

Sexual selection: driving force of speciation in fish

Ioan G. Oroian

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, Cluj-Napoca, Romania. I. G. Oroian, neluoroian@yahoo.fr

Abstract. Diversification of the Poeciliid group is indicated by its high infraspecific variability in terms of morphs: color, shape, size, brightness, conspicuous elements or movement. Besides, the best indicator of full speciation in Poeciliid fish is their behavioural variability. The presence of an indefinite male mating behaviour and heterogenic female preference for males inside of one species are decisive factors and they lead to fast diversification and finally to speciation. For instance, Endler's live bearer" (*P. wingei*) is such a case of splitting and speciation.

Key Words: Poeciliid fish, speciation, sexual selection, guppy, Endler's, preference, diversification.

Critical Note. Diversification of the Poeciliid group is indicated by its high infraspecific variability in terms of morphs: color, shape, size, brightness, conspicuous elements or movement (Lindholm & Breden 2002; Petrescu-Mag & Bourne 2008; Petrescu-Mag et al 2008; Petrescu-Mag 2009). But there is more than this aspect (Evans et al 2011; Miller et al 2010). The best indicator of full speciation in Poeciliid fish is their behavioural variability (Păsărin & Petrescu-Mag 2011). The female preference for males is highly variable (Barbosa 2009) and such extreme preferences allow the species to diversify as: polymorphic individuals, distinct populations, different species, species intermix, "hybrid species" or so called polyphyletic species (here we refer to presence of three sex chromosomes, X, Y and W in the same species; Coughlan et al 1999; Mag & Petrescu 2006). On the other side, the males are virile and they have wide preferences. For instance, the guppy male (*Poecilia reticulata*) has no clear preference concerning the female phenotype, no matter if the female is small or large, colorful or pale, active or shy (Petrescu-Mag 2008). They are willing to mate even with other species, sometimes much larger, and even a bisexual/homosexual behaviour is observed (personal notes, unpublished data). Such males are suitable and often used to produce natural interspecific hybrids (*P. reticulata* male x *P. sphenops* female; *X. hellerii* male x *X. maculatus* female etc) (I. V. Petrescu-Mag, personal communication). The presence of such an indefinite male mating behaviour and patchy female preference for males inside of one species are decisive factors which lead to no limit diversification and finally to speciation. For example, "Endler's live bearer" (*P. wingei*; see Figure 1) is such a case of population which recently separated from *P. reticulata*. Several scientists believe they are one and same species (Alexander & Breden 2004) while others claim that *P. wingei* is a true "nova species" (Poeser et al 2005). I am personally not sure if "Endler's" are new species or not (term "species" is so relative), but I am sure they are a case of splitting and speciation. It is great to have the possibility to observe how a new species is born.



Figure 1. Endler's live bearer (source: <http://home.endlers1.com/>).

References

- Alexander H. J., Breden F., 2004 Sexual isolation and extreme morphological divergence in the Cumana guppy: a possible case of incipient speciation. *Journal of Evolutionary Biology* 17(6):1238-1254.
- Barbosa M., 2009 Female mating decisions in the Trinidadian guppy, *Poecilia reticulata* (Doctoral dissertation, University of St Andrews).
- Coughlan T., Schartl M., Hornung U., Hope I., Stewart A., 1999 PCR - based sex test for *Xiphophorus maculatus*. *Journal of Fish Biology* 54(1):218-222.
- Evans J. P., Gasparini C., Holwell G. I., Ramnarine I. W., Pitcher T. E., Pilastro A., 2011 Intraspecific evidence from guppies for correlated patterns of male and female genital trait diversification. *Proceedings of the Royal Society of London B: Biological Sciences* 278(1718):2611-2620.
- Lindholm A., Breden F., 2002 Sex chromosomes and sexual selection in poeciliid fishes. *American Naturalist* 160:S214-S224.
- Mag I. V., Petrescu R. M., 2006 Evolution of the heteromorphic sex chromosomes in fish species. *Lucrări Științifice – Seria Zootehnie* 49:1076-1081.
- Miller E. G., Karlslake E. B., Masanoff J. R., Park J. P., Sammons A. J., Watson L. C., Newaj-Fyzul A., Petrescu-Mag I. V., Breden F., Allen T. C., Bourne G. R., 2010 Poeciliid livebearing fish polymorphisms: providing answers to questions of color, sex, mate acquisition, and personality. In: G.R. Bourne and C.M. Bourne (eds.), *The CEIBA Reader: an introduction to the people, ecosystems, plants, animals and cuisine of CEIBA Biological Center, Guyana*. St. Louis, MO, Yerfdog Publishing. Chapter 4.21.
- Păsărin B., Petrescu-Mag I. V., 2011 What we expect from Poeciliids for the future in terms of evolution. *Poec Res* 1(1):24-26.
- Petrescu-Mag I. V., 2008 [Biophysiological characterization of *Poecilia reticulata* and its particularities]. *ABAH Bioflux, Pilot* (b):1-56. [In Romanian]
- Petrescu-Mag I. V., 2009 Winge's sex-linked color patterns and SDL in the guppy: genes or gene complexes? *AACL Bioflux* 2(1):71-80.
- Petrescu-Mag I. V., Bourne G. R., 2008 Crossing-over between Y chromosomes: another possible source of phenotypic variability in the guppy, *Poecilia reticulata* Peters. *AACL Bioflux* 1(1):1-10.

- Petrescu-Mag I. V., Lozinsky L. R., Csep L., Petrescu-Mag R. M., 2008 Vegetation and predators mediate color pattern frequencies in *Poecilia sphenops* Valenciennes. *AACL Bioflux* 1:51-61.
- Poeser F. N., Kempkes M., Isbrücker I. J. H., 2005 Description of *Poecilia (Acanthocephalus) wingei* sp from the Paría Peninsula, Venezuela, including notes on *Acanthocephalus* Eigenmann, 1907 and other subgenera of *Poecilia* Bloch and Schneider, 1801 (Teleostei, Cyprinodontiformes, Poeciliidae). *Contributions to Zoology* 74(1/2). Available online at: <http://www.ctoz.nl/cgi/t/text/text-idx?c=ctz;sid=cdce07c18552c1ce6384c1fa94946f84;rgn=main;idno=m7401a07;view=text>
- The Endler Shop 2015 Available online at: <http://home.endlers1.com/> [last view: December 2015]

Received: 28 November 2015. Accepted: 29 December 2015. Published online: 30 December 2015.

Authors:

Ioan G. Oroian, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, 3-5 Calea Manastur Street, Cluj-Napoca 400372, Romania, e-mail: neluoroian@yahoo.fr
This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

How to cite this article:

Oroian I. G., 2015 Sexual selection: driving force of speciation in fish. *AACL Bioflux* 8(6):1035-1037.