

MAYFLIES (EPHEMEROPTERA) OF THE CURECANTI RESERVOIR BASINS

GUNNISON RIVER, COLORADO

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INTRODUCTION

An ecological study of a portion of the Gunnison River drainage in southwestern Colorado was conducted during the summer of 1961 by the University of Utah Ecological Expedition, supported by the U. S. Bureau of Reclamation, University Research Fund, Division of Biological Sciences, and the National Science Foundation.

The purpose of the study was to record the fauna and flora of the area. This was necessary because of the future inundation of the area by the proposed construction of the three dams of the Curecanti Project, Crystal, Morrow Point, and Blue Mesa dams. This flooding will destroy the habitats of many of the aquatic organisms present in the area. It is also possible that certain species of limited distribution may be completely eliminated. Mayflies appear to be extremely susceptible to such changes in their environment.

GEOGRAPHY

The general drainage system under consideration is that of the South Fork of the Gunnison River. The drainage basin is bounded by high mountains, particularly on the south and southeast where the very high peaks of the "Switzerland of America", (San Juan Mountain Range), rise to a height in excess of 14,000 ft. elevation. To the north are the West Elk Mountains and several high mesas. In the northeast, east, and southeast, out of the study area, are the Elk and Sawatch mountains and the Cochetopa Hills. The area considered here is mainly that which will be inundated by the Morrow Point and Blue Mesa dams. Most of the area is in Gunnison County and is part of the Gunnison National Forest. The Gunnison River in the Morrow Point Basin is deeply intrenched in ancient schists and gneiss of Archean age. This deep gorge is the upper portion of the famous Black Canyon. At the site of the future reservoir formed by Blue Mesa Dam, the river flows through an area of ranch land and, for the most part, is still bedded in Archean biotite schist. This section of the river is one of the most renowned trout fishing areas in the western United States. Numerous fishing resorts are located along the river and most of the ranches have facilities for fishermen. The Gunnison River in the area studied ranges from an elevation of 6760 ft. near the site of the Morrow Point Dam to 7540 ft. near the upper limits of the Blue Mesa Basin.

TRIBUTARIES

Two tributaries which do not directly enter either of the reservoir basins were studied to supply more complete data on the mayfly distribution within the drainage. Cimarron Creek is a highly silted stream entering the Gunnison River immediately below the proposed site of the Morrow Point Dam. This is the only stream studied which is located in Montrose County. Tomichi

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Creek enters the Gunnison River near the town of Gunnison, Colorado. Because of its higher elevation, 8550 ft., it was studied in an attempt to secure a different fauna than found in the lower area.

The Lake Fork of the Gunnison and Cebolla Creek are the major tributaries of the Gunnison River in the study area. They arise in the San Juan Mountains and follow a north-northwest course to the Gunnison River, roughly paralleling each other. These streams and two others, Soap Creek and West Elk Creek, will have 3 to 5 mi. embayments of the Blue Mesa Reservoir formed in their canyons. The other tributaries will be relatively unaffected by the inundation except near their mouths.

The streams studied and the areas they drain are as follows: Cimarron Creek, Blue Creek, Lake Fork, and Cebolla Creek drain the San Juan Mountains; Myers Gulch and Curecanti Creek drain Black Mesa; Soap Creek drains Sapinero Mesa and West Elk Mountains; West Elk Creek, Red Creek, East Elk Creek, Steuben Creek, and Beaver Creek drain from West Elk Mountains; Tomichi Creek flows from the Cochetopa Hills and south end of Sawatch Mountains.

HABITATS

The habitats in the streams studied are predominately riffle and torrential. The bottom type is generally rubble but in many places small boulders are present. At the junction of some of the tributaries with the Gunnison River, there are a few areas of very deep slow moving water. These have a sand or a mixed sand-gravel bottom. The bottom of the Gunnison River is composed of large rubble and boulders. The difficulty of sampling in the fast deep water of the river is compounded by a great deal of large jagged rock debris which was dumped in the river when the roadbed of a narrow gauge railway was blasted out of the bed rock many years ago.

