THE END OF AN ERA - FINAL LONGEVITY FIGURES FOR NCHALO

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After 16 years of ringing at Nchalo, Malawi (16°16S, 34°55E) the ringing station was closed in July 1989. Every two years since mid-1981, longevity figures were published (Hanmer 1981, 1983, 1985, 1987) and this will be the last, although it is possible that there may be odd recoveries and even recaptures in the future, should I or another ringer manage to trap there at some later date. Unfortunately, since the only reason for the presence of a large area of woodland and thicket in the trapping site was our constant vigilance (firewood and timber for house-building are at a premium in Malawi), it is quite possible that within six months or a year the trapping site will have been denuded of trees and will have become a maize or cotton field, while most of the birds will have departed to seek new territory in the ever-decreasing patches of bush and woodland in the lower Shire valley.

Birds were aged to the nearest half year, taking into account the apparent age of the bird at first capture, the months of first and last capture and the breeding season. Birds first ringed when apparently adult could not be accurately aged and are given as '>' the minimum possible age. Most monomorphic species were sexed on cloacal shape, the presence or absence of a brood patch, wing, tail or culmen length and weight and it is considered that, where given, the sex is correct. I am unable to sex most doves, kingfishers, bee-eaters and mousebirds, but one Malachite Kingfisher *Alcedo cristata* laid an egg and one mousebird was a recovery which was dissected.

By July 1985 (Hanmer 1985) 254 individuals of 67 species had reached five years old or more. Now 579 individuals of 75 species are known to have reached that age. Table 1 (overleaf) shows the breakdown into age classes, with those of previous years for comparison. The number of birds which were under eight years old was not given by Hanmer (1987), but is included here.

It might be interesting to calculate the percentage of birds ringed which have lived for more than five years. However, a high proportion of the birds concerned were ringed as adults of unknown age, so that a variable number of months (depending on the age at which birds of any species become impossible to age accurately) has to be added to the elapsed time between ringing and last recapture to calculate the approximate age of individuals. Such calculations are both complicated and inaccurate. However, for what it is worth, some 19 000 birds had been ringed up to five years ago, so that approximately 3 % of birds ringed are known to have reached the age of five or more.

TABLE 1

NUMBER OF BIRDS IN EACH AGE CLASS CAUGHT AT NCHALO UP TO JULY 1983, 1985, 1987 AND 1989.

KNOWN AGE (YEARS)	JULY 1983	JULY 1985	JULY 1987	JULY 1989
5 - > 5,5	69	89	125	218
6 - > 6,5	31	54	89	146
7 - > 7,5	42	46	53	96
8 - > 8,5	23	27	37	51
9 - > 9,5	10	18	18	31
10 - >10,5	9	13	14	17
11 - >11,5	0	4	10	11
12 - >12,5	0	3	6	8
13	0	0	0	1
Number of Birds	184	254	352	579
Number of Species	61	67	71	75

The total number of species handled at Nchalo was 236, of which only 217 were ringed (the rest were either corpses or species for which, at the time of capture, I had no rings large enough). Of those 217 species, 103 had between one and ten birds ringed and individuals of three (Tambourine Dove *Turtur tympanistria*, Rudd's Apalis *Apalis ruddi* and Brubru Shrike *Nilaus afer*) reached the age of five or more. In 39 species where 11-50 were ringed, individuals of ten (Black Crake *Amaurornis flavirostris*, Pied Kingfisher *Ceryle rudis*, Woodland Kingfisher *Halcyon senegalensis*, Greater Honeyguide *Indicator indicator*, Lesser Striped Swallow *Hirundo abyssinica*, Black Cuckooshrike *Campephaga flava*, Yellowbellied Bulbul *Chlorocichla flaviventris*, Natal Robin *Cossypha natalensis*, Wattle-eyed Flycatcher *Platysteira peltata* and Purple Widowfinch *Vidua purpurascens*) reached the age of five or more. Among the 17 species where 51-100 were ringed, only four (Laughing Dove *Streptopelia senegalensis*, Klaas's Cuckoo *Chrysococcyx klaas*, Bluecheeked Bee-eater *Merops persicus* and Forktailed Drongo *Dicrurus adsimilis*) did not have individuals which were known to have reached five or more. Where 101-500 had been ringed, out of 44 species only eight had no individuals of five or more (Kittlitz's Sandplover *Charadrius pecuarius*, Redfaced Mousebird

