GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Oreochromis aureus***

Oreochromis aureus 正體中文

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Perciformes	Cichlidae

Common name Blue tilapia (English)

Synonym
Chromis aureus , (Steindachner, 1864)
Sarotherodon aureus , (Steindachner, 1864)
Tilapia aurea , (Steindachner, 1864)
Tilapia aurea exul , (Steindachner, 1864)
Tilapia kacherbi , (Wunder, 1960)
Tilapia kashabi , (Elster, 1958)
Tilapia lemassoni , (Blache & Milton, 1960)
Tilapia monodi , (Daget, 1954)

Similar species *Oreochromis niloticus*

Summary Oreochromis aureus (blue tilapia) is native to parts of Africa and the Middle East and is an important food source throughout the world. Oreochromis aureus are easily raised as they are resilient and prolific and have a high grain-to-feed conversion rate. Worldwide introductions for use in aquaculture have provided an essential source of protein to many nations. However, these characteristics have allowed them to dominate many of their introduced ranges by displacing native species and restructuring aquatic communities in areas where they have established by means of escape from confinement or deliberate release.

view this species on IUCN Red List

Species Description
Oreochromis aureus is a cichlid blue and silver in color with 18-26 gill rakers, 16 dorsal spines, and 3 anal spines.The caudial fin has a broad pink to red distal margin. Males are significantly larger then females with a max length of 50.8 cm. Breeding males exhibit an intense bright metallic blue on their head, a vermillion edge to their dorsal fin, and a more intense pink on the caudal fin. Breeding females exhibit paler more orange edges to their dorsal and caudal fins (GSMFC, 2003; FishBase, 2007)

Notes
Oreochromis aureus is believed to have been documented as *Oreochromis nilotica* in many accounts since many identifications were made before the two species were differentiated. *O. aureus* may be identified by its lack of dark vertical stripes present on the caudal fins of *O. niloticus* (GSMFC, 2003; Nico, 2007).

Lifecycle Stages
Hatching occurs about 3 days after oviposition, and juveniles remain in their mother mouth until they are about 1cm long. They school near their mothers mouth for about five days before going on their own. Young are particulate feeders during larval and juvenile stages (McKaye *et al*. 1995; FishBase, 2007).

Uses
Oreochromis aureus is a prolific and tolerant species introduced worldwide for aquaculture, angling, and the control of aquatic vegetation. They are popularly used for hybridization in producing all male populations (FishBase, 2007). Power companies have introduced *O. aureus* for food and sport, as well as vegetation control, in heated effluent ponds used to cool effluents from plants which are too warm to support native fish (Nico, 2007).

Habitat Description
Oreochromis aureus is benthopelagic and potamodromous. It prefers tropical climate but is fairly cold tolerant. It occurs in temperatures 8°-30° C and freshwater to fairly brackish salinities. *O. aurues* is considered hardy and tolerant to a wide range of water quality and habitat conditions (McKaye *et al*. 1995; FishBase, 2007).

Reproduction
Ovophilic: external fertilization, capable of breeding in freshwater and brackish water. Reproduction of *Oreochromis aureus* is stimulated by long photoperiods and requires a minimum temperature of 20° C. Males dig a spawning pit, usually among weedy areas, which they defend aggressively. They visit schools of females to attract a mate. Courting behaviour includes lateral display, nipping, and tail flapping by both sexes. Females deposit eggs in single clutches. A maternal mouthbrooder, females take the eggs into their mouth as soon as they are fertilized and swim to deeper waters while the male attempts to spawn with another female. Hatching occurs about 3 days after oviposition, and juveniles remain in their mother mouth until they are about 1cm long. They school near their mothers mouth for about five days before going on their own. *O. Aureus* does not have strict habitat requirements for reproduction, so introduced populations can take up all available habitat for breeding sites (McKaye *et al*. 1995; FishBase, 2007)

Nutrition
Oreochromis aureus feeds primarily on phytoplankton and epiphytic algae, but has a wide diet including insects, zooplankton, vascular plants, and larval and juvenile fishes. Young have a more varied diet which includes large quanities of copepods and cladocerans (McKaye *et al*. 1995; GSMFC, 2003).

General Impacts
Oreochromis aureus competes with native fishes for food, spawning area, and space, and exhibits aggressive behavior. They have become the dominant species in many of their introduced ranges. Several introductions have correlated with and are believed to cause reductions in abundance of native fishes and even molluscs. Blue tilapia structure phytoplankton communities by their feeding preference of specific algae, having significant effects on the entire community ecology. Some reports maintain certain introduced areas have lost most and nearly all native fishes (McDonald, 1987; GSMFC, 2003; FishBase, 2007; Nico, 2007).

