

BIRD LONGEVITY IN THE EASTERN HIGHLANDS OF ZIMBABWE – DROUGHT SURVIVORS

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Introduction

Hanmer (1994) described my new trapping sites near Mutare, Zimbabwe and showed that, despite the 'worst drought in living memory' (the 1991-2 summer season), some birds did survive for up to three years. I suggested that many birds might have moved from their usual haunts when drought condition made life difficult and that some might return later. I also noted that very few of the then 'old' birds had been ringed as youngsters.

Now, three years later, with seven years of trapping at two sites and five at a third, recapture figures show the effects of four summers with below-average rainfall.

Sites

Mitsasa (Mit) 19°03'S, 32°39'E, alt. 1 200 m. Miombo woodland, modified by the addition of exotic plants, with birdseed and water always available. In the rain-shadow of the Bvumba Mts and normally fairly dry. Almost no trapping took

place between October 1994 and April 1997, although colour-ringed birds were noted, so 'recapture' figures are not comparable with those from other sites.

La Rochelle Botanical Gardens (LaR) 18°54'S, 32°42'E, ± 1 200 m. Exotic plants, including aloes, plus some natural forests with miombo and *Acacia* woodland nearby. On the western slope of the border hills, but with a higher rainfall than Mitsasa. Trapping took place on one day a month throughout the period.

Mountain Home (MtH) 18°50'S, 32°41'E, alt. 1 460 m. Exotic plants, especially proteas and aloes, montane forest and grassland nearby. On the western slope of a border mountain, but with a high rainfall normally and an ever-full birdbath. Trapping on one day a month throughout the period.

Bvumba Botanical Gardens (VBG) 19°07'S, 32°47'E, alt. ±1 550 m. Exotic plants, including

Table 1. Number of birds ringed and number retrapped, resighted or recovered in the Mutare, Zimbabwe area between July 1990 and June 1997. Number ringed in 1996-7 shown, but not added to total ringed. Only last sighting of each bird given.

Year Ringed	No. Ringed	Number and percentage last seen after more than					
		1 yr (%)	2 yr (%)	3 yr (%)	4 yr (%)	5 yr (%)	6 yr (%)
1990-1	1 049	89 (8,5)	22 (2,1)	17 (1,6)	6 (0,6)	15 (1,4)	6 (0,6)
1991-2	1 364	42 (3,1)	21 (1,5)	18 (1,3)	9 (0,7)	4 (0,3)	
1992-3	1 171	48 (4,1)	33 (2,8)	28 (2,4)	12 (1,0)		
1993-4	1 019	34 (3,3)	25 (2,5)	12 (1,2)			
1994-5	885	25 (2,8)	8 (0,9)				
1995-6	718	24 (3,3)					
(1996-7)	(1028)						
Total	6 254	262 (4,2)	109 (1,7)	75 (1,2)	27 (0,4)	19 (0,3)	6 (0,1)

proteas and aloes, with forest and grassland nearby. It has a high rainfall normally and a dam which did not dry up during the drought. Trapping on one day a month throughout the period.

Hillcrest College – this site was not revisited after 1993, so the fifteen birds ringed there are ignored.

Results

Table 1 shows the number of birds ringed each year (July-June) and the number of individuals retrapped, resighted or recovered for the last time in each succeeding year, up to June 1997. These figures are not comparable with those given by Hanmer (1994). The number ringed in 1996-7 is given to show the apparent increase in population after two wet summers, but is not included in the total.

Table 2 shows the number of birds known to have been alive at the end of each year after they were ringed, using the figures from Table 1. This indicates that ringing during 1991-2 produced fewer old birds than in 1990-1 and 1992-3, although the percentages in 1992-3 are lower than those in 1990-1. The rainfall in 1992-3, while low, was greater than in 1991-2, 1993-4 and 1994-5. The number ringed shows a steady decline, possibly due to lack of ringing at Mitsasa (where there were very few birds during the drought), but the percentage recapture rate at one year after ringing also decreases sharply as the effects of four dry summers accumulate.