Colius indicus, Thrush Nightingale *Luscinia luscinia*, European Sedge Warbler *Acrocephalus schoenobaenus*, Redbacked Shrike *Lanius collurio*, Redbilled Quelea *Quelea quelea* and Redbilled Firefinch *Lagonosticta senegala*) and where over 500 were ringed, out of 14 species, only one (Bronze Mannikin *Spermestes cucullatus*) had no individuals known to be five years or more. Obviously the more that are ringed, the better the chance of retrapping old birds, because it seems apparent that a great many species, even some tiny seedeaters, are capable of living for at least five years.

Table 2 (overleaf) lists the 35 species known to have reached between seven and more than nine years, but not known to have reached ten or more. There are 86 birds, of which 59 (69 %) were ringed as adults of unknown age. There are 52 males, 24 females and ten unsexed so that, of the sexed birds, 68 % were males, and in most of the species, the oldest birds were male.

Table 3 (pp. 24-25) lists the 36 individuals of 17 species known to have reached the age of ten or more. Only one bird, a Brownthroated Weaver *Ploceus xanthopterus*, is known to have been 13 years old, but one Bluespotted Dove *Turtur afer*, one Brownthroated Weaver, one Masked Weaver *Ploceus velatus* and one Red Bishop *Euplectes orix* reached > 12,5 and there are three birds of > 12, two bulbuls and a weaver. Among the oldest birds caught at Nchalo, there are 28 (78 %) which were ringed as adults of unknown age and, among the sexed birds, 21 (62 %) were males. Again, most of the oldest birds were males, although the Brownthroated Weaver is notable for the number of old females. In addition, Table 3 lists birds known to have reached between seven and more than nine years with the prefix 'plus'. There are 92 of these, with 53 (58 %) ringed as adults of unknown age and 49 (53 %) male.

Using a binomial distribution test, it appears that the percentage of males which were ten or more years old (62 %) is not significantly different from a normal distribution (which would be 50 %), nor is it significantly different from the percentage of males in either Table 2 or Table 3 which were aged 7 - > 9,5. However, in Table 2 the percentage of males aged 7 - > 9,5 (68 %) is significantly different from a normal distribution ($P < 0,02$) and it is also significantly different from the 53 % of males in Table 3 which were aged 7 - > 9,5 ($P < 0,05$). It is likely that the reason for the percentage of males aged ten or more not being significant is the relatively small sample. The significant difference between the male percentage in Table 2 (where those aged 7 - > 9,5 were the oldest of their species) and the percentage of males aged 7 - > 9,5 in Table 3 (which were not among the oldest of their species) is interesting. There are far more females in the 7 - > 9,5 group in Table 3 and this suggests that males do live longer than females, since there are proportionately fewer females in the group aged ten or more.

TABLE 2

BIRDS KNOWN TO HAVE REACHED BETWEEN 7 AND >9 YEARS

SPECIES	KNOWN AGE (YEARS)		
	7 - >7,5	8 - >8,5	9 - >9,5
Green Spotted Dove *Turtur chalcospilos*		2	1
Mocambique Nightjar *Caprimulgus fosii*	2M, 1F	2M	1M
Speckled Mousebird *Colius striatus*	1		1F
Malachite Kingfisher *Alcedo cristata*	1, 1F		
Woodland Kingfisher *Halcyon senegalensis*	1		
Bohm's Bee-eater *Merops boehmi*		1M	
Little Bee-eater *M. pusillus*	3		1
Wiretailed Swallow *Hirundo smithii*	1M	1F	1F
Natal Robin *Cossypha natalensis*	1M		
Great Reed Warbler *Acrocephalus arundinaceus*	1M	1F	1F
Basra Reed Warbler *A. griseldis*		1M	1M
Cinnamon Reed Warbler *A. cinnamomeus*	2M, 1F	1M	
Longbilled Crombec *Sylvietta rufescens*	1M	1M	
Rudd's Apalis *Apalis ruddi*	1M		
Bleating Warbler *Camaroptera b. brachyura*	4M	1M, 1F	1M
Redfaced Cisticola *Cisticola erythrops*		2M	
Tawnyflanked Prinia *Prinia subflava*	1F		
Wattle-eyed Flycatcher *Platysteira peltata*	1M		
Threestreaked Tchagra *Tchagra australis*	1F		
Orangebreasted Bush Shrike *Telophorus sulphureopectus*	1M		
Brubru Shrike *Nilaus afer*		1F	
Coppery Sunbird *Nectarinia cuprea*	1F	1M	

