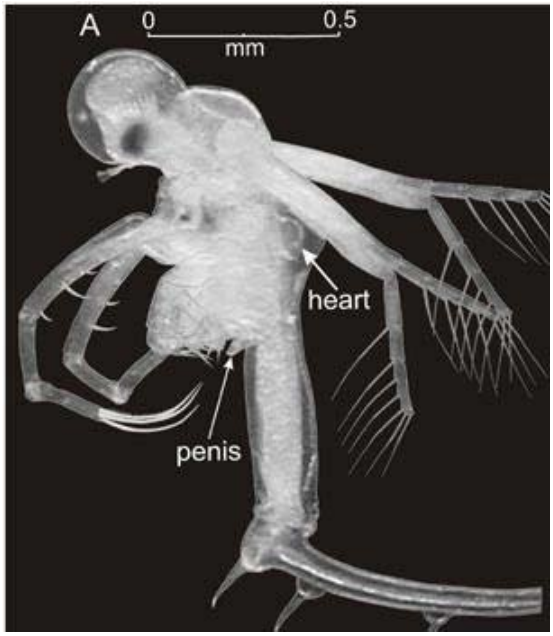
USGS science for a changing world

NAS - Nonindigenous Aquatic Species

Cercopagis pengoi
(fishhook waterflea)
Crustaceans-Cladocerans
Exotic to United States

Collection Info
HUC Maps
Point Maps
Fact Sheet



Igor Grigorovich

Cercopagis pengoi

Common name: fishhook waterflea

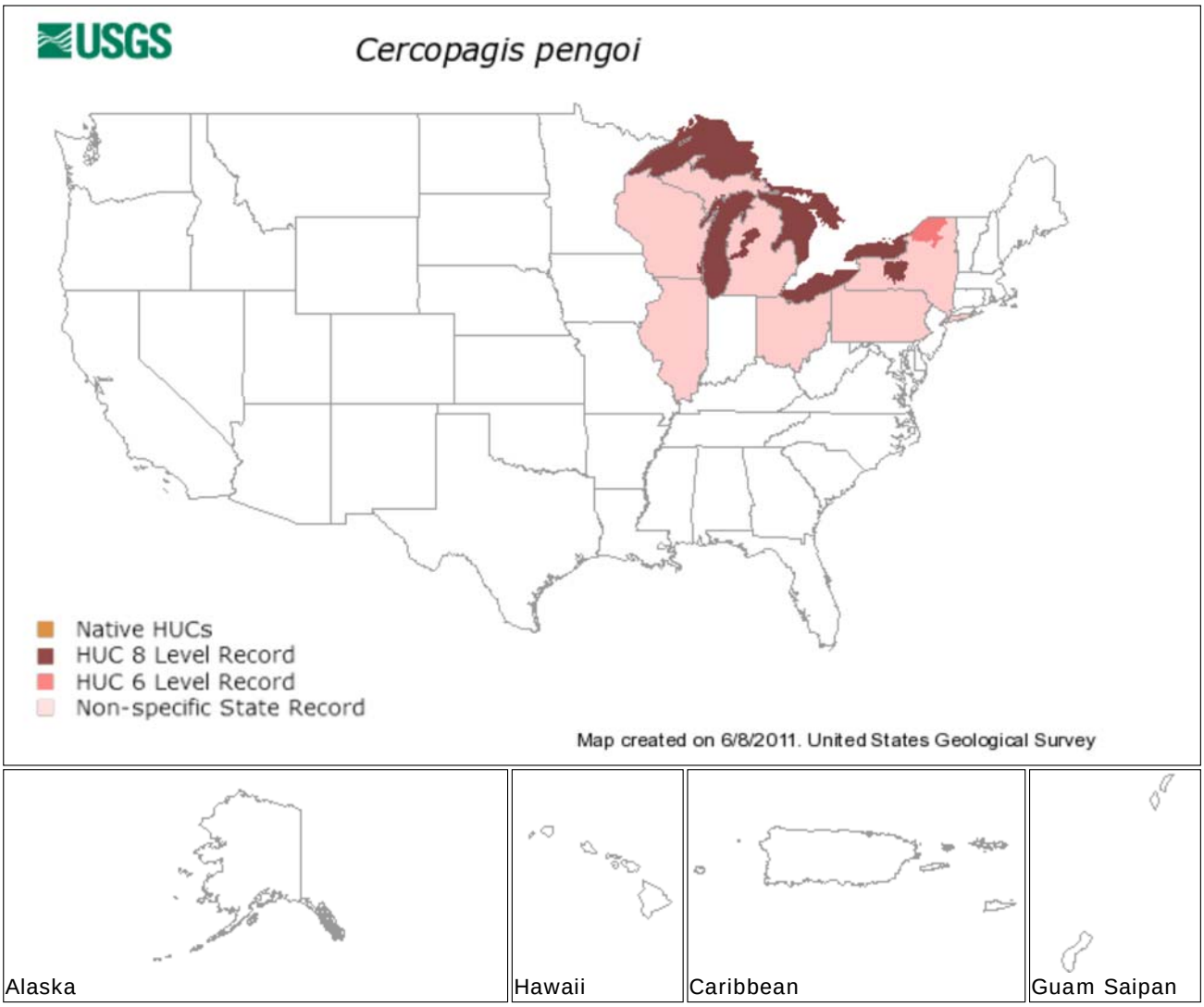
Synonyms and Other Names: fish-hook water flea

