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PINK FEUD: FIRST RECORD OF AGONISTIC INTERACTION BETWEEN CHILEAN FLAMINGO (*Phoenicopterus chilensis*) AND ROSEATE SPOONBILL (*Platalea ajaja)* IN SOUTHERN BRAZIL

*Disputa rosada: Primer registro de interacción agonística entre el Flamenco Chileno (*Phoenicopterus chilensis*) y la Espátula Rosada (*Platalea ajaja*) en el sur de Brasil*

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Abstract. During an observational study in 2019, we documented for the first time an agonistic interaction between a juvenile Chilean Flamingo (*Phoenicopterus chilensis*) and a group of Roseate Spoonbills (*Platalea ajaja*) at Lagoa do Peixe National Park, a protected area in southern Brazil. We discuss the potential drivers of this interaction, considering both interspecific competition and the influence of the flamingo's age and the color similarities between the two species.

Keywords. Behavior, Color similarities, Competition, Lagoa do Peixe National Park, Observational study.

Resumen. Durante un estudio observacional en 2019, documentamos por primera vez una interacción agonística entre un Flamenco Chileno (*Phoenicopterus chilensis*) juvenil y un grupo de Espátulas Rosadas (*Platalea ajaja*) en el Parque Nacional Lagoa do Peixe, un área protegida en el sur de Brasil. Discutimos los posibles factores que impulsaron esta interacción, considerando tanto la competencia interespecífica como la influencia de la edad del flamenco y las similitudes en la coloración entre ambas especies.

Palabras clave. Comportamiento, Similitudes en la coloración, Competencia, Parque Nacional Lagoa do Peixe, Estudio observacional.

INTRODUCTION

Agonistic behaviors and interspecific competition are widespread among birds, often due to conflicts over space, food, and other limited resources (Cody, 1974; Wesolowski, 2003; Kath, 2009). The occurrence and intensity of such behavior depend on environmental conditions and the life history traits of each species. These interactions are strongly influenced not only by resource availability but also by the social structure of the species involved (Robinson and Terborgh, 1995; Rose and Soole, 2020). Social birds that form large flocks tend to exhibit higher levels of intraspecific competition, as competition within the group generally outweighs that with other species (Peiman and Robinson, 2010; Wood et al., 2020).

The Chilean Flamingo (*Phoenicopterus chilensis*) is a highly social waterbird that inhabits lakes and shallow lagoons across South America, forming flocks ranging from tens to thousands of individuals (del Hoyo, 1992; Anderson, 2017). Like other flamingo species, it is well known for its distinctive morphology and pinkish coloration, a trait linked to its diet of red algae, crustaceans, and other aquatic microorganisms (Bildstein et al., 1991; Zweers et al., 1995; Martin et al., 2005). Reports of positive interspecific interactions involving the Chilean Flamingo are common, both in the wild and captivity, including the formation of mixed flocks with other flamingo species (e.g., Andean Flamingo [*Phoenicoparrus andinus*] and American Flamingo [*Phoenicopterus ruber*]) and diverse aquatic birds, such as egrets and plovers (Bildstein et al., 1993; Barisón et al., 2014; Anderson, 2017; Rose and Croft. 2017). Due to its high sociability and tolerance, aggressive interactions with other bird species are scarce (Anderson, 2017; Rose and Croft, 2017).

A species that shares a similar ecological niche with the Chilean Flamingo is the Roseate Spoonbill (*Platalea ajaja*) (Mathew et al., 2014). This medium-sized waterbird is characterized by its highly specialized spoon-shaped bill, which facilitates the capture of crustaceans, aquatic insects, and microalgae in shallow waters (Lorenz et al., 2009; Lorenz, 2014; Britto and Bugoni, 2015). Roseate Spoonbills occur from southern United States to South America, typically forming flocks ranging from tens to hundreds of individuals, similar to the Chilean Flamingo (Mathew et al., 2014). Despite the limited research on interspecific interactions involving this species, there are no documented cases of aggressive encounters with other birds, except for instances of nest predation by vultures and raptors (Allen, 1942; Lima et al., 1993).

Here, we report the first documented case of an agonistic interaction between a Chilean Flamingo and Roseate Spoonbills in a national park in southern Brazil. We discuss the potential ecological and behavioral drivers of this apparently rare interaction, contributing to a better understanding of interspecific dynamics among social waterbirds.

