# First record of the long-winged harrier, *Circus buffoni* (Aves, Accipitridae) from the Northeastern extreme of Brazil

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**Abstract**

We present the first record of the Long-winged harrier, *Circus buffoni* (Gmelin, 1788), from the state of Rio Grande do Norte, in the Northeastern extreme of Brazil, specifically, the East Potiguar Microregion, which is located within the Atlantic Forest phytogeographic domain. During the study, we recorded at least two individuals between January and June, and recorded their foraging behavior and predation events. We also compiled all published data available on C. buffoni, as well as records from ornithological collections and online databases, which resulted in a total of 13 documented records for the Brazilian Northeast. Breeding populations of *C. buffoni* are known to exist in both northern and southern South America, providing conflicting evidence on the possible origin of the study individuals and their migratory patterns in Brazil. Given the persistent lacunas in our understanding of the dispersal patterns of *Circus buffoni*, we recommend further surveys in areas with similar habitats to provide more comprehensive data for defining the species' distribution in South America and its migratory patterns.

**Keywords:** Accipitridae, reproduction, migration, *Circus* genera.

# Primeiro registro do gavião-de-asa-longa, *Circus buffoni* (Aves, Accipitridae) no extremo Nordeste do Brasil

**Resumo**

Apresentamos o primeiro registro do gavião-de-asa-longa, *Circus buffoni* (Gmelin, 1788), do estado do Rio Grande do Norte, no extremo Nordeste do Brasil, especificamente, a Microrregião do Leste Potiguar, que está localizada dentro do domínio fitogeográfico da Mata Atlântica. Durante o estudo, registramos pelo menos dois indivíduos entre janeiro e junho, e registramos seu comportamento de forrageamento e eventos de predação. Também compilamos todos os dados publicados disponíveis sobre *C. buffoni*, bem como os registros de coleções ornitológicas e bancos de dados online, que produziram um total de 13 registros documentados para o Nordeste brasileiro. Populações reprodutivas de *C. buffoni* são conhecidas por existirem tanto no norte quanto no sul da América do Sul, fornecendo evidências conflitantes sobre a possível origem dos indivíduos do estudo e seus padrões migratórios no Brasil. Dadas as lacunas persistentes em nossa compreensão dos padrões de dispersão de *Circus buffoni*, recomendamos mais pesquisas em áreas com habitats semelhantes para fornecer dados mais abrangentes para a definição da distribuição da espécie na América do Sul e seus padrões migratórios.

**Palavras-chave:** Accipitridae, reprodução, migração, gênero *Circus*.

## 1. Introduction

The raptors of the family Accipitridae include 250 species arranged in 74 genera (Winkler et al., 2020). These birds are cosmopolitan and are found on all the continents except Antarctica, in an ample diversity of ecosystems, ranging from forests to deserts, aquatic habitats, and even urban areas. Accipitrids are also extremely diverse in their morphology and behavior, with considerable variation in body size and morphological characteristics, such as wing shape, which has undergone adaptations for a variety of flight patterns and foraging strategies (Winkler et al., 2020).

Harriers (*Circus* spp.) are a small, cosmopolitan group of raptors with a total of 16 species. Three species of harrier are found in South America (Del Hoyo; Collar, 2014; Smith et al., 2020) – the relatively widespread Cinereous, *Circus cinereus* Vieillot, 1816, and Long-winged harriers, *Circus buffoni* (Gmelin, 1788), and the Northern harrier, *Circus hudsonius* (Linnaeus, 1766), which is found in the northwestern extreme of South America. The behavior of the species of this group is typical of the harriers, in particular their foraging strategy, which involves flying low over pastures and wetlands in search of prey such as small mammals, birds, reptiles, amphibians, and invertebrates (Oatlley et al., 2015). While most of the harriers of the northern hemisphere are long-distance migrants, the species found in the southern hemisphere tend to migrate over relatively short distances, typically during the non-breeding period, when dry-season conditions impact the availability of feeding resources, forcing the harriers to forage over wider areas (Oatlley et al., 2015).

The Long-winged harrier, *Circus buffoni*, has marked sexual dimorphism. The dorsum of the males is dark gray or black, and the remiges, retrices, and covert feathers are light gray with darker horizontal bars. The females and juveniles are similar in their coloration, with dark brown dorsum and venter and rust-colored legs, while the remiges and retrices retain the barred gray pattern (Ferguson-Lees et al., 2001). *Circus buffoni* is found in a number of different South American countries, including Colombia, Venezuela, Paraguay, Uruguay, Argentina, Chile, and Brazil. The species is found in almost all the Brazilian biomes, with most populations being distributed in the South, Southeast, and Midwest regions of the country, with few confirmed records from the North and Northeast regions (Souza et al., 2011).

