Channa argus 正體中文

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Perciformes	Channidae

Common name

northern snakehead (English), Amur-Schlangenkopf (German, Germany), zmeegolov (Russian), her-yu (Chinese, China), amur snakehead (English), cabeza de serpiente (Spanish, Spain), ga mul chi (Korean), kamuruchi (Japanese), raigyo (Japanese), kinesisk slangehovedfisk (Danish, Denmark), eastern snakehead (English), ocellated snakehead (English), amurinkäärmeenpää (Finnish, Finland), idänkäärmeenpää (Finnish, Finland), poisson tête de serpent (French, France)

Synonym

Ophicephalus nigricans
Ophicephalus pekinensis , (Basilewsky, 1855)
Ophicephalus argus warpachowskii , (Berg, 1909)
Ophicephalus argus kimurai , (Shih, 1936)
Channa argus argus , (Cantor, 1842)
Ophicephalus argus , (Cantor, 1842)

Similar species

Amia calva, Lota lota, Channa maculata

Summary

The cold temperate northern snakehead (Channa argus) is found in areas in Russia, China and Korea. It is known for its voracious predation of other fish species, ability to withstand freezing and ability to tolerate lack of water for up to four days. Used as luxuary food item and as food in poor socio-economic areas, including India, the fish is farmed and transferred around the world. Recent occurance of this \"frankenfish\" in Maryland (USA) has been the focal point of media attention.

view this species on IUCN Red List

Species Description
The body of snakeheads is torpedo-shaped, which tapers towards the tail. They have a single, long dorsal fin, a long anal fin, and a small head with a large mouth (Cudmore & Mandrak 2006). Northern snakeheads are cylindrical fish that can grow up to 85 centimeters in length (Okada 1960, in Courtenay and Williams, 2004) however, in Russia there have been reports of captured specimens reaching 1.5 meters total length (Courtenay and Williams 2004). As the name implies, the scaled head of the fish looks like a snake; they have a large mouth with sharp teeth, a truncated, not rounded tail and are easily identified by dark irregular blotches along their sides (Sea Grant Pennsylvania 2007) on a background of golden tan to pale brown. This fish is capable of darkening its background colors to the point of almost obscuring the blotches. There is a dark stripe from just behind the eye to the upper edge of the operculum with another dark stripe below from behind the orbit extending to the lower quadrant of the operculum. Coloration of juveniles is virtually the same as in adults, a characteristic atypical for many snakehead species.
Gular part of head without patch of scales; head somewhat depressed anteriorly; interorbital area flat; eye above middle of upper jaw; mouth large, reaching far beyond eye; villiform teeth present in bands with some large canine-like teeth on lower jaw and palatines; lateral line scales 60 to 67; eight scale rows above lateral line to dorsal fin origin; 12 to 13 scale rows below lateral line to anal fin origin; dorsal fin elongated, with 49 to 50 rays; anal fin with 31 to 32 rays; origin of pelvic fin beneath fourth dorsal fin ray; pectorals extending beyond base of pelvic fins (Courtenay & Williams 2004).
It is reported that actively feeding adults make grunting noises \"like pigs\" (Nina Bogutskaya Pers. Comm. 2002, in Courtenay & Williams 2004). Soin (1960, in Courtenay & Williams 2004) noted clicking sounds produced by the northern snakehead in ponds in northeastern China as the fish rose to the surface to breathe air. The northern snakehead, because of its torpedo-shaped body, has limited ability to move onto land except as young, and only during flood conditions (Courtenay and Williams 2004).

Notes
Snakeheads (family Channidae) are airbreathing freshwater fish containing two genera, *Channa* with 26 species native to Asia, Malaysia, and Indonesia; and *Parachanna* with three species native to tropical Africa (Courtenay & Williams 2004) Some snakeheads are small, reaching about 17 centimeters, but most are much larger, the largest reported to be 1.8 meters in length (Courtenay & Williams 2004). \n
Subspecies *Channa argus kimurai* (Shih 1936): Described from two specimens of length 185 mm and 250 mm; it can be distinguished by its variation in body proportions. In particular, the lower dorsal profile and differences in the arrangement of teeth. The body colour is all white, a complete contrast to *C. argus*. Above the lateral line, some of the scales have a grey centre. Vertical fins are tipped grey (Galveston Bay Invasive Species Risk Assessment Invasive Species Summary).\n
Subspecies *Channa argus warpachowskii* (Berg 1949): A larger variant which can attain a size of 800 mm and a weight of 7 kg. Characteristics of *C. argus warpachowskii* include higher average ray counts than *C. argus* (50 to 53 in the dorsal fins and 33 to 38 in the anal fins) and smaller scales. The irregular blotches on the side of the body are dark brown, edged with black and the lower part of the head is covered with small, dark brown speckles (Galveston Bay Invasive Species Risk Assessment Invasive Species Summary).
Subspecies *Channa argus argus* is common in China and Korea whereas *C. argus warpachowskii* is found in the Amur River of Russia and China.

