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EXPEDITION TO STUDY THE BREEDING ECOLOGY OF THE PRINCIPE THRUSH

Introduction

The Principe thrush *Turdus xanthorhynchus* has long been considered a subspecies of the Gulf of Guinea Thrush that lives on the island of Principe, while the nominate species known as the Sao Tome Thrush *Turdus olivaceofuscus* is present on the nearby Sao Tome Island. Recent evidence, however, has shown the contrary, and the Principe Thrush is now thought to be a separate species. The Principe thrush has unfortunately received less attention than the Sao Tome Thrush, largely because of this incorrect assumption. The Principe thrush's populations are believed to number fewer than 400 individuals and are primarily restricted to the island's primary forests, with decline attributed to anthropogenic factors (Dallimer *et al.*, 2010).

Little is known about the ecology of this endemic species, which is listed by the IUCN as "Critically Endangered" (BirdLife International, 2022). Recent research has concentrated on their population dynamics, but few studies have sought to understand other aspects like their breeding biology, habitat association, and foraging behavior (Dallimer *et al.*, 2010; Fundação Príncipe, 2019). The Príncipe Thrush is said to potentially have two breeding periods per year. The first one in the dry season between March and June, which was confirmed based on direct observational studies and a second breeding period by September to December during the rainy season, based on knowledge of the closely related São Tomé Thrush (Fundação Príncipe, 2019).

The island of Principe has a remarkable topography with vertical cliffs covered and it is covered in primary rainforests of more than 45 km². The forests are crucial for conservation because they are home to 11 endemic birds, 25 endemic land snails, and 37 endemic angiosperm species, in addition to the fact that Principe Thrushes are thought to be restricted to the island's primary rainforests (Dallimer *et al.*, 2010).

Methods

Field surveys were carried out between October and December 2022, corresponding with the breeding season of the Gulf of Guinea Thrush in Sao Tome (Dallimer *et al.*, 2010). Throughout the study period, seven survey sites totaling representative areas of the island's prior thrush sightings were repeatedly visited. They are all primarily made up of primary forests, with signs of human activity only noted on the exteriors. A team of five people conducted field surveys that began as early as 7 am and lasted an average of c. 8 hours, looking for Principe thrushes and their nests. During the study, audio replay was also used.

We observed and tracked the locations where thrushes were spotted in order to record any breeding cues and foraging activity. We recorded the GPS location of all encounters during the survey. A 10-minute point count survey was conducted where thrushes were seen and all bird species present within a 20-meter radius were recorded. Vegetation variables were measured within a 20 x 20 m radius of thrush sightings during our survey and where they had previously been recorded by the local team in order to investigate the habitat association of the Principe thrush.

Results

Twelve (12) Principe Thrush individuals were encountered at five of the seven survey locations that were visited during the study period (Table 1). The exteriors of Marria Correia, which are classified as secondary forests, are where the Principe Thrush was first spotted in October (1.59891°N 7.35304°E). In November, two more individuals were discovered at Morro de Leste, 450m above sea level, in the interior of the primary forest (1.59001°N 7.40352°E). In December, nine (9) individuals were recorded, with Praia Seca (four) and Pico Principe (three) having the highest occurrences (Table 1). In two of the surveyed sites, no individuals were observed, and on one occasion, we were unable to locate a distant calling bird. As a result, we only recorded the species where they were observed. Four individuals were seen foraging on the ground. Thirty-seven (37) birds from Eleven (11) species were recorded during a point count survey where thrushes were recorded (Table 2).

During the survey, no active nests were discovered, but at one of the sites (Pico Principe), an old nest was recovered on a tree that the Principe Thrush had previously used for breeding in July 2020 (Figure 2). The nest is a circular cup made primarily of dried fibers and twigs, and was located about 6m above the ground level in the branch of a *Carapa gogo* tree (18m tall) in Pico Principe (1.59634°N, 7.37349°E). The nest measurements were (cm): external diameter 10; internal diameter 5; external depth 2.8; internal depth 1.2; thickness 0.5. Additionally, other locations where a nest had been noted were revisited, but no nest was located there. In a 20 x 20m area surrounding thrush sightings, measurements of the habitat's characteristics showed that there was 83% ground cover, 80% canopy cover, and an average of 19. A checklist of trees within a 20 x 20 m quadrat of thrush sightings was also done (Table 3).