TABLE 2 (contd.)

BIRDS KNOWN TO HAVE REACHED BETWEEN 7 AND >9 YEARS

SPECIES	KNOWN AGE (YEARS)		
	7 - >7,5	8 - >8,5	9 - >9,5
Purplebanded Sunbird *Nectarinia bifasciata*	1M	2M	
Yellowbellied Sunbird *N. venusta*		1F	
House Sparrow *Passer domesticus*		1M	
Lesser Masked Weaver *Ploceus intermedius*	1M, 1F	2M	1F
Yellow Weaver *P. subaureus*	1M, 1F	1M	
Thickedbilled Weaver *Amblyospiza albifrons*	1M		1M
Firecrowned Bishop *Euplectes hordeaceus*	2M		
Yellowrumped Widow *E. capensis*	2M, 1F	1M	1M
Melba Finch *Pytilia melba*	1M, 1F	1M, 1F	
Blue Waxbill *Uraeginthus angolensis*	1F		
Common Waxbill *Estrilda astrild*	1M, 2F	1M	
Yelloweyed Canary *Serinus mozambicus*	1M	1M	
Bully Canary *S. sulphuratus*		1M, 1F	
NUMBER IN EACH AGE GROUP AND TOTAL =	45	30	11 = 86
NUMBER OF MALES (TOTAL 68 %) =	26	21	5 = 52
NUMBER OF FEMALES (TOTAL 32 %) =	13	7	4 = 24
NUMBER UNSEXED =	6	2	2 = 10
NUMBER ACTUAL AGE UNKNOWN (i.e. >) (69 %)			= 59
NUMBER OF SPECIES			= 35

TABLE 3

BIRDS KNOWN TO HAVE REACHED TEN YEARS OR MORE AT JULY 1989
THOSE AGED BETWEEN 7 - >9,5 ARE GIVEN AS 'PLUS'

SPECIES	SEX	RING NO.	AGE
Mourning Dove			
Streptopelia decipiens	?	5-53176	> 10
Bluespotted Dove			
Turtur afer	?	4-35757	> 12,5
Blackeyed Bulbul			
Pycnonotus barbatus	M	2-97074	> 11,5
Plus 5M, 3F	F	BB-00334	> 11
	M	2-96837	> 10
Terrestrial Bulbul			
Phyllastrephus terrestris	M	2-96748	> 12
Plus 1M, 4F			
Sombre Bulbul			
Adropadus importunus	M	BB-00586	> 12
Plus 9M, 4F	F	2-96914	> 10,5
	F	2-96803	10
Heuglin's Robin			
Cossypha heuglini	M	BB-00384	11,5
Plus 1F	M	BB-00634	10,5
Cape Reed Warbler			
Acrocephalus gracilirostris	M	AA-52407	> 10,5
Plus 1M			
Yellowbreasted Apalis			
Apalis flavida	M	AA-55801	> 11,5
Plus 3M, 2F			
Paradise Flycatcher			
Terpsiphone viridis	F	AA-30017	> 10,5
Plus 1F			
Whitebellied Sunbird			
Nectarinia talatala	F	AA-76579	> 10,5
Plus 1F	M	AA-34614	> 10
Scarletchested Sunbird			
N. senegalensis	M	AA-52818	> 11
Plus 3M, 1F			
Collared Sunbird			
Anthreptes collaris	F	AA-55981	> 11
Plus 1M, 1F			
Spectacled Weaver			
Ploceus ocularis	M	BB-14099	> 10
Plus 1F			
Spottedbacked Weaver			
P. cucullatus	M	BB-11373	> 10
Plus 5M, 3F			
Brownthroated Weaver			
P. xanthopterus	F	AA-41145	13
Plus 13M, 17F	F	2-93245	> 12,5

TABLE 3 (contd.)

