

Displays and Associated Behaviour of Wild Superb Birds of Paradise *Lophorina superba*

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Summary

Field observations were conducted on Superb Birds of Paradise *Lophorina superba*, mostly in the display area of one male, at Kompiam, Enga Province, Papua New Guinea, in November and December 1995. Display and territorial behaviour, copulation and vocalisations are described. The display season commenced by early June and lasted until early December. Displays were conducted mainly at or near ground level, with secondary display sites at higher levels in the forest.

Introduction

The Superb Bird of Paradise *Lophorina superba* is a sexually dimorphic, polygynous species, widespread and common in primary forest, forest edge, secondary growth and regrowth scrub at c. 1000–2250 m above sea level (asl) throughout mainland New Guinea (Beehler et al. 1986, Coates 1990). Superb Birds of Paradise are primarily insectivorous (Beehler & Pruett-Jones 1983) and appear to be territorial.

Adult males are jet-black with an iridescent blue permanently extended breast-shield, erectile iridescent blue-green plumage on the crown, tufts of stiff black feathers above and below the base of the bill (narial tufts), and a long, erectile and spreadable black velvet-like cape of modified nape feathers (Frith & Frith 1988, Coates 1990, Attenborough 1996; see Plate 58). Females and immature males are grey-brown above, pale grey underneath with distinct ventral barring, and have a definite white eye-stripe, similar to many other sexually dimorphic birds of paradise in female plumage (see Cooper & Forshaw 1977, Beehler et al. 1986, Coates 1990).

Displays of wild birds were undescribed until the account of Frith & Frith (1988), who watched a wild adult male display to a female and copulate on a fallen dead tree trunk (0.5 m diameter) supported 0.5–1 m above the ground. We use their descriptive terminology in this report. Crandall (1931) had earlier stated that Superb Birds of Paradise 'dance on or near the ground' (C. Frith in litt.), but otherwise the display of wild birds was said to be within or below the canopy (in Frith & Frith 1988). Beehler & Pruett-Jones (1983) noted that each male had a specific tree or a small group of trees from which he called and where he received females.

Methods and observations

We made observations in 1995, in forest at about 1700–1800 m asl, roughly 6 km south-east of Kompiam, Enga Province, Papua New Guinea. The study area was c. 1–2 hectares, mostly secondary growth (canopy height averaging 5–10 m), in which three adult male Superb Birds of Paradise held territories.

Two well-camouflaged hides of bush material looked out from opposite sides of a 2 m length of fallen tree trunk (30 cm diameter), supported 1 m above the ground and sloping at about 20°, which was regularly used by one adult male as his main display site. The site was observed for at least 51 hours over eight days, observations usually commencing at dawn and finishing between 1100 and 1430 h.

During this time the adult male came and performed High Intensity Display (HID) on eight separate occasions at his main display site. Four more times he came to the

site but did not give HID, probably being accidentally disturbed on two of these occasions. Fourteen times he was seen or heard to give HID from at least six other sites within his territory, five of these sites within 15 m of the main site.

Display sometimes followed periods of much calling, and at other times followed shorter periods of calling or silence. On one occasion HID was heard after the male had been silent for over 18 minutes, at a time when other males in the area were also silent.

Initial Display Activity (IDA)

This phase of display was short in duration, lasting <1 minute in the absence of a female and 1–2 minutes when a female was present. The male flew low over the ground to the fallen tree trunk and sometimes called (Plate 58).

The main feature of IDA was cape-flicking, which the male performed by jerking his head to point down towards his feet and simultaneously flicking the unspreed cape well forward over his head. Cape-flicking was also commonly performed from calling perches.

On three occasions a female-plumaged bird was present, and aspects of IDA that were not observed on other occasions were then performed. Initially the female watched from near the display site before landing on the fallen trunk by the male, while the male cape-flicked and directed sleeked poses towards her with narial tufts pointing forwards (see Frith & Frith 1988, Figure 1). Sleeked poses were held for 1–2 seconds, but sometimes the male stayed pointing towards the female for longer, with movements almost too quick to be apparent (probably of his cape and/or his wings) which produced a muffled sound. He interrupted sleeked poses and cape-flicking with excited activity, occasionally calling, even hopping off the display site to cling onto an adjacent vertical branch (3 cm diameter) and then almost immediately hopping back onto the display site. All movements were characteristically jerky and, together with occasional heaving of the chest, caused shimmering of the iridescent breast-shield.

High Intensity Display (HID)

The male performed HID three times to a female. Twice he immediately directed HID towards her when she landed on the display site. The third time he commenced HID when she was close, and she flew to land on the display site straight afterwards.