Table 1. Surveyed sites across the island of Principe, Gulf of Guinea.

| Site name | Dominant Habitat | Number of thrushes seen | Period of Sighting | Coordinates (N-E) |
|----------------|------------------|-------------------------|-------------------------------|---|
| Praia Cara | Primary | 0 | Nil | |
| Pico Principe | Primary | 3 | December | 1.59761 - 7.37329; 1.59554 - 7.37307; 1.59951 - 7.37864 |
| Morro de Leste | Primary | 3 | November (2); December (1) | 1.59001 - 7.40352; 1.58842 - 7.40572 |
| Maria Correia | Primary | 1 | October | 1.59891-7.35304 |
| Santa Joaquina | Primary | 0 | Nil | |
| Barriga branca | Primary | 1 | December | 1.57350- 7.35328 |
| Praia Seca | Secondary | 4 | December | 1.55974- 7.39397 |

Table 2. Bird species recorded within a 20 x 20m quadrat where Principe Thrushes were found.

| English name | Scientific name | Local name | IUCN Red list | Seen |
|-------------------------------|----------------------------------|-----------------|---------------|------|
| Blue-breasted Kingfisher | <i>Halcyon malimbica (dryas)</i> | Cho Chó | LC | 6 |
| Olive Sunbird | <i>Cyanomitra olivacea</i> | Tchibi barbeiro | LC | 2 |
| African Grey Parrot | <i>Psittacus Erithacus</i> | Papagaio | EN | 5 |
| Principe Speriops | <i>Zosterops leucophaeus</i> | Peito branco | NT | 3 |
| Principe Golden Weaver | <i>Ploceus princeps</i> | Melro | LC | 2 |
| Principe Seed-eater | <i>Crithagra rufubrunnea</i> | Chota café | LC | 2 |
| Principe Sunbird | <i>Anabathmis hartlaubii</i> | Tchibi barbeiro | LC | 2 |
| Starling sp. | <i>Lamprotornis sp.</i> | Estorinho sp. | LC | 4 |
| Principe Malachite Kingfisher | <i>Corythornis nais</i> | Conóbia | LC | 1 |
| Principe White-eye | <i>Zosterops ficedulinus</i> | Tchibi tete | EN | 4 |
| Dohrns Thrush Babbler | <i>Sylvia dohrni</i> | Tchibi fixa | LC | 6 |

Table 3. Tree species recorded within a 20 x 20m quadrat where thrushes were found.

| Local name | Scientific name | Number | Height (m) | Dbh (m) |
|---------------|---------------------------------|-----------|-------------|-------------|
| Pau Lixa | <i>Ficus exasperata</i> | 6 | 15 | 2.6 |
| Candeia sp. | <i>Psydrax subcordata</i> | 7 | 15 | 1.3 |
| Coqueiro | <i>Cocos nucifera</i> | 3 | 12 | 2.3 |
| Palmeira | <i>Elaeis guineense</i> | 3 | 10 | 1.5 |
| Pau Caixao | <i>Funtumia africana</i> | 8 | 26 | 1.65 |
| Bolina preta | <i>Greenwayodendron sp.</i> | 4 | 25 | 0.6 |
| Viro branco | <i>Scytopetalum klaineianum</i> | 4 | 26.3 | 0.48 |
| Pau Oleo | <i>Santiria balsamifera</i> | 5 | 30 | 0.6 |
| Tchili Tchili | <i>Vitex doniana</i> | 3 | 46.6 | 1.2 |
| Total | | 43 | 22.9 | 1.35 |

Discussion

The Principe Thrush was found in five of the seven sites that were surveyed, with Praia Seca and Pico Principe having the highest number of sightings. Praia Seca was a former plantation area and can be considered a mature secondary forest while Pico Principe is a primary forest where mature trees could be found at very high peaks of c.900m. This high altitude undoubtedly makes the habitat undisturbed and much difficult to access by humans. Records of habitat utilization in both primary and secondary forests may indicate that the Principe Thrush may not only be confined to primary forests but also highlights the significance of Principe Island's forests for conservation. Although the Principe thrush is less vocal, it is not a shy bird, so there is a good chance that it will be sighted in areas where it is present. Therefore, during our survey, the thrushes may have missed or absent in sites where there were no records. All of the sites visited were areas where the Principe Thrush was said to be present in the very recent past. Our revisits to the exact locations of the thrushes sighted did not result in any further encounters. The low encounter rate points to a small population.

During our survey, no active nest was discovered, and the majority of the individuals we came across appears to be non-breeders except on an instance towards the end of the survey. For most sightings, no breeding behavior or indices were seen, but in December, four individuals were encountered in Praia Seca (1.55974°N; 7.39397°E), where two of the individuals were seen with straw in their beaks, similar to their breeding behavior during the nesting stage (Fundação Príncipe, 2019). The individuals with straws in their beaks dropped them and flew away in different directions. However, no nest was located nearby despite extensive searching for about 30 minutes. Perhaps our presence might have influenced that behavior. That may be an indication that adult thrushes may possibly initiate breeding in towards the end of the rainy season in December. All prior observations of breeding were made between the months of March and June (Fundação Príncipe, 2019). Therefore, possible assertions of a second breeding season may be correct, could be very

much late in the year right after the rains. Straws are green and wet when they had just been collected and are the same materials as the old nests that have been documented. Further, during our observations, we did see a foraging individual with a worm in its beak.

