Papers

Eclipse plumage in the Miombo Doublecollared Sunbird?

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Introduction

Tree (2001) found evidence of an eclipse plumage in the Lesser Doublecollared Sunbird *Cinnyris chalybea* and suggested that the 'virtual disappearance' of the closely related Miombo Doublecollared *C. manoensis* in Zimbabwe during December–February, followed by the reappearance in the latter half of March of adult males, some of which showed traces of brown plumage on the head in later years, was an indication that males of this species also had an eclipse plumage in summer.

Occurence, moult and breeding in eastern Zimbabwe

I have caught 686 Miombo Doublecollared Sunbirds at six sites in the Eastern Highlands of Zimbabwe since 1990 and Fig. 1 shows the number caught each month; all those shown as adult males were recorded as being in full plumage.

Full-plumaged males (although many were recorded as having some dull feathers on the head) were caught in every month, as were adult females (in smaller numbers). Immatures of both sexes were caught in roughly similar numbers throughout the year. Very young immatures were caught from August and there were pre-primary moult youngsters in every month. A few birds, known to be under a year old, but almost or completely adult in appearance, were caught in August–October and from February (Fig. 2). Some of the birds caught in August and most (all?) caught in September–February were breeding or moulting adults and their young of the season.

From March the population being trapped at some sites (one in particular) included an influx of non-breeding birds from elsewhere, most in moult or with the moult suspended. Many of these were only caught once, but some appeared to remain for at least part of the winter, departing in July or early August.

Fig. 2 shows the primary moult scores (P-scores) of birds recorded as adult or immature, the growth of each of the ten primary feathers on one wing being scored as 1 = missing or in pin, 2–4 = growing and 5 = new and these are summed to obtain the P-score. Primary moult started in both groups from October and birds which had completed moult were caught from February. Adults breeding at trapping sites and their young were still starting primary moult up to about March, but although breeding seemed to be almost year-round, no bird was found to be starting primary moult from late March.

Table 1 shows breeding occurrences; there seem to be two peaks, the main one in August–October, with very little in the middle of winter and practically none in November–February when most adults were moulting. Some adults suspended their moult (i.e. moult ceased before completion, to be resumed later) in February–March (Fig. 2), presumably for a second breeding attempt (some colour-ringed birds have been seen to nest twice during summer (pers. obs.)). Only a few birds are shown in the graph as having the moult suspended, but many adults, caught later in the year, showed indications of earlier suspension, which may have been caused by the onset of breeding, or could have been due to relatively long-distance movement from a

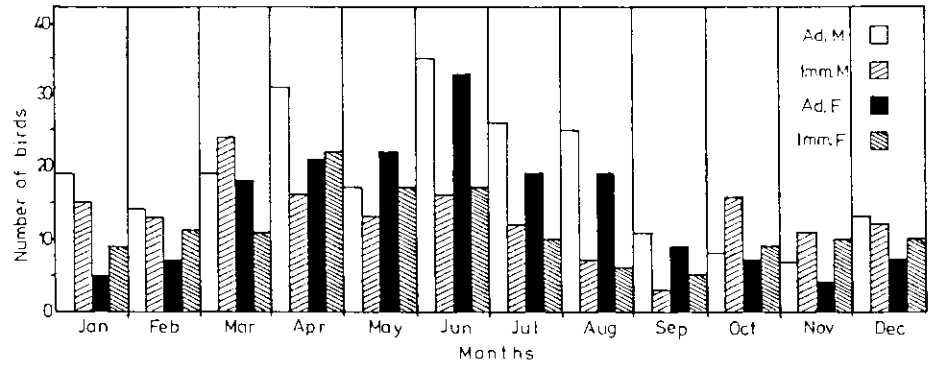

Fig. 1. Number of adult and immature male, adult and immature female Miombo Doublecollared Sunbirds caught each month in the Eastern Highlands. Those shown as immature were known to be under a year old; some young birds may be included among the adults.

