doing so were no longer attracted to the lures and therefore not trapped again.

The average index of body condition varied between the different years, both in adult and in juvenile buzzards. Indices were lowest in spring 1984 and 1985 and highest in spring 1988. The number of birds trapped exhibited a reverse trend, numbers trapped per day being greatest in 1984 and smallest in 1988. Possible connections between physical condition and the number of birds trapped, along with possible effects of environmental conditions on these two variables are discussed.

The hydration condition of migrating Steppe Buzzards in spring 1988 was determined by taking blood samples from 27 birds and measuring plasma osmolality, packed cell volume (PCV), and total body water (TBW), using the dilution technique. In addition, three captive buzzards were dehydrated experimentally and the results were compared to data from the migrants and data in the literature. The results showed no indication that the migrating buzzards were dehydrated. These results are discussed in view of the possible effects of water and/or energy shortages being limiting factors during long flights.

Moult was checked in 216 adult buzzards and 550 juveniles. Most adults showed arrested moult of remiges and rectrices. No active moult was found in the adults. However, 20% of the juveniles were in arrested and active moult of the primaries. The percentage of juveniles in primary moult increased during the season. Moult and physical condition of the moulting birds are discussed in view of the fact that birds do not normally moult their flight feathers while on migration. Average wing length did not differ significantly between the different moult categories.

Ecto- and blood parasites were collected and identified. Load of ectoparasites was measured in 110 Steppe Buzzards. No correlation was found between physical condition and load of ectoparasites.

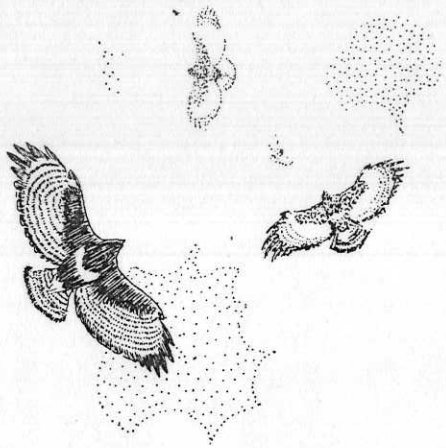
Some data on moult, demography and physical condition are also presented for other species of migrants e.g. Levant Sparrowhawk *Accipiter brevipes*, European Sparrowhawk *A. nisus* and Marsh Harrier *Circus aeruginosus*, which were trapped in fewer numbers.


- BROEKHUYSEN GJ & SIEGFRIED WR. 1970. Age and moult in the Steppe Buzzard in southern Africa. Ostrich suppl. 8: 223-237.
- BROEKHUYSEN GJ & SIEGFRIED WR. 1971. Dimensions and weight of the Steppe Buzzard in southern Africa. Ostrich suppl. 9: 31-39.
- SCHMITT MB, BAUR, S & VON MALTITZ F. 1980. Observations on the Steppe Buzzard in the Transvaal. Ostrich 51: 151-159.



EDNA GORNEY-LABINGER

DEPARTMENT OF ZOOLOGY, GEORGE S WISE FACULTY OF LIFE SCIENCES, TEL AVIV UNIVERSITY, RAMAT-AVIV, TEL-AVIV 69978, ISRAEL



# OBSERVATIONS ON THE BREEDING OF ROCK KESTRELS IN WINDHOEK, NAMIBIA


John M Mendelsohn



SUMMARY - Observations are reported on the breeding of a pair of Rock Kestrels *Falco tinnunculus rupicolus* during 1988 and 1989 in Windhoek, Namibia. Eggs were laid at two-day intervals in the second half of September. Egg size decreased with laying order, clutch size being 5 eggs in both years. Weights of eggs declined by 17 - 24% during incubation. Intervals between laying and hatching ranged from 27 + to 35 days, but full-time incubation by the female lasted 27 + to 29 days. Hatching weights were 11.3 - 14.0 g. Growth rates varied between years and, on average, were probably faster than those of slightly larger European Kestrels in Europe. Flight feathers emerged later than those of European Kestrels, but down was lost earlier. Nestling periods lasted 31-36 days. The adult female maintained high weights during incubation, but lost much weight in the nestling period.