COLLECTIONS

The collections were made with the use of a 3 ft. square handscreen. This was placed across the current flow and then the stream bottom was disturbed allowing the current to carry the dislodged insects onto the screen. The specimens were removed by hand picking and preserved in 70 per cent ethyl alcohol in four-dram corked vials.

The major collections were made by the University of Utah Ecological Expedition between June 28 and July 19, 1961. Those participating in the collecting were Allen Knight, Jay Richardson, Ernest Riley, and Delbert W. Argyle. Additional records were obtained during preliminary studies of the area by Dr. Arden R. Gaufin. These collections were made on April 1 and June 7-8, 1961. Records from these collections are designated by the

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initials ARG. A single additional record, obtained from the literature, was included to expand the distribution of one species (Allen and Edmunds, Jr, 1959). It is indicated in the annotations by an asterisk. All records were taken in Gunnison County except those for Cimarron Creek and Gunnison River junction with Cimarron Creek which are in Montrose County. Table 1 shows the distribution of specimens collected.

ANNOTATIONS

Siphonuridae (family)

Siphonurus occidentalis Eaton

Nymphs of this species occurred in ponds and pools originally part of the stream or in heavily vegetated parts of the stream. They are not usually found where fish can prey on them. The species is not abundant because of the relative scarcity of suitable habitat in this area. The single imago collected was taken outside of the expedition headquarters building.

Records - Gunnison R. jct. Soap Cr., 1 nymph, July 1, 7220 ft.; Soap Cr. 100 yds. above Highway 50, 11 nymphs, July 1, 7250 ft.; West Elk Cr. jct. Gunnison R., 3 nymphs, July 3, 7230 ft.; Red Cr. jct. Gunnison R., 1 nymph, June 29, 7280 ft.; Dry Gulch, 100 yds. above Highway 50, July 3, 1 imago; and Tomichi Cr., Highway 114 bridge, 1 nymph, July 11, 8550 ft.

Ameletus sp.

There are at least 4 and probably 5 species represented by these collections. Until they are successfully reared, they cannot be identified. They were collected from riffle areas or quiet water by a riffle. They were often found closer to the bank than to the center of the stream. They were found at only one station in the Gunnison River. Subsequent collections in the spring of 1962 indicate that they are well distributed in the main river.

Records - Myers Gulch jct. Gunnison R., 5 nymphs, June 8, 6950 ft. (ARG); Myers Gulch, at mouth and 100 yds. above, 8 nymphs, July 19, 6950-7000 ft.; Curecanti Cr. jct. Gunnison R., 2 nymphs, June 8, 7050 ft. (ARG); Soap Cr., Highway 50 bridge, 5 nymphs, June 7, 7230 ft. (ARG); Soap Cr., 100 yds. above Highway 50 bridge, 1 nymph, July 1, 7255 ft.; Soap Cr. upper campgrounds, 10 nymphs, July 12, 7510-7875 ft.; West Elk Cr. jct. Gunnison R., 3 nymphs, July 3, 7230 ft.; West Elk Cr., 1 mi. above mouth, 2 nymphs, July 3, 7360 ft.; Gunnison R. jct. Red Cr., 2 nymphs, June 29, 7260 ft.; Red Cr., 1 mi. above mouth, 1 nymph, July 10, 7500 ft.; East Elk Cr., jct. Gunnison R., 2 nymphs, June 7, 7335 ft. (ARG); Steuben Cr., lower 1 mi. of stream, 29 nymphs, July 5, 7460-7660 ft.; Beaver Cr. jct. Gunnison R., 4 nymphs, June 7, 7540 ft. (ARG); Beaver Cr., 100 yds. above mouth, 1 nymph, July 4, 7540 ft.; Beaver Cr., Highway 50 bridge, 2 nymphs, April 1, 7550 ft. (ARG); and Beaver Cr., 150 yds. above Highway 50 bridge, 4 nymphs, June 7, 7560 ft. (ARG).

