonia Lake.

Limnephilidae

Limnephilus sp. Jacques Lake, August 1926, plentiful in marshy area at south end of lake.

Anabolia 8.* Common at Maligne, Medicine, Jacques and Summit Lakes.

Anabolia 9. Marjorie Lake; Dorothy Lake. At the former locality numerous specimens were observed all resting on the brown tips of *Scirpus* leaves, which they matched in colour to a remarkable degree, 20, viii, 26.

Anabolia 10. Jacques Lake 3, ix, 26; Annette Lake, ix, 26.

Anabolia 11. Jacques Lake 24, vii, 26 (female).

Anabolia 12. Maligne Lake, 25-27, vii, 26.

Dicosmoecus gilvipes Hag. Maligne Lake, 27, viii, 26; Jacques Lake, 24, vii, 26.

Homophylax flavipennis Bks. Creek at Medicine Lake, 4, ix, 26 (female).

Ecclisomyia conspersa Bks. Maligne Lake, 10-11, viii, 26.

Apatania sp. Maligne Lake, 20-22, vii, 26 (female).

Apatania sp. Creek at Medicine Lake, 14, vii, 26 (male, female).

Hesperophylax occidentalis Bks. Maligne Lake, 20-22, vii, 26 (female).

*These numbers are Professor Betten's.

Rhyacophilidae

Rhyacophila spp. were common throughout the district in the neighbourhood of running water. Jacques Lake; Maligne Lake; Medicine Lake; Caledonia Creek; Minaga Creek; Yellowhead Lake, etc.

Glossosoma sp. Annette Lake, 3, vii, 26 (sweeping), male.

Sericostrimatidae

Atomyia(?) sp. a. Annette Lake; Edith Lake; Pyramid Lake; Caledonia Lake.

Atomyia(?) sp. b. Edith Lake, 18, viii, 26.

Lepidostomatinea sp. Cabin Creek, 30, vii, 26.

Leptoceridae

Mystacides sepulchralis Walk. Very common on the lower lakes throughout the summer; Annette Lake; Edith Lake; Marjorie Lake; Pyramid Lake; Yellowhead Lake.

M. longicornis Bks. Pyramid Lake, 29, vii, 26; Mildred Lake, 26, vii, 26.

Oecetis avara Bks. Annette Lake, July.

O. incerta Walk. Edith Lake, 16, vii, 26. Members of the family also occurred in the stomach-contents of rainbow trout from Oldfort Point.

Molannidae

Molanna flavicornis Bks. Edith Lake; Annette Lake; Mildred Lake, July.

Hydropsychidae

Hydropsychodes speciosa Bks. Pyramid Creek; Caledonia Creek. The family also occurs at Jacques Lake.

Polycentropidae

Plectrocnemia canadensis Bks. Annette Lake, early in July.

P. sp. Annette Lake, July and August.

Holocentropus flavus Bks. Edith Lake, 16, vii, 26.

Nyctiophylax vestitus Hag. Annette Lake, 3 and 5, vii, 26.

Polycentropidae were also obtained from Oldfort Point from the alimentary canals of rainbow trout.

Philopotamidae

Oldfort Point; Caledonia Lake; Pyramid Lake. July and August. "The specimens seem to belong to this family though the venation differs decidedly from every described genus" (Betten, *in lit.*).

Hydroptilidae

A form belonging to this family was captured in a light-trap at Annette Lake, 3, vii, 26.

Larvae

Little can be said concerning the numerous larval forms which were collected.

Limnephilidae

Immature forms belonging to this family were found in every lake and stream examined.

Clyphotaelius sp. Larvae bearing flat cases made of broad leaves were collected at Buffalo Prairie. This type of case has not previously been recorded from America.

Rhyacophilidae

Common in rapid streams throughout the district.

Sericostomatidae

Lepidostomatinae. Caledonia Lake (inlet creek).

Leptoceridae

Characteristic members of the inshore fauna of Lakes Annette, Edith and Beauvert, living among stones near the water's edge.

Molannidae

The characteristic flanged cases of a species of *Molanna* (*M. flavicornis*?) were found on sandy areas in Lakes Patricia and Caledonia.

Hydropsychidae

The larva of a *Hydropsyche* or *Hydropsychodes* was common in the outlet creek from Pyramid Lake and in the upper Fraser River near Lucerne, B.C.

Philopotamidae

Pyramid Creek.

