Documentation of feeding associations of the Purple Gallinule, *Porphyrio martinica* (Aves: Rallidae), and the Wattled Jacana, *Jacana jacana* (Aves: Jacanidae), with the capybara, *Hydrochoerus hydrochaeris* (Mammalia: Hydrochaeridae), facilitated by its beating behavior

Documentação de associações alimentares do frango-d'água-azul, *Porphirio martinica* (Aves: Rallidae), e jaçanã, *Jacana jacana* (Aves: Jacanidae), com a capivara, *Hydrochoerus hydrochaeris* (Mammalia: Hydrochaeridae), facilitada pelo seu comportamento de batedor

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Abstract: The capybara, *Hydrochoerus hydrochaeris*, is known to form feeding associations with different bird species. One such association involves a beating behavior, in which the animal moves through the environment while birds follow it to capture insects that are disturbed. We documented this behavior in a wetland area of Southeast Brazil, involving the already known association between the capybara and the Wattled Jacana, *Jacana jacana*, and a previously unknown association between the capybara and the Purple Gallinule, *Porphirio martinica*. The latter also fed on capybara ticks, another novel association. Expanding knowledge and documenting ecological relationships between mammals and birds contributes to both the natural history of these organisms and ecological and public health issues, as ticks are vectors of spotted fever in Southeast Brazil.

Keywords: Brazil. Guarapiranga Reservoir. Animal behavior. Public health. Spotted fever.

Resumo: A capivara, *Hydrochoerus hydrochaeris*, é conhecida pela sua associação de alimentação com diferentes espécies de aves, sendo que um dos comportamentos conhecidos é o de batedor, em que o animal se desloca pelo ambiente e as aves o seguem para capturar os insetos afugentados. Em uma região alagada do Sudeste do Brasil, conseguimos documentar esse comportamento já conhecido entre a capivara e o jaçanã, *Jacana jacana*, e ainda não conhecido entre a capivara e o frango-d'água-azul, *Porphirio martinica*, que também se alimentou dos carrapatos da capivara, outra informação inédita. A ampliação do conhecimento e a documentação das relações ecológicas existentes entre mamíferos e aves contribuem tanto com a história natural desses organismos, como com questões ecológicas e de saúde pública, pois os carrapatos são vetores da febre maculosa no Sudeste do Brasil.

Palavras-chave: Brasil. Represa do Guarapiranga. Comportamento animal. Saúde pública. Febre maculosa.

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INTRODUCTION

The capybara *Hydrochoerus hydrochaeris* (Linnaeus, 1766) is a large herbivorous and semi-aquatic rodent that occurs from northern South America (Venezuela) to southern South America (Argentina) (Emmons & Feer, 1997; Parera, 2002). The species is well known for its feeding and cleaning associations with different bird species (Macdonald, 1981; Sick, 1997; Tomazzoni et al., 2005; Queirogas, 2010; Sazima & Sazima, 2010; D'Angelo et al., 2016; Melo et al., 2018). One of the behaviors of the capybara in such associations is 'beating' — moving around the environment while birds follow to capture disturbed insects, thereby increasing their success at ingesting food (Macdonald, 1981) — although it is less frequently observed than other known associative behaviors such as serving as a hunting perch (D'Angelo et al., 2016).

Here, we provide the first documented account of the feeding association between the Purple Gallinule *Porphirio martinica* (Linnaeus, 1766) and the capybara and additional records of the known associtin between the Wattled Jacana *Jacana jacana* (Linnaeus, 1766) and capybaras.

MATERIAL AND METHODS

Data were obtained during an ornithological study in Parque Barragem de Guarapiranga (23° 40' 35.70" S/46° 42' 57.15" W, 735 m above sea level), a municipal reserve located on the right bank of the Guarapiranga reservoir, in the southern part of the city of São Paulo, Southeast Brazil. The reserve has a group of around 50 free-living capybaras and a rich community of aquatic birds. The Purple Gallinule has a poorly-known seasonal occurrence in the region, similar to what has been reported for other regions of Brazil (Somenzari et al., 2018), whereas the Wattled Jacana is a resident species. Documentation (image and video) was produced using a Canon 7D camera with a 300 mm 2.8 lens, a Kowa TSN-820 Telescope and an iPhone 13, while Leica 10x42 and Nikon Monarch 10x42 binoculars were also used for observation. The videos were deposited in the Macaulay Library (ML) online platform (Macaulay Library, n.d.).

We checked 8,564 images of the Purple Gallinule available on the online platform WikiAves (n.d.) and 8,014 in the Macaulay Library (except for those taken in countries where the capybara does not occur), until March 27 2024.

