

**AQUATIC INSECTS**  
**BSPM 445**  
**FALL 2009**

**AQUATIC INSECTS** is a basic course in the taxonomy and biology of the insects most commonly encountered in freshwater habitats. Emphasis is placed on identification of aquatic insects and important aspects of their biology such as life cycles, habitat preferences, feeding habits, adaptations to environments, and functions in ecosystems. It is primarily intended for persons interested in careers in aquatic ecology, fisheries science, environmental science, or sanitary engineering. It is recommended that students have a course in general entomology or equivalent experience before taking Aquatic Insects.

**INSTRUCTOR:** B.C. Kondratieff, 012A Laurel Hall (491-7314). Email [Boris.Kondratieff@colostate.edu](mailto:Boris.Kondratieff@colostate.edu)

**TIME AND ROOM:** Lecture: 10:00-10:50 am M&W (Plant Sciences E008)  
Lab: 1:10-2:40pm M&W (Plant Sciences E008)

**TEXTS:**

- (1) An Introduction to the Aquatic Insects of North America  
Merritt, Cummins, and Berg, eds. (4<sup>th</sup> ed)  
(Available in CSU Bookstore)
- (2) A Synopsis of General Entomology  
J. Voshell (Provided by Instructor)
- (3) An Illustrated Guide to the Mountain Stream Insects of Colorado  
Ward, Kondratieff, and Zuellig (2<sup>nd</sup> ed)  
**(optional)**

**OBJECTIVES:**

Upon completion of the course a student should be able to:

1. Demonstrate a knowledge of the taxonomy of aquatic insects (adults and immatures):
  - a. Identify basic morphological structures common to all aquatic insects.
  - b. Identify all aquatic insects to order on sight.
  - c. Identify common aquatic insects to family on sight.
  - d. Identify most immature aquatic insects to genus with taxonomic keys and microscope.

2. Describe selected aspects of the biology of aquatic insects:

- a. behavior
- b. habitat preferences
- c. feeding habits
- d. life history
- e. metamorphosis
- f. physiology
- g. reproduction
- h. adaptations to freshwater environment
- i. functions in aquatic ecosystems

3. Demonstrate current methods used in aquatic entomology:

- a. collecting
- b. preserving
- c. preparing specimens for study
- d. curating

**EVALUATION:**

Lecture:	Test I 150 pts
	Test II 150 pts
Lab:	
Quizzes (4 – lowest = 3 at 10 points each)	30 pts
Collection	200 pts
Final Exam (Lab Practical)	<u>70 pts</u>
TOTAL	600 pts

**GRADING:**

A	92%	549 pts	C	72%	429 pts
A-	90%	537 pts	C-	70%	417 pts
B+	88%	525 pts	D+	68%	405 pts
B	82%	489 pts	D	62%	369 pts
B-	80%	477 pts	D-	60%	357 pts
C+	78%	465 pts	F	<59%	≤356 pts

## SYLLABUS

(Quizzes will given in response to the pace of the class):

<b>Month</b>	<b>Week</b>	<b>Lecture</b>	<b>Lab</b>
*Aug.	4	Orientation General entomology/aquatic ecology	Orientation External morphology
Sept.	1	General entomology/aquatic ecology General entomology/aquatic ecology	Orders of aquatic insects <b>Field trip: 9 Sept</b>
	2	Ephemeroptera	Field trip
	3	Ephemeroptera	Ephemeroptera
	4	Odonata	Ephemeroptera; <b>Field trip: 23 Sept</b>
Oct.	1	Odonata	Odonata: Quiz 1
	2	Plecoptera	Odonata
	3	Plecoptera	Plecoptera
	4	Hemiptera	Hemiptera: Quiz 2
Nov.	1	Hemiptera	Review and collection
	3	Megaloptera	Megaloptera
	4	Coleoptera	Coleoptera Quiz 3
Dec.	1	Trichoptera	
	2	Trichoptera/Diptera	Trichoptera/Diptera: Quiz 4

### QUIZZES

Quizzes-(timed) based on identifications of specimens covered in the laboratory; each quiz is worth 10 points.

#### **FINAL EXAM (Lab Practical)**

Based on the identification of 20 specimens (timed) and using all available keys and other sources; given on the regular scheduled day and time of finals week (December 18, 7-9am).

#### **COLLECTION: Requirements and Scoring**

A major part of this course is a collection, which will be  $\frac{1}{3}$  of your grade. Undergraduates will work in pairs and turn in one collection per pair. Graduate students must work individually. The Basic Collection consists of the following:

Ephemeroptera                      11 taxa

Odonata	5 taxa
Plecoptera	8 taxa
Hemiptera	6 taxa
Coleoptera	5 taxa
Trichoptera	11 taxa
Diptera	<u>8 taxa</u>
TOTAL	54 taxa

[The total collection consists of the following:]

Basic Collection (54 taxa X2.4)	130 pts.
Extra taxa or reared specimens	20 pts.
Technique and effort	<u>50 pts.</u>
TOTAL	<b>200 pts.</b>

### **Field Notebook**

One of the reasons for requiring you to make a collection is for you to observe the respective habits of different aquatic insects. For this reason you are also required to keep a Field Notebook that describes the habitat where you collected each aquatic specimen (excludes terrestrial stages). Standardized sheets are provided for you to describe as completely as possible the general habitat and specific microhabitat of each organism. Each vial must be referenced to a field data sheet by means of the Collection Number. The Collection Number consists of the following: initials of collector and last two numbers of year – number of general habitat – number of microhabitat (Example: JDB79-1-3). The general habitat only needs to be described once. Use pencil for the field data sheets and fill them out in the field. Do not recopy them. Accuracy, completeness, and organization are more important than neatness here. A clipboard is recommended to write on in the field. Arrange the field data sheets chronologically in a notebook or binder to turn them in. You will not receive any credit for aquatic stages that cannot be easily referenced to a field data sheet.

### **Organization**

You must use the vials available from the Chemistry Stockroom (D110 Chemistry) (or equivalent) and organize the vials trays. You must use the labels provided during in the laboratory during the semester. There should be two labels in each vial:

Locality + Ecology label – put Collection Number in upper right corner

HAB	ecological information (ditch, Swift's Pond, Poudre River, Buckhorn Creek, etc.)
LOC	complete locality information (Rt. 15, Poudre Park, CSU campus, J. Bugg farm, etc.)
CO	write complete county name
ST	abbreviate state name

DATE           abbreviate month (3 Apr. 1988)  
COLL           only put 1 name (J. Bugg)

Identification label – self-explanatory

**A Micron 005 # Archival Ink pen for acid free environments (available in the CSU Bookstore) is required to fill out the labels.**

You must fill out a Collection Grading List on the sheets provided. These sheets should be self-explanatory. Each vial goes on a separate line. You are not graded on the neatness of these sheets. Use ditto marks, abbreviations, and Collection Numbers wherever possible. The only requirement is that you organize the sheets in the same order as you turn in your specimens.

Your collections will be returned to you. I reserve the right to remove rare or unusual specimens for the C.P. Gillette Museum of Arthropod Diversity.

### **Honor System**

Information in the field notebook must have been recorded during or immediately after each respective collecting trip. All material must have been collected in the field by one of the students turning in the collection; there will be no exchanges or raiding previous collections of others. If several students actively participate in a collecting trip, the “catch” may be divided up.

Please turn off all cell phones, unless cleared with instructor.