

# Occupation of Monk Parakeet (*Myiopsitta monachus*) nest cavities by House Sparrows (*Passer domesticus*) in Rio Grande do Sul, Brazil

OCUPACIÓN DE CAVIDADES DE LA COTORRA MONJE (*MYIOPSITTA MONACHUS*) POR GORRIONES COMUNES (*PASSER DOMESTICUS*) EN RIO GRANDE DO SUL, BRASIL

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## Abstract

Occupations of nest cavities in a Monk Parakeet community nest by several House Sparrows are reported. Only male sparrows were included in the aggressive behavior and attacked the larger parrots together. To the best of my knowledge, the observed occupation behavior in the House Sparrow has not been reported previously. Furthermore, this is the first observation of an aggressive occupation of nest cavities in a Monk Parakeet community nest by House Sparrows. The two species are common and well studied, but there is no information about their direct competition by nesting places.

**Keywords:** aggressive behavior, competition, introduced species, nest usurpation.

## Resumen

Se reporta la ocupación de cavidades de un nido comunal de la Cotorra Monje por varios Gorrioncillos. Solo Gorrioncillos masculinos mostraron un comportamiento agresivo y atacaron (en grupo) a Cotorras Monje. Hasta el momento tal ocupación no se ha reportado antes en la literatura. Además, esta es la primera observación de una ocupación agresiva de cavidades de un nido comunal de la Cotorra Monje por Gorrioncillos. Las dos especies son comunes y bien estudiadas pero no hay información sobre su competición directa por sitios para anidar.

**Palabras clave:** competencia, comportamiento agresivo, especies invasivas, usurpación de nido.

## Introduction

The Monk Parakeet (*Myiopsitta monachus*) and the House Sparrow (*Passer domesticus*) have wide distributions being exotic to some regions of the world (e.g., Stattersfield & Capper 2000). In southern Brazil, the Monk Parakeet is native whereas the House Sparrow is an introduced species to this region. The Monk Parakeet has a large global range with a native distribution in the lowlands of southern South America east of the Andes from Bolivia to Patagonia (BirdLife International 2009b, Juniper & Parr 1998). Furthermore, this parrot has been introduced to several countries where naturalized breeding populations has been established including the USA, Chile, several European countries, Kenya, Japan, and several islands of the Caribbean (BirdLife International 2009b, Buhmann-Deever *et al.* 2007, Butler 2005, Lever 1987, Munoz & Real 2006, Pruett-Jones & Tarvin 1998). The Monk

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Parakeet is an abundant resident in the southern and western two-thirds of Rio Grande do Sul, occurs less frequently toward northeast, and is not known beyond Porto Alegre (Belton 1984, 1985, Peña & Rumboll 1998). The principal habitats of these parrots in their native range are areas of low rainfall in light open forest, savanna, palm groves, thorn scrub, croplands, and fruit orchards. This species is often associated with human-altered landscapes, like pastures or arable land, and easily adapt to urban environments (BirdLife International 2009b, Bull 1973).

The association of the parrot to urban environments seems stronger in its exotic range where it mainly occurs in parks or is even restricted to urban areas (e.g., Bull 1973, Burger & Gochfeld 2007, Sol *et al.* 1997, Strubbe & Matthysen 2009). On the other hand, the Monk Parakeet is considered to be an invasive species in the

USA where expanding and growing populations are observed (Van Bael & Pruett-Jones 1996, Russello *et al.* 2008). Monk Parakeet establishment probability will increase in the future and the parrot may become an invasive species also for Europe because global warming is likely to cause a decrease in the number of frost days and because urbanization and human populations are still increasing (Strubbe & Matthysen 2009). The species also expanded its range in Brazil in recent times. The widespread introduction of *Eucalyptus* monocultures facilitates its expansion (Forshaw 2006, Navarro *et al.* 1992), but also releases are reported (*e.g.*, Amorim & de Queiroz 2006).

Monk Parakeets are the only species of the family Psittacidae that does not nest in existing cavities (Lever 1987). Principal males build a large domed stick nest with multi-chambered structure on trees, electrical power poles and other types of structures. The nests are often clustered in the same or nearby trees and form colonies. Sometimes, they also attach nest cavities on other large nests like stork nests of the Jabiru (*Jabiru myzateria*) (Burger & Gochfeld 2005). Every cavity belongs to a pair or sometimes a small group of parrots. Breeding occurs only cooperatively (Eberhard 1998). Besides Monk Parakeets, only the extinct Carolina Parakeets (*Conuropsis carolinensis*) constructed nests in the parrot family (Snyder 2004).

