



The successful establishment of Eastern mosquitofish (*Gambusia holbrooki* Girard, 1859) in the River Zagyva (water system of the River Tisza, Hungary)

A szúnyogirtó fogasponty (*Gambusia holbrooki* Girard, 1859) sikeres megtelepedése a Zagyvában

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Abstract

A stable population of the Eastern mosquitofish (*Gambusia holbrooki*) had been known to live only in thermal lakes in Hungary. However, it appeared in the River Zagyva flowing into the River Tisza at Szolnok in 2014 as well. Faunistic survey carried out repeatedly in 2015 and 2016 demonstrated that the species had survived the winter and bred successfully. It is not known in what an extent the acclimatization and the climate change played role in the naturalization of the species however it can be expected that the species will develop self-sustaining stocks in our waters with normal temperature.

Kivonat

A szúnyogirtó fogaspontynak (*Gambusia holbrooki*) Magyarországon korábban csak termáltavakban élt stabil populációja, ám 2014-ben Szolnoknál a Tiszába torkolló Zagyva folyóból is előkerült. A 2015-ben és 2016-ban megismételt faunisztikai felmérések kimutatták, hogy a faj sikeresen áttelelt és szaporodott. Nem tudható, hogy a faj megtelepedésében milyen mértékben játszott szerepet az akklimatizáció és a klímaváltozás, de számítani lehet rá, hogy a fajnak a jövőben szokványos hőmérsékletű vizeinkben is önfenntartó állományai alakulnak ki.

Originally the Eastern mosquitofish (*Gambusia holbrooki*) is native to the southern-eastern subtropical coastal areas of North America, from Delaware to Florida and Alabama (Kottelat & Freyhof 2004). This small-sized fish became known worldwide in the 20-s of the last century, when it was introduced on all continents to control mosquitos. In Hungary it was successfully introduced in the water of the thermal bath of Hévíz in 1939 (Specziár 2004a) and that of Miskolc in 1944 (Pintér 2015). Bíró (1976) confirmed that this fish belongs to the *Gambusia holbrooki* species – according to the current taxonomy.

The climatic conditions of the temperate zone of Hungary have put a stop to the spread of the Eastern mosquitofish so far. Although aquarists introduced the species in some smaller fresh-water ponds, its stable stocks live only in the two thermal lakes mentioned above. In summer these fish migrate even for a greater distance to the streams draining off the water of the lakes but they come back close to the thermal spring in winter. Therefore it was surprising in 2014 that the species also emerged in River Zagyva, a river of the Great Hungarian Plain a long way from the thermal lakes.

River Zagyva is the right side tributary of the Middle Tisza, which flows into the River Tisza at Szolnok. The length of the small river is 178 km; its average water discharge is 10 m³sec⁻¹ (Lászlóffy 1982). During our fish-faunistic survey we took samples at the stretch of the River Zagyva of Szolnok (2 rkm), where the water flows relatively slowly, and therefore there is a considerable amount of water plants in the bed. By seine net (with length x height of 3 x 1,5 m and with a mesh size of 6 mm) fishing we registered the occurrence of 29 species between 2011 and 2016; in the last three years we registered that

of the *Gambusia holbrooki* as well. Besides its morphological characteristics, we identified the species on the basis of the black spots in dorsal fin and caudal fin as well as the darker spot under the eyes (Fig. 1.).



Fig. 1. *Gambusia holbrooki* from the River Zagyva (Photo: Ákos Harka)

First time we observed the Eastern mosquitofish on September 18, 2015, when we caught a female specimen of about 15 mm 2 rkm from the River Tisza (GPS: 47.189418N, 20.201313E). We did not attach too much importance to this case because we were sure that these fish would not survive the winter.

However, a year later on September 4, 2015 we caught ten specimens by our net at the same stretch of the River Zagyva (Szepesi & Harka 2015). The fishes represented three size-groups, and it became evident that the biggest ones, the standard length of which exceeded 40 millimetres were not one-summer old specimens but overwintered ones. Two weeks later when we caught 11 new specimens we stated that they were present 2 km further above from the locality of the first capture. Its drifting specimens might even get to the River Tisza.