Taxonomy: available through ITIS

Identification: Body size from 1-3 mm in length without tail, 6-13 mm with tail; tail has three pairs of barbs and a characteristic loop near the end.

Size: 6-13 mm including tail

Native Range: Black, Caspian, Azov, and Aral seas of Europe and Asia (Makarewicz et al., 2001).



Interactive maps: Point Distribution Maps

Nonindigenous Occurrences: **Great Lakes Region**: Lake Erie (Presque Isle in 2002). Lake Ontario in 1998, Lake Michigan in 1999 (Charlebois, 2001), Finger Lakes and others of New York (Canandaiga, Cayuga, Keuka, Cross, Otisco, Owasco, and Seneca lakes). In the Summer of 2001, *C. pengoi* was found in Muskegon Lake east of Lake Michigan (Therriault et al., 2002). It was found in Lake Huron in 2002 (EPA, 2008). A single specimen was collected from Lake Superior in 2003, but the species is not believed to be established there.

Also introduced into Europe in the Baltic Sea area.

Ecology: In addition to sexual reproduction, *Cercopagis* most commonly reproduce parthenogenically (asexually), which allows them to quickly establish new populations with a relatively small seed population without the need for a large number of the smaller males along with females. Eggs produced in the early part of the season are delicate and very susceptible to damage, with low recruitment rates. Later in the season, as surface water temperatures decline, *Cercopagis* females produce over-wintering or resting eggs (the species is also known to produce resting eggs anytime during the year when environmental conditions become inhospitable). Such resting eggs can successfully overwinter in an inactive state and replenish the population after hatching in the spring. Resting eggs are also resistant to desiccation, freeze-drying and ingestion by predators (such as other fish). They can be easily transported to other drainage basins by various vectors, particularly if they are still in the female's body (the barbed caudal spine allows attachment to ropes, fishing lines, waterfowl feathers, aquatic gear, vegetation and mud). Resting eggs can hatch regardless of whether the carrier female is alive or dead.

Means of Introduction: Ballast water, boating

Status: Considered established in Lake Ontario, establishing itself quickly (similar to the invasion patterns in Europe) in the other Great Lakes (except L. Huron and Superior) and other inland lakes due to recreational boat traffic and other human activities (U.S.EPA 2008).

Impact of Introduction: According to the EPA's GARP model, the fishhook waterflea, a free-swimming macroinvertebrate, would likely find suitable habitat throughout the region, except for the deeper waters of Lake Superior. Population densities of the fishhook waterflea increase with distance from shore (IUCN, 2006), suggesting that this species may be able to occupy, given sufficient time, the entire region including the deeper waters of Lake Superior (EPA, 2008).