Some birds survived for more than three years, although most of these were ringed between July

Table 2. Total number and percentage of birds known to have survived one or more years after being ringed, to show differences in survival during the drought period (summer of 1991-2 to December 1995). The summer of 1992-3 was less dry than those before and after.

Year Ringed	No. Ringed	Total number surviving for one or more years					
		1 yr (%)	2 yr (%)	3 yr (%)	4 yr (%)	5 yr (%)	6 yr (%)
1990-1	1 049	155 (14,8)	66 (6,3)	44 (4,2)	27 (2,6)	21 (2,0)	6 (0,6)
1991-2	1 364	94 (6,9)	52 (3,8)	31 (2,3)	13 (1,0)	4 (0,3)	
1992-3	1 171	121(10,3)	73 (6,2)	40 (3,4)	12 (1,0)		
1993-4	1 019	71 (7,0)	37 (3,6)	12 (1,2)			
1994-5	885	33 (3,7)	8(0,9)				
1995-6	718	24 (3,3)					

Table 3. Number of birds ringed between July 1990 and June 1996 and number and percentage retrapped, resighted or recovered at four sites in the Mutare area between July 1991 and June 1997. Site abbreviations – see text. Only last sighting of each bird given. Trapping at MtH started in July 1992. Almost no trapping at Mit October 1994 - April 1997.

Site	No. Ringed	Number and percentage seen after more than					
		1 yr (%)	2 yr (%)	3 yr (%)	4 yr (%)	5 yr (%)	6 yr (%)
Mit	1 226	43 (3,5)	21 (1,7)	8 (0,7)	2 (0,2)	1 (0,1)	1 (0,1)
LaR	2 256	104 (4,6)	41 (1,8)	31 (1,4)	11 (0,5)	9 (0,4)	2 (0,1)
MtH	1 395	61 (4,4)	25 (1,8)	14 (1,0)	6 (0,4)		
VBG	1 377	54 (3,9)	22 (1,6)	22 (1,6)	8 (0,6)	9 (0,6)	3 (0,2)

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 1997
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1990 and June 1993, before the cumulative effect of continuing drought became manifest. It is likely that more birds which were ringed in 1993-4 and 1994-5 will be caught in later years, but unlikely that the total will ever equal that for 1990-1 or 1992-3.

Table 3 shows the number ringed and the number 'recaptured' at four sites. The figures for Mitsasa from the four-year level only show colour-ringed birds which attended feed-table and birdbath at times when I was able to sit and watch, so are not comparable with figures for the other sites. Since trapping started at Mountain Home in July 1992, those figures are difficult to compare with the others. Table 4, which gives the number of birds known to be alive at the end of each year after ringing, shows the similarity of survival at La Rochelle and Bvumba Botanical Gardens, with a higher percentage of Bvumba birds surviving for two or more years. The Mountain Home percentages show a steady decline, probably due to the death of most of the *Protea repens* plants and several other bird-attracting shrubs, as the number of birds seen in the area has reduced considerably over the last two years.

Table 5 lists the birds of each species which were retrapped, resighted or recovered three or more years after being ringed (from Table 1). There are 128 of these (including one ringed in 1984 at Seldomseen, near Bvumba Botanical Gardens, which has been resident in the Gardens since at least 1990), of which 58% were male. At the three-year level the sex ratio may be closer to 1:1, as there are five unsexed birds, but the

number of females reduces in later years and all those surviving for six (or more) years were male.

Of the 128 birds recaptured three or more years after being ringed, 22 or 17% were ringed when less than one year old. Of these, only 16 (12,5% the total) were hatched in 1991-2 or 1992-3. All others which were ringed as young birds were adult by the time the drought got going. This seems to indicate a low survival by young birds, although, among those which had survived for two years after being ringed, 29% of the total were hatched after 1992-3.

Table 6 shows the minimum age reached by 63 birds, five or more years old when last seen. Age was calculated with reference to the bird's apparent age when ringed, the date of first and last capture and the known or estimated breeding season. Those first caught as adults of unknown age are shown as 'more than' a certain age.

