

INTERNAL REPORT 94

DYNAMICS AND PRODUCTIVITY OF AQUATIC INVERTEBRATES IN THE CEDAR RIVER

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The original objectives of this project were to determine the growth rates, food habits, and the effects of temperature on the survival and metabolism of two species of each of the following orders of aquatic insects from the Cedar River: Plecoptera, Ephemeroptera, and Trichoptera. This would have necessitated several years of study and a longer period of support than was eventually approved. The first year of this project also revealed a far greater diversity of stoneflies (Plecoptera) than was anticipated and transporting and rearing specimens from the Cedar River to the University of Utah for experimental work proved to be too costly and variable. As a result the objectives of the project were changed to include an intensive study of the Plecoptera of the Cedar River, including the distribution of stoneflies in the stream, rates of growth, life cycles, emergence, productivity, food habits, and environmental relationships of this order.

The work on stoneflies is being closely coordinated with the work on aquatic production being conducted by James G. Malick. Chemical and physical data being collected by Mr. Malick will be utilized in interpreting the ecology of stoneflies in the stream. The stoneflies collected in the pot samples and drift samples collected by Mr. Malick's group are being utilized in this study.

During the last year the growth rates of specimens of the families Chloroperlidae and Nemouridae have been determined. Specimens of the other families of stoneflies are now being measured. The standing crop, biomass, and estimated production of each family of stoneflies found in the stream will be determined from the pot samples taken from the six sampling stations collected from September 1971 through October 1972. Aliquots of drift samples taken during that period will also be studied to determine the distribution, growth rates, and biomass of drifting stoneflies. This phase of the work will not be completed until the last six months of 1973 and is dependent upon the drift samples being separated by Mr. Malick's workers.

Interpretation of the food habits and role of stoneflies in energy transfer in the stream is dependent on other research being conducted at the University of Utah and University of Montana Biological Station. In the Cedar River detritivorous, omnivorous, and carnivorous stoneflies are represented by the families Nemouridae, Chloroperlidae, and Perlodidae. The food habits of species of stoneflies from these families are being studied for food content and caloric value. Adult stoneflies as well as naiads collected during the last year have been identified and emergence dates and life cycles have been determined for 39 species of stoneflies in the stream. A list of the species collected and collecting data from each station giving the emergence dates is included as part of this report.

Plecoptera from Cedar River

Peltoperlidae

Peltoperla brevis

Nemouridae

Nemoura cataractae

Nemoura cinctipes

Nemoura oregonensis

Nemoura frigida

Nemoura haysi

Nemoura californica

Nemoura columbiana

Capniidae

Capnia oenone

Taeniopterygidae

Brachyptera occidentalis

Brachyptera nigripennis

Pteronarcidae

Pteronarcys californica

Pteronarcys princeps

Leuctridae

Leuctra sara

Leuctra purcellana

Leuctra augusta

Paraleuctra occidentalis

Perlodidae

Isogenus pilatus

Isogenus yakimae

Arcynopteryx parallela

Arcynopteryx signata

Isoperlidae

Isoperla fulva

Isoperla trictura

Isoperla mormona

Isoperla gravitans

Chloroperlidae

Alloperla autumnata

Alloperla delicata

Alloperla diversa

Alloperla exquisita

Alloperla lineosa

Alloperla oregonensis

Alloperla pacifica

Alloperla pallidula

Alloperla severa

Paraperla frontalis

Alloperla fraterna

Utaperla sopladora?

Perlidae

Acroneuria californica

Acroneuria pacifica

Plecoptera from Cedar River, Washington

Sta. 1.0 Cedar Rr. Wash. above Chester Morse Lake

6/8/72 Coll. J. Malick, A. R. Gaufin

Alloperla exquisita

Alloperla oregonensis

6/15/72 Coll. J. Malick

Alloperla oregonensis

Alloperla exquisita

Leuctra sara

Nemoura haysi

Utaperla sopladora?

Isoperla gravitans

6/22/72 Coll. J. Malick

Alloperla diversa

Alloperla exquisita

Alloperla oregonensis

6/29/72 Coll. J. Malick

Alloperla exquisita

Alloperla oregonensis

Pteronarcys californica

7/6/72 Coll. J. Malick

Alloperla exquisita

Alloperla oregonensis

Leuctra sara

7/13/72 Coll. M. Stansbury

Alloperla oregonensis

Alloperla pallidula

8/13/72 Coll. L. Baker

Isogenus pilatus

9/6/72 Coll. A.R.Gaufin & J. Malick

Alloperla pallidula

Acroneuria californica

Sta. 2.0 Rex River Wash. above Chester Morse Lake

6/8/72 Coll. J. Malick, A.R.Gaufin

Alloperla diversa

Alloperla oregonensis

Alloperla pacifica

Paraperla frontalis (cast skin)

Arcynopteryx parallela (cast skin)

Leuctra sara

Leuctra purcellana

Nemoura frigida

Nemoura haysi

6/15/72 Coll. J. Malick

Paraperla frontalis

Alloperla exquisita

Alloperla diversa

Alloperla oregonensis

Nemoura oregonensis

6/22/72 Coll. J. Malick

Arcynopteryx parallela (cast skin)

