Ringing and mensural data for the Southern Yellow-billed Hornbill *Tockus leucomelas*

Pieter H. van Eeden

EcoMonitor cc, PO Box 13434, Norkem Park, 1631

Email: pieter.vaneeden@absamail.co.za

Ringing of hornbills

The first Yellow-billed hornbill was caught in 1949. Since then, 470 individuals have been caught, ringed and released. The current SAFRING database includes 375 computerised records. From Figure 1 it can be assumed that from 1949 until 1986, the trapping of Southern Yellow-billed Hornbills might have been accidental in nature. However, it would appear as if these hornbills have been the topic of species-specific projects since ever-increasing numbers have been caught since 1986, including the spike of nearly 70 individuals caught and ringed in 1969. In total, 57 ringers have contributed towards this database.

Southern Yellow-billed Hornbills have been trapped using mist-nets and walk-in traps placed between trees. They were also collected as nestlings and rehabilitees, and subsequently ringed. For the electronic records the most commonly used ring sizes were 8mm (n=251), followed by 6mm (n=86), 7mm (n=31) and 11mm (n=2). The recommended ring size is 8mm stainless steel (de Beer *et al*. 2000). Metal rings were used in 364 records whilst a combination of metal and coloured rings were used in 11 instances.

The age distribution of the 375 computerised records is as follows: unknown age (n=10), nestling (n=77), juvenile (n=4), immature (n=18), adult (n=261), 0 – 6 months (n=4) and 6 – 12 months (n=1). Likewise, the sex distribution is as follows: unknown sex (n=205), male (n=75), female (n=57), possibly male (n=20) and possibly female (n=18).

Age and sex

Based upon the description given for the Southern Yellow-billed Hornbill (Maclean 1984), one should be able to distinguish between immature and mature birds (based upon the colour of the iris and the bill). One can sometimes distinguish between the two sexes (based upon the wing and bill lengths). However, there are overlaps in these measurements between males and females. Of the 375 computerised individuals, only 45% have been sexed whilst the majority (55%) have not been sexed. A proportion of these individuals could have been sexed as either potentially male or potentially female. It is hoped that the 7th edition of Roberts, of which the measurements are based upon live birds rather than museum specimens, would encourage ringers to determine and report the age and the sex of hornbills caught.

Recoveries

Most of the hornbills caught were in good condition (n=367) whilst four birds were rehabilitated, three birds were artificially reared and only one was released away from its capture site. Most of the hornbills were caught in the northern provinces of South Africa and in Namibia (Table 1) whilst much smaller numbers were ringed elsewhere (Figure 2). The three hornbills ringed in Kwa-Zulu Natal were taken to CROW in Durban but their origin is not known (ring numbers 614354, 614355, 636497). The SAFRING data indicates that no moulting information has been recorded for this species.

Of the total of 470 hornbills ringed, only five (1.1%) recoveries and 28 (6.0%) recaptures were recorded. The greatest distance and elapsed time recorded for a Southern Yellow-billed Hornbill is 69km (501663) and 1y 5m 18d (D00497), respectively. The causes of mortality of ringed hornbills was indicated as collision with a motor vehicle (501663) and killed in a trap (501770) whilst the demise of the other three are unknown.

Mensural data

Even though the SAFRING database contains 470 ringing records for the Yellow-billed Hornbill, information on mass data and wing length data has been recorded only for a very small number of these records. The 375 computerised records contained records for mass (22%) and for wing length (15%). Subsequently to this, I made a request for further information through the South African Birding Network and South African Ringers list servers on mensural and moult data. The response was very poor – either the majority of ringers did not record mensural data or not all ringers responded to the request for information. Only 11 data sets were received.

Moult

Moult has only been recorded in four records. One individual (678101) possessed worn primary and secondary feathers and no brood patch during May 2000. Another individual (PA02303) ringed at the end of April 2002 showed moulting only of the head feathers. This and another two individuals (PA02305 and PA02307) ringed during May and June 2002, respectively, showed no moulting of the tail feathers, body feathers nor of the primary feathers. None of these three individuals possessed any brood patches. This is further confirmation that these four individuals are males, since only female hornbills incubate their eggs (Maclean 1984).

