#### **Bird-o-soar**

# Understory forest birds of nature reserves of Budongo and Bugoma Forests: A preliminary assessment of forest recovery



The rare Black-eared Ground Thrush recorded in BGNR. © Eric Sande.

Forests provide habitats for 75% of all bird species (FAO & UNEP 2020) and 78% of threatened bird species (BirdLife International 2017). Forest birds are categorized as forest specialists (FF species), typically inhabiting the forest interior; forest generalists (F species), inhabiting undisturbed forest but are commoner in secondary forests; and forest visitors (f species), often recorded in forest but are not dependent upon it (Bennun et al. 1996). Uganda has 1,057 species of birds of which 18%, 12%, and 10% are FF, F, and f species, respectively (Carswell et al. 2005). A few detailed forest bird studies have previously been done in Uganda (Dranzoa 1997; Owiunji & Plumptre 1998). This study assessed the diversity of understory forest birds in the nature reserves of Budongo



Locations of Budongo Central Forest Reserve (1.783°N, 31.853°E) and Bugoma Central Forest Reserve (1.333°N, 31.683°E) (Fuller et al. 2004).

#### Table 1. Location of the four study sites.

Study site	Longitudes	Latitudes
Bugoma (Nature Reserve)	1.2909	31.0604
Budongo Nature Reserve (N15)	1.7199	31.5163
Budongo (N3)	1.7262	31.5301
Budongo (W21)	1.7442	31.5722

#### Table 2. Comparison of specialists and generalists in BGNR andBDNR.

	Shannon Index		Hutcheson t-test		
	Budongo	Bugoma	t df		Sig
Generalists	1.70	1.257	2.350	51	P>0.05
Specialists	2.705	2.220	4.059	187	P<0.01

and Bugoma Central Forest Reserves and compared the diversity in three different compartments of Budongo Forest namely: N15 (unlogged nature reserve), N3 (logged in 1947–52), and W21 (logged in 1963–64 and 1996–97). Budongo Central Forest Reserve (BDCFR) (793 km<sup>2</sup>) lies on the escarpment north-east of lake Albert comprising colonizing, mixed, *Cynometra*, *Cynometra*mixed, swamp-forest types and is home to 360 species of birds. Bugoma Central Forest Reserve (BGCFR) (300 km<sup>2</sup>) on the other hand is situated on top of an escarpment overlooking Lake Albert on the edge of the Western Rift Valley with half of the forested portion dominated by iron wood *Cynometra alexandri* whilst 38% is mixed forest. BGCFR is home to 225 species of birds (Byaruhanga et al. 2001).

Data were collected using mist-netting (November– December 2017). Nets were opened 0800–1800 h. A standard netting effort of 7,200 m-net-hours (30 nets x 12 m each x 10 hours a day x 2 days) was used in each of the two nature reserves and compartments under study. The location (start of the net line) in each of the study sites is shown in Table 1.

Trapped birds were marked on the belly with a permanent marker pen (red or blue colour). The ink would not get off within two days that we spent at every netting site. The birds were not ringed because there was no plan of going back to the same netting site to establish

### Bird-o-soar

bird recovery. Individuals recaptured during the first or second day were not included in the total species count to avoid double counting.

A total of 20 species (15 specialists and 5 generalists) and 28 species (21 specialists, 6 generalists, and 1 forest visitor) were recorded in Bugoma Nature Reserve (BGNR) and Budongo Nature Reserve (BDNR), respectively (Appendix 1). The diversity of generalists was not significantly different in the two nature reserves while the diversity of specialist was significantly higher in BDNR than in BGNR (P <0.01) (Table 2). The lower diversity of specialists in BGNR can among other reasons, be attributed to the



Incidences of Logging in BGNR observed during the time when the study was done. © Eric Sande.

high incidences of logging observed which was not the case in BDNR.

Five specialists were relatively more abundant (where  $n \ge 10$  individuals) in at least one of the two nature reserves (Table 3). The rare Black-eared Ground Thrush was only recorded in BGNR.

In BDCF, the diversity of specialists and generalists was similar between N3/ N15, N3/W21, and N15/W2 (Table 4). The similarity in the diversity of specialists in the N15 (unlogged), N3 (five decades after logging), and W21 (two decades after logging) preliminarily shows that most likely the two logged forest compartments are approaching recovery and can provide appropriate environment for the survival

Table 3. Relative abundance of the most common specialists in thetwo nature reserves.