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Baetidae (family)

Baetis sp.

The nymphs were not identified to species because of the difficulty in doing so without reared adults. There are probably 4 or 5 species represented. They occurred in numbers at all collection stations. Because of this complete distribution, the records have not been listed.

Pseudocloeon sp.

All of the specimens collected represent 1 species whose identity is uncertain. They are probably widespread in the Gunnison River. The few records in the side streams compared to the intensive collecting done indicate that this is not the preferred habitat. Young specimens were probably collected from the river but were not separated from Baetis sp. because of the very detailed examination required upon young nymphs.

Records - Cimarron Cr. jct. Gunnison R., 1 nymph, July 13, 6760 ft.; Lake Fork jct. Gunnison R., 3 nymphs, July 8, 7210 ft.; Lake Fork Cr., 200 yds. above mouth, 3 nymphs, July 8, 7215 ft.; Gunnison R. jct. Soap Cr., 1 nymph, July 1, 7220 ft.; and West Elk Cr., 1.5 mi. above mouth, 5 nymphs, July 3, 7420 ft.

Centroptilum sp.

The members of this genus were restricted to cold waters at high elevations. The single record is from the highest station collected during the study and appears to support the known distribution pattern.

Record - Tomichi Cr., Highway 114 bridge, 2 nymphs, July 11, 8550 ft.

Heptageniidae (family)

Heptagenia solitaria McDunnough

This species was found distributed between 6760 and 7495 ft. elevation. It appears to be restricted to the river with a few ingresses into side streams and is most abundant in very rapid water riffles. The three streams in which it attains some elevation all have a high velocity.

Records - Gunnison R. jct. Cimarron Cr., 7 nymphs, July 13, 6760 ft.; Cimarron Cr., 1.1 mi. below Cimarron, 1 nymph, July 13, 6940 ft.; Gunnison R. jct. Lake Fork, 1 imago, 15 nymphs, July 8, 7210 ft.; Gunnison R. jct. Soap Creek, 5 nymphs, July 1, 7220 ft.; West Elk Cr. jct. Gunnison R., 1 nymph, July 3, 7225 ft.; West Elk Cr., 600 yds., 1 mi. above mouth, 20 nymphs, July 3, 7260 ft.; Cebolla Cr., 200 yds. above mouth, 8 nymphs, July 7, 7320 ft.; Cebolla Cr., 2 mi. above mouth, 12 nymphs, July 7, 7295 ft.; Gunnison R. jct. Dry Gulch, 1 nymph, June 28, 7330 ft.; and Steuben Cr. jct. Gunnison R., 2 nymphs, July 5, 7480 ft.

Heptagenia spp.

The nymphs of at least 2 species are included here. Rearing of the nymphs will be necessary to establish the identity of the nymphs. The nymphs were found between 6760 and 8550 ft. elevation. They occurred in riffle areas but in some cases were found in the slow deep water at the confluence of a stream with the Gunnison River.

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Heptageniidae (family) continued

Heptagenia spp. (continued)

