Scopus 40(2): 39–49, July 2020

Bird species richness in the montane evergreen forests of the Udzungwa Mountains, Tanzania

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Summary

Species richness and relative abundance of montane forest birds in the Udzungwa Mountains are presented for the 11 forests larger than 1 km^2. A high positive correlation between the number of montane bird species and the size of the forest is found with the highest species richness recorded in the largest forest. A few small (<5 km^2) forest fragments also support a high richness of forest birds. Their isolation from larger forest tracts is probably relatively recent (within the last 100–200 years) and their high bird species numbers may be partly due to delayed extirpations. Twenty-three restricted range montane forest species were recorded, and many of these were widespread in the Udzungwas. The largest populations of White-winged Apalis *Apalis chariessa,* Dapple-throat *Arcanator orostruthus*, Iringa Akalat *Sheppardia lowei* and Usambara Weaver *Ploceus nicolli* are most likely in Udzungwa forests.

Keywords Tanzania, Udzungwa Mountains, montane forest birds, distribution, abundance, extinction debt

Introduction

The Udzungwa Mountains are part of the Eastern Arc Mountain chain that rises from the coastal plains of eastern Tanzania and southeastern Kenya and is comprised of 13 individual blocks of ancient crystalline rocks covered with evergreen forest, woodland and grassland. The evergreen forests of the individual mountain blocks are isolated, and the Eastern Arc is, in effect, an archipelago of moist forested islands in a 'sea' of drier vegetation (Wasser & Lovett 1993). Because of its species richness and an extraordinary high concentration of endemic flora and fauna, the Eastern Arc is considered a global conservation hotspot (Myers *et al*. 2000). Among these hotspots, the Udzungwas consistently rank highest in terms of diversity and irreplaceability (Dinesen *et al*. 2001, Burgess *et al*. 2007, Saout *et al.* 2013).

Earlier analyses of forest birds have mainly compared richness, endemism and conservation priorities in the individual Eastern Arc Mountain blocks, or considered local distributions within the highlands for a subset of forest birds (e.g., Stuart *et al*. 1993, Dinesen 1998, Burgess *et al*. 2007). In this study, the distribution of the full set of montane Udzungwa forest birds is presented for the first time, reviewing the species assembly for each tract of forest in the Udzungwa Mountains. Following Romdal & Rahbek (2009) we recognize a boundary at *c.* 1200 m between a lowland and montane forest bird community in the Udzungwas (based on data from Mwanihana Forest). The present paper focuses on montane forest birds only, i.e. species breeding regularly in forest above 1200 m.

Study area

The Udzungwa Mountains cover an area of about 6500 km^2 of which almost 400 km^2 is montane forest. The mountains rise steeply from the flat Kilombero floodplain along their southeastern edge, at 250–300 m to over 2500 m. The east- and southeast-facing slopes are heavily forested, with Mwanihana and Uzungwa Scarp forests (Fig. 1) having continuous forest cover from 300 m up to about 2100 m. West of the escarpment there is a plateau of rolling hills covered in grassland, wooded grassland, woodland, and strips of riverine forest. This declines from 2000 m down to 1200 m towards the Great Ruaha River and the central plateau of Tanzania. On higher ground in the northwest there are a series of high ridges and mountains covered in forests (Ulongambi, Kisinga-Rugaro, Ndundulu-Luhombero, Nyumbanitu and Iyondo). The land surrounding these forest fragments is covered in farmland, plantation forestry and villages.

Most forest in the Udzungwas is montane, although Uzungwa Scarp, Mwanihana and Iyondo forests also include small areas of evergreen forest below 1200 m. Matundu and Nyanganje forests (Fig. 1) consist entirely of lowland forest and are not included in this study.

Most evergreen forests in Tanzania are designated Forest Reserves. However, in 1992 Mwanihana, the eastern half of Ndundulu-Luhombero and Iwonde forests, were upgraded in protection status and included in the Udzungwa Mountains National Park (Fig. 1) and in 2007 the western part of Ndundulu-Luhombero forest, Nyumbanitu, Ukami and Iyondo (and a number of lowland forests) were combined to form the West Kilombero Nature Reserve. In 2012, Uzungwa Scarp forest was upgraded to the Uzungwa Scarp Nature Reserve. Ulongambi, Kisinga-Rugaro, Kiranzi-Kitungulu and Kitemele remain Forest Reserves.