Lifecycle Stages
Northern snakehead larvae are about 4.5 millimeters long. Within two weeks they have reached about 11 millimeters in length. They have absorbed their yolk sacs, their fin rays are visible and their coloration is black. Within four weeks they have reached a length of about two centimeters. Their pelvic fins are developed, their epibranchial breathing cavaties are functional and their coloration becomes brown. Larvae then lose their aggregate behavior and move to deeper waters. Scales develop at a length of about four centimeters. Adults care for their young which feed on plankton until they are about four weeks old. Sexual maturity is reached at the age of two to three years and a length of about 30 centimeters. They are long lived, with one specimen recorded at eight years old and 760 mm long (Courtenay & Williams 2004; FishBase 2009; Galveston Bay Undated).

Uses
Snakeheads have long been favored food fishes in India and many parts of Asia, particularly southeastern Asia (Lee and Ng 1991, in Courtenay & Williams 2004). Some are utilised as luxury specialty foods, available alive in aquaria for customer selection at upscale restaurants in larger cities such as Calcutta, Bangkok, Singapore, Hong Kong and other major locales. They also provide easily caught food for poorer people (Wee 1982, in Courtenay & Williams 2004). *C. argus* is the most cultured snakehead in China and the most available snakehead in North American live-food markets. *C. argus* has a modest importance in aquarium fish trade in Japan, Europe and to a lesser extent, the USA (Courtenay & Williams 2004).

Habitat Description
The northern snakehead has a broad range of environmental tolerances and is extremely hardy (Cudmore & Mandrak 2006); it inhabits freshwater within a temperature range of 0 to 30°C (Okada 1960, in Courtenay & Williams 2004). Northern snakeheads prefer stagnant shallow ponds or swamps with mud substrate and vegetation; they can also be found in slow muddy streams (Okada, 1960, in Courtenay and Williams, 2004) and in canals, reservoirs, lakes, and rivers (Dukravets and Machulin 1978, Dukravets 1992, in Courtenay and Williams 2004). An obligate airbreather it can survive out of water for up to four days by breathing oxygen; cold temperatures reduce metabolism rates and oxygen demand, allowing them to survive under ice (Courtenay & Williams 2004).

Reproduction
Northern snakeheads reach sexual maturity at two to three years of age and approximately 30 to\n35 cm in length. Females produce eggs one to five times per year and release 22 000 to 51 000\neggs per spawn (Frank 1970, Nikol'skiy 1956, in Courtenay and Williams 2004). Females can lay as many as 100 000 eggs annually. Sexual fertilisation is external and occuring in early morning in shallow waters. The eggs are pelagic, spherical, non-adhesive, yellow and about two millimeters in diameter. Their eggs float and take approximately 28 hours to hatch at 31°C and 45 hours at 25°C; at lower temperatures the eggs take much longer to hatch (Courtenay and Williams 2004). Parents guard the young in a nest until yolk absorption is complete at approximately eight millimeters in length (Courtenay & Williams 2004). Minimum population doubling time is less than 15 months (Courtenay & Williams 2004; FishBase 2009).

Nutrition
Young northern snakeheads eat zooplankton (Courtenay and Williams). At a length of about 18 millimeters the young shift their diet and begin feeding on small crustaceans, aquatic insects and fish larvae (Courtenay and Williams, 2004; Cudmore & Mandrak 2006; Fuller 2009). All snakehead species are carnivorous thrust predators as adults, mainly piscivorous in nature (Cudmore & Mandrak 2006); at a length of four millimeters they begin to feed on fish and then at 13 to 15 centimeters, fishes comprise 64 to 70% of the diet (*National Control and Management Plan for the Northern Snakehead* Undated). They also prey on frogs and tadpoles, crustaceans, aquatic insects (including worms), reptiles (including snakes), small birds and mammals (Fuller 2009; Galveston Bay Invasive Species Risk Assessment Invasive Species Summary). They do not feed during winter but hibernate by burrowing into mud/substrate. Juvenile northern snakeheads feed in schools, with most of the activity during early evening and again in early morning, usually in vegetation close to shore (Courtenay and Williams 2004).

