# GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Gambusia affinis***

***Gambusia affinis*** 简体中文 正體中文

**System:** Freshwater

| Kingdom | Phylum | Class | Order | Family |
|---|---|---|---|---|
| Animalia | Chordata | Actinopterygii | Cyprinodontiformes | Poeciliidae |

**Common name**

tes (Cantonese, Hong Kong), Barkaleci (Albanian), pez mosquito (English, Dominican Republic), Gambusino (Spanish), western mosquitofish (English), Kounoupopsaro (Greek), guayacon mosquito (Spanish), live-bearing tooth-carp (English, Hong Kong), Western mosquitofish (English, USA), Dai to ue (Cantonese, Hong Kong), Obyknovennaya gambuziya (Russian), Mosquito fish (English), San hang ue (Cantonese, Hong Kong), Koboldkärpfling (German), Gambusie (French, Canada), Topminnow (English, Hong Kong), Isdang canal (Tagalog), Gambusia (English), Kadayashi (Japanese), Gambuzia pospolita (Polish), Gambuzia (Portuguese), Gambuzija (Russian, Ukraine), Texaskärpfling (German), Silberkärpfling (German)

**Synonym**

*Heterandria affinis* , Baird & Girard, 1853
*Gambusia affinis* , (Baird & Girard, 1853)
*Gambusia affinis affinis* , (Baird & Girard, 1853)
*Zygonectes patruelis* , (Baird & Girard, 1853)
*Heterandria patruelis* , Baird & Girard, 1853
*Gambusia patruelis* , (Baird & Girard, 1853)
*Zygonectes gracilis* , (Girard, 1859)
*Gambusia gracilis* , Girard, 1859
*Haplochilus melanops* , Cope, 1870
*Zygonectes brachypterus* , Cope, 1880
*Fundulus inurus* , (Jordan & Gilbert, 1882)
*Zygonectes inurus* , Jordan & Gilbert, 1882
*Gambusia humilis* , Gunther, 1866

**Similar species**

*Gambusia holbrooki, Poecilia reticulata, Xiphophorus maculatus, Poecilia latipinna*

**Summary**

Gambusia affinis is a small fish native to the fresh waters of the eastern and southern United States. It has become a pest in many waterways around the world following initial introductions early last century as a biological control agent for mosquitoes. In general, it is considered to be no more effective than native predators of mosquitoes. The highly predatory mosquito fish eats the eggs of economically desirable fish and preys on and endangers rare indigenous fish and invertebrate species. Mosquito fish are difficult to eliminate once established, so the best way to reduce their effects is to control their further spread. One of the main avenues of spread is continued, intentional release by mosquito-control agencies. G. affinis is closely related to he eastern mosquito fish (G. holbrooki), which was formerly classed as a sub-species. Their appearance, behaviour and impacts are almost identical, and they can therefore be treated the same when it comes to management techniques. Records of G. affinis in Australia actually refer to G. holbrooki.

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**Species Description**
A stout little fish, the back a little arched in front of the dorsal fin and the belly deep in front of the anal. The head is large with a flattened upper surface, the mouth small, upturned and protrusible, and not reaching as far back as the front of the eyes. The eyes are very large relative to the body. The single, soft-rayed dorsal fin is short-based, high and rounded, while the caudal peduncle is long, deep and compressed, and the caudal fin is rounded. The head and trunk are covered with large scales and there is no lateral line. The back is a greenish olive to brownish, the sides grey with a bluish sheen, and the belly a silvery white. A well-defined black spot on the upper rear abdomen is surrounded by a golden patch above and behind the vent. In mature females there is also a black patch above and somewhat forward of the vent. The ventral surface of the head is a steely blue with a diagonal chin stripe below the eyes. The eyes are greyish to olive, the dorsal fin has small black spots, and the caudal fin has several indistinct cross rows of small black spots. The anal, pelvic and pectoral fins are a translucent pale amber. (McDowall, 1990). Males grow to 40mm in length, while females reach 70mm long (FishBase, 2003).

**Notes**
*Gambusia affinis* is extremely similar to the closely related *G. holbrooki*, and until relatively recently they were classed as sub-species rather than distinct species. As such, their impacts and behaviour are virtually identical, and the same management techniques will work for both species.
Although hybrids between *G. holbrooki* and *G. affinis* can occur, they are unusual in natural populations (Wooten and Lydeard 1990).

