An Annotated Check List of Aquatic Insects Collected at Berry Creek Benton County, Oregon 1960-1984

N.H. Anderson and Bruce P. Hansen

Occasional Publication Number 2
Systematic Entomology Laboratory
Department of Entomology
Oregon State University
Corvallis, Oregon 97331
September 1987

OSU SYSTEMATIC ENTOMOLOGY LABORATORY

An Annotated Check List of Aquatic Insects Collected at Berry Creek Benton County, Oregon 1960-1984

Contents

An Annotated Check List of Aquatic Insects Collected at Berry Creek Benton County, Oregon 1960-1984

N.H. Anderson and Bruce P. Hansen
Department of Entomology • Oregon State University • Corvallis, OR 97331

Abstract

This report summarizes collection records of aquatic insects from Berry Creek for over 25 years. General collecting and about 20 research projects have resulted in a list of over 325 taxa for the site. Eight orders and 63 families are represented; almost one third of the species are Chironomidae.

Berry Creek is a second-order woodland stream of low gradient in the eastern foothills of the Oregon Coast Range (altitude 120 m). The stream is underlain by basaltic rocks with some sandstone and siltstone. The water is cool (< 20°C), low in $CaCO_3$ and nitrates, and has a pH range of 7.1-7.8.

The check list is based primarily on collections from a reach with flow (0.003-0.015 m^3/sec) controlled by a dam and bypass canal constructed in 1958. Excluding records of species collected only in an intermittent tributary (about 20 species) and also excluding Trichoptera from black lights (16 species), considered transients rather than a local population, reduces the current taxa list for Berry Creek to slightly under 300 species.

Introduction

Berry Creek has been the site of extensive aquatic insect studies for over 25 years. This work started in 1958 with the collaboration of entomologists John D. Lattin and Gerald F. Kraft in an interdisciplinary project on the effects of organic enrichment on the stream biota. The project was funded by a grant from the U.S. Public Health Service to Charles E. Warren, Department of Fish and Game Management, OSC. Other co-investigators were F.J. Burgess (Civil Engineering), H.K. Phinney (Botany), and J.H. Wales (Fish and Game).

The long-range goal of the Berry Creek project was to gain an understanding of the changes that stream enrichment (additions of sucrose and urea) could bring about in transfer of energy through stream communities (Warren et al. 1960, 1964). Emphasis was placed on pathways leading to fish production and to growth of nuisance organisms (primarily the "sewer fungus", a bacterium, *Sphaerotilus natans).* In this context, aquatic insects were part of the food chain for fish. The records of aquatic insects collected at that time are the basis of our taxa list.

This check list for eight insect orders summarizes data from several projects. Kraft's Ph.D. thesis (1963) provides the baseline data. He conducted an emergence-trap study from Dec. 1959 through Dec. 1960, as well as doing general collecting of adults and larvae. Additional general collecting and nine other entomological theses since that time have added to the species list and provided life-history information. Nomenclature from Kraft's study has been updated

and results of later studies are summarized in an introductory narrative for each order.

The tabulated numbers for emergence of mayflies and stoneflies are annual totals from six 1-ft² (86.3 cm²) traps. The traps were placed in fast (riffle) and slow (glide) areas of running water. They were moved, usually weekly, to avoid the development of a "trap habitat" (Kraft 1963).

Site Description

Berry Creek is a second-order stream located about 14 air km north of Corvallis in the Dunn Tract of McDonald Forest (SW ¼, Sec. 9, T10S, R5W) in the eastern foothills of the Coast Range. The altitude is 120 m. Berry Creek flows into Soap Creek, and thence to the Luckiamute River and the Willamette River.

Warren et al. (1964) provided a detailed description of the site and of the experimental section, which has flow control. The following is a summary from their data.

The drainage basin of Berry Creek is underlain by rocks of the Siletz volcanic series. Stream substrates are mostly basalt with some sandstone and siltstone. Particle size ranges from cobble to silt. The stream has a moderate gradient (1.3%) and regularly alternating riffles and pools. The water is neutral pH (7.1-7.8), soft (31-56 ppm $CaCO_3$), and low in nitrates (<0.5 ppm NO_3). Mean monthly temperature ranges from 3°C in January to about 20°C in July.

Berry Creek is covered by a high, dense canopy composed mainly of deciduous trees. Red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophylum*) are the major species. Other trees in the riparian area include Oregon ash (*Fraxinus latifolia*), cottonwood (*Populus trichocarpa*), Oregon oak (*Quercus garryana*), and the conifers, Douglas-fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*). Several shrub species occur in the understory and also contribute leaf detritus to the stream.

Most of the insect collecting has been done in the 460-m experimental section described by Warren et al. (1964). Flow is controlled by a dam and bypass canal. Discharge has been largely regulated at 0.12-0.50 ft³/sec (0.0034-0.014 m³/sec) since construction of the dam in 1958. In the early years the experimental channel was flushed by a flood (winter 1959) or deliberately by opening the sluice gate (Jan. 16, 1964; Feb. 1967). However, for the past 20 years it has been maintained at essentially summer low-flow conditions. The lack of flushing by winter spates has resulted in considerable accumulation of inorganic and organic fine sediments and small wood debris.

In addition to the records from Berry Creek we have also included taxa from a small unnamed temporary stream tributary. Tew (1971) sampled the insect fauna of the temporary stream during 1968-69 and 1969-70 and identified 58 species. The stream flows through open pasture and has only grasses and herbs along the banks and in much of the channel. The stream bed is comprised primarily of clay, with some exposed cobble. The timing of flow is dependent on the onset of winter rains; usually there is water in the channel from October or November until April.