Records - Cimarron Cr. jct. Gunnison R., 10 nymphs, July 13, 6760 ft.; Cimarron Cr., $\frac{1}{2}$ mi. below Cimarron, Colo., 2 nymphs, July 13, 6905 ft.; Gunnison R. jct. Lake Fork, 10 nymphs, July 8, 7210 ft.; Soap Cr., area near mouth, 18 nymphs, July 1, 7220-7240 ft.; Gunnison R. jct. West Elk, 17 nymphs, July 3, 7225 ft.; Gunnison R. jct. Red Cr., 16 nymphs, June 29, 7260 ft.; Red Cr., 50-100 yds. above mouth, 6 nymphs, June 29, 7300 ft.; Red Cr., 1 mi. above Highway 50, 6 nymphs, July 10, 7500 ft.; Cebolla Cr. jct. Gunnison R., 3 nymphs, July 7, 7320 ft.; Gunnison R. jct. Dry Gulch, 1 nymph, June 28, 7330 ft.; Gunnison R. jct. Steuben Cr., 4 nymphs, July 5, 7480 ft.; Gunnison R. jct. Beaver Cr., 18 nymphs, July 4, 7540 ft.; Beaver Cr., 300 yds. above mouth, 3 nymphs, July 4, 7555 ft.; and Tomichi Cr., Highway 114 bridge, 21 nymphs, July 11, 8550 ft.

Cinygmula sp.

The species represented in this group are unidentifiable. The taxonomy of the nymphs in this genus is poorly known, and the reared species are exceedingly similar. The specimens were taken mainly from fast riffle areas not far from the shore.

Records - Gunnison R. jct. Cimarron Cr., 1 nymph, July 13, 6760 ft.; Myers Gulch, 100 yds. above mouth, 15 nymphs, July 19, 7000 ft.; Blue Cr., 1 mi. above Highway 50 bridge, 1 nymph, July 11, 8360 ft.; Lake Fork, 5 mi. above mouth, 6 nymphs, July 18, 7420 ft.; Soap Cr., near mouth, 19 nymphs, July 1, 7225 ft.; Soap Cr., upper campgrounds, 5 nymphs, July 12, 7750-7875 ft.; West Elk Cr. mouth to 1.5 mi. above, 37 nymphs, July 3, 7220-7420 ft.; Steuben Cr., 1 mi. above mouth, 6 nymphs, July 5, 7660 ft.; and Beaver Cr., 200 yds. above mouth, 1 nymph, July 4, 7550 ft.

Rhithrogena robusta Dodds

The large nymphs have a sclerotized line on the under side of its gills and lack the small dorsal lobe on each gill that is found in the hageni group. Only 1 specimen was collected. The species is either uncommon in this drainage or the specimen may have been one of the few remaining at the end of an earlier emergence. The habitat was torrential.

Record - Myers Gulch, jct. Gunnison R., 1 nymph, June 8, 6950 ft. (ARG).

Rhithrogena sp.

These specimens may represent more than one species. They are identifiable only as members of the hageni group represented in Colorado by such species as R. hageni (=doddsi), R. morrisoni and R. undulata. All of these species have a small lobe projecting from the inner margin of the gill. The specimens were all found in the typical riffle habitat.

Records - Gunnison R. jct. Cimarron Cr., 6 nymphs, July 13, 6760 ft.; Cimarron Cr. at Cimarron, Colo., 1 nymph, June 8, 6930 ft. (ARG); Curecanti Cr. jct. Gunnison R., 3 nymphs, June 8, 7050 ft. (ARG); Blue Cr., Highway 50 bridge and 1 mi. above, 81 nymphs, July 11, 8360 ft.; Soap Cr. jct. Gunnison R., 1 nymph, July 1, 7220 ft.; Soap Cr., upper campgrounds,

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Heptageniidae (family) continued

Rhithrogena sp. (continued)

7 nymphs, July 12, 7510-7875 ft.; West Elk Cr. mouth and 1 mi. above, 7 nymphs, July 3, 7230-7360 ft.; Cebolla Cr. mouth to 2 mi. above, 8 nymphs, July 7, 7320-7495 ft.; Gunnison R. jct. Dry Gulch, 1 nymph, June 28, 7335 ft.; Steuben Cr. jct. Gunnison R., 7 nymphs, June 7, 7480 ft. (ARG); Steuben Cr. jct. Gunnison R., 8 nymphs, July 5, 7480 ft.; Beaver Cr., Highway 50 bridge, 3 nymphs, April 1, 7555 ft. (ARG); Beaver Cr., jct. Gunnison R., 4 nymphs, June 7, 7540 ft. (ARG); and Beaver Cr., 150 yds. above Highway 50, 4 nymphs, June 7, 7560 ft. (ARG).

