

INTERNAL REPORT 129

LITERATURE REVIEW OF FOODS OF AQUATIC INSECTS

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Introduction

The following list is from published feeding records up to 1972, of selected aquatic insects with some interpretive comments. Food types are listed as 1. diatoms and algae (a); 2. detritus (d); and 3. animal (c). Percentages of each food, when given, are listed in the same order as the respective food categories. Where one category comprised more than 75% of the diet, only the dominant food type is listed. An attempt was made to find references at the species level, but where these were not available, more general references at the generic or familial level are included. Data reported by Coffman (1967) are also shown in Coffman, Cummins and Wuycheck (1971) and those of Minshall (1965) are repeated in Minshall (1967). The original theses are used since data are presented in a more quantitative manner.

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Ephemeroptera			
Baetidae			
<u>Baetis bicaudatus</u>	ad(41, 57) ³	Gilpin & Brusven, 1970	38 specimens, 26 empty
<u>B. herodes</u>	d(96) ²	Minshall, 1965	measured monthly
<u>B. parvus</u>	ad(41, 53) ³	Gilpin & Grusven, 1970	10 specimens, 1 empty
<u>B. phoebus</u>	d(78) ²	Minshall, 1965	measured monthly
<u>B. rhodani</u>	ad	Jones, 1950	fed on red algae
<u>B. tricaudatus</u>	ad(45, 52) ³	Gilpin & Brusven, 1970	74 specimens, 31 empty
<u>B. vagans</u>	ad(35, 65)	Minckley, 1963	data reported graphically
<u>Baetis</u> sp.	ad(50, 50) ²	Muttkowski & Smith, 1929	2 specimens
<u>Baetis</u> sp.	a	Ivanova, 1958	in lab preference study
<u>Baetis</u> sp.	ad(70, 30) ³	Chapman & Demory, 1963	Deer Cr. 290 specimens
<u>Baetis</u> sp.	ad(55, 45) ³	Chapman & Demory, 1963	Needle Br. 220 specimens
<u>Callibaetis fluctuans</u>	d	Morgan, 1911	fed on artificial diets of ground plant material

a = algal feeding

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¹based on food calories

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Ephemeroptera			
Baetidae			
<u>Callibaetis</u> sp.	a	Morgan, 1911	---
<u>Centroptilum album</u>	a(88) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>C. luteolum</u>	a	Ivanova, 1958	lab preference study
<u>C. rufostrigatum</u>	d(95) ²	Minshall, 1965	measured monthly
<u>Centroptilum</u> sp.	ad(40, 58) ³	Gilpin & Brusven, 1970	13 specimens, 8 empty
<u>Cloeon dipterum</u>	a	Wissmeyer, 1926	---
<u>C. dipterum</u>	a	Ivanova, 1958	in lab preference study
<u>C. dipterum</u>	a	Brown, 1960	---
<u>Pseudocloeon</u> sp.	a(99) ¹	Coffman, 1967	riffle areas in Aug & Oct
Baetiscidae			
<u>Baetisca bajkovi</u>	a	Lehmkuhl, 1972	---
Caenidae			
<u>Caenis anceps</u>	a(92) ¹	Coffman, 1967	riffle areas in Aug & Oct

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Ephemeroptera (cont.)			
Caenidae			
<u>Caenis horaria</u>	d	Moon, 1938	---
Ephemerellidae			
<u>Drunella</u> sp.	ad(37, 45) ³	Muttkowski & Smith, 1929	25 specimens
<u>Ephemerella aestiva</u>	ad(69, 31) ¹	Coffman, 1967	from riffles in Aug & Oct
<u>E. coloradensis</u>	ad(40, 51) ³	Gilpin & Brusven, 1970	7 specimens
<u>E. doddsi</u>	ad(52, 45) ³	Gilpin & Brusven, 1970	55 specimens, 25 empty
<u>E. doddsi</u>	c	Snow, 1973 unpublished	can be carnivorous on other mayflies
<u>E. dorothea</u>	ad(49, 51) ¹	Coffman, 1967	from riffles in Aug & Oct
<u>E. edmundsi</u>	ad(27, 70) ³	Gilpin & Brusven, 1970	5 specimens, 2 empty
<u>E. flavilinea</u>	ad(41, 56) ³	"	85 specimens, 11 empty
<u>E. grandis</u>	ad(43, 50) ³	"	97 specimens, 16 empty

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Ephemeroptera (cont.)			
Ephemerellidae(cont.)			
<u>E. hecuba</u>	ad(55, 44) ³	Gilpin & Brusven, 1970	41 specimens, 8 empty
<u>E. hystrix</u>	ad(48, 47) ³	"	4 specimens
<u>E. inermes</u> & <u>infrequens</u>	ad(37,60) ³	"	147 specimens, 43 empty
<u>E. ignita</u>	d	Ivanova, 1958	lab preference study
<u>E. margarita</u>	ad(46, 55) ³	Gilpin & Brusven, 1970	20 specimens, 10 empty
<u>E. notata</u>	ad	Jones, 1950	---
<u>E. spinifera</u>	c(80) ³	Gilpin & Brusven, 1970	6 specimens, 5 empty
<u>E. subvaria</u>	a(75) ²	Minckley, 1963	data reported graphically
<u>E. teresa</u>	ad(30, 70) ³	Gilpin & Brusven, 1970	2 specimens
<u>E. tibialis</u>	ad(43, 55) ³	"	96 specimens, 8 empty
<u>Emphemerella</u> sp.	ad(36, 60) ²	Muttkowski & Smith, 1929	28 specimens
<u>Ephemerella</u> sp.	ad(60, 40) ³	Chapman & Demory, 1963	Deer Cr., 7 specimens

