Preliminary assessment of forest birds in Kiono, Pande, Kisiju and Kiwengoma coastal forests, Tanzania

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A preliminary assessment of the forest birds in four Tanzanian coastal forests (Kiono, Pande, Kisiju and Kiwengoma) is presented. Up to 51 species of forest bird were recorded from a single forest, with diversity declining in a sequence: Kiono; Kiwengoma, Pande; Kisiju. The threatened species, Sokoke Pipit *Anthus sokokensis,* was recorded in Kiono and the near-threatened species, Southern Banded Snake Eagle *Circaetus fasciolatus* in Kiono, Kiwengoma and Pande, Plain-backed Sunbird *Anthreptes reichenowi* in Kiono and Pande, and Uluguru Violet-backed Sunbird *Anthreptes neglectus* in Kiono and Kiwengoma. Moreover, the candidate Red Data Book species Tiny Greenbul *Phyllastrephus debilis* and Chestnut-fronted Helmet-shrike *Prionops scopifrons* were recorded in Kiono, Pande and Kiwengoma, Kretschmer's Longbill *Macrosphenus kretschmeri* was recorded in Kiono and Kiwengoma, and Little Yellow Flycatcher *Erythrocercus holochlorus* and Green Tinkerbird *Pogoniulus simplex* were recorded in Kiono and Pande. On the basis of these preliminary data, Kiono appears to support the largest number of scarce species.

All four forests visited are relatively small and are suffering increasing damage from both agricultural clearance and logging. Attention is drawn to the need for urgent action to conserve these particular coastal forests and to identify all others remaining.

The coastal forests of East Africa are a heterogeneous group of isolated evergreen or semi-evergreen closed-canopy forests located in the coastal region, generally within 50 km of the Indian Ocean and usually on the tops of hills. Such forests are believed to have been in existence, and isolated from other forest blocks in Africa, for around 30 million years. Moreover, they have been subject to a relatively stable moist climatic regime throughout this (Polhill 1989). Because of this extended period of isolation and climatic stability, coastal forests have developed high levels of biological endemism and near-endemism (Burgess *et al.* in prep., Hawthorne 1984, Howell 1981, Lovett 1988, Polhill 1969, 1989, White 1983).

Preliminary ornithological investigations in coastal forests, particularly those of the Pugu Hills in Tanzania and Arabuko-Sokoke in Kenya, have demonstrated their global conservation importance (N.E. Baker, unpublished, Bagger *et al.* 1989, Britton 1980, Britton *et al.* 1980, Britton & Zimmerman 1979, Collar & Stuart 1985, 1988, Howell 1981, Kelsey & Langton 1984, Moreau 1966, Pakenham 1979, Ripley & Heinrich 1966, 1969, Stuart 1981, Turner 1977). For example, current knowledge suggests that the Sokoke Scops Owl *Otus ireneae* and Clarke's Weaver *Ploceus golandi* are endemic to the Arabuko-Sokoke coastal forest in Kenya (Britton & Zimmerman 1979, Collar & Stuart 1985). Moreover, Sokoke Pipit *Anthus sokokensis* and races of the East Coast Akalat *Sheppardia gunningi sokokensis*, Spotted Ground Thrush *Turdus fischeri fischeri*, Green Barbet *Stactolaema olivacea woodwardi* and Pale-breasted Illadopsis *Trichastoma rufipennis puguensis* are believed to be wholly confined to coastal forests (Collar & Stuart 1988). In addition, several other forest birds have their centre of population in these forests.

Despite the high level of ornithological importance demonstrated for some coastal forests, the bird assemblages of the majority of such forests in Tanzania are not known. As a consequence, the Wildlife Conservation Society of Tanzania (WCST), in conjunction with the International Council for Bird Preservation (ICBP), have initiated a coastal

