

# Spiny and Fishhook Water Flea

## FACT SHEET

Pennsylvania Sea Grant, as part of the National Sea Grant Program, promotes efforts to improve the environmental and economic health of Pennsylvania's coastlines.

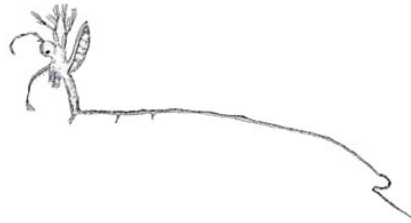
Focusing on the Lake Erie and Delaware River watersheds, Pennsylvania Sea Grant works to increase public awareness of coastal environmental and economic issues through extension, communication, applied research, and education activities.

The National Oceanic and Atmospheric Administration (NOAA) administers the National Sea Grant College Program. Pennsylvania Sea Grant is also supported by the Pennsylvania State University and the Commonwealth of Pennsylvania.

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**Background** The spiny water flea (*Bythotrephes cederstroemi*) and the fishhook water flea (*Cercopagis pengoi*) belong to the class Crustacea, a group of animals including crabs and shrimp that possess a hard exoskeleton (outer shell). Like all other



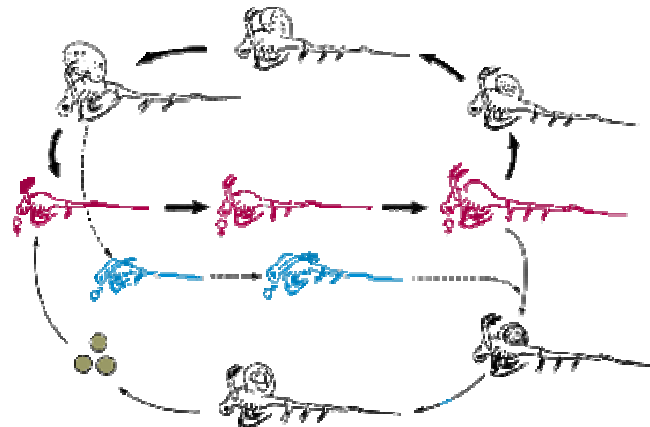
**Figure 1. Fishhook Water Flea:** courtesy of Marquette County Community Information System Web site: <http://www.mqtinfo.org/>

Crustacea, they molt their exoskeleton in order to grow. A native of Great Britain and northern Europe east to the Caspian Sea, this animal was first found in Lake Huron in 1984, likely imported in the ballast water of transoceanic freighters. No one is really sure what effect spiny water fleas will have on the ecosystems of the Great Lakes' region. Resource managers are worried because the animals may compete directly with young perch and other small fish for food, such as *Daphnia* zooplankton.

The spiny and fishhook water fleas are easily recognizable by their unique shapes (Figure 1 and 2). The tail spine is their distinguishing feature and separates them from all other free-swimming lake invertebrates, or zooplankton. The spine often comprises 70 to 80 percent of the animal's total length, and has one to four pairs of thorn-like barbs. Fishhook water fleas can be distinguished from spiny water fleas by the unique loop at the end of their tails and by a brood pouch that is more pointed than in spiny water fleas.



**Figure 2. Spiny Water Flea:** courtesy of Marquette County Community Information System Web site:



**Figure 3. Reproductive cycle:** courtesy of Minnesota Sea Grant: <http://www.seagrant.umn.edu/exotics/spiny.html>

Alternating asexual and sexual life cycles of *Bythotrephes*. The top loop illustrates the progression of embryos as they develop asexually. Females hatched from resting eggs can develop as many as four pairs of barbs. The presence of the male in the bottom loop indicates the sexual production of resting eggs.

During the summer, when the surface water of the lake is warm, spiny and fishhook water fleas can produce a new generation without fertilization (parthenogenesis) in less than two weeks (Figure 3). Because males are not needed for parthenogenesis, they are rarely found when food is plentiful, or when environmental conditions favor rapid population growth. Sex of offspring is not determined genetically, but rather by environmental

factors. When food becomes limited or when the lake cools in the fall, males begin to be produced. Adult females, who respond by producing male rather than female offspring, can sense declining environmental quality. These males are able to mate with surviving females, producing resting eggs. The resting eggs are first carried as orange-brown spheres in the female brood pouch. They are later released and sink to the lake bottom where they can survive the cold winter. In spring or early summer, these eggs hatch into juvenile females that begin parthenogenic reproduction again.

**Impact** Since their introduction into Lake Huron in 1984, the spiny and fishhook water flea have spread throughout the Great Lakes and to some inland lakes (Figure 4). Their rapid population growth enables them to monopolize the food supply at times, to the detriment of some fish. Although fish eat spiny and fishhook water fleas, the barbed spine of the water fleas seems to frustrate most small fish, which have difficulty swallowing them. Growth rates and survival of these young fish may be adversely affected by the presence of spiny and fishhook water fleas in the ecosystem because of competition for food.



Figure 4. 2003 Distribution of Water fleas: courtesy of USGS Web site: <http://nas.er.usgs.gov/crustaceans/>



Fishhook water fleas have also become a nuisance to anglers. They collect on fishing lines while trolling, and accumulate in such high numbers and with such density at the tip of fishing rods that the line can not be reeled in at times. They become such a problem that charter and recreational anglers have stopped fishing during periods of peak abundance. Fishhook water fleas also foul commercial fishing nets.

Figure 5. Cluster of Water fleas on Fishing Line: Photo Courtesy of the Minnesota Department of Natural Resources: <http://www.dnr.state.mn.us/aboutdnr/index.html>

**How to stop the spread** Thoroughly clean all fishing tackle, diving gear, nets, boats, and anything else that may hold water before moving from one body of water to another. Drain water from boat motors, live wells, bilges, and transom wells while on land before leaving a water area. Empty bait buckets on land upon leaving the water and before you leave the area. Do not release live bait into a body of water or release animals from one body of water into another. Discard contaminated fishing line and nets that are un-cleanable.

**Information for this fact sheet was adapted from a variety of sources, including:**

*The Great Lakes Information Network* - [www.great-lakes.net](http://www.great-lakes.net)

*Sea Grant Nonindigenous Species Site (SGNIS)* - [www.sgnis.org](http://www.sgnis.org)

*Great Lakes Sea Grant Network* - [www.uaf.edu/seagrant/private/SG-regional/greatlakes/index.html](http://www.uaf.edu/seagrant/private/SG-regional/greatlakes/index.html)