Gymnocephalus cernuus 正體中文 **System:** Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Perciformes	Percidae

Common name pope (English), river ruffe (English), Eurasian ruffe (English), blacktail (English), ruffe (English), redfin darter (English)

Synonym *Acerina cemua* , (Linnaeus, 1758)
Acerina czekanowskii
Acerina fischeri
Acerina vulgaris
Perca cermua , Linnaeus, 1758

Similar species *Stizostedion vitreum, Perca flavescens, Percopsis omiscomaycus*

Summary Gymnocephalus cernuus is introduced into new locations in the ballast water of ships. Introductions also occur through escaped or discarded live bait. It has become a threat to the Great Lakes in North America and some lakes in Europe. Gymnocephalus cernuus has become invasive due to its reproduction ablity; its wide habitat range and its aggressive feeding habits.

view this species on IUCN Red List

Species Description
Gymnocephalus cernuus are small, reaching up to 20cm in length, with olive brown colouring on the back and pale sides. They have spiny dorsal and anal fins (Hajjar, 2002).

Notes
According to Hajjar (2002), \"*Gymnocephalus cernuus* have few predators in Europe and Asia, and most will only prey on *G. cernuus* when other prey is scarce. Predators include pike perch, northern pike, some eel, burbot, lake trout, small-mouth bass, black crappie, bullheads, walleye, Eurasian perch, yellow perch, cormorants, and kingfishers. To avoid predators, the ruffe prefers darkness, and uses special sensory organs called \"neuromasts\" to detect predators and prey. The ruffe also has a large, spiny dorsal fin likely unpalatable to predators.

Lifecycle Stages
According to Hajjar (2002), “the reproductive potential of *G. cernuus* is exceptionally high. It matures early, in two to three years, but males in some populations may mature in one year in warmer waters, reaching 11-12cm in length at maturity. *G. cernuus* spawn in a variety of habitats and environmental conditions. Spawning occurs at a wide range of temperatures, 4.9 to 20 degrees Celsius, and on a variety of substrates, including submerged plants, logs, branches, gravel, rocks, hard bottoms of clay, and sand. Eggs develop normally at pH 6.5 to pH 10.5, one of the widest ranges from a broad set of fish tested. Eggs hatch in 5-12 days. Young tolerate temperatures ranging from 7- 30 degrees Celsius. Females generally live for a maximum of 11 years, males for 7 years.”

Uses
Hajjar (2002) explains that *Gymnocephalus cernuus* fishery would only have minor commercial value. \"In some eastern European countries it is considered a delicacy, but is generally only used as a bait by anglers.\"

Habitat Description
G. cernuus can tolerate a wide range of ecological and environmental conditions. They are found in fresh and brackish water (with salinity up to 12ppt) and occur at depths varying from 0.25m to 85m. they are also able to thrive in eutrophic conditions (Hajjar, 2002).

Reproduction
According to Hajjar (2002), *G. cernuus* is a prolific breeder. \"Females produce up to 200,000 eggs in the first batch, and up to 6,000 eggs per subsequent batch.\"

Nutrition
Hajjar (2002) writes that “*Gymnocephalus cernuus* is an aggressive feeder. Depending on its life history stage and location, *G. cernuus* prey upon rotifer and copepod nauplii, cyclopoid copepods, cladocera, and chironomid larvae, macrocrustaceans, heleids, dragonfly and caddisfly larvae, zooplankton, mollusks, water mites, isopods, fly larvae and juveniles, and fish larvae (especially *Coregonus* spp.), and smelt. Larger *G. cernuus* will eat some small fish, including juvenile smelt, gobies, perch and nine-spined sticklebacks. According to Sea Grant (2002) \"*G. cernuus* spends its days in deeper water and moves to the shallows to feed at night.\" Nutrition includes eggs of whitefish (*Coregonus* spp.) (Adams & Maitland, 1998); *C. lavaretus* (Schmid, 1998) and *C. albula* (Winfield *et al.* 2004).