## Introduction

Although a common bird throughout much of its range, relatively little has been published on the biology of Rock Kestrels *Falco tinnunculus rupicolus*. Existing knowledge on this race is summarized by Brown et al. (1980), Steyn (1982), and Village (1990), but these books provide little firm information.

A pair of Rock Kestrels has nested for several years in the Windhoek office block where I work. Komen & Myer (1989) provide some information on post-fledging dependence of chicks reared by this pair. This paper presents data obtained from observations at the pair's nest during the incubation and nestling periods in 1988 and 1989. These preliminary results also allow some comparisons with the wealth of information on European Kestrels *Falco t. tinnunculus*. Such comparisons might help to explain the well-established but poorly understood differences in life history traits between temperate and more tropical areas (Kemp 1985). In this respect, Robertson (1988) drew attention to the potential usefulness of comparing Rock and European Kestrels. Comparisons must, however, take into account allometric effects of body sizes; Rock Kestrels are slightly smaller (male wing length 237 mm) than European Kestrels (244 mm) (Village 1990).

## Methods

I visited the nest on most days to note its contents and the behaviour of the parents. Most visits were between 07h30 and 18h00. In 1988, the eggs were weighed using a 30-g Pesola scale. In both years, nestlings were weighed on Pesola scales (100 and 300-g scales). The female was caught several times, either on the nest by hand or using a baited trap below the site.

## Results & Discussion

### *Nest site*

The nest was on the 7th floor of an office block in the central business district, and one of several used by pairs of Rock Kestrels on buildings in Windhoek (Komen & Myer 1989). The nest was on a layer of rubble in a gap between a wall of ventilation bricks and a window. Access for the kestrels was through gaps in the brick wall, while I reached the nest through the window.

Rock Kestrels seldom nest on buildings (Steyn 1982), unlike European Kestrels in the Palaearctic. To my knowledge, Windhoek is the only city in southern Africa in which substantial numbers of Rock Kestrels occur and breed (at least six pairs, CJ Brown pers. comm.). Urban nesting by Rock Kestrels in Windhoek was first noted by Rowan et al. (1964). The recognition and use of sites on buildings presumably takes some time to develop. However, other factors must be involved because Windhoek is younger than many other cities and towns in southern Africa.

### *Laying and Incubation*

Eggs were laid at very similar times in both years; the first two eggs were found on 19 September 1988, while the first egg was laid on the same date in 1989. The five-egg clutches were completed on 24 and 28 September in 1988 and 1989, respectively. Eggs were evidently laid at two-day intervals, three eggs being laid over six days in 1988 while five eggs were laid over 10 days in 1989. Intervals of at least 44 and 49 h between laying were recorded between successive eggs. Similar laying intervals are noted for other Rock (Steyn 1982) and European Kestrels (Village 1990).

Egg-laying apparently occurred during the day. One egg was laid between 11h00 and 15h45 and another between 08h30 and 16h15. During 1988, the weight of the eggs declined by 17 - 24% during incubation, dropping from initial values of 20.2 - 23.0 g within 1-2 days of laying to 15.5 - 19.0 g within 1-2 days of hatching.

Egg weights in 1988 and sizes in 1989 suggested that the size of eggs decreased with the laying order. The 1989 clutch measured 35.9 - 37.4 x 29.9 - 32.0 mm, somewhat smaller than those usually laid by Rock Kestrels - a sample of 67 eggs measured 36.6 - 43.0 x 30.3 x 34.3 mm (Steyn 1982).

Incubation was by the female alone; the male was never seen on the nest. In 1989, she was first seen incubating three eggs, six days after the first egg was laid. Casual observations in 1988 also indicated that the start of incubation was delayed. These results accord with what is known of European Kestrels, based on many more studies (Village 1990).



The delay in incubation resulted in hatching occurring over a much shorter period than laying. In 1988 the first two chicks hatched on the same day, while their two siblings hatched on the next two days; the fifth egg failed to hatch. The first four chicks hatched on the same day in 1989 and the fifth emerged two days later.

Intervals between laying and hatching varied between 27+ and 35 days ("mean" of about 31 days for nine eggs). However, this includes periods during which early eggs were not incubated. Three eggs that were laid and incubated immediately hatched 27+ - 29 days later. These are similar to periods recorded elsewhere (Steyn 1982, Village 1990), but the start and end of incubation periods are seldom specified.

