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Breeding of the Black-winged Kite *Elanus caeruleus* in Fars Province, Iran

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Abstract
The first breeding attempt of the Black-winged Kite *Elanus caeruleus* in Fars Province, Iran, was recorded at Darab in June 2011, and three active nests were found in July 2012. Analysis of 74 pellets collected around the nests indicated that House Mouse *Mus musculus* and Steppe Field Mouse *Apodemus cf witherbyi* contributed 59.4% and 24.3% of the diet, respectively. The adult kites were absent for an average of 49.9 minutes (*N*=8) between visits to the nests. Threats to the kites are discussed and some conservation measures are proposed to encourage better protection of the breeding Black-winged Kites in the region. According to published records and a number of unpublished records, it can be concluded that a major expansion in the breeding range of the Black-winged Kite is occurring in many parts of southern Iran.

1. Introduction

The Black-winged Kite is mainly a resident species in the Middle East, although it undertakes some dispersal and has occurred as a vagrant in several countries, e.g. Turkey, Saudi Arabia, UAE and Oman (Porter *et al.* 1996). It was first recorded in Iran on 25 April 1998 (Scott 1998, Kirwan 1998). However, Khaleghizadeh *et al.* (2011) presented records of 19 birds in five provinces of Iran between 1998 and 2010 (in southern, northern and north-eastern Iran), and suggested that the species was expanding its range and becoming much commoner in Iran. There have been a number of reports of the species from various parts of the country in recent years, indicating that the species is now even more widely distributed than it was in the 2000s.

Some studies on the breeding ecology and diet of this species have been conducted by Bustamante (1993) in central Spain, while Barnes (2005) and Debus *et al.* (2006) have studied the closely related species *Elanus axillaris* in Australia, but there is little quantitative information on the foraging behavior of either species (Debus *et al.* 2006), and no information is available on the breeding ecology of the Black-winged Kite in Iran or elsewhere in the Middle East. In the present survey, some characteristics of the breeding ecology of the Black-winged Kite were studied at four active nests in Fars Province, southern Iran, in 2011 and 2012.

2. Study Areas and Methods

Observations of breeding Black-winged Kites were made at Dehkhir Sofla village in Darab District in southeastern Fars Province, southern Iran, from October 2010 to June 2012 (Fig. 1). Darab District (28°01'– 28°57'N and 54°06'–55°27'E, 1,180 m a.s.l.) covers about 6,560 km^2 and is bordered by Neriz and Estahban Districts to the north, Hormozgan Province to the east, Lar and Zarien Districts to the south and Fasa District to the west. The area has a warm semi-

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dry climate with a mean annual temperature and rainfall of 22°C and 264.8 mm, respectively (Khormaie 2011). Most village people are farmers or fruit growers. The principal crops are wheat *Triticum aestirum*, corn *Zea mays*, oranges *Citrus sinensis* and apricots *Prunus armeiaca*. Other trees in the area include tamarisk *Tamarix* spp., Blue Gum *Eucalyptus* spp., Nabktree *Ziziphus spina-christi*, White Mulberry *Morus alba* and Palm *Phoenix dactylifera*, especially at the edge of the farmland.

In total, four nests of Black-winged Kites were located (Table 1). The height of the nests above ground was measured with a measuring tape. The distance between the nests was measured by GPS and map source software. The habits and breeding behaviour of the Black-winged Kites were investigated using a pair of binoculars (8×30; Steiner model). Two methods were used for the identification of food items. First, photographs and video footage were taken of the adult Black-winged Kites with rodents in their mouths, and identification of the rodents was based on morphology, size and colouration. A total of 74 pellets were collected beneath an apricot tree at Dehkhir station (28°39'37.6"N, 54°38'53.8"E) during the nestling and post-nestling periods for dietary analysis (Fig. 1). The diameter of the dried pellets was measured with a ruler to the nearest millimetre. All pellets were kept separately according to locality and date, and then dissected with needles in the Zoology Laboratory of Golestan University. Skulls and their mandibles were identified with the available keys (Bagherian 2002, Etemad 1978, Ziaie 2008). We also placed a camera above one of the nests and recorded the behaviour of the adults for a total of about 6 hours when the nestlings were about 6-8 days old (90 minutes per day on 18, 26 and 30 May from 6:00 pm and on 19 May from 7:00 am).