The native range of the House Sparrow includes most of Europe, Asia, and the Mediterranean region. Furthermore, it has been introduced to North America, Central America, many islands of the Caribbean, most of South America, South Africa, eastern Australia, New Zealand, Hawaii, and further islands including some with extreme cold climate as South Georgia and the South Sandwich Islands (BirdLife International 2009a, Lever 1987). First introduced to Rio de Janeiro in 1906 to combat the mosquito problem, it is recently distributed from the tropical north of Brazil, where it could adapt to the humid hot climate (Borges *et al.* 1996, Sick 1957, Smith 1973, 1980), to the colder subtropical south (Belton 1984, 1985, Peña & Rumboll 1998). Its spread in Brazil has always been associated with men. House Sparrows were repeatedly released (*e.g.*, in 1963 to the northeastern city Recife; Smith 1973), spread along highways (*e.g.*, 500 miles within six years along the Belém-Brasília highway; Müller 1967), and ‘hopped’ from town to town (*e.g.*, from Argentina, where it was

introduced in 1867, along the Paraguay River to the Brazilian state Mato Grosso; Sick 1959).

In Rio Grande do Sul, the House Sparrow is an urban centre dweller, thus occurring in cities, towns, and small rural settlements across the state (Belton 1984, 1985, Peña & Rumboll 1998). The House Sparrow is a non-migratory sedentary bird that is primarily associated with urban environments in its native (Cramp & Simmons 1977) and its exotic range (*e.g.*, Leveau & Leveau 2005). The association with urban environments, combined with its sedentary behavior, is so strong that House Sparrows are used as biomonitors for heavy-metals (Gragnaniello *et al.* 2001, Swaileh & Sansur 2005). House Sparrows have been found to become a dominant species in the communities where they occur all over the world (*e.g.*, Clergeau *et al.* 1998, Emlen 1974, Gavareski 1976, Stattersfield & Capper 2000, White *et al.* 2005), partly because they readily adapt to novel situations (see Martin & Fitzgerald 2005).

The House Sparrow prefers to breed in cavities, like tree holes, and in community with other individuals. Sometimes, also unused nests of other bird species are used (Anderson 2006, Glutz von Blotzheim & Bauer 1997).

Although it is normally a very social bird that often forms flocks with other bird species (Anderson 2006), it sometimes usurps active nests of other birds by displacing the owners (*e.g.*, Burger 1976), removing eggs or killing chicks and even adults (*e.g.*, Earle 1985, Gowaty 1984, Weisheit & Creighton 1989). In this work, aggressive occupations of several Monk Parakeet nest cavities by male House Sparrows are reported. The results contribute to the understanding of the natural history of both species.

## Results

On 15 November 2008, a battle among five male House Sparrows and three Monk Parakeets was observed. The location was a nesting association of approximately 50-60 Monk Parakeets on an electric power pole near the city of Mostardas (31°5'S, 50°54'W; 12 m.a.s.l.). Mostardas has about 12,000 inhabitants and is located between the coastal freshwater sea ‘Lagoas dos Patos’ and the Atlantic Ocean. The surrounding is mainly composed of arable land as rice cultivations (<http://www.mostardas.rs.gov.br>). The group of male sparrows attacked the parrots aggressively, in spite of their larger size. At the beginning, all five House

Sparrows chased away one single Monk Parakeet and one House Sparrow remained in the cavity. Then, the remaining House Sparrows did the same with two more Monk Parakeets. At the end, three Monk Parakeets lost their nest cavities in less than five minutes, while the two unsuccessful House Sparrows pushed along. The three invaded nest cavities were located at the bottom of the community nest. I observed this scene for a further half an hour and the three Monk Parakeets did not try to repossess their nests. Instead, they looked for unoccupied nest cavities at the top of the community nest.

## Discussion

To the best of my knowledge, the observed occupation behavior in the House Sparrow and the aggressive nest occupations in a Monk Parakeet community nest by House Sparrows have not been previously reported. I reviewed the literature (i) using 'ISI Web of Science', (ii) 'Google Scholar' (to include also gray literature), and (iii) reviewed following journals (in alphabetical order): Ararajuba/Revista Brasileira de Ornitologia, El Hornero, Journal of Field Ornithology, Journal of Ornithology, Ornitologia Neotropical, The Auk, The Condor, Wilson Bulletin/Wilson Journal of Ornithology.

Lindell (1996) defined the term 'nest usurpation' as a "nesting strategy, in which species take over active nests or nest holes of other species for breeding purposes." It remained unclear if the occupied cavities were later used for breeding by the House Sparrows. However, it is likely that these occupations resulted in a 'real' nest usurpation *sensu* Lindell (1996) since several publications deal with the usurpations of active nests by House Sparrows (*e.g.*, Burger 1976, Earle 1985, Gowaty 1984, Weisheit & Creighton 1989). Furthermore, the display of House Sparrows often begins with males taking up suitable nesting sites and calling for females (Anderson 2006, Glutz von Blotzheim & Bauer 1997). Lindell (1996) recapitulated cases of nest usurpation around the world. In this review the House Sparrow is recognized together with the European Starling (*Sturnus vulgaris*) as the most aggressive introduced species prone to usurping nests. MacGregor-Fors *et al.* (2009) found that invasions by the House Sparrow negatively affect the structure, composition, and richness of Neotropical bird communities.

