

# Plumage Notes on Nankeen Kestrels

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Recently G. R. and A. E. Cam (1975) discussed results of banding free-flying Kestrels *Falco cenchroides* to obtain information on various aspects of their life history. This paper compares my results with the Cams' and suggests that wing covert markings may be useful in age determination of Kestrels.

## Details of Study

During the period July 1972 to September 1975, 122 Nankeen Kestrels were banded\* for this study, 109 by the author, 7 by D. I. Smedley, and 6 by P. A. White. The study area included most of New South Wales except the north-west corner of the state where only one visit was made and very few Kestrels were encountered. The method of capture was similar to that used by S. G. Lane (1966) and Cam & Cam (1975).

Initially the only plumage details recorded were head and tail colours and markings. After handling a number of birds other plumage details appeared to be important and were therefore recorded. These included breast colour and markings, upper tail covert colour, and wing covert markings.

Plumage details of tail, head and breast were recorded for all birds captured, while details of upper tail coverts (108), flanks (87) and wing coverts (72) were also noted. Wing measurements were taken in all instances and wing-span measurements for 43 birds.

Sex was determined in a similar manner as described by Cam & Cam (1975).

## Results and Discussion

Of the 122 birds banded only two were re-trapped during the study, both at their respective banding places. One bird (081-09482) was banded at Woollooware on 13 July 1971, and re-trapped as an adult female on 4 August 1974 (see Recovery Round-up, Vol. 12, no. 4, p. 83). The other bird (081-09476), also a female, was banded at Rouse Hill on 3 December 1972, and re-trapped on 17 March 1974.

\*Bands used were provided by the Australian Bird-banding Scheme, Division of Wildlife Research, CSIRO.

## Wing and Wing-span Measurements

Wing measurements were taken on 122 birds; males ranged from 220 mm to 267 mm, females from 256 to 275 mm, with an overlap range of 12 mm from 256 mm to 267 mm. Wing-span measurements were taken on 43 birds with males ranging from 710 mm to 758 mm and females from 763 to 782 mm.

## Plumage

Cam & Cam (1975) divided males into five, and females into two, plumage classes and further subdivided them depending upon the degree of barring on the tail. My data support this classification and is detailed in Tables 1 and 2.

TABLE 1

Category of plumage types for male Nankeen Kestrels showing the number banded in each category

Plumage Category	Tail Barred	Tail Unbarred
1. All brown .....	5	1
2. Brown with grey tail coverts .....	14	1
3. Brown head; grey tail coverts and tail .....	3	2
4. Grey and brown head; grey tail coverts and tail .....	18	12
5. Grey head, tail coverts and tail .....	—	7

TABLE 2

Category of plumage types for female Nankeen Kestrels showing the number banded in each category

Plumage Category	Tail Wholly Barred	Tail Barred except centre two feathers
1. Brown tail coverts ....	10	1
2. Grey tail coverts ....	22	6

TABLE 3  
Comparison of Wing Covert Types with Other Plumage Details

Wing Covert Type	TAIL		HEAD			UPPER TAIL COVERTS		
	Grey/Brown		Grey/Brown/Grey & Brown			Brown/Brown/Grey (barred)		
1. Unmarked .....	27	2	3	5	21	—	—	29
2. Moderately marked .....	—	18	—	18	—	—	5	13
3. Fully marked .....	—	25	—	24	1	7	4	14

### Barred Upper Tail Coverts

Birds in category 1 are thought to be juveniles, as all had brown heads and fully barred brown tails and most had fully marked wing coverts. Three birds had partly grey ceres, three had pale yellow ceres and four had yellow ceres. No bird in this category had a bright yellow cere. Although there was some variation, most birds in this category had brown upper tail coverts with dark brown/black streaking near the rump and barring near the tail blending with the barring on the tail.

Cam & Cam suggested that male plumage categories 1 and 2 were juveniles, but it would appear that birds in category 2 had undergone a part body moult in which the barred upper tail coverts were replaced by grey feathers. This would mean that they were apparently coming into their first-year body plumage.

### Unbarred Brown Tail

Only two birds banded for this study had brown tails with virtually no barring (apart from the subterminal band). They were both sexed as males and were not juveniles. One bird (081-19353), banded at Bulga on 2 March 1975 had a brown head, brown upper tail coverts, and moderately marked wing coverts. There were no signs of barring whatsoever on the tail. The other bird (081-15306), banded at Branxton on 21 September 1975, had a brown head, grey upper tail coverts and brightly coloured unmarked wing coverts. There were very faint brown patches on the tail, discernible only at close quarters.

Cam & Cam (1975) made no mention of the existence of this tail category, although it was provided for in the tables. It is, therefore, assumed that no birds with unbarred brown tails were banded in that study.

