

# A NEW RECORD OF *BETTA SPLENDENS* (ANABANTIFORMES: OSPHRONEMIDAE) FOR THE NORTHEASTERN BRAZIL

UM NOVO REGISTRO DE *BETTA SPLENDENS* (OSPHRONEMIDAE) PARA O NORDESTE BRASILEIRO

OCURRENCIA DE *BETTA SPLENDENS* (OSPHRONEMIDAE) EN AMBIENTES NATURALES DEL NORESTE DE BRASIL

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## Abstract

The introduction of exotic species, although harmful to the natural environment, still occurs accidentally, intentionally or as a strategy of biological control. In this work, a specimen of *Betta splendens* was collected and recorded for Northeastern Brazil, a fish of the family Osphronemidae, originally from Asia. This species has the potential to compete with the native species, causing alterations in the natural community. The record of this species in Brazilian environments and the lack of diagnostic works on this region makes this work of special importance and as an incentive for future investigations.

**Key words:** introduction, exotic species, fish.

## Resumo

A introdução de espécies exóticas, embora prejudicial ao meio ambiente, ainda ocorre acidentalmente, intencionalmente ou como estratégia de controle biológico. Neste trabalho, foi coletado e registrado no Nordeste do Brasil um espécime de *Betta splendens*, peixe da família Osphronemidae, originário da Ásia. Esta espécie tem potencial para competir com as nativas, causando alterações na comunidade natural.

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O registro dessa espécie nos ambientes brasileiros e a falta de trabalhos diagnósticos sobre a situação na região tornam esse estudo de especial importância e como fator de incentivo para futuras investigações.

**Palavras chave:** introdução, espécie exótica, peixe.

## Resumen

La introducción de especies exóticas, aunque perjudicial para el medio ambiente natural, se sigue produciendo accidental, intencional o como una forma de estrategia de control biológico. En este trabajo, se recoge y queda grabada en el Nordeste de Brasil un ejemplar de *Betta splendens*, un pez de la familia Osphronemidae, originario de Asia. Esta especie tiene potencial para competir con el nativo, causando alteración en la comunidad natural. El registro de esta especie en ambientes de Brasil y la falta de trabajo de diagnóstico sobre el tipo de situación en la región hace que este trabajo especial importancia y como un factor de empuje para las investigaciones futuras.

**Palabras clave:** introducción; especie exótica; pez.

## INTRODUCTION

The South American continent holds the richest fish fauna of the planet with 5160 described species, representing 1/3 of the global freshwater species richness (Reis et al., 2016). However, many human actions negatively contribute to the conservation of this region, causing the reduction of native populations to extreme limits (Cowx, 2002).

Among these actions, are the introduction of non-native species, an important cause of disturbance in the ecosystems (Vitousek et al., 1997). Despite this, introductions of non-native species frequently occur in several regions of the World (Vitule et al., 2009; Welcomme, 1989).

In Brazil, most of the fish introductions in freshwater environments occur through aquaculture activities (Azevedo-Santos et al., 2011, Ortega et al., 2015), including fishes and associated organisms (Agostinho et al., 2007; Nobile et al. 2020). However, other human activities have been often recognized as different ways of new introductions (e.g., fishkeeping, sport fishing, etc.) (Azevedo-Santos et al., 2015).

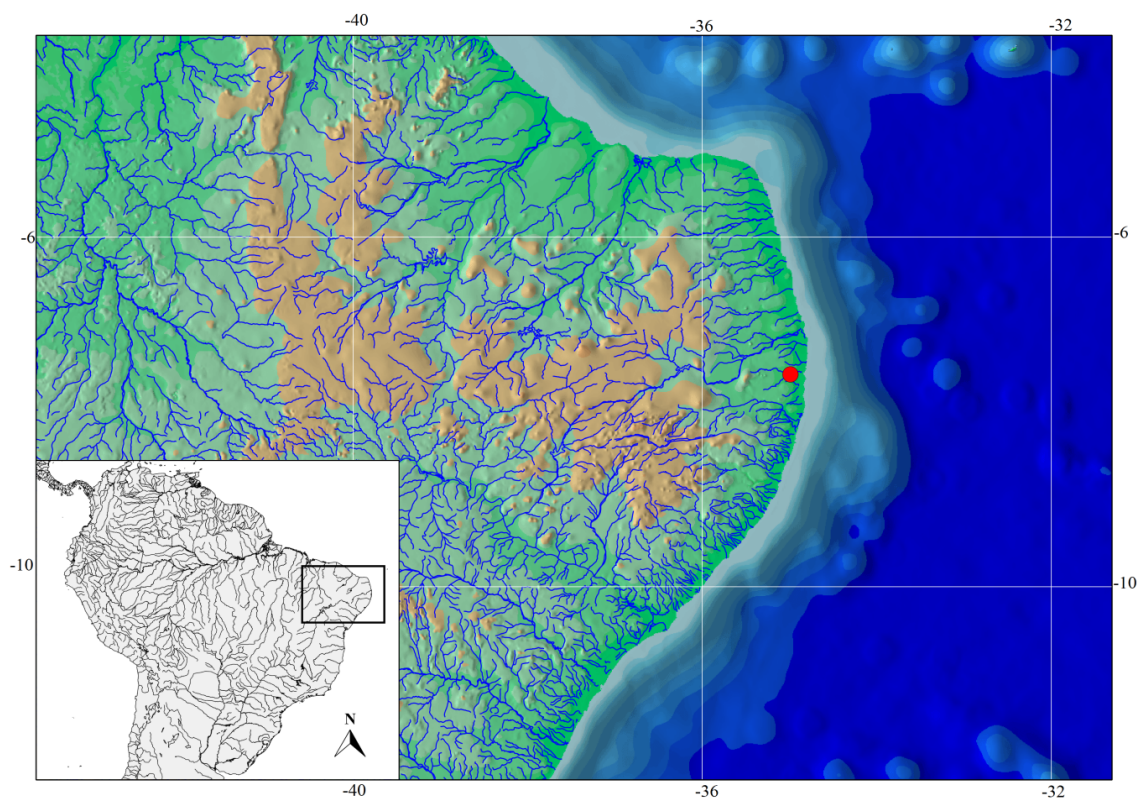
*Betta splendens* (Regan, 1910) is a member of the family Osphronemidae, a fish native from Asia (Welcomme, 1989), and naturally occurring in poor oxygen swampy environments, such as rice paddies and swamps (Faria et al., 2006). Due to anthropogenic actions, especially aquarium releases, this specie was introduced in Europe (France) in 1874 and in the United States (Goldstein, 2004) in 1910. Currently, the species is widespread throughout the American continent, including Brazil (Welcomme, 1989). In this country, this species is one of the most popular in aquarium trade. Moreover, it has been studied for the biological control of mosquitoes, such as