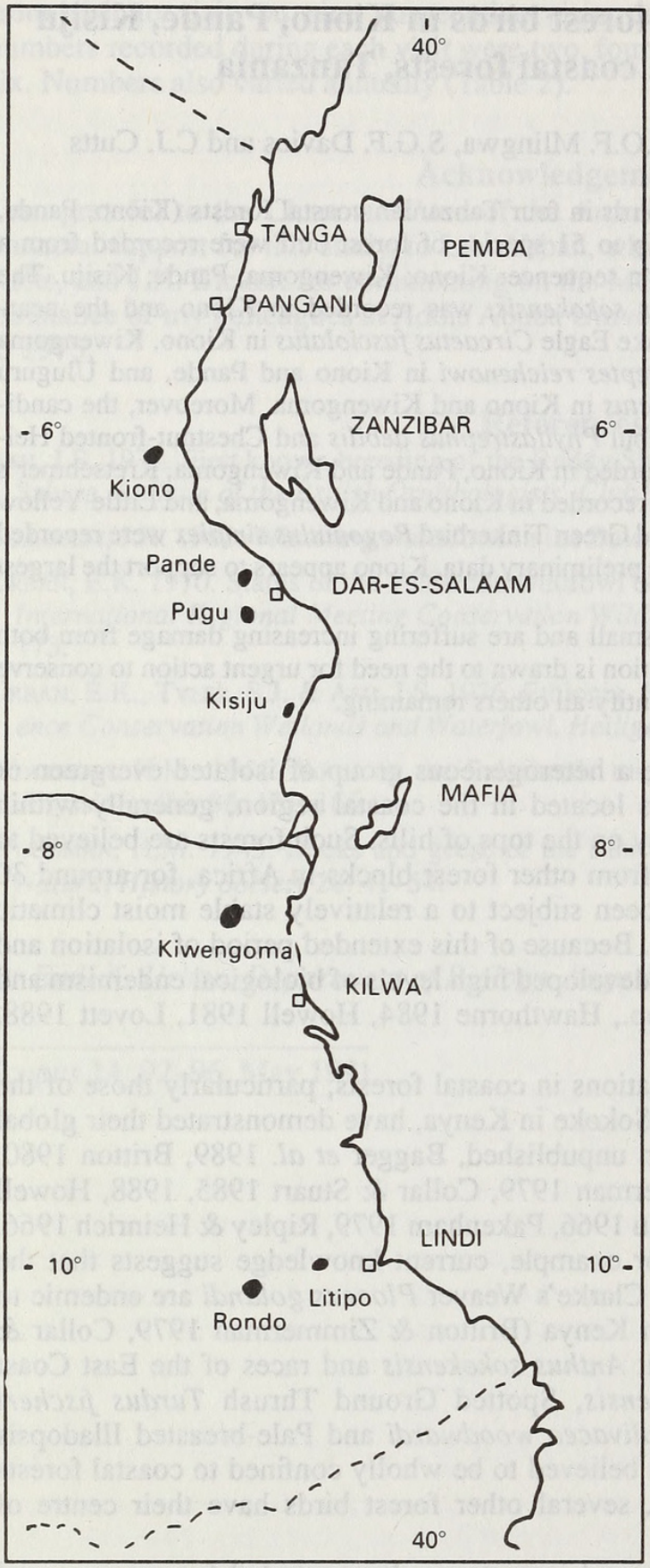

Fig. 1. *Location of Tanzanian coastal forests mentioned in the text*

forest project aiming to collect bird data on each forest. Recent studies have been completed in Rondo Forest Reserve and Litipo Forest Reserve in southern Tanzania (Bagger *et al.* 1989, Holsten *et al.* 1991.). In this paper we present preliminary data on the forest birds recorded in four additional Tanzanian coastal forests, as collected in 1989 and early 1990. Globally scarce, or potentially scarce species as defined in the ICBP/IUCN Red Data Book for Africa (Collar & Stuart 1985), are highlighted, and assemblages are briefly compared with those previously published from Tanzania and Kenya.

Study Sites

Locality details for the four forests studied between 1989 and 1990 are presented below, in a sequence from the north to the south of Tanzania (see Fig. 1).

Kiono Forest Reserve (6° 10S, 38° 35E)

Kiono Forest covers about 20 km^2 and is located some 15 km inland from the Indian Ocean and 20 km west-south-west of the coastal town of Sadaani, with the majority of the forest growing on a plateau around 300 m above sea level. Around 50 per cent of the forest has been logged in recent years, but even in the apparently unlogged areas there are few large trees which might imply logging at some point in the past. There has also been some recent agricultural clearance around the villages of Mbwebwe and Gongo. Two ringing sites were used in this study, (a) 3.5 km along the vehicle track between the villages of Mbwebwe and Gongo in apparently primary closed-canopy forest,

and (b) within 0.5 km of the north-west corner of the large wetland area inside the forest.

