

THE FIRST RECORD OF USE OF A NEST BOX BY HOOPOE *Upupa epops* IN ISRAEL

Prvi zapis uporabe gnezdilnice za smrdokavro *Upupa epops* v Izraelu

MOTTI CHARTER¹, YOSHI LESHEM¹, AMIR EZER², SHAUL AVIEL³ & VLADIMIR CHIKATUNOV¹

¹ Zoology Department, Tel-Aviv University, Ramat-Aviv, 69978, Israel, e-mail: charterm@post.tau.ac.il

² Hahatsav 55/1 Afula, 18782, Israel

³ Kibbutz Sde Eliyahu, Jordan Valley Mobile Post 10810, Israel

The Hoopoe *Upupa epops* is a secondary cavity nester with a large distribution, being found in Europe, Asia and Africa (CRAMP 1985). The Hoopoe uses a wide range of cavity nest sites, including trees and buildings (CRAMP 1985). Very few studies have dealt with the breeding success of this bird in Europe and Asia (KUBIK 1960, GUPTA & AHMAD 1993, BALDI & SORACE 1996, MARTIN-VIVALDI *et al.* 1999, FOURNIER & ARLETTAZ 2001), and nest box use by the Hoopoe has been published only for Europe (KUBIK 1960).

In Israel, the Hoopoe is a resident, migrating and winter species (SHIRIHAI 1996), but despite its common status no studies have as yet been published. Here we present the results of a one year study to determine whether the Hoopoe will breed in nest boxes in Israel, and describe the breeding success. In addition, the

Hoopoe's diet, which has rarely been studied elsewhere (BATTISTI *et al.* 2000, FOURNIER & ARLETTAZ 2001), is also presented.

Altogether 31 nest boxes (20 cm wide, 23 cm deep and 40 cm high; entrance hole 64 mm diameter), were mounted at 3.5-4.5 m height on Eucalyptus trees *Eucalyptus* sp. and Mediterranean Cypress *Cupressus sempervirens* on 15 Mar 2008, in the Yizre'el and Beit Shean valleys. From 1 May 2008 to 1 Aug 2008, all nest boxes were visited at least three times to determine occupancy and to collect breeding parameters: dates of egg-laying, hatching, and fledging of young when possible; clutch size, brood size (number of young observed in a nest during first visit), and the number of young fledged. Since adult Hoopoes do not remove their dead young (MARTIN-VIVALDI *et al.* 1999) the total number of young could be determined even if we were unable to visit the nest during the first few days after hatching. When laying date was unknown, it was determined by back-calculating, using an incubation period of 17 days (MARTIN-VIVALDI *et al.* 1999).

Prey remains were collected from two nests after the young had fledged and were brought back to Tel Aviv University where they were separated and the items counted according to head, mandibles, chelicerae and wings. Unknown prey items were identified by comparing with the collection of the National Museum of Natural History at Tel Aviv University. Data were listed as the minimum number of individuals (MNI) per species.

Even though the nest boxes were added late in the year, three were nonetheless occupied by Hoopoes located in three villages: Kibbutz Nir David (32°30'8.89"N, 35°27'30.03"E, nest 1) Kibbutz

Table 1: Breeding parameters of three Hoopoe *Upupa epops* pairs breeding in nest boxes during the breeding season 2008 in Israel

Tabela 1: Gnezditveni podatki treh parov smrdokavre *Upupa epops*, ki so leta 2008 gnezdili v gnezdilnicah v Izraelu

	Nest 1	Nest 2	Nest 3
Location / Lokacija	Kibbutz Nir David	Kibbutz Sde Eliyahu	Moshav Ram On
Laying date / Datum valjenja	31 Mar 2008	27 Apr ₅ 2008	4 May ₃ 2008
Number of eggs / Število jajc	unknown ₄		
Number of nestlings hatched / Število izleženih mladičev		4	0
Number of young fledged / Število speljanih mladičev	2	3	0
Percentage of young fledged / Odstotek speljanih mladičev	50.0%	75.0%	

Table 2: Prey remains found in two Hoopoe *Upupa epops* nests in Israel during the 2008 breeding season. (MNI - Minimum number of individuals, co - common, uc - uncommon)

