

***Tomeurus gracilis* Eigenmann, 1909 – the outsider of the subfamily Poeciliinae**

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Abstract. This paper aims to highlight the phylogenetic relationship of a marginal species with the rest of the group Poeciliidae. *Tomeurus gracilis* is a member of the family Poeciliidae, order Cyprinodontiformes. According to physiological, morphological and anatomical investigations, *T. gracilis*, even close related to Poeciliinae, is a sister taxon of all the species included in subfamily Poeciliidae. Molecular investigation of Hrbek et al (2007) confirms it. Due to this, the species is included separately in the subfamily Tomeurinae.

Key words: phylogeny, sister taxon, taxonomy, Tomeurinae, *Tomeurus gracilis*.

Introduction. Understanding the origin of animal taxa is of particular importance in understanding the evolution of animals on earth. Often, anatomical and morphological studies are not sufficient to classify taxa correctly, but even molecular studies alone cannot elucidate the past of the species studied. A complex approach, based on studies of biogeography, anatomy, morphology and molecular genetics is the ideal solution to better understand the origin of taxa and the degree of kinship between them (Reznick et al 2007; Ward et al 2008). This paper is a short note of discussions on literature and aims to highlight the phylogenetic relationship of a marginal species, *Tomeurus gracilis* Eigenmann, 1909 with the rest of the Poeciliid group.

***Tomeurus gracilis*, species description.** *Tomeurus gracilis* (Figure 1) is a member of the subfamily Tomeurinae (facultative viviparous poeciliids), family Poeciliidae, order Cyprinodontiformes and class Actynopterygii (which are ray-finned fishes) (Regan 1911; Huber 1996; Froese & Pauly 2002). Etymologically, *Tomeurus* comes from the Greek words tomos (meaning cut) and oura (meaning tail) (Romero 2002 cited by Froese & Pauly 2002).

According to Baensch & Riehl (1997), *T. gracilis* is a freshwater, tropical, pelagic, non-migratory species (Regan 1911; Huber 1996). It lives in water with a pH range of 7.5-8.5, a dH range of up to 20; and a temperature of 26-29°C. It is spread in South America (Froese & Pauly 2002), more exactly in small coastal drainages of the Venezuelan departments Delta Amacuro, Monagas, Territorio Federal and in Brazilian states of Amapá and Pará; Guamá and Tocantins River basins; Cuyuni, Mazaruni, Essequibo and Corantijn River basins (Froese & Pauly 2002).

The maximum length of the species is 3.3 cm TL male or unsexed (Keith et al 2000), although there are sources that reported larger sizes (Froese & Pauly 2002). *T. gracilis* lives in schools of about several tens of individuals, in muddy creeks or along the

sandy-muddy edge of shallow estuarine areas (Froese & Pauly 2002). Sometimes the fish stays motionless at the surface and prefers to seek shelter beneath floating plants. Fertilization of the eggs is internal (Keith et al 2000). Several days after fertilization, the female lays eggs individually on aquatic plants. About 1-2 eggs are visible through the transparent belly of the female. In the case of this species, viviparity is facultative (Bragança et al 2011), as the eggs can be laid prematurely and be attached to aquatic plants (Keith et al 2000). As importance, it is a good model organism for scientific investigation (Ghedotti 2000; Parenti et al 2010), but for fisheries or aquarium market it is of no interest (Froese & Pauly 2002).



Figure 1. *Tomeurus gracilis*, female (picture by Bitter F., Fishbase.org – Froese & Pauly 2022).

Poeciliid fishes, a taxonomic and phylogenetic view. The family of Poeciliids as was described by Rosen & Bailey (1963), or the subfamily Poeciliinae according to Parenti (1981), is a largely spread and heterogenous group of small-sized fishes that comprises about 22-29 genera (based on various taxonomic views) and a total number of over 200 species (Lucinda 2003; Hrbek et al 2007).

Most species of the subfamily Poeciliinae are endemic to The New World, more exactly to Mexico, Central America and the Antilles (Hrbek et al 2007; Petrescu-Mag et al 2007, 2008). They are one of four groups of Cyprinodontiform fishes, which developed internal fertilization during their evolution, and one of three groups which developed live-bearing features (Parenti 1981; Meyer & Lydeard 1993). The pattern of internal fertilization of eggs and live-bearing is found in almost all members of the family (Hrbek et al 2007). The exception is *T. gracilis* that was shown to be the sister taxon of all other Poeciliid species (Parenti & Rauchenberger 1989; Lucinda & Reis 2005; Hrbek et al 2007; Figure 2). However, Ghedotti (2000) found *T. gracilis* to be close related to the subfamily Poeciliinae. *T. gracilis* has a peculiar type of egg laying (Parenti et al 2010). It has an internal fertilization of the eggs, but is an obligatory egg-layer that retains eggs in the oviduct for several days post fertilization (Rosen 1964; Hrbek et al 2007; Parenti et al 2010). Within the group of live-bearing species, there are different levels of post-fertilization maternal provisioning of the embryo (Petrescu-Mag et al 2019). They

developed multiple attempts of placenta formation during their evolution (Turner 1940; Petrescu-Mag et al 2019) and some species possess multiple simultaneous gestations, a condition referred to as 'superfetation' (Thibault & Schultz 1978; Reznick & Miles 1989; Olivera-Tlahuel et al 2019; Fleuren et al 2019; Saleh-Subaie et al 2021).

