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Effect of Touching on the Breeding Success of Collared Dove *Streptopelia decaocto*, Grey Hypocolius *Hypocolius ampelinus* and Common Babbler *Turdoides caudatus* in Khuzestan, Southwestern Iran

Seyed Masoud Hosseini-Moosavi[1*], Behrouz Behrouzi-Rad[1], Seyed Mehdi Amini-Nasab[2] & Reza Karimpour[1]

1) Department of Environmental Science, Science and Research Branch, Islamic Azad University, Ahwaz, Iran
2) Department of Environmental Science, Behbahan Khatam Alanbia University of Technology, Iran

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Abstract
To survey the effect of touching eggs and nestlings during research activities upon breeding success, this study was carried out from 19 February to 24 June 2010 in Haft-Tappeh and Miyan-Ab agriculture complexes in the northern part of Khuzestan province, southwestern Iran. In the study period, 19 nests (14 touched and 5 untouched) of Collared Dove *Streptopelia decaocto*, 11 nests (6 touched and 5 untouched) of Grey Hypocolius *Hypocolius ampelinus*, and 38 nests (29 touched and 9 untouched) of Common Babbler *Turdoides caudatus* were monitored at 3-day intervals. There was a significant difference between breeding success in the touched and untouched nests of Grey Hypocolius ($P<0.05$) while in Common Babbler and Collared Dove there were not any significant effects ($P>0.05$). Among these species, Grey Hypocolius is determined as a susceptible species. Also in Grey Hypocolius, the stage before hatching was determined as a crisis stage in its reproductive period because touching of chicks did not cause any mortality in all the touched nests, while touching eggs caused some egg mortalities.

1. Introduction

Frequency of human activities (particularly activities related to a higher frequency of nest visits) has a significant probability of affecting nest success (Newton 1979). Several studies have been performed to investigate the impact of nest visits by observers and their frequency on breeding success of birds. Some findings have shown no or only low negative effects of research activity (Grady *et al.* 1996, Mayer-Gross *et al.* 1997). Some studies, including those on shrikes (Bart 1997, Lenington 1979, Major 1990, Tryjanowski & Kuzniak 1999), provide evidence that a high frequency of nest visits can seriously reduce breeding success, mainly due to an increasing risk of predation. Many bird species such as waders, terns, owls, and some passerines including shrikes, recognize humans as potential predators and actively defend nests and nestlings against them (Purger 2001, Carrillo & Aparicio 2001).

This paper focuses on three abundant species in Khuzestan Province with good breeding populations. The Collared Dove *Streptopelia decaocto* is not a migratory species, but is strongly dispersive. Over the last century, it has been one of the greatest colonisers of the bird world (Cramp & Simmons 1993), and is a resident and abundant species in Iran (Mansoori 2008). The Collared Doves typically breed close to human

* *Corresponding: masoud.moosavi@yahoo.com*

habitation wherever food resources are abundant and there are trees for nesting; almost all nests are within one kilometer of inhabited buildings. It is a gregarious species and sizable winter flocks will form where there are food supplies such as grain (its main food) as well as seeds, shoots and insects (Cramp & Simmons 1993). The Common Babbler *Turdoides caudatus* breeds in tropical and lower subtropical latitudes mainly extralimitally. It inhabits part of arid areas southeast of the Western Palearectic (Ali & Ripley 1971). This species has extended its range into Iraq, Iran, Afghanistan, Pakistan and India (Cramp & Simmons 1993). The Common Babbler is a resident in southern Iran and inhabitant of cultivated and dry regions with scattered bushes and trees. The Grey Hypocolius *Hypocolius ampelinus* ranges through the Middle East, breeding in Iraq, Iran, Afghanistan, Pakistan, and Turkmenistan areas (Peklo & Sopyev 1980).

Primary observations on nest touching showed that touching the nests decreased breeding success probability. Therefore, this study was conducted to examine the effect of touching on the breeding success of the three species in touched and untouched nests.

