Notes and records

Faecal analysis of Nahan's Francolin *Francolinus nahani*, Budongo Forest Reserve, Uganda

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Introduction

Nahan's Francolin *Francolinus nahani* is an endangered, shy tropical forest bird species (Urban, Keith & Fry, 1986; Bennun, Dranzoa & Pomeroy, 1996; Plumptre, 1996; BirdLife International, 2000). Therefore, it is difficult to follow and observe their foods and feeding in their natural environment. Records show that they eat insects, small mollusks, green shoots, seeds and bulbs (Urban *et al.* 1986, Fuller, Carroll & McGowan, 2000). The faecal analysis method for determining the principal foods eaten by birds is good because neither the adults nor the chicks are affected or harmed (Moreby, 1988). However, limited information is available on identifying the arthropod components (Green, 1984; Moreby, 1988, 1993). Our goal was to understand the constituents of the food eaten by Nahan's Francolin.

Study area

The study was carried out in Budongo Forest Reserve, Uganda (Fig. 1) in compartments N15 – primary; N3 – logged 50 years ago and W231 – logged twice 40 and 5 years ago. Their location in relation to the entire Reserve is given in Fig. 2.

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Methods

Collection of faecal samples

Faecal samples of adults were collected between July 1998 and November 1999 from mist-netted birds that were kept for about 10–20 min in cotton bags in preparation for attachment of radio transmitters. The birds defecated either in the bags while they were being kept or upon being released.

Faecal sample of the chicks were obtained from roosting sites, ascertained by radio trucking technique. The adults do not seem to defecate at roost sites. Females with downy chicks did not roost with the other members. The collected faecal samples were preserved in 5% formalin.

Analysis of the faecal samples

The faecal samples were analysed by M. Steven from the Game Conservancy, U.K. Samples were washed in a 210-mm mesh sieve to remove uric acid content and very fine organic matter that would otherwise cloud a sample and obscure the key items. The samples were then preserved in 70% ethanol, later examined under a microscope (120×). Vertebrates' identifications were at class, order or family level where identifiable parts survived the digestive system passage.

Results

Of 74 captures, we obtained faecal samples from fifteen adults. One of the fifteen adults was followed all through the incubation period to hatching and was then monitored with three downy chicks for four consecutive days after hatching. Five samples from the three chicks were collected from their roosting sites. Termites and mollusks dominated the invertebrates fed upon by the adults whereas termites, coleopterans and lepidopterans dominated the samples from chicks (Fig. 3). Quantitatively, termites dominated the samples of the majority adults with the number of individual termites counted from mandibles ranging from 1 to 600 per adult (Fig. 4).

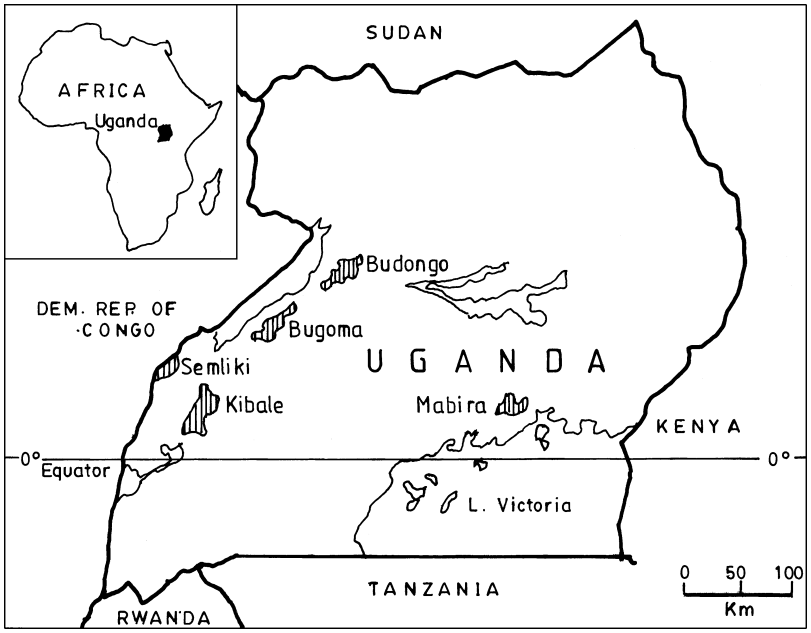

Fig 1 Budongo Forest Reserve in relation to other reserves in Uganda where Nahan's Francolin has been reported

