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Behaviour of the White-necked Picathartes *Picathartes gymnocephalus*, at nest sites prior to breeding

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Summary

White-necked Picathartes *Picathartes gymnocephalus* apparently made regular visits to their nesting sites outside the breeding season and roosted in the vicinity all year round. Observations during breeding suggested that the birds do not have helpers at the nest as has been previously speculated. All nests in a colony were used simultaneously by different breeding pairs. Previous assessments of *Picathartes* population sizes based on reports that one breeding pair uses two nests at a colony were therefore probably underestimates. A rarely seen group interaction behaviour, involving group mutual bowing, is probably associated with breeding.

Résumé

Comportement du Picatharte à cou blanc *Picathartes gymnocephalus* sur le site des nids avant la reproduction. Le Picatharte à cou blanc *Picathartes gymnocephalus* faisait, semble-t-il, des visites régulières au site des nids en dehors de la saison de reproduction et passait la nuit à proximité toute l'année. Des observations au cours de la reproduction suggèrent que les oiseaux ne reçoivent pas d'aide au nid comme on l'avait pensé auparavant. Tous les nids d'une colonie étaient utilisés simultanément par les différentes paires nicheuses. Des estimations antérieures de la population de *Picathartes*, reposant sur le fait qu'une paire nicheuse utiliserait deux nids dans la colonie, étaient probablement sous-évaluées. Un comportement de groupe, rarement observé, avec des salutations mutuelles, est sans doute associé à la reproduction.

Introduction

The White-necked Picathartes *Picathartes gymnocephalus* occurs in Guinea, Sierra Leone, Liberia, Ivory Coast and Ghana whilst its only congener, the Grey-necked Picathartes *P. oreas* has been recorded from Nigeria, Cameroon, Gabon, continental

Equatorial Guinea and Bioko (Fry *et al*. 2000, Marks *et al.* 2004). Both species have conservation status Vulnerable (BirdLife International 2004) and are listed on Appendix 1 of CITES. National law in Cameroon, Ghana and Sierra Leone protects them but enforcement is minimal (pers. obs., R. Fotso & E. Owusu pers. comm.). Unusually for rainforest birds, Picathartes breed in mud nests in colonies of up to 40, usually on rock or cliff faces and/or cave roofs (Thompson & Fotso 1995) but occasionally on tree trunks (*e.g*. Waltert & Muhlenberg 2000).

Picathartes biology and ecology have until recently not been studied in detail and with a few exceptions (Grimes & Darku 1968, Tye 1987, Fotso 1993) studies have been qualitative and based on either brief observations in the wild (*e.g*. Mudd & Martins 1996, Waltert & Muhlenberg 2000) or on observations of captive birds (*e.g*. Faust 1971, McKelvey 1981). This paper describes roosting and pre-breeding behaviour of White-necked Picathartes observed during a long-term study of the ecology and behaviour of the species in Sierra Leone (Thompson 1997, 1998, 2001, 2004).

Study area and methods

The study was carried out in three forest reserves in Sierra Leone: the Western Area Peninsula Forest (WAPF, 177 km^2, 8°15´N, 13°15´W) on the Atlantic coast, the Gola Forest (748 km^2, 7°40´N, 10°45´W) on the eastern border with Liberia, and the Kambui Hills (158 km^2, 7°45´N, 11°15´W) about 70 km to the west of Gola. All three areas are rugged and hilly (up to 800 m a.s.l.) with steep-sided valleys and numerous streams. Vegetation is essentially lowland evergreen rainforest, which grades into forest-farm regrowth mosaic within 1–2 km of the reserve boundaries. The three study colonies comprised three (WAPF), six (Gola) and seven nests (Kambui Hills), situated on huge rocks (5.5–13.5m high by 13.5–16.1m wide) in closed canopy forest of canopy height at least 10m, close to seasonally flowing streams.

Nest sites were observed for a total of 508 h (WAPF 206, Gola 48, Kambui 254). Total observation time was distributed between different stages of the breeding cycle as follows: pre-breeding activity (before any eggs were laid) 145 h, incubation 153 h, nestling stage 154 h. Observations were made from a 1.5 x 1 x 1 m hide constructed from leaves and branches about 10 m from each breeding colony. This paper describes observations made during the pre-breeding period in 1992 and 1993. To determine diurnal activity at nesting sites, birds were observed at the WAPF and Kambui Hills nesting sites from 8h00–18h00 for 30 hours over three days in April and May 1992. Similar observations were made at the same sites for 57 hours over seven days with observations from 0800-1800 hours between 8 and 27 July 1993.

Behaviour was quantified using the individual focal sample method and simultaneous scanning (Altmann 1974). The number and duration of the following activities were measured and recorded: nest repair (birds bringing nesting material to

the nest or actively arranging material already in the nest); nest visits (birds sitting in the nest or perched on its rim without engaging in nest repair); aggressive encounters (fights or one bird chasing another without any immediate subsequent behaviour to indicate that the chase might be part of some other type of interaction); preening (auto- and allo-preening); hopping about; standing still (for longer than 1 min.); perched on a branch; bathing; foraging for food. Active behaviours were given precedence over passive ones whenever two or more categories occurred simultaneously. Structured observation periods were supplemented by opportunistic observations.

Results

The breeding cycle

Detailed results on the timing of breeding in Sierra Leone will be published elsewhere but in general egg-laying occurred from June to December with chicks in the nest from August to January. However, onset of egg-laying differed between sites and years and began later, in late July to August, at WAPF and Kambui Hills in 1993 (Thompson 1997 and unpubl.). From February to May, there were no eggs or nestlings at nesting sites. Birds were regularly seen at nest sites from April onward and nest repair started in May after the first rains (Thompson 1997 and unpubl.).