2. Study Area and Methods

This study was conducted in the Haft-Tappeh and Miyan-Ab agriculture complexes which are located at 32°4'N, 48°21'E, 40–90 m asl, comprising 25,000 ha, at about 90 km north of Ahwaz between the Dez and Karkheh rivers. The weather is influenced by the hot and dry plain in the southern part of Khuzestan Province. The Miyan-Ab agriculture complex, c. 7,000 ha, is located around the town of Shush, in the southeast of the Haft-Tappeh area (Fig. 1). To delineate the nest topology, GPS (Garmin 72H) was used. Eggs and broods were weighed with a 0.01 g precision digital scale. This study was carried out to examine possible effects of touching eggs on the breeding success of three abundant species in Khuzestan. Collared Dove and Grey Hypocolius were the first and the last breeding birds in the study area.

All available nests of Grey Hypocolius, Common Babbler and Collared Dove were monitored in the study area from 19 February to 24 June 2010 in 3-day intervals. To survey the effect of nest touching on breeding success of the three species, two kinds of nests for each of these species were defined: touched and untouched nests. In touched nests eggs and chicks touching occurred once in the following stages: 1) After clutch size completion; 2) in the nestling stage; 3) in the post-nestling stage. In untouched nests we did not touch the eggs, but in the nestling and post-nestling stages, chicks were touched similarly to touched nests. Thus, in this study we can discuss effects of egg touching on breeding success. A total of 68 nests were monitored during the present study: 11 of Grey Hypocolius (6 nests touched and 5 untouched); 38 of Common Babbler (29 nests touched and 9 untouched); and 19 of Collared Dove (14 nests touched and 5 untouched). However, the present study does not take into account individual differences in behaviour, which are important in this and other species (Didier *et al.* 2002, van Oers *et al.* 2004).

To identify the rate of breeding success and production, numbers of nests, eggs, nestlings and post-nestlings between touched and untouched nests, based on mean fledged chicks (Barati 2009) or the mean rate for each breeding stage (Smith & Renken 1993), were calculated. To determine the effect of touching on the breeding success of *H. ampelinuis*, *T. caudatus and S. decaocto* the non-parametric Mann-Whitney *U* test was used in SPSS 12 software.

3. Results

In Collared Dove nests, despite the lower rate of breeding success in touched nests (Fig. 2), the difference was not noticeably different (Mann-Whitney *U* test: U=17.0, N_1= 5, N_2=14, P>0.05) (Tables 1−2). In Grey Hypocolius, breeding success in untouched nests (72.8%) was noticeably greater than in touched nests (30.4%; Fig. 3) (Mann-Whitney *U* test: U=2.50, N_1= 5, N_2=6, P<0.05) (Tables 1−2). In Common Babbler the rate of breeding success in touched nests was also lower than untouched nests (Fig. 4) but this difference was not significant (Mann-Whitney *U* test: U=129.50, N_1= 9, N_2=29, P>0.05) (Tables 1−2).