General Impacts
According to Sea Grant (2002), \"*Gymnocephalus cernuus* compete with native fish for food and habitat. Because of this, walleye, perch, and a number of small forage fish species are seriously threatened by continued expansion of the ruffe's range. Hajjar (2002), describes *G. cernuus* as prolific breeders and aggressive feeders. Their indiscriminate habitat requirements and selected life history traits are conducive to invasion. Their tolerance of different habitats and environmental conditions ensures successful introduction to novel locations.Their early maturation and high fecundity result in quick increases in abundance and quick establishment. *G. cernuus* have a competitive advantage over other bottom feeding fish, such as bream, *Coregonus* spp., roach, sturgeon, smelt, trout perch, Eurasian perch, and yellow perch, due to their flexible foraging abilities. They also “thrive in eutrophic conditions such as those associated with human disturbance, out-competing fish with narrower ecological requirements. They have been implicated in density declines of native fish by egg predation and competition for food in some European waters where they have been introduced. While the impact of *G. cernuus* on the Great Lakes ecosystem has not yet been considerable, the population is increasing and spreading, and has the potential to detrimentally effect highly valued commercial fishery species throughout the Great Lakes. And with the convenient mode of transportation of ballast water in ships traversing the Great Lakes, it is likely that *G. cernuus* will invade further habitats in the Great Lakes.\"

Management Info
According to Hajjar (2002), many physical, chemical, and biological methods have been suggested to contain the spread of the *G. cernuus*. In some Polish lakes, stocking of elvers and measures taken to protect pikeperch and eel resulted in an unintentional 5-7 fold decrease of *G. cernuus*. In 1989, attempts to control *G. cernuus* with a top-down predator control strategy failed. Northern pike and walleye were stocked in problem areas, but both species preferred native species and failed to control the *G. cernuus* population. Piscicides such as 3-trifluoromethyl-4nitrophenol (TFM) are now being suggested as an effective measure to control the *G. cernuus* population, but effects of such chemicals on other biota are questionable. Many believe that it is too late for eradication of *G. cernuus*, and instead are concentrating efforts on controlling the spread of the invasion. The Volunteer Ballast Water Management Program was enforced in 1993 for this purpose. In this joint effort among several Canadian and American coastal organizations and ocean lines, ships calling at ports in the western portions of Lake Superior were discouraged from taking on or discharging ballast water from these areas.\"\" According to Sea Grant (2002), \"fisheries managers have also considered a program to net and destroy as many ruffe as possible in the St. Louis River, on the theory that the ruffe's range would not expand as rapidly if populations were controlled.\" A modified design of the Windermere trap, (a useful collapsible tool in surveillance, monitoring, or control programs for ruffe or similar species, especially in situations where gillnetting or bottom trawling are not feasible) is found to be inexpensive and lightweight.

Pathway
Introductions occur through escaped or discarded live bait.According to Hajjar (2002), the fish was introduced and is mainly spread by boats taking on ballast water and bring it to new locations.

Principal source: Hajjar, R. 2002. *Ruffe (Gymnocephalus cernuus)* Columbia University , New York, United States.

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Ian J Winfield. Centre for Ecology & Hydrology, UK

Pubblication date: 2006-03-31

ALIEN RANGE

[2] CANADA
[1] FRANCE
[1] ITALY
[1] NORWAY
[3] UNITED KINGDOM
[1] UPPER LAKE CONSTANCE
[1] CROATIA
[1] GERMANY
[1] LAKE SUPERIOR
[1] SWITZERLAND
[5] UNITED STATES

Red List assessed species 2: CR = 1; EN = 1;

Coregonus pennantii **CR**

Coregonus vandesius **EN**

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25 references found for **Gymnocephalus cernuus**

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Summary: The reproduction and early life history of the ruffe (*Gymnocephalus cernuus*) in the St. Louis River tributary of Lake Superior is examined. Spawning period and corresponding water temperatures are reported as is timing of protolarval emergence. Diel movements of larval ruffe are also reported. Characteristics of ruffe reproduction and the activity of larval ruffe are used to estimate the most probable times of larval infestation of ballast water and subsequent translocation of larval ruffe. The authors suggest that this information may be useful to fishery managers developing ruffe control methods as well as determining possible interactions between ruffe and native species during early life stages.