Management Info
Preventative measures: The use of potentially invasive alien species for aquaculture and their accidental release/or escape can have negative impacts on native biodiversity and ecosystems. Hewitt *et al*, (2006) Alien Species in Aquaculture: Considerations for responsible use aims to first provide decision makers and managers with information on the existing international and regional regulations that address the use of alien species in aquaculture, either directly or indirectly; and three examples of national responses to this issue (Australia, New Zealand and Chile). The publication also provides recommendations for a 'simple' set of guidelines and principles for developing countries that can be applied at a regional or domestic level for the responsible management of Alien Species use in aquaculture development. These guidelines focus primarily on marine systems, however may equally be applied to freshwater.
Copp *et al*, (2005) Risk identification and assessment of non-native freshwater fishes presents a conceptual risk assessment approach for freshwater fish species that addresses the first two elements (hazard identification, hazard assessment) of the UK environmental risk strategy. The paper presents a few worked examples of assessments on species to facilitate discussion. The electronic Decision-support tools- Invasive-species identification tool kits that includes a freshwater and marine fish invasives scoring kit are made available on the Cefas (Centre for Environment, Fisheries & Aquaculture Science) page for free download (subject to Crown Copyright (2007-2008)).
Most management techniques to control undesired fish populations are not effective for control of tilapia. Prevention of escape and care in stocking of *Oreochromis aureus* can effectively prevent their establishment of wild populations. Totally closed systems should always be used when cultivating blue tilapia, and only in watersheds where tilapia have already penetrated. *O. aureus* aquaculture should be banned from watersheds and lakes in which they have not become established (McCrary *et al*. 2007).
Physical: *Oreochromis aureus* populations of Brunner Island, Pennsylvania were eradicated in 1986, when condenser cooling water was deliberately and temporarily released at lethal, low temperature. One study recommended the temperature be brought to 5°C for 16 hours to effectively eradicate *O. aureus* (Stauffer *et al*. 1988; Costa-Pierce, 2001; Nico, 2007).
Biological: The use of predatory fish *Morone saxatilis* X *Morone chrysops* and *Sciaenops ocellatus* has been effectively employed to reduce wild spawning among tilapia hybrids (*Oreochromis niloticus* X *Oreochromis aureus*) in aquaculture growout ponds. However, such introductions in the wild would have their own ecological effects. Other known predators and possible controls include: snakehead (*Channa striata*), tarpon (*Megalops cyprinoides*), Nile perch (*Lates niloticus*), *Hemichromis fasciatus*, and *Cichlasoma managuens* (Milstein *et al*. 2000).
A management program in Lake Nicaragua to increase the abundance of potential predators of large tilapias, including *Oreochromis aureus* such as alligators, *Crocodrilus acutus*, *Crocodrilus gars* and *Crocodrilus elasmobranchs*, all vastly reduced from just a few decades earlier, has been recommended (McCrary *et al*. 2007).
Integrated management: Promotion and augmentation of fishing pressure on *O. aureus* in order to reduce the average fish size and thereby free niche space for other fishes is another recommended means of controlling their populations (McCrary *et al*. 2007).

Pathway
Many introductions of *Oreochromis aureus* have been to control aquatic vegetation (Nico, 2007).*Oreochromis aureus*, a tolerant and prolific species has been stocked as a food species in rivers, lakes, and ponds throughout the world (Nico, 2007).

Principal source: FishBase. 2007. *Oreochromis aureus* Blue tilapia
Nico, L. 2007. *Oreochromis aureus*. Nonindigenous Aquatic Species Database (NAS), Gainsville FL.
Gulf States Fisheries Marine Commission (GSFMC)., 2003. *Oreochromis aureus* (Steindachner, 1864).

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

Review: Pam Fuller USGS/BRD, Nonindigenous Aquatic Species Program. Florida Integrated Science Center. USA

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ALIEN RANGE

[1] ANTIGUA AND BARBUDA
[1] BAHAMAS
[1] BRAZIL
[1] COSTA RICA
[1] CUBA
[1] DOMINICA
[1] EL SALVADOR
[1] GUATEMALA
[1] JAPAN
[1] MEXICO
[1] NICARAGUA
[1] PANAMA
[1] PHILIPPINES
[1] RUSSIAN FEDERATION
[1] SOUTH AFRICA
[1] TAIWAN
[1] TURKEY
[1] UNITED ARAB EMIRATES
[1] ZAMBIA
[1] ATLANTIC - WESTERN CENTRAL
[1] BES ISLANDS (BONAIRE, SINT EUSTATIUS AND SABA)
[1] CHINA
[1] COTE D'IVOIRE
[1] CYPRUS
[1] DOMINICAN REPUBLIC
[1] FRENCH POLYNESIA
[1] HAITI
[1] KUWAIT
[1] MYANMAR
[1] PAKISTAN
[1] PERU
[1] PUERTO RICO
[1] SINGAPORE
[1] SYRIAN ARAB REPUBLIC
[1] THAILAND
[1] UGANDA
[15] UNITED STATES

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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: A study on the effects of invasive tilapia on Lake Nicaragua.
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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.
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Summary: Experiment using predatory fishes as a control for *Oreochromis aureus*.
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Summary: This is a detailed profile concerning *Oreochromis aureus* and its introductions to the United States.
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Summary: An abstract of a study suggesting cold shock as a means of eradicating *Oreochromis aureus*.

General information

CONABIO. 2008. Sistema de informaci&#65533;n sobre especies invasoras en M&#65533;xico. Especies invasoras - Peces. Comisi&#65533;n Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.
Summary: English:
The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (http://www.conabio.gob.mx/invasoras/index.php/Portada), under the section Novedades for information on updates.
Invasive species - fish is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Peces [Accessed 30 July 2008]
Spanish:
La lista de especies del Sistema de informaci&#65533;n sobre especies invasoras de m&#65533;xico cuenta actualmente con informaci&#65533;n aceca de nombre cient&#65533;fico, familia, grupo y nombre com&#65533;n, as&#65533; como h&#65533;bitat, estado de la invasi&#65533;n en M&#65533;xico, rutas de introducci&#65533;n y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p&#65533;gina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizaci&#65533;n, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la secci&#65533;n novedades, para conocer los cambios.
Especies invasoras - Peces is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Peces [Accessed 30 July 2008]
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