*Aedes aegypti* (Linnaeus, 1762) and *Culex quinquefasciatus* Say, 1823 (Pamplona et al. 2004).

Recently, *B. splendens* had four new records reported for two Brazilian states, Ceará and Pernambuco (Leão et al., 2011). However, records of this species in Brazil's natural environments (rivers, lakes, reservoirs) are rare in the literature. In this work, a new record for *B. splendens* is reported from a coastal waterbody of Northeast Brazil.

## MATERIAL AND METHODS

During an analysis of the ichthyological collection of UNESP - Botucatu (LBP –Laboratório de Biologia e Genética de Peixes), an unusual record of occurrence was found for a single specimen of *B. splendens*. According to the data obtained from the batch, the specimen was collected in October 2012 (IBAMA: 13843-1), in Tracunhaém River (07°34'21.6 "S; 34°59'20" W), State of Pernambuco, coastal drainage of Northeast Brazil (Figure 1).



**Figure 1.** Map indicating the new location of occurrence of *Betta splendens* in the coastal drainage of Northeastern Brazil.

## RESULTS AND DISCUSSION

The single adult specimen captured was morphologically identified as a female with 45.13 mm standard length (Figure 2). The sexual dimorphism in this species is observed from the age of two months and evidenced by the more developed fins of males, which are much larger than the female's in adult specimens. Additionally, it is noteworthy that in some captive specimens this distinction is made only from the behavior of the male, which appears to be much more aggressive than the female's (Faria et al. 2006)



**Figure 2.** Specimen of *Betta splendens* caught in the Northeastern coastal region.

Although a new record is reported for the state of Pernambuco, it is impossible to assert if this species is already established in this region based on a single specimen. Moreover, there is no evidence of reproduction and/or recruitment for this species in this region (Duggan et al., 2006; Vermeij, 1996). However, there are two hypotheses of how this specimen may have been released in the environment.

In general, there are several ways of introducing a non-native fish species in the continental ecosystems, including aquaculture, fishkeeping, sport fishing, biological control and the use of live baits (Azevedo-Santos et al, 2015; Júlio et al. 2009; Langeani et al. 2007). Still, given the fact that this species is highly explored for different purposes around the world, we suggest here two likely possibilities for their introduction (Cavalcanti et al. 2007; Oliveira Lima et al. 2010; Magalhães & Jacobi, 2013).

*Betta splendens* is much appreciated in aquarism (Magalhães & Jacobi, 2013). Therefore, there is the possibility that its introduction has occurred in the region as a result of aquarium dumping. In this sense, several authors point out that the aquarism has become one of the main routes of introduction of non-native fish species due to the easiness of acquiring a wide range of species from all around the world in any

specialized store, a trend that has gained increasing popularity (Magalhaes & Jacobi, 2010, 2013; Padilha & Williams, 2004).

In general, Duggan et al. (2006) argue that the popularity of a species and how often it occurs in aquarium shops can be a determining factor for its subsequent introduction because it acts as a propagule pressure. Thus, there is a clear relationship between widely marketed species (as is the case of *B. splendens*) and its release into the environment.

Another factor that may have caused the introduction of this individual in the natural environment is the use of non-native fish species in the control of populations of mosquitoes, such as *Aedes aegypti* (Azevedo-Santos et al., 2016). Some species have been introduced in the aquatic environment through this way, as is the case with the upper Paraná river (Langeani et al., 2007). *Betta splendens* has been effectively employed to combating *A. aegypti* (e.g., Pamplona et al., 2004) and has been reported as a potential species in the fight against mosquitoes (Trigueiro, 2015).

## CONCLUSION

This study expands the area of occurrence of the species *Betta splendens* in Brazil, as well as highlights the potential of its introduction as a consequence of the aquarism and of its employment in the biological control of mosquitoes.

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