HID began when the male faced the female and quickly spread his cape to form a wide and slightly concave velvet-black oval which contrasted dramatically with his iridescent breast-shield. His crown feathers were raised and obscured centrally by the black narial tufts, which gave the impression (in suitable light and from a suitable angle) of two iridescent blue-green eyes, one each side of the bill (cf. Frith & Frith 1988). As he spread his cape the male crouched away from the female, tail raised, and rapidly flicked his wings to make a loud and sharp mechanical 'tick-tick' sound. He held the crouched position for c. 2 seconds, then bobbed up and down still facing the female before crouching again, flicking his wings and producing another sharp 'tick-tick'. After holding this position as before he danced by bobbing and side-stepping in a semicircle around the female, always facing her and with his back to Hide 1, flicking his wings and producing first a 'tick-tick' and then a sequence of about 6–10 regular 'ticks', c. 2 'ticks' per 3 seconds. These 'ticks' were distinctive and could be heard from c. 50 m. The whole HID lasted <1 minute.

In two of the three displays the female left the display site during HID without copulation. The male held his pose for some seconds, motionless and with cape fully

expanded towards the female, and then lowered his cape and reverted to IDA briefly before flying off.

In the absence of a female, the male performed HID five times. He first turned about after IDA to face the opposite way and slightly down the trunk, and adopted a crouched position with the cape partially expanded but not raised above the head (reminiscent of *Parotia* spp. with the 'skirt' viewed from the rear, cf. Frith & Frith 1981). From this position he made jerky and restrained movements, gradually raising his cape. When after a few seconds his cape was completely raised, he suddenly crouched back and flicked his wings to make a 'tick-tick' sound. From there the display continued as in the presence of a female except that the male always faced in the same direction, bobbed forwards and backwards whilst 'ticking' and ended up c. 30 cm down the trunk from where he started. The male then lowered his cape, turned back to face Hide 1, performed some cape-flicking and sometimes called, and then either flew off or repeated HID. HID was performed from 0–3 times per visit to the main display site.

Copulation

On 11 November at 1029 h, after much calling over the preceding half-hour, the clicking sound associated with HID was heard about 30 m below the main display site. The male was then silent until 1037 h, when he flew directly to the main display site. He performed IDA for 1–2 minutes, directed towards a female-plumaged bird located between him and Hide 1. When she came within a metre of the display site, the male directed HID towards her. The female then hopped onto the fallen trunk facing him from above, at which the male retreated down the trunk about 50 cm and crouched again, still facing her, and flicked his wings to produce a 'tick-tick' sound for the second time. After pausing, he side-stepped up the trunk around her and back down again, 'ticking' as he went. The female turned to face the male when he was positioned above her, but when he danced back down the trunk she did not turn her body and the male mounted by hopping onto her back from behind. After c. 1–2 seconds both birds fell together to the ground out of view, and c. 2 seconds later the female flew up to a short sapling close by, paused and then flew off. The male stayed on the ground for a minute or more, then flew up to just above the trunk where he perched briefly and departed in the same direction as the female at 1040 h. This took place in direct sunlight, with the male facing the sun in HID.

Times of display

The earliest display was observed in the absence of a female at 0620 h, when the male gave HID three times (23 November). On 18 November at 0559 h, muffled sounds and then one 'tick-tick' were heard directly above Hide 1, just 12 minutes after the male had first called at dawn. HID was observed and heard at various times throughout the morning until 1226 h, and it is probable that displays later in the afternoon would have been noted if observations had continued.

Direct sunlight fell on the main display site from about 0900 h. The male sometimes displayed in shade or gloom, sometimes in direct sunlight and once in light rain just before a heavy downpour.

Other display sites of the adult male

The main display site was in an area where there was a number of fallen tree trunks, many appearing suitable for display sites. HID was observed on two of these fallen trunks and was heard at two or more other points in that area. On one occasion HID was observed on a thin branch c. 10 m up in an emergent tree. There was a secondary

display area c. 30 m down from the main site, where HID was heard five times and from where the male often called.

Sometimes the male displayed at more than one display site in a sequence. For example, on 18 November he gave HID 10 m from the main display site at 1145 h, on a branch (1 cm diameter) c. 2 m above ground. After this he hopped to the ground, foraged towards the main display site and gave HID on a fallen log half embedded in the earth. He then flew to the main display site and engaged in IDA by calling and cape-flicking, before being accidentally disturbed.

Displays and display sites of other males

From the hides, at least two other adult males in adjacent territories could clearly be heard calling and clicking when in HID. One of these was observed in HID on 18 September, when at 0830 h he flew to a fallen bough which was lying on the ground and called. He was out of sight for c. 2 minutes at the lower end of the bough before calling and flying c. 10 m to land on compacted ground in the arc of a half-buried tree root. A female flew to perch c. 4 m from him, and the male gave a 'tick-tick' with cape spread. The female then landed directly in front of the male which directed HID towards her, always facing her (their beaks almost touching) but without dancing around her. The female retreated as the male advanced over c. 30 cm and then she flew off, the male following after a few seconds.