Ephemeroptera (26 + species)

Kraft's (1963) mayfly list for Berry Creek included 27 species, but biosystematic studies by Lehmkuhl (1969) indicated that, particularly in the genus *Baetis*, several of these were synonyms. Data from Kraft's emergence-trap study are total numbers per year.

Collecting methods are coded as: emergence (E), larvae in benthos samples (B), adults swarming or on vegetation (W), and reared (R).

Collection records include Kraft (K), and other biological studies or benthic sampling. Common species recorded by several collectors in miscellaneous studies, or larvae identified only to the generic level are coded as (X). Benthic samples identified by Taxon Consulting (Ta) and Tom Dudley (D) are from an unpublished EPA survey in 1977-78. Lehmkuhl (L) (1968,1969), and Lehmkuhl and Anderson (1971) reviewed data on *Baetis*, *Paraleptophlebia*, and *Epeorus* from Oregon sites, including Berry Creek. Keyt (Ke) (1965) made larval-adult associations for some ephemerellids and for *Epeorus deceptivus* at the site. Tew (T) (1971) recorded *Centroptilum* and *Baetis tricaudatus* in a temporary stream tributary. Pereira (P) (1980) and Pereira and Anderson (1982) studied the mayfly fauna associated with wood and compared the abundance of taxa on this substrate with that occurring on stones and in kick samples.

Paraleptophlebia heteronea (McDunnough) was listed by Kraft as one of the common mayflies at Berry Creek, but Lehmkuhl (1969) considered this to be a misidentification of *P. temporalis*, so we only include *P. temporalis* in our list. Harper and Harper (1986) refer to Kraft's thesis for ecological notes on *P. heteronea*, but their records for its geographical range are all in the Rocky Mountain area and do not include Oregon.

EPHEMEROPTERA	Collector	Method	Number in Emergence Traps	Remarks
Siphlonuridae				
Ameletus suffusus McDunnough	Ta,D	B		
A. (nr.) *connectus* McDunnough	K	E	1	
A. (nr. or) *vancouverensis* McDunnough	K	E	1	
A. sp(p).	X,D,P	B		
Siphlonurus occidentalis (Eaton)	K	E		standing water
Baetidae				
Baetis bicaudatus Dodds	X,K,L,Ta,D	E,B	4	
B. hageni Eaton	X,L,Ta,D	B		
B. tricaudatus Dodds	X,K*,L,TA,D	E,W,B	103*	also temporary stream
Centroptilum elsa Traver	T	E,R,B		temporary stream
Heptageniidae				
Cinygma integrum Eaton	X,K,P,D	E,B	7	
Cinygmula reticulata McDunnough	X,L,D	R,B		
Epeorus (Iron) *albertae* (McDunnough)	L,Ke,Ta	W,R,B		
E. (Iron) *deceptivus* (McDunnough)	Ke,Ta	R,B		
E. (Iron) *longimanus* (Eaton)	X,L,Ta	B		
E. (Iron) sp(p).	X,K,P,Ta	E,B	3	
Ironodes nitidus (Eaton)	X,K,P, Ta,D	E,B	4	
Rithrogena morrisoni (Banks)	L	R		
R. sp.	X,K,P,Ta	E,B	2	
Leptophlebiidae				
Leptophlebia pacifica (McDunnough)	K	E	6	standing water
Paraleptophlebia bicornuta (McDunnough)	K,Ta,D	E,B	3	
P. debilis (Walker)	K,L,Ta,D	E,B	56	
P. gregalis (Eaton)	K	E	68	
P. temporalis (McDunnough)	K**,L,Ta,D	E,B	28	
P. sp(p).	X,P,D	B		
Ephemerellidae				
Drunella doddsi (Needham)	X,K,Ta	B		
D. flavilinea (McDunnough)	Ke,Ta	R,B		
Ephemerella infrequens McDunnough	Ta	B		
Serratella teresa (Traver)	Ta	B		
S. tibialis (McDunnough)	X,K,Ke,Ta	E,R,B	2	
Timpanoga hecuba (Eaton)	Ke,Ta	R,B		

* as *B.* spp.
**as *P. heteronea*

Plecoptera (39 species)

The following is essentially the species list for Berry Creek reported by Kraft (1963), whose determinations were done by S.G. Jewett, Portland, OR. Generic names have been updated following Harper and Stewart (1984). Additional records are benthos collections from Tom Dudley (D) and Taxon Consulting (Ta) for samples sorted during the EPA study in 1977-78 and from Anderson (1975) (A). Five species collected by Tew (1971) from a temporary stream tributary (also identified by Jewett) are coded as (T). Numbers in emergence traps are 1-year totals from Kraft (1963).

The stonefly fauna of Oak Creek, a stream of similar size within 10 km of Berry Creek, was studied from 1968 to 1970 using 1-m^2 emergence traps (Kerst and Anderson 1974, 1975). Of the 43 species in Oak Creek, 13 are not included in the Berry Creek list, and 8 from Berry Creek were not recorded by Kerst and Anderson. Differences between the lists are primarily for uncommon species but there are major discrepancies in the family Chloroperlidae.

Kraft (1963) only collected 2 species in his emergence traps whereas Kerst and Anderson obtained 8 species from Oak Creek. *Sweltsa fraterna*, which was only recorded by Kraft from general collecting, was the dominant stonefly at Oak Creek; 892 adults were collected, accounting for over one third of all stoneflies in the traps (Kerst and Anderson 1974). *Alloperla delicata* Frison and *Suwallia pallidula* (Banks) were common chloroperlids at Oak Creek that have not been recorded from Berry Creek.

