

## Short Communication

### Discovery of a relict breeding colony of northern bald ibis *Geronticus eremita* in Syria

Gianluca Serra, Mahmud Abdallah, Adeb Assaed, Ahmed Abdallah, Ghazy Al Qaim, Talal Fayad and Douglas Williamson

**Abstract** The eastern population of the northern bald ibis *Geronticus eremita* had been presumed extinct following the loss of the colony in Birecik, Turkey, in 1989. However, occasional sightings of birds in Yemen, Eritrea, Saudi Arabia and Israel during the 1980s and 1990s suggested that there was still a colony somewhere in the Middle East. Intensive field surveys in spring 2002, based on the knowledge of Bedouin nomads and local hunters, revealed that the species has never become completely extinct on the Syrian desertic steppe. Following systematic searches 15 old nesting sites were found, one of them

still hosting an active breeding colony of seven individuals. The species appears to have been relatively common in the area until 20 years ago, when a combination of overexploitation of rangelands and increasing hunting pressure initiated a dramatic decline.

**Keywords** *Geronticus eremita*, local knowledge, Middle East, northern bald ibis, Syria.

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Until early spring 2002 the only known population of the northern bald ibis *Geronticus eremita*, a colonial cliff-nesting bird, was in Morocco (about 70 breeding pairs confined to two colonies; Bowden, 1998). Following the extinction of the colony at Birecik, Turkey, in 1989, the last known eastern population of the species, and its disappearance from most of its former range in North Africa (Bowden, 1998), the northern bald ibis became one of the world's rarest birds (Everett, 1994). It is categorized as Critically Endangered on the IUCN Red List (BirdLife, 2000; IUCN, 2002).

The northern bald ibis has undergone a continuous decline over the last 4–5 centuries throughout its range, i.e. the Alps, south-eastern Europe, Middle East and North Africa (Hirsch, 1979; Lawton, 1989). Probably at least 400 years ago the species split into two populations, which since then have been diverging morphologically, ecologically (Cramp & Simmons, 1998) and genetically (Broderick *et al.*, 2001). During the 20th century the

species declined by 98% between 1900 and 2002 (Collar & Stuart, 1985). Causes of the decline are thought to be pesticides (Hirsch 1980), human persecution (Hirsch, 1979; Aharoni, 1911, 1928, 1929), habitat loss (Collar & Stuart, 1985) and long-term global fluctuations in rainfall (Safriel, 1980).

At the beginning of the 20th century the northern bald ibis was found throughout the Syrian desertic steppe (Aharoni, 1911, 1929), but was believed to have become extinct from the area some time after 1928 (Safriel, 1980; Collar & Stuart, 1985). However, occasional sightings of birds in Yemen, Eritrea, Saudi Arabia and Israel during the 1980s and 1990s (Cramp & Simmons, 1998; Bowden, 1998), suggested that there was still a colony somewhere in the Middle East. However, searches in the Syrian steppe from 1960 to the 1990s were unable to locate the birds (Kumerlove, 1967, 1984; Baumgart, 1995). In this paper we describe our survey methodology for detecting old nesting sites and an extant colony in Syria, and analyse the causes of the decline and current threats. This study was undertaken within the framework of an Italian-funded, FAO-implemented project (GCP/SYR/009/ITA) based in Palmyra, Syria, with the aim of assisting the Syrian authorities in promoting biodiversity conservation and developing the first operational protected area, Al Talila, in the country.

The search for a possible northern bald ibis colony began in March 2002 on the basis of an account given by a local hunter. A total of 33 field surveys were carried

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out, involving three trained local observers, over an area of *c.* 18,000 km<sup>2</sup>. On the basis of available literature and directions provided by nomads, careful inspection was made of cliffs potentially suitable for ibis nesting. A standard questionnaire, including a photo-recognition test, was used for interviewing nomads and hunters (Appendix 1); the questionnaire was designed so as not to give any clue about the possible expectations of the interviewer. If all the questions were satisfactorily answered, it was assumed that the person had probably seen a northern bald ibis at some time in the past. Old ibis nesting sites were recognized by the combination of niches and ledges on sheer cliffs with the marks of bird droppings (Aharoni, 1911), and a number of nests clustered together.