The Forest Reserves aim to protect the forests, but also allow for regulated utilization by local communities of forest products and services including medicinal plants, fungi, honey, and some timber and wild animals. Nature Reserves have a higher level of protection than Forest Reserves in that these are for non-extractive use only and are gazetted with an aim to attract tourism. The Udzungwa Mountains National Park has the highest level of protection and funding. National Parks are strict preservation areas and the only uses allowed are recreational and photographic tourism.

Until the 1970s there were scattered villages between some of the forests inside the National Park and Kilombero Nature Reserve, but today the grasslands and woodlands that separates these forests are uninhabited.

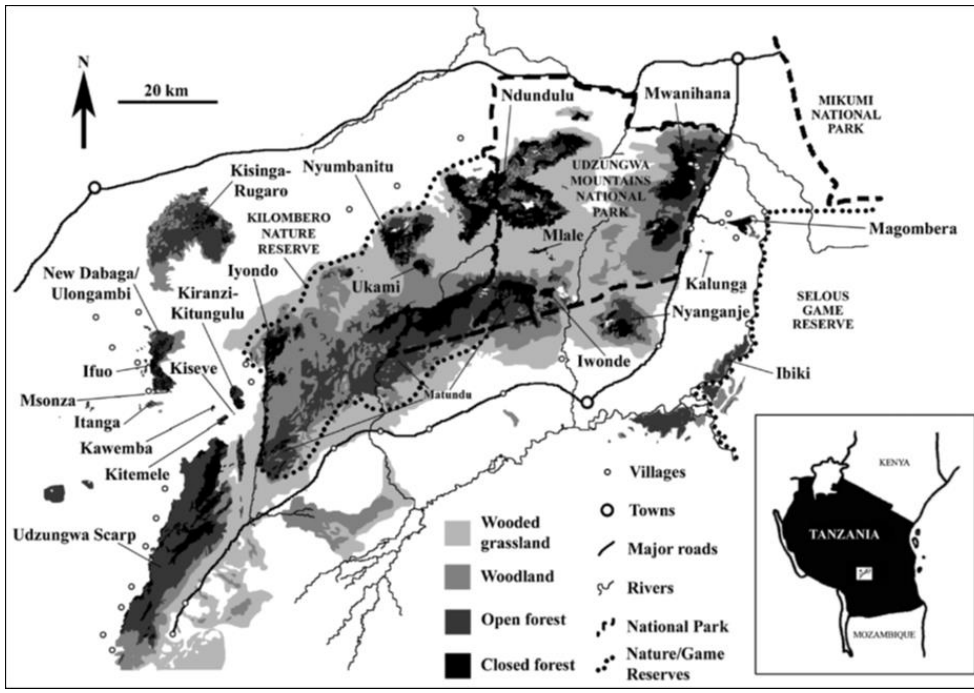

Figure 1. Montane forests in the Udzungwa Mountains based on Landsat imagery (from Marshall *et al*. 2009). Areas of unclassified habitat are mostly agriculture and bushland. Note that Matundu and Nyanganje are lowland forests and not included in this study.

Materials and methods

Bird data were mainly sourced from our own observations spanning nearly four decades of field work from 1981 to 2019 (Table 1). Extensive field work was carried out in all the larger Udzungwa forests (Table 1). This involved bird observations collected from field sites in the various forests. In the larger forests we sampled at different altitudes (typically 1400 and 1700 m) to ensure coverage of forest birds with limited altitudinal ranges. From the study sites we usually followed animal paths in all directions making visual and aural bird observations. Mist netting and/or song play-back were also used to detect and document individual bird species.

We define a 'field day' as one full day of bird recording (or other types of bird field work such as species or group specific data collection) by one person. This typically includes observation and listening from dawn to mid-day and again in the late afternoon. Only four or five field days were spent in the small forest fragments of Kiranzi-Kitungulu, Kitemele and Iwonde (Table 1), and it is therefore likely that our species lists from these areas are incomplete. In addition to our own data, we have included all other published and unpublished records that we have been able to trace (see References).