In November, two adult thrushes were observed for about 15 mins in Morro de Leste and were mostly seen foraging simultaneously with each observation taking place at a distance of about 10 metres apart (1.59001°N;7.40352°E). Given that both Principe Thrush individuals foraged on the ground just a few meters away from observers, they appear to be typical ground foragers. What they were feeding on was not clearly seen as trees obstructed our view. However, a look at the foraging point after they left revealed the presence of invertebrates which may potentially be their prey. During the breeding season, the Principe thrush frequently exhibits territorial behavior, but none of the birds were observed guarding the area against nearby conspecifics or other bird species as had been documented in earlier studies (Fundação Príncipe, 2019). We also could not tell if they were pairs as both individuals subsequently left the area in different times and in different directions and we were unable to determine their destination.

An old nest was found on a *Carapa gogo* tree (18m in height) which is endemic on the Island. In April 2019, the Principe Thrush used the exact same tree as a nesting location (Yodinay Dos Santos, pers comm). The empty nest found previously by the local team had been removed before our study. Sighting of an old thrush nest in a previously used site indicates a possibility of the Principe Thrush reusing a nesting site. It could not be ascertained if the nest was deserted or predated upon as no trace of egg shells was found in the area. The nest found is one of the three Principe thrush nest to ever be documented (Yodinay Dos Santos, pers comm). Nest description is quite similar to details given by Fundação Príncipe (2019), indicating that they both utilize similar nesting materials. In terms of habitat association, Principe thrushes were found to utilize habitats with good canopy and ground cover. They also appear to utilize areas where trees are in abundance. The presence of other endangered bird species such as the Príncipe White-eye and Grey Parrot also highlights the importance of the Island's primary forests to avian conservation.

As observed in our study, the Mona Monkey *Cercopithecus mona* appears to be the main potential threat to the Principe Thrush during the breeding season. Mona Monkeys were in abundance in most of the sites visited. Despite spending a significant amount of time in the field, our attempts to study the breeding behavior of the Principe Thrush using camera traps were largely unsuccessful because we were unable to locate any active nests. This general difficulty has also been encountered by other researchers in São Tomé (Joao Alves, pers. comm). However, our survey still may have provided useful information on the nesting behaviour and habitat use of the Principe Thrush.

Research was conducted in partnership with Fundação Príncipe and all non-consumable equipment bought over the course of the project with ABC funding was given to Fundação Príncipe for continued work on the Príncipe Thrush.

Research Team and Affiliation

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Figure 1: Principe Thrush sighted during the study, November 2022. ©Taiwo Adams



Figure 2: An old inactive nest of the Principe Thrush recorded during the study, November 2022. ©Taiwo Adams



Figure 3: Some members of the field research team during the survey November 2022. ©Taiwo Adams

| Project Costs (1,00 GBP ~ 30,00 STD) | Local currency (STD) | International currency (GBP) |
|--|---------------------------------|---|
| Field Work | | |
| Field Equipments | 25500 | 850 |
| Field Supplies | 6000 | 200 |
| Salary of local staffs | 15000 | 500 |
| Equipment carriers | 6000 | 200 |
| Living Expenses | | |
| Accommodation at research guesthouse | 15000 | 500 |
| Living allowance | 18000 | 600 |
| Telecommunications (incl. local mobile plan) | 4500 | 150 |
| Travel & Transport | | |
| Transportation (incl. car and boat fuel) | 9000 | 300 |
| Travel (incl. national and international flights) | 48000 | 1500 |
| Equipment shipping | 3000 | 100 |
| Administrative Costs | | |
| Bank transfer charges | 3000 | 100 |
| Total | 153.000 STD | 5.000 GBP |

References

BirdLife International (2022) Species factsheet: *Turdus xanthorhynchus*. Downloaded from <http://www.birdlife.org> on 24/12/2022.

Dallimer, M., Melo, M., Collar, N. J., & Jones, P. J. (2010). The Príncipe Thrush *Turdus xanthorhynchus*: A newly split, 'Critically Endangered', forest flagship species. *Bird Conservation International*, 20(4), 375–381. <https://doi.org/10.1017/S0959270910000390>

Fundação Príncipe. (2019) Understanding the Remarkable Biodiversity of Príncipe Island – *Scientific Report*. Fundação Príncipe, Santo Antonio, Príncipe Island, www.fundacaoprincipe.org.



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