ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/331832820

Avian Assemblages Of The Western Highlands Vegetation In The Kunene Region, North-Western Namibia

Article · March 2019

CITATIONS
0

READS
20

1 author:

Grzegorz Kopij
University of Namibia

414 PUBLICATIONS **845** CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Project SA kudu project View project

Project Vertebrate fauna of Wroclaw View project

All content following this page was uploaded by Grzegorz Kopij on 18 March 2019.

The user has requested enhancement of the downloaded file.

Avian Assemblages Of The Western Highlands Vegetation In The Kunene Region, North-Western Namibia

Grzegorz Kopij[1*]

[1]Department of Integrated Environmental Sciences, Ogongo Campus, University of Namibia, Private Bag 5520, Oshakati, Namibia

Received: 24th July, 2017. Accepted: 14th October, 2018. Published: 23rd October, 2018

Abstract

In April 2011 and February 2012, quantitative studies were conducted on avian assemblages associated with the Western Highlands vegetation in the Kunene Region, north-western Namibia. In total, 70 resident, and seven Palearctic migrant bird species were recorded in this vegetation type. The overall Simpson Diversity Index was high ($D = 0.95$). The group of dominant species comprising 39.1% was composed of five species: Plocepasser mahali, Streptopelia capicola, Prinia flavicans, Lanioturdus torquatus and Pternistes adspersus. Twelve other species were classified as subdominants (31.7%). The following endemic or near-endemic species were recorded: Lanioturdus torquatus, Pternistes adspersus, Ploceus rubiginosus, Tockus damarensis, Poicephalus rueppellii and Parus carpi. Most Palearctic migrants proved to be uncommon in this region. The avian assemblages appear to be relatively unique, both in terms of species composition, dominance structure and relative abundance of some species.

Keywords:community ecology, Koakoland, endemism, Lanioturdus torquatus

ISTJN 2018; 11:99-110.

*Corresponding author: Email: g.kopij@unam.na

1 Introduction

The Kunene Region is one of the most remote areas in Namibia, and de facto, in the whole of southern Africa. Although overall biodiversity there is relatively low, the area is known as an important endemic region in Africa, especially in regard to groups such as scorpions, reptiles and birds (Mendelsohn et al. 2009). For this reason, the region has attracted the attention of ornithologists for long time. However, most of their studies focused on subspecies taxonomy (Watt 1943; Hoesch 1952; Niethammer 1955; Winterbottom 1966; Macdonald & Hall 1957) and on the occurrence of species (Winterbottom 1966; Penzhorn 1978; Clinning & Jansen 1979; Harrison et al. 1997; Simmons et al. 2001).

After taxonomic and distribution research, quantitative studies on avian assemblages should constitute a next step in the advancement of knowledge on the local avifauna. Such steps have never been taken in the Kunene Region (Kopij 2014b). The presented study constitutes, therefore, the first attempt to quantify avian communities associated with the main vegetation type in this important endemic region of southern Africa.

2 Study Area

The Kunene Region (115 164 km^2) is located in the extreme north-western part of Namibia and represents deserts, semi-deserts, and arid savanna (Fig. 1). Seven vegetation types were distinguished in this region. The Western Highlands is one of those seven types, and occupies the central part of this region (Giess 1971). The annual rainfall ranges from c. 100 mm in the western to 250 mm in the eastern parts of this vegetation type (Mendelsohn et al. 2009).

The natural vegetation of the Western Highlands (Fig. 2 and 3) is dominated by following shrub and tree species: *Catophractes alexandrii*, *Colophospermum mopane*, *Combretum imberbe*, *Commiphora spp.*, *Cadaba schroeppelii*, *Grewia flavescens*, *Kassenia capensis*, *Moringa ovalifolia*, *Maerua schinzii*, *Sesamo thamnus guerichii*, *Sterculia africana*, *Terminalia prunoides* (Curtis & Mannheimer 2005, Mannheimer & Curtis 2009).

