



## A Note on Nest Characteristics and Diet of the Red-headed Merlin *Falco chicquera*, Common Kestrel *Falco tinnunculus* and Saker Falcon *Falco cherrug* in Chakwal District, Potohar Plateau, Pakistan

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### Abstract

We investigated nest characteristics and the diet of the Red-headed Merlin *Falco chicquera*, Common Kestrel *Falco tinnunculus* and Saker Falcon *Falco cherrug* inhabiting Chakwal district, Potohar Plateau, Pakistan. Nests of the three falcon species in the study area were searched for at eight different sampling sites and active nests were recorded for their composition and measurements. Results showed two active nests that were parasitized by the Red-headed Merlin constructed on *Acacia nilotica*, only one active nest utilized by the Common Kestrel constructed on *Tamarix aphylla* while the Saker Falcon utilized two active cavity nests on a rocky ledge on a hill. Analysis of regurgitates and prey remains of the three species revealed birds and small mammals as their main prey items, with a very small percentage of insects, vegetation and seeds. The small mammals in the diet of the Red-headed Merlin and Common Kestrel included Short-tailed Mole Rat *Nesokia indica* while bird prey species of the three falcon species included House Sparrow *Passer domesticus*, Collared Dove *Streptopelia decaocto*, and Blue Rock Dove *Columba livia*.

### 1. Introduction

Falcons, medium to large-sized birds of prey, are at the top of the food chain in an ecosystem (Kemp & Newton 2003). Normally, they do not build their own nests; but parasitize unused nests of other bird species such as crows and kites. They are diurnal birds although several species also hunt occasionally at night; some are aerial hunters while others kill their prey on the ground. They consume a variety of prey; the most common being insects (for example locusts and grasshoppers), small mammals such as rodents, ground-feeding birds such as Common Tree Sparrow, doves and pigeons and reptiles such as lizards (Roberts 1991; Naoroji 2006).

Out of nine different falcon species reported from Pakistan, three species viz. Red-headed Merlin *Falco chicquera*, Common Kestrel *Falco tinnunculus* and Saker Falcon *Falco cherrug* inhabit the Chakwal district of Potohar

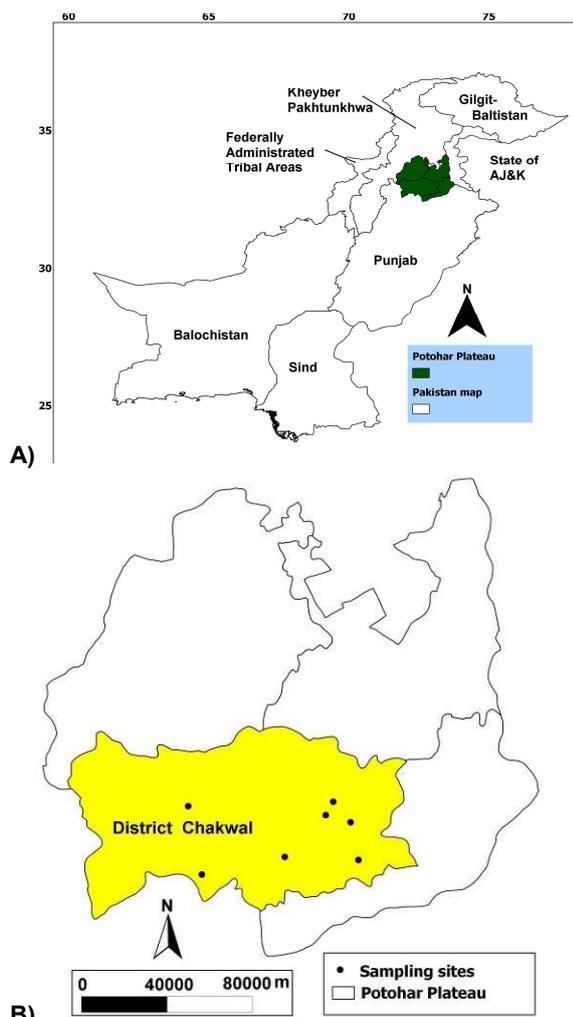
Plateau, Pakistan (Mahmood *et al.* 2012). Only scanty information exists about their nesting and food habits in the region; some preliminary information regarding nest characteristics and diet composition of these falcons in Chakwal district are reported here in the present study.

