

Range extension of an exotic sailfin molly *Poecilia latipinna* (Lesueur, 1821) in Iran

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Abstract. The sailfin molly - *Poecilia latipinna*, has been previously reported from Zayandehrud and the Tigris River basins in Iran. This report confirms the presence and establishment of the exotic sailfin molly from a warm-water spring in Namak Lake basin. The sailfin molly was probably introduced to the region due to the ornamental aquarium trade, but it is now established in the natural water bodies of Kashan City in central Iran. To our knowledge, this is the first documented record of sailfin molly from the basin, which shows the range extension of the fish in Iran.

Key Words: molly, livebearer, aquarium, exotic fish, Namak Lake basin.

Introduction. Aquarium trade has been regarded as one of the important pathways for introduction of non-indigenous species (Copp et al 2005; Rixon et al 2005; Nunes et al 2015). For example, six freshwater ornamental fish species have been reported within last few years in Iran: goldfish, *Carassius auratus* (Linnaeus, 1758), piranha, *Piaractus brachypomus* (Cuvier, 1818) (see Esmaeili et al 2017), convict cichlid, *Amatitlania nigrofasciata* (Günther, 1867) (see Esmaeili et al 2017, Mousavi-Sabet & Eagderi 2016), sailfin molly *Poecilia latipinna* (Lesueur, 1821) (see Esmaeili et al 2017), guppy, *Poecilia reticulata* Peters, 1859 (see Mousavi-Sabet & Eagderi 2014), and swordtail, *Xiphophorus hellerii* Heckel, 1848 (see Esmaeili et al 2017). However, the introduction of nonnative fish species has increased considerably within recent decades (Jouladeh-Roudbar et al 2015), reaching 29 confirmed species belonging to eleven families for Iran (Esmaeili et al 2018). Introductions of fish species into Iranian water bodies dates back a long time but were most prominent in the 1920s when the mosquitofish, *Gambusia holbrooki* (Poeciliidae) was introduced as an anti-malarial Agent (Esmaeili et al 2010; Jouladeh-Roudbar et al 2015). Since then, about 29 species have been introduced to Iranian inland waters, which are about 9.76% of its ichthyofauna (Esmaeili et al 2018). Aquaculture, sport fishing, control of malaria, research and accidental introductions have been the main reasons for these introductions (Coad 1996; Esmaeili et al 2007; Radkhah et al 2016). Livebearers are an important group of relatively small and often colorful aquarium fishes. Poeciliids are popular ornamental fishes in Iran, also important as a research models, which are recently studied in term of ontogeny, growth, sex reversal and etc. (Mousavi-Sabet & Ghasemnezhad 2013; Faghani-Langroudi et al 2014; Mousavi-Sabet et al 2013; 2014; 2015; Moshayedi et al 2015a; Moshayedi et al 2015b; Khiabani et al 2016). The family Poeciliidae (37 genera and about 304 species) includes live-bearing fishes of small size (< 200 mm length) having diverse morphology and coloration, with distribution in the freshwater and brackish environments of the eastern United States, South America, and Africa, including Madagascar (Moyle 2002; Nelson 2006). The Poeciliid genus *Poecilia* with 40 recognized species (Nelson 2006) is native to the Americas, and some species in the genus are euryhaline. A myriad of species of the genus *Poecilia* have been widely and deliberately introduced worldwide for mosquito control (Fuller et al 1999) or the aquarium trade (Crossman & Cudmore 1999) due their short generation time, colorfulness, hardiness, and readiness to breed in captivity (Moyle

2002). One of the most important species in livebearers ornamental fish culture is the sailfin molly - *Poecilia latipinna*, which is one of the most popular freshwater aquarium fish species (Mousavi-Sabet et al 2015; Moshayedi et al 2015a). This exotic fish was observed for the first time from natural water bodies of Namak Lake basin in central Iran.

Material and Method. The *P. latipinna* specimens were collected by hand-net during fieldwork in the Namak Lake basin, central Iran on 22 June 2018 (Figure 1). Our collecting site was Soleymaniyeh spring in Kashan city (33°56'46.04"N, 51°22'20.50"E), Esfahan Province, Iran (Figure 2). The specimens were preserved in 10% formalin after anesthetizing with 1% clove solution and transferred to laboratory for further processing. Species *Capoeta aculeata*, *Poecilia reticulata* and *X. hellerii* were also collected during sampling.