Epeorus albertae McDunnough

The nymphs were found clinging to the surface of rubble stones in riffle areas. They are generally distributed at lower elevations in the Colorado River system. These collections probably represent the upper limits of their altitudinal distribution in this particular part of the Upper Colorado River Basin.

Records - Gunnison R. jct. Cimarron Cr., 5 nymphs, July 13, 6760 ft.; Curecanti Cr. jct. Gunnison R., 6 nymphs, July 19, 7050 ft.; Curecanti Cr., 500 yds. above mouth, 9 nymphs, July 19, 7360 ft.; Blue Cr. Highway 50 bridge, 56 nymphs, July 11, 8300 ft.; Soap Cr. Highway 50 bridge to mouth, 74 nymphs, July 1, 7220-7245 ft.; Soap Cr., upper campgrounds, 22 nymphs, July 12, 7510-7750 ft.; West Elk Cr. jct. Gunnison R., 38 nymphs, July 3, 7230 ft.; West Elk Cr., 600 yds. above mouth, 2 nymphs, June 7, 7280 ft. (ARG); West Elk Cr., 1 mi. above mouth, 12 nymphs, July 3, 7360 ft.; Gunnison R. jct. Red Cr., 6 nymphs, June 29, 7260 ft.; Red Cr., area near mouth, 14 nymphs, June 29, about 7300 ft.; Red Cr., 1 mi. above Highway 50, 6 nymphs, July 10, 7500 ft.; Gunnison R. jct. Dry Gulch, 2 nymphs, June 28, 7335 ft.; Steuben Cr. jct. Gunnison R., 16 nymphs, July 5, 7480 ft.; Steuben Cr., 1 mi. above mouth, 12 nymphs, July 5, 7560 ft.; Beaver Cr. jct. Gunnison R., 89 nymphs, July 4, about 7540 ft.; and Beaver Cr., 100-300 yds. above mouth, 125 nymphs, July 4, 7550 ft.

Epeorus longimannus Eaton

This species is often found with E. albertae in riffle areas. It seems, however, to be more tolerant of cold water and usually achieves greater elevation in its distribution. In this particular drainage, it was found at only one station above the distribution of E. albertae. In Blue Creek it was found at 8360 ft., while E. albertae reached only 8300 ft. in the same stream.

Records - Cimarron Cr., $\frac{1}{4}$ mi. below Cimarron, Colo., 1 nymph, July 13, 6905 ft.; Myers Gulch jct. Gunnison R., 14 nymphs, June 8, 6950 ft. (ARG); Myers Gulch, 100 yds. above mouth, 29 nymphs, July 19, 7000 ft.; Curecanti Cr. jct. Gunnison R., 4 nymphs, June 8, 7050 ft. (ARG); Curecanti Cr. jct. Gunnison R., 8 nymphs, July 19, 7050 ft.; Curecanti Cr., 500 yds. above mouth, 3 nymphs, July 19, 7360 ft.; Blue Cr., Highway 50 bridge, 23 nymphs, July 11, 8300 ft.; Blue Cr., 1 mi. above Highway 50 bridge, 50 nymphs, July 11, 8360 ft.; Soap Cr., area near mouth, 22 nymphs, July 1, 7220-7260

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Heptageniidae (family) continued