Centre for Environment, Fisheries & Aquaculture Science (CEFAS)., 2008. Decision support tools-Identifying potentially invasive non-native marine and freshwater species: fish, invertebrates, amphibians.
Summary: The electronic tool kits made available on the Cefas page for free download are Crown Copyright (2007-2008). As such, these are freeware and may be freely distributed provided this notice is retained. No warranty, expressed or implied, is made and users should satisfy themselves as to the applicability of the results in any given circumstance. Toolkits available include 1) FISK- Freshwater Fish Invasiveness Scoring Kit (English and Spanish language version); 2) MFISK- Marine Fish Invasiveness Scoring Kit; 3) MI-ISK- Marine invertebrate Invasiveness Scoring Kit; 4) FI-ISK- Freshwater Invertebrate Invasiveness Scoring Kit and AmphISK- Amphibian Invasiveness Scoring Kit. These tool kits were developed by Cefas, with new VisualBasic and computational programming by Lorenzo Vilizzi, David Cooper, Andy South and Gordon H. Copp, based on VisualBasic code in the original Weed Risk Assessment (WRA) tool kit of P.C. Pheloung, P.A. Williams & S.R. Halloy (1999).
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Summary: In 1993, Canada, Mexico and the United States signed the North American Agreement on Environmental Cooperation (NAAEC) as a side agreement to the North American Free Trade Agreement (NAFTA). The NAAEC established the Commission for Environmental Cooperation (CEC) to help the Parties ensure that improved economic efficiency occurred simultaneously with trinational environmental cooperation. The NAAEC highlighted biodiversity as a key area for trinational cooperation. In 2001, the CEC adopted a resolution (Council Resolution 01-03), which created the Biodiversity Conservation Working Group (BCWG), a working group of high-level policy makers from Canada, Mexico and the United States. In 2003, the BCWG produced the ?Strategic Plan for North American Cooperation in the Conservation of Biodiversity.? This strategy identified responding to threats, such as invasive species, as a priority action area. In 2004, the BCWG, recognizing the importance of prevention in addressing invasive species, agreed to work together to develop the draft CEC Risk Assessment Guidelines for Aquatic Alien Invasive Species (hereafter referred to as the Guidelines). These Guidelines will serve as a tool to North American resource managers who are evaluating whether or not to introduce a non-native species into a new ecosystem. Through this collaborative process, the BCWG has begun to implement its strategy as well as address an important trade and environment issue. With increased trade comes an increase in the potential for economic growth as well as biological invasion, by working to minimize the potential adverse impacts from trade, the CEC Parties are working to maximize the gains from trade while minimizing the environmental costs.
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Summary: The introduction of the ruffe (*Gymnocephalus cernuus*) into Loch Lomond, Scotland in 1982 and the subsequent expansion of the population are discussed. The population is reported to have grown exponentially between 1982 and 1992, and then stabilized at a very high level. Food habits of the ruffe are examined with emphasis on diet overlap between this exotic species and native species including perch (*Perca fluviatilis*) and brown trout (*Salmo trutta*). Results suggest that feeding resource competition does not occur between ruffe and perch or ruffe and brown trout during their adult lives. Possible disruption of predator-prey interactions is also discussed focusing on the use of ruffe as prey by cormorants, herons, and northern pike (*Esox lucius*). The effects of this diet shift on native fish populations is commented on.

FishBase, 2005. Species profile *Gymnocephalus cernuus* Ruffe
Summary: FishBase is a global information system with all you ever wanted to know about fishes . FishBase on the web contains practically all fish species known to science. FishBase was developed at the WorldFish Center in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and many other partners, and with support from the European Commission (EC). Since 2001 FishBase is supported by a consortium of seven research institutions. You can search on Search FishBase
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Summary: Available from: http://www.iucnredlist.org/details/135518/0 [Accessed 25 May 2012]
Hajjar, R. 2002. *Ruffe (Gymnocephalus cernuus)* Columbia University , New York, United States.
Summary: Contains common names, scientific name, taxonomy, description, native and non-native distribution, mode of introduction and spread, benefits, impacts, and control methods.
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Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
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Summary: The direct and indirect effects of eutrophication on U.K. fish communities is briefly discussed with references cited for more in depth discussions. Also included is a discussion on how species introductions can effect U.K. fish communities. Attention is focused on pike-perch (*Stizostedion lucioperca* L.), ruffe (*Gymnocephalus cernuus* L.) and roach (*Rutilus rutilus* L.) in regard to their roles as predators, competitors and environmental degraders.
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