Pande Forest Reserve (6° 42S, 39° 05E)
Pande Forest covers approximately 11 km^2 of a gently rounded ridge of sandstone ranging up to 300 m above sea level and located *c.* 25 km north-west of Dar es Salaam and 16 km inland from the Indian Ocean. The canopy of this forest has been partially removed for timber and to produce fuel-wood and charcoal for Dar es Salaam, hence the forest has a rather open structure. The main ringing site was located in partially damaged forest towards the southern end of the site, approximately 5 km from the entrance to the reserve via Mabwe Pande village. A second ringing site was located at the northern end of the forest, approximately 1 km from the entrance to the reserve.

Kisiju Forest (7° 24S, 39° 20E)
This small forest is located on an island surrounded by a tidal creek and adjacent to the Indian Ocean, some 5 km north of the coastal village of Kisiju. The main forest currently occupies some 3 km^2, although other fragments of forest are located on nearby islands and the mainland. In 1982 the forest was regarded as largely undamaged (Hawthorne 1984). However, it is presently being rapidly cut down and burnt to provide poor-grade agricultural land for subsistence farmers. The ringing site was located in primary forest adjacent to a farm clearing, *c.* 200 m inland from the high tide mark, and *c.* 6 km north of Kisiju.

Kiwengoma Forest Reserve (8° 23S, 38° 55E)
This forest is on the the complex topography of the Matumbi massif, located to the south of the Rufiji river, 25 km to the south-east of Utete and about 20 km inland from the Indian Ocean. The forested area covers at least 25 km^2, but the best stands are found in the steep-sided valleys with secondary forest on the plateau-tops. Areas of unlogged forest with large trees still remain but selective felling of timber trees by pit-sawers is altering the composition of the forest and agricultural clearance is increasing. Four ringing sites were used and these were evenly distributed along the Mwengei valley, the widest in the reserve.

Study Methods

Species-lists of ground-dwelling and shrub-layer birds in each forest were principally compiled by catching specimens in mist-nets. These nets were 3 m high, varied between 9 m and 18 m in length and were positioned contiguously along *c.* 1 m wide rides cut through typical forest vegetation. At each site approximately 400 m^2 of net were located along such 'net-rides' throughout the investigation period. Net-rides avoided forest edges so that forest-interior rather than forest-edge and woodland species were caught. Nets were obtained from the British Trust for Ornithology. Every day the nets were in place, captured birds were removed each hour from 07:00 to 19:00 hours local time (dawn to after dusk), then identified using Mackworth-Praed & Grant (1960), weighed and measured back at camp. The original ringing sheets presenting standard biometric data, moult status, level of fat deposition and extent of brood-patch are held by Neil Burgess in the UK and Neil Baker (ICBP representative) in Dar es Salaam.

Lists of canopy species and ground-living birds compiled during the dry season (July to October 1989) in Kiono, Pande and Kisiju were augmented by early morning surveys and observation of bird parties when they were encountered throughout the day. The

visits to Kiono and Kiwengoma in January to March 1990 coincided with the main breeding seasons for most forest birds, hence many species which were not caught could be identified from their songs.

Table 1. *Main periods of ornithological investigation in Kiono, Pande, Kisiju and Kiwengoma coastal forests, Tanzania*

Forest	year	month(s) and season	study period	survey personnel
Kiono (1)*	1989:	August/September (dry)	3 weeks	NDB, MH, CC, CM
Kiono (2)	1990:	January/March (wet)	3 weeks	SGD, CM
Pande	1989:	July/August (dry)	3 weeks	NDB, MH, CC, CM
Kisiju	1989:	September (dry)	1 week	NDB, MH, CC, CM
Kiwengoma	1990:	January-March (wet)	$2^1/_2$ weeks	SGD, CM

*also visited on three previous occasions by Neil Baker, ICBP representative for Tanzania.

The personnel responsible for gathering the data used in this paper, as well as the year, season, and length in weeks of the study period are presented in Table 1.

Field support for this project was provided by: a) Frontier-Tanzania expeditions TZ01 and TZ03, a joint initiative of the Society for Environmental Exploration, UK and The University of Dar es Salaam, Tanzania, and b) The Wildlife Conservation Society of Tanzania. Additional technical and financial support was provided by: a) The International Council for Bird Preservation, Cambridge, UK, and b) The Royal Society for the Protection of Birds, Sandy, UK.

Results

Table 2 presents the occurrence of forest birds in the four Tanzanian coastal forests investigated, as arranged left to right in a sequence from north to south. The total number of forest birds for each forest is also presented to give an idea of species-diversity. However, it is important to note that many of the sites have only received a few weeks' study (see Table 1), and not over all the seasons, hence the species-lists for most forests are probably not definitive.