The size of the Udzungwa forests has been estimated by Dinesen *et al*. (2001) using 1:50 000 maps; subsequently Marshall *et al*. (2009) estimated the size of closed-canopy forests using satellite imagery and further verifying canopy cover for about 50% of the forest area from ground survey and aerial overflights. We calculated estimates of montane (i.e. >1200 m altitude) closed-canopy forest coverage from the closed-can-

opy estimates in Marshall *et al*. (2009) by drawing polygons in Google Earth Pro containing closed-forests areas below 1200 m in Uzungwa Scarp, Mwanihana and Iyondo forests and subtracted these areas from the total. We limit the study to montane forests we estimate as having an area over 1 km^2.

The species richness against forest area relationship was calculated using a semi-logarithmic graph where area is logged, and the number of species is arithmetic, using the formula $S = \log(cA^z) = \log(c) + z \log(A)$ where S is the number of species, A is the area of the forest, c is a constant which depends on the unit used for area measurement and Z is the slope of the line.

Results

We found that large areas (>15 km^2) of montane forest are restricted to six forest tracts, and that there are five other montane forests larger than 1 km^2 (Table 1).

Table 1 also lists the number of montane forest bird species and restricted range species recorded in the 11 forest areas larger than 1 km^2. For the purpose of this paper we define restricted range montane forest species as birds that are limited in range to Eastern Arc forests, and in some cases also to one or two forest areas outside the Eastern Arc Mountains, typically in Tanzania and/or mountain patches in northern Mozambique (see also Stattersfield *et al*. 1998). The full list of forest species in each forest is provided in Appendix 1, including an indication of the abundance of the species in the larger forests. Bird names and taxonomy follow Gill & Donsker (2020) IOC World Bird List (v 10.1).

Table 1. The Udzungwa forests with more than 1 km^2 of closed-canopy montane forest, in descending order of size. Number of field survey days spent in the various forests (one field survey day is one day of bird recording by one person), number of montane forest bird species recorded and number of restricted range species. Forests shaded with grey are not well surveyed and further field work might add more species in these forests (see text). [1]We consider records of Moreau's Warbler *Spectomycter winifredae* from Mwanihana Forest mentioned first in Stuart *et al*. (1987) and repeated in Jensen & Brøgger-Jensen (1992) an error. [2]Restricted range montane forest species recorded in the Udzungwas are shown in bold in Appendix 1.

Forest	Area of montane closed-canopy forest (km^2)	Number of field survey days	Number of montane forest species[1]	Restricted range montane forest species[2]
Ndundulu-Luhombero	161.1	422	70	25
Uzungwa Scarp	c. 75	164	69	24
Mwanihana	69.4	139	67	22
Nyumbanitu	27.9	118	69	24
Iyondo	c. 23	23	61	19
Ulongambi	16.0	12	57	15
Kisinga-Rugaro	9.4	44	55	13
Ukami	5.0	82	58	20
Kiranzi-Kitungulu	4.4	5	40	12
Kitemele	1.2	5	31	10
Iwonde	1.1	4	8	5
Total forest area	394			

Figure 2. shows the species richness against (log) forest area. The coefficient of determination R^2 was calculated to 0.78. This suggest a high positive correlation between the number of montane bird species and the size of the forest.