PLECOPTERA	Collector	Number in Emergence Traps	Remarks
Peltoperlidae			
Soliperla quadrispinula (Jewett)	K		
Yoraperla brevis (Banks)	K		
Nemouridae			
Malenka californica (Claassen)	K		
M. cornuta (Claassen)	K	174	
Ostrocerca dimicki (Frison)	K,T		also temporary stream
Podmosta obscura (Frison)	T		temporary stream
Soyedina interrupta (Claassen)	K	3	
S. producta (Claassen)	K		
Zapada cinctipes (Banks)	K,D	33	
Z. oregonensis (Claassen)	K,D,T	13	also temporary stream
Leuctridae			
Despaxia augusta (Banks)	K		
Paraleuctra forcipata (Frison)	K	3	
P. sara (Claassen)	K	12	
Perlomyia sp.	Ta		
Capniidae			
Capnia pileata Jewett	T		temporary stream
C. projecta complex	K,T	3	also temporary stream
Eucapnopsis brevicauda (Claassen)	A		
Taeniopterygidae			
Taenionema nigripennis (Banks)	K	25	
T. oregonensis (Needham & Claassen)	K	3	
Taeniopteryx maura (Pictet)	K	1	
Pteronarcidae			
Pteronarcella regularis (Hagen)	K,D	3	
Pteronarcys princeps Banks	K		
Perlodidae			
Cascadoperla trictura (Hoppe)	K	1	
Chernokrilus misnomus (Claassen)	K		
Cultus sp.	D		
Frisonia picticeps (Hanson)	Ta		
Isoperla marmorata (Needham & Claassen)	K	1	
I. mormona Banks	K	8	
I. sobria (Hagen) (as *I. ebria*)	K	1	
Kogotus nonus (Needham & Claassen)	D		
Megarcys subtruncata Hanson	Ta		
Skwala parallela (Frison)	D		
Chloroperlidae			
Hastaperla chilnualna Ricker	Ta		
Kathroperla perdita (Banks)	Ta		
Sweltsa borealis (Banks)	K	2	
S. coloradensis (Banks)	K	10	
S. fraterna (Frison)	K		
Perlidae			
Calineuria californica (Banks)	K,D		
Hesperoperla pacifica (Banks)	K,Ta	2	

Odonata (2 species)

Except for a record of an aeshnid larva in the 1977-78 EPA study, the only odonate at Berry Creek is *Octogomphus specularis*. This species was recorded by Kraft (1963) and in all benthos studies. Larvae are common to abundant in the substrates of shallow riffles, glides, and pools. Numerous adults emerging on grass stems and shrubs were noted on June 11, 1984, at 1-2 pm by Anderson and Hansen.

ODONATA
Gomphidae
Octogomphis specularis (Hagen)
Aeshnidae
(Not identified)

Megaloptera (3 species)

In this small order, only *Sialis californica* is common at Berry Creek, although there are occasional records of the pond-inhabiting species *S. rotunda*. A detailed study of production ecology of *S. californica* was conducted in 1967-68 (Azam 1969, Azam and Anderson 1969). Standing crop of larvae was higher in the enriched section than in the non-enriched control and lower prey densities in the latter resulted in more *S. californica* having a 2-year life cycle. *Trichogramma semblidis* is an important hymenopterous parasite of *Sialis* eggs at Berry Creek.

Evans (1972) recorded the hellgramite *Protochauloides spenceri* from the temporary stream tributary. Based on the duration of the flow period (early November to mid-April) when the larvae are active, he estimated a 5-year life cycle at this site compared with 2 years in a permanent stream.

MEGALOPTERA
Sialidae
Sialis californica Banks
S. rotunda Banks
Corydalidae
Protochauloides spenceri (Munroe)

Trichoptera (54 species)

The caddisfly fauna of Berry Creek is well known because biology of this order has been a focus of the aquatic entomology program at OSU, and state records were compiled by Anderson (1976). Close cooperation with D.G. Denning, Moraga, CA; G.B. Wiggins, Royal Ontario Museum, Toronto; and the local expertise of R.W. Wisseman has resulted in a nearly complete set of larval-adult associations for Berry Creek. Caddisflies usually have been identified at least to the generic level in benthos sampling.

Records for the site are listed by collector and method of collecting. The latter is an indication of whether the creek is a breeding habitat. Benthos collections (B) are records of larvae and/or pupae. Adults reared (R) and from emergence traps (E) are from the creek, and those collected on the wing (W) are probably a local population. Black lights (B) sample adults from undetermined habitats, so those collected only by this method are listed separately. The species from light traps are primarily strong-flying transients that do not breed in small woodland streams. The temporary stream (T) records are from a tributary with winter flow from about November-April that was studied by Tew (1971). Excluding records from lights and the temporary stream, the list for Berry Creek is reduced to about 30 species.

Collector records are coded as: N.H. Anderson (A) (1975, 1976) and other dates; T. Dudley (D) and Taxon Consulting (Ta), material sorted and identified from the 1977-78 EPA study; E.D. Evans (E), black light collecting, 1968; G.F. Kraft (K) (1963), emergence trap study; M.P. Tew (T), fauna of a temporary stream; J.L. Wold (Wo) (1974) general collecting; and R.W. Wisseman (W), general collecting, 1980-85. Voucher specimens are in the OSU Systematic Entomology Laboratory and some material is deposited in the ROM, Toronto.