The natural vegetation in the Kunene Region is well-preserved (Fig. 2 and 3). In 2001 there is only 68224 people and 150 km^2 out of 115154 km^2 cleared for crops. Some of the area is utilized as pastures for cattle, sheep, goats and donkeys (in 2000: 255200, 133900, 547400, 11800 exx. respectively) (Mendelsohn et al. (2009).

There is also relatively high number of wild ungulates, such as plain zebra *Equus quagga burchellii*, Hartmann's mountain zebra *Equus zebra hartmannae*, kudu *Tragelaphus strep-*

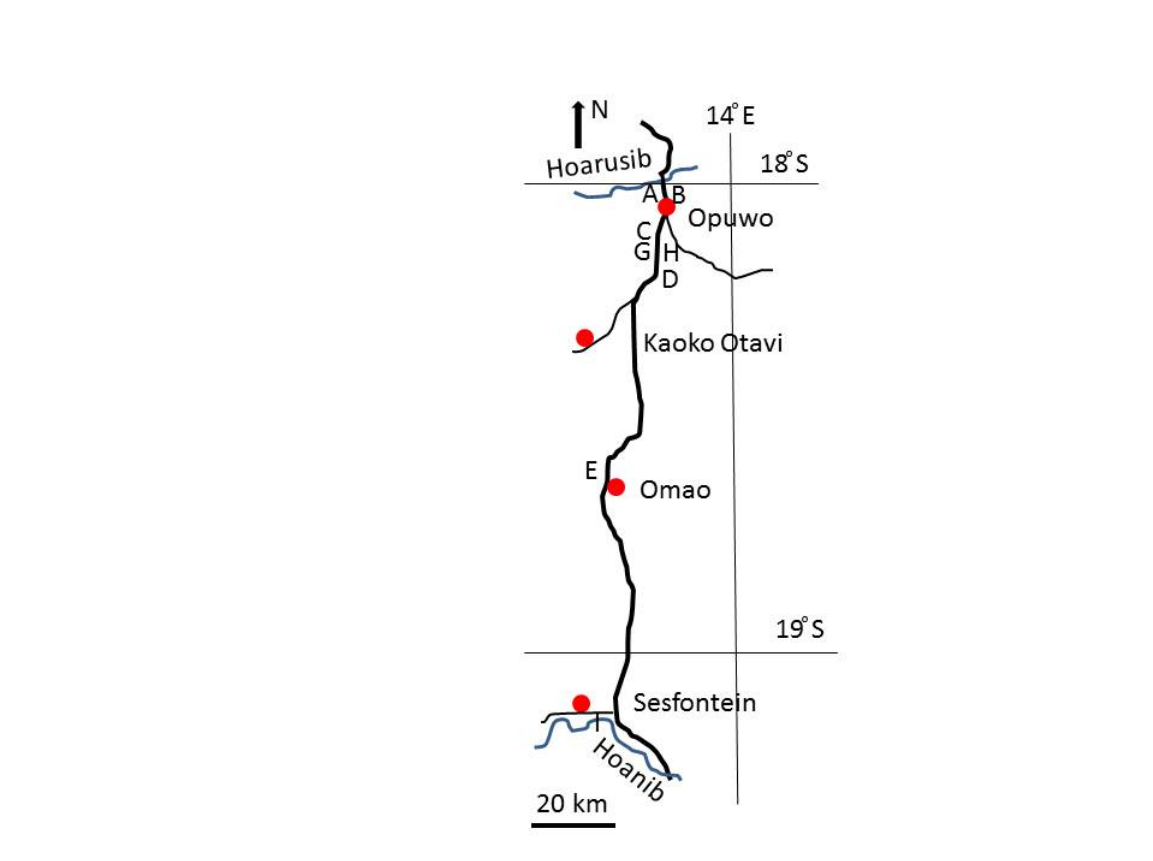

Figure 1: Kunene Region between Opuwo and Sesfontein showing the distribution of transects (A, B, CâĂęI) designed for the study.

siceros, eland *Taurotragus oryx*, gemsbok *Oryx gazelle*, springbok *Antidorcas marsupialis*, klipspringer *Oreotragus oreotragus*, and steenbok *Raphicerus campestris* (Viljoen 1982).