Mass and wing length

The mass and wing length data that have been recorded in the SAFRING database are summarised in Tables 2 and 3. None of these results referred to juvenile or immature birds. Mass for Southern Yellow-billed Hornbills range from about 150g to about 340g. The average mass of 49 adult males is about 15g heavier than that measured for 32 adult females (Table 2). However, mass alone is not a useful criterion for sex determination since two female birds weighed in at 152g and 354g, respectively, both of which are much heavier then the minimum and maximum mass recorded for adult males.

Wing length for Southern Yellow-billed Hornbills range from about 180mm to about 220mm. The average wing length of 38 adult males is about 11mm longer than that measured for 18 adult females (Table 3). Yet again, wing length alone is not a useful criterion for sex determination since there is a great degree of overlap in wing length for both adult males and females (Table 3).

Additional mensural data

In Table 4 I have summarised the mensural data that I received for 11 adult Southern Yellow-billed Hornbills. Again, none of these results referred to juvenile or immature birds. From this set of data, it is clear that weights of adult birds have a much narrower range (167g to 274g) but had a slightly wider range for wing length (179mm to 238mm) when compared to similar measurements in the SAFRING database (Tables 2 and 3).

Body length ranged from 465mm to 526mm (n = 6), tarsus length ranged from 39.0mm to 46.1mm (n = 10) whilst tail length ranged from 205mm to 240mm (n = 11) (Table 4). Head length varied from 98.9 mm to 119.5mm, of which the culmen (67.6mm to 92.5mm, n = 11) contributed 68% to 77% towards head length (Table 4).

The set of data represented in Table 4 was then divided between adult males and adult females (Table 5). Again, the average mass and the average wing lengths for male birds were heavier or longer when compared to the average mass and the average wing lengths of female birds but mass and wing length is again depicted not to be useful criteria for the determination of sex.

Both the minimum and maximum measurements for culmen, tail and head lengths in adult males completely overshadow those for adult females (Table 5). Thus the culmen, tail and head measurements are clearly unreliable characteristics for the reliable determination of sex in adult Southern Yellow-billed Hornbills.

It would appear that both total body length and tarsus length might be better measurements to establish or confirm sex, since the results in Table 5 show that the total body lengths and tarsus lengths of adult males were much longer when compared with those for adult females. However, in both instances, the database consists of only 3 measurements for each sex and as such, is much too small to draw any reliable conclusions.

Acknowledgements

I would like to thank Dr. GPJ Grobler, Dries Nel and Stephanie Tyler for making their ringing data available to me. I would also like to thank Dieter Oschadleus for providing me with the SAFRING data and the associated map and graph.

References

De Beer SJ, Lockwood GM, Raijmakers JHFA, Raijmakers JMH, Scott WA, Oschadleus HD & Underhill LG. (Eds.) 2000. SAFRING: Bird Ringing Manual, ADU Guide 5, pp. 102

Maclean GL. 1984. Roberts' Birds of southern Africa. John Voelcker Bird Book Fund, Cape Town.

Table 1. Number of hornbills ringed per region

Province	n
Limpopo Province	126
Namibia	124
Northwest Province	84
Botswana	18
Mpumalanga	7
Northern Cape	7
Kwa-Zulu Natal	3
Gauteng Province	2
Zimbabwe	2
Swaziland	1

Table 2. Mass data (g) for adult Southern Yellow-billed Hornbills

	n	Min	Mean	Max
Adult male	49	145	230.7	338
Adult female	32	152	215.0	354

Table 3. Wing length (mm) for adult Southern Yellow-billed Hornbills

	n	Min	Mean	Max
Adult male	38	180	202.1	224
Adult female	18	178	191.2	218

Table 4. Statistical summary of the mensural data for 11 adult Southern Yellow-billed Hornbills.