### *Nestlings and Fledging*

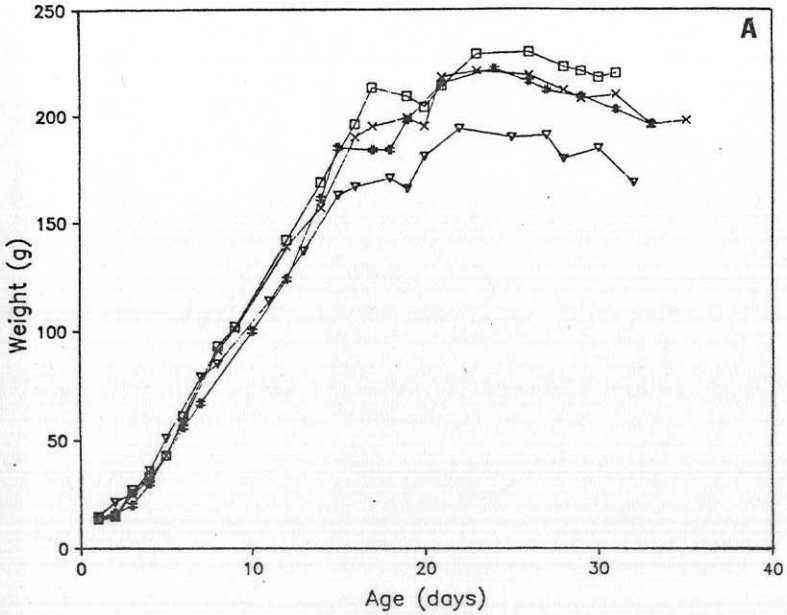
Chicks weighed 11.3 - 14.0 g (mean = 13.0 g, n = 7) within 6 h of hatching. All nine chicks (four in 1988, five in 1989) that hatched fledged successfully. However, there was considerable variation in growth rates (Fig. 1), resulting from the last-hatched nestlings growing more slowly than their siblings. In addition, the brood in 1988 grew more rapidly and fledged at higher weights than the 1989 brood. Following Ricklefs' (1967) methods of quantifying growth, the growth constant, K, in 1988 was 0.291 (logistic equation), average asymptotic weight was 225 g, and 15.1 days elapsed between growth from 10 to 90% of the asymptotic weight. For 1989, K was 0.265, the average asymptote was 185 g, and growth from 10 to 90% of asymptote lasted 16.6 days. The heaviest chick in 1988 fledged at about 230 g while the lightest one in 1989 weighed only about 150 g.

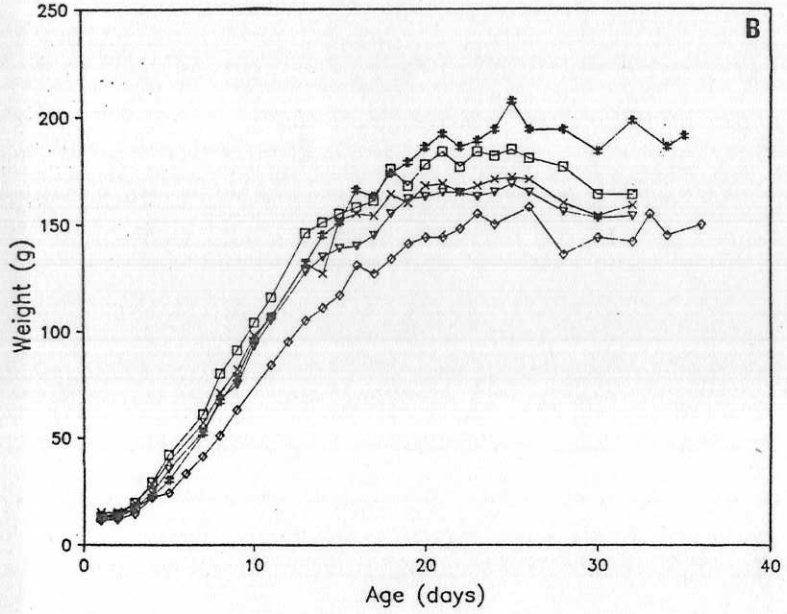
Comparison with results from a number of European studies (see Table 34 in Village 1990) suggests that the Windhoek birds grew more rapidly than most European Kestrels, although the parameters were within the range recorded for European Kestrels. This difference might be due to the greater size of European Kestrels, in which case they would take longer to reach asymptotes of 220-260 g.