	No. of bir	ds trapped		
Species	BGNR	BDNR	X2	Sig (P)
Olive Sunbird	24	5	12.45	<0.01
Red-tailed Bristlebill	14	5	4.26	<0.05
Olive-green Camaroptera	2	10	5.33	<0.05
Yellow-streaked Greenbul	22	4	12.46	<0.01
Forest Robin	22	10	4.50	<0.05
Cabanis's Greenbul	10	18	2.29	>0.05
Brown-chested Alethe	5	12	2.88	>0.05
Fire-crested Alethe	13	6	2.58	>0.05

	Shann	on Index	Hutcheson t-test			
N3/N15	N3	N15	t	df	Sig	
Generalists	1.987	1.700	0.166	54	P>0.05	
Specialists	2.601	2.705	0.848	199	P>0.05	
N3/W21	N3	W21				
Generalists	1.987	2.014	0.196	69	P>0.05	
Specialists	2.601	2.589	0.024	218	P>0.05	
N15/N3	N15	W21				
Generalists	1.700	2.014	1.669	58	P>0.05	
Specialists	2.705	2,598	0.853	179	P>0.05	

### Table 4. Comparison of specialists and generalists diversitybetween differently managed compartments of BDF.

W21. The relative abundance of Yellow-streaked Greenbul was significantly higher in N3 than N15; in W21 than N15 but it was the same in N15 and W21. The Pale-breasted Illadopsis was significantly more abundant in W21 than in N3 but its abundance was not significantly different in W21 and N15 (Table 5).

### Table 5. Comparison of the most common specialists betweencompartments in BDFR.

Species	N15	N3	<b>X</b> <sup>2</sup>	Sig (P)
Brown-chested Alethe	12	31	8.40	<0.01
Yellow-streaked Greenbul	4	19	9.78	<0.01
Cabanis's Greenbul	18	0	18.00	<0.01
Fire-crested Alethe	6	12	2.00	>0.05
Forest Robin	6	11	1.47	>0.05
Olive-green Camaroptera	5	10	1.67	>0.05
	N3	W21		
Brown-chested Alethe	31	11	9.52	<0.01
Pale-breasted Illadopsis	3	11	4.57	<0.05
Yellow-streaked Greenbul	19	16	0.26	>0.05
Fire-crested Alethe	12	7	1.32	>0.05
Forest Robin	11	8	0.47	>0.05
Olive-green Camaroptera	10	5	1.67	>0.05
	N15	W21		
Cabanis's Greenbul	18	0	18.00	<0.01
Yellow-streaked Greenbul	4	16	7.20	<0.01
Brown-chested Alethe	12	11	0.04	>0.05
Pale-breasted Illadopsis	4	11	3.27	>0.05

of many forest specialists like the unlogged one. Seven specialists were relatively more abundant (where  $n \ge 10$  individuals in atleast one of the three compartments) of BCFR. The Brown-chested Alethe was significantly more abundant in N3 compared to N15 and The two logged forest compartments can also provide appropriate microhabitats for the survival of many forest specialists. This was further confirmed by the fact that out of the six commonest specialists in the three compartments, the relative abundance of the Fire-crested Alethe, Forest Robin and Olivegreen Camaroptera was not significantly different in the three compartments while Brown-chested Alethe was most common in N3, Pale-breasted Illadopis in W21 and Yellow-streaked Greenbul in N3 and W21. Our results show that in BDCFR today, the previously logged compartments can now accommodate some forest specialists in higher numbers than the

#### Appendix 1. Bird species trapped in Budongo and Bugoma Central Forest Reserves.

SPP	Category	BGN	BDN	N3	W21
African Dwarf Kingfisher Ceyx lecontei	FF	0	2	1	2
African Pygmy Kingfisher Ceyx picta	f	0	1	2	0
Blue-breasted Kingfisher Halcyon malimbica	F	0	0	1	1
Black-eared Ground Thrush Zoothera cameronensis	FF	1	0	0	0
Blue-shouldered Robin-Chat Cossypha cyanocampter	F	0	0	0	5
Blue-throated Brown Sunbird Cyanomitra cyanolaema	FF	0	0	0	2
Brown Illadopsis Illadopsis fulvescens	FF	2	1	9	2
Brown-chested Alethe Alethe poliocephala	FF	5	12	31	11
Brown-eared Woodpecker Campethera caroli	FF	0	0	3	0
Buff-spotted Woodpecker Campethera nivosa	FF	2	1	2	0
Cabanis's Greenbul Phyllastrephus cabanisi	FF	10	18	0	0
Cameroon Sombre Greenbul Andropadus curvirostris	FF	0	0	1	1
Cassin's Grey Flycatcher Muscicapa cassini	F	1	0	0	0
Chestnut Wattle-eye Dyphorophyia castanea	FF	0	2	0	0
Chocolate-backed Kingfisher Halcyon badia	FF	0	0	0	1
Dusky crested-Flycatcher Trochocercus nigromitrata	F	0	5	2	1
Dusky Long-tailed Cuckoo Cercococcyx mechowi	FF	0	0	0	1
Fire-crested Alethe Alethe diademata	FF	13	6	12	7
Forest Robin Stiphrornis erythrothorax	FF	22	6	11	8
Green Hylia <i>Hylia prasina</i>	F	5	1	4	4
Green-backed Twinspot Mandingoa nitidula	FF	0	1	0	0
Grey-headed Negrofinch Nigrita canicapilla	F	0	0	0	1
Grey-throated Flycatcher Myioparus griseigularis	FF	0	2	2	1
Honeyguide Greenbul Baeopogon indicator	FF	0	0	1	0
Jameson's Antpecker Parmoptila jamesoni	FF	0	1	0	1
Jameson's Wattle-eye Dyphorophyia jamesoni	FF	0	0	3	4
Little Greenbul Andropadus virens	F	2	4	4	13
Olive Sunbird Cyanomitra olivacea	FF	24	5	7	5
Olive-green Camaroptera Camaroptera chloronota	FF	2	5	10	5
Pale-breasted Illadopsis Illadopsis rufipennis	FF	2	4	3	11
Red-bellied Paradise Flycatcher Terpsiphone rufiventer	F	0	3	3	0
Red-headed Bluebill Spermophaga ruficapilla	F	0	3	2	3
Red-tailed Ant-Thrush Neocossyphus rufus	FF	0	3	1	0
Red-tailed Bristlebill Bleda syndactyla	FF	14	5	9	9
Red-tailed Greenbul Criniger calurus	FF	0	1	1	0
Rufous Flycatcher-Thrush Stizorhina fraseri	FF	3	2	3	0
Scaly-breasted Illadopsis Illadopsis albipectus	FF	1	5	7	2
Tambourine Dove Turtur tympanistria	F	5	0	6	3

