FINAL PROJECT REPORT
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Project title: Breeding Ecology of the Mount Cameroon Francolin (*Pternistis camerunensis*) and initiating a community-based conservation awareness in Mount Cameroon National Park; Southwest Cameroon

Executive Summary

This project represents the first attempt to document the nesting characteristic, breeding habitat, and reproductive success of the little-studied Mount Cameroon Francolin (*Pternistis camerunensis*), a species endemic to a highly restricted range on Mount Cameroon. Despite being classified as Endangered since 2000, virtually nothing is known about its reproductive ecology.

From November 2024 to January 2025, intensive field surveys were conducted between 1,100 and 2,500 m altitude along the eastern and southwestern slopes of Mount Cameroon National Park where the species was recently reported. Field activities included systematic nest searches, deployment of camera traps at sites with frequent vocal activity, point counts with playback to maximize detection, and documentation of the broader bird community. The surveys recorded 65 bird species and 46 detections of the Mount Cameroon Francolin. However, no nests, eggs, or direct reproductive behaviors were observed.

Multiple ecological and anthropogenic factors likely contributed to the absence of nest detection. High hunting pressure and recurrent bush fires have degraded ground-level vegetation that typically supports Galliforme nesting. Extensive disturbances caused by forest elephants further reduce dense understory cover essential for nest concealment. In addition, atypical rainfall patterns may have shifted breeding activity during the study period, as rainfall influences the availability of food resources for animal species. Local ecological knowledge also revealed contradictory reports on breeding seasonality, suggesting that reproduction may vary interannually or respond flexibly to rainfall and food availability. Finally, upward elevational shifts possibly linked to climate change may be pushing birds into less accessible or suboptimal nesting habitats.

Although nests were not located, the project provides essential baseline information and underscores the need for multi-season monitoring and advanced techniques, such as radio-telemetry, to identify critical breeding habitats and inform evidence based conservation strategies for the long-term survival of the Mount Cameroon Francolin.

Introduction

The Mount Cameroon Francolin (*Pternistis camerunensis*) is an understudied Endangered Galliforme endemic to the Mount Cameroon (BirdLife International, 2025). With an estimated population of 600–1,700 mature individuals confined to a narrow range of approximately 200 km², the species continues to face increasing anthropogenic and natural pressures (Mayaka, Guetse et al., 2021). Major threats include hunting (Nkembi et al., 2017), habitat modification by forest elephants (*Loxodonta cyclotis*) (Blake et al., 2009), overharvesting of *Prunus africana* whose fruits constitute part of the species' diet (Mayaka, Guetse et al., 2021; Guetse et al., 2024), recurrent bush fires set by local communities and continued agricultural expansion around its range margins (ABC-Djomo Report, 2022).

Emerging evidence suggests that climate change is exacerbating these pressures. Similar to other African mountain-endemic francolins (Abrha et al., 2025), warming temperatures may be altering habitat suitability, driving distributional shifts to higher elevations. Recent observations indicate that Cameroon francolin's now occurs at elevations higher than previously documented and avoids heavily modified landscapes such as plantations (Guetse et al., 2024).

Despite being listed as Endangered for more than two decades, little is known about its current population trend and fundamental information about the species' ecology remains scarce. Critically, the breeding biology of the Mount Cameroon Francolin has never been described in scientific literature. No data exist on nesting habitat, nest characteristic, clutch size, incubation period, breeding season or parental behavior. This lack of reproductive information hinders evidence-based conservation planning and the identification of critical breeding habitats.

The main objective of this study was to locate nests, characterize nesting sites, and initiate monitoring breeding activity through systematic field surveys and camera traps to direct conservation action on the ground.

Material and methods

Project location: Surveys were conducted across mid- and high-elevation habitats (1,100–2,500 m a.s.l.) on the eastern and southwestern slopes of Mount Cameroon National Park, South West Region, Cameroon (N 4°9'36.5688'', E°16'44.9616''; 4095 m a.s.l) (figure 1). These sites cover both historically documented Francolin range and recently reported higher-elevation occurrences (Guetse et al., 2024).