BIRDS KNOWN TO HAVE REACHED TEN YEARS OR MORE AT JULY 1989
THOSE AGED BETWEEN 7 - >9,5 ARE GIVEN AS 'PLUS'

SPECIES	SEX	RING NO.	AGE
Brownthroated Weaver (contd.)			
P. xanthopterus			
	F	BB-11915	12,5
	F	AA-30470	> 12
	F	AA-38983	> 11
	F	AA-44924	> 11
	F	2-93015	11
	M	2-93122	> 10,5
	M	2-93307	> 10
	M	2-93446	> 10
Masked Weaver			
P. velatus	M	AA-39279	> 12,5
Plus 1M, 1F			
Red Bishop			
Euplectes orix	M	AA-43731	> 12,5
Plus 7M, 3F	M	AA-40416	> 11
	M	AA-40772	11
	M	AA-44921	> 10,5
	M	AA-39261	10

NUMBER OF SPECIES = 17

	BIRDS 10 YEARS OR MORE	BIRDS 7 - > 9,5 YEARS
NUMBER OF BIRDS	36	92
NUMBER OF MALES	21 (62 %)	49 (53 %)
NUMBER OF FEMALES	13	43
NUMBER UNSEXED	2	0
NUMBER AGE UNKNOWN	28 (78 %)	53 (58 %)

The percentage of birds ringed as adults of unknown age in Table 2 (69 %) is significantly different from a normal distribution ($P < 0,01$), as is that of adults of unknown age which have reached ten or more years (78 %) in Table 3 ($P < 0,02$). This latter figure is also significantly different from the 58 % of birds aged 7 - > 9,5 in Table 3 which were ringed as adults of unknown age ($P < 0,05$), although the former figure (69 %) is just not significantly different. The 58 % is not significantly different from a normal distribution. Just what this means is unclear, but it appears that birds ringed as adults of unknown age live longer than do birds ringed as immatures, provided that they are among the oldest birds of their species. It is understandable that adults might live longer (or appear to do so), since juvenile mortality and/or dispersal would reduce the number of birds ringed as immatures which remained to be caught in the trapping area many years later. However, the higher percentage of birds ringed as immatures found in the 7 - > 9,5 group in Table 3 is inexplicable. If birds ringed as adults of unknown age either live longer than do birds ringed as immatures or (more likely) remain longer in a given area, then one would expect the percentage of birds ringed as adults to be similar in both groups of birds aged 7 - > 9,5 years.

There are more weavers and bishops than other birds among the oldest known birds. In Table 3, 18 (50 %) of those known to be ten years or older belonged to this group, while bulbuls and robins formed 25 %, sunbirds 11 %, warblers and doves 5,6 % each and flycatchers 2,8%. From this one might assume that weavers and bishops are the longest-lived group among the species ringed at Nchalo; this is improbable. The preponderance of weavers and bishops is almost certainly due to the large number of these birds which were ringed. Before preparing Table 4 (page 28), the number of birds in each of the above groups which had been ringed up to ten years ago was converted to a percentage of the total number of birds of all species which had been ringed up to that time. Then simple proportion sums were done to discover which group had produced the highest percentage of old birds, relative to the percentage of the total number of birds ringed. By this means the groups were put into a descending order of relative longevity (Table 4), since, if 6,5% of the total population (bulbuls/robins) produced 25,0 % of the old birds, then 1,6 % of the total population (doves) should have produced 6,2 % of the old birds ($25,0 \times 1,6 \div 6,5 = 6,2$ %), if doves formed the same proportion of old birds. In fact they did not, since the actual percentage found was 5,6 %. In each case the 'expected' percentage (right hand column) is the smallest which can be obtained (although it must be equal to or larger than the figure in the next column). Had the groups been in any other order, the 'expected' percentage in each case would be either smaller than that in the next column, or else far larger.