In the Brazilian Northeast, in fact, *C. buffoni* has only been recorded in two states, Bahia (https://www.wikiaves.com.br/969986) and Maranhão (Pinto, 1938). This means that there may be a major knowledge gap in the distribution of this species in the region, which covers an area of more than one and a half million square kilometers. Here, we present the first record of *C. buffoni* from the northeastern Brazilian state of Rio Grande do Norte, review the available evidence on its distribution in this region, and discuss the possible origin of the individuals observed in the study area and their potential migratory patterns.

## 2. Materials and Methods

### *2.1 Local station*

The present study focused on two sites, Site 1 (55°39'03" S and 35°24'25" W) and Site 2 (5°37'48" S, 35°23'51" W), located within a deactivated sugarcane (*Saccharum officinarum*) plantation in the municipality of Ceará-Mirim, Rio Grande do Norte state, Brazil. This area, which the Vale owns do Ceará-Mirim Sugar Mill, is 1.73 km from the urban zone of the town of Ceará-Mirim, and was cultivated until the early 21st Century. The property has an area of approximately 350 hectares and is covered with herbaceous vegetation dominated by grasses, with some patches of shrubs.

The local rainy season begins in March and lasts until July, while the dry season generally occurs between August and January. During the rainy season, the gently sloping terrain permits the formation of small pools and temporary lakes, which favor the local occurrence of species that depend on wetlands. The study area is located in the area between two rivers – the Rio Ceará-Mirim, which is approximately 1.5 km to the north, and the Rio Doce, around 2.6 km to the south. The seasonal rains are the principal factor determining the formation of the local wetland areas and temporary lakes (Mendes; Farias, 2024).

We compiled all the data available on the distribution of *C. buffoni* from published sources, and the ornithological collections (Table 1) of the Goeldi Museum (MPEG; Belém, Brazil), the Zoology Museum of the University of São Paulo (MZUSP; São Paulo, Brazil), the American Museum of Natural History (AMNH; New York, United States), the National Museum of Natural History, Smithsonian Institution (NMNH; Washington, D.C., United States), and the Forschungsinstitut Senckenberg (SMF; Weimar, Germany). We also consulted six online databases: eBird (2025), WikiAves (2025), Xeno-canto (2025), speciesLink (2025), Global Biodiversity Information Facility (GBIF.org 2025), and Fonoteca Neotropical Jacques Vielliard (2025), and reviewed Sagot-Martin et al.'s (2020) inventory of the bird fauna of Rio Grande do Norte.

We produced the species occurrence map in QGIS v. 3.14 Pi (QGIS Development Team 2020). We deposited all our photographic records of *C. buffoni* in the WikiAves (2024) database.

## 3. Results

We recorded *C. buffoni* in the study area between January 21 and June 22, 2024. During this study period, in addition to monitoring the species, we also documented specific features of the behavior of the study animals.

At approximately 16:00 h on January 21, 2024, we observed a juvenile *C. buffoni* flying over an abandoned sugarcane plantation at site 1, at a height of around 30 m (Figure 1a). This encounter lasted only a few minutes, and the individual soon moved out of sight. At about 16:40 h on February 16, we observed an adult foraging in an area of herbaceous vegetation dominated by grasses (Figure 1b). This individual was flying round in circles just above the vegetation, at heights of 2–5 m. On occasion, when identifying potential prey, the harrier maneuvered spirally, opening its retrices rapidly to descend to the ground, where it would remain for a few moments before flying upward again, and then around in circles. This individual continued foraging in this way until almost sunset, when it flew toward a patch of tall grass, after which it was not observed again.

Figure 1. Adult and juvenile Long-winged harriers (*Circus buffoni*) observed in the municipality of Ceará-Mirim, Rio Grande do Norte state, Brazil. **(a)** Juvenile (1/21/2024), **(b)** Adult (2/16/2024), **(c)** Adult foraging (2/17/2024), **(d)** Adult and juvenile (2/18/2024), and **(e)** Adult flying with a snail (gastropod) in its beak (2/27/2024). Photographs by JAFP (a,b,c,d) and Eugênio Oliveira (e), 2024.