3 Methods

The line transect method in the American version (cf. Bibby et al. 1992) has been employed to quantify the avian community, i.e. the frequency of occurrence, dominance and relative abundance of bird species. Ten transects were randomly selected and fixed in a close proximity to the gravel road running from Opuwo through Schwarze Kuppen and Warmquelle to Kamanjab, and from there to Khorixas and further east towards Outjo (Fig. 1). Transects were surveyed in the wet season (six transects in April 2011 and four transects in February

Figure 2: Typical vegetation of the Western Highlands near Opuwo.

Table 1: Transects and time expenditure.

No.	Locality	Co-ordinates	Count date	Count time
A	Opuwo vicinity	S18.02.96 E13.49.48	28.04.2011	06.55-07.55
B	Opuwo vicinity	S18.02.01 E13.48.70	28.04.2011	08.25-09.25
C	c. 15 km S of Opuwo	S18.11.82 E14.49.15	28.04.2011	10.10-11.10
D	c. 25 km S of Opuwo	S18.20.23 E14.46.70	28.04.2011	11.40-12.25
E	Omao vicinity	S18.55.89 E14.46.10	28.04.2011	13.00-13.45
F	c. 15 km S of Otjowasando	S19.34.97 E14.34.31	29.04.2011	07.45-08.45
G	c. 20 km S of Opuwo	S18.16.58 E13.46.67	02.02.2012	06.30-07.55
				10.50-11.15
H	c. 20 km S of Opuwo	S18.17.57 E13.46.86	02.02.2012	07.55-10.50
I	Hoanib Valley near Sesfontein	S19.08.41 E13.41.45	03.02.2012	06.30-10.00
J	c. 30 km E of Khorixas	S20.17.66 E15.25.64	04.02.2012	08.20-06.20

2012). Counts were conducted on all 10 transects in the mornings from c. 7 a.m. till c. 10 a.m. by walking slowly and recording all seen and heard birds (Table 1).

Figure 3: Savanna in the Hoanib River Valley near Sesfontein

The following parameters were used to describe the avian assemblages:

1. N - number of species recorded;
2. $\%F$ - frequency of occurrence of each species, defined as the percentage of transects, where a given species was recorded to the total number ($N = 10$ transects) of transects surveyed;
3. $\%N$ - dominance expressed as the proportion of resident pairs of a given species to the total number of all breeding pairs of all species recorded, expressed as a percentage.
4. D - Simpson's Diversity Index, used to calculate diversity of avian assemblages: $D = 1 - \sum 2\frac{n}{N}$, where: n - total number of pairs of particular bird species; N - total number of pairs of all bird species; no diversity if $D = 0$; infinite diversity if $D = 1$

Dominant species is defined here as comprising at least 5% of the total number of all breeding pairs; while subdominant that comprising 2-4.9% of that total. The nomenclature of bird species follows that of Hockey et al. (2005).

Table 2: Number of pairs of resident (breeding) species on 10 transects in the Kunene Region. Dominant species are indicated with bold case. *N* - number of pairs, %D - dominance, %F - frequency of occurrence.