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Ephemeroptera (cont.)			
Ephemeridae			
<u>Ephemera simulans</u>	c(87) ¹	Coffman, 1967	from riffles in Aug and Oct
<u>E. varia</u>	a(82) ¹	"	"
<u>Hexagenia bilineata</u>	d	Fremling, 1960	---
<u>H. limbata</u>	ad	Hunt, 1953	---
<u>Hexagenia sp.</u>	ad	Morgan, 1911	---
Heptageniidae			
<u>Anepeorus sp.</u>	c	Burks, 1953	on basis of mouthparts
<u>Anepeorus sp.</u>	c	Edmunds, 1957	on basis of mouthparts
<u>Chirotenetes sp.</u>	a	Clemens, 1917	---
<u>Chirotenetes sp.</u>	c	Morgan, 1911	---
<u>Cinygmula sp.</u>	ad(40, 60) ³	Chapman & Demory, 1963	Deer Cr., 229 specimens
<u>Cinygmula sp.</u>	ad(35, 65) ³	Chapman & Demory, 1963	Needle Br., 98 specimens

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Ephemeroptera (cont.)			
Heptageniidae (cont.)			
<u>Cinygmula</u> sp.	ad(40, 53) ³	Gilpin & Brusven, 1970	128 specimens, 39 empty
<u>Epeorus albertae</u>	ad(46, 54) ³	"	30 specimens, 12 empty
<u>E. grandis</u>	ad(28, 73) ³	"	5 specimens, 3 empty
<u>E. longimanus</u>	ad(38, 61) ³	"	41 specimens, 12 empty
<u>E. pleuralis</u>	d(85) ²	Minshall, J., 1964	25 specimens
<u>Epeorus</u> sp.	ad(60, 40) ³	Chapman & Demory, 1963	Deer Cr., 30 specimens
<u>Epeorus</u> sp.	ad(25, 75) ³	"	Needle Br., 8 specimens
<u>Heptagenia criddlei</u>	ad(55, 45) ³	Gilpin & Brusven 1970	56 specimens, 14 empty
<u>H. lateralis</u>	d	Jones, 1950	---
<u>H. sulphurea</u>	d	Ivanova, 1958	lab preference study
<u>H. sp.</u>	d(76) ²	Muttkowski & Smith, 1929	34 specimens
<u>Heptagenia</u> sp.	ad	Morgan, 1911	---
<u>Pseudiron</u> sp.	c	Edmunds, 1957	on basis of mouthparts
<u>Rhithrogena hageni</u>	ad(45, 55) ³	Gilpin & Brusven, 1970	38 specimens, 11 empty

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Ephemeroptera (cont.)			
Heptageniidae (cont.)			
<u>R. robusta</u>	ad(41, 55) ³	Gilpin & Brusven, 1970	4 specimens, 3 empty
<u>R. semicolorata</u>	d	Jones, 1950	---
<u>Stenonema canadense</u>	a(87) ¹	Coffman, 1967	from riffles in Aug and Oct
<u>S. fuscum</u>	a(80) ¹	"	"
<u>S. tripunctatum</u>	a(79) ¹	"	"
<u>Stenonema</u> sp.	d(80)	Minckley, 1963	data presented graphically
<u>Stenonema</u> undet.	ad(70, 30) ¹	Coffman, 1967	from riffles in Aug & Oct
Isonychidae			
<u>Isonychia albomanicata</u>	c(57) ¹	Coffman, 1967	from riffles in Aug & Oct
<u>Isonychia</u> sp.	c	Burks, 1953	partly predaceous
Leptophlebiidae			
<u>Blasturus</u> sp.	a	Morgan, 1911	---

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Ephemeroptera (cont.)			
Leptophlebiidae			
<u>Choroterpes</u> sp.	a(79) ¹	Coffman, 1967	from riffles in Aug & Oct
<u>Habrophleboides</u>			
<u>americana</u>	ad(49, 51) ¹	Coffman, 1967	from riffles in Aug & Oct
<u>Leptophlebia marginata</u>	d	Moon, 1938	---
<u>L. vespertina</u>	d	Moon, 1938	---
<u>Paraleptophlebia</u>			
<u>bicornuta</u>	ad(33, 66) ³	Gilpin & Brusven, 1970	30 specimens, 7 empty
<u>P. debilis</u>	ad(36, 61) ³	"	7 specimens, 1 empty
<u>P. heteronea</u> &			
<u>memorialis</u>	ad(31, 65) ³	"	33 specimens, 7 empty
<u>P. columbiae</u>	ad(27, 72) ³	"	6 specimens
<u>P. mollis</u>	d	Hynes & Kaushik, 1968	fed on leaves in lab

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Ephemeroptera (cont.)			
Leptophlebiidae (cont.)			
<u>Paraleptophlebia</u> sp.	d(95) ³	Chapman & Demory, 1963	Deer Cr., 444 specimens
<u>Paraleptophlebia</u> sp.	d(95) ³	Chapman & Demory, 1963	Needle Br., 371 specimens
Oligoneuriidae			
<u>Oligoneuriella rhenana</u>	a	Pinet, 1962	---
Siphonuridae			
<u>Ameletus</u> sp.	d(77) ²	Muttkowski & Smith, 1929	25 specimens
<u>Ameletus</u> sp.	ad(40, 60) ³	Gilpin & Brusven, 1970	57 specimens, 6 empty
<u>Metreturus pecatonia</u>	c	Burks, 1953	on basis of mouthparts
<u>Metreturus</u> sp.	c	Edmunds, 1957	"
<u>Siphonurus lacustris</u>	d	Jones, 1950	---
<u>S. occidentalis</u>	adc	Edmunds, 1960	fed on live mosquito larvae in lab