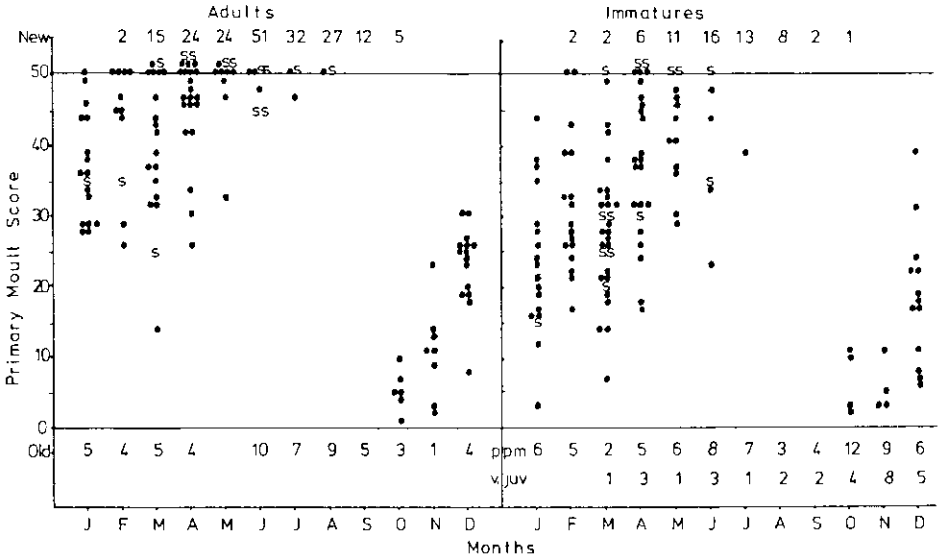

Fig. 2. Primary moult scores of adult and immature Miombo Doublecollared Sunbirds in the Eastern Highlands. All immatures were known to be under a year old, some young birds may be included among the 'New' and 'P-score 50' adults. P-score 50 = primaries complete, secondaries not; S = moult suspended; v. juv = only just left the nest; ppm = pre-primary moult in juveniles.

Table 1. Breeding indications in Miombo Doublecollared Sunbirds in the Eastern Highlands; active nests, females with an active brood patch and juveniles just out of the nest with primaries not fully grown or only just complete.

Breeding indications	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Active nests	–	1	2	2	–	–	1	2	4	3	–	–
Active brood patch:												
early	–	–	1	2	1	–	1	3	4	1	–	–
oldish	1	–	1	–	2	1	–	2	3	2	–	2
Very young juveniles caught	–	–	1	3	1	3	1	2	2	4	8	5

breeding to a wintering area.

Many immatures had suspended moult at P-scores of 10–20 and some at 25–35. A few were caught while moult was suspended, but most showed indications that suspension had occured earlier in their first moult cycle. This may have been due to fairly long-distance movement from natal areas in late summer. The few young birds with moult suspended at P-score 50 (primaries complete, secondaries and contour plumage not), were perhaps about to breed, as males were more or less in full plumage and two females, known to be under a year old, had an early (not yet active) brood patch. However, this suspension could have been the result of long-distance movement from a wintering to a breeding area.

Moult suspension, for whatever reason, makes estimation of primary moult duration difficult. Figure 2 suggests about four months for adults and estimations from retrapped birds are given in Table 2, where a period of 120–130 days seems likely, provided suspension does not occur. It can be seen that the inner primaries, which are smaller, are replaced more quickly than are the outer ones.

Ageing young Miombo Doublecollared Sunbirds

Table 3 gives a rough estimation of the age of young birds showing certain characteristics, on the assumption that the first primary moult starts at c. 2.5 months old (as suggested by the appearance of recaptured birds). The relationship between gape colour, irridescent plumage acquisition and primary moult, is complicated by birds suspending their moult, so that, depending on the time spent in suspension, the gape may become less yellow or darker than would be expected from the P-score. Also, the amount of irridescent plumage in males may be greater than expected, especially if suspension occured at P-score 25 or more, because at that time many more irridescent contour feathers are developing than earlier. Since already growing feathers complete growth even though the dropping of old feathers and the budding of new ones has been suspended, a greater area of irridescent plumage is produced than there would have been at the time when moult suspension occured. It is also possible that contour moult is not always suspended when flight feather moult is, but I have no information on this.