Fig. 1. Some pellets of Black-winged Kite *Elanus caeruleus* collected in Darab District on 13 May 2012.

3. Results

3.1. Nests

All four nests were in trees and were in cultivated areas surrounded by some trees, i.e. in similar habitats to those mentioned by Porter *et al.* (1996). The nests were built in Apricot, Blue Gum and Nabktree trees. Other trees such as tamarisk and orange were not used for building nests, presumably because these trees have thin branches that would not provide adequate support for nests in strong winds and rain. The nests were built amongst foliage which partly obscured them from sight at least from a distance of 70–80 m. The area around the nests was often clean and we never found any faeces of the birds under or around the nests.

3.2. Diet

All of the skulls found in the pellets belonged to two rodents: House Mouse *Mus musculus* and Steppe Field Mouse *Apodemus cf witherbyi* (family Muridae, subfamily Murinae). However, no complete skull or mandible was found in the pellets. No skulls of shrews (family Soricidae) were found in the pellets. Based on 74 pellets, rodent remains constitute almost all of the pellets (98.65%), with the House Mouse contributing 59.45% to the diet (Table 2). It was observed that new pellets were transported to other places by ants. The long diameters of the smallest and largest pellets were 16 and 41 mm, respectively (mean 28.04 ± 5.8 mm, N= 74).

Table 1. Records of Black-winged Kites in Darab District, Fars Province, Iran 2010 –2012.

Place	Coordinates	Tree	Nest height	Notes on breeding
About 2 km from Dehkhir Sofla village	28°39'37.6"N, 54°38'53.8"E	Apricot	c. 4 m	On 2 June 2011, one nest was found with four eggs. On 5 June, after a strong wind and heavy rain, the nest was destroyed. On 10 December 2011, we observed two juveniles with one of the parents around the nest tree.
Pir-Ghib plain (less than 40 km from Dehkhir Sofla village)	28°46'29.4"N, 54°14'28.7"E	Nabktree, tree height about 5.5 m	c. 4 m	In late December 2011, a farmer took three chicks from the nest.
1 km from Dehkhir Sofla village and 1,100 m from the first nest	28°39'37.6"N, 54°38'53.8"E	Apricot, tree height 5 m (Fig. 2)	c. 4 m	On 29 April 2012, one nest with three eggs was found. The shape of the nest was similar to that of a Eurasian Magpie. It was constructed of twigs of apricot *Prunus armeiaca*. The inner parts of the nest were covered with soft, green twigs and leaves of Tamarisk. On 13 May 2012, two chicks (about 3 days old) and an egg were in the nest, and on 9 June 2012, three chicks fledged. On 26 June 2012, we observed only two immatures in an Apricot tree about 1 km away from the nest. Local people informed us that about three years ago, villagers had taken four chicks from a nest in this area.
About 1.8 km to the south of Dehkhir Sofla village and about 3 km from the previous nest	28°37'47.7"N, 54°39'02.5"E	Blue Gum, tree height 17 m	c. 16 m	On 13 May 2012, one nest with two chicks was found. Local people informed us that the nest was active three years ago. There were active nests of a Spanish Sparrow and a House Sparrow beside the kite's nest.

Table 2. Diet of the Black-winged Kite *Elanus caeruleus* in Darab District, Fars Province, Iran.

Prey Species (English Name)	Scientific Name	Frequency	Frequency (%)
House Mouse	*Mus musculus*	44	59.45
Steppe Field Mouse	*Apodemus cf witherbyi*	18	24.32
Rodent hairs only	Murid rodents	11	14.86
Feathers of birds	Birds (Passeriformes)	1	1.35
Total		**74**	**100.00**

Fig. 2. A nest of Black-winged Kite with 3 chicks in Dehkhir Sofla village, Darab, Fars, May 2012.

