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## Squirrel nest usurped by parakeet: An urban interaction between two native species

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**Abstract**

Interspecific interactions play a major role in the survival of a species and hence shaping and maintaining ecosystem and its biodiversity. However, such studies face lot of challenge in obtaining direct evidence often relying on anecdotal observations. We report an observation on nest usurping and occupation by rose-ringed parakeet *Psittacula krameri* on the northern palm squirrel *Funambulus pennantii* from an urban park in eastern India. This observation contributes to our understanding of how urban environments shape the behaviour and interactions of local wildlife species.

**Keywords:** *Funambulus pennantii*, *Psittacula krameri*, urban park, squirrel-bird interaction

**1. Introduction**

Breeding, hence abundance in many avifauna species are limited due to dearth of nesting habitat thus resulting in inter and intraspecific competitions. Most research has been directed toward the effects of interspecific competition between bird species, there is a paucity of information regarding their interactions with mammals (Robinson and Terborgh, 1995; Mori *et al.*, 2013; Guillaumet and Russell, 2022) <sup>[18, 16, 6]</sup>. Nonetheless, obtaining direct evidence of such interaction among species is frequently challenging and usually relies on anecdotal observations (Strubbe *et al.*, 2011) <sup>[20]</sup>. The rose-ringed parakeet, *Psittacula krameri* is generally not considered a territorial species, but it may display aggressive and antagonistic behaviour towards other birds or animals that approach its nests during the breeding season (Covas *et al.*, 2017) <sup>[4]</sup>. Rose-ringed parakeets have been observed taking possession of natural nesting cavities by displacing honey bee (*Apis mellifera*) swarms, bats, and other birds (Hernández-Brito *et al.*, 2014a; Menchetti *et al.*, 2016) <sup>[7, 14]</sup>. Mori *et al.* (2013) <sup>[16]</sup> observed red squirrels (*Sciurus vulgaris*) hunting chicks at two nests of rose-ringed parakeets and an adult Barraband's parakeet (*Polytelis swainsonii*) caused the death of an adult red squirrel in Italy. In another report, it is documented that rose-ringed parakeets killed an adult red squirrel in France (Menchetti and Mori, 2014) <sup>[13]</sup>. Menchetti *et al.* (2014) <sup>[15]</sup> documented a rose-ringed parakeet's fatal attack on a Leisler's bat (*Nyctalus leisleri*) in Italy. Hernández-Brito *et al.* (2014b) <sup>[8]</sup> reported several cases of rose-ringed parakeets attacking and, in some instances, causing the death of black rats (*Rattus rattus*) in Spain. Joshi and Puri (2023) <sup>[9]</sup> observed interspecific competition between northern palm squirrels and rose-ringed parakeets for nesting sites in India. We report an observation on nest usurping and occupation by rose-ringed parakeets on the northern palm squirrel *Funambulus pennantii* from an urban park in eastern India.

**2. Materials and Methods**

The observations occurred in Banabitan (Central Park), Kolkata (22.588806° N, 88.415821° E), West Bengal, India on 24 November 2023, during a scheduled field-work aimed to assess interactions among avifauna. The area of the park is about 100 acres with a large water body at the centre. The water body is surrounded by trees, shrubs and herbs. We observed the interaction at a nest box attached above ground at 9.3 m on an African tulip tree (*Spathodea campanulata*). As reported by the park ranger, the nest box was earlier occupied by common myna (*Acridotheres tristis*). After the breeding season, the common myna left the box and individuals of northern palm squirrel occupied the nest box. We noted the observations from the initial point of interaction as the number of incidences every 10 minutes.

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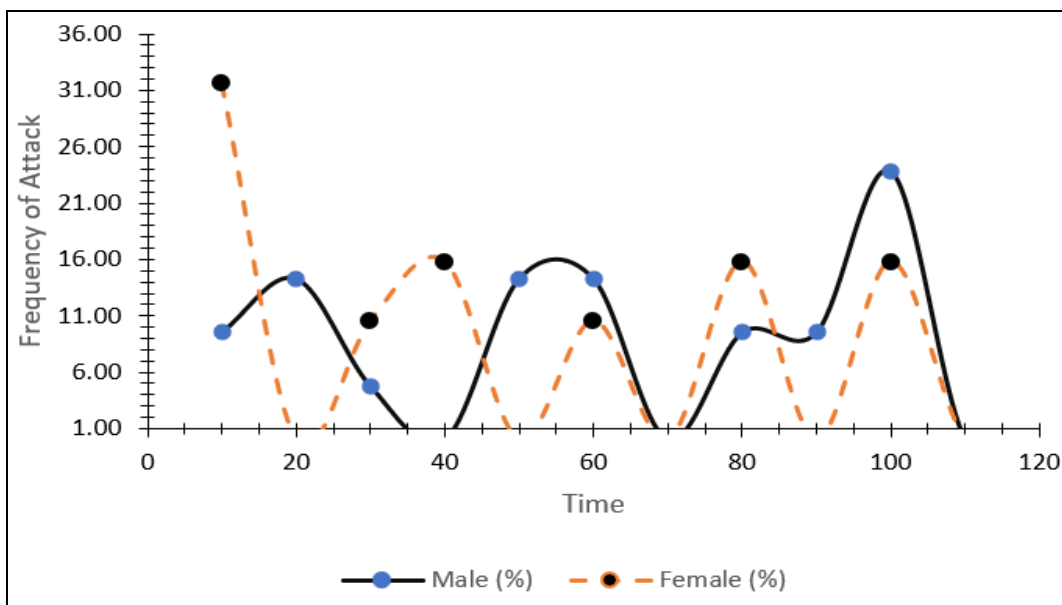
Observations were captured on a cell phone through photos and short video clips. The present observation was accounted

for a total of 2 hours. We plotted the frequency of attack by parakeet to male and female squirrels accordingly (Fig. 2).