Species	Transect (see Table 1)										Total		
	A	B	C	D	E	F	G	H	I	J	N	%	%F
Acacia Pied Barbet					2	1	1	2	3	8	**17**	**2.6**	**60**
Accipiter sp.							1		2		3	0.5	20
African Golden Oriole	1										1	0.2	10
African Hoopoe									3		3	0.5	10
Ashy Tit										1	1	0.2	10
Barn Owl										1	1	0.2	10
Black-backed Puffback	1				1	2		1	1	1	7	1.1	60
Black-cheeked Waxbill						1					1	0.2	10
Black-chested Prinia			1		1	3	4	7	13	21	**50**	**7.6**	**70**
Black-crowned Tchagra								4		3	7	1.1	20
Black-throated Canary										1	1	0.2	10
Brubru								1	9	8	**18**	**2.7**	**30**
Cape Penduline Tit								1			1	0.2	10
Cape Turtle-Dove	6	10			2	3	3	7	3	16	**50**	**7.6**	**80**
Caprimulgus sp.										1	1	0.2	10
Cardinal Woodpecker									1	1	2	0.3	20
Carp's Tit										2	2	0.3	10
Chat Flycatcher									1		1	0.2	10
Chustnut Weaver										20	**20**	**3.1**	**10**
Cinnamon-breasted Bunting					3				1		4	0.6	20
Common Scimitar							3	2	5		10	1.5	30
Crimson-breasted Shrike			1		1		3	3	4	2	**14**	**2.1**	**60**
Damara Hornbill		1		2	1	2					6	0.9	40
Diederick Cuckoo										1	1	0.2	10
Familiar Chat									1	1	2	0.3	20
Fiscal Shrike							2				2	0.3	10
Fork-tailed Drongo							1		11	5	**17**	**2.6**	**30**
Glossy Starling							4	13		1	**18**	**2.7**	**30**
Golden-breasted Bunting	2				3	1	3	11			**20**	**3.1**	**50**
Golden-tailed Woodpecker										1	1	0.2	10
Grey Hornbill							2	3	1		6	0.9	30
Grey Lourie				1			4	3	3	2	**13**	**2.0**	**50**
Grey-headed Sparrow									13	2	**15**	**2.3**	**20**
Ground Hornbill									1		1	0.2	10
Groundscraper Thrush	1	1						1		1	4	0.6	40
Jacobin Cuckoo										1	1	0.2	10
Kalahari Scrub-Robin								2	1	3	6	0.9	30
Laughing Dove	1	3					1		2	1	8	1.2	50
Lilac-breasted Roller			1								1	0.2	10
Little Banded Goshawk									1		1	0.2	10

Table 3: Continued...: Number of pairs of resident (breeding) species on 10 transects in the Kunene Region. Dominant species are indicated with bold case. *N* - number of pairs, %D - dominance, %F - frequency of occurrence.

Species	Transect (see Table 1)										Total		
	A	B	C	D	E	F	G	H	I	J	N	%	%F
Long-billed Crombeck							1	3	12		**16**	**2.4**	**30**
Marico Flycatcher										1	1	0.2	10
Melba Finch										1	1	0.2	10
Mevi's Starling	2	3	3	1				1			10	1.5	50
Ostrich							3				3	0.5	10
Pale Chanting Goshawk									1		1	0.2	10
Pirit Batis								1	1	2	4	0.6	30
Purple Roller										1	1	0.2	10
Rattling Cisticola							1			24	**25**	**3.8**	**20**
Red-billed Francolin							2		15	16	**33**	**5.0**	**30**
Red-billed Hornbill	1	1					2	1	7	3	**15**	**2.3**	**60**
Red-billed Quelea									5		5	0.8	10
Red-billed Wood-Hoopoe	1	1	1			1	1				5	0.8	50
Red-eyed Bulbul						1	3	4		2	10	1.5	40
Red-faced Mousebird								6			6	0.9	10
Rosy-faced Lovebird									4		4	0.6	10
RÃijppell's Parrot										1	1	0.2	10
Chestnut-vented Tit-Babbler									6	2	8	1.2	20
Sparrow Weaver	3	7	1	4	4	4	22	5	18	24	**88**	**13.4**	**90**
Spotted Eagle Owl									1		1	0.2	10
Tockus sp.										8	8	1.2	10
Turdoides sp.							3	2			5	0.8	20
Violet-backed Starling						2	2			1	5	0.8	30
Violet-eared Waxbill									1	2	3	0.5	20
Wattled Staling										3	3	0.5	10
White-crowned Shrike									2		2	0.3	10
White-tailed Shrike							13	19	3	1	**36**	**5.5**	**40**
Wire-tailed Swallow								1			1	0.2	10
Yellow-billed Hornbill							2			2	4	0.6	20
Yellow-breasted Apalis							1	5	5	1	12	1.8	40
Total number of species	10	8	6	4	8	11	26	26	35	43	70		
Total number of pairs	19	27	8	8	14	21	89	109	164	206	655		
Simpson's Diversity Index	0.84	0.77	0.78	0.66	0.85	0.88	0.90	0.92	0.94	0.93	0.95		

4 Results and Discussion

In total, 70 resident, and seven Palearctic migrant bird species were recorded in the Western Highlands (Fig. 4-8). On a particular transect the number of resident species ranged from 4 to 43 (Table 2). On transects surveyed in April, the numbers were low (< 11), while on transects surveyed in February âĂŞ relatively high (26-43).