METHODS

The observations were conducted in southern Brazil at Lagoa do Peixe National Park (31° 19′ 0″ S; 51° 1′ 0″ W), located between the municipalities of Mostardas and Tavares in the state of Rio Grande do Sul (Fedrizzi and Carlos, 2011). This park encompasses a large, shallow lagoon (mean depth: 30 cm) extending for approximately 35 km, surrounded by diverse ecosystems, including dunes, sand fields, natural grasslands, and periodically flooded areas (Knak, 1999). Lagoa do Peixe serves as a critical stopover for thousands of migratory birds that use the area for foraging and resting during the non-breeding season, while also supporting a diverse assemblage of resident bird spe-

cies. Due to its ecological significance, the park is considered one of the most important conservation areas in southern Brazil (Harrington et al., 1986; Antas, 1994; Somenzari et al., 2018). Among the bird species frequently recorded in the lagoon are the Royal Tern (*Thalasseus maximus*), Red Knot (*Calidris canutus*), Sanderling (*Calidris alba*), Coscoroba Swan (*Coscoroba coscoroba*), and Black-necked Swan (*Cygnus melancoryphus*), in addition to the Chilean Flamingo (*Phoenicopterus chilensis*) and Roseate Spoonbill (*Platalea ajaja*) (Gonçalves, 2009; Fedrizzi and Carlos, 2011).

Observations were conducted in a region known as "Barra," where the lagoon connects to the sea, forming an ecotone characterized by high algal and plankton diversity, which enhances local food availability (Knak 1999) (Figure 1). The observed interaction occurred on the morning of November 24, 2019, at 10:44 h. Data collection was carried out using binoculars. At the time of observation, a group of 14 Chilean Flamingos was actively foraging in the area, maintaining close proximity to one another and displaying species-typical feeding behaviors such as foot trembling and stomping. Nearby, several other waterbird species, including American Oystercatchers (*Haematopus palliatus*), Black Skimmers (*Rynchops niger*), Sanderlings, and various plover species, were present, either resting or foraging in small flocks. A group of eight Roseate Spoonbills was also observed in the vicinity. No agonistic interactions were recorded prior to the event described in this study.

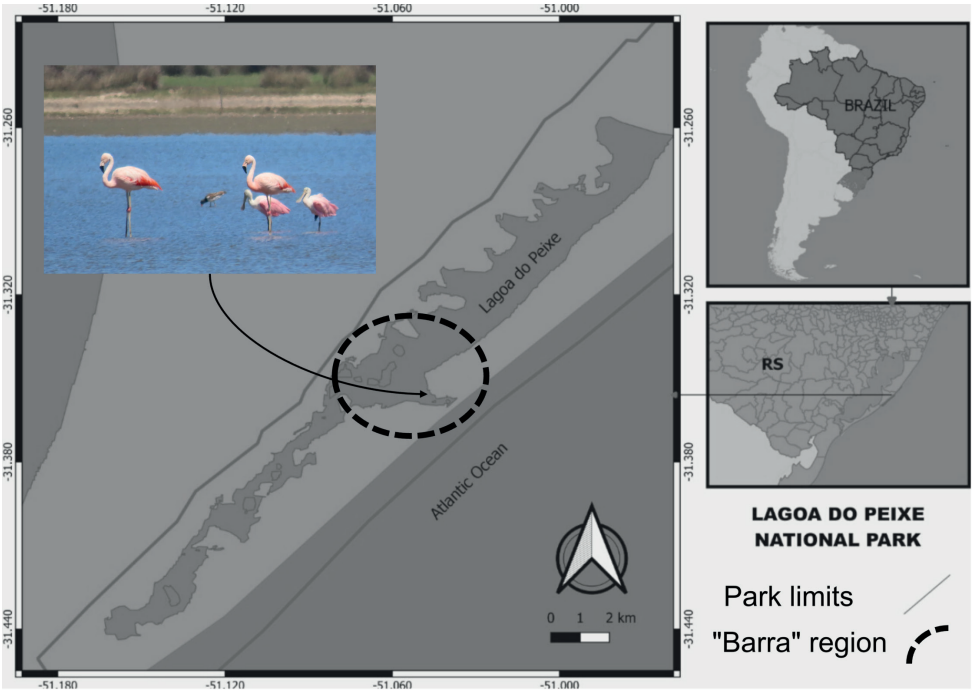

Figure 1 - Map showing the area and boundaries of Lagoa do Peixe National Park, located on the central coast of Rio Grande do Sul state, Southern Brazil. The point marks the "Barra" region, where the lagoon meets the sea and where interactions between Chilean Flamingos and Roseate Spoonbills were recorded. The photograph within the image, taken in the same area in 2023, depict adult Chilean Flamingos and Roseate Spoonbills sharing foraging sites. Photograph by HCD.