Activity at nesting sites

In April and May, birds were seen at the WAPF and Kambui Hills nesting sites (no observations were made in the Gola forest at this time) only at dawn and dusk, 08h00–10h00 and 16h00–18h00. Numbers seen per day ranged from two to nine and birds were present at the sites for 12 % of observation time. Birds arrived at the sites singly or in pairs, from the same general direction each day, and carried out maintenance activity such as bathing and preening. Occasionally, birds made brief visits to nests, or chased each other short distances; they sometimes displaced each other at nests. Nest repair activity was not observed until late May.

In July, about 2 – 8 weeks prior to the start of egg-laying, birds visited the WAPF and Kambui Hills nesting sites more or less throughout the day, being present for 22 % of observation time. Maximum numbers seen at this time were 14–16 birds at the Kambui Hills nesting site. Birds spent most of this time repairing damaged nests (31 %). The remaining time was largely divided between perching on nest rims (17 %), sitting in nests for 5–60 s periods (14 %), hopping about (14 %), autopreening (9 %, allopreening was seen only once), and standing still (5 %). Other activities (10 %) included bathing, foraging, aggression, and a peculiar group behaviour pattern described below.

Nest repair was mainly observed in July at the WAPF and Kambui Hills nesting sites and comprised birds resealing holes in the bottom of old mud nests remaining

from the previous breeding season, and building up nest cup walls. Two individuals cooperated in repairing each nest. As in many passerines, one bird remained at the nest and arranged nesting material (mainly wet mud but also dried leaves, fibres and twigs) brought by the other. Roles were frequently switched and birds occasionally swallowed and regurgitated mud before using it on the nest.

Group Behaviour

A peculiar group behaviour was observed three times in July between 18h00 and 19h30 at the Kambui Hills site, as birds prepared to roost. Typically, 6–7 birds would stand 0.5–1 m apart in a loose circle on the ground in front of the nesting rock and make short abrupt runs toward each other. The bird approached would move a short distance off and in turn chase the same or another individual. Chasing sequences sometimes extended to low branches on the trees surrounding the breeding site. At intervals, a bird would stand and lower its head in a bowing display as if briefly looking at the ground between its legs. The effect was to present the yellow crown and black ear patches to the other bird(s) in the immediate vicinity. Each bow was usually followed by feather ruffling and tail shaking. One interaction session lasted 5 min. whilst each of the others lasted 15 min. Bowing behaviour occurred about once every 2–3 min. within each display session. Not all birds at the site took part in the displays; on one occasion, two individuals remained standing on a nearby rock throughout the session.

Roosting behaviour

In July and August 1992, a year when egg-laying started in October at the Kambui Hills nesting site (Thompson 1997), single birds were found roosting in the nests at night, in all three site checks made. A maximum of three nests at the nesting site were seen to be used in this way for roosting, although there were seven nests at the site. However, all seven nests were subsequently used for breeding. At certain times in the breeding season, all nests were being used simultaneously by breeding pairs of birds. When eggs and chicks were in the nest (Oct –Jan), single birds invariably roosted in the nests at night.

From February to April 1993, after chicks had fledged (the non-breeding season), birds congregated at the Kambui Hills breeding site in the evenings but usually left at dusk in different directions, singly or in pairs, to roost in nearby trees. This occurred in five of six site checks. In one case however, two birds roosted singly in separate nests at the nesting site. No site checks were made at night in May and June.

Discussion

The pattern of activity observed at nesting sites suggests that White-necked Picathartes made regular visits to their nesting sites outside the breeding season and roosted in the vicinity all year round.

No more than two birds at a time were seen repairing a particular nest. Although birds were not distinguishable by plumage and only a few marked birds were eventually observed breeding (Thompson 1997), these observations agree with those of Tye (1987) and Fotso (1992) who also did not observe more than two individuals attending nests. Contrary to speculation by Grimes (1976), of possible cooperative breeding by the species, the birds do not seem to have helpers at the nest.

A striking feature of the behaviour of White-necked Picathartes prior to breeding was the group interaction behaviour observed in the Kambui Hills, in which birds engaged in group bowing displays. Similar behaviour has been observed during the Picathartes breeding season in Ivory Coast (Mudd & Martins 1996*)*, when a single individual was seen performing a behavioural pattern (repeated three times in 30 min.) which included a deep bow with raised and partially open wings, whilst facing a roosting cave entrance around which several other birds were gathered. Mudd & Martins (1996) were uncertain whether the behaviour observed was peculiar to that individual, or a formalised display associated with roosting or breeding, but Fry *et al.* (2000) refer to it as a "pre-group-roosting-intention-display". The observations described in this study and the timing of the behaviour (pre-breeding in Sierra Leone and breeding in Ivory Coast) indicate that it is more likely associated with breeding.

Several authors have suggested that each pair of White-necked Picathartes uses one nest for breeding and another for roosting at the same colony (Grimes & Darku 1968, Collar & Stuart 1985, Allport *et al.* 1989, Fry *et al.* 2000), so that number of nests would be double the number of breeding pairs present. However, these statements all trace back to observations by Grimes & Darku (1968) who found nests in pairs at two colonies, and two nests associated with one pair of birds at one of these sites. In contrast, the present study showed simultaneous use of all nests in a colony by different pairs, indicating that previous population assessments based on one pair using two nests (*e.g.* Allport *et al.* 1989, Collar & Stuart 1985) may have been underestimates.

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