The Bronze Sunbird, ringed in June 1984 as an immature and last seen in July 1996, is shown as being 12,5 years old. A Kurrichane Thrush, ringed at La Rochelle as a juvenile (0-6 months old) in December 1990, was recovered in Mozambique in January 1996, beside the Pungwe River. Apparently it committed suicide by diving at great speed and from a great height, to collide with a Baobab *Adansonia digitata*. Be that as it may, what is interesting is where it died. It had travelled 61 km N-E from La Rochelle (where it must have been hatched, as it was extremely young when ringed), over the border hills and down to a perennial river at a fairly low altitude.

Table 4. Total number and percentage known to have survived one or more years after being ringed at four sites, to show survival differences, as in Table 2.

Site	No. ringed	Total number surviving for one or more years					
		1 yr (%)	2 yr (%)	3 yr (%)	4 yr (%)	5 yr (%)	6 yr (%)
Mit	1 226	76 (6,2)	33 (2,7)	12 (1,0)	4 (0,3)	2 (0,2)	1 (0,1)
LaR	2 256	198 (8,8)	94 (4,2)	53 (2,3)	22 (1,0)	11 (0,5)	2 (0,1)
MtH	1 395	106 (7,6)	45 (3,2)	20 (1,4)	6 (0,4)		
VBG	1 377	118 (8,6)	64 (4,6)	42 (3,1)	20 (1,5)	12 (0,9)	3 (0,2)

Table 5. Birds retrapped, resighted or recovered three or more years after being ringed. Sex is given where known; where not known birds are shown as ?. One Bronze Sunbird, ringed in 1984 and in his thirteenth year when last seen, is shown as (+).

Species	No. of years after being ringed				
	3 yrs	4 yrs	5 yrs	6 yrs	
Palm Swift <i>Cypsiurus parvus</i>		1 F			
Speckled Mousebird <i>Colius striatus</i>	2 ?				
African Hoopoe <i>Upupa epops</i>	1 F				
Blackeyed Bulbul <i>Pycnonotus barbatus</i>	2 F	2 F, 1 M			
Stripecheeked Bulbul <i>Andropadus milanajensis</i>	1 F				
Kurrichane Thrush <i>Turdus libonyanus</i>	2 M	1 F	2 M	1 M	
Olive Thrush <i>T. olivaceus</i>			1 F, 1 M		
Heuglin's Robin <i>Cossypha heuglini</i>	1 F, 2 M				
Cape Robin <i>C. caffra</i>	1 M	1 F			
Barthroated Apalis <i>Apalis thoracica</i>	1 F	1 F, 2 M	1 M	1 M	
Singing Cisticola <i>Cisticola cantans</i>	1 M				
Paradise Flycatcher <i>Terpsiphone viridis</i>	1 F				
Longtailed Wagtail <i>Motacilla clara</i>	1 F		1 M		
Redwinged Starling <i>Onychognathus morio</i>	1 F				
Bronze Sunbird <i>Nectarinia kilimensis</i>	2 M	1 F	2 F	1 M (+1 M)	
Miombo Doublecollared Sunbird <i>N. manoensis</i>	1 F	1 M	1 M	2 M	
Yellowbellied Sunbird <i>N. venusta</i>	2 F, 7 M	2 F, 4 M	1 F, 1 M		
Olive Sunbird <i>N. olivacea</i>	3 F, 11 M	2 F, 5 M	2 M		
Collared Sunbird <i>Anthreptes collaris</i>	2 M				
Black Sunbird <i>N. amethystina</i>	1 F, 1 M		1 M	1 M	
Yellow White-eye <i>Zosterops senegalensis</i>	5 F, 2 M, 3 ?	1 F, 2 M	1 F, 1 M		
Spottedbacked Weaver <i>Ploceus cucullatus</i>	1 M				
Fast African Swee <i>Estrilda quartinia</i>	1 F				
Redthroated Twinspot <i>Hypargos niveoguttatus</i>	1 M				
Bluebilled Firefinch <i>Lagonosticta rubricata</i>	1 F, 1 M				
Blue Waxbill <i>Uraeginthus angolensis</i>	1 F, 1 M		1 F		
Cape Canary <i>Serinus canicollis</i>	4 F, 2 M		1 M		
Yelloweyed Canary <i>S. mozambicus</i>	1 M				
Bully Canary <i>S. sulphuratus</i>	1 F, 2 M		1 F		
Streakyheaded Seed eater <i>S. gularis</i>	1 F				
Total	(128)	75	27	19	6 (+ 1)
No. of males	(74)	40	15	12	7
Percentage male	(58%)	53%	56%	63%	100%
No. ringed as immature	(22)	14	5	2	(+1)
Percentage immature	(17%)	19%	19%	11%	14%