Figure 4: Rosy-faced Lovebird

The overall Simpson Diversity Index was high ($D = 0.95$). In particular transects, it changed from $D = 0.66$ to $D = 0.94$. The values below 0.80 were for transects surveyed in April, while the value above 0.90 was characteristic for transects surveyed in February.

The group of dominant species comprising 39.1% was composed of five species: White-crowned Sparrow-weaver *Plocepasser mahali*, Cape Turtle-dove *Streptopelia capicola*, Black-chested Prinia *Prinia flavicans*, White-tailed Shrike *Lanioturdus torquatus* and Red-billed Spurfowl *Pternistes adspersus*. The following 12 species were identified as subdominants: Acacia Pied Barbet *Tricholaema leucomelas*, Brubru *Nilaus afer*, Chestnut Weaver *Ploceus rubiginosus*, Crimson-breasted Shrike *Laniarius atrococcineus*, Cape Glossy Starling *Lampro-*

Figure 5: Lilac-breasted Roller

tornis nitens, Golden-breasted Bunting *Emberiza flaviventris*, Grey Lourie *Corythaixoides concolor*, Long-billed Crombeck *Sylvietta rufescens*, Rattling Cisticola *Cisticola chiniana*,

Fork-tailed Drongo *Dicrurus adsimilis*, Red-billed Hornbill *Tockus erythrorhynchus*, and Grey-headed Sparrow *Passer diffusus*. They comprised together 31.7%. Altogether, the dominant and subdominant species comprised, therefore, 70.8% of all breeding pairs recorded. The remaining 53 species comprised together 29.2% of birds recorded (Table 2). A general trend was noticeable: an increase in the number of species south-eastwards, with an increase in annual precipitation.

Table 4: Number of individuals of Palearctic migrant species on 10 transects in the Kunene Region.

Species	Transect (see Table 1)										Total		
	A	B	C	D	E	F	G	H	I	J	N	%	%F
European Roller										1	1	10	10
Lesser Grey Shrike										4	4	40	10
Lesser Kestrel									1		1	10	10
Red-backed Shrike										1	1	10	10
Spotted Flycatcher									1		1	10	10
Steppe Buzzard							1				1	10	10
Willow Warbler									1		1	10	10
Total number							1		3	6	10	100	30

Relatively uncommon were bulbuls *Pycnonotis spp.* and Red-faced Mousebird *Urocolius indicus*. Only two Streptopelia doves were recorded and the proportion between Laughing Dove *S. senegalensis* and Cape Turtle-dove was 0.14: 0.86 (n=58 of pairs of both species).

The following endemic or near-endemic species were recorded: White-tailed Shrike (as dominant), Red-billed Francolin (as dominant), Chestnut Weaver (as subdominant), Damara Hornbill Tockus damarensis, Rüppell's Parrot *Poicephalus rueppellii* and Carp's Tit *Parus carpi*.

Most Palearctic migrants were uncommon in this region. April surveys were too late to register them, but in February among seven species recorded only the Lesser Grey Shrike Lanius minor appeared to be relatively common (Table 3).

In general, the number of resident species recorded in the Western Highlands ($n = 70$) is relatively high and similar to that recorded around Ruacana Waterfall on Kunene River (Kopij 2015). In Koakoland (Mopane) Savanna in Ogongo Game Reserve, Omusati Region, in the dry season - 35, in wet season - 46 species were recorded (Kopij 2013). In urbanized and rural habitats in the Cuvelai Drainage System, north-central Namibia, the number of resident species ranged from 6 to 34 ($x = 20.2, n = 16$), with Simpson's diversity index ranging from 0.61 to 0.89 (Kopij 2014a). In South African grasslands in 12 habitats investigated, the number ranged from 33 to 75, with the mean value being at $x = 46.7$ (sd=11.7) (Kopij 2006).