Birds with a dark brown-blackish gape can be aged by the length of unmoulted secondary feathers, those of an immature being shorter than their new secondaries. The percentage of the skull which is pneumatized probably would not help to identify an immature which looked to be adult. The four which I have dissected were: a fat-gaped juvenile = 0%; a pre-primary moult female with yellowish gape = 65%; a female with a 'slight yellow' gape and P-score 25 (suspended) = 80% and a male with a yellowish gape, P-score 29 and 'partial' male plumage = 75%. It seems likely that the skull is more or less fully pneumatized by the time that primary moult is complete and a young male looks like an adult, especially if its moult was suspended

Table 2. Estimated duration of primary moult in Miombo Doublecollared Sunbirds. S-moult = secondary wing feather moult.

Age & sex	1st score	2nd score	Difference	No. of days	Days to moult from 0–50	Months	Comments
Adult	0	19	19	<34	<89	Oct.–Dec.	
males	0	26	26	<60	<115	Oct.–Dec.	
	5	44	39	102	131	Oct.–Feb.	
	3	50	47	<119	<127	Nov.–March	Wing moult complete
	10	50	40	<96	<120	Oct.–Jan.	S-moult not complete
	23	50	27	<67	<124	Dec.–Feb.	S-moult not complete
Adult	0	24	24	<67	<140	Sept.–Dec.	
females	24	39	15	<101	<337	Dec.–March	Suspended at P-score 25
	0	50	50	<113	<113	Oct.–Feb.	S-moult not complete
	3	47	43	120	136	Oct.–Feb.	
Immature	0	23	23	<35	<76	May–June	
males	3	15	12	21	88	Nov.–Dec.	
	6	20	14	35	125	Dec.–Jan.	
	0	37	37	<64	<86	Feb.–April	
	10	31	21	56	133	Oct.–Dec.	
	10	39	29	77	133	Oct.–Dec.	
	14	41	27	56	104	March–May	
	21	50	29	<63	<109	Feb.–April	S-moult not complete
Immature	0	17	17	<34	<100	March–April	
females	0	16	16	<40	<125	Nov.–Jan.	
	16	50	34	<88	<129	Jan.–April	Wing moult complete
	0	50	50	<126	<126	Nov.–April	Wing moult complete

Table 3. Ageing young Miombo Doublecollared Sunbirds by gape colour, irridescent male plumage and primary moult score.

Age	Gape	Male plumage	P-moult score
<1 month	swollen yellow	none	none
<2 months	yellow	none to very slight	none
<3 months	yellowish	very slight to slight	0–15
<4 months	slightly yellow	slight to partial	15–30
<5 months	slightly yellow to brown	partial irridescent plumage to almost full plumage	30–45
<6 months	very slightly yellow to black	almost full plumage to full plumage	45–50
>6 months	brown to black	full plumage, much dull grey/brown plumage on the head	new

for any length of time. However, a bird with a fully ossified (white-hard) skull would be at least a year old. Such a bird, with only partially irridescent plumage, would provide proof that an eclipse plumage occurs.

Normally I note why I called a bird adult, immature, juvenile, male or female, but when large numbers are being handled, this is not always done. I know how I distinguish ages and sex in the species handled frequently, so lack of a note about gape colour or amount of irridescent plumage is not important; anything other than the expected appearance would have been noted, provided I ringed the bird. Generally, recaptures are handled as new birds, their previous records only being looked up when the trapping data are typed into species' files; unintentionally this provides a means of checking ageing and sexing criteria.

However, others have assisted with the processing on many occasions and, where no gape colour is written down, I cannot be certain that the gape was even examined. There is also a difference in colour perception among humans and differences in its description. This also applies to the assessment of 'slight', 'partial' or 'full' male plumage. I know what I meant by 'yellowish gape, slight male plumage,' but what did my co-ringers mean? Thus it is possible that among my 'adult' males there are some, well under a year old, which showed a trace of yellow or brown on the gape and traces of immature plumage, particularly on the head, but none of these birds could have been adult males in eclipse.

The converse, adult males recorded as immature because they had only partially irridescent plumage, is quite possible, but these could not be picked out from the files unless they were recaptures or were subsequently recaught.

From the recapture of birds ringed when known to be young, it seems that the head area of sunbirds is the last to attain full plumage, after primary moult is complete. I have several birds marked 'young adult', birds known to be under a year old, but adult in all respects except on the crown, which was a checker board of dull brownish/dark greyish feathers and new irridescent ones; I marked these as 'lots dull head'. In some there were new pins developing, but not in others, in which moult appeared to have ceased. On the other hand, among males recorded as adult (many known to be), a large number have the comment 'few dull head', but none 'lots dull'. Some, ringed when immature and with 'lots dull', when recaught after the second moult had either 'few dull' or no comment, because the head was more or less completely green. Less than half of the adult males which I have handled had no dull feathers among the green on the head.