Another bird of interest is the ancient Blue Wax-bill at Mitsasa. Ringed as a juvenile in April 1991, she disappeared for a while before becoming a regular visitor to the feed-table. She was last seen in early March 1997 and her mate of two breeding seasons came to the table with a different female at the end of March; death is more likely than divorce.

Discussion

It is likely that fewer birds ringed when immature should survive to a ripe old age than those ringed as adults, as juvenile mortality and dispersal must reduce their numbers. However, a figure of 12.5% or even 17% of the total number of known old birds, seems low. In Malawi, over 16 years, birds ringed when immature made up 31% of those which were seven or more years old (Hanmer 1989). This figure is close to that found for Eastern Highlands birds which were hatched after 1992-3 and had survived for two years (29%). It is odd that birds hatched in the middle of the drought should have a nearly 'normal' survival rate, because drought effects were much worse after 1993. Perhaps there was a reduction in dispersal from areas where there was sufficient food to allow breeding to occur?

That more males than females are found among old birds seems to be normal. Among Eastern Highlands birds recaptured three or more years after being ringed, 58% were male. This and the 63.5% male found for those of five to eight (or more) years old (Table 6) fall well within the percentages found by Hanmer (1989) for Malawian birds of various age groups and in both countries the oldest birds were usually male. The reason for this is probably related to the strain put on females by annual breeding.

It has been found previously (Hanmer 1989) that food preference and size are factors in survival, with bigger birds and insectivores and omnivores tending to live longer, although there were some interesting exceptions. Sunbirds appeared to have a high survival rate, despite their small size and, although frugivores and small seedeaters tended to have the shortest life-span, canaries were relatively long-lived. In Table 6 the vast majority of old birds are insectivorous or omnivorous, a lot

of sunbirds are among the oldest birds and there are several old canaries.

Admittedly trapping has been aimed at catching as many sunbirds as possible in order to elucidate their movements (in which we have not succeeded as yet), but a great many birds of other groups have also been trapped. The old canaries are of interest, in that during the drought practically all the hundreds of Cape Canaries disappeared from the Bvumba Gardens and even in 1996-7 there were only a few tens there, mostly juveniles, but the flock included a few old birds. At La Rochelle the flock of nearly a hundred Bully Canaries disappeared completely, but the dozen or so which reappeared in 1996-7 included at least one old bird.

The movements of thrushes requires elucidation, as they seem to disappear after breeding at the Bvumba Gardens and ringed individuals may not reappear for years, whereas at Mitsasa, although the species has been present for much of the time, individuals have changed; a colour-ringed bird may be present for months, but then disappear, reappearing a year or more later. More ringing at Mitsasa might sort out what is going on.

Hanmer & Chadder (1993) reported that A J Manson (of Seldomseen, on the Bvumba) considered that, during 1991-3, he lost 70% of the birds which normally lived on his property, but we felt that the 1992-3 breeding season had been a good one and, provided a sufficient number of birds found a place in which to survive, population numbers would increase within a couple of years. We did not then know that the drought would continue until December 1995, but even so, a sufficient number of birds did survive and bred successfully in 1996 and 1997.

