

Lab Exercise 5 - Aquatic Insects

Introduction

Aquatic insects represent a fascinating adaptive radiation of arthropods into freshwater environments. Insects have colonized streams, ponds, and lakes. Aquatic insects are key players in freshwater ecological communities. Some are scavengers, others feed on plankton, and others feed on animals (including vertebrates). Species differ in the part of the aquatic environment where they predominate, with some on the bottom, others in the water column, and others sticking to the surface. Aquatic insects often metamorphose into a terrestrial adult, or an adult that inhabits a different aquatic environment than the immature form. The table shown below summarizes some information about orders of insects found in aquatic habitats.

Order	Common name	N. American species	Feeding habits ¹
Ephemeroptera	Mayflies	700	H, P, S
Odonata	Dragon and damselflies	450	P
Plecoptera	Stoneflies	500	(H), P, S
Hemiptera	Water bugs, water striders	400	(H), P, S
Megaloptera ²	Fishflies, dobsonflies, alderflies	50	P
Neuroptera	Spongillafly	6	P
Coleoptera	Water beetles	1000	H, P, (S)
Trichoptera	Caddisflies	1200	(H), P, (S)
Lepidoptera	Aquatic caterpillars	50	H
Diptera	Midges, mosquitoes, gnats, flies	3500	H, P, (S)

The species found in a stream or pond reflect its ecological condition. Some species occur mostly in well-aerated, rushing streams, others favor low-oxygen, high-nutrient environments. The former tend to be unpolluted, while pollution tends to cause the latter situation. Thus, aquatic insects may be used to identify the water quality of a river or stream.

The SSU library contains many interesting books about aquatic insects, and several graduate students have completed their master's theses about local aquatic insects. You will use some of these books to complete today's laboratory exercise.

Activity 1- Identification of aquatic insects to order and family

Keying six immature and adult insects- Complete an identification to order and family level for twelve insects provided by your instructors. These insects are numbered (1-6 for adults, 7-12 for immatures). Use the key to aquatic insects found in the book by P. McCafferty (*Aquatic Entomology*, 1981, Jones and Bartlett, Boston), which includes pictures of the taxa, to identify immatures. You may use Bland and Jaques or the pictorial key in McCafferty to identify adults. Before moving on, consult your instructors to verify that your identifications are correct.

Once you have completed the identifications, match larval specimens to adult ones. Then complete a brief description of insects in that particular order and family, including any unique morphological features that you noticed during the identification and a brief description of the habitats used, or feeding mode that is predominant in immatures of that group. On the identification table, include the page number from Bland and Jaques that includes a description of that family.

¹ H = herbivore, P = predator, S = scavenger, parentheses indicates a few species.

² Often classified within the Neuroptera

Specimen	Life Stage	Order	Family	page #
1	Larva			
2	Larva			
3	Larva		don't identify	
4	Larva			
5	Larva			
6	Larva			
7	Adult	Odonata (Anisoptera)		
8	Adult	Trichoptera	don't identify, follow key	
9	Adult	Diptera		
10	Adult	Odonata (Zygoptera)		
11	Adult	Ephemeroptera		
12	Adult	Plecoptera		

Order _____ **Family** _____

Immature specimen # _____ **Adult Specimen #** _____

Description of immature morphology and ecology

Key couplets used for adult _____, _____, _____, _____, _____, _____, _____, _____, _____,
 _____, _____, _____, _____, _____, _____, _____, _____, _____

Description of adult morphology and ecology

Order _____ **Family** _____

Immature specimen # _____ **Adult Specimen #** _____

Description of immature morphology and ecology

Key couplets used for adult _____, _____, _____, _____, _____, _____, _____, _____, _____,
_____, _____, _____, _____, _____, _____, _____, _____, _____

Description of adult morphology and ecology

Order _____ **Family** _____

Immature specimen # _____ **Adult Specimen #** _____

Description of immature morphology and ecology

Key couplets used for adult _____, _____, _____, _____, _____, _____, _____, _____, _____,
_____, _____, _____, _____, _____, _____, _____, _____, _____

Description of adult morphology and ecology

Coleoptera (beetles)

Family	Specimen	page # in B&J	Habitat type	Types of food used	Breathing mechanism
Dytiscidae		191			
Gyrinidae		192			
Hydrophilidae		193			
Psephenidae		202			