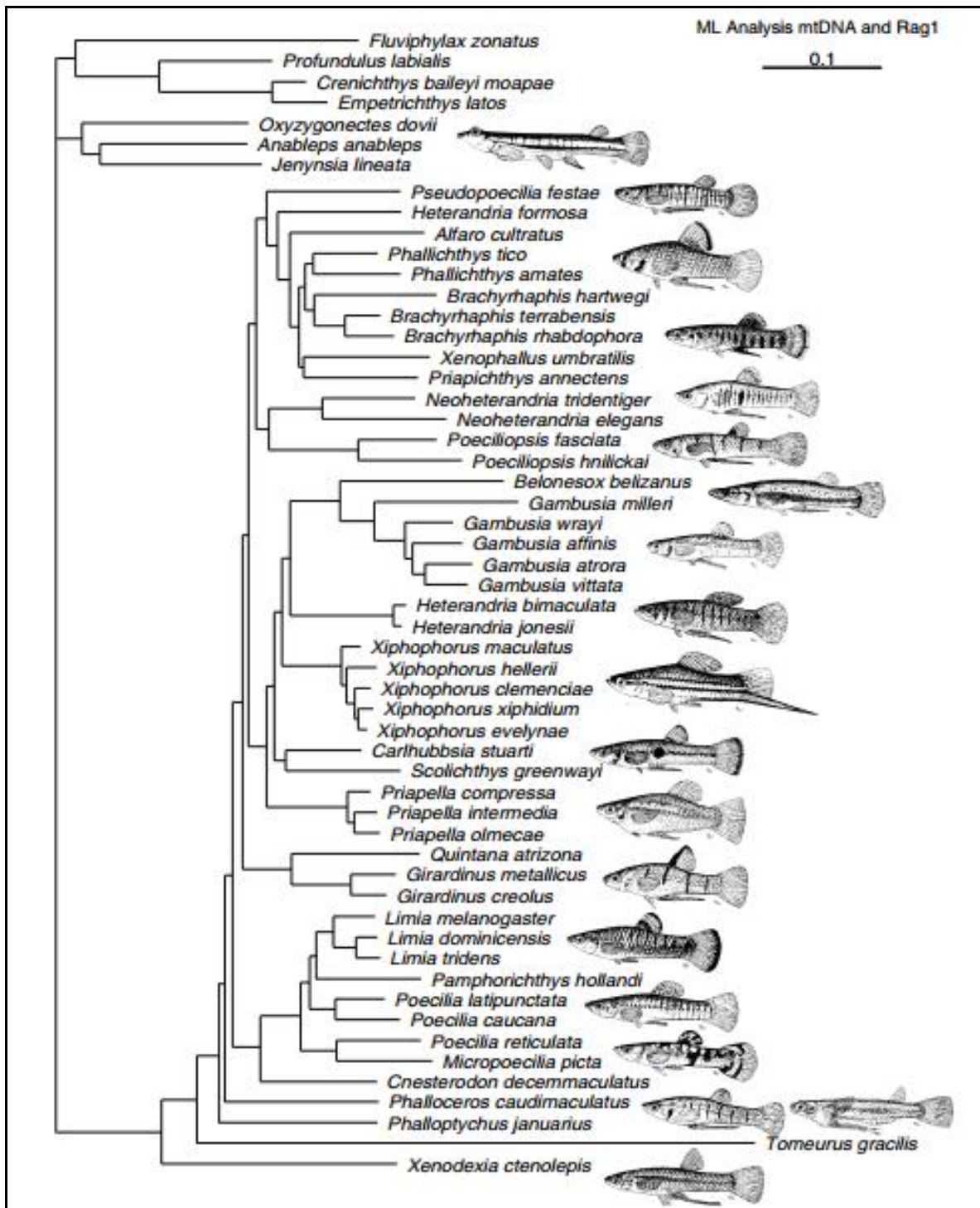


Figure 2. A maximum likelihood hypothesis of phylogenetic relationships of the Poeciliinae prepared by Hrbek et al (2007).

Conclusions. According to physiological, morphological and anatomical investigations, *Tomeurus gracilis*, even close related, is a sister taxon of all the species included in

subfamily Poeciliidae. Molecular investigation of Hrbek et al (2007) confirms it. Due to this, the species is included separately in the subfamily Tomeurinae.

Conflict of Interest. The authors declare that there is no conflict of interest.

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