We visited site 1 daily, from 14:00 h onward, between February 17 and 19, 2024, and waited at a fixed point for the appearance of one or more of the target animals. On February 17, we observed an adult harrier at approximately 15:00 h. This individual was flying directly toward a distant area, without pausing to forage. At around 17:00 h, we observed what we presumed to be the same individual flying back toward the observation point, this time, exhibiting a clear pattern of foraging behavior, that is, flying low down and around in circles, occasionally engaging in complex maneuvers as it came down to the ground. This harrier continued flying in this pattern until nightfall, when it came to rest in a patch of tall grass, after which it was not observed again, indicating the possible use of a roost within this vegetation (Figure 1c).

On February 18, we observed two individuals together at approximately 14:30 h, flying in different patterns at heights of 5–30 m above the ground, apparently engaging in a chase (Figure 1d). Both birds were making elaborate maneuvers, with rapid changes in direction, spins, and brief drops in height, the adult first chasing the juvenile, and the juvenile then chasing the adult, and so on. This behavior lasted for around 25 minutes, when the juvenile finally moved out of sight, while the adult began to forage in the same area, following the typical flight pattern. On February 19, we observed only the juvenile foraging between 15:30 h and nightfall, at 17:50 h.

We returned to the study area at around 14:00 h on February 21, when we observed only the juvenile (~15:00 h), which was foraging. On February 27, we observed only the adult, in foraging mode, between 15:00 h and 17:40 h. At one point, it flew down to the ground and then back up into the sky with a snail (gastropod) in its beak (Figure 1e). During the monitoring period, we observed that the harriers foraged at times when other local raptors, such as the roadside hawk, *Caracara plancus*, White-tailed hawk, *Geranoaetus albicaudatus*, and Savanna hawk, *Heterospizias meridionalis*, were relatively inactive, which indicates a possible strategy of behavioral niche partitioning.

We next observed the harriers in the study area on March 8 (~16:00 h), when we sighted the adult foraging in circular flight. At approximately 17:00 h, we observed this individual coming down abruptly to the ground in the patch of tall grass, and by using binoculars, we were able to confirm that the harrier had taken a quail (*Nothura* sp.), although it was not observed again after this moment.

The harriers were not observed in the study area again until June 21, when we observed what we presumed to be the same adult, alone, engaging in typical circular foraging flight in the study area. On June 22 (~11:00 h), we encountered a juvenile (possibly the same individual sighted previously) at site 2, which is around 2.7 km from site 1. This individual was flying at a considerable height, alternating between beating its wings and short glides, as it flew into the distance and out of sight. These two observations in June were our last records of the species in Ceará-Mirim and, in turn, the Brazilian state of Rio Grande do Norte.

Together with the 13 existing cases, the new records of *C. buffoni* presented here (Figure 2) bring the total number of confirmed localities in the Brazilian Northeast to 15. These records are restricted to three states, however, that is, Maranhão, Bahia, and Rio Grande do Norte (Table 1).

As Rio Grande do Norte is located in the northeastern extreme of Brazil, and assuming the harriers observed here were not members of an isolated enclave population, they would have needed to have traversed at least two other states to have reached Rio Grande do Norte from either Maranhão or Bahia. In Maranhão, *C. buffoni* was recorded between February and July, whereas in Bahia state, the species has been recorded in almost all the months of the year, albeit concentrated in the period between September and February, while in Rio Grande do Norte, the records were collected between January and June. Where more than one record has been obtained from a given locality, only the oldest reference is shown here. The localities are numbered as in (Figure 2).