Cercopagis pengoi is a consumer of other zooplankton. As such it competes with other planktivores of the Great Lakes, including the alewife (*Alosa pseudoharengus*) and rainbow smelt (*Osmerus mordax*) (Bushnoe et al., 2003). Its long spine makes it less palatable to planktivorous fish. For these reasons *C. pengoi* could have a serious effect on the food supply of planktivores. For example, yearling alewife compete directly with *C. pengoi* because they are planktivorous, and cannot consume *C. pengoi* due to the caudal appendage. Once alewife reach their first year they are large enough to handle the caudal appendage (Bushnoe et al., 2003). *C. pengoi*'s establishment in Lake Ontario in 1998 corresponded with the lowest alewife populations in twenty years (Makarewicz et al., 2001). *C. pengoi* also fouls fishing gear.

A 2002 study of the food web impacts of *C. pengoi* showed that the depth at which *C. pengoi* exists is depleted of small organisms (<0.15 mg) (Benoit et al., 2002). It is unclear as to whether this is due to predator evasion or *C. pengoi* consumption, but in either case the smaller organisms are forced into deeper, cooler strata, causing growth rate changes (Benoit et al., 2002). The full impact of *C. pengoi* on the food web has not yet been extensively studied.

Remarks: Lives in brackish and freshwater lakes. Can reproduce asexually during the summer; sexual reproduction occurs in the fall when water temperatures decline; exhibit diurnal vertical migrations in native range; predatory feeding habits on other zooplankton. *C. pengoi* has been found in the stomach of some fishes in high percentages in Europe.

References:

Anonymous. 2001. *Cercopagis pengoi* (Ostroumov, 1891). Regional Biological Invasions Center, Russia. Available on-line at http://www.zin.ru/projects/invasions/gaas/cerpen.htm. Last accessed 12/4/2003.

Benoit, H. P., O. E. Johannsson, D. M. Warner, W. G. Sprules, L. G. Rudstam. 2002. Assessing the impact of a recent predatory invader: The population dynamics, vertical distribution, and potential prey of *Cercopagis pengoi* in Lake Ontario. Limnol. Oceanogr., 47(3):626-635.

Bushnoe, T. M., D. M. Warner, L. G. Rudstam, and E. L. Mills. 2003. *Cercopagis pengoi* as a new prey item for Alewife (*Alosa pseudoharengus*) and Rainbow Smelt (*Osmerus mordax*) in Lake Ontario. J. Great Lakes Res. 29(2):205-212.

Charlebois, P.M., M. J. Raffenberg, and J. M. Dettmers. 2001. First occurance of *Cercopagis pengoi* in Lake Michigan. J. Great Lakes Res. 27(2):258-261.

EPA Monitoring Data. 2008. EPA Great Lakes National Program Office.

Makarewicz, J. C., I. A. Grigorovich, E. Mills, E. Damaske, M. E. Cristescu, W. Pearsall, M. J. LaVoie, R. Keats, L. Rudstam, P. Hebert, H. Halbritter, T. Kelly, C. Matkovich, and H. J. MacIsaac. 2001. Distribution, fecundity, and genetics of *Cercopagis pengoi* (Ostroumov) (Crustacea, Cladocera) in Lake Ontario. J. Great Lakes Res. 27(1):19-32.

Telesh, I. V. and H. Ojaveer. 2002. Pages 62-65 In: Leppäkoski, E., S. Gollasch, S. Olenin, The predatory water flea *Cercopagis pengoi* in the Baltic Sea: invasion history, distribution and implications to ecosystem dynamics. Kluwer Academics Publishers, The Netherlands, 583 pp.

Therriault, T. W., I. A. Grigorvich, D. D. Kane, E. M. Haas, D. A. Culver, and H. J. MacIsaac. 2002. Range Expansion of the exotic zooplankter *Cercopagis pengoi* (Ostroumov) into western Lake Erie and Muskegon Lake. J. Great Lakes Res. 28(4):698-701.

Other Resources:

Army Corps of Engineers, WES

Cercopagis pengoi (ANS Clearinghouse Bibliography)

Cercopagis pengoi(Global Invasive Species Database)

Cercopagis pengoi (EPA)

EPA. 2008. Predicting Future introductions of nonindigenous species to the Great Lakes.NOAA Sea Grant Nonindigenous Species Site (SGNIS)

Great Lakes Water Life

New York Invasive Species Clearinghouse http://nyis.info/animals/FishhookWaterflea.aspx

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