# GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Tilapia zillii***

***Tilapia zillii*** 正體中文

**System:** Freshwater

| Kingdom | Phylum | Class | Order | Family |
|---|---|---|---|---|
| Animalia | Chordata | Actinopterygii | Perciformes | Cichlidae |

**Common name**

**Synonym**

*Acerina zilli* , (Gervais, 1848)
*Chromis andreae* , (Gunther, 1864)
*Chromis coeruleomaculatus* , (Rochebrune, 1880)
*Chromis faidherbii* , (Rochebrune, 1880)
*Chromis melanopleura* , (Dumeril, 1861)
*Chromis menzalensis* , (Mitchell, 1895)
*Chromis tristrami* , (Gunther, 1860)
*Chromis zillii* , (Gervais, 1848)
*Coptodon zillii* , (Gervais, 1848)
*Coptodus zillii* , (Gervais, 1848)
*Glyphisidon zillii* , (Gervais, 1848)
*Haligenes tristrami* , (Gunther, 1860)
*Sarotherodon zillei* , (Gervais, 1848)
*Sarotherodon zillii* , (Gervais, 1848)
*Tilapia faidherbi* , (Rochebrune, 1880)
*Tilapia melanopleura* , (Dumeril, 1861)
*Tilapia menzalensis* , (Mitchell, 1895)
*Tilapia multiradiata* , (Holly, 1928)
*Tilapia shariensis* , (Fowler, 1949)
*Tilapia sparrmani multiradiata* , (Holly, 1928)
*Tilapia tristrami* , (Gunther, 1860)

**Similar species**

**Summary**

In its native, tropical range, Tilapia zillii is important as a food fish as well as for aquaculture. Tilapia zillii provided 70% of Egypt's fish production, however outside its native range, this freshwater fish has the ability to establish itself even in highly salinated waters, only being held back by a low tolerance to cold water. Often introduced for use in aquatic weed control, Tilapia zilli can alter native benthic communities through the elimination of macrophytes and exhibits aggressive behaviour towards other fish species.

view this species on IUCN Red List

**Species Description**
*Tilapia zillii* has a maximum length of 40cm (SL) and a maximum published weight of 300 grams with a total of 13 to 16 Dorsal spines. The non-breeding coloration of *T. Zillii* is dark olive on top and light olive to yellow-brown on the sides, often with an iridescent blue sheen. Lips are bright green and the chest is pinkish. Six to seven dark vertical bars cross two horizontal stripes on the body and caudal peduncle. Fins are olivaceous, covered in yellow spots with the dorsal and anal fins displaying an outline of a thin orange band. Caudal fin often grey with pale interstices with dots covering the entire fin. Adults display a black spot outlined in yellow. *T. Zillii* from 2 to 14cm (SL) have an entirely yellow to grey caudal fin with no dots, developing a greyish caudal fin with dots with increasing size. Spawning coloration is shiny dark green on top and sides, red and black on the throat and belly, and obvious vertical bands on the sides. Heads turn dark blue to black with blue-green spots. Eggs are green to olive green, sticky, 1-2 mm in diameter; relatively smaller than eggs of other cichlids (FishBase, 2008; Williams, 2008).

**Notes**
In many of the publications reviewed in creating this profile, a misspelling of the species name *Tilapia zillii* is used. It seems to be a common mistake to omit one of the i's at the end of the word zillii, often incorrectly being spelled *T. zilli*.

**Lifecycle Stages**
Spawning of *Tilapia zillii* takes 1 to 2 hours while hatching of the eggs takes between 48 and 74 hours. Fry form school which is protected by both parents. 1 month after spawning, *T. zillii* can spawn again. In its native range, *Tilapia zillii* can breed throughout the year. Maturity is reached at about age 2, growing to 170 mm in year 1 and 315 mm in year 2. Longevity of *T. zillii* is around 6 years (Williams, 2008; GSMFC, 2005).

**Uses**
*Tilapia zillii* is used for aquaculture, commercial aquarium trade, a weed control agent, and as a recreational fishery for many countries through out the world (FishBase, 2008). In a study investigating the feeding preferences of *T. zillii* among four species of aquatic plants, it was determined that *Chara* sp. and *Najas marina* could be controlled by *T. zillii* in small lakes and ponds (Saeed, 1986).