Hydroptilidae

Three species of larvae belonging to this little-known family of micro-caddis-flies were obtained. One (*Oxyethira* sp.) is a minute form living inside a transparent case shaped like a milk-bottle but flattened at the broad end. It was found in great numbers in the alimentary tracts of rainbow trout from Buffalo Prairie Lake, nearly always in company with the crustacean *Eurycercus lamellatus* Müll.

Two other species with opaque, flat cases inhabit running water at Oldfort Point and the upper Fraser River respectively. These forms are also eaten by trout despite their small size.

The following table shows the number of species of Ephemeroptera and Trichoptera obtained at the localities which were visited most frequently.

	Annette	Edith	Pyramid	Caledonia	Jacques	Medicine	Maligne
Ephemeroptera	4	2	4	1	3	7	14
Trichoptera	10	6	5	5	6	4	7

It will be seen that the Trichoptera show a relatively even distribution as regards number of species at each locality. The Ephemeroptera on the other hand are distributed much more irregularly, with Maligne Lake furnishing by far the longest list of species. Though these discrepancies might be partly explained by the brief aerial life of the adult may-flies, causing them to be overlooked at certain localities, it may be remarked that a comparison based on the nymphal forms alone shows approximately the same distribution with Maligne Lake and Medicine Lake still first and second in number of species. It is of interest to note that these two lakes are two of the highest and coldest of the waters examined, Maligne being the more extreme in each respect (under summer conditions).

ODONATA

The following list is admittedly incomplete, both as regards number of species recorded and as regards the distribution of the forms listed here. The material, almost wholly nymphal, was determined by Dr. E. M. Walker.

- Coenagrion angulatum* E. M. Walker(?). Lake Patricia, 1925, fairly common; Lake Caledonia, 1925.
- Enallagma boreale* Selys. Trefoil Lake, 1926 (female).
- Ophiogomphus* sp. Caledonia Creek.
- Aeshna interrupta* E. M. Walker. Trefoil and Dorothy Lakes, 1925, near shore.
- A. palmata* Hag. Fairly common in the standing waters of Lakes Patricia, Trefoil, Marjorie and Mildred.
- A. umbrosa* E. M. Walker. Annette Lake; Pyramid Lake; Trefoil Lake.
- Aeshna* sp. Marjorie Lake. *Aeshna* nymphs also occurred in some numbers at Oldfort Point.
- Cordulia shurtleffi* Scudder. Marjorie Lake.
- Somatochlora albicincta* Burm. Pond between Jasper and Buffalo Prairie.
- S. hudsonica* Hag. Caledonia Lake, 1925.
- S.* sp. Marjorie Lake.

HEMIPTERA

- The Hemipterous material was examined by Professor H. B. Hungerford.
- Gerris rufoscutellatus* Latr. Collected at a number of the smaller lakes and pools near Jasper. Mildred Lake; Oldfort Point; small lake near Athabasca.
- A small unidentified Gerrid was found in numbers at Mildred Lake, Trefoil Lake and Edith Lake.
- Notonecta insulata* Kisby. A *Notonecta*, probably this species, was abundant in many of the smaller lakes but was not noted from any of the higher waters examined. Trefoil Lake; Marjorie Lake; Buffalo Prairie, etc.
- Callicorixa vulnerata* Uhl. Buffalo Prairie, 1925 and 1926. Other Corixidae occurred at Lac Beauvert, Lake Annette, Lake Marjorie, Summit Lake and in a beaver pool near Medicine Lake.

DIPTERA

The following brief notes concern only those families which commonly occur in the food supply of the fish of the region. Much help with these insects was given by Mr. C. H. Curran and other members of the Dominion Entomological Branch.

Dixidae

Dixa sp. Oldfort Point and Buffalo Prairie (larvae).

Culicidae.

Larvae of *Corethra* were collected at Buffalo Prairie.

Chironomidae

As usual this family proved to be the most important. The larvae of *Chironomus* spp. occurred in all the lakes and most of the creeks that were examined. Tanypine larvae were nearly as widespread and were even found in the very cold, silt-laden waters of a glacial torrent at Maligne Lake.

Tanytarsus larvae were found in Annette Lake, Buffalo Prairie Lake and Jacques Lake.

Metricnemus sp. (larvae). Caledonia Lake.

Protenthes culiciformis L. Pupae and imagines common at Jacques Lake in July.

