

## What are wood-hoopoes shouting about?

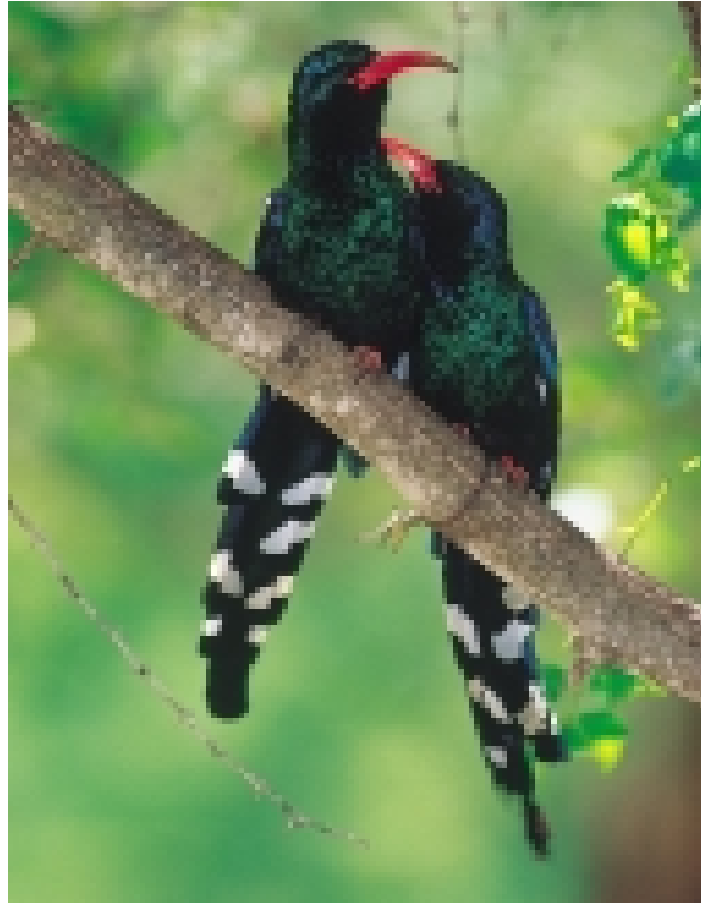
Groups of Green (Red-billed) Wood-Hoopoes *Phoeniculus purpureus* are highly vocal, and are usually heard well before they are seen. When two neighbouring groups meet, a raucous, vocal rallying contest follows. The adults in the intruding group cackle loudly together while bowing up and down; the group that owns the territory responds in similar fashion. Contests may last for up to 45 minutes, with groups rallying alternately, and this 'assessment phase' usually precludes the need for escalated fighting. Because groups may interact several times a day, these vocal displays form an integral part of wood-hoopoe life.

Cambridge University and FitzPatrick doctoral student Andy Radford has recently been investigating which group members participate in rallies, what information is conveyed, and who emerges triumphant. Individual wood-hoopoes differ in their contributions to rallies depending on their sex and dominance status, as well as on the composition of the opposing group. Both males and females direct most effort in responding to intruders of their own sex, perhaps because these represent a greater threat to their breeding or foraging opportunities. Subordinate individuals also tend to cackle for longer than dominants,

possibly because they have the greatest need to ensure that no new birds succeed in joining the group (and thereby threaten their already lowly status).

Contests are either decided within five minutes (nearly 60 per cent are 'short' contests) or they take more than 15 minutes to reach an outcome (termed 'extended' contests). On many occasions, an intruding group may simply be checking to see whether a territory is indeed occupied, or investigating the composition of a neighbouring group to assess whether a breeding vacancy exists. As soon as the intruding group has established this information, it retreats. This would explain why resident groups tend to win short contests.

However, an intruding group may also be seeking a more tangible reward, leading to a more extended contest. Resident groups try to match the length of each rally given by intruding groups and the contest goes on for as long as they continue to achieve this. If a resident group cannot match the rallying stamina of the intruders, the contest is lost, and the residents are forced to retreat. The intruders are left to forage and check out roost holes in the residents' territory for up to an hour. In extended contests, the relative size of the two groups is all-important: it is easier for larger groups to rally for



CHRIS VAN ROOYEN

*Mutual preening in Green Wood-Hoopoes builds group cohesion, important in vocal contests.*

longer, because each individual has to make a smaller personal contribution and thus suffers a lower metabolic cost. As a result, larger groups tend to win extended contests.

Intriguingly, these contests do not result in permanent changes in territory boundaries. Once an intruding group has finished foraging in its neighbours' territory, it returns to its own, and subsequent interactions between the groups are conducted on the same boundary line as before. Despite large fluctuations in group sizes over the years, territories have remained remarkably fixed in size – many recent

vocal contests have been recorded not only in the same areas, but in exactly the same trees as 20 years ago.

Although many species live and interact in groups, few studies have investigated the details of inter-group contests. The vocal rallying contests of Green Wood-Hoopoes suggest that many different things are being shouted at the same time. On the one hand, individuals (particularly subordinates) are trying to defend their own position within the group; on the other, they are also helping their fellow group members in group territorial defence. □

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Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch 7701, Cape Town, South Africa.

Tel. (021) 650 3290; fax (021) 650 3295; e-mail [birds@botzoo.uct.ac.za](mailto:birds@botzoo.uct.ac.za)