

State of poeciliid fishes in the international market

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ABSTRACT

Objective: To make a review about the knowledge of the fish of the family poeciliidae in Mexico in the main areas of knowledge.

Design/methodology/approach: The present review was carried out through the search and bibliographic compilation of literature, as well as in the consultation of articles in different databases, for its subsequent analysis.

Results: Poeciliid fish are the most widespread group of ornamental fish internationally, they are found in all international markets, leading productions for aquarium purposes, and therefore have great economic importance within the trade of aquatic organisms for commercial purposes. Ornamental.

Limitations on study/implications: The Poeciliids are a well-known group of fish, however information on marketing and specific sales data is limited.

Findings/conclusions: The most sold fish is the Guppy (*P. reticulata*), followed by mollies, platies and swordtails, which constitute the main internationally traded poeciliids.

Keywords: Ornamental fish, pet trade, exotic species, aquarism.

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INTRODUCTION

Currently, the ornamental fish trade has grown considerably, due to its great acceptance and good development prospects (Lango-Reynoso *et al.*, 2012; Evers *et al.*, 2019) being one of the markets with the highest profits worldwide, which reach 30 billion dollars annually, Within the international field of aquarism, aquarium hobby has had an annual growth of 14% since the 70's and in this area, freshwater species, mainly fish, are those that have the greatest demand, since total market represent 90%, in contrast to 10% of marine species (Evers *et al.*, 2019; Ruíz, 2022). Among the most commercialized freshwater species are poeciliid fish, which are small fish with a maximum length of 200 mm, belonging to the Poeciliidae family, characterized by presenting lecithotrophic viviparity and their males

have a gonopodium. Within the aquarium hobby, they are highly valued fish for their variety of shapes and striking colors, as well as for being highly fertile, which makes them quite attractive (Miller *et al.*, 2009; Hedrick & Hurt, 2012; Gavriiloaie *et al.*, 2016).

MATERIALS AND METHOD

The selection of bibliographic material was carried out by searching different online databases and scientific search engines, such as: Elsevier-Scopus, SCIELO and Google academic, data from the FAO and official pages were also consulted as well as digital repositories from different universities and book chapters.

RESULTS AND DISCUSSION

Below are the main marketing markets for poeciliids and their situation worldwide:

Asian market

Asia is the region with the largest production and marketing of ornamental fish in the world. The countries that lead the trade in ornamental fish and especially poeciliids are: Singapore, Thailand, China, Indonesia and Sri Lanka (Monticini, 2010; Hernández-López & Luna-Vivaldo, 2021; Kabir & Hawkeswood, 2021). The most traded species in these countries are: guppies (*Poecilia reticulata*), swordtails (*Xiphophorus helleri*), platys (*Xiphophorus maculatus*) and mollies (*Poecilia* sp.) (Wijesekara & Yakupitiyage, 2001; Arévalo-Rivera *et al.*, 2010; Evers *et al.*, 2019; Kabir & Hawkeswood, 2021). Within these countries, Singapore stands out, as it is the largest exporter of poeciliids worldwide, distributing this group of fish to more than 60 countries. Within its total production of ornamental fish species, poeciliids represent 30%, among which stand out: los Platys (*X. maculatus*), mollies (*Poecilia* sp.) y los guppies (*P. reticulata*); However, when the total production is analyzed in terms of specimens and not species, it is clear that of the total number of specimens produced and distributed around the world, guppies alone represent more than 80% of the total number of specimens sold (Monticini, 2010; Kabir & Hawkeswood, 2021), Another of the countries in which there is a specific record of this group of ornamental fish is Sri Lanka, a country in which the majority of fish exported are poeciliids: Mollies, platys, swordtails and guppies, together constituting more than 80% of the total fish exported, of which guppies (*P. reticulata*) stand out as they represent 65% of its international sales (Wijesekara & Yakupitiyage, 2001), Within the Asian region, not only do poeciliids stand out in terms of export, they also happen to be the most demanded group of fish in local Asian markets, where poeciliids represent around 49% of their sales and in the case of Japan only guppies represent 28% of imported fish (Monticini, 2010; Dey, 2016).

