

Threatened fishes of the world: *Ophisternon infernale* (Hubbs, 1938) (Synbranchidae)

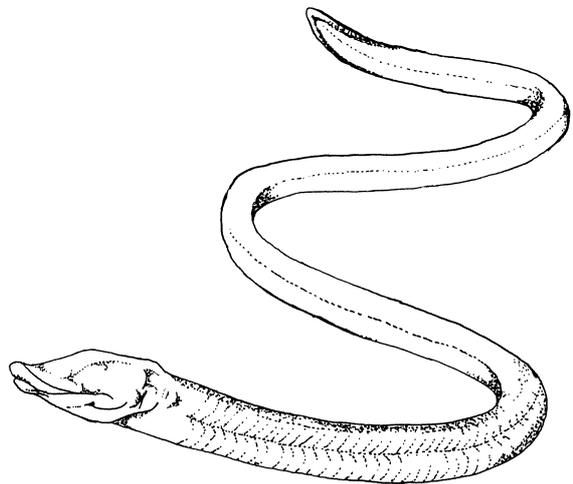
Roger Medina-González^a, Graham Proudlove^b, Lizbeth Chumba-Segura^a & Thomas Iliffe^c

^a*Departamento de Ecología and Departamento de Zoología, Facultad de Medicina Veterinaria y Zootecnia, Universidad Autónoma de Yucatán, Mérida, Yucatán 97100, México*

^b*Department of Zoology, Manchester Museum, Manchester, M13 9PL, U.K. (e-mail: g.proudlove@umist.ac.uk)*

^c*Department of Marine Biology, Texas A & M University, Galveston, TX 77553, U.S.A.*

Common name: Anguila ciega, anguila ciega yucateca (S). **Conservation status:** Endangered (IUCN). **Identification:** Total lack of external eyes and melanin pigment. Muzzle spatulate. Up to 325 mm SL. Lack of scales. Head long and bulb shaped with sensitive pores. Caudal region 37–54% longer than in other synbranchids (drawing by Rhian Hicks, 325 mm TL). **Distribution:** Cenotes and groundwater on the Yucatán Peninsula, Mexico (20–21°N, 88–90°W), including anchialine caves on the Caribbean coast. This species is sympatric in some areas with *Ogilbia pearsei* (Bythitidae) and *Rhamdia guatemalensis* (Pimelodidae) (Chumba-Segura 1984). **Abundance:** Very few specimens have been observed (maximum two at the same time) in very few localities. Underwater exploration should increase the number of recorded sites. It is of note that several locals in rural areas have seen *Ogilbia pearsei* but not *Ophisternon infernale*. **Habitat and ecology:** Builds mucus-lined burrows in organic rich sediments within the freshwater part of the aquifer. Has been observed under stones in muddy bottoms in the shallow parts of cave cenotes, and at 24 m in depth. The principle source of energy in this environment is bat and swallow guano. *Ophisternon infernale* feeds on the troglotic shrimp *Creaseria morleyi*, tolerates low oxygen levels and is able to breathe atmospheric oxygen. **Reproduction:** Reported to be oviparous. **Threats:** The main threat is from water pollution, principally faecal coliforms and excess nitrate (Cruickshank et al. 1980). Populations in shallow caves are exposed to human disturbance, by modification and use of the caves, and by waste and wastewater disposal. Human populations obtain their water from the aquifer and, until recently, disposed of wastewater directly back into the same aquifer, a few metres from where it was obtained. This situation is particularly acute under the largest city, Mérida, although some piped water is now available. In rural areas there is little or no sewage treatment and industrial and domestic waste is discarded into caves. The population of the peninsula is growing: 2.3×10^6 in 1990, 2.9×10^6 in 1995. Additionally tourist numbers are also rising. This will place growing strain on the water resources of the area. For example, freshwater removal will lead to the incursion of saline waters into the freshwater zone. **Conservation action:** Wastewater in Mérida is now collected and pumped to treatment plants. The resulting treated product is injected into the saline groundwater 200 m below the surface. *O. infernale* has been reported from caves in the Reserva de la Biósfera de Sian Ka'an in Quintana Roo (Navarro-Mendoza 1988). It may also be present at Reserva Especial de la Biósfera de Ría Lagartos on the north coast of Yucatán, although it has not yet been reported. Its potential presence in such areas could be advantageous in terms of conservation actions (Navarro-Mendoza & Valdés-Casillas 1990). **Conservation recommendations:** Human water supply should be augmented by the collection (and subsequent treatment) of rainfall to supplement that obtained from the aquifer. All wastewater should be collected and properly treated. It should not be injected into the aquifer which contains a very delicate ecosystem. The best economic solution is probably to pipe it out to sea although this will of course have its own (detrimental) effects. The continental shelf is wide and it will be expensive to dispose of wastewater far enough to avoid the immediate effect on the coastal systems. Detailed studies of the aquifer need to be made to monitor its health. It is necessary to survey the occurrence of cave and groundwater species such as *O. infernale* in order to have up to date distribution records. **Remarks:** This species is closely related to *Ophisternon aenigmaticum* and probably invaded freshwater caves from wetlands during the Pliocene.



Chumba-Segura, L. 1984. Synbranchidae: *Ophisternon infernale*. Fauna Cenotes Yucatán (6): 1–9.

Cruickshank, G., J. Aguirre, D. Kramer & E. Craviota. 1980. Bacterial contamination of the limestone aquifer beneath Mérida, México. pp. 341–345. *In*: Aquifer Contamination and Protection, UNESCO Publication No. 30.

Navarro-Mendoza, M. 1988. Inventario íctico y estudios ecológicos preliminares en los cuerpos de agua continentales en la reserva de la Biosfera de Sian Ka'an y áreas circunvecinas en Quintana Roo, México.

Navarro-Mendoza, M. & C. Valdés-Casillas. 1990. Peces cavernícolas de la península de Yucatán en peligro de extinción, con nuevos registros para Quintana Roo. pp. 218–241. *In*: J.L. Camarillo & F. Rivera A. (ed.) Areas Naturales Protegidas en México y Especies en Extinción, Nacional Autónoma de México, Ciudad de México.