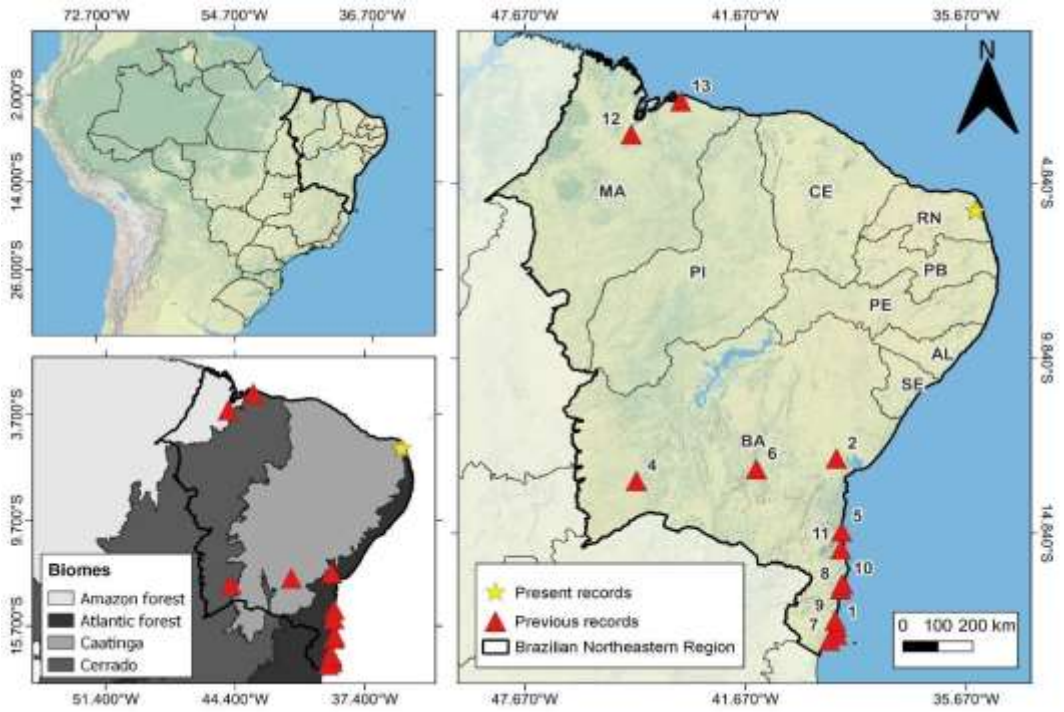


Figure 2. Recorded localities of the Long-winged harrier (Circus buffoni) in northeastern Brazil. The red triangles indicate the existing records retrieved during the data search, with the numbers corresponding to the localities listed in Table 1. The star corresponds to the two new localities in the state of Rio Grande do Norte. Brazilian states: AL = Alagoas, BA = Bahia, CE = Ceará, MA = Maranhão, PB = Paraíba, PE = Pernambuco, PI = Piauí, RN = Rio Grande do Norte, SE = Sergipe. Source: Authors, 2025.

Table 1. Known location records of the long-winged harrier (*Circus buffoni*) in northeastern Brazil.

| Code | Latitude | Longitude | Locality | Municipality | State | Source | Number | Month/year of record |
|---|---|---|---|---|---|---|---|---|
| **1** | -17.519444 | -39.195556 | – | Alcobaça | Bahia | WikiAves | WA2602905 | 6/2017 |
| **2** | -12.691944 | -38.122778 | Barra do Jacuípe | Camaçari | Bahia | WikiAves | WA2307418 | 10/2016 |
| **3** | -17.733611 | -39.189167 | Barra de Caravelas | Caravelas | Bahia | WikiAves | WA1672587 | 1/2015 |
| **4** | -13.340833 | -44.633611 | – | Correntina | Bahia | WikiAves | WA6509792 | 11/2022 |
| **5** | -14.792222 | -39.055556 | – | Ilhéus | Bahia | WikiAves | WA1187015 | 2/2013 |
| **6** | -13.006944 | -41.372222 | – | Mucugê | Bahia | WikiAves | WA6047044 | 3/2023 |
| **7** | -17.900278 | -39.383611 | RESEX de Cassurubá | Nova Viçosa | Bahia | WikiAves | WA3147002 | 10/2018 |
| **8** | -16.428611 | -39.083056 | – | Porto Seguro | Bahia | WikiAves | WA814519 | 11/2012 |
| **9** | -17.327500 | -39.230278 | – | Prado | Bahia | WikiAves | WA4562116 | 9/2021 |
| **10** | -16.281667 | -39.031111 | – | Santa Cruz Cabrália | Bahia | WikiAves | WA1581980 | 1/2013 |
| **11** | -15.293056 | -39.073889 | – | Una | Bahia | WikiAves | WA488526 | 10/2011 |
| **12** | -3.452222 | -44.775556 | – | Arari | Maranhão | WikiAves | WA2027612 | 2/2016 |
| **13** | -2.511849 | -43.428992 | – | Primeira Cruz | Maranhão | Pinto, 1938 | MZUSP/6680 | 7/1906 |
| **14** | -5.630000 | -35.397500 | Site 1 | Ceará-Mirim | Rio Grande do Norte | Present study | WA5876471 | 1–6/2024 |
| **15** | -5.650833 | -35.406944 | Site 2 | Ceará-Mirim | Rio Grande do Norte | Present study | WA6154034 | 6/2024 |

Source: Authors, 2025.

**4. Discussion**

The records presented here represent a considerable extension of the geographic distribution of *C. buffoni*, given that they are located approximately 1000 km to the north of the closest known locality, in Camaçari, in the state of Bahia. In northeastern Brazil, *C. buffoni* was recorded previously in only two states, Bahia and Maranhão (Table 1; Figure 2), and was never registered in the northeastern extreme of the country, particularly in Rio Grande do Norte.