The avian assemblages in the Western Highlands vegetation appear, therefore, as relatively rich and unique, both in terms of species composition, dominance structure and relative

abundance of species.

References

[1] Bibby C. J., Burgess N. D., Hill D. A.1992. Bird censuses techniques. London: Academic Press.

[2] Clinning C. F., Jansen R. A. C. 1979. Additions to the bird check-list of Koakoland and the Skeleton Coast. Madoqua, 11(3): 247-253.

[3] Curtis B. A., Mannheimer C. A. 2005. Tree Atlas of Namibia. Windhoek: National Botanical Research Institute.

[4] Giess W. 1971. A preliminary vegetation map of South West Africa. Dinteria, 4: 1-114.

[5] Harrison J. A., Allan D. G., Underhill L. G., Herremans M., Tree A. J., Parker V., Brown C. J. 1997. The Atlas of southern African birds. Vol. 1 and 2. Johannesburg: BirdLife South Africa.

[6] Hockey P. A. R., Dean W. R. J., Ryan P. G., Maree S. (eds.) 2005. RobertsâĂŹ Birds of Southern Africa. Cape Town: John Voelcker Bird Book Fund.

[7] Hoesch W. 1952. Ornithologische Beobachtungen aus dem Kaoko-Veld in SÃijdwest-Afrika. J. Orn., 93(2): 115-121.

[8] Kopij G. 2006. The structure of assemblages and dietary relationships in birds of South African grasslands. WrocÅĆaw: Wydawnictwo Akademii Rolniczej we WrocÅĆawiu.

[9] Kopij G. 2013. Seasonal changes in avian assemblages in Koakoland (Mopane) Savanna in Ogongo Game Reserve. Int. Sci. Technol. J. Namibia, 2(1): 32-44.

[10] Kopij G. 2014a. Avian assemblages of urbanized habitats in north-central Namibia. Int. Sci. Technol. J. Namibia, 3(1): 64-81.

[11] Kopij G. 2014b. Namibian Wildlife Bibliography. Katima Mulilo: University of Namibia.

[12] Kopij G. 2015. Avian diversity and assemblages around Rucana Waterfall, north-western Namibia. Int. Sci. Technol. J. Namibia, 5; 81-96

[13] Mannheimer C. A., Curtis B. A. (eds.) 2009. Le Roux and MÃijllerâĂŹs Field guide to the Trees and Shrubs of Namibia. Windhoek: Macmillan Education Namibia.

[14] Macdonald J. D., Hall P. B. 1957. Ornithological results of the Bernard Carp âĂŞ Transvaal Museum Expedition to the Koakoveld, 1951. Ann. Transvaal Mus., 23: 1-39.

[15] Mendelsohn J., Jarvis A., Roberts C., Robertson T. 2009. Atlas of Namibia. A Portrait of the Land and its People. Cape Town: Sunbird Publishers.

[16] Niethammer G. 1955. Zur Systematik der Vogel des Koako-Veldes (SÃijdwestafrika). Bonner Zoologische BeitrÃďge, 6(3/4): 173-195.

[17] Penzhorn B. 1978. Twee weke in Koakoland. Bokmakierie, 30(3): 72-75.

[18] Simmons R. E., Boix-Hinzen C., Barnes K., Jarvis A. M., Robertson A. 2001. Namibia; p. 639-660. In: Fishpool L. D. C., Evans M. I. (eds.): Important bird areas in Africa and associated islands: Priority sites for conservation. Newburry and Cambridge (UK): Pisces Publications and BirdLife International.

[19] Viljoen P. J. 1982. The distribution and population status of larger mammals in Kaokoland, South West Africa / Namibia. Cimbebasia, A, 7: 5-33.

[20] Watt J. S. 1943. Some notes on the birds of the Koakoland. Ostrich, 13(4): 185-202.

[21] Winterbottom J. M. 1966. Results of the Percy FitzPatrick Institute âĂŞ Windhoek State Museum joint ornithological expeditions. 5. The birds of the Kaokoveld and Kunene River. Cimbebasia, 19.

View publication stats