The results seem reasonable, although sunbirds come surprisingly high on the list and produced a considerably higher percentage of old birds than did weavers/bishops, when the numbers ringed are taken into account. However, these results may not be an accurate

indication of the relative longevity in the groups concerned, partly because of the small number of birds which are known to have reached ten or more years of age.

To obtain larger numbers, Table 5 (page 29) was constructed by the same methods used for Table 4, but using all the birds known to have reached the age of seven or more (Tables 2 and 3 combined) and the total number of birds of all species ringed up to seven years ago. There nightjars top the list, with bulbuls/robins not far behind (small difference between 'expected' and actual percentage of old birds), but weavers/bishops a long way below them (large difference between 'expected' and actual). The groups from weavers/bishops to sparrows all have a similar proportion of old birds, since the 'expected' percentages differ very little from the actual and two, flycatchers and canaries, have the same proportion of old birds. If one compares weavers/bishops with sparrows (i.e. 40,2 x 0,6 ÷ 32,8 = 0,7 %) there is only a 0,2 % difference between the 'expected' and actual proportion of old sparrows. Kingfishers/bee-eaters, swallows and mousebirds also show little difference in relative longevity (comparing kingfishers/bee-eaters with mousebirds the difference between 'expected' and actual is only 0,9 %), while small seedeaters seem to form the lowest proportion of old birds.

Although Table 5 (where fairly large numbers are involved) probably does give a reasonable indication of the relative longevity of certain groups of birds, it is likely that it is still not entirely accurate, because of differing habits among the groups or among different species in the groups. Strong territoriality, leading to high immature emigration in some species, would have reduced the number of ringed birds which had remained in the trapping area to be recaught years later (this might have affected mousebirds, bulbuls/robins and sparrows), but equally, that territoriality may have been the cause of the high bulbul/robin figures, since old birds did remain in the trapping area. Differing levels of faithfulness to the area by migrants and even so-called residents would also affect the results; the position of the kingfisher/bee-eater group was probably affected by this, because in some species many were ringed, but none was recaught. That group should probably be higher on the list, as should the warblers, for the same reason. Differences in palatability and the ease with which certain species can be caught for food may also have affected the results, particularly in the case of doves and mousebirds, but also in the weaver/bishop group and, contrarily, the difficulty of catching and recatching some species (swallows in particular) must have some effect on the results. However, Table 5 does give a better picture of relative longevity than merely totalling the number of birds in each group which have reached a certain age, since it does seem probable that, at the seven-year-old level, a great many species or groups would produce a similar proportion of old birds (i.e. would have a similar longevity) and it is likely that small seedeaters are correctly placed at the bottom of the list, since they probably do not live as long as do bigger birds.

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Although Table 5 (where fairly large numbers are involved) probably does give a reasonable indication of the relative longevity of certain groups of birds, it is likely that it is still not entirely accurate, because of differing habits among the groups or among different species in the groups. Strong territoriality, leading to high immature emigration in some species, would have reduced the number of ringed birds which had remained in the trapping area to be recaught years later (this might have affected mousebirds, bulbuls/robins and sparrows), but equally, that territoriality may have been the cause of the high bulbul/robin figures, since old birds did remain in the trapping area. Differing levels of faithfulness to the area by migrants and even so-called residents would also affect the results; the position of the kingfisher/bee-eater group was probably affected by this, because in some species many were ringed, but none was recaught. That group should probably be higher on the list, as should the warblers, for the same reason. Differences in palatability and the ease with which certain species can be caught for food may also have affected the results, particularly in the case of doves and mousebirds, but also in the weaver/bishop group and, contrarily, the difficulty of catching and recatching some species (swallows in particular) must have some effect on the results. However, Table 5 does give a better picture of relative longevity than merely totalling the number of birds in each group which have reached a certain age, since it does seem probable that, at the seven-year-old level, a great many species or groups would produce a similar proportion of old birds (i.e. would have a similar longevity) and it is likely that small seedeaters are correctly placed at the bottom of the list, since they probably do not live as long as do bigger birds.