Baseline data on the caddis fauna at the time flow control was initiated are limited because Kraft (1963) only collected 194 adults in emergence traps. *Wormaldia anilla*, *Psychomyia lumina*, and *Agapetus bifidus* were the common species. Species richness (17) was definitely underestimated (as was abundance, probably) because his traps were located in riffles and glides. Thus the edge, backwater, and pool habitats frequented by detritivorous species were not sampled. Also, his emergence traps were probably too small to collect species that occur at relatively low population densities.

Life history information for many of the Berry Creek species is given in Anderson (1976). Quantitative data on *Lepidostoma quercina* is provided by Grafius and Anderson (1979). Seasonal density of *Glossosoma penitum* is reported by Anderson and Bourne (1974).

TRICHOPTERA	Collector	Method	Black Light Only	Remarks
Rhyacophilidae				
Rhyacophila brunnea Banks	K*,Wo*, *Ta*,D**	E,B		*as *R. acropedes*
R. angelita Banks	Ta,W	W,B		
R. blarina Ross	K,Wo,D,W	R,B		
R. grandis Banks	T,Ta,D	W,R,B		also temporary stream
R. narvae Navás	T,Ta,D,W	W,B		
R. norcuta Ross	T	R		temporary stream
R. vaccua Milne	W	R		
R. vagrita Milne	D	B		
R. vao Milne	Wo,W	W,R,B		
R. vedra Milne	K,E*,Wo,Ta	E,W,B		*common at light
R. vocala Milne	Ta	B		
R. vuzana Milne	W		x	
Glossosomatidae				
Agapetus bifidus Denning	K,A,W	E,R,B		
Glossosoma penitum Banks	K,A,W,D	E,R,B		
G. traviatum Banks	W		x	
Hydroptilidae				
Hydroptila sp.	K,W	E,B		
Stactobiella delira (Ross)	W	B		
Philopotamidae				
Dolophilodes pallidipes (Banks)	W	W		
Wormaldia anilla (Ross)	K,A,W	E,B		
W. gabriella (Banks)	K	E		
Psychomyiidae				
Psychomyia lumina (Ross)	K,A,W	E,B		
Polycentropodidae				
Polycentropus variegatus Banks	A*,W	W,B		*as *P. halidus*
Hydropsychidae				
Cheumatopsyche campyla Ross	W		x	
Hydropsyche amblis Ross	K*,W	E,B		*? as *H. tana*
H. californica Banks	W		x	
H. centra Ross	W		x	
H. oslari Banks	W		x	
Parapsyche almota Ross	K*,T**,W	E,B		*as *P. elsis* **also temporary stream
Phryganeidae				
Ptilostomis ocellifera (Walker)	A,E,D,W	B	x	also 1 larva
Limnephilidae				
Dicosmoecus gilvipes (Hagen)	K*,W	B		*as *D.* sp.
Onocosmoecus unicolor (Banks)	A,Ta,W	W,R,B		
Neophylax rickeri Milne	W		x	
N. splendens Denning	A,W	W,B		
Pseudostenophylax edwardsi (Banks)	T,A			temporary stream
Lenarchus rho (Milne)	W		x	
Limnephilus aretto Ross	T,A	R,B		temporary stream
L. harrimani Banks	E		x	
L. lunonus Ross	W		x	
L. nogus Ross	T,A	R,B		temporary stream
L. occidentalis Banks	E		x	
L. sitchensis (Kolenati)	T,A	R,B		temporary stream
Grammataulius betteni Hill-Griffin	T,A	R,B		temporary stream
Hatesochila taylori (Banks)	E,W		x	
Hesperophylax alaskensis (Banks)	T,W	R,B		temporary stream

TRICHOPTERA (continued)	Collector	Method	Black Light Only	Remarks
Chyranda centralis (Banks)	E,W		x	
Hydatophylax hesperus (Banks)	K,A,W	E,R,B		
Psychoglypha avigo (Ross)	W	B		
P. subborealis (Banks)	W		x	
Lepidostomatidae				
Lepidostoma cinereum (Banks)	W		x	
L. quercina Ross	K,A,Ta,D,W	E,R,B		
L. roafi (Milne)	A,W	R,B		
L. unicolor (Banks)	A,W	R,B		
Brachycentridae				
Micrasema dimicki (Milne)	K,A,W	E,R,B		
Calamoceratidae				
Heteroplectron californicum McLachlan	A,W	R,B		

* Asterisks refer to remarks for each species.

Coleoptera (37 taxa)

This list of beetles is from Kraft (1963) (K) with updating from later collections. Kraft's material was identified by P.J. Spangler, USNM, Washington, DC. Beetles from the temporary stream tributary recorded by Tew (1971) (T) are listed in a separate column. These were identified by L. Russell, OSU. Other records are added as: N.H. Anderson (A) (1975 and other dates); H.P. Brown (B) (1985); T. Dudley (D) and Taxon Consulting (Ta), material sorted and identified from the 1977-1978 EPA study; and R.J. Steedman (S).

Kraft's records are from general collecting because beetles are rarely collected from aquatic emergence traps. His list of 12 species of Staphylinidae is not included, as these are terrestrial riparian beetles. The only detailed study of an aquatic beetle at Berry Creek is that for the xylophagous *Lara avara* (Steedman 1983, Steedman and Anderson 1985).