### 2. Methods

#### 2.1 Study area

The current study was conducted in Chakwal district (32°56'0" N, 72°52'0" E) of the Potohar Plateau, which has an area of approximately 6,524 square kilometers (Fig. 1). The study area comprises agricultural landscape and natural vegetation, including some protected areas - Chumbi Surla Wildlife Sanctuary, Chingi National Park and Kallar Kahar Lake, a Ramsar site. Many small mammals, in particular, rodents and birds are available as potential prey to the raptors inhabiting the agriculture ecosystem of the area.

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**Fig. 1.** A) Map of Pakistan showing location of Potohar Plateau B) Potohar Plateau showing the study area in Chakwal District and the location of sampling sites.

## 2.2 Data collection procedure

Potential habitats of three falcon species were identified through reconnaissance surveys and eight sampling sites were then selected for data collection in the period from May 2009 to June 2010. Already constructed nests of various bird species on trees and nests in cavities were searched to identify falcon species occupying the nests. Active nests were measured for their dimensions and characteristics.

In order to investigate the diet of the falcon species, their prey remains and regurgitates were collected, especially from around their nests and perching and roosting sites. Identification of vertebrate prey species was based on recovered feathers, bones and hair. Among prey remains, beaks and leg bones were used in the identification of bird species;

similarly, mammalian prey species were identified on the basis of hair recovered from the regurgitates.

## 3. Results

### 3.1 Nesting records

At sampling site-I, a total  $N=28$  nests were recorded, but only one was active (Table 1); this was located on an *Acacia nilotica* (Fig. 2 A and B) and two hatchlings of Red-headed Merlin were observed near the nest during March and April 2009. The *Acacia* tree was 10m tall having thin foliage leaves. The nest was located at a height of 8.5m from the ground, had a diameter of 34 cm, and was composed of small sticks of tree branches along with grasses (Table 2).

At sampling site-II, twenty-four nests were recorded but none was parasitized by any falcon species; similarly, at site-III, both Red-headed Merlin and Common Kestrel were sighted but out of nineteen nests searched, none was active.

At site-IV, Common Kestrel was present and twenty-two ( $N=22$ ) nests of different bird species were recorded, but only one was active, located on a large old *Tamarix aphylla* tree; as reported by a local resident, it had been utilized by Common Kestrel the previous year, but, during this breeding season (April and May 2010) it was being used by a kite species. The tree had thin foliage and was 11m tall; the nest was located at a height of 9m above the ground, its diameter was 31 cm, composed of small sticks of the tree branches and grasses (Table 2).

At sampling site-V, a hilly area, a pair of Saker Falcons was identified. Seven ( $N=7$ ) cavity nests were recorded on the steep  $90^\circ$  ridge of Karangi hill (Table 1; Fig. 2C and D). A local informant reported one nest with two nestlings the previous year. Two more active nests were found at this sampling site; one on a bare rock and the other in a cavity where very prominent signs of white scats (particular to Saker Falcon) were observed. The height of the hill was 580 m from the ground level while the nest elevations were about 450m and 530m above the ground, and they were apparently composed of sticks and grasses (Table 2).

The sampling sites VI and VII were occupied by Red-headed Merlin. At site-VI, seventeen inactive nests ( $N=17$ ) were found, whereas at site-VII, twenty-six ( $N=26$ ) nests

including one active nest were recorded. The single active nest was located on an *Acacia nilotica* and from this particular nest two young were reported to have fledged very recently. The tree had thin foliage leaves, was 13m tall,

and the nest elevation was 11m above the ground. The diameter of the nest was 28cm, composed of small tree sticks and grasses (Table 2).

**Table 1.** Details about nests available to be occupied by three falcon species during the study period at selected study sites of Chakwal District, Potohar Plateau.

Study Site No.	Falcon species occupying the nest	Numbers of nests of Crows/ Kites can be occupied by the falcon species	Number of active nests
I	Red-headed Merlin	28	1
II	Common Kestrel	24	-
III	Common Kestrel	19	-
IV	Common Kestrel	22	1
V	Saker Falcon and Common Kestrel	07	2
VI	Red-headed Merlin	17	-
VII	Red-headed Merlin	26	1
VIII	Common Kestrel	15	-

**Table 2.** Analysis of the active nests used by the three Falcon species at selected sampling sites in Chakwal District, Potohar Plateau.

Site No.	Species occupying the nest	Location of nest	Foliage type	Height of tree/ledge (m)	Height of nest above ground level (m)	Nesting material	Nest diameter (cm)
I	Red-headed Merlin	<i>Acacia nilotica</i>	Thin foliage	10	8.5	Twigs & grasses	34
IV	Common Kestrel	<i>Tamarix aphylla</i>	Thin foliage	11	09	Twigs & grasses	31
V	Saker Falcon	Ledge	-	580	450	Twigs & grasses	*
V	Saker Falcon	Ledge	-	600	530	Twigs & grasses	*
VII	Red-headed Merlin	<i>Acacia nilotica</i>	Thin foliage	13	11	Twigs & grasses	28

\* = not possible to measure.



