

TROUT PARK, A REGIONAL REFERENCE SPRING SYSTEM FOR NORTHERN ILLINOIS

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Trout Park, previously known as Elgin Botanical Gardens, has one of the most important habitats in Illinois for spring and springbrook communities. It has been studied by the Illinois Natural History Survey since the early 1930s (Ross 1944, see supplementary material) and has been examined often since then. It should be thought of as a region reference spring system, supporting a large number of animals and plants that require coldwater spring systems, the vast majority of which have the main part of their distributions being much further north. This type of habitat was always rare in Illinois and has become degraded due to agricultural development and urbanization in the state and throughout the lower Midwest.

Springbrook such as this one often support an assemblage of species sensitive to water quality changes. This spring system supports over 21 species of the most water quality sensitive insect species known to inhabit Illinois waters (Table 1). This includes several species within the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). In the nearly 100 years of study of this location, a total of 21 species have been collected from the spring boils and springbrook channels that empty into the Fox River at Trout Park. The vast majority of these species require coldwater habitats of low nutrient (not polluted) levels and are known from only 1-5 locations other locations in the state. This distribution has been used in the past to rank species as highly imperiled.

Only a single mayfly species resides in Trout Park springs, but it is of a species that occurs at only a few locations within Illinois in springbrook habitat (Fig. 1A). Six species of stoneflies occurred in the springs (Fig. 1B). Unfortunately, two of these species appear to have been extirpated. The caddisfly assemblage inhabiting Trout Park is the most diverse. The greatest number of species occurs within the family Limnephilidae (so called “northern caddisflies”). These are the species most recognizable at Trout Park. Most make large cases of gravel, sand, or wood pieces (Fig. 1C). Another caddisfly, commonly known as a “saddlecase maker”, builds a dome of sand grains as its home. The larva lives under the dome (Fig. 1D).

This location is famous among scientists who study aquatic insects. One species of caddisfly was described (made known to science) from specimens collected at Trout Park. This **holotype** location is extremely important for comparative purposes. Description of a new species that is closely related requires comparison with specimens from this location. If genetic comparisons are to be done, they are best accomplished with specimens from this very location. In addition, the description of a stonefly species uses Trout Park as a **paratype** location (meaning around the holotype, helping to define variation in a species). Clearly, the preservation

of this site is important to science. Its loss to a scientist would be on the order losing a first edition of a treasured work of literature or of an original sculpture.

Because aquatic insects are often used as indicators of water quality, the presence of this assemblage of aquatic insects in Trout Park is ample evidence that the spring system is of high quality. No such community would result from a less pure source of water. Disruption of the hydrology of the immediate area would likely lead to reduced water flow and possibly changes in the thermal character of the spring discharge. This would adversely affect the assemblage inhabiting the springs. In addition, care must be taken to reduce the risk of contamination of the springs from broken water mains, leaking domestic waste mains, septic fields, and runoff from parking areas and lawns. Fertilizers, pesticides, oils, and other contaminants from groundwater or overland sources could increase the risk to one or more species, or the entire assemblage being lost from the spring system.

Table 1. Ephemeroptera, Plecoptera, Trichoptera from Trout Park springs. Number of unique dates collected pre- and post-1970, comments, sensitivity to water pollution.

Taxon	Pre-1970	Post-1970	Comments	Wat. Qual. Sensitivity
Ephemeroptera				
Baetidae				
<i>Baetis tricaudatus</i>	6	1		high
Plecoptera				
Nemouridae				
<i>Amphinemura delosa</i>	5	2	Paratype location	high
<i>Amphinemura varshava</i>	1	0		medium
<i>Nemoura trispinosa</i>	5	4		high
Perlodidae				
<i>Clioperla clio</i>	4	9		medium
Leuctridae				
<i>Leuctra tenuis</i>	2	0	Extirpated	high
Capniidae				
<i>Paracapnia angulata</i>	2	0	Extirpated	high
Trichoptera				
Glossosomatidae				
<i>Glossosoma intermedia</i>	9	3		high
Hydropsychidae				
<i>Diplectrone modesta</i>	7	3		medium
<i>Hydropsyche betteni</i>	3	0		low
<i>Hydropsyche slossonae</i>	6	0		medium
Lepidostomatidae				
<i>Lepidostoma liba</i>	4	3	Holotype location	high
Limnephilidae				
<i>Frenesia missa</i>	2	1		high
<i>Hesperophylax designatus</i>	9	2		high
<i>Limnephilus rhombicus</i>	1	1		high
<i>Platycentropus radiatus</i>	0	1		medium
<i>Pseudostenophylax uniformis</i>	1	0		high
Molannidae				
<i>Molanna blenda</i>	1	0		high
Philopotamidae				
<i>Wormaldia moesta</i>	6	2		high
Uenoidae				
<i>Neophylax concinnus</i>	3	2		high
Rhyacophilidae				
<i>Rhyacophila vibox</i>	7	0	Extirpated?	high
Ephemeroptera	1			
Plecoptera	6			
<u>Trichoptera</u>	<u>14</u>			
Total	21			



Fig. 1. Aquatic insects inhabiting Trout Park. A) *Baetis tricaudatus* (small minnow mayfly), B) *Clioperla clio* (clio stripetail), C) *Hesperophylax designatus* (northern caddisfly), D) *Glossosoma intermedia* (saddlecase making caddisfly).