COLEOPTERA	Collector	Temporary Stream
Haliplidae		
Peltodytes callosus LeConte	A,T	x
Dytiscidae		
Agabus confertus LeConte	T	x
A. lugens LeConte	K,T	x
A. lutosus LeConte	T	x
Deronectes griseostriatus (DeGeer)	K,T	x
D. striatellus (LeConte)	K,T	x
Dytiscus hatchi Wallis	K	
D. marginicollis LeConte	K	
Hydroporus fortis LeConte	T	x
H. nr. *planiusculis* Fall	T	x
H. nr. *subpubescens* LeConte	T	x
H. vilis LeConte	K	
Hydrovatus sp.	Ta	
Laccophilus decipiens LeConte	K	
Gyrinidae		
Gyrinus pleuralis Fall	T	x
G. plicifer LeConte	K,T	x
Hydrophilidae		
Ametor latus (Horn)	K,D	
Anacaena limbata Fabricius	K,T	x
Crenitis seriellis (Fall)	K	
Cymbiodyta imbellus LeConte	T	x
C. pacifica Leech	A	
Helophorus sp.	D	
Hydrobius sp.	D,Ta	
Laccobius californicus d'Orchymont	T	x
Tropisternus sp.	D	
Hydraenidae		
Hydraena vandykei d'Orchymont	A,D,K	
Ochthebius rectus LeConte	A,D	
Psephenidae		
Acneus sp.	A	
Elmidae		
Cleptelmis sp.	Ta	
Heterlimnius koebeli (Martin)	D	
Lara avara LeConte	A,S,D	
Narpus concolor (LeConte)	K	
Optioservus sp.	D,Ta	
Zaitzevia milleri Brown	B	
Z. parvula (Horn)	D	
Helodidae		
Cyphon concinnus (LeConte)	K	
Elodes sp.	K	

Diptera (excluding Chironomidae) (65 + taxa)

This list for Berry Creek is from Kraft's thesis (1963), with additions from Dudley (D) and Taxon Consulting (Ta) in the EPA study, and Anderson (1975). Specialists who identified Kraft's material were: Tipulidae, G. Byers, Kansas Univ.; Dixidae, Ceratopogonidae, and Simuliidae, A. Stone, USNM; Dolichopodidae, H. Robinson, Wofford College, Spartansburg, SC; and Sciomyzidae, B.A. Foote, Kent State Univ. Speir (1976) had a site upstream from the controlled-flow section for his work with Simuliidae; four additional species records for black flies are coded here as (S). Records from the temporary stream tributary by Tew (1971) are listed in a separate column. His material was determined by: Tipulidae, C.D. Hynes, Cal. Poly.; Simuliidae, J.A. Speir; Dolichopodidae, F.C. Harmston, Utah State Univ.; and Ephydridae, W. Wirth, USNM.

A detailed study of the wood-boring craneflies, *Lipsothrix* spp., is reported by Dudley (1982) and Dudley and Anderson (1987). Records for *Lipsothrix* and other wood-associated flies included in Dudley and Anderson (1982) are coded as (DA).

DIPTERA (excluding Chironomidae)	Collector	Temporary Stream
Tipulidae		
Antocha sp(p.)	A,Ta,D	
Austrolimnophila badia Alexander	DA	
Dicranota cayuga Alexander	K	
D. sp.	T	x
Erioptera oregonensis Alexander	T	x
E. sp.	Ta	
Hexatoma sp.	Ta,T,D	x
Holorusia grandis (Bergroth)	K	
Limnophila sp.	Ta,T	x
Limonia sciophila Osten Sacken	K	
Lipsothrix fenderi Alexander	K,DA	
L. nigrilinea (Doane)	DA	
Molophilus sp.	Ta	
Ormosia upsilon Alexander	K	
Pedicia ampla (Doane)	K	
P. bicomata Alexander	A	
P. sp.	T	x
Tipula aspersa Doane	K	
T. fulvolineata Doane	K	
T. sp.	T	x
Rhabdomastix sp.	Ta	
Ptychopteridae		
Ptychoptera townesi Alexander	K	
Blephariceridae		
Agathon comstocki (Kellogg)	K	
Psychodidae		
Maruina lanceolata (Kincaid)	K	
Pericoma sp.	Ta,D	
Psychoda sp.	K	
Mycetophilidae		
Symmerus sp.	DA	
Dixidae		
Dixa arge Dyar & Shannon	K	
D. californica Johannsen	K	
D. johansenni Garrett	K	
D. rhathyme Dyar & Shannon	K	
Simuliidae		
Cnephia minus (Dyar & Shannon)	K,T	x
Prosimulium caudatum Shewell	S	
P. dicum Dyar & Shannon	S,T	x
P. fulvum (Coquillett)	S,T	x
Simulium arcticum Malloch	K	
S. canadense Hearle	K	
S. piperi Dyar & Shannon	K	
S. pugetense Dyar & Shannon	K,T	x
S. tuberosum (Lundstrom)	K	
S. vittatum Zetterstedt	K	
Twinnia nova (Dyar & Shannon)	A,T	x
Ceratopogonidae		
Atrichopogon epicautae Wirth	K	
Culicoides jamesi Fox	K	
Forcipomyia sp.	D	
Johannsenomyia albibasis (Malloch)	K	
Mallochohelea sybleae (Wirth)	K	
Neurohelea nigra Wirth	K	
Palpomyia aldrichi (Malloch)	K	
P. flavipes (Meigen)	K	
Serromyia barberi Wirth	K	
Thaumaleidae		
? *Thaumalea* sp.	A	
Tabanidae		
? *Chrysops* sp.	Ta,D	
Athericidae		
Atherix sp.	Ta	
Pelecorhynchidae		
Glutops sp.	A	
Dolichopodidae		
Argyra bimaculata VanDuzee	K	
Campsicnemus claudicans Loew	T	x
C. degener Wheeler	K	
Dolichopus crenatus Osten Sacken	K	
D. duplicatus Aldrich	K	
D. grandis Aldrich	K	
D. nigricauda VanDuzee	K	
D. renidescens Melander & Brues	K	
D. tenuipes Aldrich	K	
Empididae		
Hemerodromia sp.	K,DA	
Sciomyzidae		
Atrichomelina pubera (Loew)	K	
Syrphidae		
Pocota sp.	DA	
Xylota sp.	DA	
Ephydridae		
Hydrellia sp.	T	x

Diptera - Family Chironomidae (91 taxa)

This is the dominant family at Berry Creek, both in number of individuals and in number of species. Although chironomids have been sampled in several studies at the site, the complexity of systematic problems and difficulties of identification have resulted in most identifications being limited to the family or subfamily level. Despite this, as is indicated below, qualitative collections of various life stages have resulted in an extensive taxa list for this family.