The first remiges emerged as pin feathers at 11 days of age and most down had been shed by 24 - 28 days. European Kestrels, by contrast, show their first flight feathers at 8 days, but retain down for longer, most of it only having disappeared by 35 days (Village 1990).

The first flights by fledglings were hazardous because they could not fly well. Most landed on the street, pavements or roofs below the nest site. Fortunately, all were returned to the nest or cared for until they were better equipped for flight. These preliminary flights occurred at ages of 31 - 36 days (average 33 days, n = 6). Two chicks were estimated to have made their first sustained flights to high-level perches at ages of 33-35 and 34-35 days, respectively. These periods are slightly longer than nestling periods of 27-32 days recorded for European Kestrels in Europe (Cramp & Simmons 1980), but whether this indicates any significant difference requires further data.

After fledging, the young birds remained in the area of the nest site for some weeks, although they were often not seen for several days at a time. Komen & Myer (1989) recorded a post-nestling dependence period of 37 days for a brood reared at this nest site.





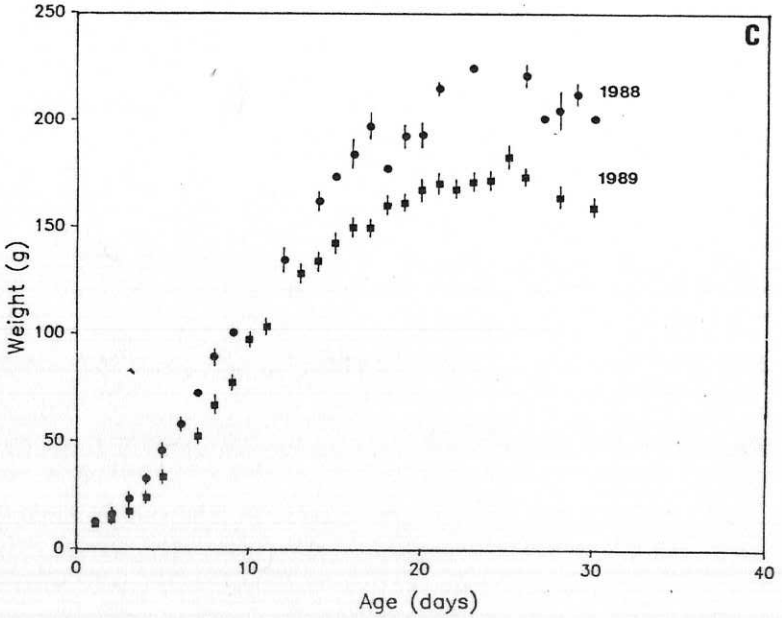




Figure 1. Growth of Rock Kestrel nestlings during 1988 (A) and 1989 (B). Average growth (with 95% confidence limits of the means) during the two years is compared in C.

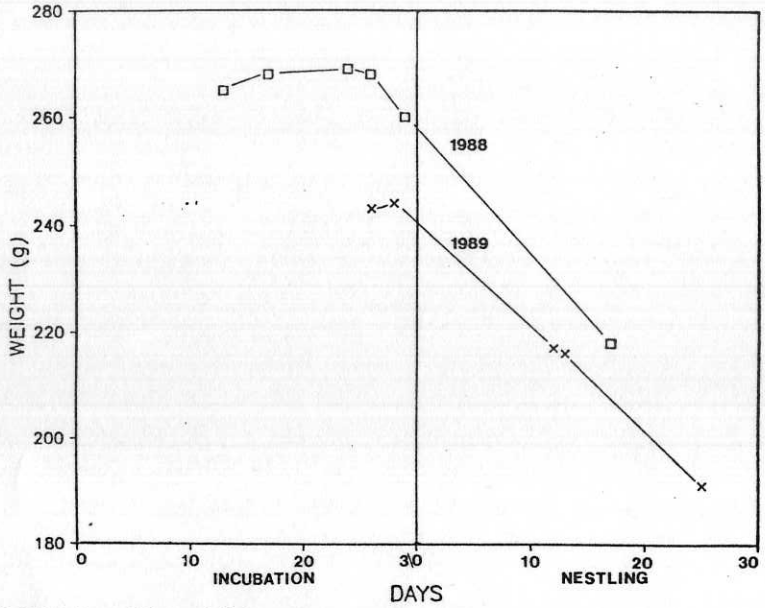



Figure 2. Weights of the adult female during incubation (days after last egg laid) and the nestling period (days after last chick hatched).