Epeorus longimanus (continued)

ft.; Soap Cr., upper campgrounds, 22 nymphs, July 12, 7510-7875 ft.; West Elk Cr. jct. Gunnison R., 10 nymphs, July 3, 7230 ft.; West Elk Cr., 1 mi. above mouth, 11 nymphs, July 3, 7360 ft.; West Elk Cr., 1.5 mi. above mouth, 53 nymphs, July 3, 7420 ft.; Red Cr., area near mouth, 18 nymphs, June 29, 7300 ft.; Red Cr., 1 mi. above Highway 50, 7 nymphs, July 10, 7500 ft.; Red Cr., 2 mi. above mouth, 12 nymphs, July 10, 7540 ft.; East Elk Cr. jct. Gunnison R., 8 nymphs, June 7, 7335 ft. (ARG); Steuben Cr., jct. Gunnison R., 5 nymphs, June 7, 7480 ft. (ARG); Steuben Cr. jct. Gunnison R., 13 nymphs, July 5, 7480 ft.; Steuben Cr., $\frac{1}{2}$ mi. above mouth, 40 nymphs, July 5, 7540 ft.; Steuben Cr., 1 mi. above mouth, 12 nymphs, July 5, 7660 ft.; and Beaver Cr. jct. Gunnison R., 9 nymphs, July 4, 7540 ft.

Ephemerellidae (family)

Ephemerella doddsi Needham

This species was uncommon in the collection. It is particularly well adapted to the torrential habitat occurring in several streams in this drainage, but it was only taken from three collection streams. Most of the specimens may have emerged before the intensive July collections.

Records - Myers Gulch, jct. Gunnison R., 5 nymphs, June 8, 6950 ft. (ARG); Myers Gulch, 100 yds. above mouth, 2 nymphs, July 19, 700 ft.; West Elk Cr. jct. Gunnison R., 1 nymph, July 3, 7230 ft.; West Elk Cr., 1 mi. above mouth, 1 nymph, July 3, 7360 ft.; and East Elk Cr. jct. Gunnison R., 1 nymph, June 7, 7335 ft. (ARG).

Ephemerella grandis grandis Eaton

This species is quite common in most streams in the area. The emergence of this species concludes in the first part of July with the principal emergence taking place during the last two weeks in June. The nymphs were taken in riffle areas, generally close to the bank.

Records - Cimarron Cr. at Cimarron, Colo., 11 nymphs, June 8, 6930 ft. (ARG); Myers Gulch, jct. Gunnison R., 7 nymphs, June 8, 6950 ft. (ARG); Curecanti Cr. jct. Gunnison R., 2 nymphs, June 8, 7050 ft. (ARG); Blue Cr. Highway 50 bridge, 8 nymphs, July 11, 8300 ft.; Blue Cr., 1 mi. above Highway 50 bridge, 6 nymphs, July 11, 8360 ft.; Soap Cr. Highway 50 bridge, 1 nymph, April 1, 7230 ft. (ARG); Soap Cr., Highway 50 bridge, 2 nymphs, June 7, 7230 ft. (ARG); Soap Cr. near Highway 50 bridge, 2 nymphs, July 1, 7260 ft.; Soap Cr. upper campgrounds, 8 nymphs, July 12, 7750-7875 ft.; West Elk Cr., 1.5 mi. above mouth, 1 nymph, July 3, 7420 ft.; East Elk Cr. jct. Gunnison R., 3 nymphs, June 7, 7335 ft. (ARG); Steuben Cr. jct. Gunnison R., 1 nymph, July 5, 7480 ft.; Steuben Cr. jct. Gunnison R., 5 nymphs, June 7, 7480 ft. (ARG); Steuben Cr., 1 mi. above mouth, 7 nymphs, July 5, 7660 ft.; Beaver Cr. jct. Gunnison R., 2 nymphs, June 7, 7540 ft. (ARG); Beaver Cr. Highway 50 bridge, 13 nymphs, April 1, 7555 ft. (ARG); and Beaver Cr., $\frac{1}{4}$ mi. above mouth, 4 nymphs, June 7, 7560 ft. (ARG).

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Ephemerelellidae (family)

Ephemerelella hecuba hecuba Eaton

The records of this species appear to indicate that it is confined to the main Gunnison and the larger tributaries. It is probably more abundant than the records show because the river was not worked with the intensity that the streams were, mainly because of its inaccessibility.