It becomes more and more evident that small birds can live for many years, although this may refer more to African birds than to birds in general, as I am told (Dr W Peach pers. comm.) that at least some African species may live longer than do European ones. Why this should be so, I do not know. Admittedly, the winter in much of Europe is such that most birds take off for Africa and long migratory flights twice a year

Table 6. Species, sex, age when ringed, ring number, minimum age when last seen and site where ringed and retrapped, resighted or recovered, of birds five or more years old ringed in the Mutare area from July 1990. One Bronze Sunbird, ringed in 1984, is also shown. Latin names are given in Table 5. SS = Seldomseen on the Bvumba, Moz = on the Pungwe River in Mozambique. Juv = 0-6 months old, Imm = 6-12 months, Y/Ad = 2nd year and Ad = unknown age. Birds ringed as 'Ad' are shown as more than the estimated age in years.

Species	Age/Sex	Ring No.	Age (years)	Site
Palm Swift	Ad F	Y01176	> 6,0	LaR
Black-eyed Bulbul	Ad F	BD05636	> 5,0	VBG
	Ad F	BD05651	> 5,0	Mit
Kurrichane Thrush	Ad M	4-81551	> 7,5	VBG
	Ad M	4-81553	> 6,5	VBG
	Y/Ad F	4-88207	5,5	Mit
	Ad M	CC04218	> 5,0	Mit
Olive Thrush	Juv M	4-81568	5,0	LaR - Moz
	Ad.M	4-81561	> 7,0	VBG
Cape Robin	Ad F	4-81567	> 7,0	VBG
	Ad F	F02288	> 5,5	MtH
Barthroated Apalis	Ad F	AB69208	> 8,0	VBG
	Ad M	AB69328	> 5,5	VBG
	Ad M	AD01413	> 5,0	MtH
	Ad F	X77992	> 5,0	VBG
Longtailed Wagtail	Ad M	F17350	> 6,5	VBG
Bronze Sunbird	Imm M	AA65742	12,5	SS - VBG
	Ad M	AB69204	> 7,5	VBG
	Ad F	AA91537	> 7,0	VBG
	Ad F	AA91665	> 7,0	VBG
	Ad F	AA91956	> 6,0	VBG
Miombo Sunbird	Ad M	X62872	> 8,0	Mit
	Ad M	AB69397	> 7,0	LaR
	JuvM	AB69322	6,0	LaR
	Ad M	AA91992	> 5,0	LaR
Yellowbellied Sunbird	Ad M	X62889	> 6,5	LaR
	Ad M	X62952	> 6,5	LaR
	Ad M	X74352	> 6,5	LaR
	Ad F	X74427	> 6,0	LaR
	Ad M	X77907	> 6,0	VBG
	Ad M	X74386	> 6,0	VBG
	Ad M	X84522	> 5,0	LaR
	Ad M	X62989	> 5,0	VBG
	Ad F	X63037	> 5,0	LaR
	Ad F	X77998	> 5,0	LaR
	Olive Sunbird	Ad M	AA91798	> 7,0
Ad M		AB69313	> 6,0	LaR
Ad M		AA91611	> 6,0	VBG

Table 6. cont'd

Species	Age/Sex	Ring No.	Age (years)	Site
Olive Sunbird (cont'd)	Ad M	AD01361	> 5,5	LaR
	Imm M	AA91896	5,5	LaR
	Imm F	AA91578	5,5	VBG
	Ad M	X84687	> 5,0	LaR
	Ad M	AD01529	> 5,0	MtH
	Ad M	AD01527	> 5,0	MtH
	Y/Ad M	AA91979	5,0	LaR
	Y/Ad M	X84591	5,0	LaR
	Y/Ad M	AD01516	5,0	MtH
	Imm F	X84581	5,0	MtH
Collared Sunbird	Ad M	X77956	> 5,0	LaR
Black Sunbird	Y/Ad M	AA91570	7,0	LaR
	Ad M	AB69328	> 6,5	LaR
	Ad M	AD01551	> 5,0	LaR
Yellow White-eye	Ad M	AA91652	> 7,0	LaR
	Ad F	X63059	> 6,0	LaR
	Ad F	X84721	> 5,0	LaR
	Imm M	X84563	5,0	LaR
	Imm F	X74421	5,0	LaR
Blue Waxbill	Juv F	X74203	6,0	Mit
Cape Canary	Y/Ad M	AB69348	6,0	VBG
	Ad F	AB69345	> 5,0	VBG
	Ad F	AA91876	> 5,0	VBG
Bully Canary	Ad F	AC05688	> 6,5	LaR
	Ad M	AC18804	> 5,0	MtH

No. of birds = 63. No. of males = 40.
 No. of birds under 1 yr when ringed = 9.