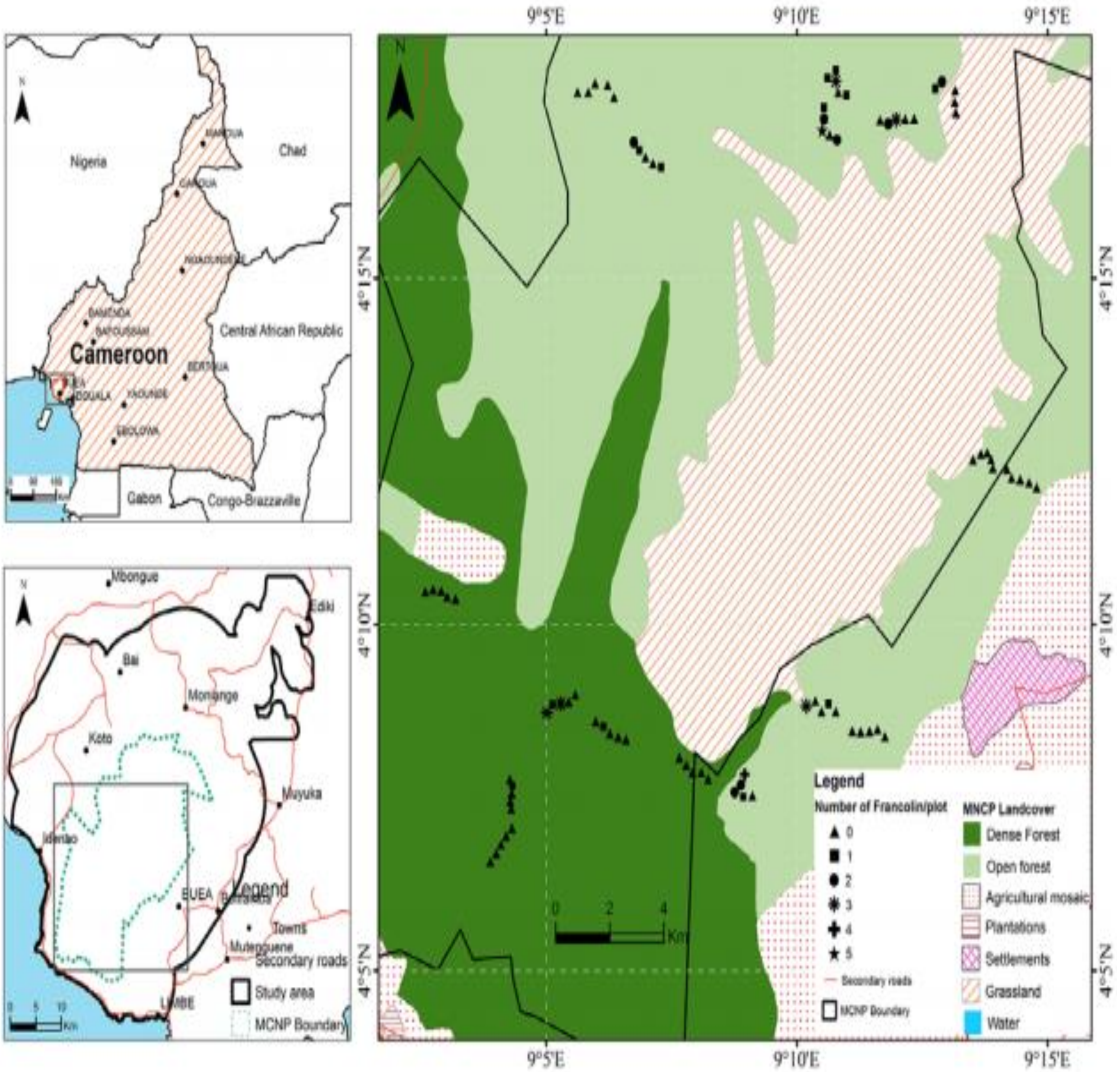

Figure1. Mount Cameroon Francolin distribution map

Data collection

Project proponents

- Project PI: Francis Guetse. Has more than 6 years of experience in bird study in Cameroon, he carried out the recent survey that allow to determine the occurrence of Francolin and established a preliminary distribution of the species.
- Project liaison officer: Godwill Kamta. Forest ranger who facilitated the study within the Mount Cameroon National Park.
- Field assistant: Francis Luma: Experienced ornithologist with close to 10 years of field experience. He is one of the few who recorded the sound of the francolin.
- Field guide: Francis Mokoko. Native of the area with a good knowledge in Mount Cameroon forest.

Surveys included:

- **Nest searching**

Based on the Mount Cameroon francolin distribution map that we established recently, systematic searches of the nests were carried out between November 2024 and January 2025 in keys habitats where francolin had been detected during our previous surveys. And the searches for francolin nests intensified in areas where francolins were heard vocalizing at the dusk or in the evening, during the survey. In the thirst to find nests, we also extended the search around the park and the forest-savannah edges which were suggested to us by the park authorities and by the biomonitoring team of the program of sustainability management of natural resources in south west region. Search effort focused on ground cover, thickets, and vegetation structures typical of nesting sites in other African *Pternistis* species.

- **Camera traps setting and monitoring**

Since we were unable to locate the nests, camera traps were installed at strategic points where francolin vocalizations were consistently heard, around the flushing hollows they made in the ground, to try to detect if it was a nest being built by this ground nesting bird. But once again, no nest was detected during the survey. We used Bushnell camera and each camera with a 32 GB SD card was set as follows: - Mode: only photo - Photos series: 3 - Photo resolution: 14 MP - Shot lag: 0.5 second - Sensitivity of the motion sensor: high

Photo .1 Camera setting around the flushing hollow