Records - Lake Fork jct. Gunnison R., 2 nymphs, July 8, 7210 ft.; West Elk Cr., 100 ft. above mouth, 1 nymph, July 3, 7230 ft.; Cebolla Cr., 200 yds. above mouth, 2 nymphs, July 7, 7320 ft.; Gunnison R., Iola, Aug. 16, 1949, 7430 ft. (H. Higgins*); Steuben Cr. jct. Gunnison R., 1 nymph, July 5, 7480 ft.; and Beaver Cr. jct. Gunnison R., 2 nymphs, July 4, 7540 ft.

Ephemerelella inermis Eaton

This is the most widespread species in the entire drainage. The nymphs were collected from all of the streams and all but a few of the collection stations. All specimen of this species complex are being studied by R. K. Allen and G. F. Edmunds who are attempting to revise this taxonomically difficult complex. One specimen seems to be different than the other nymphs collected.

Records - Cimarron Cr. jct. Gunnison R., 19 nymphs, July 13, 6760 ft.; Cimarron Cr., $\frac{1}{4}$ mi. below Cimarron, Colo., 3 nymphs, July 13, 6905 ft.; Cimarron Cr. at Cimarron, Colo., 2 nymphs, June 8, 6930 ft. (ARG); Myers Gulch jct. Gunnison R., 7 nymphs, June 8, 6950 ft. (ARG); Curecanti Cr. jct. Gunnison R., 3 nymphs, June 8, 7050 ft. (ARG); Blue Cr., 1 mi. above Highway 50 bridge, 1 nymph, July 11, 8360 ft.; Lake Fork jct. Gunnison R. 58 nymphs, July 8, 7210 ft.; Lake Fork, 5 mi. above mouth, 28 nymphs, July 18, 7420 ft.; Soap Cr., near mouth, 190 nymphs, July 1, 7225 ft.; Soap Cr., Highway 50 bridge, 1 nymph, June 7, 7230 ft. (ARG); Soap Cr., upper campgrounds, 12 nymphs, July 12, 7510-7875 ft.; West Elk Cr. jct. Gunnison R., 98 nymphs, July 3, 7230 ft.; West Elk Cr., 0.3 mi. above mouth, 30 nymphs, July 3, 7280 ft.; West Elk Cr., 1.5 mi. above mouth, 18 nymphs, July 3, 7420 ft.; Red Cr. jct. Gunnison R., 10 nymphs, June 29, 7280 ft.; Cebolla Cr., near mouth, 9 nymphs, July 7, 7320 ft.; Cebolla Cr. 2 mi. above mouth, 10 nymphs, July 7, 7495 ft.; Dry Gulch jct. Gunnison R., 16 nymphs, June 28, 7330 ft.; East Elk Cr. jct. Gunnison R., 1 nymph, June 7, 7335 ft. (ARG); Steuben Cr. jct. Gunnison R., 3 nymphs, June 7, 7480 ft. (ARG); Steuben Cr. jct. Gunnison R., 120 nymphs, July 5, 7480 ft.; Steuben Cr., $\frac{1}{2}$ -1 mi. above mouth, 2 nymphs, July 5, 7540-7660 ft.; Beaver Cr. jct. Gunnison R., 3 nymphs, June 7, 7540 ft. (ARG); Beaver Cr. jct. Gunnison R., 120 nymphs, July 4, 7540 ft.; Beaver Cr., 200 yds. above mouth, 1 nymph, July 4, 7550 ft.; Beaver Cr., 150 yds. above Highway 50, 9 nymphs, June 7, 7560 ft. (ARG); and Tomichi Cr., Highway 114 bridge, 58 nymphs, July 11, 8550 ft.

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Ephemerelellidae (family) continued

Ephemerelella margarita Needham

The nymphs of this species were very young and many of them were probably not detected in hand screen collections.

