Weight Loss of Bands Used on Grey Teal

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An analysis is made of weight loss of bands used on Grey Teal (*Anas gibberifrons*). The study has suggested that for this species and for this type of band, band wear assumed to have been caused by corrosion, may be extremely variable. Perhaps this phenomenon may be more widespread in species subject to constantly changing extremes in environment.

Rowley (1966) drew attention to the lack of data concerned with band wear and loss of bands on birds generally and he pointed out that most previous studies (e.g. Coulson and White, 1955, 1959; Harris, 1964) had been conducted with sea birds. In such species life expectancy is normally longer than that of passerine species. Band recoveries are used to determine mortality rates of various age groups and it is important to recognise that calculations concerned with mortality and survivorship parameters in long-lived species become increasingly dependent upon the variable properties of the bands used. If birds can remove the bands or if bands corrode or abrade and drop off in time, then relatively fewer are returned and mortality rates become more positively skewed. This results in mortality estimates of younger age groups being increased with a corresponding decrease in that for older age groups. The use of band recoveries may then produce an underestimate of longevity and could cause an overestimate of the species' mortality rate. Further in species which are seasonally hunted (as is the case with most Australian ducks) and where bands are returned mainly by the shooters themselves, it is useful to be able to check dubious records (generally when the "estimated" date of shooting is given) by comparison of returned band weights with a previously accepted series having an established rate of weight loss.

In Victoria, the Fisheries and Wildlife Department has promoted a wide-scale programme of duck-trapping and banding which was initiated in 1953. Most banding during this period has been undertaken at Lara Lake, about 30 miles west of Melbourne (see McNally and Falconer, 1953, for further details). To date some 83,000 ducks have been banded and the Grey Teal has figured prominently in the total with 59,898 banded and 12,251 recovered up to the end of 1969. Several types of bands have been used on this species during this time and in the current analysis of the banding and recovery data, band wear is being examined as a potential source of error in formulating mortality estimates. This note presents some results obtained during the use of 'Sale' bands, which were placed on Grey Teal during the period 1960 to 1963. These bands, made of anti-corrosive aluminium alloy (BA.21) in a flat strip of 29 mm by 10 mm, were 1.35 mm thick. Bands were weighed to 0.001 grm prior to use and when returned as recovered (from shot birds, or from birds found dead) they were re-weighed and the band appearance classed on an arbitrary scale of 1 to 9, based on the amount of wear. The mean initial, or pre-banding, weight of the 134 bands later returned, and discussed below, was 0.881 grm (range 0.850-0.909 grm, S.D. = 0.009 grm).

Figure 1 presents the weights of recovered 'Sale' bands, given to the nearest month of recovery and up to 74 months after being placed on Grey Teal. The distribution of weights in relation to time is clearly diverse. The line showing band wear may be expressed as $y = 0.881 - 0.00377x$ ($y = a + bx$), where x is the time of wear in months and y equals band weight. This shows a weight loss of 0.00377 grm per month, and hence 0.045 grm per annum, and 95 per cent confidence limits based on the line are $b \pm 0.00077$.

Table 1 gives the weights of bands in year classes since time of banding, and the variation shown within each year class is large. Nevertheless,

TABLE 1

Bands used on Grey Teal and later recovered: the 132 bands have been grouped into year classes since banding.

	MONTHS SINCE BANDING						
	0-12	13-24	25-36	37-48	49-60	61-72	73+
Number of bands	38	26	36	21	3	7	1
Mean weight (grm)	0.874	0.834	0.753	0.727	0.700	0.614	0.692
Range:							
maximum	0.901	0.903	0.895	0.870	0.773	0.770	—
minimum	0.766	0.756	0.580	0.577	0.605	0.420	—
Standard deviation	0.029	0.033	0.070	0.083	0.083	0.015	—
Mean weight as % of initial weight	99.2	94.6	84.5	81.6(1)	78.9	68.9	77.7

(1) During the first four years of wear, there is a mean annual weight loss of 4.8 per cent per annum.