-Point-count for assessing the bird community

Given the difficulty of locating Francolin nesting sites, we decided to collect bird-community data on Mount Cameroon at each station where we stopped, to check for the presence of the Francolin using playback or by listening, in order to maximize our sampling effort. The distance between neighbouring points was be minimum 200 m (Bibby *et al*., 2000; Guetse et al., 2024). When the francolin responded the playback call, we proceeded to randomly search for nests at the census points. Two visits were conducted at each census point, recording all birds (both visually, listening to the sound and playback to detect francolin) within a 50 m radius for 10 minutes.

Photo2: Project proponents doing point counts

Results

A total of 65 bird species (791 individuals, including 46 detections of the Mount Cameroon Francolin) were identified during the survey (see checklist in Appendix). The abundance of the francolin declined progressively from areas within Mount Cameroon National Park to areas outside the park, and from undisturbed to disturbed forest sites.

Across the full survey period, no nests, eggs, or nest structures attributable to the Mount Cameroon Francolin were found. Although adults and sub-adults were recorded both visually and by playback, no reproductive behaviors such as courtship displays, parental care, or brooding were observed.

Potential Reasons for the Lack of Nest Detection

a. Hunting pressure and bush fires

During the survey, we observed several signs of hunting, including active trapping of francolins (photo 3). Hunting pressure is known to be high on Mount Cameroon, especially during the dry season when vegetation cover is reduced (Nkembi et al., 2017). Given that francolins are terrestrial, slow-moving, and particularly sensitive to habitat alteration (Garson, 2000; Ssemanda & Fuller, 2005; Arlette et al., 2012), persistent disturbance likely forces breeding individuals into remote or inaccessible locations. Additionally, fires set in savanna zones to facilitate hunting often spread into forest savanna ecotones, destroying suitable nesting habitat and causing direct mortality to eggs and chicks (Nana Eric, ABC report, 2022).