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Ephemeroptera (cont.)			
Siphonuridae			
<u>S. occidentalis</u>	d(79) ³	Gilpin & Brusven, 1970	5 specimens, 1 empty
<u>Siphonurus</u> sp.	ad	Morgan, 1911	also some mayfly fragments
Tricorythidae			
<u>Tricorythodes minutus</u>	d(83) ¹	Gilpin & Brusven, 1970	5 specimens
Plecoptera			
Filipalpia			
Capniidae			
<u>Allocapnia granulata</u>	ad	Frison, 1929	---
<u>A. vivipara</u>	ad	"	---
<u>A. recta</u>	ad	"	---
<u>A. mystica</u>	ad	"	---
Leuctridae			
<u>Leuctra claasseni</u>	d	"	---

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Plecoptera (cont.)			
Filipalpia (cont.)			
Lauctridae			
<u>L. hippopus</u>	d	Jones, 1950	---
Nemouridae			
<u>Nemoura delosa</u>	d(97) ²	Minshall, 1965	measured monthly
<u>N. vallicularia</u>	d(100) ²	"	"
<u>N. vallicularia</u>	d	Wu, 1923	---
<u>Nemoura</u> sp.	ad	Needham & Claassen, 1925	---
<u>Nemoura</u> sp.	d(100) ³	Chapman & Demory, 1963	23 specimens
Peltoperlidae			
<u>Peltoperla brevis</u>	a(90) ²	Chapman & Demory, 1963	Deer Cr., 4 specimens
<u>P. brevis</u>	d(100) ²	"	Needle Br., 2 specimens
<u>P. maria</u>	d	Wallace, et al, 1970	---
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Plecoptera (cont.)			
Filipalpia (cont.)			
Pteronarcidae			
<u>Pteronarcys californica</u>	d ²	Muttkowski & Smith, 1929	virtually 100% detritus
<u>P. princeps</u>	d	Grafius, 1974	lab study
<u>P. scotti</u>	d	McDiffett, 1970	lab study
<u>Pteronarcys</u> spp.	ad	Needham & Claassen, 1925	---
Taeniopterygidae			
<u>Brachyptera</u> sp.	a	Hynes, 1941	---
<u>Taeniopteryx fasciata</u>			
(= <u>Strophoteryx</u>)	ad	Frison, 1929	---
<u>T. maura</u>	c(99) ¹	Coffman, 1967	riffle areas in Aug and Oct
<u>T. nivalis</u>	ad	Frison, 1929	---

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Plecoptera (cont.)			
Setipalpia (cont.)			
Chloroperlidae			
<u>Alloperla</u> sp.	c	Chapman & Demory, 1963	Deer Cr. & Needle Br., 52 specimens
<u>Alloperla</u> sp.	dc	Ellis, 1970	scavengers on dead alevins and salmon eggs
<u>Chloroperla</u> sp.	ad	Frison, 1935	---
<u>Chloroperla</u> sp.	c(99) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Kathroperla perdita</u>	ad(50, 50) ³	Chapman & Demory, 1963	Deer Cr., 6 specimens
<u>K. perdita</u>	d(95) ³	Chapman & Demory, 1963	Needle Br., 20 specimens
Perlidae	c	Frison, 1935	---
<u>Acroneuria californica</u>	c	Chapman & Demory, 1963	Deer Cr. and Needle Br., 35 specimens

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Plecoptera (cont.)			
Setipalpia (cont.)			
Perlidae (cont.)			
<u>A. lycorias</u>	c(99) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>A. pacifica</u>	c(77) ²	Muttkowski & Smith, 1929	49 specimens
<u>A. pacifica</u>	c	Chapman & Demory, 1963	Deer Dr., 5 specimens
<u>Phasganophora capitata</u>	c(98) ¹	Coffman, 1967	riffle areas in Aug & Oct
Perlodidae			
<u>Arcynopteryx curvata</u>	ac(70, 21) ³	Thut, 1969a	87.9% chironomids
<u>A. subtruncata</u>	ac(39, 53) ³	Thut, 1969a	animals were 85.6% chironomids
<u>Isogenus decusus</u>	c(100) ²	Minshall, 1965	measured monthly
<u>I. nonus</u>	ac(29, 63) ³	Thut, 1969a	animals were 85.6% chironomids
<u>I. subvarius</u>	c	Minckley, 1963	---

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Plecoptera (cont.)			
Setipalpia (cont.)			
Perlodidae (cont.)			
<u>Isoperla bilineata</u>	ad	Frison, 1935	---
<u>I. clio</u>	dc (18, 82) ²	Minshall, 1965	measured monthly
<u>I. confusa</u>	c	Frison, 1935	---
<u>I. decepta</u>	c	"	---
<u>I. duplicata</u>	c	"	---
<u>I. grammatica</u>	c	Jones, 1950	---
<u>I. minuta</u>	ad	Frison, 1935	---
<u>I. mohri</u>	c	"	---
<u>I. richardsoni</u>	c	"	---
<u>Perla verticalis</u>	c ²	Muttkowski & Smith, 1929	virtually 100% carnivores, 5 specimens, 1 empty