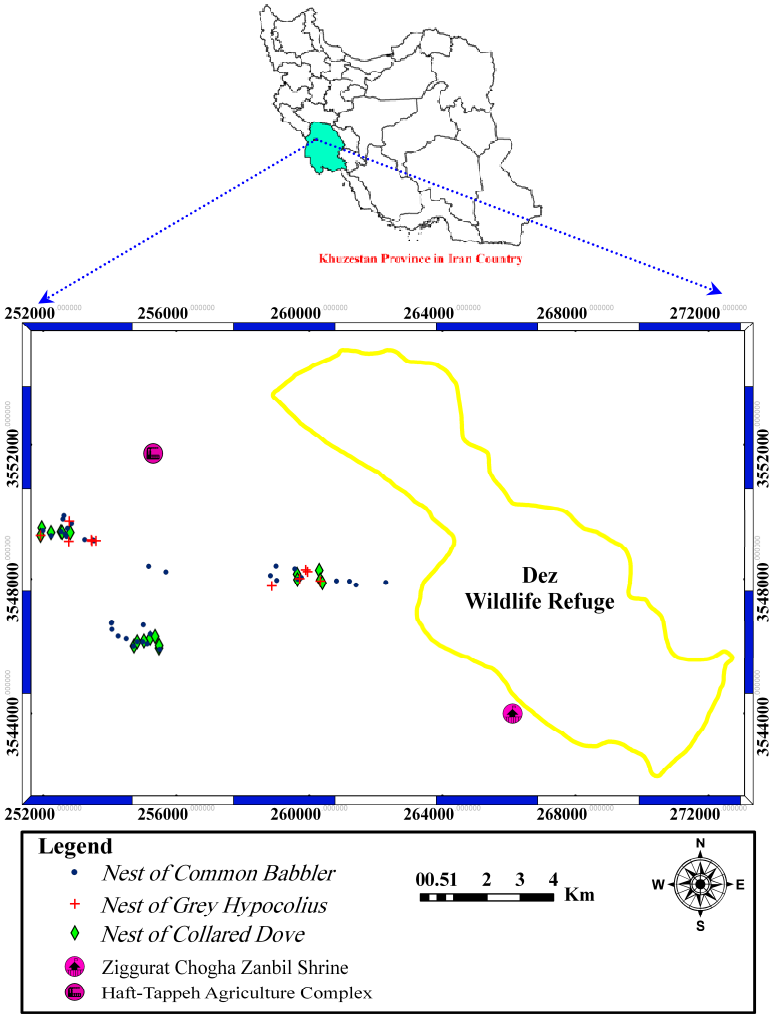

Fig. 1. Map of the study areas.

Table 1. The rate of breeding success at the nests of the three species (%) with related number of eggs.

Species	Treatments	No. of nests (No. of eggs)	Hatching Success (No. of eggs)	Nestling Success (No. of eggs)	Post-Nestling Success (No. of eggs	Breeding Success (Mean of 3 stages)
Collared Dove	**Touched**	14 (28)	53.57 (10)	28.57 (4)	21.42 (3)	34.52
	Untouched	5 (10)	80 (8)	80 (8)	80 (8)	80
Grey Hypocolius	**Touched**	6 (27)	29.62 (8)	29.62 (8)	29.62 (8)	29.62
	Untouched	5 (23)	86.96 (20)	78.26 (18)	78.26 (18)	81.16
Common Babbler	**Touched**	29(127)	36.66 (43)	20.28 (26)	20.28 (26)	25.74
	Untouched	9 (32)	32.77 (11)	26.11 (9)	26.11 (9)	28.33

Table 2. *P*-value of the Mann-Whitney *U* test results regarding to the breeding success in touched and untouched nests in the three species.

Species	Hatching Success	Nestling Success	Post-Nestling Success	Breeding Success
Collared Dove	0.288	0.052	0.023	0.079
Grey Hypocolius	0.020	0.041	0.041	0.033
Common Babbler	0.867	0.715	0.715	0.970

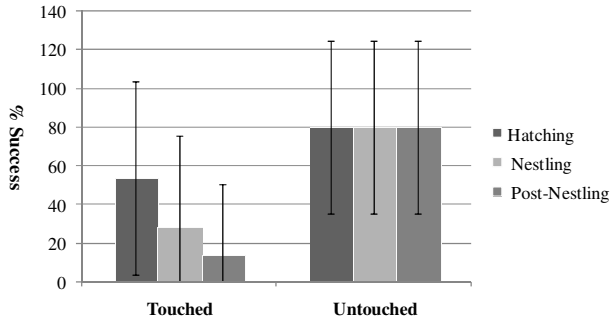

Fig. 2. Comparison of breeding success in various stages of Collared Dove.

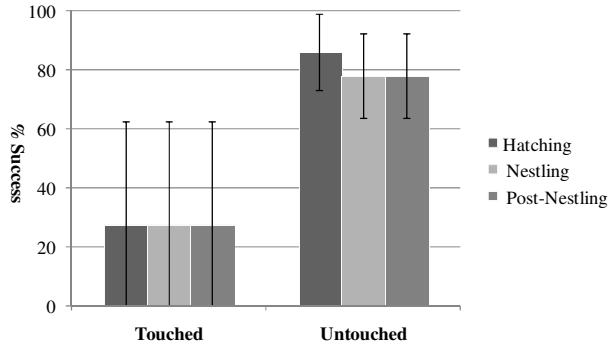

Fig. 3. Comparison of breeding success in various stages of Grey Hypocolius.