Kraft (1963) collected 8,434 chironomid adults in a year of emergence-trap sampling, compared to a combined total of 1,065 for other nematocerous Diptera, mayflies, stoneflies, and caddisflies. The subfamily composition was: Orthocladiinae, 5,460; Chironominae, 2,723; Tanypodinae, 191; and Diamesinae, 55. J. Sublette, Eastern New Mexico Univ., identified the material and recognized 32 species of which 23 were undescribed. Unfortunately the microscope slide preparations in Hoyer's medium deteriorated and the voucher collection is no longer usable (Sublette, personal communication).

R.K. Eppley made further studies of the Berry Creek midge fauna from 1963-66. He worked with Sublette on the identifications, so his nomenclature should be consistent with that of Kraft. A synoptic collection is not available, but Eppley's unpublished data increased the chironomid list to almost 50 species. Generic names from the Kraft and Eppley studies have been updated according to current literature sources.

Extensive collecting in Oregon, and publication of new keys to larvae, pupae, and adults of Nearctic chironomids has resulted in considerable progress on identification of our midge fauna in the last decade. Berry Creek has been a major collecting site in a project on wood-associated insects (Anderson 1984), and for data towards preparation of a chironomid species list for Oregon. Specialists who have identified material are W.P. Coffman, Univ. of Pittsburgh; D. Oliver, BRI, Ottawa; P. Cranston, BMNH, London; and J.K. Furnish, OSU.

Coffman collected in Oregon from April 25 to May 31, 1977. His survey, including 20 streams in the Coast and Cascade Ranges, was based on collections of pupal exuviae and resulted in a list of over 150 morphotypes. Many of these cannot be positively assigned to a described species, which is based on the adult stage, so records are listed as "cf species x". Coffman's identifications from Berry Creek are for about 60 morphotypes that are in his collection. Our list is based on his report for exuviae from his 1977 visit (Coffman 1977) and on larvae collected from wood by Anderson in 1977.

Material identified by Oliver, Cranston, and Furnish is largely from Anderson's wood-invertebrate project supported by NSF (1975-1985). Voucher slides of larvae prepared by Furnish from five collections (July 1983, July 1984, Oct. 1984, Feb. 1985, and May 1985) are deposited in the OSU Systematic Entomology Laboratory. Research on xylophagous chironomids was the focus of the Oliver/Cranston study but this has resulted in identifications of many incidental (wood-surface associated) larvae as well. Oliver identified more than 10 large shipments of midges from 1979-1985. This material is deposited in the Canadian National Collection. Cranston collaborated with Oliver on the xylophage midge study. He also provided identifications of nine taxa from a visit to Berry Creek on June 27, 1985.

CHIRONOMIDAE	Kraft-Eppley 1959-66	Coffman 1977	Oliver-Cranston 1979-85	Furnish 1983-85
Tanypodinae (13 taxa)				
Pentaneurini				
Conchapelopia sp.		x		
Larsia pallens (Coquillett)			x	x
				(*L.* sp.)
Meropelopia flavifrons (Johannsen)	x (as *Pentaneura*)			
Nilotanypus sp.				x
Paramerina fragilis (Walley)			x	
Thienemannimyia complex		x	x	x
Zavrelimyia thryptica (Sublette)	x (as *Pentaneura*)			

CHIRONOMIDAE (continued)	Kraft-Eppley 1959-66	Coffman 1977	Oliver-Cranston 1979-85	Furnish 1983-85
Z. sp. 1		x		
Z. sp. 2		x		
Macropelopiini				
Brundiniella eumorpha (Sublette)		x		
Macropelopia sp.		x		x
Procladius (Holotanypus) sp.		x		
Radotanypus submarginella (Sublette)		x		
Natarsiini				
Natarsia sp.	x (as *Anatopynia*)	x		x
Diamesinae (3 taxa)				
Diamesa heteropus (Coquillett)	x (Hansen & Cook 1976)			
Pseudodiamesa diastena Sublette	x			
Sympotthastia sp.		x		
Prodiamesinae (1 taxon)				
Prodiamesa olivacea (Meigen)	x			
Orthocladiinae (50 taxa)				
Acricotopus spp.	x (3 species as *Trichocladius*)			
Brillia cf *flavifrons*		x		
B. cf *retifinus*	x (+ 1 species)	x	x	x
Bryophaenocladius sp.			x (terrestrial)	
? *Camptocladius* sp.			x (terrestrial)	
Chaetocladius sp.	x	x	x	x
Corynoneura spp.	x	x (3 species)	x	x
Cricotopus (C.) bicinctus gr. sp.	x (as *C.* sp.)	x		
C. tremulus gr. sp.				x
Eukiefferiella brevinervis (Malloch)	x (+ 3 species)			
E. brevicalcar gr. sp.		x		
E. claripennis gr. sp.				x
E. coerulescens gr. sp.		x		
E. devonica gr. sp.		x		
Heleniella cf *curtistila*	x (as *H.* sp.)	x		
Heterotrissocladius cf *marcidus*		x		
Krenosmittia cf *boreoalpina*		x		
Limnophyes spp.	x		x (2 species)	x
Metriocnemus aequalis (Johannsen)	x (+ 2 species)		x (*M.* sp.)	
Nanocladius cf *balticus*		x		
N. brevinervis	x (+ 3 species)			
Orthocladius sp. or spp.	x (4 species)	x	x	x