Photo.3 Francolin on a snare

b. Elephant disturbances

Several mid-elevation zones (1,100–1,700 m) exhibited substantial African forest elephant disturbance, including browsing, bark stripping, trampling, and extensive alteration of the understorey. Such impacts may reduce availability of dense ground cover required for nesting (Blake et al., 2009). For instance, forest structure changes affect bird nesting sites and foraging opportunities (Whelan, 2001; Bakermans *et al*., 2012). There is a report that claims that elephants browsing from the Mount Cameroon Francolin's habitat would prevent it from reproducing (Nana Eric, ABC report, 2022), which remains to be proved, because the species is rare and little is known about its biology. Its nests and nesting habitat remain undescribed.

c. Seasonal rainfall variability

The study coincided with atypical rainfall patterns, including a delayed onset of rains. Because ground-nesting Galliformes typically synchronize reproduction with rainfall and vegetation growth, such anomalies may have shifted or suppressed breeding activity during the study year.

d. Uncertainty about breeding seasonality

Interviews we had with hunters yielded inconsistent reports on breeding timing mentioned in literature (October –December):

- Some observed juveniles between March–May.
- Others reported reproductive activity in January-February.
- Some people stated breeding occurs generally in the dry season without specifying the months.

This uncertainty underscores the need for year-round monitoring to reliably determine the breeding phenology of the Mount Cameroon Francolin. Breeding timing may vary annually with rainfall patterns and food availability.

e. Climate change and elevational shifts

Consistent detections at unusually high elevations suggest ongoing upslope shifts, similar to patterns observed in other African montane francolins (Abrha et al., 2025). Such distributional changes may push birds into suboptimal or unfamiliar nesting habitats, thereby reducing nest detectability.

Awareness campaigns

The awareness campaigns were organized in schools and in chiefdoms in the area to teach local people the ecological role of birds (photo 2). A quiz was organized at the end and prizes (t-shirts) given to best student who answered the questions to foster conservation.

Photo 2. Outreach campaigns

Conclusion

This project represents the first attempt to document the breeding ecology of the Endangered Mount Cameroon Francolin, a species endemic to a highly restricted range on Mount Cameroon. By attempting to locate nests and identify breeding habitats, this study lays the foundational fieldwork needed to determine the specific ecological requirements for successful reproduction. Even though nests were not found, the results highlight the strong influence of ecological disturbances, climate variability, and human pressures on both the detectability of breeding activity and the potential success of nesting. Environmental factors, such as habitat modification by elephants, recurrent fires, and climate-driven ecological changes, are likely to reduce nest visibility and may also impact breeding success.

Divergent reports from hunters regarding reproductive timing further emphasize the need for comprehensive, multi-season studies. In the absence of long-term, systematic surveys, it remains uncertain whether the species breeds during a distinct season or responds flexibly to environmental cues, such as rainfall or fruit availability. Accurately determining the breeding season and reproductive ecology is therefore crucial for designing effective conservation strategies to ensure the long-term survival of the Mount Cameroon Francolin.

Building on the camera traps already acquired through this project, we aim to mobilize additional resources to expand the research. The next phase will integrate local ecological knowledge from experienced hunters with advanced techniques such as radio-telemetry, enabling us to accurately determine the breeding season and fully document the reproductive ecology of the Mount Cameroon Francolin.

Acknowledgements

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Budget

Description of budget item	Unit cost in £	number	Total Cost in £
Cost for research permit application	350	1	350
10 Camera traps +32 SD cards (for nest monitoring)	£112/Bushnell camera	10	1120
Energizer AA Batteries for Cameras alimentation	£30	4	120
Vehicle rental + fuel to transport researchers + field gear to field site and back	£50/vehicle rental £20/fuel	2days 2days	140
Perdiem for field guides (02 local guides)	£8/day	60days	960
Feeding and accommodation for applicant and field guide	£7/day	60days	420
Printed t-shirts	£3.5/t-shirt	30	105
Awareness campaign	Lump sum		100
Grand Total			**3315**
Amount obtained from ABC			**3000**