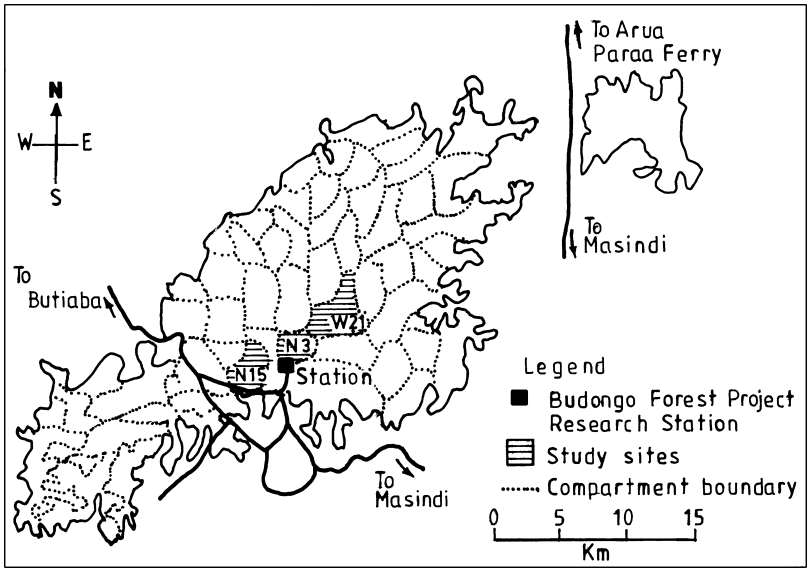

Fig 2 Compartments of Budongo Forest Reserve where the study was done

Discussion

Feeding habits

Being ground-dwelling birds, it is not surprising that the diet of Nahan's Francolin is composed mainly of ground invertebrates. During our study in Budongo Forest, the areas where Nahan's Francolin had recently scratched would easily be noticeable in areas with dense leaf litter and the research trail system, especially during the set season. However, the birds would spend most of the time in areas with dense understorey vegetation (Sande, Dranzoa & Wegge, 2001).

As they are very shy, it is not practical to go near them to observe their feeding habits in such habitats. The dense areas are presumably moist and are preferred probably

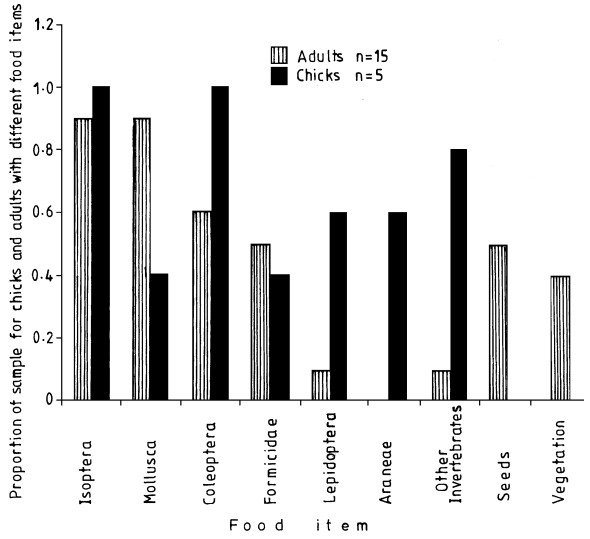

Fig 3 The proportion of faecal samples where the different food items were found for the chicks and adults

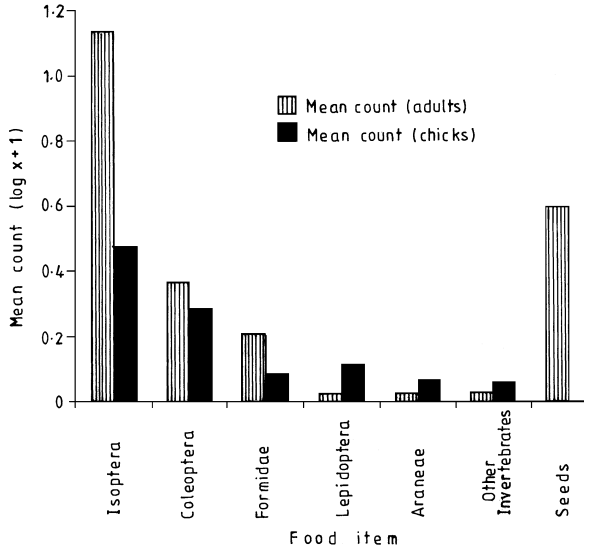

Fig 4 The mean numbers of different food items per sample

because the birds are able to pick insects, larvae mollusks, and other food items within their reach that require such habitat conditions from the understorey vegetation or on the ground. As such food items are probably less abundant in open habitats, the birds tend to avoid. The francolins also get their feed by scratching the leaf litter but the amount of leaf litter and the food items therein have not been not sampled both in the areas preferred and in those not preferred during the study.

Food items

One other drawback of the faecal analysis technique in determining the food insect component of a bird's diet is that only hard parts of arthropods remain as faecal matter after digestion. Therefore, arthropods belonging to order Diptera, the smaller Coleoptera, nympal-stage Hemiptera, and the smaller Hymenoptera may not be identified at all or their numbers may be underestimated they being soft-bodied and their faecal sample are rarely found. The high prevalence of termites, mollusks, Coleoptera and to some extent Formicidae could have been either because these groups of invertebrates were abundant in the home range of the birds and thus were readily eaten, or they featured more because of their hard parts that could not be digested, thus they were easily identifiable in the samples.

The feeding requirements of Nahan's Francolin are very similar to those of other forest francolin *Francolinus lathami*, which comprises 90% arthropods and 10% plant matter (Urban *et al.*, 1986). Galliforme chicks search for and catch their own food possibly with some help from their parents. A group with downy chicks that was radio tracked continuously for 4 days after hatching showed that the group preferred to forage in areas with low understorey vegetation density where they thoroughly scratched the leaf litter. This is probably because the parents had to help the chicks to locate the small arthropods that the chicks could handle from the leaf litter. Very young chicks of Phasianidae require a protein-rich arthropod diet for the first few weeks of life. The need for a high-protein diet for the very young chicks probably explains why there was no plant matter in the samples analysed for the chicks that had just hatched.

Conclusion

This study provided additional information on the species' diet. It is clear that arthropods form a significant part. Hence forestry practices that negatively impact on these food resources have a potentially negative impact on their survival. However, more work is still required to better understand the species' seasonal requirements within habitats of structural diversities. Combined approach of faecal and insects sampling within the home range of

radio-tagged individuals can be used to correlate the foods eaten with potentially available foods.

Acknowledgements

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