*Circus buffoni* was recorded in northeastern Brazil for the first time in 2011, in the municipality of Una, Bahia state (https://www.wikiaves.com.br/488526). While the species has subsequently been recorded at a number of new localities in the region, these were invariably located in either Bahia or Maranhão states (Fig. 3).

In the present study, the Long-winged harrier presented a clear preference for open habitats, such as pastures. This is consistent with the findings of Baladrón et al. (2016), who recorded a greater affinity of this species for pastures and agricultural environments. This preference may be related to the predation of birds that inhabit pastures, such as *Nothura* sp., which was recorded as a prey item during the present study.

The foraging pattern observed in the present study was similar to that described by previous authors, such as Menq (2016) and Baladrón et al. (2016). This harrier has an active foraging strategy, flying low in wide circles above the vegetation, alternating between short glides and bursts of wing flapping. It does not use hunting perches or other passive foraging strategies.

Seasonal migration is a typical harrier (*Circus* spp.) behavior, with long-distance dispersal and migration playing an important role in the speciation of the genus (Oatley et al., 2015). In the northern hemisphere, most harrier species migrate over long distances, whereas in the southern hemisphere, breeding individuals undertake relatively short migrations in search of feeding resources during dry periods (Thiollay, 1994). The Long-winged harrier, *C. buffoni*, engages in intracontinental movements, dispersing among practically all the different regions of South America. In Brazil, however, the available data are still insufficient for a systematic evaluation of the migration patterns of the species (Bierregaard; Kirwan, 2024).

Somenzari et al. (2018) did not consider *C. buffoni* to be a migrant in Brazil. However, we believe that the migratory status of the species should be revised to partial migrant, given that it apparently does not breed throughout the whole of its geographic range. The origin of the individuals recorded here remains unclear and requires further, more conclusive investigation. Breeding populations are known to nest in southern South America between September and January (Ferguson-Lees et al., 2001), although in Brazil, we found only a single record of breeding, from the southernmost state of Rio Grande do Sul, registered in the month of December (Camilotti et al., 2008). Despite the overall lack of breeding data from Brazil, records of both adults and juveniles are obtained frequently from some regions of the country, presumably representing individuals migrating from their breeding areas, located further south, in Argentina, Uruguay, and Paraguay. The harriers that migrate north and eastward from these countries are found principally in the South and Southeastern regions of Brazil and, more sporadically, in northern and northeastern Brazil.

While this dispersal route appears to be the most likely, a second possibility is the dispersal of individuals from the breeding population located in northern South America, in Trinidad, where the species is known to breed between December and August (Ferguson-Lees et al., 2001). It is important to note here that one of the individuals we observed in Rio Grande do Norte between January and June was a juvenile that was probably not born in the region, but rather immigrated together with the adult, from a breeding population. The period of the records from Rio Grande do Norte coincides with the breeding season documented for northern South America. Overall, then, while it seems more likely that these individuals originated in southern South America, given the shorter distances to potential breeding populations, we cannot rule out a northern South American origin altogether, given the evidence available at the present time.

Studies of the geographic distribution of a species are essential for the development of effective conservation strategies, while also supporting biogeographic and ecological research (Piacentini et al., 2006). Records of occurrence, such as those presented here, are of fundamental importance for the understanding and conservation of local biodiversity (Godoi et al., 2012).

**5. Conclusions**

The records of *Circus buffoni* presented here contribute to the expansion of the known distribution of the species in northeastern Brazil, specifically, the state of Rio Grande do Norte, which is the northeastern extreme of South America. While it seems most likely that these individuals migrated from the south of the continent, given the

shorter distance between the present study area and known breeding populations in southern South America, it is nevertheless also possible that the individuals originated from northern South America, reflecting the complexity of the migratory patterns of the species. The evidence presented here emphasizes the importance of further comprehensive surveys of the bird fauna of the study region, given the paucity of available data. The compilation of records, such as those presented here, is fundamental for the elimination of lacunas in the understanding of local biogeography, as well as contributing to the understanding of dispersal patterns and migration routes. Investment in research of this type will be essential to support effective strategies for the conservation and management of the biodiversity of the study region.

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**7. Authors' Contributions**

*José Arthur Felipe Pequeno: Conceptualization; Writing – Original Draft; Visualization; Investigation; Data Curation. Hilda Raianne Silva de Melo: Writing – Original Draft. Mauro Pichorim: Writing – Review & Editing; Supervision.*

**8. Conflicts of Interest**

There are no conflicts of interest.

**9. Ethics Approval**

Not applicable.

**10. References**

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