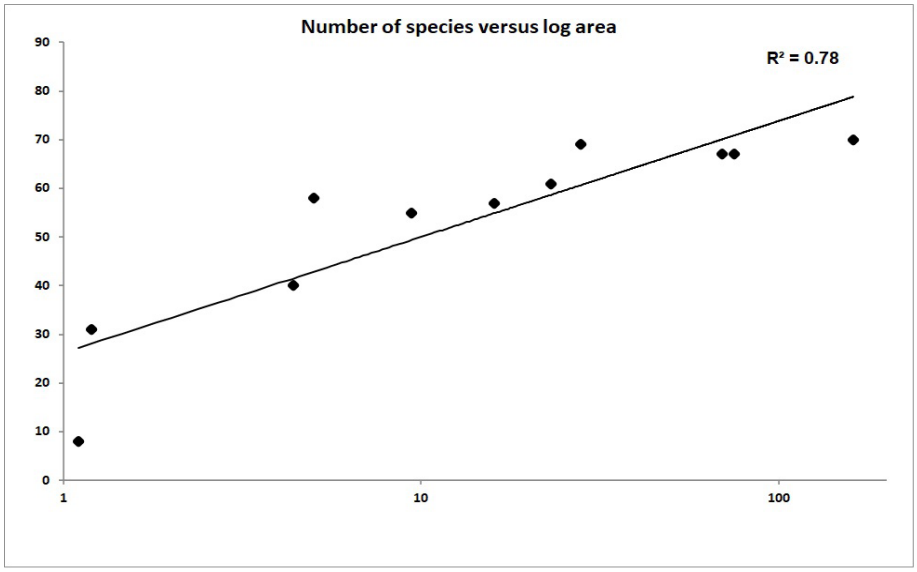

Figure 2. The species richness (numbers) against forest area relationship (km²) using a semi-logarithmic scale.

Discussion

Most of the montane forest birds are widespread in the Udzungwas and are recorded from all the well-surveyed forests (Appendix 1). Notable exceptions are Pale-breasted Illadopsis *Illadopsis rufipennis,* and Iringa Akalat *Sheppardia lowei*, which have not been recorded from Mwanihana forest. This is one of the best surveyed forests and prime habitat for both species appears to be widespread. The lack of records of these two forest dwellers is particularly unexpected because both are relatively common and widespread in other parts of the Udzungwas. It should be noted that unpublished genetic studies by R. Bowie suggests that there are "marked genetic differences" between the highland populations in the Udzungwa and Rubeho Mts. and the other populations of Pale-breasted Illadopsis in Tanzania (Fjeldså *et al*. 2010).

The majority of restricted range species occur in many of the larger forests (Appendix 1). Several of these are very rare and local in all other parts of their range. White-winged Apalis *Apalis chariessa* was found in eight Udzungwa forests including all the four larger ones (with >15 km² forest cover) (Appendix 1). Elsewhere, this species has only tiny populations left in southern Malawi (Dowset-Lamaire & Dowset 2006), northern Mozambique (Dowset-Lamaire 2008) and perhaps also in the Uluguru Mountains in Tanzania (Svendsen & Hansen 1995). Dapple-throat *Arcanator orostruthus* was found in seven forest patches (Appendix 1) where it generally is a low-density species, but locally can be relatively common (Fig. 3). Outside the Udzungwas, this species occurs in very small populations on Mount Namuli and Mabu in northern Mozambique (Dowsett-Lemaire 2008, Dowsett-Lemaire & Dowsett 2009) and in the East Usambara Mountains in northeastern Tanzania (Borghesio *et al*. 2008). Iringa Akalat *Sheppardia lowei* was recorded from five Udzungwa forests (Fig. 4). Elsewhere it is restricted to a few small forests in south Tanzania (Britton 1980) including several of the small forest patches around Njombe (pers. obs.). Us-

ambara Weaver *Ploceus nicolli* is a low-density species in the Udzungwa Mountains, but has been recorded from seven forests. Outside the Udzungwas it is known only from a few small forest patches in the East and West Usambara Mountains (Seddon *et al.* 1999) and in the Uluguru Mountains from two specimens collected in 1952 and 1961, and a single observation from 1981 (Stuart & Jensen 1981). Considering the large distribution these four species have in the Udzungwas, these mountains most likely support their largest populations.

Figure 3. The largest populations of Dapple-throat *Arcanator orostruthus* is most likely in Udzungwa forests (photo Flemming P. Jensen).

Figure 4. Iringa Akalat *Sheppardia lowei* occurs in only five of the Udzungwa forests (photo: Flemming P. Jensen).

We found a strong linear relationship between the number of montane species and the size of the forests (Fig. 2). This is to be expected as large forests generally will offer a wider range of habitats, and larger populations have less chance of extirpation. Larger areas (forests) also have a higher chance of receiving colonists, but movements of forest birds between forest tracts is probably not an important factor in the Udzungwas. Erratic and inter-montane movements have been documented in a small number of the montane forest species (Dowsett-Lemaire 1989, pers. obs.) and some species are known to carry out considerable seasonal movements to lower altitudes in the non-breeding season (Jensen & Brøgger-Jensen 1992), but the majority are restricted to forest interior with limited ability to disperse outside of their core habitat types (Newmark 1991).

