

## THREATENED FISHES OF THE WORLD: *Aphanius transgrediens* Ermin, 1946 (Cyprinodontidae)

Baran Yoğurtçuoğlu\*, Fitnat Güler Ekmekçi

Department of Biology, Faculty of Science, Hacettepe University, 06800 Beytepe Ankara, Turkey

\*Corresponding author, E-mail: baranyog@hacettepe.edu.tr

### ARTICLE INFO

Received: 7 July 2014

Received in revised form: 2 December 2014

Accepted: 3 December 2014

Available online: 5 December 2014

### Keywords:

Turkey

Acıgöl Toothcarp

Conservation

Threats

### ABSTRACT

*Aphanius transgrediens* is distributed only in the spring systems of Lake Acıgöl (Afyon-Denizli/Turkey). Because its population is assumed to have declined since the 2000's, the species is assessed as Critically Endangered (CR) in the IUCN Red List of Threatened Species. The most threatening factors are the Eastern Mosquitofish (*Gambusia holbrooki*) densely found in the area and industrial activity.

### COMMON NAME

Acıgöl Toothcarp; Acıgöl Dişlisazancı (TR).

### CONSERVATION STATUS

Present status: Critically Endangered B1ab(i,ii,iii,iv,v)+2ab(i,i,iii,iv,v) (Freyhof, 2014).

### IDENTIFICATION

Small-sized fish that reaches up to 50-60 mm in total length. It is sexually dimorphic by means of colour and pattern. Males have 6-10 dark grey (or black in breeding conditions) vertical bars. The dorsal and anal fins are pale grey, but fully black in breeding conditions. The caudal fin is colourless with two vertical thin black to grey bars. Females have irregular dark grey spots on both sides of their silver body and lighter interconnected spots on their dorsal side. All the fins are colourless. Scales are reduced like other close Anatolian *Aphanius* species.

### DISTRIBUTION

Restricted to the small karstic springs which run down to Lake Acıgöl (Wildekamp et al., 1999). These springs are mainly found at the south of the lake. The north side is mostly occupied by Sodium sulphate production plants.

### HABITAT AND ECOLOGY

*Aphanius transgrediens* (Fig 1) inhabits the freshwater

springs instead of the lake itself due to high salinity especially occurring in dry periods (Wildekamp et al., 1999). However, they migrate from spring outlets toward the lake shore. This short-distance migration occurs from the springs to the lake shore in late summer, and in the opposite direction in early summer for wintering (Yoğurtçuoğlu and Ekmekçi, 2014a). The temperature of the water at the spring outlets is nearly stable (19C°-21C°) throughout the year. However, the change in water temperature at the lake shore has a higher range and decreases to a minimum of 11C°. They exhibit spawning and feeding activity in summer months close to the springs, whereas they enter a stationary phase near the lake shore by burying themselves into the bottom in the winter period. The dominant submerged plant species in the springs is reed (*Typha* sp.). The most common aquatic invertebrate is *Gammarus* sp. in almost all of the springs. *A. transgrediens* is an omnivorous species like other members of the genus. It preferably feeds from the water surface (Huber, 1996).



Fig 1. *Aphanius transgrediens* (a) Male, (b) Female, caught from the spring near Akpınar (Acıgöl)

## REPRODUCTION

Males are site-guarders in the spawning season. Females are batch-spawners and lay 5-11 eggs per batch which adhere to aquatic vegetation. The egg diameter ranges between 1.3-1.5 mm (B. Yoğurtçuoğlu and F. G. Ekmekçi unpublished data, 2014b). Spawning covers a long period from early spring to late autumn (Yoğurtçuoğlu and Ekmekçi, 2014a).

## THREATS

*A. transgrediens* is endemic to the spring system of Lake Acıgöl. Lake Acıgöl possesses Turkey's largest sodium sulphate reserves that are extensively used in industry. In addition to industrial activities, a dense population of alien *Gambusia holbrooki* is a serious threat to *A. transgrediens*. *G. holbrooki* preys on fry of *A. transgrediens* and much outnumbers the native killifish at most sites. The Acıgöl spring system consists of about 30 small-sized freshwater springs flowing into the lake and the whole spring system has been invaded by *G. holbrooki* (Yoğurtçuoğlu and Ekmekçi, 2014c).