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Plecoptera (cont.)			
Setipalpia (cont.)			
Perlodidae (cont.)			
<u>Perlodes mortoni</u>	c	Jones, 1950	---
<u>Rickera sorpta</u>	c(80) ³	Thut, 1969a	animals were 95.4 chironomids
Trichoptera			
Brachycentridae			
<u>Brachycentrus americanus</u>	a(97) ³	Mecom & Cummins, 1964	sometimes feeds on "drift"
<u>B. nigrosoma</u>	ac	Murphy, 1919	older larvae become carnivorous
<u>B. subnubilis</u>	d	Hanna, 1957	also fed on diatoms, etc.
<u>Brachycentrus</u> sp.	ac(73, 18) ²	Muttkowski & Smith, 1929	---
<u>Micrasema</u> sp.	a(90) ³	Chapman & Demory, 1963	Deer Cr., 36 specimens

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Trichoptera (cont.)			
Brachycentridae (cont.)			
<u>Micrasema</u> sp.	a(75) ³	Chapman & Demory, 1963	Needle Br., 10 specimens
Calamatoceratidae			
<u>Ganonema americanum</u>	d	Lloyd, 1921	---
<u>Heteroplectron</u>			
<u>californicum</u>	d	Grafius, 1974	lab studies
Glossosomatidae			
<u>Agapetus fuscipes</u>	a	Douglas, 1958	---
<u>A. fuscipes</u>	a	Anderson, 1972 (unpublished)	---
<u>Glossosoma boltoni</u>	a	Badcock, 1949	mainly diatoms
<u>G. boltoni</u>	a	Jones, 1950	blue-green algae, 10 specimens
<u>G. boltoni</u>	a	Scott, 1958	---

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Trichoptera (cont.)			
Glossosomatidae (cont.)			
<u>G. intermedium</u>	d(88) ²	Minshall, 1965	---
<u>G. nigrrior</u>	a(98) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>G. nigrrior</u>	a	Cummins, <u>et al</u> 1966	---
<u>Glossosoma</u> sp.	a(95) ³	Chapman & Demory, 1963	26 specimens
Goeridae			
<u>Goera calcarata</u>	a(99) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Silo nigricornis</u>	a	Slack, 1936	10 specimens
Helicopsychidae			
<u>Helicopsyche borealis</u>	ac(67, 31) ¹	Coffman, 1967	riffle areas in Aug & Oct
Hydropsychidae			
<u>Cheumatopsyche</u> sp.	ac(50, 42) ¹	Coffman, 1967	"
<u>Diplectrona modesta</u>	d(86) ²	Minshall, 1965	---

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Trichoptera (cont.)			
Hydropsychidae (cont.)			
<u>Hydropsyche betteni</u>	c(98) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>H. betteni</u>	a	Minckley, 1963	---
<u>H. borealis</u>	ad	Coffman, Cummins & Wuycheck, 1971	no animal fragments
<u>H. bronta</u>	ac(39, 55) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>H. instabilis</u>	a	Jones, 1950	some detritus
<u>H. slossonae</u>	c(80) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Hydropsyche</u> sp.	ac(54, 42) ²	Muttkowski & Smith, 1929	27 specimens
<u>Hydropsyche</u> sp.	adc	Slack, 1936	10 specimens
<u>Hydropsyche</u> sp.	a	Badcock, 1949	some detritus and animals
Hydroptilidae			
<u>Agraylea multiplicata</u>	a(100) ²	Minckley, 1963	---

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Trichoptera (cont.)			
Hydroptilidae (cont.)			
<u>A. sexmaculata</u>	a	Barnard, 1971	filamentous algae
<u>Orthotrichia tetensii</u>	a	Lepneva, 1964	---
Lepidostomatidae			
<u>Lepidostoma</u> sp.	d(95) ³	Chapman & Demory, 1963	Deer Cr. & Needle Br. 93 specimens
<u>Lepidostoma</u> sp.	d	Brusven, 1969	fed on dead squawfish
<u>Lepidostoma</u> sp.	d	Grafius, 1974	lab study
Leptoceridae			
<u>Arthripsodes transversus</u>	-	Resh, 1972	bacterial grazers
<u>Anthripsodes</u> sp.	c	Lehmkuhl, 1970	freshwater sponges
<u>Anthripsodes</u> spp.	c	Resh, 1972	freshwater sponges
<u>Leptocerus</u> sp.	ac	Slack, 1936	5 specimens