Even a few of the small (1.2–4.4 km²) forest fragments support a high richness of forest birds. This include the Forest Reserves Kiranzi-Kitungulu and Kitemele. The isolation of these forest fragments is probably relatively recent (within the last 100–200 years) and their high bird species numbers may be partly due to delayed extirpations constituting an extinction debt (*sensu* Tilman *et al*. 1994, Hylander and Ehrlén 2013).

Avoiding these extirpations by reconnecting smaller Forest Reserves with larger forest areas would be a challenge since the land surrounding these fragments is now mostly farmland and settlements.

Long-term presence of edaphic montane grasslands on the Eastern Arc Mountains is well documented (Finch & Marchant 2010). However, large areas of secondary grassland separating many Udzungwa forest patches in the National Park and Nature Reserves today are most likely a result of relatively recent clearing and burning of forest by humans for agricultural purposes. Although such activities have taken place since the arrival of bantu agriculturalists in the area several thousand years ago, most of the forest loss and isolation of forest patches has occurred within the last 200 years (Schmidt 1989, Newmark 1998).

The relocation of villages from the Udzungwa escarpment areas in 1974 and the designation of Udzungwa Mountains National Park in the 1992 has stopped most of the agricultural activities in the grasslands between forest patches and some regeneration of trees and shrubs in these areas has been observed by us. However, annual bushfires in many of these areas inhibit natural regeneration of forest connections between forest tracts.

Although many species have fairly small territory sizes (Moyer 1993) and are able to maintain viable populations in small forest patches for a considerable time, the risk of extinction of isolated populations does increase with decreasing forest area due to stochastic events, and some of these populations are eventually doomed to extinction (Newmark *et al*. 2017). Suppression of the annual burns should therefore be given priority in order for the forests to expand and reconnect and thereby create more forest habitat for increasing populations and at the same time restoring the gene flow of the montane forest birds.

Acknowledgements

Trevor Jones provided important observations and comments on a draft of the paper for which we are very grateful. We also thank Shera Moyer and an anonymous reviewer for very helpful comments on this paper. The Bøje Benzon Foundation supported some of the fieldwork of LD and FPJ. Lastly, we thank Tanzania Commission for Science and Technology (COSTECH), Tanzania Wildlife Research Institute (TAWIRI), Tanzania National Park Authority (TANAPA), and the Forestry Division of the Ministry of Natural Resources and Tourism for permission to carry out the bird surveys in the Udzungwas.

References

Borghesio, L., John, J.R.M., Mulungu, E., Mkongewa, V., Joho, M. & Cordeiro, N.J. 2008. Observations of threatened birds in the East Usambara Mountains, Tanzania. *Bulletin of the African Bird Club* 15: 59–70.

Britton, P.L. (ed) 1980. *Birds of East Africa*. Nairobi: EANHS.

Burgess, N.D., Butynski, T.M., Cordeiro, N.J., Doggart, N.H., Fjeldså, J., Howell, K.M., Kilahama, F.B., Loader, S.P., Lovett, J.C., Mbilinyi, B., Menegon, M., Moyer, D.C., Nashanda, E., Perkin, A., Rovero, F., Stanley, W.T. & Stuart, S.N. 2007. The biological importance of the Eastern Arc Mountains of Tanzania and Kenya. *Biological Conservation* 134: 209–231.

Dinesen, L. 1998. Priorities for Biodiversity Conservation in the Udzungwa Mountains, Tanzania-Based on Bird Data. *Journal of East African Natural History* 87: 195–204.

Dinesen, L. Lehmberg, T., Rahner, M.C. & Fjeldså, J. 2001. Conservation priorities for the forests of the Udzungwa mountains, Tanzania, based on primates, duikers and birds. *Biological Conservation* 99: 223–236.

Dowsett-Lemaire, F. 1989. Ecological and biogeographical aspects of forest bird communities in Malawi. *Scopus* 13: 1–80.

Dowsett-Lemaire, F. 2008. Survey of birds on Mount Namuli (Mozambique), November 2007, with notes on vegetation and mammals. *Dowsett-Lemaire Misc. rep*. 60. 26 pp.

Dowsett-Lemaire, F. & Dowsett, R.J. 2006. *The Birds of Malawi*. Liège: Tauraco Press & Aves.