## CONSERVATION ACTION

A conservation project which is financially supported by the Rufford Small Grants and includes in-situ and ex-situ breeding programmes and environmental education to the local community has been carried out under the authors' management. The first stage of the project that covers one-year study period has been achieved and the second stage is to be prepared. The first stage was about determining the population statuses of *A. transgrediens* and *G. holbrooki*, whereas the second will be on establishing viable stocks of *A. transgrediens* in its native habitat (Yoğurtçuoğlu and Ekmekçi, 2014c).

## CONSERVATION RECOMMENDATIONS

To accomplish long-lasting conservation in the future, conservation genetics and ecological niche modelling are needed. These studies will be realized as part of the second stage of the ongoing project. The wetland is under risk, both quantitatively and qualitatively, due to a number of anthropogenic threats; namely groundwater abstraction for domestic use, open dumping of solid and liquid wastes in and around the wetland, agricultural activities in the recharge area, and mining activities in the recharge area and in the hyper saline lake. Delineation of protection zones around the wetland site is proved to be ineffective. Effective protection requires the establishment of a protection strategy based upon a system approach considering the spatio-temporal dynamics of surface and groundwater systems. This can be achieved by a detailed hydrological-hydrogeological study utilizing hydrological, hydrogeological, hydro-chemical and isotopic data.

## REMARKS

It is important to strengthen the communication with the local community and government to maintain in-situ conservation for the long-term. Fish transportation to a *G. holbrooki* free pond is crucial to establish a stock for further reintroductions. The authors' trial for this will be fully achieved in the near future.

## ACKNOWLEDGEMENTS

We would like to thank the Rufford Foundation for their financial support, Mr. Umut Uyan for his helps in field studies and Prof. Dr. Mehmet Ekmekçi for his contributions to our *A. transgrediens* conservation project.

## Sažetak

### UGROŽENE VRSTE RIBA U SVIJETU: *Aphanius transgrediens* Ermin, 1946 (Cyprinodontidae)

*Aphanius transgrediens* je rasprostranjena samo u izvorišnom sistemu jezera Acıgöl u Turskoj. Zbog vjerovanja da populacije opadaju uvrštena je u kritično ugrožene vrste (CR) na IUCN crvenoj listi ugroženih vrsta. Najveća prijetnja je (*Gambusia holbrooki*) koja je pronađena u visokoj gustoći u području staništa ovog endema kao i različite industrijske aktivnosti.

**Ključne riječi:** Turska, Acıgölska šaranozupka, zaštita, prijetnje

## REFERENCES

- Freyhof, J. (2014): *Aphanius transgrediens*. In: IUCN (2014): IUCN Red List of Threatened Species. Version 2014.1. www.iucnredlist.org, Downloaded on 03 July 2014
- Huber, J. H., (1996): Killi-Data, Updated checklist of taxonomic names, collecting localities and bibliographic references of oviparous Cyprinodont fishes (Atherinomorpha, Pisces). Société Française d'Ichtyologie, Muséum National d'Histoire Naturelle, Paris, France, 399 p.
- Wildekamp, R. H., Küçük, F., Ünlüsayın, M., Neer, W. V. (1999): Species and subspecies of the genus *Aphanius* Nardo 1897 (Pisces: Cyprinodontidae) in Turkey. Turkish Journal of Zoology. 23,23-44.
- Yoğurtçuoğlu, B., Ekmekçi, F. G. (2014a): Conservation of a Critically Endangered Endemic Killifish (*Aphanius transgrediens*) Living in a Sensitive and Invaded Habitat in Turkey. The Rufford Foundation, 12983-1 Numbered Project, Final Report. Web page: [http://www.rufford.org/projects/baran\\_yo%C4%9Furt%C3%A7uo%C4%9Flu](http://www.rufford.org/projects/baran_yo%C4%9Furt%C3%A7uo%C4%9Flu)
- Yoğurtçuoğlu, B., Ekmekçi, F. G. (2014b): First Attempt at Conservation of a Critically Endangered Cyprinodontid in Turkey. Unpublished paper.
- Yoğurtçuoğlu, B., Ekmekçi, F. G. (2014c): Conservation action for the Acı Göl toothcarp, *Aphanius transgrediens*, Saving Freshwater Fishes and Habitats, Newsletter of the IUCN SSC/WI Freshwater Fish Specialist Group, Issue 4, page 30.