Records of Scarce Species

Scarce species, as defined in Collar & Stuart (1985), recorded during this project, are presented in Table 3. Most of these species were identified from captured individuals. However, Southern Banded Snake Eagle and Chestnut-fronted Helmet-shrike were identified by sight only, and Kretschmer's Longbill and Green Tinkerbird were identified from calls alone.

From these data it can be clearly seen that Kiono forest supports the largest number of scarce birds. As all these species were recorded in August and January–February, the latter being the breeding season, they can be assumed to breed in this forest.

It is also possible that visits during the migration period would locate the rare Spotted Ground Thrush *Turdus fischeri* on migration in some, if not all of these forests.

Table 2. *Provisional assessment of the species-composition and relative abundance of forest birds in Kiono, Pande, Kisiju and Kiwengoma coastal forests, Tanzania*

(Names and taxonomic order follow Britton 1980; assessment of forest birds is by Neil Baker, ICBP representative for Tanzania; forests are arranged north to south from left to right)

	Kiono	Pande	Kisiju	Kiwengoma
Accipitridae (eagles and hawks)				
Circaetus fasciolatus Southern Banded Snake Eagle	x(4)			x(4)
Accipiter melanoleucus Great Sparrowhawk	x(4)			
A. tachiro African Goshawk	x(3)	x(3)	x(3)	x(4)
Stephanoaetus coronatus Crowned Eagle	x(4)			x(3)
Numididae (guineafowl)				
Guttera pucherani Kenya Crested Guineafowl	x(2)	x(2)	x(3)	x(2)
Columbidae (pigeons and doves)				
Turtur tympanistria Tambourine Dove	x(2)	x(2)		x(1)
Psittacidae (parrots)				
Poicephalus robustus Brown-necked Parrot	x(2-3)			
P. cryptoxanthus Brown-headed Parrot				x(3)
Musophagidae (turacos)				
Tauraco livingstonii Livingstone's Turaco	x(2)	x(3)		x(2)
Cuculidae (cuckoos and coucals)				
Ceuthmochares aereus Yellowbill	x(3)	x(3)	x(4)	
Chrysococcyx montanus Barred Long-tailed Cuckoo				x(1)
Strigidae (owls)				
Ciccaba woodfordii African Wood Owl	x(2)	x(2)		x(1)
Caprimulgidae (nightjars)				
Caprimulgus pectoralis Fiery-necked Nightjar	x(2)	x(2)		
Trogonidae (trogons)				
Apaloderma narina Narina's Trogon	x(2)	x(2)		x(1)
Alcedinidae (kingfishers)				
Ispidina picta Pygmy Kingfisher	x(1)	x(1)	x(2)	x(1)
Bucerotidae (hornbills)				
Bycanistes bucinator Trumpeter Hornbill	x(1)	x(1)	x(2)	x(2)
Capitonidae (barbets)				
Pogoniulus bilineatus Yellow-rumped Tinkerbird	x(1)	x(1)	x(1)	x(1)
P. simplex Green Tinkerbird	x(3)	x(3)		
Buccanodon leucotis White-eared Barbet				x(2)
Indicatoridae (honeyguides)				
Indicator variegatus Scaly-throated Honeyguide	x(1)			
I. minor Lesser Honeyguide		x(1)		
Picidae (woodpeckers)				
Campethera abingoni Golden-tailed Woodpecker	x(3)			x(2)
C. cailliautii Little Spotted Woodpecker	x(3)	x(2)		x(3)
Eurylaimidae (broadbills)				
Smithornis capensis African Broadbill	x(2)	x(2)		x(1)
Pittidae (pittas)				
Pitta angolensis African Pitta				x(2)
Hirundinidae (swallows, martins, rough-wings)				
Psalidoprocne pristoptera Black Rough-wing				x(2)