3.3. Behaviour

The Black-winged Kites showed some attacking behavior when humans were approaching their nests, especially when they had chicks (gliding over the intruder's head and taking off with loud calls), but when they had eggs, the birds only left the nest and, after circling for a short time, flew to a perch in a tree about 100 m away from the nest. The nearer to the end of the incubation period, the more aggressive the birds became towards human intruders. We observed a few immature birds about one week after fledging, but as this was the time of the wheat harvest, there was a lot of human disturbance, and the birds soon left the nest-sites. When hunting for mice (with their feet), the birds hovered with their wings at a 45° angle and gradually moved nearer their prey before finally dropping onto it. In open farmland, hunting birds usually hovered about 20 to 25 m above the ground, while in dense vegetation, they hovered about 2 to 3 m above the ground. Black-winged Kites were not seen to attack passerine birds, but only attacked small mammals. However, in captivity they were seen to eat House Sparrows. Some local people call this species Shaheen in Persian. They also use the name Sutak because of its loud call which is similar to a whistle. Information obtained by camera indicated that the average amount of time between visits by one or other of the parents to the nest was 49.87

minutes (*N*=8). Both parents were involved in feeding the nestlings, but not all of the prey brought to the nest was given to the nestlings.

3.4. Threats

The breeding season of the Black-winged Kite in spring coincides with the picking of apricots and the wheat harvest. Shepherds and their sheep come to the farmland and utilize the shade of the trees. Some shepherds might take chicks from the nest, while some nestlings might fledge prematurely because of disturbance. Such premature fledging was observed in at least one nest during the present study. The shooting of birds is common in this area, and strong winds and heavy rain are frequent in spring. In recent years, the population of Eurasian Magpies *Pica pica* has increased in the area, and these birds might pose another threat to eggs and nestlings. During the study period, Black-winged Kites were seen attacking Eurasian Magpies at least three times when they approached the nest-site.

4. Discussion

Although we found only four nests during the present study, we suspect that there other breeding pairs of Black-winged Kites in Darab District. More fieldwork is required in the future, both in Darab District and throughout southern Iran. There has recently been a report of a nest with chicks in Kerman Province (M.E. Sehhatisabet, pers. comm.), while hitherto unpublished reports include that of a bird seen by S. Khosravian at Asaluyeh in Bushehr Province on 30 July to 1 August 2005 (photograph given to H.G. Kami), and a bird photographed by game guards of the DOE at Chabahar in Sistan and Baluchestan Province in late February 2008 (H.G. Kami, in litt.). The nests that we found at Darab were at least 200 km from the nearest reported breeding locality in Kerman Province (Khaleghizadeh *et al.* 2011). It is concluded that a major expansion has occurred in the breeding range of the Black-winged Kite in southern Iran since 1998. There have been at least two records of the species in the northeast of the country in recent years (Khaleghizadeh *et al.* 2011), but it has yet to be recorded in the west and northwest. We think that the range expansion could be related to global warming, a suggestion that needs to be investigated further.

Nearly 84% of the prey items found in the present study belonged to House Mouse and Steppe Field Mouse (Table 2). Mice are considered as pest animals in farmland, particularly in corn fields, and farmers formerly used poisons against them because their populations were high some years ago. However, today farmers do not use poisons in their farmland because the populations of mice have decreased. We think that the presence of the Black-winged Kite in the area and the occurrence of about 2,500 Lesser Kestrels *Falco naumanni* as passage migrants from March to May every year could be effective in controlling the mice.

Most local people of Dehkhir Sofla village were unaware of the importance of the kites in helping to control populations of rodent pests in this area. It is recommended that in order to protect the Black-winged Kite in Darab, Fars, awareness campaigns should be launched to inform the local inhabitants, farmers, fruit-growers and shepherds of the value of the Black-winged Kites in controlling rodent populations, and thereby encourage them to protect the birds.

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