**Lifecycle Stages**
Males mature at about 21mm long and a month old; females at 28mm and six weeks old (McDowall, 2000)

**Uses**
Used as live food for carnivorous aquarium fishes and also used as mosquito control (FishBase, 2003).

**Habitat Description**
Benthopelagic; non-migratory; lives in fresh and brackish water with a pH range of 6.0 - 8.0 and usually at temperatures between 12 - 29°C (FishBase, 2003). Mosquito fish are a remarkably hardy species, surviving in waters with little oxygen, in high salinities (including twice that of sea water) and temperatures of up to 42°C for short periods (McCullough, 1998). They are most abundant in lower reaches of streams, where they inhabit brackish, standing to slow-flowing water. They are most common in vegetated ponds and lakes, backwaters and quiet pools of streams (FishBase, 2003).

**Reproduction**
Live-bearer. Several times a year mosquito fish produce moderate numbers of young, which are protected by the mother but which become immediately independent. Brood size is usually around 60 young, but large females can carry more than 300 (McDowall, 2000).

**Nutrition**
Feeds on zooplankton, small insects and detritus, (FishBase, 2003).

**General Impacts**
Adult *Gambusia affinis* are extremely aggressive and attack other fish, shredding fins and sometimes killing them. Controversy has followed the introduction of mosquito fish, as they have been accused of being little better at destroying mosquitoes than native fish species, as well as being responsible for eliminating many of these same species (Myers, 1965; Haas *et al.*, 2003). Selective predation by mosquito fish has also been shown to alter zooplankton, insect and crustacean communities (McDowall, 1990). Mosquito fish are potential hosts of helminth parasites, which have been transmitted to native fishes (FishBase, 2003).

**Management Info**
Chemical: The poison Rotenone, which works by inducing hypoxia in fish, may be used to eliminate mosquito fish from small areas of permanent water. Rotenone is indiscriminate, so non-target species ideally need to be removed prior to its application. Fish affected by Rotenone come to the surface to seek oxygen, so any remaining non-target species may be removed at this stage (Willis & Ling, 2000).

**Pathway**
Brought to New Zealand by ship. (McDowall, 1990)Widely introduced for mosquito control. (FishBase, 2003)Survivors of the sea voyage to New Zealand were released into a pond in the Auckland Botanical Gardens. (McDowall, 1990)

**Principal source:** FishBase, 2004. Species profile *Gambusia affinis* Mosquito fish

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

**Review:**

**Pubblication date:** 2010-06-21

**ALIEN RANGE**

**[1]** AFGHANISTAN
**[1]** AMERICAN SAMOA
**[1]** BANGLADESH
**[1]** CANADA
**[1]** CHILE
**[1]** COOK ISLANDS
**[1]** CYPRUS
**[1]** FIJI
**[1]** FRANCE
**[1]** GHANA
**[1]** GUAM
**[1]** HUNGARY
**[1]** INDONESIA
**[1]** IRAQ
**[1]** ITALY
**[1]** KAZAKHSTAN
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**[1]** MALAYSIA
**[1]** MICRONESIA
**[1]** MYANMAR
**[1]** NORTHERN MARIANA ISLANDS
**[1]** PAPUA NEW GUINEA
**[1]** PHILIPPINES
**[1]** PUERTO RICO
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**[1]** EGYPT
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**[2]** FRENCH POLYNESIA
**[1]** GREECE
**[1]** HONG KONG
**[1]** INDIA
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**[2]** ISRAEL
**[1]** JAPAN
**[1]** KENYA
**[1]** MADAGASCAR
**[1]** MARSHALL ISLANDS
**[1]** MOROCCO
**[10]** NEW ZEALAND
**[1]** PAKISTAN
**[1]** PERU
**[1]** PORTUGAL
**[1]** ROMANIA
**[1]** SAMOA
**[1]** SOLOMON ISLANDS
**[1]** SPAIN
**[1]** SUDAN
**[1]** TAIWAN
**[1]** TURKEY
**[1]** UNITED ARAB EMIRATES