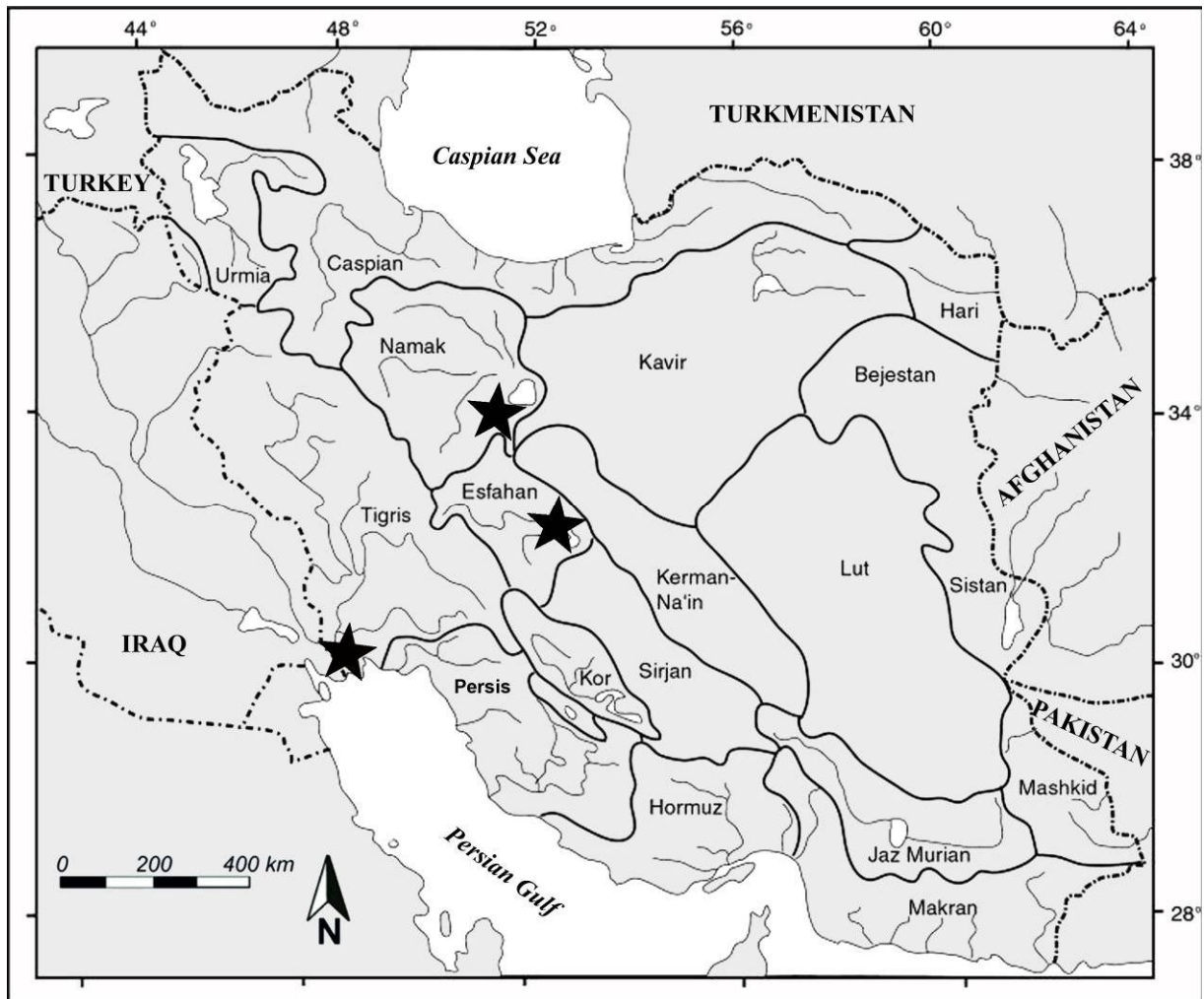


Figure 1. Map of the Iranian water basins; showing the documented distribution of the exotic *Poecilia latipinna* in Esfahan and the Tigris River basins, and the new habitat where the fish introduced in Namak Lake basin (Kashan City, in central Iran).

Results and Discussion. A total of 5 individuals (three females and two males) of *P. latipinna* (61-69 mm SL, 2.4-5.1 g) were collected from the Soleymaniyeh spring. The collected *P. latipinna* specimens (Figure 3) were characterized by the number of scales in the caudal peduncle which is a useful character definitely identifying individuals as *P. latipinna* (Koutsikos et al 2017). Like other poeciliids, sexual dimorphism is clear in adult specimens as males have a developed gonopodium, a specialized reproductive fin found only in male fish (Mousavi-Sabet et al 2012).



Figure 2. Soleymaniyeh Spring, Namak Lake basin, Iran; catching site of *Poecilia latipinna*.