RESULTS

On 21 June 2023, we observed a capybara in a flooded area with a Purple Gallinule behind it looking for food in the substrate. The bird followed the capybara as it moved, capturing food in the disturbed flooded area, even getting beneath the animal at times (Figure 1). The bird performed this behavior for about 30 minutes. At a certain point, when the capybara was not moving, the bird pecked the side of its body twice, as if capturing something in its fur, presumably a tick (Arachnida: Ixodidae) or other ectoparasite.

On 3 August 2023, we observed two capybaras in the same flooded area as the individual observed on 21 June 2023, with a Purple Gallinule (two individuals) and a Wattled Jacana (one individual) looking for food around the animals, especially when they moved and disturbed the substrate (videos – Schunck, 2023a, 2023b, 2023c). The Purple Gallinule went beneath a capybara, between its legs (video - Schunck, 2023d), while the Wattled Jacana even pecked at the capybara's side (video - Schunck, 2023e), indicating the capture of some type of food, probably a tick. The birds accompanied and followed the capybaras for around 30 minutes, even foraging on the surrounding substrate when the capybaras were not moving.

Other bird species were observed during the two days of observations, landing on the capybaras and probably feeding on their ticks. These bird species included the Yellow-headed Caracara *Milvago chimachima* (Vieillot, 1816) (Falconidae), the Smooth-billed Ani *Crotophaga ani* Linnaeus, 1758 (Cuculidae) and the Cattle Tyrant *Machetornis rixosa* (Vieillot, 1819) (Tyrannidae).

Figure 1. Purple Gallinule *Porphirio martinica* feeding around a capybara *Hydrochoerus hydrochaeris* including during its beating behavior as it moves around. Sequence from A to D. Photos: Fabio Schunck (2023).

About the images consulted on the WikiAves and Macaulay Library platforms, we found only five images of the Purple Gallinule (all on the WikiAves platform and taken in Brazil) close to some aquatic mammal, including two capybaras, one nutria *Myocastor coypus* (Molina, 1782), one cavy *Cavia aperea* (Erxleben, 1777), and one domestic bovine *Bos taurus* Linnaeus, 1758 (Table 1).

DISCUSSION

The Wattled Jacana is known to feed in association with capybaras (D'Angelo et al., 2016), being the species that most commonly follows these semi-aquatic mammals to look for food during their beating behavior (Macdonald, 1981). The Purple Gallinule, on the other hand, has not been mentioned in the literature as performing any such

Table 1. List of images available on the WikiAves platform of the Purple Gallinule *Porphirio martinica* near some species of mammal.

Mammal species	Reference
Capybara *Hydrochoerus hydrochaeris*	Snyder (2011)
	Loures (2023)
Domestic bovine *Bos taurus*	Nicolletti (2022)
Nutria *Myocastor coypus*	Miranda (2022)
Cavy *Cavia aperea*	Brondani (2019)

associative behaviors, including feeding on capybara ticks, making this a record for this interspecific relation.

This feeding association between the Purple Gallinule and the capybara was somewhat expected, as this bird species has behaviors similar to those of the Wattled Jacana and lives in the same type of environment, together with capybaras. The lack of records may be associated with several issues, such as the lower abundance (in general) of the Purple Gallinule relative to the Wattled Jacana in most localities of occurrence; its behavior of staying among aquatic vegetation and being less exposed; its undertaking of seasonal movements and disappearing from some locations at certain times of the year, thereby reducing chances of detection; or it may just be a non-typical behavior for the species. D'Angelo et al. (2016) found that bird feeding in association with capybara beating behavior was less evident than other feeding categories, due to the fact that the observations were made in a capybara resting area. Thus, this bird behavior may be less detectable in the field (as reflected in the low number of available images), and needs more attention from bird researchers, observers and photographers.

The few images available on online platforms of the Purple Gallinule near mammals shows that, in addition to capybaras, these birds may have some type of feeding associations with other semi-aquatic mammals or those that come close to water, such as nutria, cavy and even domestic species (cattle), a hypothesis that also needs to be better investigated.

CONCLUSIONS

Capybaras, ticks and spotted fever are directly related (Luz et al., 2019). Thus, the discovery of yet another bird species that may feed on capybara ticks advances the understanding of the natural history of these organisms and can contribute to addressing health issues, such as the occurrence and control of spotted fever in Brazil.

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AUTHORS' CONTRIBUTION

F. Schunck contributed to project administration, conceptualization, research and data acquisition, data curation, and writing (original draft, review and editing); and E. P. V. Santos contributed to data acquisition and writing (review).