GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Xenopus laevis***

Xenopus laevis 正體中文

System: Brackish

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Amphibia	Anura	Pipidae

Common name upland clawed frog (English), African clawed frog (English), Glatter Krallenfrosch (German), clawed frog (English), clawed toad (English), common platanna (English)

Synonym
Bufo laevis , (Daudin 1802)
Pipa laevis , (Merrem 1820)
Engystoma laevis , (Fitzinger 1826)
Xenopus boiei , (Wagler 1827)
Dactylethra capensis , (Cuvier 1829)
Leptopus oxydactylus , (Mayer 1835)
Dactylethera boiei , (Tschudi 1838)
Dactylethra delalandii , (Cuvier 1836)
Dactylethera laevis , (Blanford 1870)
Dactylethra levis , (Duméril and Bibron 1841)

Similar species

Summary Xenopus laevis (the African clawed frog) is the standard experimental amphibian used in laboratories pan-globally. Escapees have formed viable and invasive populations in many climates, where individuals are generalist aquatic carnivores, predating on invertebrates, amphibians and fish.

view this species on IUCN Red List

Species Description
Frogs of the genus *Xenopus* are the only frogs with clawed toes and the African clawed frog (*Xenopius leavis*) is the largest species, adults reaching 120mm. Larvae are mid-water suspension feeders, having long barbels and little pigmentation.

Notes
Chytridiomycosis was detected in museum specimens of this species dating back to 1938, and it is hypothesised that the international trade in this species might have introduced this fungal disease to other regions of the world. The disease does not appear to have any detrimental affect on populations of this species (IUCN, Conservation International, and NatureServe. 2006).

Lifecycle Stages
African clawed frogs are noted for being principally aquatic throughout their lives. Sexual maturity within one year is possible. Eggs are laid singly. Tadpoles typically take 3 months to metamorphosis. Captive adults have been known to live to 20 years. Adults are capable of overland migration.

Habitat Description
The African clawed frog is a water-dependent species occurring in a very wide range of habitats, including heavily modified anthropogenic habitats. It lives in all sorts of waterbodies, including streams, but tends to avoid large rivers, and waterbodies with predatory fish. It reaches its highest densities in eutrophic water. It breeds in water; there are no records of it breeding in flowing water. It has very high reproductive potential. It is a highly opportunistic species, and colonizes newly recreated, apparently isolated, waterbodies with ease. It can migrate in large numbers when breeding ponds start to dry up, and the weather is wet (IUCN, Conservation International, and NatureServe. 2006).
X. laevis exhibit high salt tolerance (40% seawater), pH (5-9) and temperature variation (2-35+). They are capable of aestivation during dry periods. They have been selected as laboratory animals for their ease of maintenance and resistance to disease. They are often available as pets but also distributed *via* laboratories.

Reproduction
Sexual. External fertilisation of eggs, which are deposited singly in water. *Xenopus laevis* has a prolonged breeding season in its native South Africa, and is noted to be year round in California.
Gravid females are recorded as containing from 1,000 to 27,000 eggs, with larger females producing larger clutches. They will produce multiple clutches in a season under favourable conditions.

Nutrition
Xenopus laevis prey on aquatic invertebrates, amphibians and fish. They are capable of taking terrestrial prey. Cannabalism of larvae is thought to be important.

General Impacts
African clawed frogs predate on and compete with native species. They are possibly toxic to predators. They are also known to make water bodies turbid.

Management Info
Preventative measures: The African clawed frog is included in the list of declared animals and birds in Western Australia and has been gazetted as a 'Declared Animal' under the Agriculture and Related Resources Protection Act 1976. The catergories assigned to it are A1 = no entry, A2 = eradicate in the wild, A3 = no keeping (Massam *et al*. 2004).
Risk Assessment models for assessing the risk that exotic vertebrates could establish in Australia have been further explored by the Western Australia Department of Agriculture & Food (DAFWA) to confirm that they reasonably predict public safety, establishment and pest risks across a full range of exotic species and risk levels.
The Risk assessment for the African Clawed Frog (*Xenopus laevis*), has been assigned a VPC Threat Category of **EXTREME**.
Mammals and birds were assessed for the pest risk they pose if introduced to Australia, by calculating Vertebrate Pests Committee (VPC) Threat Categories. These categories incorporate risk of establishing populations in the wild, risk of causing public harm, and risk of becoming a pest (eg causing agricultural damage, competing with native fauna, etc). The 7-factor Australian Bird and Mammal Model was used for these assessments.
Physical and Chemical: Lafferty and Page (1997) suggest that the use of traps may be the best option to lower densities of the African clawed frog in the Santa Clara River Estuary, California, as other options like the use of chemicals or introduction of predatory fish may have devastating effects on native species like the endangered tidewater gobies. Recent studies show that it is not impacted by the herbicide atrazine (IUCN, Conservation International, and NatureServe. 2006).