The observed united and male-only aggressions could be a part of the behavioral mechanism of nest usurpation in the House Sparrow. It is reported that the House Sparrow uses nests of another native species in Rio Grande do Sul, the Rufous Hornero (*Furnarius rufus*), and competes with the nest owners (Belton 1985, Burger 1976). Burger (1976) reported on a displacement of adult Rufous Horneros by a pair of sparrows due to repeated annoying. Other authors observed further tactics of nest usurpation. House Sparrows removed eggs and killed chicks and even adults of host species in their native range (*e.g.*, Barn Swallows (*Hirundo rustica*); Weisheit & Creighton 1989) and their exotic range (*e.g.*, Eastern Bluebirds (*Sialia sialis*) in North America or South African Cliff Swallows (*Hirundo spilodera*); Earle 1985, Gowaty 1984). Unfortunately, most authors did not mention the sex of the sparrows that took part in nest usurpations. Weisheit & Creighton (1989) observed several cases, a single male sparrow removed eggs or killed nestlings. Likewise, Gowaty (1984) reported on a case, a single male sparrow harmed several chicks. Anyhow, as far as I know, no observations of several males attacking adult host species together were made.

The Monk Parakeet occupies its nest all along the year for roosting as well as breeding in Rio Grande do Sul (Belton 1984). Therefore, it is difficult to estimate exact breeding dates for southern Brazil. However, the breeding season of Monk Parakeets has been observed to happen between October and May in Argentina (Aramburu 1997, Navarro *et al.* 1992). Hence, it is likely that also the Monk Parakeets of Mostardas bred on 15 November and eggs or nestlings may have been affected by the occupations. It is likely that the affected Monk Parakeets were females that incubated or were in an early nestling period because only one parrot was observed per cavity. In later nesting periods, both sexes tend the nestlings (Eberhard 1998). However, it was impossible to determinate the sex of the parrots because Monk Parakeets are sexually monomorphic (Forshaw 2006, Juniper & Parr 1998). A differentiation is only possible with DNA probes (Eberhard 1998).

Bird species reported nesting in Monk Parakeet nest chambers include several species: American Kestrels (*Falco sparverius*) and Speckled Teals (*Anas flavirostris*) (Belton 1984, Eberhard 1998, Dabenne 1918, de Lucca 1984, Port & Brewer 2004, Port & McKinney 2001), Tree Ducks (*Dendrocygna* spp.) (Friedman 1927), Spot-winged Falconets (*Spizapteryx circumcincta*) (Martella & Bucher 1984), Guira Cuckoo (*Guira guira*), White Monjita (*Xolmis irupero*),

Screaming Cowbird (*Molothrus rufoaxillaris*), and Baywing (*Agelaioides badius*) (Martella *et al.* 1985). Besides birds, even small mammals use cavities in Monk Parakeets nests like the White-eared Opossum (*Didelphis albiventris*), a potential predator of the parrots (Martella *et al.* 1985). Eberhard (1998) observed American Kestrel pairs took over two nests. Martella & Bucher (1984) also noted that Monk Parakeets abandoned all nests usurped by Spot-winged Falconets. This behavior seems reasonable because these two bird species are potential predators of the parrots (Nores 2009). Nores (2009) observed Common Pigeons (*Columba livia*) nesting in Monk Parakeet nests. In only one occasion, the parrots abandoned their nests as pigeons became established, in most of the other cases, there appeared to be a harmonious coexistence between parrots and pigeons, which nested simultaneously. In general, Monk Parakeets are social birds and tolerant of having other birds near their nests (Eberhard 1998).

Hence, may Monk Parakeets are especially sensitive to usurpation by hollow nesting invasive birds? Nores (2009) noted that in some cases parrots defended their nests against pigeons by blocking entrances with thorny sticks or making tunnels narrower. In addition, Monk Parakeets successfully defended their nests against Speckled Teals (Port & McKinny 2001), Guira Cuckoos, Screaming Cowbirds, and Baywings (Martella *et al.* 1985). Therefore, it seems controversial if Monk

Parakeets are especially sensitive to nest usurpation. Furthermore, only unused nest cavities were used by several bird species in several cases

Nest usurpation can also lead to a nesting association when different sections of the nest are used simultaneously by the usurper species and the host species. Such associations may result in more individuals guarding the nest (Lindell 1996). Some studies also demonstrate greater reproductive success for individuals nesting in interspecific associations (*e.g.*, Burger 1984). There is no information on community nesting of Monk Parakeets and House Sparrows. Lorenzo (1993) reported on community nesting of the closely related Spanish Sparrows (*Passer hispaniolensis*) in Monk Parakeet nests on the Canary Islands. However, he did not observe any aggressions between the sparrows and the parrots. Therefore, a nesting association by Monk Parakeets and House Sparrows would not be surprising.

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