TABLE 2

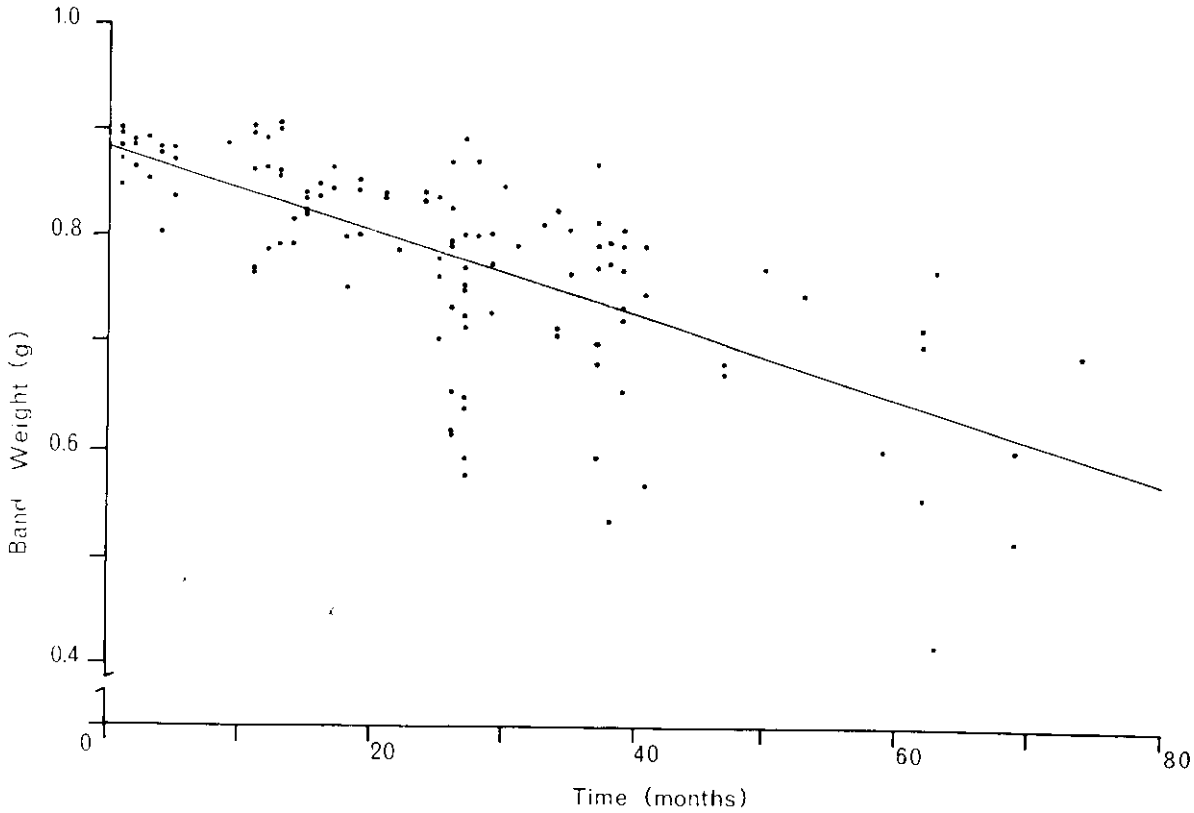
Band appearance for 133 recovered bands used on Grey Teal; recoveries have been grouped in year classes.

	MONTHS SINCE BANDING						
CATEGORY	0-12	13-24	25-36	37-48	49-60	61-72	73+
1. Not worn	36	15	—	—	—	—	—
2. Slightly worn	2	10	21	8	1	—	—
3. Half worn	—	2	10	13	2	4	1
4. Very worn	1	—	5	—	—	2	—

(In this system of classification of band appearance, bands in class '5' are partially illegible.)

there is a mean annual weight loss of 4.8 per cent per annum if the bands in each year class are compared with their mean initial weight. Table 2 shows the distribution of band appearance in the four categories of wear. Although no bands included in this study have been recorded as illegible, or even partially illegible, most bands begin to show some wear after two years of use. However, unlike the clip bands used on Australian Ravens (*Corvus coronoides*) by Rowley (1966), no unusual notching or extreme wear was noted at band edges, and wear was confined to outer and inner surfaces. Little evidence of pitting of the band surface or abrasion at the butted ends was seen. Results shown in Figure 1 and in Tables 1 and 2 indicate that wear of 'Sale' bands used on Grey Teal has been extremely variable. The mean weight loss of 4.8 per cent per annum is lower than that of 7.2 per cent recorded for the Raven (Rowley, 1966). It is considerably lower than the 10.5 per cent given for the Manx Shearwater (Harris, 1964) and the 9.3 per cent obtained for bands used on the Kittiwake (Coulson and White, 1959), both sea birds. In this study abrasion and corrosion have not been separable but, although Rowley (1966) found that bands used in his study showed no evidence of corrosion, it seems likely that corrosion must be the significant factor causing weight loss of bands used on the Grey Teal. Since the Grey Teal occupies most fresh water, brackish or salt water habitats, spends a great deal of its life in water and breeds in a range extending from coastal swamps to inland tanks (Frith, 1967), then bands placed on this species can be subjected to extremely variable corrosive (but limited abrasive) conditions. This changing environment must have a profound and unmeasurable effect on bands.

For this species there is not a problem of legibility of bands (cf. Harris, 1964; Rowley, 1966) but rather that corrosion may reduce band



• Figure 1. *Weight loss of bands placed on Grey Teal. (The two extreme weights, indicated by crosses, at 6 and 17 months were not included in calculations and multiple values of x on y have not been indicated).*

weight rapidly to cause an indefinite number of band losses. If, as in the two cases shown in Figure 1, one band can loose 53.9 per cent of its original weight in six months and the other 51.3 per cent in 17 months, then this weight loss must cause band loss. This band loss, unmeasurable by present techniques, must be recognised to influence calculations based on band returns. Since band wear can vary markedly from individual to individual dependent on habitat utilisation, the nomadic nature of the Grey Teal may assist in the destruction of the bands. In extreme cases, of band wear, the life expectancy of the bird becomes, as far as the bander is concerned, the life expectancy of the band itself.

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References

Coulson, J. C. and White, E. (1955), 'Abrasion and Loss of Rings among Sea Birds', *Bird Study*, 2:41-44.

Coulson, J. C. and White E. (1959), 'The Post-fledging Mortality of the Kittiwake', *Bird Study*, 6:97-102.

Frith, H. J. (1967), Waterfowl in Australia. Angus and Robertson, Sydney.

Harris, M. P. (1964), 'Ring Loss and Wear of Rings on Marked Manx Shearwaters', *Bird Study*, 11:39-46.

McNally, J. and Falconer, D. D. (1953), 'Trapping and Banding Operations, Lara Lake, 1953', *Emu*, 53:51-70.

Rowley, I. (1966), 'Rapid Band Wear on Australian Ravens', *Aust. Bird Bander*, 4:47-49.

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