Pathway
Often sold as pets.Exported from South Africa for use in laboratories pan-globally.

Principal source:

Compiler: IUCN SSC Invasive Species Specialist Group
Updates with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment

Review:

Pubblication date: 2010-05-26

ALIEN RANGE

[1] CHILE
[1] INDONESIA
[1] ITALY
[1] MEXICO
[1] SAINT HELENA
[2] UNITED KINGDOM
[1] FRANCE
[1] ISRAEL
[1] JAPAN
[1] PORTUGAL
[1] SPAIN
[13] UNITED STATES

Red List assessed species 1: VU = 1;

Eucyclogobius newberryi **VU**

BIBLIOGRAPHY

28 references found for **Xenopus laevis**

Managment information
Bomford, M., 2003. Risk Assessment for the Import and Keeping of Exotic Vertebrates in Australia. Bureau of Rural Sciences, Canberra.
Summary: Available from: http://www.feral.org.au/wp-content/uploads/2010/03/PC12803.pdf [Accessed August 19 2010]
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].
IUCN/SSC Invasive Species Specialist Group (ISSG)., 2010. A Compilation of Information Sources for Conservation Managers.
Summary: This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.
Louis A. Somma. 2008. *Xenopus laevis*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.
Massam, Marion and Win Kirkpatrick, Peter Mawson, Norm Press, Tony Bennell and Neil Hamilton., Revised 2007. Importing and keeping introduced mammals, birds, reptiles and amphibians in Western Australia. Bulletin 4604 ISSN 1448-0352 February 2004. Department of Agriculture. Government of Western Australia.
Summary: Available from: http://www.agric.wa.gov.au/content/AAP/OL/BULLETIN4604.PDF [Accessed 1 September 2008]
Massam M, Kirkpatrick W and Page A., 2010. Assessment and prioritisation of risk for forty introduced animal species. Invasive Animals Cooperative Research Centre, Canberra.
Summary: This report documents work contributing to a project commissioned by the Invasive Animals Cooperative Research Centre to validate and refine risk assessment models used in decisions to import and manage introduced vertebrate species. The intent of the project was to: a) increase predictive accuracy, scientific validation and adoption of risk assessment models for the import and keeping of exotic vertebrates, and b) reduce the risk of new vertebrate pests establishing introduced populations in Australia.
Available from: http://www.feral.org.au/wp-content/uploads/2010/08/DAFWA_RA_060510.pdf [Accessed 16 March 2011]

NatureServe. 2007. NatureServe Explorer: *Xenopus laevis* - (Daudin, 1802) An online encyclopedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia.
Summary: Available from: http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Xenopus+laevis [Accessed 25 February 2008]
Page, Amanda; Win Kirkpatrick and Marion Massam, July 2008, African Clawed Frog (*Xenopus laevis*) risk assessments for Australia. Department of Agriculture and Food, Western Australia.
Summary: Models for assessing the risk that exotic vertebrates could establish in Australia have been developed for mammals, birds (Bomford 2003; Bomford 2006, 2008), reptiles and amphibians (Bomford 2006, 2008; Bomford *et al*. 2005). These Risk Assessment models have been further explored by Western Australia Department of Agriculture & Food (DAFWA) to confirm that they reasonably predict public safety, establishment and pest risks across a full range of exotic species and risk levels. Mammals and birds were assessed for the pest risk they pose if introduced to Australia, by calculating Vertebrate Pests Committee (VPC) Threat Categories. These categories incorporate risk of establishing populations in the wild, risk of causing public harm, and risk of becoming a pest (eg causing agricultural damage, competing with native fauna, etc). The 7-factor Australian Bird and Mammal Model was used for these assessments.
Varnham, K. 2006. Non-native species in UK Overseas Territories: a review. JNCC Report 372. Peterborough: United Kingdom.
Summary: This database compiles information on alien species from British Overseas Territories.
Available from: http://www.jncc.gov.uk/page-3660 [Accessed 10 November 2009]