**Fig 1:** (a) Rose-ringed parakeet usurped northern palm squirrel nest (red arrow) and (b) Rose-ringed parakeet attacked northern palm squirrel (white and red circle)

### 3. Observations



**Fig 2:** Frequency of attack by parakeet on squirrels (male & female) observed during the nest usurpation

The interaction was first noted with a distress/alarm call by the squirrel at around 14:37 hrs. We observed a female parakeet entering the nest box while a male parakeet was on the lookout from another adjacent branch of that tree. A litter was present in the nest box. The litter also started to give out a repeated alarm call. At that moment the female squirrel was at a distance of 15.2 m from the nest, on the ground, foraging (we measured the distance later using a measuring tape). As the mother squirrel noticed the alarm, she surged towards the nest and began chasing the female parakeet away using a multimodal signal containing both the acoustic and the moving visual components. To help its partner, the male parakeet came down and started chasing the female squirrel, and attacked physically. As a result, the female squirrel fled to the branch above the nest box and the litter followed its mother. The female squirrel inspected the litter, repeatedly groomed and took another chance alone to reclaim the nest box. A separate male parakeet attacked the female squirrel and chased her away. All of these incidents happened during

the first 10 minutes of the observation.

The female parakeet continued and deconstructed the nest box by pulling out the squirrel nest materials. Whenever the female squirrel tried to chase away the parakeets, she got attacked (Fig. 1a and b). This continued in a repeated manner. As a result, the female squirrel carried the litter by the scruff of the neck to a nearby drey (located 5.4 meters away) on an African tulip tree possibly for its protection. The drey was occupied by other squirrels who were not present at that time. When the occupants came back the female squirrel was successful in chasing them away.

Our observations noted, a) an attack by the parakeets only happened when the female squirrel tried to enter the nest or tried to chase the parakeets. b) Throughout the interaction, the female squirrel was observed being very defensive about its occupancy due to its role as a mother, a provider of shelter for her litter. c) The majority of the chasing and attack took place within the first 10 minutes of the total observation period. Following this, the frequency of parakeet attacks decreased

(Fig. 2). d) The female squirrel was unsuccessful in defending the nest from the parakeets but succeeded in defending from the other squirrel individuals.

#### 4. Discussion

Nest usurping of squirrels by other animals has rarely been observed in introduced (Barkalow and Soots, 1965; Vander Haegen *et al.*, 2013) <sup>[1, 21]</sup> and native ranges (Viswanathan *et al.*, 2018; Zevgolis *et al.*, 2022; Joshi and Puri, 2023) <sup>[22, 23, 9]</sup>. Our study reports a nest of northern palm squirrels usurped by rose-ring parakeets in an urban park. A similar observation has been previously reported from an urban park in New Delhi (Joshi and Puri, 2023) <sup>[9]</sup>. In the native range, the northern palm squirrel and the rose ring parakeets have overlapping reproductive months (Seth and Prasad, 1969; Khan *et al.*, 2004) <sup>[19, 10]</sup>. Occupying suitable places (e.g. tree holes, nest boxes, etc.) for nests is essential in urban habitats to protect the eggs/nestlings for both species (Malpass *et al.*, 2018; Patankar *et al.*, 2021) <sup>[12, 17]</sup>. Henceforth, competition between two species residing in the same area for a suitable nest is likely to happen. However, squirrels show different adaptive measures in urban and rural or natural areas (Beliniak *et al.*, 2022) <sup>[2]</sup>. The interaction among the birds and squirrels depends on their body size and the need for the association. Medium-sized birds have been found to live in close proximity to the squirrels which benefits both species, whereas the association of squirrels with smaller and larger birds is not seen enough in natural areas (Limparungpatthanakij *et al.*, 2017) <sup>[11]</sup>. Association and conflicts are not much known in urban environments. Such instances must be noted carefully, taking into account the underlying complexities that are at play. Otherwise, incomplete data and dispersed research could produce inaccurate results. For example, for a considerable amount of time, it was believed that eastern grey squirrels were the main competitors for bird nests in Europe. However, more extensive observations revealed that this was not the case (Broughton, 2020) <sup>[3]</sup>. Douglas (*Tamiasciurus douglasii*) and northern flying squirrel (*Glaucomys sabrinus*) abundance were once considered to be in decline due to the presence of non-native eastern grey squirrel, which later was also found insignificant (Gonzales *et al.*, 2008) <sup>[5]</sup>. Making educated decisions is necessary for effective conservation. To gain a better understanding of the interactions, research on squirrels' interactions with other animals in both natural and urban settings should be taken into account.

#### 5. Acknowledgement

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