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>References</u>	<u>Remarks</u>
Trichoptera (cont.)			
Leptoceridae (cont.)			
<u>Oecetis</u> spp.	c	Ross, 1944	---
<u>Setodes</u> sp.	ac	Merrill & Wiggins, 1971	---
Limnephilidae			
<u>Anabolia nervosa</u>	adc	Slack, 1936	18 specimens
<u>A. nervosa</u>	d	Jones, 1950	some algae :
<u>Apatania muliebris</u>	a	Elliott, 1971	---
<u>Arctoezia consicia</u>	d	Lloyd, 1921	---
<u>Astenophylax argus</u>	d	"	---
<u>Chilostigma difficilis</u>	d	"	---
<u>Drusus annulatus</u>	a	Gower, 1966	---
<u>Dicosmoecus</u> sp.	d	Brusven, 1967	fed on dead squawfish
<u>Ecclisomyia</u> sp.	ad	Grafius, 1974	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>References</u>	<u>Remarks</u>
Trichoptera (cont.)			
Limnephilidae (cont.)			
<u>Ecclisopteryx guttulata</u>	a	Scott, 1958	---
<u>Frenesia difficilus</u>	d	Flint, 1956	---
<u>F. missa</u>	d	Flint, 1956	---
<u>Glyphotaelius</u> sp.	ad	Slack, 1936	10 specimens
<u>Halesochila taylori</u>	d	Winterbourne, 1971	---
<u>H. taylori</u>	d	Grafius, 1974	lab study
<u>Halesus guttifer</u>	d	Lloyd, 1921	---
<u>H. radiatus</u>	d	Jones, 1950	---
<u>Halesus</u> sp.	ad	Slack, 1936	20 specimens
<u>Limnephilus combinatus</u>	ad	Lloyd, 1921	aquatic macrophytes
<u>L. flavicornis</u>	d	Hanna, 1957	also fed on diatoms, etc.
<u>L. indivisus</u>	ad	Lloyd, 1921	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>References</u>	<u>Remarks</u>
Trichoptera (cont.)			
Limnephilidae (cont.)			
<u>L. lunatus</u>	d	Hanna, 1957	also fed on diatoms, etc.
<u>L. rhombicus</u>	d	Slack, 1936	10 specimens
<u>L. submonilifer</u>	ad	Lloyd, 1921	---
<u>Neophylax autumnus</u>	ad(33, 67) ²	Minshall, 1965	varies with season
<u>Neophylax nacatus</u>	a(100) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>N. concinnus</u> & <u>oligius</u>	ad(28-37, 62-73) ¹	Sedell, 1971	40 specimens
<u>Platyphylax designata</u>			
(= <u>Hesperophylax</u>)	a	Lloyd, 1921	---
<u>Potamophylax stellatus</u>	d	Hanna, 1957	also fed on diatoms, etc.
<u>Psychoglypha</u> sp.	d	Brusven, 1969 ^a	fed on dead squawfish
<u>Pycnopsyche antica</u>	d(91) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>P. guttifer</u>	d	Cummins, 1964	also some algae

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Trichoptera (cont.)			
Limnephilidae (cont.)			
<u>P. guttifer</u>	d	Feldmeth, 1970	lab feeding studies
<u>P. lepida</u>	d	Cummins, 1964	also some algae
<u>P. lepida</u>	d	Feldmeth, 1970	lab feeding studies
<u>P. scabripennis</u>	d	Lloyd, 1921	---
<u>Pycnopsyche</u> sp.	d(90) ²	Minckley, 1963	data presented graphically
<u>Stenophylax latipennis</u>	d	Scott, 1958	---
<u>S. stellatus</u>	a	Badcock, 1949	also some detritus and invertebrates
<u>Stenophylax</u> sp.	a	Slack, 1936	10 specimens
<u>Thremma</u> sp.	ad(64, 36) ²	Muttkowski & Smith, 1929	23 specimens
Molannidae			
<u>Molanna augusta</u>	ac	Slack, 1936	12 specimens

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>References</u>	<u>Remarks</u>
Trichoptera (cont.)			
Odontoceridae			
<u>Odontocerum albicorne</u>	ac	Slack, 1936	12 specimens
<u>O. albicorne</u>	ac	Jones, 1949	---
<u>O. albicorne</u>	adc	Scott, 1958	---
<u>Psilotreta indecisa</u>	a(97) ¹	Coffman, 1967	riffle areas in Aug & Oct
Philopotamidae			
<u>Chimarra aterrima</u>	ad(65, 31) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Chimarra marginata</u>	a	Badcock, 1949	---
Phryganeidae			
<u>Agrypnia pagetana</u>	a	Haage, 1970	filamentous algae and <u>Fucus</u>
<u>Banksiola crotchi</u>	ac	Winterbourne, 1971	carnivorous in final instar
<u>Neuronia clathrata</u>	a	Gatjen, 1926	---
<u>N. pardalis</u>	d	Lloyd, 1921	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Trichoptera (cont.)			
Phryganeidae (cont.)			
<u>N. phalaenoides</u>	a	Gatjen, 1926	---
<u>N. postica</u>	d	Lloyd, 1921	---
<u>N. reticulata</u>	a	Gatjen, 1926	---
<u>N. rufierus</u>	ad	Kolenkina, 1951	---
<u>N. stygipes</u>	d	Lloyd, 1921	---
<u>Oligostomis reticulata</u>	ad	Kolenkina, 1951	---
<u>Phryganea grandis</u>	-	Smirnov, 1962	aquatic macrophytes
<u>P. grandis</u>	c	Haage, 1970	---
<u>P. interrupta</u>	ad	Lloyd, 1921	---
<u>P. minor</u>	a	Gatjen, 1926	---
<u>P. obsoleta</u>	a	"	---
<u>P. striata</u>	a	"	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Trichoptera (cont.)			
Phryganeidae (cont.)			
<u>P. striata</u>	ad	Kolenkina, 1951	preferred leaf detritus & <u>Cladophora</u>
<u>P. varia</u>	a	Gatjen, 1926	---
<u>P. vestita</u>	ad	Lloyd, 1921	aquatic macrophytes
Psychomyiidae			
<u>Polycentropus</u>	c	Badcock, 1949	---
<u>flavomaculatus</u>			
<u>P. flavomaculatus</u>	c	Jones, 1950	---
<u>Psychomyia flava</u>	a(94) ¹	Coffman, 1967	riffle areas in Aug & Oct
Rhyacophilidae			
<u>Rhyacophila arnaudi</u>	c(94) ²	Thut, 1969b	---
<u>R. dorsalis</u>	c	Slack, 1936	---
a = algal feeding d = detrital feeding c = carnivorous ¹ based on food calories ² based on number of food items ³ based on food volume or area			