TABLE 4

Distribution of sex for each wing covert type

Wing Covert Type	Male	Female	Unknown
1. Unmarked .....	28	—	1
2. Moderately marked	4	13	1
3. Fully marked .....	11	10	4

The only museum specimen examined with an unbarred brown tail was found to be a female. This may be the climax tail type of the adult female as many females banded had no barring on the centre two tail feathers and very little barring on the other tail feathers, suggesting a progression to a completely unbarred tail.

### Wing Coverts

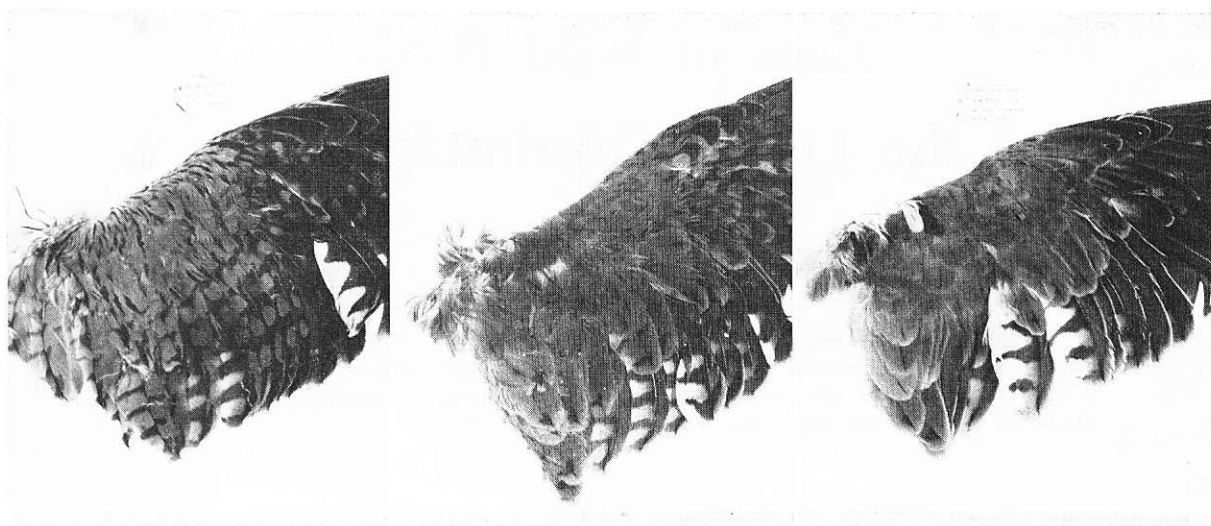
(For the purpose of this paper, wing coverts refer collectively to the lesser, median and secondary coverts, but not the primary coverts of the upper wing.)

Data collected from 72 birds in the field show that three main categories of wing coverts may be identified—see Figure 1. Examination of museum specimens supports this classification.

Table 3 shows the comparison of wing covert types with other plumage details.

Table 4 shows the distribution of sex within each category.

*Unmarked*—The wing coverts of birds in this category were a bright rufous colour, being completely unmarked or with very faint lines. All birds banded in this category had grey tails and most had grey or partly grey heads. All had grey upper tail coverts and were sexed as males. This category is typical of the adult or maturing male.



● Figure 1. Wing coverts of Nankeen Kestrels — “Unmarked” (right), “Moderately Marked” (centre) and “Fully Marked” (left).

*Moderately marked*—The wing covert markings in this category varied from broad streaks to thin “arrowheads”. The four males in this category were probably progressing from fully marked wing coverts. The majority of females banded for the study had this wing covert type.

*Fully marked*—The wing covert markings in this category were broad “arrowheads” and prominent streaks. All birds in this category had barred, brown tails and brown heads. Some had barred upper tail coverts and greyish ceres. Nankeen Kestrels are broadly marked when young, the marking being lost progressively as the birds age. Therefore this category would most likely refer to juvenile and first-year birds.

#### Flanks and Breast

Details of flank and breast colours and markings were taken on 87 and 122 birds respectively. Although there was some variation in these areas, to date no clear patterns have emerged.

#### Ageing

It would appear that juveniles of both sexes are similar, apart from size, with fully barred, brown tails, brown heads, barred upper tail coverts and fully marked wing coverts. With age, males attain grey upper tail coverts, head and tail, and lose all marking on the wing coverts, which become a brighter rufous. With age,

females lose some of the barring on the tail, attain grey upper tail coverts and have moderately marked wing coverts.

#### Conclusion

The exact sequence of the plumage changes outlined, and at what age they occur, still has to be determined. Further research into plumage changes is still required and it is hoped that the classifications used for wing covert markings in this paper will be useful in this research.

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#### References

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