Supplementary Material

From Ross, H. H. 1944. The caddis flies, or Trichoptera, of Illinois. Bulletin of the Illinois Natural History Survey, 23: pp. 7-8.



Fig. 6.—Brook in Botanical Gardens at Elgin, Illinois. This and three parallel sister brooks are fed by seepage and are cold and clear throughout the year. Here live several northern caddis flies found nowhere else in the state.

Elgin.—Just north of the city of Elgin are the unique Botanical Gardens situated along the low, east bluff of the Fox River. The park is an undisturbed remnant of the original woods of the region and contains a great variety of interesting herbs, shrubs and trees. Out of the sides and base of the bluff run many seepage rivulets which merge to form five small brooks, each from 1 to 3 feet wide and a few inches deep, with a stony bottom and a fairly rapid flow, fig. 6. The water is cold and clear at all times. In all of these streams the caddis flies are extremely numerous, their cases literally paving the bottom of the streams. Here we have taken seven species found nowhere else in the state: *Glossosoma intermedium*, *Dolophilus moestus*, *Rhyacophila vibox*, *Hesperophylax designatus*, *Molanna tryphena*, *Limnephilus rhombicus* and *Drusinus uniformis*. The first four are common, especially the *Glossosoma* and *Hesperophylax*, the cases of which may be found by the thousands in these streams.

Not only are these species peculiar to these streams, but other species found in neighboring streams are practically absent. Other species which occur include chiefly *Lepidostoma liba* and *Diplectrone modesta*, both found only locally elsewhere in Illinois. These conditions mark this Elgin group as the most unusual and interesting of our relic streams.

Somewhat similar in nature are two other spring-fed brooks near the Botanical Gardens. In one we discovered a large colony of *Hydropsyche slossonae* and in the other a colony of *Chimarra aterrima*, both rare and local in the state.

ILLINOIS NATURAL HISTORY SURVEY - UNIVERSITY OF ILLINOIS

OTHER LINKS

[Plecoptera Species File](#)

[Plecoptera Society of North America](#)

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Research

Taxonomy, ecology, and conservation of aquatic insects with particular emphasis on (Plecoptera).

*Reintroduction of aquatic insects to Illinois streams.

*Comparison of historical and contemporary stonefly assemblages in the Midwest USA and Canada.

*Post-glacial dispersal of stoneflies into the north from glacial refugia.

Message to Students

Students who wish to study any aspect of the taxonomy, life history, or conservation of riverine aquatic insects are welcome to contact me.

Recognition

Treasurer Illinois State Academy of Science

Professional affiliations

North American Benthological Society
Entomological Society of American
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Selected publications

*DeWalt, R. E. 2011. DNA barcoding: a taxonomic point of view. *Journal of the North American Benthological Society*, 30(1):174-181.

*Xin Zhou, Jason L. Robinson, Christy J. Geraci, Charles R. Parker, Oliver S. Flint, Jr, David A. Etnier, David Ruitter, R. Edward DeWalt, Luke M. Jacobus, and Paul D. N. Hebert. 2011. Accelerated construction of a regional DNA-barcode reference library: caddisflies (Trichoptera) in the Great Smoky Mountains National Park. *Journal of the North American Benthological Society*, 30(1):131-162.

*Zhou, X., L. M. Jacobus, R. E. DeWalt, S. J. Adamowicz , and P. D. N. Hebert. 2010. Ephemeroptera, Plecoptera, and Trichoptera fauna of Churchill (Manitoba, Canada): insights into biodiversity patterns from DNA barcoding. *Journal of the North American Benthological Society*, 29: 814-837.

*DeWalt, R. E., Y. Cao, L. Hinz, and T. Tweddale. 2009. Modeling of historical stonefly distributions using museum specimens. *Aquatic Insects*, 31, Suppl. 1: 253-267.

DeWalt, R. E., V. H. Resh, and W. L. Hilsenhoff. 2009. Chapter 16. Diversity and Classification of Insects and Collembola, 71 pp, in: J. Thorp & A. Covich (eds). *Ecology and Classification of North American Freshwater Invertebrates*, 3rd Ed. Elsevier.

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