Ceratopogoninae (aquatic) were found in the larval condition at Buffalo Prairie Lake.

A number of adult Chironomidae attracted by light at Lake Annette included:

Tanypus monilis L.

T. prudens Walley.

Tanytarsus sp. (*flavellus* group).

T. sp. near *dives* Joh.

Simuliidae

Simulium venustum Say, *S. bracheatum* Coq., *S. vittatum* Zett. were found along Caledonia Creek.

Simulium spp. were also obtained from Oldfort Point, Minaga Creek and the upper Fraser River. They were not noticed at the higher altitudes visited.

Blepharoceridae

Bibliocephala griseus Curran is recorded from Maligne Lake (Walley, Can. Ent. LIX, 115). Specimens of a *Bibliocephala*, very likely the present species, were taken from the stomachs of rainbow trout at Buffalo Prairie, which is only a few miles distant from Maligne Lake.

Empididae

Though the larvae of this family are seldom aquatic, the habit shown by the adults of swarming near water renders them very liable to be captured by fish feeding at the surface. Adult Empididae were found, often in considerable numbers, in the alimentary canals of fish from Oldfort Point and district, Minaga Creek, Fraser River, Caledonia Lake and at the junction of the Maligne River with the Athabasca.

On the basis of the records given here and in previous reports, it would seem that those waters of Jasper Park which were examined for their insect fauna may be divided into five classes from an entomological standpoint.

- I. Small streams derived directly from the tips of glaciers and hence only existing during the summer months.
- II. Larger, more permanent streams.
- III. Standing lakes.
- IV. Natural lakes possessing inlet and outlet streams.
- V. Beaver pools.

The creeks comprised in the first category flow into the upper end of Maligne Lake. They are extremely rapid and laden with silt from the glaciers which give rise to them. Their beds are composed of rounded, constantly shifting stones which provide little cover for animal life, while no plants of any kind were observed in the water. These conditions combined with the temporary nature

and low temperature of these streams (4°C. on afternoon of August 12th, a warm day) render them very unsuitable for most aquatic insects and it is not surprising that very few specimens were obtained during a lengthy search. The brief list includes one species of stone-fly nymph, probably *Paraperla frontalis* Banks, one Baetine nymph, the case of a Limnephilid larva and the larvae of a Tanypine fly, the latter being not uncommon. No other forms of animal life were observed in these glacial streams.

The second category includes various streams connecting directly or indirectly with the Athabasca and also the Fraser River near its source. These, though rapid, are less torrential than the foregoing, less turbid and with a higher temperature and consequently support a more varied fauna. Characteristic of these waters are stone-flies of the genera *Perlodes*, *Clio-perla*, *Acroneuria*, *Nemoura*, *Leuctra* and *Capnia*. Among may-flies the Heptageninae and such forms as *Ephemerella* and *Baetis* are numerous and the Trichoptera are well represented by *Rhyacophila*, *Hydropsychidae* and *Limnephilidae*.

The standing lakes which are placed in group III are situated near the Athabasca. They are characterized for the most part by bottoms composed mainly of fine mud, which is not productive of many forms of insect life. Chironomine larvae occur here, but not in very large numbers. The margins of these lakes, however, are stony, the stony belt extending outward a few yards from the shore-line. This belt is better suited to a variety of larvae, but it must be remembered that part of it is rendered uninhabitable in winter by ice, while a general lack of vegetation explains the absence of many well-known forms. Stone-fly nymphs of the genus *Alloperla* live among the stones together with the nymphs of the may-fly *Blasturus* and certain Leptocerid larvae.

The lakes which constitute the fourth class form a much less homogeneous group than the rest, and in point of fact nearly every one possesses well-marked individual characteristics as regards its insect fauna. These bodies of water vary very considerably in size, and it is obvious that at different points conditions may approach any of the preceding types. *Siphonurus occidentalis* appears to be the chief common bond between the three high-altitude lakes, Jacques, Medicine and Maligne. The two latter have many species of stone-flies and may-flies in common. In general, the lakes of this category are characterized by a large variety of Ephemeroptera and Trichoptera.

The pools which have been formed at a number of points near Jasper by the action of beavers in damming up small creeks, present a rather different set of conditions. These waters are shallow and contain more vegetation than most of the natural lakes. They are favoured by *Dixa*, and are also strongholds of *Callibaetis* and various aquatic beetles.

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