**Habitat Description**
*Tilapia zillii* generally prefer shallow, vegetated areas in a tropical climate but will live over sand, mud, or rock; tolerating a range of pH between six to nine. While temperatures between 20 to 32 degrees Celsius are optimal for *T. zillii*, it can tolerate temperatures between 11 to 36 degrees Celsius, becoming lethargic and vulnerable to predators and disease below 16 degrees Celsius. Mostly occurring in fresh water, *T. zillii* are often found in brackish waters and has occasionally been reported to be found in marine waters; tolerating salinity levels of up to 29-45 ppt (Costa-Pierce, 2003; FishBase, 2008; GSMFC, 2005).

**Reproduction**
*Tilapia zillii* are dioecious and begin courtship and mate selection in waters at or above 20 degrees Celsius. Both parents may help in nest building, constructing nesting depressions 20 to 25cm in width and 5 to 8cm in depth, often in bottoms with sand or pebbles and ample vegetation. Eggs are green, sticky, 1-2 mm in diameter, and have been found in waters ranging in temperature of 20 to 28 degrees Celsius. The adhesive eggs are laid directly on the substrate within the excavated nest. Males fertilize the eggs externally. Females have been reported to lay between 1,000 and 6,000 eggs at one time. Both parents fan water over the eggs with their fins and pick debris and dead eggs from the nesting depression. Nest complexity can be variable, often with simple nests and limited parenting at exposed sites and complex nests with brooding chambers in sheltered areas. *T. Zillii* is not a mouth brooder (FishBase, 2008; Williams, 2008; GSMFC, 2005).

**Nutrition**
*Tilapia zillii* are omnivorous with juveniles being more carnivorous, consuming a number of different zoobenthos. Adults are especially herbivorous, consuming mainly aquatic plants. In a study of feeding habits of *T. zillii* within Lake Kinneret (Israel), the main source of food was *Chironomida* pupae (Diptera) in the spring and winter and zooplankton in the summer and autumn with algae supplementing the diet throughout the year (Spataru, 1978; Williams, 2008).

**General Impacts**
Adult *Tilapia zillii* are considered to be voracious herbivores, often decreasing plant density and changing the composition of native plants which can threaten many native aquatic organisms that depend on such plants for forage, protection, or spawning (GSMFC, 2005; Spataru, 1978).

**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)).
Chemical: In 1975, the Florida Freshwater and Game Commission used Rotenone to eradicate *Tilapia zillii* from a small borrow pit, about 0.2 hectares in size (Taylor, 1986).
Biological: The following species are known predators of *Tilapia zillii*: *Micropterus salmoides* in Kenya, *Barbus canis* in Israel, *Gymnarchus niloticus* (no location noted), and *Lates niloticus* as well as *Mormyrops anguilloides* in Nigeria (FishBase, 2008). *T. zillii* is not a mouth brooder and therefore can possibly be suppressed through competitive exclusion by mouth brooding species of fish (University of California Riverside, 2008).

**Principal source:**
Australian Centre for Tropical Freshwater Research (ACTFR)., 2007a. Pest fish profiles - *Tilapia mariae*.
Gulf States Marine Fisheries Commission (GSMFC)., 2005. *Tilapia mariae* (Boulenger, 1899).
Cribb, H. 2006. Fishnote: Tilapia. All species of the genera *Oreochromis* and *Tilapia*. Department of Primary Industry, Fisheries and Mines (DPIFM), Northern Territory Government.
FishBase., 2008. *Tilapia mariae* Spotted tilapia: Summary
Fuller, P.L., Nico, L.G. & Williams, J.D. 1999. Nonindigenous fishes introduced into inland waters of the United States. *American Fisheries Society, Special Publication 27*. 613p.

**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

**Pubblication date:** 2008-04-22

## ALIEN RANGE

**[1]** ANTIGUA AND BARBUDA
**[1]** ERITREA
**[1]** ETHIOPIA
**[1]** GUAM
**[1]** INDIAN - OCEAN WESTERN
**[1]** IRAN, ISLAMIC REPUBLIC OF
**[1]** JAPAN
**[1]** MADAGASCAR
**[1]** MAURITIUS
**[1]** MEXICO
**[1]** NEW CALEDONIA
**[1]** PHILIPPINES
**[1]** RUSSIAN FEDERATION
**[1]** SRI LANKA
**[1]** SYRIAN ARAB REPUBLIC
**[1]** TAIWAN
**[1]** TANZANIA, UNITED REPUBLIC OF
**[1]** TURKEY
**[1]** UNITED KINGDOM
**[12]** UNITED STATES