Dowsett-Lemaire, F. & Dowsett, R.J. 2009. The avifauna and forest vegetation of Mt. Maby, northern Mozambique, with notes on mammals. *Mabu Report*. 20 pp.

Finch, J. & Marchant, R. 2010. A palaeoecological investigation into the role of fire and human activity in the development of montane grasslands in East Africa. *Vegetation History and Archaeobotany* 20: 109–124.

Fjeldså, J., Kiure, J., Doggart, N., Hansen, L.A. & Perkin, A. 2010. Distribution of highland forest birds across a potential dispersal barrier in the Eastern Arc Mountains of Tanzania. *Steenstrupia* 32: 1–43.

Gill, F. & D. Donsker (eds). 2020. IOC World Bird List (v 10.1). doi: 10.14344/IOC.ML.9.1. Available at http://www.worldbirdnames.org (accessed 25 February 2020).

Hylander, K. & Ehrlén, J. 2013. The mechanisms causing extinction debts. *Trends in Ecology & Evolution* 28: 341–346.

Jensen, F.P. & Brøgger-Jensen, S. 1992. The forest avifauna of the Udzungwa Mountains, Tanzania. *Scopus* 15: 65–83.

Marshall, A.R., Jørgensbye, H.L.O., Rovero, F., Platts, P.J., White, P.C.L. & Lovett, J.C. 2009. The Species-Area Relationship and Confounding Variables in a Threatened Monkey Community. *American Journal of Primatology* 71: 1–12.

Moyer, D. C. 1993. A preliminary trial of territory mapping for estimating bird densities in Afromontane forest. *Proceedings of the Pan-African Ornithological Congress* 8: 302–311.

Myers, N., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853–858.

Newmark, W.D. 1991. Tropical Forest Fragmentation and the Local Extinction of Understory Birds in the Eastern Usambara Mountains, Tanzania. *Conservation Biology* 5: 67–78.

Newmark, W.D. 1998. Forest area, fragmentation, and loss in the eastern Arc Mountains for the conservation of biological diversity. *Journal of East African Natural History* 87: 29–36.

Newmark, W.D., Jenkins, C.N., Pimm, S.L., McNeally & P.B. & Halley, J.M. 2017. Targeted habitat restoration can reduce extinction rates in fragmented forests. *Proceedings of the National Academy of Sciences of the United States of America* 114: 9635–9640.

Romdal, T.S. & Rahbek, C. 2009. Elevational zonation of afrotropical forest bird communities along a homogeneous forest gradient. *Journal of Biogeography* 36: 327–336.

Saout, S.L., Hoffmann, M., Shi, Y., Hughes, A., Bernard, C., Brooks, T.M., Bertzky, B., Butchart, S.H.M., Stuart, S.N., Badman, T. & Rodrigues, A.S.L. 2013. Protected Areas and Effective Biodiversity Conservation. *Science* 342: 803–805.

Schmidt, P.R. 1989. Early exploitation and settlement in the Usambara Mountains. In A.C. Hamilton & R. Bensted-Smith (eds) *Forest Conservation in the East Usambara Mountains, Tanzania.* Gland and Cambridge: IUCN. Pp. 75–78.

Seddon, N., Ekstrom, J.M.M., Capper, D.R., Isherwood, I.S., Muna, R., Pople, R.G., Tarimo, E. & Timothy, J. 1999. Notes on the ecology and conservation status of key bird species in Nilo and Nguu North Forest Reserves, Tanzania. *Bird Conservation International* 9: 9–28.

Stattersfield, A. J., Crosby, M.J., Long, A.J., Wege, D.C & Rayner, A.P. 1998. *Endemic bird areas of the world: priorities for biodiversity conservation*. Cambridge: BirdLife International.

Stuart, S.N. & Jensen, F.P. 1981. Further range extensions and other notable records of forest birds from Tanzania. *Scopus* 5: 106–115.

Stuart, S.N., Jensen, F.P. & Brøgger-Jensen, S. 1987. Altitudinal zonation of the avifauna in Mwanihana Forest and Magombera Forests, Eastern Tanzania. *Le Gerfaut* 77: 165–186.

Stuart, S.N., Jensen, F.P., Brøgger-Jensen, S. & Miller, R. I. 1993. The zoogeography of the montane forest avifauna of eastern Tanzania. In: Lovett, J. & Wasser, S. (eds) *The biogeography and ecology of the forests of East Africa*. Cambridge: Cambridge University Press.