American market

The poeciliid fish market in America is mainly made up of the United States and Mexico. In the United States, its trade is dominated by a few species, highlighting the guppies (*P. reticulata*) and the swordtails (*Xiphophorus* sp.) (Tamaru *et al.*, 2001; Evers *et al.*, 2019). These fishes have had crossbreed between congeners over the years to accentuate colors and shapes, so in many cases they are not pure species (Păsărin & Petrescu-Mag, 2011), within

this market, poecilids are a group of fish that stand out for their high demand to the extent that *P. reticulata*, *X. maculatus*, *X. helleri* and *Poecilia* sp., are known as the “group of four”, since they are the four fish that are sold the most in all of America and that are easiest to find at points of sale (Hellweg, 2016; Evers *et al.*, 2019). Mexico is a country that, in terms of ornamental fish production, is mainly a producer and exporter of poecilids, with its neighboring country, the United States, being the main destination, In Mexico, the most produced ornamental fish is the Guppy, followed by *P. sphenops*, *X. helleri* and *X. maculatus*, which although they are native to Mexico, are cultivated in their ornamental varieties (Devezé *et al.*, 2004; Maya *et al.*, 2007; Scotto, 2020) Although there are fish with higher prices in the market, poecilids have a greater margin in terms of profits because they do not need very specialized infrastructure for their production unlike other fish, which is why more than 52% of farms producing ornamental fish in Mexico raise poecilids, of which guppies along with carp (*Carassius auratus*) represent 88% of the total fish sold in this country (Espinosa *et al.*, 2011; Ruíz, 2022).

European market

Within Europe, poeciliid fish have great relevance in terms of their marketing. In this market, the best-selling fish is the guppy (*P. reticulata*), which together with the neon tetra (*Paracheidoron inessi*) make up 25% of total ornamental fish sales; therefore, they have great economic importance. In European countries such as Spain and Romania, poecilids are of great commercial importance and are countries that stand out for their cultivation. The Czech Republic is a country that has recently been on the rise in the production of guppies, mainly due to its proximity to other European countries (Monticini, 2010; Vivas, 2019; Novák *et al.*, 2020), while other European countries such as the United Kingdom, France, the Netherlands and Germany are mainly importing countries of poecilids (Novák *et al.*, 2020).

In the European market, Germany stands out, because unlike other international markets, it is characterized by the fact that it is the largest importer of poeciliid species in the world, which is why they are importers of species that are normally not so requested in other countries such as: *Poecilia vivipara*, *Gambusia holbrooki*, *Phalloceros caudimaculatus*, *Cnesterodon carnegidi*, *Poecilia sphenops*, *Girardinus unnotatus*, *Gambusia affinis*, *Cnesterodon decenmaculatus*, *Poecilia latipina*, *Poecilia branneri*, *Gambusia nicaraguensis*, *Girardinus metallicus*, *Phallichthys amates*, *Poecilia caucana*, *Phalloptychus januaris*, *Poecilia mexicana*, *Poecilia vittata*, *X. maculatus*, *X. helleri*, *Poecilia dominicensis*, *Poecilia melanogaster*, *P. reticulata* and *Belonesox belizanus*). Therefore, Germany can be considered the importing country of the greatest diversity of poeciliid species internationally (Evers *et al.*, 2019; Novák *et al.*, 2020).

Although there is no specific record of the imports of these species, mainly of their origin and specific quantities, it is suspected that they come from regions of America, in which poecilids are native and in many cases extracted from their natural habitat, without a well-regulated trade in ornamental fish, whose main destination has been traced to the European market (Hignette, 2003; Vaca & Quirce, 2005; Mancera & Reyes, 2008; Zúñiga, 2010).

Other markets

India

The Indian market for ornamental fish has been growing significantly in recent years. Although this region is rich in diversity of freshwater species, its trade focuses on non-native species (Pandey & Mandal, 2017), and poecilids dominate the market due to their high demand, mainly: *P. reticulata*, *Poecilia* sp., *X. variatus* and *X. helleri*, which have higher sales in volume compared to other species (Raja *et al.*, 2014). Although more native species are beginning to be cultivated, the Indian market has grown mainly because some countries cannot meet the demand for poecilids that they have, Thus, India's main export destination for poecilids is Singapore and the United States (Abalika *et al.*, 2003; Monticini, 2010; Raja *et al.*, 2019).

CONCLUSIONS

Poecilids are a group of fish of utmost importance in international trade, they constitute most sales of freshwater ornamental fish, highlighting the guppy fish (*P. reticulata*) in first place, followed by mollies, platys and sword tails. Nowadays, more and more countries actively participate in the trade of these species that, although they may seem to have little unit value, in volume they become the species with the greatest demand in the international aquarium market, Therefore, poecilids are a group of highly profitable fish to market.

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