Records - Lake Fork jct. Gunnison R., 2 nymphs, July 8, 7210 ft.; Cebolla Cr. jct. Gunnison R., 2 nymphs, July 7, 7320 ft.; Cebolla Cr., 2 mi. above mouth, 1 nymph, July 7, 7495 ft.; and Tomichi Cr., Highway 114 bridge, 4 nymphs, July 11, 8550 ft.

Ephemerelella tibialis McDunnough

This species is recorded from three streams. The greatest concentration of them was found in a torrential habitat in association with a large amount of algae in the rocks.

Records - Myers Gulch, 199 yds. above mouth, 2 nymphs, July 19, 7000 ft.; West Elk Cr. area near mouth, 2 nymphs, July 3, 7225 ft.; West Elk Cr., 1.5 mi. above mouth, 1 nymph, July 3, 7420 ft.; Red Cr. jct. Gunnison R., 18 nymphs, June 29, about 7280 ft.; Red Cr., above Highway 50 culvert, 1 nymph, July 10, 7425 ft.; and Red Cr., 1 mi. above Highway 50, 1 nymph, July 1, 7500 ft.

Tricorythididae (family)

Tricorythodes minutus Traver

Nymphs of this species were found predominately in slow deep water or in the larger tributaries. They are found principally where a moderate current moves through vegetated areas or areas where organic detritus is deposited.

Records - Lake Fork jct. Gunnison R., 2 nymphs July 8, 7210 ft.; West Elk Cr. jct. Gunnison R., 1 nymph, July 3, 7225 ft.; West Elk Cr., 1 mi. above mouth, 2 nymphs, July 3, 7360 ft.; Cebolla Cr. jct. Gunnison R., 2 nymphs, July 7, 7320 ft.; Cebolla Cr., 2 mi. above mouth, 1 nymph, July 7, 7495 ft.; and Tomichi Cr., Highway 114 bridge, 12 nymphs, July 11, 8550 ft.

Leptophlebiidae (family)

Paraleptophlebia pallipes (Hagen)

Only one station revealed the presence of this species. The record is from an early collection and the size of the nymphs plus the known biology of this species indicates that the main emergence had passed before intensive collections were made. The specimens were from a riffle area near the bank.

Records - East Elk Cr. jct. Gunnison R., 2 nymphs, June 7, 7335 ft.

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Leptophlebiidae (family)

Paraleptophlebia sp.

The nymphs recorded here are probably P. debilis Walker, but their immature condition precludes certain identity. They were in relatively small numbers, although well distributed in the area. A few specimens were taken from pool environments but the majority came from riffles. All specimens were from tributaries to the Gunnison River.

Records - Myers Gulch, jct. Gunnison R., 3 nymphs, June 8, 6950 ft. (ARG); Myers Gulch jct. Gunnison R., 1 nymph, July 19, 6950 ft.; Curecanti Cr. jct. Gunnison R., 1 nymph, June 8, 7050 ft. (ARG); Curecanti Cr., 300 yds. above mouth, 2 nymphs, July 19, 7320 ft.; Blue Cr., Highway 50 bridge, 9 nymphs, July 11, 8300 ft.; Blue Cr., 1 mi. above Highway 50 bridge, 2 nymphs, July 11, 8360 ft.; Soap Cr., Highway 50 bridge, 1 nymph, July 1, 7230 ft.; Soap Cr., commissary campground, 1 nymph, July 12, 7875 ft.; West Elk Cr., area near mouth, 6 nymphs, July 3, 7230 ft.; Cebolla Cr. jct. Gunnison R. 2 nymphs, July 7, 7320 ft.; Cebolla Cr., 2 mi. above mouth, 2 nymphs, July 7, 7495 ft.; and Beaver Cr., mouth and 300 yds. above, 2 nymphs, July 4, 7540-7555 ft.

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