Alloperla exquisita

Alloperla diversa

Alloperla oregonensis

6/29/72 Coll. J. Malick

Alloperla exquisita

Alloperla fraterna

Alloperla oregonensis

Leuctra sara

Pteronarcys princeps (cast skin)

7/6/72 Coll. J. Malick

Pteronarcys princeps

Alloperla exquisita

Alloperla diversa

Alloperla oregonensis

7/13/72 Coll. M. Stansbury

Alloperla lineosa

Alloperla oregonensis

Alloperla pacifica

Acroneuria californica

7/20/72 Coll. C. Baker

Alloperla exquisita

Alloperla pallidula

Acroneuria californica

7/27/72 Coll. M. Stansbury

Alloperla pallidula

8/3/72 Coll. L. Baker

Alloperla diversa

Alloperla pallidula

Isogenus pilatus

8/10/72 Coll. M. Stansbury

Alloperla pallidula

9/7/72 Coll. A.R.Gaufin & J. Malick

Alloperla pallidula

Capnia oenone

Leuctra augusta

Nemoura californica

Sta. 3.0 Cedar River, Wash., Cedar Falls

6/8/72 Coll. J. Malick, A.R. Gaufin

*Alloperla pacifica**Alloperla oregonensis**Leuctra sara**Isoperla fulva*

6/15/72 Coll. J. Malick

*Alloperla exquisita**Alloperla diversa**Alloperla oregonensis**Alloperla pacifica**Leuctra sara**Nemoura oregonensis*

6/22/72 Coll. J. Malick

Acroneuria pacifica (adult and cast skin)*Alloperla diversa**Alloperla oregonensis**Alloperla pacifica**Arcynopteryx parallela* (cast skin)*Leuctra sara*

6/29/72 Coll. J. Malick

*Alloperla pacifica**Alloperla pallidula**Isoperla trictura**Isogenus yakimae**Isoperla* ♀ sp.*Acroneuria californica*

7/6/72 Coll. J. Malick

*Alloperla delicata**Alloperla pacifica*

7/13/72 Coll. M. Stansbury

Isogenus pilatus ♀*Arcynopteryx parallela*?

7/20/72 Coll. L. Baker

Alloperla pacifica 3 ♀*Alloperla pallidula*

8/3/72 Coll. L. Baker

Nemoura californica

8/10/72 Coll. M. Stansbury

Nemoura californica

8/30/72 Coll. L. Baker

Nemoura californica

Sta. 4.0 Cedar River Wash. above Landsburg

6/8/72 Coll. J. Malick, A.R. Gaufin

Arcynopteryx parallela (cast skins)*Alloperla oregonensis**Alloperla severa*

6/15/72 Coll. J. Malick

*Alloperla diversa**Alloperla oregonensis**Isoperla trictura*

6/22/72 Coll. J. Malick

*Alloperla oregonensis**Isoperla trictura*

6/29/72 Coll. J. Malick

*Alloperla lineosa**Alloperla oregonensis**Isoperla trictura**Isogenus yakimae*

7/6/72 Coll. J. Malick

Alloperla lineosa (no mid pronotal s*Alloperla pallidula* (mid pronotal s*Isogenus yakimae* ♀

7/13/72 Coll. M. Stansbury

Alloperla lineosa

7/20/72 Coll. L. Baker

Alloperla pallidula

7/27/72 Coll. M. Stansbury

Alloperla pallidula

8/24/72

Alloperla pallidula

Sta. 5.0 Cedar River, Wash., Cedar Grove

6/9/72 Coll. J. Malick, A.R. Gaufin

*Alloperla oregonensis**Alloperla pacifica**Alloperla severa**Alloperla pallidula**Nemoura oregonensis**Capnia* sp.*Acroneuria californica**Isoperla trictura*

6/15/72 Coll. J. Malick

*Alloperla lineosa**Alloperla oregonensis**Alloperla pacifica**Isoperla trictura**Isogenus yakimae*

6/22/72 Coll. J. Malick

*Alloperla pallidula**Isoperla trictura**Isogenus yakimae*

Sta. 5.0 Cedar River, Wash, Cedar Grove (cont.)

7/6/72 Coll. J. Malick
Alloperla exquisita
Alloperla diversa
Alloperla severa
7/20/72 Coll. L. Baker
Alloperla pallidula
Isoperla mormona

8/10/72 M. Stansbury
Alloperla pallidula
Acroneuria californica
9/7/72 Coll. A.R.Gaufin & J. Malick
Alloperla autumnna
Acroneuria californica

Sta. 6.0 Cedar River, Wash, Renton, Washington

6/9/72
Alloperla pallidula
Alloperla pacifica
Alloperla severa
6/15/72 Coll. J. Malick
Alloperla pacifica
6/22/72 Coll. J. Malick
Alloperla lineosa
Isogenus yakimae

6/29/72 Coll. J. Malick
Alloperla lineosa
7/6/72 Coll. J. Malick
Alloperla pallidula (♀ no notch)
Alloperla lineosa
7/13/72 Coll. M. Stansbury
Alloperla pallidula
7/26/72 Coll. Larry Baker
Isoperla mormona