Svendsen, J.O. & Hansen, L.A. 1995. *Report on The Uluguru Biodiversity Survey 1993*. Sandy: The Royal Society for the protection of Birds, Danish Centre for Tropical Biodiversity and Tanzania Forestry Research Institute.

Tilman, D., May, R.M., Lehman, C.L. & Nowak, M.A. 1994. Habitat destruction and the extinction debt. *Nature* 371: 65–66.

Wasser, S.K. & Lovett, J.C. 1993. Introduction to the biogeography and ecology of the rain forests of eastern Africa. In Lovett, J.C. & Wasser, S.K. (eds) *Biogeography and ecology of the rain forests of eastern Africa*. Cambridge: Cambridge University Press.

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Scopus 40(2): 39–49, July 2020
Received 26 February 2020

Appendix 1. Distribution and abundance of closed-canopy montane forest birds in forests tracts of Udzungwa Mountains. Areas shaded with grey are not well surveyed and further field work will add more species. Species in bold are endemic or restricted range species (see text for explanation). Definition of abundance: xx = common in right habitat(s), x = rare/low density species, O = recorded, but status not evaluated due to limited field effort.

	Ndundulu - Luhombero	Uzungwa Scarp	Mwanihana	Nyumbanitu	Iyondo	Ulong'ambi	Kising'a-Rugaro	Ukami	Kiranzi-Kitungulu	Iwonde	Kitemele
Udzungwa Forest Partridge *Xenoperdix udzungwensis*	x			x							
African Goshawk *Accipiter tachiro*	x	x	x	x	x	x	x	x			
Mountain Buzzard *Buteo oreophilus*	x	x	x	x	x	x	x	x			
Cassin's Hawk-eagle *Aquila africana*	x	x	x	x	x					O	
Crowned Eagle *Stephanoaetus coronatus*	x	x	x	x	x	x	x	x	O		
Africa Olive Pigeon *Columba arquatrix*	xx	xx	xx	xx	xx	xx	xx		O		
Eastern bronze-naped Pigeon *Columba delegorguei*	xx	xx	xx	xx	xx	xx	xx	xx	O		
Lemon Dove *Columba larvata*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Livingstone's Turaco *Tauraco livingstonii*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Barred long-tailed Cuckoo *Cercococcyx montanus*	xx	xx	xx	xx	xx	xx	xx	xx	O		
African Wood Owl *Strix woodfordii*	x	x	x	x	x	x	x	x	O		O
Usambara Eagle Owl *Bubo vosseleri*	x	x	x					x		O	
Bar-tailed Trogon *Apaloderma vittatum*	xx	xx	xx	xx	xx	xx	xx	x	O		O
Silvery-cheeked Hornbill *Bycanistes brevis*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Green Barbet *Stactolaema olivacea*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Moustached Tinkerbird *Pogoniulus leucomystax*	xx	xx	xx	xx	xx	xx	xx	xx	O		
Yellow-rumped Tinkerbird *Pogoniulus bilineatus*	xx	xx	xx	xx	xx	xx	xx	xx			
Olive Woodpecker *Dendropicos griseocephalus*	x	x	x	x	x	x	x	x	O		O
African Broadbill *Smithornis capensis*	xx	xx	xx	xx	xx	xx	xx	xx	O		
Dark Batis *Batis crypta*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Black-fronted Bushshrike *Chlorophoneus nigrifrons*	xx	xx	xx	xx	xx		x	xx	O		O
Black-backed Puffback *Dryoscopus cubla*	x	x	x	x	x	x	x	x			
Fülleborn's Boubou *Laniarius fuelleborni*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Grey Cuckooshrike *Coracina caesia*	xx	xx	xx	x	xx	xx	xx	x	O		O
Green-headed Oriole *Oriolus chlorocephalus*	x	x	xx	x				xx			
Square-tailed Drongo *Dicrurus ludwigii*	xx	xx	xx	xx	xx	xx	xx	xx	O	O	O
African Paradise Flycatcher *Terpsiphone viridis*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
White-tailed Crested Flycatcher *Elminia albonotatus*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Shelley's Greenbul *Arizelocichla masukuensis*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Yellow-throated Greenbul *Arizelocichla chlorigula*	xx	xx	xx	xx	xx	xx	xx	xx			
Stripe-faced Greenbul *Arizelocichla striifacies*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Little Greenbul *Eurillas virens*	xx	xx	xx	xx	xx		xx	xx			
Placid Greenbul *Phyllastrephus placidus*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Yellow-streaked Greenbul *Phyllastrephus flavostriatus*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Yellow-throated Woodland Warbler *Phylloscopus ruficapilla*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Evergreen Forest Warbler *Bradypterus lopezi*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Bar-throated Apalis *Apalis thoracica*	xx	xx	xx	xx	xx	xx	xx	xx			
White-winged Apalis *Apalis chariessa*	x	x	x	x	x			x	O	O	

