



Record of native amphibian predation by the alien African catfish in the Brazilian Atlantic Rain Forest

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Abstract: We record here the predation of an adult individual of the native frog *Leptodactylus ocellatus* (Linnaeus, 1758) by the non-native catfish *Clarias gariepinus* (Burchell, 1822), in a river at the Brazilian Atlantic Rain Forest.

Key words: *Clarias gariepinus*, feeding, food web, invasive fish, *Leptodactylus ocellatus*.

Resumo. Registro de predação de um anfíbio nativo pelo bagre-Africano introduzido na Floresta Atlântica brasileira. Registramos aqui a predação de um indivíduo adulto da rã nativa *Leptodactylus ocellatus* (Linnaeus, 1758) pelo bagre introduzido *Clarias gariepinus* (Burchell, 1822), em um rio da Floresta Atlântica brasileira.

Palavras-chave: Alimentação, *Clarias gariepinus*, *Leptodactylus ocellatus*, peixe invasor, teia trófica.

Neotropical fauna faces a new and potentially serious threat: the introduction and spread of alien fishes. Fishes are major components of food webs in tropical rivers, and display great variability in trophic behaviour at all levels (Winemiller & Jepsen 1998). The ecological consequences of fish invasions include alterations in community-ecosystem energy flow. On August 3, 2004, during an ecological survey on alien fishes in a river located in the Brazilian Atlantic Rain Forest (Guaraguaçu river basin, 25°45'S and 48°35'W at coastal plain, east side of the Serra do Mar, sub-basin of Paranaguá Bay, Paranaguá city, Paraná state, southern Brazil), we retrieved a well-preserved specimen of the native frog *Leptodactylus ocellatus* (Linnaeus, 1758) (Amphibia, Anura, Leptodactylidae) (female, 85 mm total length, 76.58 g total mass) from the esophagus of an adult specimen of the catfish *Clarias gariepinus* (Burchell, 1822) (Teleostei, Siluriformes, Clariidae) (female, 600 mm total length, 575 mm standard length, 1.650 kg total mass – (Fig. 1)).

The African catfish *C. gariepinus* is an alien species in Brazil, and has been reported as a serious ecological problem (Vitule *et al.* 2006a, b,

Vitule 2008). This species is originally from Africa and parts of Asia (Israel, Syria and south of Turkey); it has a long body, pseudo-lungs, and a high mucous secretory capacity, as adaptations to live in stagnant shallow environments or even out of the water (Donnelly 1973). The capacity for amphibious life-style can provide specific advantages to its feeding ecology, such as access to food sources that are mostly inaccessible to other fish, as shown in other fish species (Kruitwagen *et al.* 2007). In its natural geographical areas of occurrence, *C. gariepinus* feeds on plankton, arthropods, mollusks, vegetables, fish, reptiles, and amphibians, showing a very wide and generalist diet (Munro 1967, Willoughby & Tweddle 1978, Bruton 1979, Spataru *et al.* 1987, Winemiller & Kelso-Winemiller 1996, Yalçin *et al.* 2001). In Brazil, native fishes and arthropods have been reported in its diet (Mili & Teixeira 2006). This catfish is a top food chain predator, and being a voracious feeder, could deeply modify pre-existing biotic interactions in the community. The impact of this large invasive predator species in a native food web of a community with many endemic species of short size is imminent (Vitule *et al.* 2006a, Vitule 2008). Maximum adult

size is a relevant biological variable for successful invasions in life-history traits of non-native fishes in Iberian watersheds (Ribeiro *et al.* 2007).