Does the Miombo Doublecollared Sunbird have an eclipse plumage?

Out of 223 birds recorded as adult males, 32 have been recaught more than once over several months or years and have been in primary moult on at least one occasion; none was ever recorded as having partial male plumage. Admittedly c. 15% which did not show signs of an eclipse plumage on one or more occasion, over one or more years, is not proof that an eclipse plumage does not occur, at least occasionally.

In my files I have found some oddities; an 'immature' with no plumage or gape description and 'newish' wings in June, was recorded as a full-plumaged adult in July; two 'immatures' with black or dark gape and partial plumage in May and September respectively, had completed flight feather moult; an 'immature' with blackish gape, partial plumage and a P-score of 10 in October, was recorded as an adult in full plumage (no gape colour given) with a P-score of 35 (suspended) the following January and two 'immatures' (no gape colour given) with 'slight' plumage and a P-score of 42 in March and 48 in May respectively.

The first of these probably was a young bird and the next two may have been, with the 'partial' plumage more correctly described as 'almost full'; the head may have had few irridescent feathers. The fourth should perhaps not have had a blackish gape at a P-score of 10, but perhaps it was 'black-

ish' in the eye of the ringer because it was slightly yellow? That apparently it was in full plumage at P-score 35 (suspended) three months later, is odd, but it may have been in 'almost full plumage'. The last two with 'slight' plumage and almost completed primary moult, are also surprising, but judgement of 'slight' and 'partial' is subjective; gape colour probably would not have helped, since it should have been fairly dark by that stage of primary moult if it was immature. Nevertheless, there are at least five instances where an eclipse plumage could have occured, although none seems to be very likely.

Tree (2001) does not claim to have found any adult males in eclipse. He only suggests that traces of brown plumage on the crown might indicate that eclipse had occured. He also cites the 'virtual disappearance' of the species during summer as a possible indicator.

In the Eastern Highlands, while the species is present in large numbers during winter at one site and in smaller numbers at two where there are large areas of aloes and late summer or winter-flowering shrubs, and seems to disappear in winter from sites which are only breeding areas, numbers of adults at breeding sites remain relatively similar throughout the peak breeding period (August–October), the main moulting period (October–March) and the secondary breeding period (February–April). Many continue to moult until June, but a lot of those birds suspended their moult either for a second breeding attempt or because of long-distance movement, which does appear to occur in this species (Hanmer 2001). At trapping sites where breeding occurs there is no 'virtual disappearance' in summer, although only a few pairs breed in or near my sites. The only 'disappearance' is in winter, when most adults seem to leave breeding areas which are not also winter feeding areas and young birds (before the first primary moult in March–July/August) do not appear to have remained in trapping areas (even winter-feeding ones) until they did moult. Presumably they disperse from their natal area, irrespective of its winter feeding qualities, to some other wintering site.

Regarding the traces of brown head plumage, my impression is that the head is the last to attain or replace irridescent plumage, usually after primary moult is complete, especially in young birds. Many birds suspended moult from March, once the primaries were fully grown, either to breed or to migrate and this would leave the head incompletely moulted, with many adult males still with a few dull (old) feathers and some, particularly first year birds, with a lot.

It is possible that adult males develop a few 'female' feathers on the head while moulting – a slight touch of eclipse plumage – and these feathers might not be replaced by irridescent ones because of moult suspension. However, judging by the number of known adults with some dull-coloured head plumage (I have also found it in Yellow-bellied *C. venusta* and Collared *Hedydipina collaris* Sunbirds), if it is due to partial eclipse of the head only, I would have expected to have found some developing female-coloured feathers on the head of at least some moulting males. I have not done so, although admittedly I do not search the head of every one I catch. Of course, dull feathers on the head of a male Collared Sunbird cannot be due to partial female plumage, since females of that species also have an irridescent head; old, dull feathers seem a more likely explanation.

In conclusion, based on the above study, I suggest that male Miombo Doublecollared Sunbirds in the Eastern Highlands do not have an eclipse plumage, but further work is necessary to confirm this.

References

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