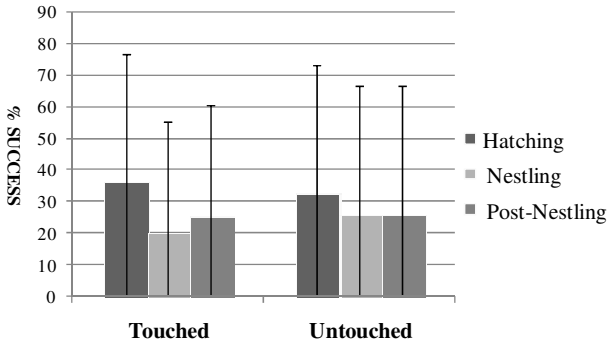

Fig. 4. Comparison of breeding success in various stages of Common Babbler.

4. Discussion

For scientific and ethical reasons, some investigators have expressed concern over whether or not research activities have a detrimental effect on the success of nesting birds (Hammond & Forward 1956, Johnson & Sloan 1975, Lenington 1979, Major 1990). Human activities do not necessarily have a disturbing effect on all birds (Arroyo & Razin 2006). Human activities such as touching nests and eggs are stated as one of threatening factors affecting the Common Babbler (Arbabi *et al.* 2008) but data on the two other species are rare. Research activities may promote predation (or other reproductive failure) on nests in several ways: (1) researchers may leave a visual or olfactory trail that predators can follow (Maclvor *et al.* 1990); (2) nest markers may reveal the location of a nest to visually oriented predators such as corvids (Picozzi 1975); (3) predators may follow researchers (Strang 1980); (4) researchers may leave a scent on the eggs and/or nest (Maclvor *et al.* 1990); (5) adult birds may excrete on their eggs when disturbed, and this scent may attract predators (Hammond & Forward 1956); and (6) nesting birds may desert their nests after disturbance (Safina & Burger 1983).

Results of the present study compared detrimental effects of touching as an index of human presence near nests on the breeding success of the Grey Hypocolius, Common Babbler and Collared Dove. However, our analyses did not also take into account factors such as egg-laying date, breeding density or age of the parents, which are known to influence breeding in Grey Hypocolius (Heredia & Margalida 2001, Margalida *et al.* 2003).

Grey Hypocolius are shy and susceptible birds. According to our observations, if touching occurs in the egg stage, the breeder pair leaves the nest (80% of cases) and builds a new nest near the older nest, about 50–70 m away, or defecates upon the original eggs (20% of cases). If touching happens after hatching, the breeder pair does not leave the nest. Thus, the susceptible stage of Grey Hypocolius reproduction is before hatching, and touching eggs should be avoided.

There is little literature about the effects of egg/hatchling touching by humans on the breeding success of Common Babbler. Common Babblers actively defend their nests and broods when they hear their chicks' voice or alert call from the natal group. This behaviour may deter predators' finding the nest

site. Arbabi *et al*. (2008) considered nests and eggs touching as a threatening factor to this species, but the statistical results of our study do not justify a significant negative effect of touching.

Due to suitable temperatures in the reproductive period of Collared Dove in the study area (April–June), it is not necessary for a breeder pair to incubate in the nest (rarely breeder pairs were observed around the nest before hatching). At this stage, nest-touching may be invisible from breeder pairs and the difference between the two kinds of nests (touched and untouched) may show this (Mann-Whitney *U* test: U=25.0, N_1= 5, N_2=14, P=0.284). After hatching, because of the need for feeding chicks, breeder pairs visit the nest more than before hatching, and touching the nest can be obvious. The difference between the two types of nests in the nestling (Mann-Whitney *U* test: U=17.0, N_1= 5, N_2=14, P=0.052) and post-nestling (Mann-Whitney *U* test: U=14.5, N_1= 5, N_2=14, P= 0.023) stages may reveal this.

However, touching as a direct human activity affects the breeding success of Grey Hypocolius, Common Babbler and Collared Dove but only in Grey Hypocolius was this effect statistically significant. In conclusion, among the three species, Grey Hypocolius was considered as a susceptible species.

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