General information

CONABIO. 2008. Sistema de informaci&#65533;n sobre especies invasoras en M&#65533;xico. Especies invasoras - Anfibios. 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 - amphibians is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Anfibios [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 - Anfibios is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Anfibios [Accessed 30 July 2008]
Fouquet, Antoine.; Measey, G. John., 2006. Plotting the course of an African clawed frog invasion in Western France. Animal Biology, Vol. 56, No. 1, pp. 95-102 (2006)
ITIS (Integrated Taxonomic Information System), 2005. Online Database *Xenopus laevisi*
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=Xenopus+laevis&p_format=&p_ifx=plglt&p_lang= [Accessed March 2005]
IUCN, Conservation International, and NatureServe. 2006. Global Amphibian Assessment. Downloaded on 4 May 2006.
Summary: The Global Amphibian Assessment (GAA) is the first-ever comprehensive assessment of the conservation status of the world s 5,918 known species of frogs, toads, salamanders, and caecilians. This website presents results of the assessments, including IUCN Red List threat category, range map, ecology information, and other data for every amphibian species.
Available from: http://www.globalamphibians.org/ [Accessed 5 November 2006].
Lafferty, K. D. and Page, C. J. 1997. Predation on the endangered tidewater goby, *Eucyclogobius newberryi*, by the introduced African clawed frog, *Xenopus laevis*, with notes on the frog s parasites. Copeia 1997: 589-592.
Lobos, Gabriel and G. John Measey., 2002. Invasive populations of *Xenopus laevis* (Daudin) in Chile. Herpertological Journal, Vol. 12, pp. 163-168 (2002)
Lobos, G., Cattan, P. and Lopez, M. 1999. Antecedentes de la ecologia trofica del sapo Africano *Xenopus laevis* en la zona central de Chile.. Boletín del Museo Nacional de Historia Natural, Chile 48.
Summary: Large populations of *Xenopus laevis* are reported to be present in the Metropolitan area of Chile, as well as mentioning existance of other populations.
Lobos, G & Jaksic, FM 2005.The ongoing invasion of African clawed frogs (*Xenopus laevis*) in Chile: causes for concern. Biodiversity and Conservation 14: 429-439.
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McCoid, M. J. and Fritts, T. H. 1993. Speculations on colonizing success of the African clawed frog, *Xenopus laevis* (Pipidae). California. S. Afr. J. Zool. 28: 59-61.
McCoid, M. J., Pregill, G. K. and Sullivan, R. M. 1993. Possible decline of *Xenopus* populations in southern California. Herpet. Rev. 24: 29-30.
Measey, G. J. 1998. Diet of feral *Xenopus laevis* in South Wales, UK. J. Zool., Lond. 246: 287-298.
Summary: Diet in UK is mainly benthic invertebrates, but includes all other aquatic groups and terrestrial prey.
Measey, G. J. 2001. Growth and ageing of *Xenopus laevis* (Daudin) in South Wales, UK. J. Zool., Lond. in press.
Summary: Growth is slower than that in the US, but population growth is considerable, if sporadic.
Measey, G. J. & Tinsley, R. C. 1998. Feral *Xenopus laevis* in South Wales. Herpetological Journal 8: 23-27.
Tinsley, R. C. and McCoid, M. C. 1996. Feral populations of *Xenopus* outside Africa. In Tinsley, R. C. and Kobel, H. R. (eds.) The Biology of *Xenopus*. Oxford University Press, Oxford: 81-94.
Summary: A critical review shows that many reports have not been substantiated recently. The data are based on populations in the USA and the UK.
Measey G.J., Rödder D., Green S.L., Kobayashi R., Lillo F., Lobos G., Rebelo R., Thirion J.-M., Lobos, G., Rebelo R. and Thirion J.-M. (2012). Ongoing invasions of the African clawed frog, *Xenopus laevis* : a global review. Biol Invasions, 14: 2255-2270.