On May 30, 2016 we went back to the designated river stretch again, where we caught three overwintered specimens of about the same size (their standard length was 29-31 mm). Among the additional 12 specimens caught on June 24, 2016 the size of the largest females was between 37–39 mm. According to investigation carried out by Erguden (2013) in Turkey average size of females belonging to year classes 0+, 1+ and 2+ were 17, 25 and 38 mm respectively.

The population that can be found in the River Zagyva must have been developed illegally introduced specimens as it is far from the habitats of the species known in Hungary, and it is not in connection with any of them. The introduction probably took place in 2014 because the species was not demonstrated by earlier faunistic examinations.

The Eastern mosquitofish is a warm-water fish, but it can tolerate the change of temperature within relatively wide limits (Báskay et al. 1998). In the Lake of Hévíz in September already there were no specimens larger than 28 mm (Specziár 2004b), but in the Lake of Miskolctapolca even in October a specimen of 38 mm was found (Báskay et al. 1998). According the information given by András Specziár in a letter, the stock emigrated further from the Lake of Hévíz and has already adjusted itself to the lower temperature; it can survive an average winter even in the part of the Small-Balaton reservoir which does not freeze over. According to local anglers in Szentendre these fish overwinter also in Lake Pannonia (Weiperth et al. 2016).



Fig. 2. The River Zagyva near Szolnok (Photo: Ákos Harka)

However, in spite of this the survival of the specimens observed in the River Zagyva in 2014 seemed to be improbable because there is no thermal water running into the river in this area (Fig. 2). In winter it is covered by ice for a shorter or longer time, and the overwintering of the species has not been experienced in such habitat in Hungary as far. Supposedly the milder winters, the higher water temperatures in the vegetation period and acclimatization jointly made possible the naturalization of the species. Survival of the population is not sure as far however we can expect that in the future the species will form self-sustaining stocks in waters of normal temperature.

References

- Báskay I., Péntes B., Repkényi Z. (1998): Adatok a szúnyogirtó fogasponty (*Gambusia affinis holbrooki* Girard, 1859) táplálkozásához és szaporodásához hazai körülmények között. *Állattani Közlemények* 83: 67–82.
- Bíró P. (1976): A Hévízi-tó halfaunájáról. *Halászat* 22/6: 186–188.
- Erguden, S. A. (2013): Age, growth, sex ratio and diet of eastern mosquitofish *Gambusia holbrooki* Girard, 1859 in Seyhan Dam Lake (Adane/Turkey). *Iranian Journal of Fisheries Sciences* 12/1: 204–218.
- Kottelat, M., Freyhof, J. (2007): *Handbook of the European freshwater fishes*. Kottelat, Cornol, Switzerland and Freyhof, Berlin, Germany, pp. 646.
- Lászlóffy W. (1982): *A Tisza. Vízi munkálatok és vízgazdálkodás a tiszai vízrendszerben*. Akadémiai Kiadó, Budapest, pp. 610.
- Pintér K. (2015): *Magyarország halai. Biológiájuk és hasznosításuk*. Mezőgazda Kiadó, Budapest, pp. 360.
- Specziár A. (2004a): Life history pattern and feeding ecology of the introduced eastern mosquitofish, *Gambusia holbrooki*, in a thermal spa under temperate climate, of Lake Hévíz, Hungary. *Hidrobiologia* 522: 249–260.
- Specziár A. (2004b): A szúnyogirtó fogasponty (*Gambusia holbrooki*) biológiájának sajátosságai a Hévízi-tóban. *Hidrológiai Közöny* 84/5-6: 133–135.
- Szepesi Zs., Harka Á. (2015): Szúnyogirtó fogaspontyok (*Gambusia holbrooki*) megtelepedése a Zagyvában. *Halászat* 108/4: 11.
- Weiperth A., Danyik T., Dukay I., Gál B. (2016): Új adatok az elevenlőfogasponty-félék magyarországi elterjedéséhez. *Pisces Hungarici* 10: 71–76.

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