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Trichoptera (cont.)			
Rhyacophilidae (cont.)			
<u>R. dorsalis</u>	c	Badcock, 1949	---
<u>R. dorsalis</u>	c	Scott, 1958	---
<u>R. fuscula</u>	c	Lloyd, 1921	also some filamentous algae
<u>R. grandis</u>	c(90) ²	Thut, 1969b	2 specimens
<u>R. parantra</u>	d(96) ²	Minshall, 1965	---
<u>R. vaccua</u>	c(93) ²	Thut, 1969b	---
<u>R. vaefes</u>	adc(39, 21, 36) ²	Thut, 1969b	---
<u>R. vagrita</u>	c(87) ²	"	---
<u>R. verrula</u>	-	"	31% algae, 64% vascular plant (i.e. moss)
<u>R. verrula</u>	a	Smith, 1968	<u>Prasiola</u> and watercress

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Trichoptera (cont.)			
Rhyacophilidae (cont.)			
<u>R. vepulsa</u> (narvae)	c(91) ²	Thut, 1969b	---
<u>Rhyacophila</u> sp.	dc(28, 49) ²	Muttkowski & Smith, 1929	32 specimens
<u>Rhyacophila</u> spp.	c	Ross, 1944	---
<u>Rhyacophila</u> sp.	c	Chapman & Demory, 1963	Deer Cr. & Needle Br., 16 specimens
Sericostomatidae			
<u>Sericosoma personatum</u>	d	Slack, 1936	10 specimens
<u>S. personatum</u>	d	Jones, 1950	---
Diptera			
Blepharoceridae	a	Wirth & Stone, 1968	---
Chaoboridae			
<u>Chaoborus nyblasi</u>	c	Dodson, 1970	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Diptera (Cont.)			
Chaoboridae (Cont.)			
<u>C. flavicans</u>	c	Dodson, 1970	---
Ceratopogonidae	c	Kajak & Pieczynski, 1966	---
<u>Palpomyia</u> spp.	d(95) ¹	Coffman, 1967	riffle areas in Aug & Oct
Chironomidae	ad(71, 29) ²	Muttkowski & Smith, 1929	6 specimens
Chironomidae (except			
Tanypodinae)			
Tanypodinae)	ad	Badcock, 1949	---
Orthocladiinae	d(90) ³	Chapman & Demory, 1963	Deer Cr., 316 specimens
(=Hydrobaeninae)			
Orthocladiinae	d(85) ³	Chapman & Demory, 1963	Needle Br., 255 specimens
Pelopiinae	c	Kajak & Pieczynski, 1966	---
Tanypodinae			
(=Pelopiinae)	c	Badcock, 1949	---

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Diptera (cont.)			
Chironomidae (cont.)			
<u>Brillia flavifrons</u>	ad(42, 58) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Corynoneura</u> sp.	ad(66, 34) ¹	"	"
Genus nr. <u>Corynoneura</u> sp.	ad(68, 32) ¹	"	"
<u>C. taris</u>	a(77) ¹	"	"
<u>Crictopus exilis</u>	a(94) ¹	"	"
<u>C. sp. nr. junus</u>	a(95) ¹	"	"
undet. <u>Crictopus</u>	a(100) ¹	"	"
<u>Cryptochironomus</u> sp. A	d(94) ¹	"	"
<u>Cryptochoronomus</u> sp. B	a(100) ¹	"	"
<u>Cryptochoronomus</u> sp. C	c(100) ¹	"	"
<u>Cryptochoronomus</u> sp. 3	c(100) ¹	"	"
<u>C. vulneratus</u>	ad(57, 43) ¹	"	"

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Diptera (cont.)			
Chironomidae (cont.)			
<u>Einfeldia synchrona</u>	ad	Danks, 1971	no filter-feeding mechanism observed
<u>Endochiromus dispar</u>	a	Walshe, 1951	filter-feeders
<u>E. tendens</u>	a	"	"
<u>E. albipennis</u>	a	"	"
<u>Eukiefferiella</u> sp. 2	ad(57, 43) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Eukiefferiella</u> sp. nr.			
<u>brevinervis</u>	a(99) ¹	"	"
<u>E. sp. nr. longicalcar</u>	a(100) ¹	"	"
<u>E. sp. nr. sordens</u>	a(81) ¹	"	"
genus nr. <u>Eukiefferiella</u>	a(77) ¹	"	"
<u>Glyptotendipes barbipes</u>	ad	Kimerle, 1969	in waste stabilization lagoon

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Diptera (cont.)			
Chironomidae (cont.)			
<u>G. foliicola</u>	d	Walshe, 1951	possibly live plant tissue
<u>G. gripekoveni</u>	d	"	"
<u>G. pallens</u>	d	"	"
<u>G. viridis</u>	d	"	"
<u>Hydrobaenus</u> sp. nr.			
<u>paradoreus</u>	a(88) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Lauterborniella marmorata</u>			
(= <u>Zavreliella</u>)	ad	Walshe, 1951	---
<u>Limnochironomus modestus</u>	a(87) ¹	Coffman, 1967	riffle areas in Aug & Oct
Genus nr. <u>Metriocnemus</u>			
sp.	a(80) ¹	"	"
<u>Microsectra</u> sp.	d	Walshe, 1951	---