Ring No.	Age	Sex	Mass	Wing	Body	Tarsus	Culmen	Tail	Head
PA2303	4	3	167	179	-	41.2	67.6	205	98.9
PA2305	4	0 (1)*	190	188	-	40.6	72.1	207	99.3
PA2307	4	3	227	202	-	46.1	84.7	218	112.3
6H68330	4	2	228	198	510	40.3	82.1	217	113.2
6H68331	4	1	240	204	519	43.2	89.8	230	119.5
6H68338	4	2	194	191	480	40.6	71	214	100.2
6H68339	4	2	224	195	465	39	77.1	231	105.5
6H68340	4	1	274	210	519	42.2	92.5	240	119.1
6-78101	4	2	226	200	-	-	82	221	-
6-20955	4	1	265	229	526	42.7	92.4	213	117
6-21273	4	0 (1)*	245	238	-	45.7	91	219	117.4
Count	11	11	11	11	6	10	11	11	10
Minimum			167	179	465	39.0	67.6	205	98.9
Average			225	203	503	42.2	82.0	220	110.2
Maximum			274	238	526	46.1	92.5	240	119.5

*Based upon the measurement given in Maclean (1984), these two individuals can be sexed as males

Table 5. Comparative mensural data based upon 11 adult male and female Southern Yellow-billed Hornbills

Males	mass	wing	body	tarsus	culmen	tail	head
Count	7	7	3	7	7	7	7
Minimum	167	179	519	40.6	67.6	205	98.9
Average	230	207	521	43.1	84.3	219	111.9
Maximum	274	238	526	46.1	92.5	240	119.5
Females	**mass**	**wing**	**body**	**tarsus**	**culmen**	**tail**	**head**
Count	4	4	3	3	4	4	3
Minimum	194	191	465	39.0	71.0	214	100.2
Average	218	196	485	40.0	78.1	221	106.3
Maximum	228	200	510	40.6	82.1	231	113.2