On 25 September this adult male was no longer calling and a sub-adult male (female-plumaged but with some black on the wings and a slightly iridescent blue crown) was calling in his place. A pile of adult male Superb Bird of Paradise feathers, which had been bitten off at the shafts, was found on the ground c. 20 m from where the display had been seen, indicating that the adult male had been eaten by a mammalian predator.

The sub-adult male was observed displaying at 0915 h on 28 September. This bird was unusual as its plumage produced a clicking sound in flight, similar to that produced by male Magnificent Birds of Paradise *Diphyllodes magnificus* in the vicinity of their courts (pers. obs.). Other adult male and female-plumaged Superb Birds of Paradise were never heard to make this sound.

Before display the sub-adult flew to a sapling, called, then flew to a muddy path and made the distinctive clicks associated with HID. He then worked his way up the path and gave HID again. He was crouched, his wings held slightly out from the body seemed to be fluttering, his chest was pouted and he moved backwards and forwards on the mud whilst 'ticking'. This display took place within 20 m of where the adult male was seen displaying on 18 September.

Territorial behaviour

All the males in the study area interacted with one another. There were periods when all males were silent, and the calling or displaying of one bird stimulated others to respond in a similar manner. Adult males were observed together only on one occasion, when two were chasing each other near the border between territories.

No aggression by adult males towards sub-adults or female-plumaged birds was apparent. A female-plumaged bird (presumably an immature male) frequently called in the area near the hides, and the resident adult was apparently not antagonistic towards it. Similarly the adult male observed displaying on 18 September did not appear antagonistic towards the sub-adult in his territory.



Adult male Superb Bird of Paradise calling on display perch. Note raised naral tufts.

Calls

The most frequently heard call was a loud series of harsh screeches (as described in Beehler et al. 1986 and Coates 1990). Males in the study area gave this call throughout the day as frequently as once a minute in the display season, though there were periods of silence.

Another call, less frequently delivered (though normally given more than once in a morning), was a long, drawn-out hissing, which lasted up to 5 seconds and led to seven or more rapidly delivered harsh screeches. This hissing (which began quietly and gradually became louder) resembled the sound made by a clockwork toy unwinding. An adult male, with cape fully spread, once made this sound on a nearly horizontal branch (25 cm diameter) c. 10 m above ground, and a local man imitated this as the sound made by displaying males. It seems likely that this call could be associated with display. On more than one occasion it was heard either immediately before or after the clicking associated with HID, and the male once made the sound on the main display perch before HID, though without his cape spread.

Scolding by a sub-adult male and a female-plumaged bird consisted of a sequence of about eight harsh notes on an even pitch, lasting c. 2 seconds and strikingly similar to scolding by a female Blue Bird of Paradise *Paradisaea rudolphi* warning intruders away from her nest, and by a female-plumaged Carola's Parotia *Parotia carolae* (pers. obs.).

Display season

The study area was first visited on 10 September, when at least three adult males were actively calling and displaying. Local informants told us that a male Superb Bird of Paradise displayed on a short stretch of a fallen tree trunk at a different site in June, before being shot on 17 June. Thus the display season around Kompiam ran from at least early June until early December. From early December the calling activity of Superb Birds of Paradise declined markedly.

Discussion

Our observations support those of Frith & Frith (1988), in that the Superb Bird of Paradise displays near or at ground level. The BBC has since filmed display on a fallen tree trunk just above the ground near Tari, Southern Highlands, Papua New Guinea (Attenborough 1996).

The displays we observed have many features in common with displays described in earlier papers (reviewed in Frith & Frith 1988), but there are also important differences. Frith & Frith described breast-shield flashing associated with cape-flicking in IDA, which we never observed. The sleeked poses we observed were as described by Frith & Frith, but were held for only about a second at a time and only when a bird in female plumage was close. Frith & Frith (1988) described sleeked poses held for c. 5 seconds.

High Intensity Displays we observed compare favourably with a description by Morrison-Scott (1936), in that the tail was 'depressed and elevated' and during the display a clicking sound was made by the wings in the manner he described. However, Morrison-Scott's male displayed with wide-open bill, and made a 'cawing sound' throughout the display. In all displays we observed the bill was closed, and no sound other than the clicking produced by the wings was apparent.

Manson-Bahr (1935) described a displaying male moving 'fanwise, swaying from side to side, and uttering a slight hissing sound'. We never observed males moving in this manner during display, though we did note a clockwork-like hissing sound which could have been associated with display.

Morrison-Scott (1936) noted that 'the most remarkable feature of the display is the erection of a patch of feathers on each side of the head, on top, which gives the effect of two green eyes, one on each side of the beak. Right in the centre of each green disc is a small black spot'. Seth-Smith (1936) clearly illustrated the same phenomenon. We did not notice black pupils in the green discs, though the iridescent discs were very striking when seen from a suitable angle.

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