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First record of herbivory of the invasive macrophyte *Hedychium coronarium* J. König (Zingiberaceae)

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Abstract: Invasive species can cause structural and functional changes in their non-native habitats, such as changes in the trophic chain. We describe ramet herbivory of butterfly ginger, an aggressive aquatic weed in Brazil, by capybaras in a floodplain area of a Cerrado reserve. This is the first record of herbivory of *H. coronarium* in invaded areas. Capybaras could be using the butterfly ginger as habitat and as a food resource, which could cause changes in apparent competition between these invasive and native macrophytes.

Keywords: butterfly ginger, aquatic weed, capybaras.

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Resumo: Espécies invasoras podem causar alterações estruturais e funcionais nos ecossistemas invadidos, tais como alterações na cadeia trófica. Neste trabalho, descrevemos o primeiro registro de herbivoria de rametas de lírio-do-brejo, erva daninha aquática agressiva no Brasil, por capivaras em uma área de várzea de uma reserva de Cerrado. Este é o primeiro registro de herbivoria de rametas de *H. coronarium* em áreas invadidas. As capivaras desta região podem estar se utilizando dos bancos de lírio-do-brejo como habitat e como recurso alimentar, o que poderia ocasionar alterações na competição aparente entre esta invasora e as macrófitas nativas.

Palavras-chave: lírio-do-brejo, erva daninha aquática, capivaras.

A species is considered invasive when it acquires a competitive advantage, in addition to the disappearance of natural obstacles to spread, allowing its rapid dispersal and dominance in a new habitat (Valery et al. 2008). This dominance causes structural and functional changes in these ecosystems (Mack & D'Antonio 1998). Currently, biological invasion is considered the second biggest cause of global biodiversity loss (Wilcove et al. 1998, McGeoch et al. 2010). Changes in ecological processes, for example in food webs, are important impacts of invasive species (Vitousek 1990, Mack et al. 2000).

Aquatic macrophytes are among the most important global invasives, threatening biodiversity and ecosystem processes in aquatic environments (Pieterse & Murphy 1990, Santamaria 2002). They spread rapidly, are able to grow and reproduce in sub-optimal conditions such as under intense competition (Spencer & Bowes 1990) and exhibit rapid metabolism and large biomass in eutrophic ecosystems (Pieterse & Murphy 1990). In Brazil, *Hedychium coronarium* J. König, Zingiberaceae, is an aggressive weed, invading floodplains, lake shores, streams and drainage channels, where it establishes dense populations (Couto & Cordeiro 2005, Lorenzi 1991). It can reach up to 2.0 m tall, and is commonly named butterfly ginger (Macedo 1997, Santos et al. 2005, Instituto... 2012). It is native in tropical Asia and widely used for ornamental purposes (Kissmann & Groth 1991). Due to its rapid growth and dispersal, it is considered an important weed that replaces the native vegetation (Santos et al. 2005). Our objective is to describe the first record of herbivory of these invasive macrophyte by capybara (*Hydrochoerus hydrochaeris* Linnaeus 1766)

From October 2011 to April 2013, we followed every two months a population of *H. coronarium* in 20 plots of 0.5 m² located a floodplain area of ca. 0.8 ha, within the forest reserve of the Federal University

of São Carlos (21° 58' 15.00" S and 47° 53' 16.45" W). Each ramet of *H. coronarium* found was measured and marked with numbered tags to evaluate the population dynamics. From June to August 2012, we found in 7 plots grazed ramets associated with the disappearance or fragmentation of numbered plastic tags (Figure 1). Grazed ramets were all smaller than 25 cm height. No adult ramets were damaged or had tags missing or broken. In these plots, we found footprints and feces of *H. hydrochaeris*, a very common herbivore in this region. The fragments of the tags showed signs of *H. hydrochaeris* dental activity. *H. hydrochaeris* is a wild herbivore and the largest Brazilian rodent. Adults consume approximately 3 kg/day of fresh forage. Capybaras are selective grazers, and choose plants with high protein content (González-Jiménez 1978). According to Ferraz et al. (2007), capybaras are commonly found in large banks of *H. coronarium*, using them only as shelter from predators. Although rhizomes of these species have high quality nutritional content (Clippel et al. 2008), no signs of herbivory were observed, such as impressions of dental activity or revolving the sediments near the plants. The preference for *H. coronarium* ramets in early stages of development suggests that these plants have greater palatability and fewer secondary compounds than adult ramets (Bowers & Stamp 1993).