**Fig. 2.** **A)** A fledgling Red-headed Merlin (arrow), sitting on a branch close to the nest, **B)** Close view of nest of Red-headed Merlin after its two young had fledged from the nest, **C)** Cavity nest of a Saker Falcon (arrow) on a ledge at Karangli hill at Site-V located in the Salt Range, **D)** A closer view of the cavity nest of the Saker falcon on a ledge at Karangli hill at site-V.

### 3.2 Diet Composition

#### *Red-headed Merlin*

Analysis of seven samples ( $N=7$ ) of regurgitates of the Red-headed Merlin (Table 3; Fig. 3) showed feathers (6.0%), bones (88.4%), hairs (4.0%), insect parts (0.01%), vegetation (0.1%), seeds (0.8%), and unidentified items (0.7%). The prey bird species identified from the recovered feathers included House Sparrow *Passer domesticus*, and Collared Dove *Streptopelia decaocto*, while recovered bones were identified as being birds and small mammals, the hairs were identified to be of Short-tailed Mole Rat *Nesokia indica*.

#### *Common Kestrel*

Regurgitates ( $N=8$ ) of the Common Kestrel (Table 3; Fig. 3) included feathers (27.4%),

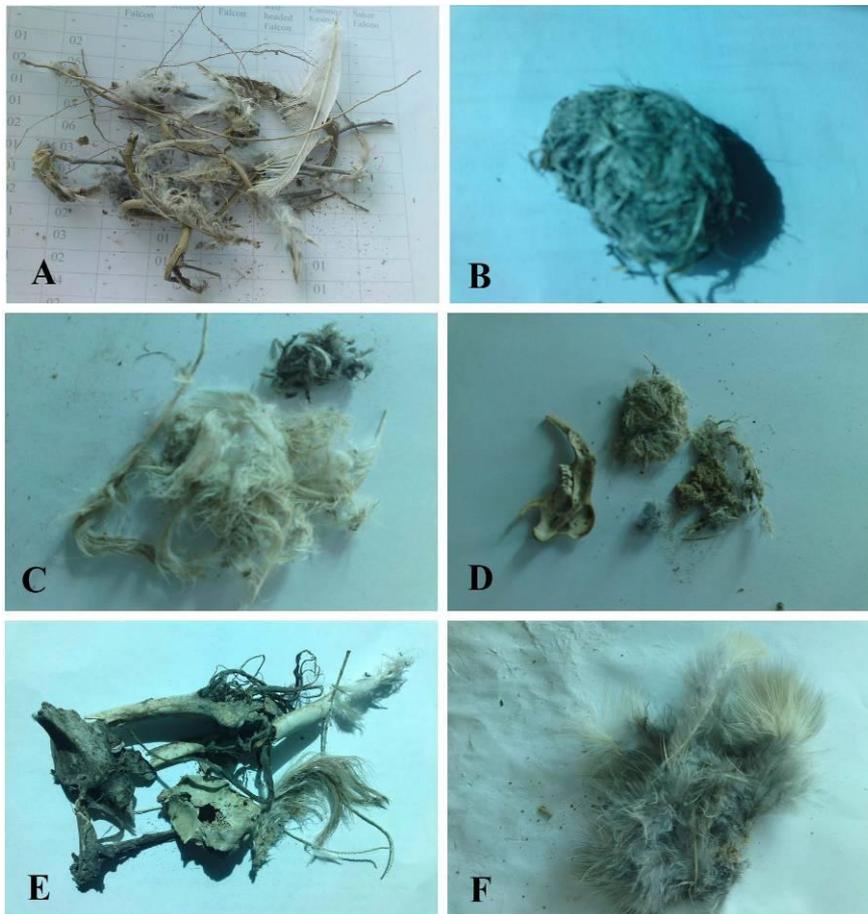
bones (71.7%), hairs (0.03%), vegetation (0.6%), seeds (0.3%), and unidentified items (0.3%). The identification of feathers also revealed House Sparrow and Collared Dove prey bird species of the Common Kestrel, while hair identification revealed Short-tailed Mole Rat as the prey mammal species.

#### *Saker Falcon*

Frequency of recovered food items from the prey remains ( $N=10$ ) of the Saker Falcon (Figs. 2-3, Table 3) included only feathers 33.3% (1.6 %V) and bones 66.7% (98.4%V). Identification of feathers showed Rock Dove *Columba livia*, House Sparrow and Collared Dove as prey species of the Saker Falcon.