CHIRONOMIDAE (continued)	Kraft-Eppley 1959-66	Coffman 1977	Oliver-Cranston 1979-85	Furnish 1983-85
Orthocladius (O.) cf *appersoni*		x		
O. (O.) cf *curtiseta*		x		
O. (O.) cf *dentifer*		x		
O. (O.) cf *frigidus*		x		
O. (O.) ? *obumbratus*			x	
O. (Symposiocladius) lignicola Kieffer			x	x
Parachaetocladius cf *hirtipectus*		x		
Parakiefferiella sp.	x	x (2 species)		
Parametriocnemus sp.		x	x	x
P. cf *lundbecki*		x		
Paraphaenocladius sp.			x	
Psilometriocnemus cf *triannulatus*		x		
Rheocricotopus effusus gr. sp.	x (3 species)	x	x (*R.* sp.)	x (*R.* sp.)
Stilocladius sp.				x
Synorthocladius cf *semivirens*		x		x (*S.* sp.)
Thienemanniella sp.	x	x		x
Tvetenia bavarica gr. sp.		x		x
T. calvescens gr. sp.		x		
Chironominae (24 taxa)				
Chironomini				
Chironomus jucundus Walker	x (+ 2 species)			
Cryptochironomus sp.				x
Microtendipes sp.			x	
Phaenopsectra sp.	x	x		
Paratendipes albimanus (Meigen)	x			
Polypedilum sp.		x	x	x
P. fuscipenne (Meigen)	x			
P. fallax gr. sp.		x (2 species)		
Stenochironomus (S.) colei (Malloch)		x (*S.* sp.)	x	x (*S.* sp.)
Tribelos protexus (Townes)	x	x (*T.* sp.)		
Tanytarsini				
Cladotanytarsus sp.		x		
Micropsectra polita (Malloch)	x (+ 1 species)		x (*M.* sp.)	
M. groenlandica gr. sp.		x		
M. dives gr. sp.		x		
Rheotanytarsus sp.		x		x
Stempellina sp.				x
Stempellinella sp. or spp.		x (2 species)		x (*S.* sp.)
S. cf *brevis*		x		
Tanytarsus (T.) eminulus gr. sp.	x (+ 1 species)	x		
T. (T.) lugens gr. sp.		x		
Zavrelia sp.	x			

Hemiptera-Heteroptera (9 species)

This list of aquatic and semiaquatic bugs is from Kraft (1963), whose material was determined by J.D. Lattin. Hemiptera occur on the shore or water surface and not in the stream benthos, so they have not been included in later studies. Kraft recorded *Gerris remigis* as occurring at >1 individual/ft² (86.3 cm²) on the water surface in the experimental section, and lists *Microvelia californiensis* as the second most abundant hemipteran at Berry Creek. In a study of invertebrates associated with wood debris, Anderson (unpublished data) found that eggs of *Gerris* and *Microvelia* were common on tethered sticks at the interface with the water.

HEMIPTERA-HETEROPTERA

Corixidae
Graptocorixa californica (Hungerford)
Notonectidae
Notonecta sp.
Gelastocoridae
Gelastocoris oculatus (Fabricius)
Gerridae
**Gerris remigis* (Say)
G. incognitus (Drake & Hottes)
Veliidae
Microvelia californiensis (McKinstry)
M. paludicola (Champion)
Mesoveliidae
Macrovelia horni Uhler
Saldidae
Saldula pallipes (Fabricius)

* Identified as *G. nyctalis*. Stonedahl and Lattin (1982) use the name *G. remigis* for Oregon and Washington populations.

Acknowledgements

In compiling this check list we have drawn heavily on the unpublished data of a large number of entomologists who have worked at Berry Creek during the past 30 years. Collection records and identifications from these persons are acknowledged in the text. We are especially grateful to Charles Warren, who established the Berry Creek project, and to Jack Lattin, Gerald Kraft, and Dick Eppley for their entomological contributions in the early years of the study.

Our project was supported by the OSU Water Resources Research Institute by Grant No. 14-08-0001-G-1039 from the USDI Geological Survey. This is Technical Paper No. 8256 of the Oregon Agriculture Experiment Station.

References

Anderson, N.H. 1975. Aquatic and semi-aquatic insects of Berry Creek, Benton Co., Oregon. Unpublished list, Aquatic Entomology. OSU. 10 pp.

Anderson, N.H. 1976. The distribution and biology of the Oregon Trichoptera. Oregon Agricultural Experiment Station, Technical Bulletin No. 134. 152 pp.

Anderson, N.H. 1984. Utilization of small wood debris by invertebrates in stream systems. Final Report, National Science Foundation, Grant No. BSR 80-22190. 4 pp.

Anderson, N.H., and J.R. Bourne. 1974. Bionomics of three species of glossosomatid caddisflies (Trichoptera: Glossosomatidae) in Oregon. Canadian Journal of Zoology 52:405-11.

Azam, K.M. 1969. Life history and production studies of *Sialis californica* Banks and *Sialis rotunda* Banks (Megaloptera: Sialidae). Ph.D. Thesis, OSU. 111 pp.

Azam, K.M., and N.H. Anderson. 1969. Life history and habits of *Sialis rotunda* and *S. californica* in western Oregon. Annals of the Entomological Society of America 62:549-58.