Tabela 2: Ostanke plena najdeni v dveh smrdokavrinih *Upupa epops* gnezdihi v Izraelu leta 2008 (MNI - minimalno število osebkov, co - pogost, uc - redek)

Species / Vrsta	MNI	
	Nest 1	Nest 2
Apidae		
<i>Bombus terrestris</i>	0	1
Gryllotalpidae		
<i>Gryllotalpa</i> sp.		co
Scarabaeidae		
<i>Pentodon algerinus dispar</i>	18	
<i>Obthopagus</i> ssp.	3	
<i>Onitis ezechias</i>	3	
<i>Onitis humerosus</i>		uc
Tenebrionidae		
<i>Alhitobius diaperrinus</i>	-	4
<i>Gonocephalum</i> sp.	uc	5
Blattodea		
<i>Arenivaga africana</i>	2	6

Sde Eliyahu (32°26'44.39"N, 35°30'47.34"E, nest 2, Figure 1), and Moshav Ram-On (32°32'08.98"N, 35°15'50.57"E, nest 3). Breeding data are presented in Table 1. Two out of the three nests successfully fledged young (66.7%). In nest 2, the young fledged at 24 days; and in nest 3, the pair abandoned the clutch for some unknown reason. The diet contained mainly terrestrial invertebrates, except for one Buff-tailed Bumblebee *Bombus terrestris* (Table 2).

The results of this study, despite the small sample size, demonstrate that Hoopoes will use nest boxes in Israel. The number of young fledged was within the range reported in Spain (KUBIK 1960, GUPTA & AHMAD 1993, BALDI & SORACE 1996, MARTIN-VIVALDI *et al.* 1999). Nest boxes are used by researchers and conservationists for many species of birds as a popular management tool to increase nest site availability in sites where these are lacking (NEWTON 1998). Similar to many secondary cavity nesters, we found that the Hoopoe will also breed in nest boxes when these are provided. In Europe, the Hoopoe status is listed as declining (BIRDLIFE INTERNATIONAL 2004) and the ability to add nest boxes may assist in increasing its population in certain areas.

Similar to that found in other studies, the diet of the Hoopoe was made up of terrestrial invertebrates (FOURNIER & ARLETTAZ 2001, BATTISTI *et al.* 2000). Unlike the other studies that used photographs at nests sites, we attempted to identify the diet remains at nest sites. This proved somewhat difficult, because of the efficient digestive system of the Hoopoe, which leaves few remains. Furthermore, our results are most likely over-represented by adult invertebrates, because larvae and pupae will leave fewer remains to identify. Interestingly, some of the same invertebrates are also preyed on by Little Owls *Athene noctua* in the same area (CHARTER *et al.* 2006).

On 29 May 2008, the Hoopoe was selected in a nation-wide campaign to be Israel's national bird. Both the status of the Hoopoe and public interest have greatly increased since then, and due to the results of this pilot study additional nest boxes will be added within the next few years. The presence of Hoopoes is welcome, as they prey on many terrestrial invertebrates that are considered pests to both homes (lawns) and agriculture. The ability to provide nest boxes for Hoopoes will encourage them to breed in cities and villages, and allow future studies, both observational and experimental, which are needed in order to better understand the Hoopoe's breeding ecology.

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Povzetek

Avtorji poročajo o treh parih smrdokavre *Upupa epops*, gnezdečih v gnezdilnicah, postavljenih v izraelskih dolinah Yizre'el in Beit Shean. Skupno je bilo nameščenih 31 gnezdilnic. Dva para sta uspešno izvalila in speljala mladiče. Analizirali so ostanke plena iz dveh gnezdilnic. Plen so v veliki večini sestavljali hrošči Coleoptera. Gre za prvi podatek o gnezdenju smrdokavre v gnezdilnici v Izraelu ter prav tako za prve podatke o njeni prehrani v Izraelu.



Figure 1: An adult Hoopoe *Upupa epops* from nest 2 in the nest box (Photo: Amir Ezer)

Slika 1: Odrasla smrdokavra *Upupa epops* na gnezdilnici (gnezdo 2) (foto: Amir Ezer)

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