APPENDIX

List of bird species identified during this survey

N°	Scientifique name	Commun name
1	*Pternintis camerunensis*	Mount Cameroon Francolin
2	*Amblyospiza albifrons*	Yellow-eyed Black Flycatcher
3	*Apalis cinerea*	Grey Apalis
4	*Apaloderma vittatum*	Bar-tailed Trogon
5	*Arizelocichla tephroleama*	Grey-headed Greenbul
6	*Bradypterus lopezi*	Evergreen Forest Warbler
7	*Buccanodon duchaillui*	Buff-spotted Woodpecker
8	*Buteo auguralis*	Augur Buzzard
9	*Campethera tullbergi*	Tullberg's Woodpecker
10	*Chrysococcyx cupreus*	African Emerald Cuckoo
11	*Chrysococcyx klaas*	Klaas's Cuckoo
12	*Cinnyris reichenowi*	Reichenow's Sunbird
13	*Cisticola chubbi*	Chubb's Cisticola
14	*Colius striatus*	Speckled Mousebird
15	*Coracina azurea*	Blue Cuckooshrike
16	*Corythaeola cristata*	Great Blue Turaco
17	*Cossypha isabellae*	White-browed Robin-Chat
18	*Criptospiza reichenovii*	Reichenow's Seedeater
19	*Crithagra burtoni*	Burton's Canary
20	*Cyanomitra oritis*	Eastern Olive Sunbird
21	*Dendropicos aguimp*	African Grey Woodpecker
22	*Dendropicos elliotii*	Elliot's Woodpecker
23	*Dendropicos fuscescens*	Cardinal Woodpecker
24	*Elminia albiventris*	White-tailed Blue Flycatcher
25	*Estrilda nonnula*	Black-rumped Waxbill
26	*Euplectes capensis*	Cape Widowbird
27	*Grafisia torquata*	Collared Apalis
28	*Gymnobucco calvus*	Bare-faced Go-away-bird
29	*Kakamega poliothorax*	Grey-chested Kakamega Greenbul
30	*Laniarius atroflavus*	Yellow-billed Boubou
31	*Laniarius poensis*	Fernando Po Boubou
32	*Linurgus olivaceus*	Olive Bulbul
33	*Lybius leucocephalus*	White-headed Barbet
34	*Malaconotus gladiator*	Grey-headed Bushshrike
35	*Nesocharis shelleyi*	Shelley’s Oliveback
36	*Nigrata fusconotus*	Dusky-backed Starling
37	*Oriolus auratus*	African Golden Oriole
38	*Oriolus larvatus*	Black-headed Oriole
39	*Oriolus nigripennis*	Black-winged Oriole

40	*Phylloscopus trochilus*	Willow Warbler
41	*Pitta reichenowi*	Reichenow's Pitta
42	*Platysteira cyanea*	Brown-throated Wattle-eye
43	*Ploceus bicolor*	Black-headed Weaver
44	*Ploceus insignis*	Village Weaver
45	*Ploceus melanogaster*	Black-bellied Weaver
46	*Pogoniulus bilineatus*	Yellow-rumped Tinkerbird
47	*Pogoniulus coryphaea*	Red-rumped Tinkerbird
48	*Pogoniulus scolopaceus*	Simple Tinkerbird
49	*Pogoniulus simplex*	White-tailed Warbler
50	*Poliolais lopezi*	Baird’s Warbler
51	*Prinia bairdii*	Banded prinia
52	*Psalidoprocne fuliginosa*	Mountain saw-wing
53	*Muscicapa adusta*	African Dusky Flycatcher
54	*Pternintis squarmatus*	Scaly Francolin
55	*Pycnonotus barbatus*	Common Bulbul
56	*Saxicola torquatus*	African Stonechat
57	*Silvia abyssinica*	African Hill Babbler
58	*Stizorhina fraseri*	Fraser's Forest Flycatcher
59	*Tauraco macrorhynchus*	Great Blue Turaco
60	*Treron calvus*	African Green Pigeon
61	*Turdus pelios*	African Thrush
62	*Zosterops atricapilla*	Black-capped White-eye
63	*Urolais epichlorus*	Green Hylia
64	*Zosterops luteus*	Lemon-bellied White-eye
65	*Zosterops melanocephalus*	Mount Cameroon speirops