Percentage male = 63%.
 Percentage immature = 14%.

must shorten the life-span, but Africa is not known for having an equitable climate either and conditions vary, with drought or flood, tremendous heat or icy cold during the so-called wet season and every year there is a long dry period in winter which, in this part of Africa, generally continues until October or even December, during which months temperatures become extremely high. Supplies of food and water must likewise fluctuate, so African birds must have a strategy to cope with this, or none would survive.

sedentary (Brooke 1978, Hanmer 1977, 1978). Some or most individuals move a long or a short distance at certain times of the year in response to certain factors, probably related to temperature and food supply, returning to their 'residential area' at other times of the year. Thus, when conditions become difficult, even at the wrong time of year, they will move. Adult birds probably have a knowledge of suitable off-season areas, where previously they survived the long dry season and will return there in time of drought.

One possibility comes to mind: I believe that few African bird species or populations are truly

immature dispersal is probably random (although in many species immature birds as well as adults

move to a lower altitude for the winter and hence, closer to permanent rivers), so only some will locate a good dry-season haven and survive to return to breeding areas when conditions improve. This could explain why the Eastern Highlands figures indicate a much higher survival rate in adults than in immatures over the drought period. However, it is then necessary to explain the relatively high (normal?) immature survival figures for those hatched after 1992-3, when the effects of drought were becoming considerably worse than in 1991-3, a period during which immature survival was very low. Perhaps adults which had survived the 'worst drought in living memory' (1991-2) bred in the area in which they had found a haven and immatures hatched there did not move far, as there was no food or water elsewhere. Thus, already being in a haven, they survived; those that did move may well have died.

Hanmer & Chadder (1993) showed that much movement had occurred during 1991-3, with unusual species turning up in the Mutare area, but this was much less noticeable during the following years; populations seemed more static. This is a subjective impression and what the birds actually did to survive the drought is unknown, but the fact remains that several old birds which had not been seen for years, recently turned up again, whereas others were present at a trapping site throughout most of the drought period.

Places like Bvumba Botanical Gardens, with perennial watery or La Rochelle, where some watering of flowers and shrubs was done during the drought, may have provided a haven for birds which did not move and perhaps many of the birds ringed there were refugees from elsewhere. The young Kurrichane Thrush found a haven on the Pungwe River (until a Baobab intervened) and there must have been many such places in this area where conditions remained suitable for survival. Mitsasa, with its feed-table and bird-bath, allowed the survival of a few waxbills and canaries, although most other birds disappeared, perhaps moving to the dam in the valley some 2 km away, as that did not dry up completely and the surroundings were well-vegetated.

Now, in mid 1997, it is evident that after two good wet seasons, not only have bird numbers increased, but species which had not been seen in some areas for years, have returned. The return of tiny seedeaters like Redbilled Firefinch *Lagonosticta senegala* to La Rochelle and Jameson's Firefinch *L. rhodopareia* to Mitsasa, shows that individuals of most (all?) species survived somewhere and will repopulate the areas in which they used to occur, so their strategy to cope with the vagaries of Africa's climate must be a good one. Ringing and recapture figures for the next couple of years should be interesting unless El Niño messes things up again.

Conclusion

Males are slightly longer lived than females and adults survive drought conditions better than do immatures, their knowledge of a suitable haven perhaps being better. The general habit of African birds to move from summer (wet-season) areas to dry-season havens may well be a factor in survival, although, under continuous bad conditions, those already in a haven may not move.

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