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Diptera (cont.)			
Chironomidae (cont.)			
<u>Microtendipes pedellus</u>	d	Walshe, 1951	---
<u>M. pedellus</u>	a(87) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Paraclunio alaskensis</u>	a	Morley & Ring, 1972	intertidal
<u>Pelopia punctipennis</u>	c	Kajak & Stanczykowska, 1968	---
<u>Pentaneura auriensis</u>	c(100) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>P. carnea</u> group sp.	c(100) ¹	"	"
<u>P. melanops</u> group sp.	c(100) ¹	"	"
<u>P. psilosella</u>	c(100) ¹	"	"
<u>P. sp. A</u>	c(100) ¹	"	"
<u>Pentapedilum sordens</u>	a	Walshe, 1951	filter-feeder
<u>Phaenopsectra jucundus</u>	a(87) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>P. obediens</u>	ad(43, 57) ¹	"	"

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Diptera (cont.)			
Chironomidae (cont.)			
<u>Polypedilum fallax</u>	c(93) ¹	Coffman, 1967	riffle areas in Aug & Oct
group sp.			
<u>P. sca'aenum</u>	a(85) ¹	"	"
<u>P. sp. nr. sordens</u>	a(83) ¹	"	"
<u>Polypedilum</u> sp.	d	Walshe, 1951	---
<u>Procladius</u> sp. nr.	c(100) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>abumbratus</u>			
<u>P. choreus</u>	c	Kajak & Stanczykowska, 1968	---
<u>Psectrocladius</u> sp. nr. 4	a(80) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Saunderia clavicornis</u>	a	Morley & Ring, 1972	intertidal
<u>S. marinus</u>	a	"	"
<u>S. pacificus</u>	a	"	"

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Diptera (cont.)			
Chironomidae (cont.)			
<u>Sergentia coracina</u>	d	Walshe, 1951	---
<u>Stempellina bausei</u>	d	"	---
<u>S. sp. nr. johannseni</u>	a(86) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Tanytarsus conversus</u>	a (84) ¹	"	"
<u>T. dissimilis</u>	ad	Cavanaugh & Tilden, 1930	"
<u>T. sp. nr. exigua</u>	a(74) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>T. exigua</u>	ad(66, 27) ¹	"	"
<u>T. sp. nr. polita</u>	a(80) ¹	"	"
<u>T. sp. 3</u>	a(87) ¹	"	"
<u>T. sp. 4</u>	ad(47, 53) ¹	"	"
<u>T. sp. 5</u>	a(100) ¹	"	"
<u>T. rivulorum</u>			
(=Rheotanytarsus)	a	Walshe, 1951	filter-feeders

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Diptera (cont.)			
Chironomidae (cont.)			
<u>Tanytarsus</u> sp.	ad	Walshe, 1951	---
<u>Tendipes anthracinus</u>			
(= <u>Chironomus</u>)	d	"	---
<u>Tendipes dissidens</u>			
(= <u>Einfeldia</u>)	d	"	---
<u>T. dorsalis dorsalis</u>	d	"	---
<u>T. riparius</u>	d	"	---
<u>T. plumosus flaveolus</u>	a	"	filter-feeders
<u>T. plumosus plumosus</u>	a	"	"
<u>Trichocladius</u> sp. nr. 3	c(77) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Zavrelia</u> sp. nr.			
<u>pentatoma</u>	ad(61, 27) ¹	"	"

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Diptera (cont.)			
Dixidae			
<u>Dixa</u> sp.	d(95) ³	Chapman & Demory, 1963	Deer Cr., 4 specimens
Empididae			
<u>Hemerodromia</u> sp.	ad(34, 66) ¹	Coffman, 1967	riffle areas in Aug & Oct
Psychodidae			
<u>Psychoda alternata</u>	ad(39, 61) ¹	"	"
Simuliidae			
<u>Prosimulium caudatum</u>	d(87) ³	Speir, 1973 (unpublished)	30 specimens, Feb & Mar
<u>P. dicum</u>	d(84) ³	"	26 specimens, Feb & Mar
<u>Simulium arcticum</u>	-	Fredeen, 1963	reared on bacterial suspension
<u>S. arcticum</u>	ad(39, 58) ³	Speir, 1973 (unpublished)	34 specimens, May

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Diptera (cont.)			
Simuliidae (cont.)			
<u>S. canadense</u>	ad(33, 62) ³	Speir, 1973 (unpublished)	18 specimens, May
<u>S. venustum</u>	-	Fredeen, 1963	reared on bacterial suspension
<u>S. verecundum</u>	-	"	"
<u>S. vittatum</u>	d(88) ³	Speir, 1973 (unpublished)	14 specimens, Oct
<u>S. vittatum</u>	d	Fredeen, 1963	reared on bacterial suspension
<u>Simulium</u> spp.	a (79) ²	Muttkowski & Smith, 1929	---
<u>Simulium</u> sp.	d(95) ³	Chapman & Demory, 1963	33 specimens
<u>Simulium</u> sp.	a(90) ³	Coffman, 1967	riffle areas in Aug & Oct
<u>Twinnia nova</u>	a(81) ³	Speir, 1973 (unpublished)	9 specimens, Mar, this species has no head fans