A few prey items were found in the nest - a mouse *Rhabdomys pumilio*, three *Agama* lizards, and one small passerine. A similar spectrum of prey was noted in previous years at this site (Komen & Myer 1989).

### *Female weights*

I do not know if the parents were the same individuals in 1988 and 1989. However, in both years the female was very defensive, remaining on the nest and attacking my approaching hand with her feet and bill. Her weights remained rather constant during the incubation period, but dropped markedly (18 - 20%; losing about 2 g/day) in the nestling period (Fig. 2). Such changes, probably reflecting declining fat levels, are similar to those recorded in Europe (Village 1983, Dijkstra et al. 1988).

## Conclusions

Overall, the results obtained from the Windhoek nest are similar to those reported elsewhere, both for Rock and European Kestrels. Differences of possible significance, but requiring confirmation through much more investigation, may exist in the more rapid growth, longer nestling periods, later development of flight feathers, and earlier loss of down by Rock Kestrels compared with European Kestrels in the Palaeactic.


## Acknowledgements

My thanks to Chris Brown, Joris Komen, Rob Simmons and Andy Village, who checked and improved the paper.



- BROWN LH, URBAN EK & NEWMAN K. 1980. The Birds of Africa. Vol. 1. Academic Press, London.
- CRAMP S & SIMMONS KEL (EDS). 1980. The Birds of the western Palaearctic. Vol. 2. Oxford University Press.
- DIJKSTRA C, DAAN S, MEIJER T, CAVE AJ & FOPPEN RPB. 1988. Daily and seasonal variations in body mass of the kestrel in relation to food availability and reproduction. Ardea 76: 127-140.
- KEMP AC. 1985. Life-history traits: adaptations of effects? Ostrich 56: 147-150.
- KOMEN J & MYER E. 1989. Observations on post-fledging dependence of Kestrels (*Falco tinnunculus rupicolus*) in an urban environment. J. Raptor Res. 23: 94-98
- RICKLEFS RE. 1967. A graphical method of fitting equations to growth curves. Ecology 48: 978-983.
- ROBERTSON A. 1988. Life histories of Rock Kestrels and other African raptors; don't for get body size. Gabar 3: 8-14.
- ROWAN MK, SKEAD CJ & WINTERBOTTOM JM. 1964. Notes on some Damaraland birds, chiefly around Windhoek. Ostrich 35 234-235.
- STEYN P. 1982. Birds of Prey of Southern Africa. David Philip, Cape Town.
- VILLAGE A. 1983. Body weights of kestrels during the breeding cycle. Ringing & Migration 4: 167-174.
- VILLAGE A. 1990. The Kestrel. T & AD Poyser, London.



JOHN M MENDELSOHN
STATE MUSEUM OF NAMIBIA, PO BOX 1203, WINDHOEK, NAMIBIA




# THE GUNS OF ANDERS OHLSSON


**André Boshoff & Patricia Jennings**


Anders Ohlsson was a wealthy Cape Town businessman who owned several farms in the western and south-western Cape Province around the turn of the century. One of these farms, "The Oaks", was situated in a valley some 30 km east of the little town of Cerès, which lies in the Cape fold mountains some 100 km NE of Cape Town. The original farm has now been divided into four smaller units, one of which is still called "De Eike" (=The Oaks). In those days, some 100 years ago, the natural vegetation on "The Oaks" probably comprised mainly pristine mountain renosterveld in the valleys, and moist fynbos (macchia) on the surrounding mountain slopes.

We do not know what the main farming activity on "The Oaks" was at the turn of the century, but we do know that both "game" and "vermin" were hunted on the farm by Ohlsson, his family and friends, and by his gamekeepers. This information was gleaned from the meticulous hunt registers kept by Ohlsson, which came to light recently. Several types of "vermin" were hunted but in this article we deal only with one of these, namely "hawks".

The "vermin" registers were closed on 31 July each year and the annual total for each vermin type therefore relates to the previous 12 month period. During the nine-year period, 1892-1901, a total of 3 144