The amphibian prey *L. ocellatus* occurs widely in South America, east of the Andes. This species is well adapted to habitat modification and disturbance. It is frequently found in ponds, small lakes or flooded areas (*sensu* IUCN 2006). It occurs in some tropical regions where deforestation

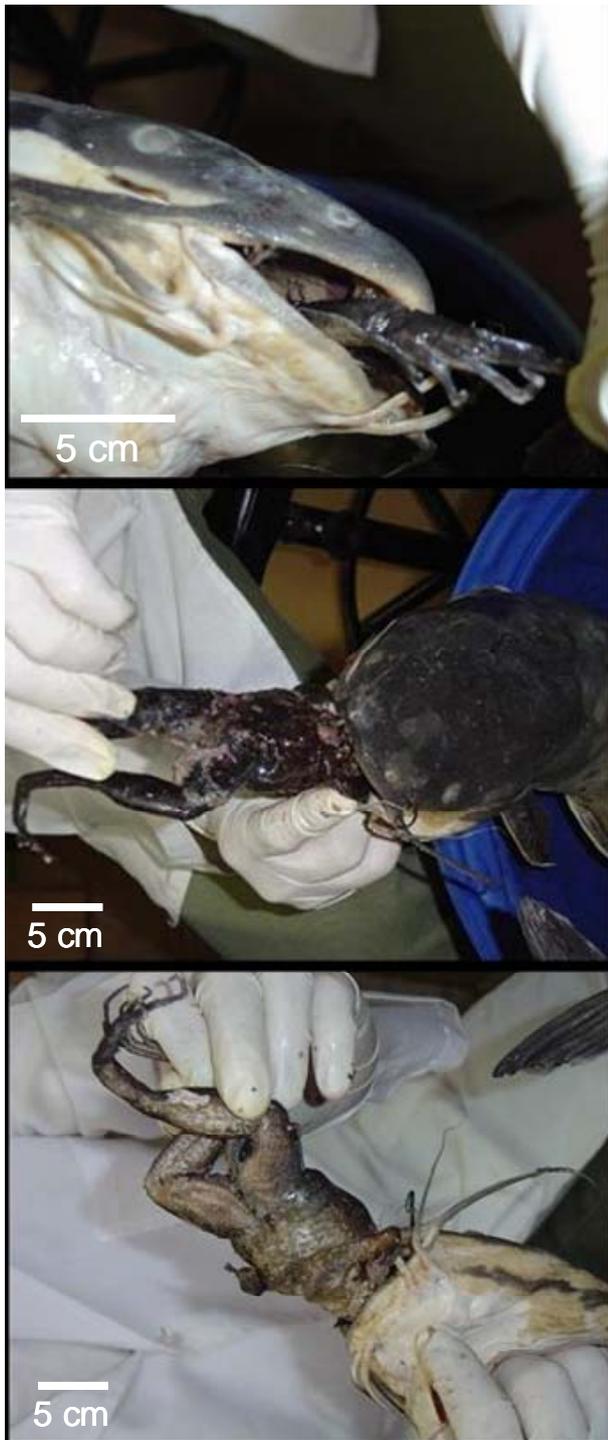


Figure 1. Photographs depicting the African catfish *Clarias gariepinus* with the frog *Leptodactylus ocellatus* stuck into its throat (top picture), and the withdrawal of the frog.

advances at fast rates, including the Atlantic Rain Forest, one of the most ecological diverse but threatened ecosystems of the planet (Myers *et al.* 2000). Impacts of alien fishes on amphibian populations have already been reported in temperate regions (Knapp & Matthews 2000, Finlay & Vredenburg 2007). The predation of this resistant native amphibian species by a large alien fish like *C. gariepinus* may indicate its potential for high impact on an aquatic community and in nearby habitats such as lateral pools and riparian areas. Frogs seem to be a preferred prey for this catfish, as, while using longline for capturing fish in this river basin, frogs were the only baits that allowed us to capture the African catfish (Vitule 2008). We believe such information can contribute to the development of management plans aimed at minimizing probable impacts. Unfortunately, many aquaculture publications (including some FAO technical papers e.g. De Graaf & Janssen (1996)) are referring to the advantages and benefits of its cultivation, due to its robustness and fast growth, attaining a large size, but without considering its highly invasive potential. This stimulates the use of such species in an indiscriminate way in countries with high biodiversity and natural resources, but poor in technology in order to properly explore them in an adequate manner. In this context the dissemination of these results can help institutions involved in the licensing of growers and the conservation of the environment with the adoption of preventive actions to be adopted as early as possible.

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