	Kiono	Pande	Kisiju	Kiwengoma
Dicruridae (drongos)				
Dicrurus ludwigii Square-tailed Drongo	x(1)	x(1)		x(1)
Pycnonotidae (bulbuls)				
Chlorocichla flaviventris Yellow-bellied Greenbul	x(1)	x(1)	x(2)	x(1)
Phyllastrephus fischeri Fischer's Greenbul	x(1)	x(2)	x(2)	x(1)
P. flavostriatus Yellow-streaked Greenbul	x(1)	x(1)		x(1)
P. debilis Tiny Greenbul	x(1)	x(1)		x(1)
Nicator chloris Nicator	x(1)	x(1)	x(2)	x(1)
Turdidae (thrushes, robins, etc.)				
Cercotrichas quadrivirgata E. Bearded Sc'b Robin	x(2)	x(1)		x(2)
Cossypha natalensis Red-capped Robin Chat	x(1)	x(1)	x(1)	x(1)
Neocossyphus rufus Red-tailed Ant Thrush	x(1)	x(2)		x(2)
Turdus gurneyi Orange Ground Thrush	x(4)			
Sylviidae (warblers)				
Apalis melanocephala Black-headed Apalis	x(2)			
Camaroptera brachyura Grey-backed Camaroptera	x(1)	x(1)	x(2)	x(1)
Macrosphenus kretschmeri Kretschmer's Longbill	x(3)			x(2)
Muscicapidae (flycatchers)				
Batis mixta Forest Batis	x(2)			
Erythrocercus holochlorus Little Yellow Flycatcher	x(2)	x(2)		
Trochocercus cyanomelas Crested Flycatcher	x(3)	x(2)		x(2)
Terpsiphone viridis Paradise Flycatcher	x(2)	x(2)		
Bias musicus Black and White Flycatcher				x(3)
Motacillidae (wagtails and pipits)				
Anthus sokokensis Sokoke Pipit	x(4)			
Malaconotidae (bush-shrikes)				
Dryoscopus cubla Black-backed Puffback	x(3			x(3)
Malaconotus quadricolor 4-coloured Bush Shrike	x(3)	x(3)		x(3)
Laniarius ferrugineus Tropical Boubou	x(2)	x(2)		x(2)
Prionopidae (helmet shrikes)				
Prionops scopifrons Chestnut-fronted H. Shrike	x(2)	x(2)		x(2)
Sturnidae (starlings)				
Lamprotornis corruscus Bl-br'd Glossy Starling	x(1)			x(1)
Nectariniidae (sunbirds)				
Anthreptes collaris Collared Sunbird	x(1)	x(1)		x(2)
A. reichenowi Plain-backed Sunbird	x(1)	x(1)		
A. neglectus Uluguru Violet-backed Sunbird	x(2)			x(3)
Nectarinia olivacea Olive Sunbird	x(1)	x(1)	x(1)	x(1)
Zosteropidae (white-eyes)				
Zosterops senegalensis Yellow White-eye		x(2)		
Ploceidae (weavers)				
Ploceus bicolor Dark-backed Weaver	x(1)	x(1)		x(1)
Estrildidae (waxbills, etc.)				
Hypargos niveoguttatus Peters' Twinspot	x(2)	x(2)		x(2)
Mandingoa nitidula Green-backed Twinspot	x(2)	x(2)	x(3)	x(2)
Total number of species	51	37	13	43

Key: (1) = seen 2–3 times per day; (2) = seen once every 2–3 days; (3) = seen a few times in total; (4) = seen once or twice.

Table 3. *Presence of globally scarce species by study forest (rarity criteria from Collar & Stuart 1985)*

The criteria are Endangered, Vulnerable, Indeterminate, Rare, Insufficently known, Near-threatened, and Candidate

Kiono	**Vulnerable:** Sokoke Pipit **Near-threatened:** Plain-backed Sunbird, Southern Banded Snake Eagle, Uluguru Violet-backed Sunbird **Candidate:** Tiny Greenbul, Chestnut-fronted Helmet Shrike, Kretschmer's Longbill, Little Yellow Flycatcher, Green Tinkerbird
Kiwengoma	**Near-threatened:** Southern Banded Snake Eagle, Uluguru Violet-backed Sunbird **Candidate:** Tiny Greenbul, Chestnut-fronted Helmet Shrike, Little Yellow Flycatcher, Green Tinkerbird
Pande	**Near-threatened:** Plain-backed Sunbird **Candidate:** Tiny Greenbul, Chestnut-fronted Helmet Shrike, Kretschmer's Longbill
Kisiju	none

Other Notable Records

The capture of a single specimen of Orange Ground Thrush *Turdus gurneyi* in Kiono during August, and possible sight records of a specimen during January–February are highly notable as this is generally regarded as a montane species, not normally associated with lowland evergreen forests (Britton 1980). However, there are occasional records of the species in other coastal forests (N.E. Baker pers. comm.).