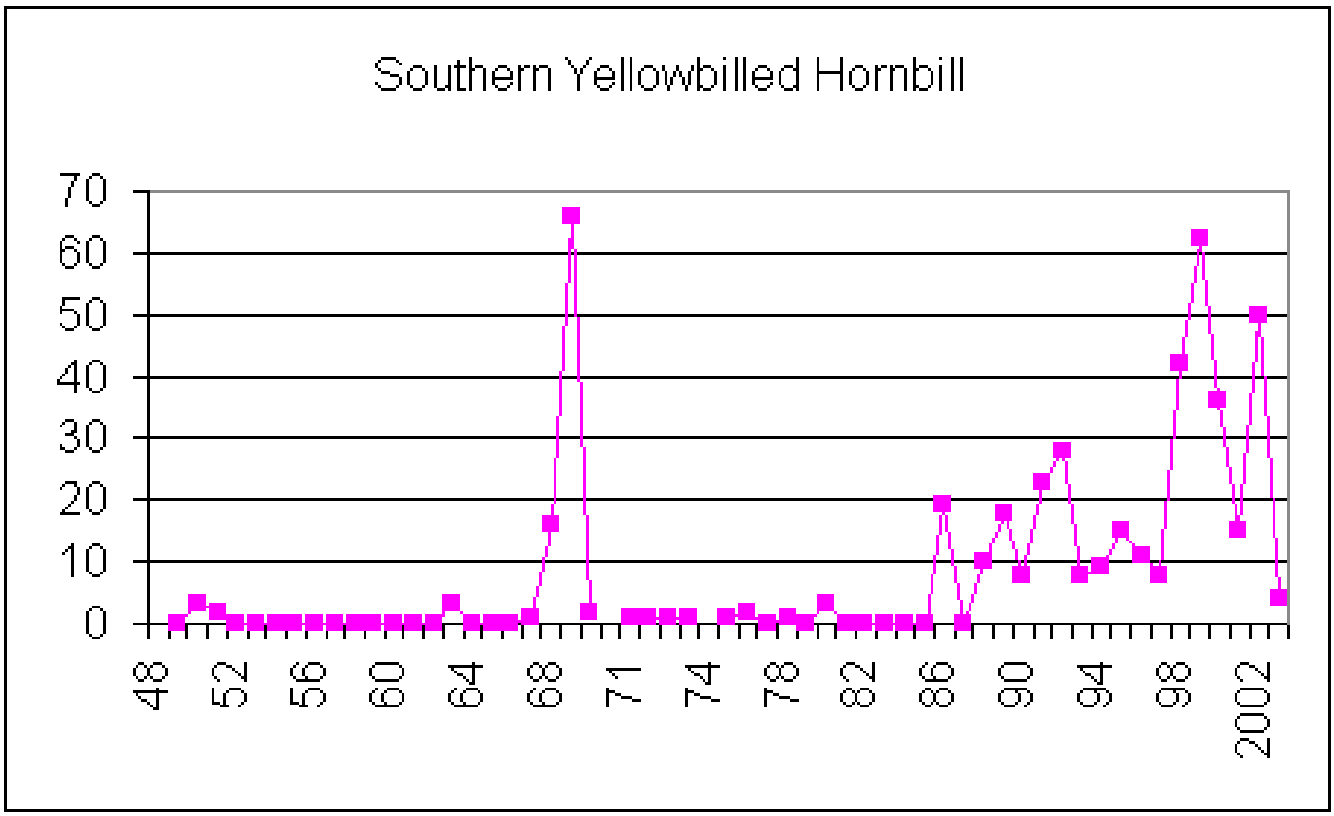

Figure 1. Annual number of Southern Yellow-billed Hornbills ringed in southern Africa. Note that a total of four (average of one per year) were ringed during the period of 1970 to 1973; the individual year totals are not known.

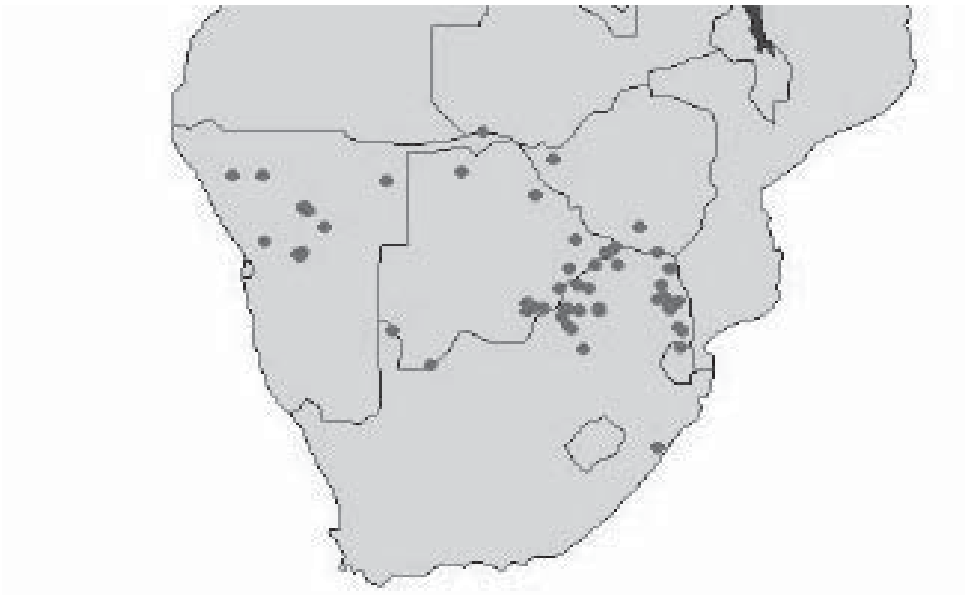

Figure 2. Map of localities where Southern Yellow-billed Hornbills have been ringed in southern Africa, 1975 to 2002.