General Impacts
The introduction of non-native northern snakeheads into waterways has received a great deal of media, public and political attention in the USA (US Fish and Wildlife Service & Arkansas Game and Fish Commission. 2008). The high fertility of and tolerance to a wide range of conditions of the northern snakehead, as well as the lack of natural enemies in its introduced range, make it highly likely to be a formidable invasive if it were to become established.\n
Ecosystem change: Left uncontrolled, this predatory invasive species is likely to expand its range and could permanently alter the balance of aquatic ecosystems throughout the Mississippi River basin (US Fish and Wildlife Service & Arkansas Game and Fish Commission. 2008).\n
Predation: Okado (1960, in Courtenay and Williams 2004), reported that this species is a voracious feeder of aquatic fauna. Northern snakeheads can eat prey up to 33% of their own body length with larger prey often consisting of loach, bream, carp and perch; other food items include crayfish, dragonfly larvae, beetles and frogs (Courtenay & Williams 2004). A total of 17 food items, including 15 fish species, were identified from stomach contents of (n= 219) northern snakehead from the Potomac River (Odenkirk & Owens 2007) between 2004 and 2006. Food items observed consisted mostly of banded killifish (*Fundulus diaphanous*) with white perch (*Morone americana*), bluegill (*Lepomis macrochirus*) and pumpkinseed sunfish (*Lepomis gibbosus*) also commonly consumed (Odenkirk & Owens 2007). Goldfish (*Carassius auratus*), gizzard shad (*Dorosoma petenense*), American eel (*Anguilla rostrata*), yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), spottail shiner (*Notropis hudsonias*), eastern silvery minnow (*Hybognathus regius*), mummichog (*Fundulus heteroclitus*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), tessellated darter (*Etheostoma olmstedi*), frogs and crayfish were also consumed at low levels (Odenkirk 2006, in *National Control and Management Plan for the Northern Snakehead* Undated).\n
Competition: Northern snakeheads are capable of surviving in water with very low oxygen content, giving them a competitive advantage over species such as pike and bass that require more oxygen (Sea Grant Pennsylvania 2007).\n
Economic/Livelihoods: It could have significant negative economic impacts if it were to become established throughout the the Mississippi River basin (US Fish and Wildlife Service & Arkansas Game and Fish Commission. 2008).\n
Disease Transmission: The Northern snakehead is affected by the following parasites which are also known to affect native species in various parts of the world: *Mysosoma acuta* (also affects crucian carp), *Henneguya zschokkei* ? (also affects salmonids), *Cysticercus gryporhynchus cheilancristrotus* (also affects cyprinids, perches), *Clinostomum complanatum* (also affects perches) and *Paracanthocephalus cutus* (also affects cyprinids, escocids, sleepers and bagrid catfish) (for more information on parasites carried by the northern snakehead please see Courtenay & Williams 2004).