**Table 3.** Percentage volume (%V) occurrence of different food components recovered from the prey remains and regurgitates of three falcon species, collected from the selected study sites in Chakwal District, Potohar Plateau.

Prey remains	Red-headed Merlin	Common Kestrel	Saker Falcon
	(N=7)	(N=8)	(N=10)
<b>Feathers</b> (sparrows, dove, and pigeons)	5.96	27.43	1.64
<b>Bones</b> (Birds and small mammals viz. field rat)	88.46	71.67	98.36
<b>Hair</b> (small mammals mainly field rat)	3.98	0.03	-
<b>Insect body parts</b>	0.01	-	-
<b>Vegetation parts</b>	0.11	0.57	-
<b>Seeds</b>	0.79	0.28	-
<b>Unidentified items</b>	0.68	0.28	-

**Fig. 3.** Photographs of the prey remains and regurgitates of three falcon species collected from the various sites of the study area; **A)** Feathers of a bird collected from the nest of Red-headed Merlin, **B)** A regurgitated pellet of Red-headed Merlin at site-VI, **C)** Prey remains (bird feathers) of Common Kestrel at site-VIII, **D)** Feathers and bone pieces of the prey remains of Common Kestrel at site-II, **E)** Feathers, skull and other bones of the prey species of Saker Falcon from site-V, **F)** Feathers of the prey species of Saker Falcon collected from site-V.

#### 4. Discussion

Nine falcon species occur in Pakistan (Roberts 1991; Ahmed 2003; Naoroji 2006); three of these were previously reported from Chakwal district viz. Red-headed Merlin, Common Kestrel and Saker Falcon.

In the current study, Red-headed Merlin and Common Kestrel have been found to utilize nests of other bird species while the Saker Falcon was found to be a cavity nester. Only two active nests (at sites-I and VII) were found to be utilized by Red-headed Merlin, both built on an *Acacia nilotica* tree. Earlier published

literature shows that Red-headed Merlin like other falcon species re-uses old nests of other raptors or crows in thorny trees (Roberts 1991; del Hoyo *et al.* 1994). Study sites-I and VII had active nests located on the thorny *Acacia nilotica*, while only one active nest utilized by the Common Kestrel was found at site-IV. Earlier reports indicate that Common Kestrel is a cavity nester, preferring holes in cliffs, trees or buildings; in built-up areas, it will often nest on buildings, and reuses old nests of corvids if available (Roberts 1991; del Hoyo *et al.* 1994). Only a single nest utilized by Common Kestrel was found on an old *Tamarix aphylla*. The Saker Falcon has been found to be a cavity nester in the current study, where its two cavity nests were recorded on a high ledge at site-V; both nests were active and had been utilized the previous year by this falcon species for breeding. It has been reported that the Saker Falcon utilizes old nests of other raptors and also ravens in trees, on bare ledges or in potholes of rocky cliffs, or even on the bare ground (Potapov *et al.* 2002).

Limited published literature is available on the diet composition of falcons but shows that the main prey items of Red-headed Merlin are birds while occasionally small mammals and reptiles are also consumed (Roberts 1991). The current study also revealed that the major food components of the Red-headed Merlin were birds (sparrows, doves and pigeons) and small mammals (rodents including mole rat), while the proportion of insects in its diet was very low. During the current study period, the Red-headed Merlin was observed many times carrying small birds while flying. Similarly, the species was once observed with a mole rat in its beak, sitting near a newly fledged young one at study site-I. One early morning, in May 2009 a mature bird was observed on an *Acacia* tree at site-I, feeding a small sparrow to a young bird after plucking the feathers of the prey item.

Roberts (1991) reported that the diet of Common Kestrel comprises small birds, reptiles and insects. The current study showed similar food items although no insect parts were recovered from the analyzed pellets. The main food items in the diet of Common Kestrel were small birds (sparrows, doves and pigeons). A

low proportion of hair in the recovered food items indicated either less availability or less preference for small mammals such as rodents.

Earlier reports showed that the Saker Falcon feeds upon birds, lizards and rodents and that it hunts birds in flight and carries its prey to the ground (Roberts 1991). Results of the current study indicate birds as its major prey items. However, no evidence of feeding of Saker Falcon on small mammals or rodents was found. During the current study, a Saker Falcon was once observed hunting a Feral Pigeon at study site-V. There are also reports of shooting of Saker Falcons by pigeon fanciers in the surroundings of study site-V.

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