RESULTS

At 1044 h, a group of Roseate Spoonbills moved toward the area where the Chilean Flamingos were foraging. As the spoonbills approached, one flamingo (likely a juvenile, as indicated by its grayish plumage) adopted an alert posture. Despite this reaction, the spoonbills continued wading without displaying any response. The juvenile flamingo maintained its alert stance for nearly a minute, while the rest of the flock continued foraging undisturbed (Figure 2a).

As the spoonbills drew closer, the alert

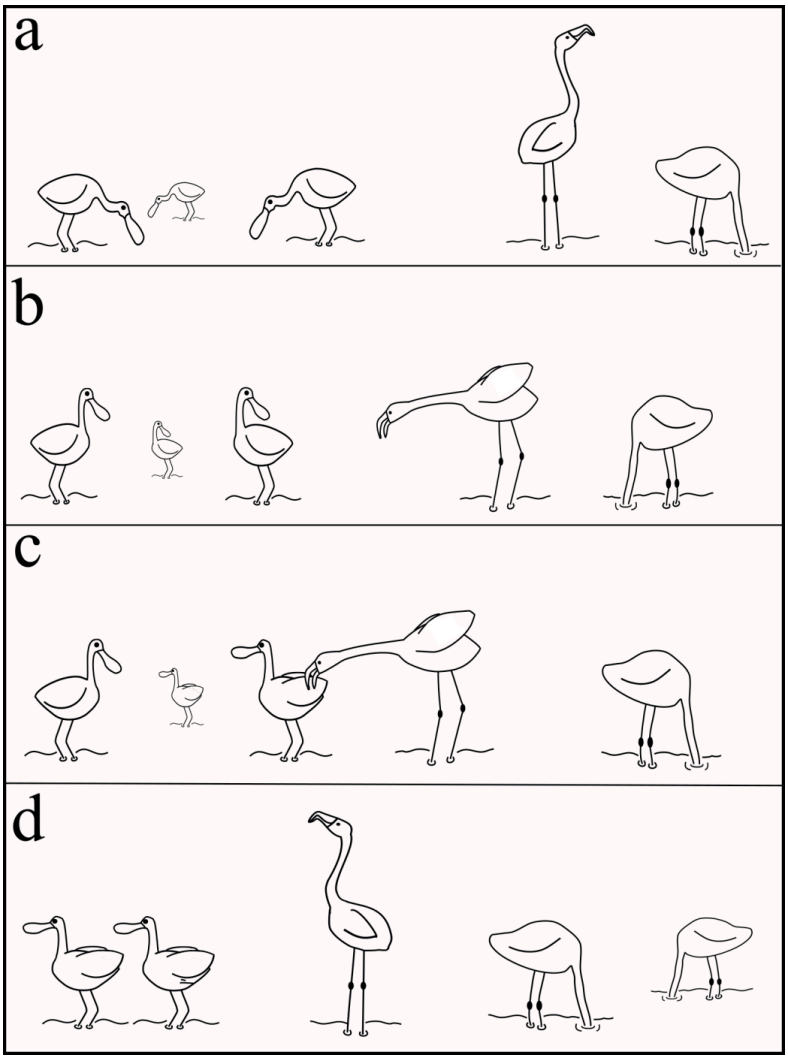

Figure 2 - Illustration representing different moments of the interaction between the young Chilean Flamingo and the Roseate Spoonbill group. **a)** The moment where the Chilean flamingo notices the approximation of the group of Roseate Spoonbills, displaying alert posture; **b)** The young Chilean Flamingo individuals runs towards the group of Roseate Spoonbills, displaying a threatening behavior; **c)** The moment where the physical interaction occurs; **d)** The group of Roseate Spoonbills runaway from the area and the flamingo displayed vigilance behavior again, returning to forage after.

flamingo initiated a rapid approach toward the group, with its neck slightly extended forward and its wings partially open. This behavior closely resembled an intraspecific agonistic display known as "chasing" (Delfino and Carlos, 2021). The sudden movement triggered an alert response in the spoonbills (Figure 2b). The flamingo quickly reached one of the spoonbills and pecked its back (Figure 2c). In response, the spoonbills fluttered and moved away from the area, maintaining a safe distance from the flamingo group and avoiding further physical interaction. The aggressive flamingo ceased its chase but remained in an alert posture for nearly a minute before rejoining its flock and resuming feeding (Figure 2d).