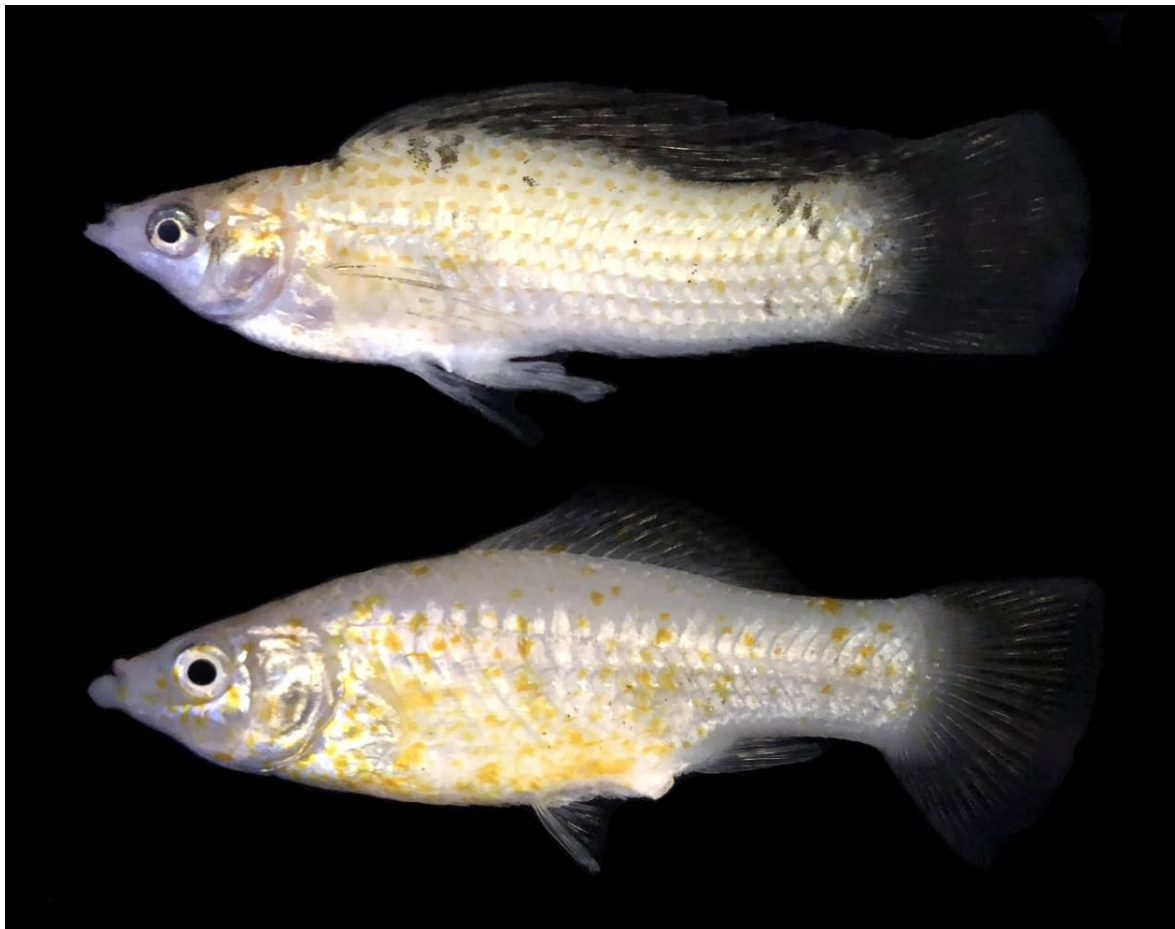


Figure 3. *Poecilia latipinna*: above - male, below - female; Iran, Namak Lake basin, Soleymaniyeh spring.

It seems that *P. latipinna* was introduced into Iran as an aquarium fish, but is now established in natural habitats e.g., in the Soleymaniyeh spring, in Kashan. Kashan city is the largest center of livebearer ornamental fish production in Iran with more than 1500 farms that produce more than 40% of ornamental fishes in Iran (Iranian Agriculture Department of Kashan 2014).

P. latipinna is native to the southeastern U.S.A. and south to Mexico but because of its wide environmental tolerances (Nunes et al 2015) and popularity as an aquarium fish, *P. latipinna* has been introduced widely (Al-Faisal & Abdullah 2014) and has established breeding populations in most countries. Several countries have reported adverse ecological impacts of *P. latipinna* after its introduction (Smith 1997). *P. latipinna*, like the other introduced species, may cause harm to native fishes because of its ability to reproduce rapidly. As the introduction of exotic fishes may affect populations of native fishes through predation, competition, habitat changes, genetic changes, and introduction of parasites and diseases, special care should be taken to prevent such introductions. Therefore, this species may have negative impact on native fish populations such as *C. aculeata* through competition, habitat changes, and introduction of parasites and diseases (Esmaeili et al 2010, 2014, 2017).

The first evidence of the sailfin molly, *P. latipinna* introduction in Iran comes from the study by Khalaji et al (2016) who collected the fish from Hasan-Abad Qanat and Malvajerd, in Esfahan Province, Zayandehrud (or Esfahan) Basin. Khalaji et al (2016) also reported two ectoparasites from the collected specimens. Esmaeili et al (2017) report another established population of *P. latipinna* in the Tigris River tributary in Iran. The present study reports for the first time, the sailfin molly from the Namak Lake basin, which shows the range extension of the fish in Iran.

Conclusions. *Poecilia latipinna* from the sampling site showed a restricted distribution and established breeding population, acting as invaders. Eradication programs can be successful in the case of *P. latipinna* in Namak Lake basin. Since, there is a possible chance of success because of the fish have yet very limited distribution in the basin. However, such programs have to be accompanied by a public awareness campaign to ensure that the aquarium trade and hobbyists do not release these pet fishes into natural habitats. Monitoring of this fish is highly recommended.

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