	Ndundulu - Luhombero	Uzungwa Scarp	Mwanihana	Nyumbanitu	Iyondo	Ulong'ambi	Kising'a-Rugaro	Ukami	Kiranzi-Kitungulu	Iwonde	Kitemele
Black-headed Apalis *Apalis melanocephala*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Chapin's Apalis *Apalis chapini*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Red-capped Forest Warbler *Artisornis metopias*	xx	xx	xx	x	xx	xx	xx	xx			
Pale-breasted Illadopsis *Illadopsis rufipennis*	xx	xx		x	xx	x		x			
African Hill Babbler *Pseudoalcippe abyssinica*	x	x	x	x	x	x	x				
Southern Yellow White-eye *Zosterops anderssoni*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Spot-throat *Modulatrix stictigula*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Dappled-throat *Arcanator orostruthus*	x	x	x	x	x			x	O		
Waller's Starling *Onychognathus walleri*	xx	xx	xx	xx	xx	xx	xx	xx			
Kenrick's Starling *Poeoptera kenricki*	x	x	x	x	x	x	x				
Orange Ground-thrush *Zoothera gurneyi*	x	xx	xx	x	x	x	x	x	O		
Abyssinian Thrush *Turdus abyssinicus*	xx	xx	xx	x	xx	xx	xx	xx			
White-chested Alethe *Chamaetylas fuelleborni*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
White-starred Robin *Pogonocichla stellata*	xx	xx	xx	xx	xx	xx	xx	xx			
Swynnerton's Robin *Swynnertonia swynnertoni*	x	x	x	x	x			x			
Sharpe's Akalat *Sheppardia sharpei*	xx	xx	xx	xx	xx	xx		xx			
Iringa Akalat *Sheppardia lowei*	x	x		x		x	x				
Olive-flanked Ground Robin *Cossypha anomala*	xx	xx	xx	xx		xx	xx				
African Dusky Flycatcher *Muscicapa adusta*	xx	xx	xx	xx	xx	xx	xx		O		O
Uluguru Violet-backed Sunbird *Anthreptes neglectus*	x	x	x	x	x	x		x		O	
Banded Green Sunbird *Anthreptes rubritorques*	x		x	x				x			
Collared Sunbird *Hedydipna collaris*	xx	xx	xx	xx	xx	xx	xx	xx			
Amani Sunbird Hedydipna pallidigaster	x		x					x			
Olive Sunbird *Cyanomitra olivacea*	xx	xx	xx	xx	xx	xx	xx	xx	O		O
Forest Double-collared Sunbird *Cinnyris fuelleborni*		xx		x	xx	xx	x	xx	O	O	O
Moreau's Sunbird *Cinnyris moreaui*	xx		xx	xx							
Rufous-winged Sunbird *Cinnyris rufipennis*	x	xx	xx	x	xx			x	O	O	O
Dark-backed Weaver *Ploceus bicolour*	xx	xx	xx	xx	xx	xx	xx	xx	O	O	O
Usambara Weaver *Ploceus nicolli*	x	x	x	x	x	x		x			
Green-backed Twinspot *Mandingoa nitidula*	x	x	x	x							
Red-faced Crimsonwing *Cryptospiza reichenovii*	xx	xx	xx	x	xx	x	x		O		O
Kipengere Seed-eater *Crithagra melanochrous*	x	x	x	x	x	x	x				
Oriole Finch *Linurgus olivaceus*	x	x	x	x		x	x				