Throughout the interaction, the remaining flamingos exhibited no significant reaction, continuing their feeding and locomotion behavior as usual. For the remainder of the day, the spoonbill group did not return to the area and was not observed in Barra until after the flamingos had left the site.

DISCUSSION

Chilean Flamingos and Roseate Spoonbills frequently share similar habitats, inhabiting aquatic environments such as lakes and lagoons (Lewis. 1983; Powell. 1987; del Hoyo. 1992; Aguilar et al., 2019). These species exhibit substantial niche overlap, as both feed primarily on aquatic invertebrates and plankton (Arcos et al., 2019; Aldana-Ardila and Carlos, 2021). In captivity, other flamingo species, such as the American and Greater Flamingo, are known to coexist with Roseate Spoonbills without reports of agonistic interactions (Brown and King, 2005). To date, no prior records describe interspecific aggression between Chilean Flamingos and Roseate Spoonbills, as observed in this study. Two main hypotheses are proposed to explain this unusual interaction: one based on competition and the other on the age of the flamingo.

Species that share the same environment and have similar ecological niches are expected to compete for resources such as food, space, and water. This competition is often marked by intraspecific agonistic interactions, which can involve both physical aggression and threat displays (Hurd and Enquist, 2001; Dhondt, 2012; Powell et al., 2020). A plausible explanation for the observed interaction is that the two species were competing for food resources in Barra, particularly plankton and other aquatic invertebrates such as crustaceans and annelids. However, this hypothesis is weakened by the fact that Barra is a highly productive ecosystem, with abundant algae and aquatic invertebrates, especially during spring and summer when rising temperatures induce chemical and physical changes that enhance resource availability (Singh and Singh, 2015; Scrine et al., 2017; Aldana-Ardila and Carlos 2021).

In addition, Chilean Flamingos in Barra coexist with numerous other bird species that share similar dietary preferences, including Stilts, Oystercatchers, and Sandpipers, without exhibiting agonistic behavior toward them (Delfino et al., 2023; HCD, pers. obs.). This suggests that interspecific competition between Chilean Flamingos and Roseate Spoonbills is unlikely to be a significant factor in their interactions. However, competition cannot be entirely ruled out, as it may involve food selectivity or competition for less obvious resources (Cody, 1974; Jankowski et al., 2012). Given these considerations, individual characteristics (particularly age) may provide a more compelling explanation for this interaction.

Chilean Flamingo flocks at Lagoa do Peixe National Park comprise both adult and juvenile individuals during the non-breeding season (Somenzari et al., 2018;

Delfino et al., 2023). Juvenile individuals, typically 4–5 months old, can be distinguished by their gray and brown dorsal plumage, with salmon-colored inner wing feathers (Chiale et al., 2018). The individual involved in this interaction exhibited these characteristics, confirming its juvenile status. In contrast, the rest of the flock consisted of older individuals with pink plumage that did not display any response to the presence of spoonbills.

In other flamingo species, agonistic social interactions emerge during the pre-reproductive phase, primarily among dominant males and juveniles, with threat displays commonly observed as part of social skill development (Perdue et al., 2011; Hinton et al., 2013). Juvenile males often position themselves on the periphery of the flock to avoid conflicts with dominant individuals (HCD, pers. obs.), a behavior consistent with the observed flamingo's location during this interaction. It is likely that this particular juvenile perceived the approaching Roseate Spoonbills as a threat, prompting an aggressive response.

Beyond the physical presence of the spoonbills, the similarity in coloration between the two species may have influenced this interaction. Flamingos did not exhibit aggression toward any other bird species in the area, suggesting that color resemblance may serve as a behavioral trigger for interactions (both aggressive and non-aggressive) between individuals (Göth and Houber, 2004). Juveniles, in particular, may be more susceptible to such triggers, as their ability to accurately distinguish stimuli is still under progress (Groves, 1978; Göth and Houber, 2004). This could explain why the juvenile flamingo reacted aggressively, whereas the adult flamingos remained indifferent to the spoonbills' presence.

Regardless of whether the interaction was driven by competition or age-related behavioral factors, this study documents the first known case of agonistic behavior between wild Chilean Flamingos and Roseate Spoonbills. Such records contribute to a broader understanding of avian behavioral ecology, highlighting unresolved questions about interspecific interactions in natural environments with minimal human influence. In addition, these observations highlight the importance of further research in behavioral ecology and ethology, particularly through naturalistic field studies outside of captivity

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