The preferential herbivory of new ramets of *H. coronarium* could be attributed to a lower availability of other resources during the winter, when capybaras can present more opportunistic behavior than in periods of high resource abundance, as in spring (Borges & Colares 2007). This is the first record of *H. coronarium* herbivory by capybaras and also the first record of herbivory of this macrophyte outside its native range. This record reinforces the need for further studies on the relationship between herbivory and invasive plants. Besides using the stands of *H. coronarium* as habitat (Ferraz et al.

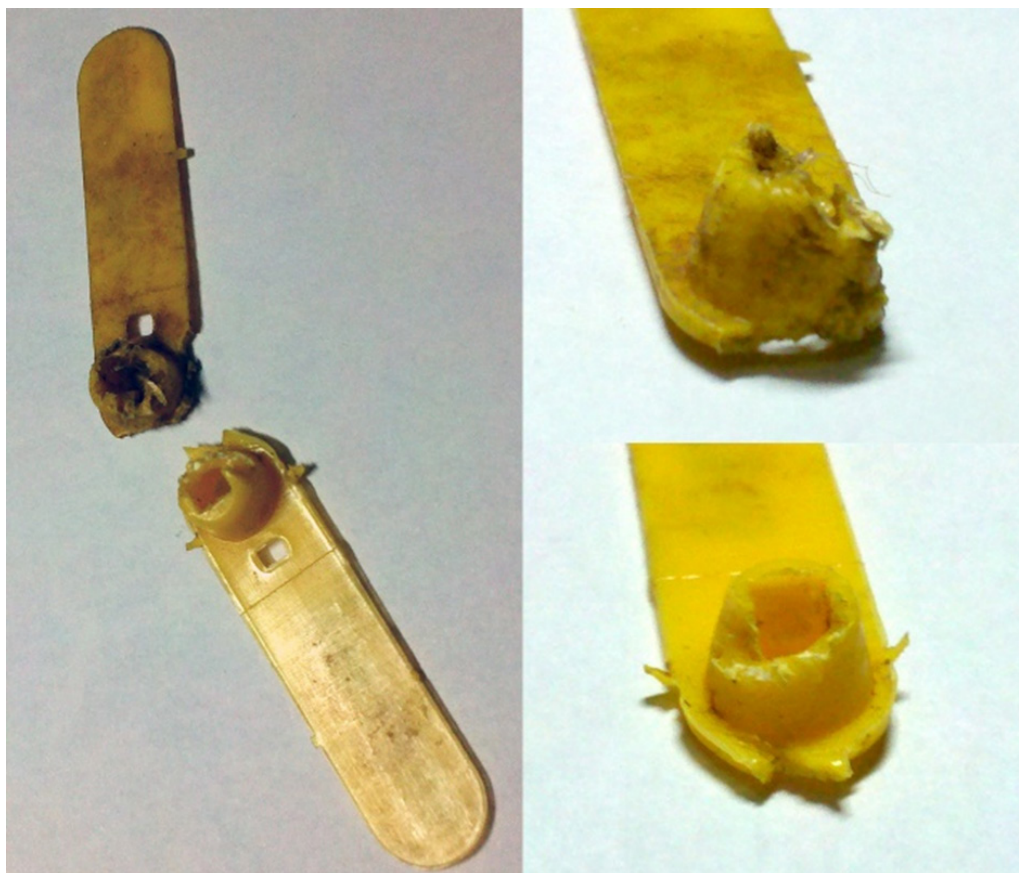


Figure 1. Numbered plastic tags bitten by capybara.

2007) we observed that capybaras can also feed on them. This could affect the competitive capacity and also the apparent competition (Dangremond et al. 2010) between these invasive and native macrophytes. In this case, *H. coronarium* could benefit capybaras by offering favorable habitat protecting them from predators and adverse microclimatic situations besides serving as abundant food resource. These benefits would provide changes in the abundance and / or distribution of populations of capybara. As a result, these changes in capybara populations could change the rate of predation on, and also affect the population dynamics of, native species used primarily as its resource (Holt 1977, Holt & Kotler 1987). Thus, these could ultimately allow the expansion of *H. coronarium*.

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