## Bird-o-soar

SPP	Category	BGN	BDN	N3	W21
White-tailed Ant-Thrush Neocossyphus poensis	FF	1	3	3	0
Yellow-streaked Greenbul Phyllastrephus flavostriatus	FF	22	4	19	16
Yellow-whiskered Greenbul Andropadus latirostris	F	15	5	10	4
Yellow Longbill Macrosphenus flavicans	FF	0	0	0	4
Yellow-rumped Tinkerbird Pogoniulus bilineatus	F	0	0	2	1

unlogged nature reserve. So, preliminarily one can say that probably the previously logged compartments are approaching full recovery. Cabanis's Greenbul was however only recorded in nature reserves for both BGCFR and BDCFR but not in the logged compartments of the later. This is because the two nature reserves which are predominantly *Cynometra* (the climatic climax Eggeling 1947) probably provide the most appropriate habitat for the survival of this FF species.

In conclusion, although the strict nature reserves have been set aside for research and conservation, the BGNR is in a sorry state due to rampant timber harvesting. Thus, in its current state, it may not be a good control to assess effects of logging on biodiversity. BDNR on the other hand has remained quite intact owing to the presence of intensive ecological research since 1990, hence, it is apparent higher diversity of specialists. Preliminary results have indicated the logged compartments are almost fully recovering since the diversity of specialists in these compartments and that of the nature reserve was not significantly different.

#### References

Bennun, L., C. Dranzoa & D. Pomeroy (1996). The forest birds of Kenya and Uganda. *Journal of the East African Natural History Society* 85(1): 23-48. https://doi. org/10.2982/0012-8317(1996)85[23:TFBOKA]2.0.CO;2 BirdLife International (2017). One in eight of all bird species is threatened with global extinction. Downloaded from http://www.birdlife.org on 26/08/2021

**Byaruhanga, A., P. Kasoma & D.E. Pomeroy (2001).** *The Important Bird Areas in Uganda*. Kampala, Nature Uganda.

**Carswell, M., D.E. Pomeroy, J. Reynolds & H. Tushabe** (2005). Bird atlas of Uganda. British Ornithologists' Club, London.

**Dranzoa, C. (1997).** The survival of understorey birds in the tropical rainforest of Ziika, Uganda. *Ostrich* 68: 68–71. https://doi.org/10.1080/00306525.1997.9639714

**Eggeling, W. (1947).** Observations of the ecology of the Budongo rainforest. *Journal of Ecology* 34: 20–87. https://doi.org/10.2307/2256760

**FAO & UNEP (2020).** The State of the World's Forests 2020. Forests, biodiversity and people. Rome.

Fuller, R., P. Akite, J.B. Amuno, C. Flockhart, J.M. Ofwono, G. Proaktor & R. Ssemmanda (2004). *Recovery* of the Nahan's francolin: decline of a globally threatened bird in the forests of central Uganda. Final Project Report, Durham UK.

**Owiunji, I. & A.J. Plumptre (1998).** Bird communities in logged and unlogged compartments in Budongo Forest, Uganda. *Forest Ecology and Management* 108(1) 115–126. http://dx.doi.org/10.1016/S0378-1127(98)00219-9

#### Eric Sande<sup>1</sup> & Ubaldo Rutazaana<sup>2</sup>

<sup>1&2</sup> Department of Zoology, Entomology and Fisheries Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda.

Emails: <sup>1</sup>ericsandephd@gmail.com (corresponding author), <sup>2</sup>urutazaana@gmail.com

**Citation:** Sande, E. & U. Rutazaana (2021). Understory forest birds of nature reserves of Budongo and Bugoma Forests: A preliminary assessment of forest recovery. Birdo-soar #101, In: *Zoo's Print* 36(10): 67–72.