Brown, H. 1985. A new northwestern riffle beetle resembling *Zaitzevia parvula* (Elmidae). North American Benthological Society (Abstract No. 173). Pages 95-96.

Coffman, W.P. 1977. (a)Chironomidae based on pupal exuviae collected Apr. 25-31. (b)Chironomid larvae from wood, Apr. 25-31. Unpublished lists, Aquatic Entomology, OSU. 9 pp. and 2 pp.

Dudley, T.L. 1982. Population and production ecology of *Lipsothrix* spp. (Diptera: Tipulidae). M.S. Thesis, OSU. 161 pp.

Dudley, T., and N.H. Anderson. 1982. A survey of invertebrates associated with wood debris in aquatic habitats. Melanderia 39:1-21.

Dudley, T., and N.H. Anderson. 1987. The biology and life cycles of *Lipsothrix* spp. (Diptera: Tipulidae) inhabiting wood in western Oregon streams. Freshwater Biology 17:437-51.

Evans, E.D. 1972. A study of the Megaloptera of the Pacific coastal region of the United States. Ph.D. Thesis, OSU. 210 pp.

Grafius, E., and N.H. Anderson. 1979. Population dynamics, bioenergetics, and role of *Lepidostoma quercina* Ross (Trichoptera: Lepidostomatidae) in an Oregon woodland stream. Ecology 60: 433-41.

Hansen, D.C., and E.F. Cook. 1976. The systematics and morphology of the Nearctic species of *Diamesa* Meigen, 1835 (Diptera: Chironomidae). Memoirs American Entomological Society, No. 30. 203 pp.

Harper, F., and P.P. Harper. 1986. An annotated key to the adult males of the northwestern Nearctic species of *Paraleptophlebia* Lestage (Ephemeroptera: Leptophlebiidae) with the description of a new species. Canadian Journal of Zoology 64:1460-68.

Harper, P.P., and K.W. Stewart. 1984. Chapter 13: Plecoptera. Pages 182-230 in R.W. Merritt and K.W.

Cummins, eds., An Introduction to the Aquatic Insects of North America. Kendall/Hunt, Dubuque, IA.

Kerst, C.D., and N.H. Anderson. 1974. Emergence patterns of Plecoptera in a stream in Oregon, USA. Freshwater Biology 4:205-12.

Kerst, C.D., and N.H. Anderson. 1975. The Plecoptera community of a small stream in Oregon, U.S.A. Freshwater Biology 5: 189-203.

Keyt, K.A. 1965. Preliminary biological studies of Oregon Ephemeroptera. NSF Undergraduate Research Participation Program report. Unpublished report, Aquatic Entomology, OSU. 5 pp.

Kraft, G.F. 1963. Seasonal occurrence and distribution of insects in Berry Creek. Ph.D. Thesis, OSU. 122 pp.

Lehmkuhl, D.M. 1968. Observations on the life history of four species of *Epeorus* in western Oregon (Ephemeroptera: Heptageniidae). Pan-Pacific Entomologist 44:129-37.

Lehmkuhl, D.M. 1969. Biology and downstream drift of some Oregon Ephemeroptera. Ph.D. Thesis, OSU. 110 pp.

Lehmkuhl, D.M., and N.H. Anderson. 1971. Contributions to the biology and taxonomy of the *Paraleptophlebia* of Oregon (Ephemeroptera: Leptophlebiidae). Pan-Pacific Entomologist 47:85-93.

Pereira, C.R.D. 1980. Life history studies of *Cinygma integrum* Eaton (Ephemeroptera: Heptageniidae) and other mayflies associated with wood substrates in Oregon streams. M.S. Thesis, OSU. 92 pp.

Pereira, C.R.D., and N.H. Anderson. 1982. Observations on the life history and feeding of *Cinygma integrum* Eaton and *Ironodes nitidus* (Eaton) (Ephemeroptera: Heptageniidae). Melanderia 39:35-45.

Speir, J.A. 1976. The ecology and production dynamics of four black fly species (Diptera: Simuliidae) in western Oregon streams. Ph.D. Thesis, OSU. 297 pp.

Steedman, R.J. 1983. Life history and feeding role of the xylophagous aquatic beetle, *Lara avara* LeConte (Dryopoidea: Elmidae). M.S. Thesis, OSU. 106 pp.

Steedman, R.J., and N.H. Anderson. 1985. Life history and ecological role of the xylophagous aquatic beetle, *Lara avara* LeConte (Dryopoidea: Elmidae). Freshwater Biology 15:535-46.

Stonedahl, G.M., and J.D. Lattin. 1982. The Gerridae or water striders of Oregon and Washington (Hemiptera: Heteroptera). Oregon Agricultural Experiment Station, Technical Bulletin No. 144. 36 pp.

Tew, M.P. 1971. The species composition and adaptations of insects in an intermittent stream in western Oregon. M.S. Thesis, OSU. 84 pp.

Warren, C.E., F.J. Burgess, J.D. Lattin, H.K. Phinney, and J.H. Wales. 1960. Ecological studies of an experimental stream. Progress Report. U.S. Public Health Service, Research Grant RG 5493. 58 pp.

Warren, C.E., J.H. Wales, G.E. Davis, and P. Doudoroff. 1964. Trout production in an experimental stream enriched with sucrose. Journal of Wildlife Management 28:617-60.

Wold, J.L. 1974. Systematics of the genus *Rhyacophila* (Trichoptera: Rhyacophilidae) in western North America with special reference to the immature stages. M.S. Thesis, OSU. 229 pp.