Management Info
Preventative measures: The northern snakehead has a wider latitudinal range and temperature tolerance than other snakehead species, which indicates that it could become established throughout most of the contiguous United States and some waters in adjoining Canadian provinces (Courtenay and Williams, 2004). In a Canadian risk assessment prepared by Cudmore & Mandrak (2006) Part I (*Aquatic Organism Ecological and Genetic Risk Assessment Process*) revealed a \"High probability of establishment estimate\" (reasonably certain) and a \"High consequences of establishment estimate\" (reasonably certain), giving a \"Final Risk Estimate\" of \"High\" (reasonably certain). Similarly, Part II (*Pathogen, Parasite or Fellow Traveler Risk Assessment Process*) revealed a \"Medium probability of establishment estimate\" (reasonably certain) and a \"Medium consequences of establishment estimate\" was \"Medium\" (very uncertain), giving a \"Final Risk Estimate\" of \"Medium\" (very uncertain). \n
All snakeheads were banned from importation and interstate transport in the USA in October 2002 by the US Fish and Wildlife Service under the Lacy Act (NSWG 2006). In the USA anglers and commercial fisherman have been asked to kill and freeze all snakeheads rather than re-release them and immediately report them to the local Fish and Game Department (Sea Grant 2007). \n
Chemical: In Crofton pond, Maryland (USA) herbicides (Diquat Dibromide and Glyphosate) were used to lower oxygen levels, then a piscicide (Rotenone) was used to poison the fish (Hilton 2002). The total cost of this eradication in a 1.8 ha pond was estimated at $110,000 (Courtenay & Williams 2004). Eradication would be much more complicated in rivers, streams, or larger lakes. \n
Physical: Electrofishing and netting may provide a low level of control to established populations but would not result in eradication due to selectivity of certain size classes (NatMangPln).\n
Decision support tools for identifying potentially invasive non-native marine and freshwater species (fish, invertebrates and amphibians) have been adapted from Pheloung Williams and Halloy (1999) Weed Risk Assessment. Please follow this link to access the decision support tool and kit.
A Risk-assessment for non-native freshwater species in the UK is available for determining the level of potential invasion The assessment can aid resource managers in decision making when it comes to management strategies.

Pathway
The northern snakehead is a popular aquarium fish in Europe and Japan, however, because of their highly predacious nature snakeheads have not had a large following of interested hobbyists in the USA (Courtenay & Williams 2004). Some introductions are believed to be the result of intentional release of aquarium fish as they are very expensive to feed and soon outgrow their aquaria (Courtenay & Williams 2004)Many introductions of the northern snakehead are believed to be the result of intentional release of fish obtained from the live food trade (Courtenay & Williams 2004). The northern snakehead has been a market leader and is cultured in China and Korea (Courtenay & Williams 2004). This species has been exported to other nations, including Canada and the United States where it has been sold alive in certain ethnic markets and restaurants (Courtenay & Williams 2004).The northern snakehead is introduced to many locations for culture as a sport fish (Courtenay & Williams 2004).Many introductions of the northern snakehead are believed to be the result of intentional release of fish obtained from the live food trade (Courtenay & Williams 2004). The northern snakehead has been a market leader and is cultured in China and Korea (Courtenay & Williams 2004). This species has been exported to other nations, including Canada and the United States where it has been sold alive in certain ethnic markets and restaurants (Courtenay & Williams 2004).

Principal source: Courtenay, W.R. Jr., & J.D. Williams. 2004. Snakeheads (Pisces, Channidae) - A Biological Synopsis and Risk Assessment. USGS.

Compiler: IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Expert review underway: Dr. Walter R. Courtenay, Research Fishery Biologist, Center for Aquatic Resources Studies, USGS Florida Integrated Science Center USA

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ALIEN RANGE

[1] ARAL SEA
[1] CANADA
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[1] KAZAKHSTAN
[1] NIGERIA
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[11] UNITED STATES
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[1] CAMBODIA
[1] CZECH REPUBLIC
[1] JAPAN
[1] KOREA, REPUBLIC OF
[1] SLOVAKIA
[1] TURKMENISTAN
[1] UZBEKISTAN

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Managment information

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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 &#65533;Strategic Plan for North American Cooperation in the Conservation of Biodiversity.&#65533; 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. Available from: English version: http://www.cec.org/Storage/62/5516_07-64-CEC%20invasives%20risk%20guidelines-full-report_en.pdf [Accessed 15 June 2010]
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Summary: Abstract: The introduction of fishes, whether of foreign origin or from one part of North America to another, has been part of fisheries management for much of the past century, some introductions dating well back into the nineteenth century. Federal, state, and provincial agencies, along with aquaculture facilities and private aquarists, have all played important roles in this history. In recent decades there have been many unauthorized introductions via a rapidly increasing number of pathways, some of which are difficult to control. One very large problem in dealing with introduced fish is the inability of many fishery biologists and managers to identify native fishes in their jurisdictions, recognize introduced species, and appreciate the management problems that might result. Proper management cannot be done by those who have little knowledge of systematic ichthyology and who are thus unable to identify the fishes they are dealing with, be they native or introduced. I suggest a solution to some of these problems and recommend a curriculum change to better train future fishery biologists and managers.
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