**[2]** UNITED STATES
**[1]** VIET NAM

**[1]** UNITED STATES MINOR OUTLYING ISLANDS

**Red List assessed species 25: CR = 6; EN = 5; VU = 9; NT = 3; LC = 2;**

Adelotus brevis **NT**
Aphanius baeticus **EN**
Cherax cuspidatus **LC**
Galaxias gracilis **VU**
Hyla meridionalis **LC**
Lithobates chiricahuensis **VU**
Litoria castanea **CR**
Litoria piperata **CR**
Mixophyes balbus **VU**
Pelobates cultripes **NT**
Poeciliopsis sonorensis **VU**
Tenuibranchiurus glypticus **EN**
Valencia hispanica **CR**
Alytes maurus **NT**
Aphanius saourensis **CR**
Crenichthys baileyi **VU**
Garra ghorensis **CR**
Iotichthys phlegethontis **VU**
Litoria aurea **VU**
Litoria olongburensis **VU**
Litoria raniformis **EN**
Neochanna apoda **VU**
Pelobates varaldii **EN**
Scaturiginichthys vermeilipinnis **CR**
Travancoria elongata **EN**

## BIBLIOGRAPHY

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**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]
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Copp, G.H., Garthwaite, R. and Gozlan, R.E., 2005. Risk identification and assessment of non-native freshwater fishes: concepts and perspectives on protocols for the UK. Sci. Ser. Tech Rep., Cefas Lowestoft, 129: 32pp.
**Summary:** The discussion paper 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.
Available from: http://www.cefas.co.uk/publications/techrep/tech129.pdf [Accessed 1 September 2005]
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Eldredge, L. G. 2000. Non-indigenous freshwater fishes, amphibians, and crustaceans of the Pacific and Hawaiian islands. In Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy. South Pacific Regional Environment Programme, Samoa: 173-190
**Summary:** Discusses the most invasive freshwater fish in the Pacific region and also includes a checklist of introduced fish to the Pacific.
Englund, R.A. 1999. The impacts of introduced poeciliid fish and Odonata on the endemic *Megalagrion* (Odonata) damselflies of Oahu Island, Hawaii. Journal of Insect Conservation 3:225-243.
Gambusia Control Homepage, 1998.
**Summary:** A website focused on the possibilities of biological control of *Gambusia affinis*.
Available from: http://www.gambusia.net/ [Accessed 21 July 2003]

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**Summary:** The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable). The IUCN Red List also includes information on taxa that are categorized as Extinct or Extinct in the Wild; on taxa that cannot be evaluated because of insufficient information (i.e. are Data Deficient); and on taxa that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme (i.e. are Near Threatened).
Available from: http://www.iucnredlist.org/ [Accessed 25 May 2011]
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**Summary:** A literature review that looks at both the effects of *G. holbrooki* on a range of different organisms and control options available. This document formed the background information for NSW NPWS (2003).
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.
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New South Wales (NSW) National Parks and Wildlife Service 2003. NSW Threat Abatement Plan. Predation by *Gambusia holbrooki* &#65533; The Plague Minnow. NPWS. Hurstville, NSW.
**Summary:** Although this report refers to *Gambusia holbrooki* it is applicable to *G. affinis* as well.This management plan has been prepared in accordance with NSW legislative obligations for listed key threatening processes. It contains a review of the literature in regard to the biology, ecology, impacts and control of the species and includes proposed research and management actions. The plan also contains a model to predict the possible impact of Gambusia on NSW frog species.
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**Summary:** Has information on the possible use of the poison rotenone to control mosquitofish.

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**Summary:** Report into the way that *Gambusia affinis* affects native fish.
Fishbase, 2003. Species profile *Gambusia affinis* Mosquitofish
**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
This species profile is available from:

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**Summary:** The Freshwater Biodata Information System (FBIS) contains fish, algae, aquatic plant and invertebrate data and metadata gathered from New Zealand s freshwater streams, rivers and lakes. FBIS provides different ways to search for biodata: choose a predefined search from a list of common searches; use the map view to draw a box on a map and search for biodata; or create your own search for maximum search flexibility. FBIS is offered as a nationally available resource for the New Zealand public, institutions and companies who need access to a well-maintained long-term data repository.
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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.
Available from:
http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Gambusia+affinis&p_format=&p_ifx=plglt&p_lang= [Accessed March 2005]
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