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MIXED-SPECIES FLOCKING OF NIGERIAN FOREST BIRDS

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The adaptive significance of mixed-species flocking in birds has attracted much recent attention (for references, see Krebs 1973). In most parts of the tropics, mixed flocks in forest habitats are particularly large and varied (e.g. McClure 1967, Brosset 1969, Croxall 1976) and provide useful data for testing hypotheses of the functions of flocking. The only published information on forest flocks in western Africa is Brosset's account (1969) of flocks in Gabon, though casual observations are reported in Bannerman (1930-51) and elsewhere. In view of this scarcity of information, it seems worth recording the following observations.

OBSERVATIONS

On 4th October 1975, I visited an area of forest near Erin-Ijesha (approximately 07° 36'N, 04° 45'E), southern Nigeria. The vegetation consisted of a tree canopy at about 40 metres, above an understory of dense bushes up to about 4 metres. This habitat had been subject to shifting cultivation, and was therefore not entirely natural, though some stands of trees were probably remnants of the original forest vegetation.

During the afternoon, two mixed flocks were encountered. The larger flock was followed for about 20 minutes, and the identity and activities of its members were determined. Table 1 lists the numbers of birds and species participating, their positions in the vegetation profile and in the flock, and whether or not they were seen foraging or calling. This shows a total of 30 birds in 18 species, although it is possible that the four which remained at the rear of the flock did not move on with the rest. Only 6 species were represented by more than one bird. In these, the birds kept in close groups which may have been mated pairs and their offspring; this was confirmed in the case of Fraseria ocreata by the occurrence of repeated begging by two of the four birds.

The flock progressed rapidly through the forest, each species keeping to its characteristic position in the flock. Birds of different species were separated by 2-3 metres or more, although conspecifics approached more closely. Only four species were obviously calling, and the frequency of contact calls was not as high as in many mixed flocks

Table 1. Composition and activity of mixed-species flock in forest at Erin-Ijesha, Nigeria

Species	Number of birds	Height in vegetation	Position in flock	Whether foraging	Whether calling
Chrysococcyx cupreus	1	very high	centre		
Ceuthmochares aereus	1	mid	rear		+
Gymnobucco calvus	4	high	front	+?	+
Pogoniulus scolopaceus	1	mid-low	centre	+	
Pogoniulus bilineatus	1	mid	centre	+	
Dryoscopus sabini	2(pair)	mid-high	centre	+?	
Oriolus nigripennis	1	mid	rear		
Stizorhina fraseri	1	mid	centre	+	
Apalis rufogularis	1	low	centre	+	+?
Muscicapa caerulescens	3	high	centre	+	+?
Fraseria ocreata	4	mid-high	front	+	
Platysteira castanea	1	low	centre	+	+
Terpsiphone rufiventer	3	mid-high	front		+
Anthreptes collaris	1	mid	rear	+?	
Nectarinia sp.	1	mid	centre	+	
Malimbus rubricollis	2	very high	centre	+	
Nigrita luteifrons	1	mid	rear	+?	
unidentified sunbird or warbler	1	mid	front	+	+?

(e.g. McClure 1967, and pers. obs.). At least 16 of the birds, in 10 species, were foraging; all the prey seen were small insects on foliage and bark. When an eagle (probably Hieraaetus sp) flew overhead, just above the tree canopy, the flock suddenly and rapidly dispersed, the birds remaining in patches of dense foliage until the raptor had passed, when the flock reformed.

The second flock encountered was different in composition and behaviour. It contained about 15 birds, which formed a very close, rapidly moving group within which there was no consistent order of progression. Many of them were foraging for insects on foliage. Birds identified were Eremomela badiceps, Hyliota violacea, Batis senegalensis, Muscicapa epulata, Sylvietta ?denti, Artomyias ?fuliginosa/ussheri, and Pogoniulus sp, but there were certainly other species present. A broadbill, Smithornis ?rufolateralis/capensis remained in the vicinity, though at some distance from the main flock.

DISCUSSION

It is obviously not possible to draw any firm conclusions from these observations, but several points are worth making.

Brosset (1969) records seven of these species (Platysteira castanea, Fraseria ocreata, Ceuthmochares aureus, Malimbus rubricollis, Apalis rufogularis, Anthreptes collaris, and Stizorhina fraseri) as members of mixed flocks in Gabon. Congeners of many of the remaining species join mixed flocks regularly elsewhere, either in forest (Brosset 1969, and N. C. Davidson, pers. comm.) or in savanna (Greig-Smith 197-). The barbets Gymnobucco and tinkerbirds Pogoniulus have apparently not been reported as mixed flock members, but I have records of associations between P. scolopaceus and G. calvus in southern Nigeria, and between G. calvus and Lybius hirsutus in southern Ghana. This information suggests that the mixed flocking habits observed may be typical of the species throughout their ranges.

The observations demonstrated that the birds of the first flock did respond to predators, though without showing that flocking improved this response. The fact that all the species involved were wholly or largely insectivorous (with the possible exception of G. calvus) suggests that there may be a feeding advantage. Although only half of the first flock members were seen foraging, the observations were too brief to be certain that the others were not also foraging intermittently. Flushing of insects, such as Brosset (1969) proposed, might have been operating in the smaller, compact flock, but the wide spacing of birds in the larger flock suggests that it would not occur there. Any feeding advantages are therefore more likely to lie in some form of 'social learning' (see Krebs 1973).

Previous studies of mixed flocks have recognised 'nucleus' species, which are present as a close group of birds followed by the other member species (see Winterbottom 1949). Brosset (1969) mentions Platysteira castanea as a nucleus species, but in these flocks it did not appear to behave as such. Indeed, no other species obviously fulfilled that role, though the observations were too brief to be sure that there was no nucleus.

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