## Red List assessed species 1: VU = 1;

Tachybaptus pelzelnii **VU**

## BIBLIOGRAPHY

**22** references found for **Tilapia zillii**

**Managment information**
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).
The decision support tools are available from:
http://cefas.defra.gov.uk/our-science/ecosystems-and-biodiversity/non-native-species/decision-support-tools.aspx [Accessed 13 October 2011]
The guidance document is available from http://www.cefas.co.uk/media/118009/fisk_guide_v2.pdf [Accessed 13 January 2009].
Costa-Pierce, Barry A., 2003. Rapid evolution of an established feral tilapia (*Oreochromis* spp.): the need to incorporate invasion science into regulatory structures. Biological Invasions 5: 71&#65533;84, 2003.
Gulf States Marine Fisheries Commission (GSMFC)., 2005. *Tilapia zilli* (Gervais, 1848)
**Summary:** Available from: http://nis.gsmfc.org/nis_factsheet.php?toc_id=200 [Accessed 4 March 2008]
Mendoza, R.E.; Cudmore, B.; Orr, R.; Balderas, S.C.; Courtenay, W.R.; Osorio, P.K.; Mandrak, N.; Torres, P.A.; Damian, M.A.; Gallardo, C.E.; Sanguines, A.G.; Greene, G.; Lee, D.; Orbe-Mendoza, A.; Martinez, C.R.; and Arana, O.S. 2009. Trinational Risk Assessment Guidelines for Aquatic Alien Invasive Species. Commission for Environmental Cooperation. 393, rue St-Jacques Ouest, Bureau 200, Montr&#65533;al (Qu&#65533;bec), Canada. ISBN 978-2-923358-48-1.
**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]
French version: http://www.cec.org/Storage/62/5517_07-64-CEC%20invasives%20risk%20guidelines-full-report_fr.pdf [Accessed 15 June 2010]
Spanish version: http://www.cec.org/Storage/62/5518_07-64-CEC%20invasives%20risk%20guidelines-full-report_es.pdf [Accessed 15 June 2010].

Saeed, M.O. and Ziebell, C.D. 1986. Effects of Dietary Nonpreferred Aquatic Plants on the Growth of Redbelly Tilapia (*Tilapia zillii*). The Progressive Fish-Culturist: Vol. 48, No. 2 pp. 110-112.
**Summary:** Abstract only. Available from: http://afs.allenpress.com/perlserv/?request=get-abstract&doi=10.1577%2F1548-8640(1986)48%3C110%3AEODNAP%3E2.0.CO%3B2 [Accessed on 12 March 2008]
Spataru, P. 1978. Food and feeding habits of *Tilapia zillii* (Gervais) (Cichlidae) in Lake Kinneret (Israel). Aquaculture, 14:327-338.
Williams, C. and Bonner, T.H. 2008. Texas Freshwater Fishes: *Tilapia zillii* Redbelly Tilapia. Texas State University - San Marcos, Biology Department, Aquatic Station.
**Summary:** Available from: http://www.bio.txstate.edu/~tbonner/txfishes/index.htm [Accessed 12 March 2008]

**General information**

Bayoumi, A.R., 1969. Notes on the occurrence of *Tilapia zillii* (Pisces) in Suez Bay. Marine Biology 4, 255--256 (t969)
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]
Crutchfield, J.U Jr., 1995. Establishment and expansion of redbelly tilapia and blue tilapia in a power plant cooling reservoir. Uses and Effects of Cultured Fishes in Aquatic Ecosystems. American Fisheries Society Symposium. Vol. 15.
**Summary:** Abstract only
Edwards,Robert J., 2001. New additions and persistence of the introduced fishes of the upper San Antonio River, Bexar County, Texas. The Texas Journal of Science 53.1 (Feb 2001): p3.
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**Summary:** Available from: http://www.fishbase.org/trophiceco/EcosysList.cfm?ID=1390&GenusName=Tilapia&SpeciesName=zillii [Accessed 4 March 2008]
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**Summary:** Available from: http://www.fishbase.org/Introductions/IntroductionsList.cfm?ID=1390&GenusName=Tilapia&SpeciesName=zillii&fc=349&StockCode=1408 [Accessed 4 March 2008]
FishBase, 2008. *Tilapia zillii* Redbelly tilapia: Reproduction
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ITIS (Integrated Taxonomic Information System), 2008. Online Database *Tilapia zillii* (Gervais, 1848)
**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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