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Diptera (cont.)			
Tabanidae			
<u>Chrysops</u> spp.	c	Philip, 1931	lab studies
<u>Tabanus</u> sp.	ad(74, 26) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Tabanus</u> sp.	c	Philip, 1931	lab studies
Tipulidae			
<u>Antocha</u> sp.	a(93) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Dicranota</u> sp.	d(78) ¹	"	"
<u>Eriocera fultonensis</u>	c(96) ¹	"	"
<u>Tipula nobilis</u>	a(90) ²	Minckley, 1963	data presented graphically
<u>Tipula</u> sp.	c(76) ¹	Coffman, 1967	riffle areas in Aug & Oct
Megaloptera			
Corydalidae			
<u>Chauliodes</u> sp.	c	Chandler, 1968	---

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³based on food volume or area

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Megaloptera (cont.)			
Corydalidae (cont.)			
<u>Nigronia serricornis</u>	dc(85, 15) ³	Minshall, 1965	---
Sialidae			
<u>Sialis californica</u>	c	Azam, 1968	---
<u>S. joppa</u>	c(100) ³	Minshall, 1965	---
<u>S. rotunda</u>	c	Azam, 1968	---
<u>Sialis</u> spp.	c	Ross, 1937	---
Coleoptera			
Dryopidae	-	Leech & Chandler, 1968	larvae are probably root feeders
<u>Helicus</u> sp. (adults)	ad(26, 74) ¹	Coffman, 1967	riffle areas in Aug & Oct
Dytiscidae			
<u>Acilius</u> sp.	c	Balduf, 1935	adults & larvae all carnivorous

a = algal feeding

d = detrital feeding

c = carnivorous

¹based on food calories

²based on number of food items

³based on food volume or area

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Megaloptera (cont.)			
Corydalidae (cont.)			
<u>Nigronia serricornis</u>	dc(85, 15) ³	Minshall, 1965	---
Sialidae			
<u>Sialis californica</u>	c	Azam, 1968	---
<u>S. joppa</u>	c(100) ³	Minshall, 1965	---
<u>S. rotunda</u>	c	Azam, 1968	---
<u>Sialis</u> spp.	c	Ross, 1937	---
Coleoptera			
Dryopidae	-	Leech & Chandler, 1968	larvae are probably root feeders
<u>Helicus</u> sp. (adults)	ad(26, 74) ¹	Coffman, 1967	riffle areas in Aug & Oct
Dytiscidae			
<u>Acilius</u> sp.	c	Balduf, 1935	adults & larvae all carnivorous

a = algal feeding

d = detrital feeding

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¹based on food calories

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<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Coleoptera			
Dytiscidae			
<u>Colymbetes</u> sp.	c	Balduf, 1935	adults & larvae all carnivorous
<u>Coptotomus</u> sp.	c	"	"
<u>Cybister</u> spp.	c	"	"
<u>Dytiscus</u> spp.	c	"	"
<u>Limnaea</u> sp.	c	"	"
<u>Hydroporus</u> sp.	c	"	"
Elmidae	ad	Badcock, 1949	---
<u>Dubiraphia</u> sp. (adults)	ad(26, 74) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Optioservus</u>			
<u>quadrimaculatus</u>			
(adults)	ad(65, 35) ³	Chapman & Demory, 1963	Deer Cr., 6 specimens

a = algal feeding

d = detrital feeding

c = carnivorous

¹based on food calories

²based on number of food items

³based on food volume or area

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Coleoptera (cont.)			
Elmidae (cont.)			
<u>O. quadrimaculatus</u>			
(adults)	d(100) ³	Chapman & Demory, 1963	Needle Br., 1 specimen
<u>Optioservus</u> sp. (larvae)	a(90) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Optioservus</u> sp. (adults)	a(76) ¹	"	"
<u>Stenelmis beameri</u>			
(larvae)	ac(71, 22) ¹	"	"
<u>S. beameri</u> (adults)	ad(59, 41) ¹	"	"
Hydrophilidae			
all larvae except			
<u>Berosus</u> spp.	c	Balduf, 1935	---
<u>Berosus</u> spp.	a	"	adults and larvae
<u>Enochrus</u> sp.	a	"	adults

a = algal feeding

d = detrital feeding

c = carnivorous

¹ based on food calories

² based on number of food items

³ based on food volume or area

<u>Taxa</u>	<u>Food Categories and % Composition</u>	<u>Reference</u>	<u>Remarks</u>
Coleoptera (cont.)			
Hydrophilidae (cont.)			
<u>Laccobius</u> sp.	a	Baldus, 1935	adults
<u>Hydrophilus obtusatus</u>	a	"	"
<u>Tropisternis</u> sp.	a	"	"
<u>Hydrous triangularis</u>			
(= <u>Hydrophilus</u>)	-	Wilson, 1923	adults may be predaceous
<u>Hydrophilus piceus</u>	c	Miller, 1963	adults & larvae
<u>Tropisternis</u> sp.	ad	Spangler, 1960	adults
Psephenidae			
<u>Ectoporia</u> sp.	a(98) ¹	Coffman, 1967	riffle areas in Aug & Oct
<u>Psephenus herricki</u>	a(98) ¹	Coffman, 1967	"
<u>P. herricki</u>	a	Murvosh, 1971	---

a = algal feeding

d = detrital feeding

c = carnivorous

¹based on food calories

²based on number of food items

³based on food volume or area

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