TABLE 4

SPECIES GROUPS IN DESCENDING ORDER OF PROPORTION OF OLD BIRDS AS SHOWN BY % WHICH REACHED TEN OR MORE YEARS OLD OUT OF TOTAL NUMBER WHICH REACHED TEN OR MORE (36 BIRDS), COMPARED WITH % OF EACH GROUP RINGED OUT OF TOTAL NUMBER OF BIRDS OF ALL SPECIES RINGED TEN YEARS AGO AT END JUNE 1979 (9 139 BIRDS)

GROUP	NUMBER RINGED AT END JUNE 1979	% OF BIRDS OF ALL SPECIES RINGED (9 139)	NUMBER 10 YEARS OR MORE	% OF TOTAL AGED 10 OR MORE (36)	% EXPECTED IF PROPORTION OF OLD BIRDS THE SAME AS IN THE GROUP ABOVE
Bulbulbs/robins	596	6,5	9	25,0	
Doves	150	1,6	2	5,6	6,3
Sunbirds	409	4,5	4	11,0	15,1
Weavers/bishops	3 409	37,3	18	50,0	91,9
Warblers	1 000	10,9	2	5,6	14,4
Flycatchers	137	1,5	1	2,8	0,8
TOTAL	5 701		36		
ALL OTHER GROUPS	3 438				
TOTAL RINGED	9 139				

TABLE 5

SPECIES GROUPS IN DESCENDING ORDER OF PROPORTION OF OLD BIRDS AS SHOWN BY % WHICH REACHED SEVEN OR MORE YEARS OUT OF TOTAL NUMBER WHICH REACHED SEVEN OR MORE (214), COMPARED WITH % OF EACH GROUP RINGED OUT OF TOTAL NUMBER OF BIRDS OF ALL SPECIES RINGED SEVEN YEARS AGO AT END JUNE 1982 (15 117)

GROUP	NUMBER RINGED AT END JUNE 1982	% OF BIRDS OF ALL SPECIES RINGED (15 117)	NUMBER 7 YEARS OR MORE	PERCENTAGE OF TOTAL AGED 7 OR MORE (214)	PERCENTAGE EXPECTED IF PROPORTION OF OLD BIRDS THE SAME AS IN THE GROUP ABOVE
Nightjars	140	0,9	6	2,8	
Bulbuls/robins	1 054	7,0	37	17,3	21,1
Weavers/bishops	4 964	32,8	86	40,2	81,4
Sunbirds	981	6,5	17	7,9	7,9
Warblers	1 761	11,6	30	14,0	14,2
Doves	295	2,0	5	2,3	2,3
Shrikes	206	1,4	3	1,4	1,6
Canaries	299	2,0	4	1,9	2,0
Flycatchers	230	1,5	3	1,4	1,4
Sparrows	86	0,6	1	0,5	0,5
Kingfishers/ bee-eaters	739	4,9	8	3,7	4,0
Swallows	388	2,6	3	1,4	2,0
Mousebirds	400	2,6	2	0,9	1,4
Small seedeaters	2 417	16,0	9	4,2	5,6
TOTAL	13 960		214		
ALL OTHER GROUPS	1 157				
TOTAL RINGED	15 117				

The order in which the groups are placed in Table 4 will also have been affected by differing habits among the species or groups and, unfortunately, the sample is small, so that one cannot be sure that the fairly large differences in proportion of very old birds occurring in each group (which indicate big differences in relative longevity at the ten-year-old level), accurately reflect reality.

Most old birds (those of seven years or more) belong to more or less resident species (86 %) and practically all the species involved are insectivorous or omnivorous, only Mourning Doves *Streptopelia decipiens*, Blue spotted Doves, Bully Canaries *Serinus sulphuratus* and adult Red bishops being supposedly vegetarian (Maclean 1985).

The number of older birds (five or more years old in Table 1) retrapped each year has been increasing, but at the upper range of ages (ten or more) the increase has been slight. There were 30 birds in this group in July 1987 and only seven more two years later. At the 12 years and older level, there was one Sombre Bulbul *Andropadus importunus* and one Red Bishop which were previously listed as > 11 and one Brownthroated Weaver (now 13) which was previously unlisted, but otherwise there have been no changes since July 1987. This supports my suggestion (Hanmer 1987) that it is very rare for a small to medium-sized bird (less than 100 g) to live as long as 12-13 years in the wild.

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