The discovery of six nests of African Pitta *Pitta angolensis* in Kiwengoma during January/March provides the most northern breeding records of this species in East Africa.

Discussion

Our preliminary description of forest birds from these four coastal forests provides additional information on the bird assemblage of this ecosystem and the status of individual species. For example, the capture of two specimens of Sokoke Pipit in Kiono forest increases the number of known localities for this species to four and provides the most recent records of the bird in Tanzania (Burgess *et al.* in press). Additionally, the occurrence of near-threatened species such as Plain-backed Sunbird, Southern Banded Snake Eagle and Uluguru Violet-backed Sunbird in several of the forests shows they have a wider distribution than was previously realized. Moreover, the occurrence of candidate Red Data Book species in all forests except Kisiju allows the global status of these species to be more formally evaluated.

Our provisional data, allied with those from the Rondo Plateau (Bagger *et al.* 1989, Holsten *et al.* 1991), Litipo Forest (Bagger *et al.* 1989) and the Pugu Hills (N.E. Baker, unpublished; Collar & Stuart, 1988) (see Figure 1 for location details), indicate that the bird assemblages in many of the Tanzanian coastal forests render them conser-

vation priorities according to the criteria presented in Collar & Stuart (1988). However, all Tanzanian coastal forests which have been studied appear ornithologically less important than the Arabuko-Sokoke coastal forest in Kenya, where there are two endemic species and several other rare and near-threatened birds (Britton & Zimmerman 1979, Kelsey & Langton 1984). The relative importance of Sokoke may reflect the fact that around 170 km^2 of largely evergreen forest is present (Kelsey & Langton 1984), whereas in Tanzania individual sites generally occupy less than 20 km^2 and the total resource of evergreen coastal forest is probably only a few hundred square kilometres (Burgess *et al.* in prep.). In contrast, the bird assemblage of most Tanzanian coastal forests appears of more conservation significance than that of comparable valley forest in Somalia, where few species of global conservation significance have been discovered (Wood 1988).

The length and timing of ornithological investigation in a particular forest is also an important factor influencing the diversity of birds which have been recorded. For example, Kiono forest has been studied for six weeks in two seasons and the highest diversity of species has been recorded (Table 2). It is likely that visits in May and October would further increase the number of birds recorded in this forest because passage species such as the Spotted Ground Thrush and African Pitta would be moving through at that time. Other forests were studied in only one season and for three weeks or less (Table 1). If visits were made to all the Tanzanian coastal forests in all seasons then a more extensive and accurate list of forest birds would result for each site, enabling a better assessment of their relative importance.

However, we believe that even our preliminary studies show interesting ornithological differences between the various forests. For instance, East Coast Akalat appears genuinely absent from all four forests we investigated, whereas it is very common in Pugu, Rondo and Litipo forests (N.E. Baker, unpublished, Bagger *et al.* 1989, Holsten *et al.* 1991). Even Pande Forest, which is only 15 km north of Pugu, has no sign of this species. Other notable differences between Pande and Pugu are that the former supports Plain-backed Sunbird which has never been seen at the latter, and Uluguru Violet-backed Sunbird is frequent at Pugu but appears to be absent at Pande. Additionally, many of the normally common forest species appear to be absent from Kisiju which has a very depauperate bird assemblage. These differences are striking and cannot be explained on the current limited knowledge of the ecology, habitat preferences and dispersal potential of these forest birds.

It was also apparent from visits to Kiono and Kiwengoma during the breeding season, that the densities of birds varied markedly between sites. For example, Red-tailed Ant Thrush *Neocossyphus rufus* was much more common at Kiono than Kiwengoma, whereas for the Red-capped Robin Chat *Cossypha natalensis* and African Broadbill *Smithornis capensis* the reverse applied. Such differences need to be more fully investigated.

There remain at least twenty areas of coastal forest over 2 km^2 in area on the mainland of Tanzania and the islands of Zanzibar and Pemba which have received little, if any, recent ornithological investigation (see Burgess *et al.* in prep). These forests require urgent study in order to more fully evaluate the relative and overall ornithological importance of the Tanzanian coastal forests. These sites are to be visited as part of the continuing coastal forest project.

This work is made all the more urgent because many of the coastal forests are subject to extreme pressure for fuel, timber and agricultural land from the expanding population

of the coastal region (Burgess *et al.* in prep). Without a greater level of protection it is possible that many of the forests will be extensively damaged or completely destroyed before the end of the century.

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