The responses of 16 local hunters and 31 nomadic shepherds to the questionnaire (Appendix 2) indicated a degree of both recent and older local knowledge of the species. The 68 sightings reported during the interviews date from the 1930s to 2002. Our field surveys based on this information resulted in the recognition of 15 old nesting sites of varying size (Appendix 3). Nests were located in niches and holes and on ledges on limestone cliffs. In some cases a considerable amount of stratified guano bordered the nests, suggesting long-term use. Based on their local name and location, and of the number of birds reportedly seen in the past by local people, two of the old nesting sites appeared to match the description given by Aharoni (1911) of two colonial sites containing 500 and 300 breeding pairs in 1910 (#11 and #12, Appendix 3; Collar & Stuart, 1985). The extinction of the latter of these two large colonies (reportedly during 1930–40) may have been due to its proximity to a densely inhabited village, while birds at the former were still abundant during the 1970s until a military facility was built nearby. Of the other 13 old nesting sites, we discovered a colony of seven ibises at one of them (#5, Appendix 3), on 21 April 2002, on a small and remote cliff containing 10–15 old nests (Plate 1). It was composed of three breeding pairs and one non-breeding adult. The characteristics of this nesting site were similar to the those described by Aharoni (1911) and to those currently used by northern bald ibis in Morocco (C. Bowden, pers. comm.). The precise location of the colony is not provided here, in order to safeguard it.

The three active nests were located on an easterly oriented, vertical 40–50 m high limestone cliff, at *c.* 15 m from the ground, protected from both the dominant westerly/north-westerly wind and the midday sun. Immediately following the discovery of the colony a round-the-clock guard was established at the cliff. Daily observations were made, and dry droppings and pellets were collected. At the time of the discovery the three pairs were almost at the end of the incubation period.

One pair lost their chicks shortly after hatching, a chick disappeared at another nest for unknown reasons over 10–14 May and the surviving chick took 43–44 days to fledge, while the two chicks raised at the third nest took 36 days to fledge. Fledglings followed the adults to feeding grounds for the first time on 10 June, and a month later all birds disappeared from the breeding area. The breeding success recorded in 2002 was comparable to that recorded in the colonies in Morocco (Bowden *et al.*, in press).

The birds were observed to feed at seven sites, from the base of the nesting cliff to 28 km away. The feeding areas were of three types (cf. Hirsch, 1979): micro-ridges separating a complex system of micro-wadis of a large drainage area dominated by dwarf *Salsola* spp. shrubs, cultivated areas, and an irrigation reservoir. Due to unusually late rainfall in 2002 the dwarf shrubland only started to dry up at the end of June. The fact that the birds were feeding up to 28 km away from the nests could be an indicator that the nearby rangelands are an inadequate food source, as the species has previously been reported to travel not more than 5 km away from nests with young (Hirsch, 1979).

Analysis of droppings and pellets and direct observation suggest that tenebrionid ground beetles and acridid grasshoppers formed the bulk of the prey taken within the drainage and cultivated areas. At the irrigation reservoir ibises were observed feeding on juvenile frogs *Pelobates syriacus* (Serra *et al.*, unpub. data). The need for a mixed diet based on both steppe and marsh fauna (Collar & Stuart, 1985; Cramp & Simmons, 1998) is confirmed by our observations of ibises moving daily between fields and the irrigation reservoir during June, and by pellet analysis (Serra *et al.*, unpub. data). The ibises left the area just as the reservoir dried up. The construction of two small dams in the area during the 1960s–1970s might have compensated, in terms of food availability, for increasing degradation of the rangelands.

Information from those interviewees familiar with the ibis (Appendix 2) indicates that the species was common on the Syrian steppe until 20 years ago and relatively abundant 30 years ago, and that the individuals located in 2002 are the last remnant of a once large population, rather than individuals from the semi-wild population in Birecik, Turkey. These seven survivors of the eastern population of northern bald ibis are the only individuals presently known to be migratory, as the western wild population does not migrate (Everett, 1994).

The explanation for the widespread belief that the Syrian population of northern bald ibis was extinct is that sufficient survey efforts were not undertaken since the time of Aharoni (1911, 1929). In addition, our rediscovery of the colony would not have been possible without the use of the knowledge of Bedouin nomads

and local hunters. Although Baumgart (1995) noted that the folkloric memory of ibises had been lost, most of the elderly interviewees, especially from the Palmyra area, repeatedly reported a specific local name, *an-nuq*, for the bald ibis. The combination of a questionnaire and adequate field surveys were crucial to the location of the relict colony.

Information collected during the interviews suggested that uncontrolled hunting, the removal of chicks for food and habitat degradation have all contributed to the decline of the northern bald ibis on the Syrian steppe. Uncontrolled hunting and habitat degradation have intensified in the last 30–40 years, prompted by the increased use of motorized vehicles. The productivity of the rangelands in the survey area has declined by 20–50% during 1993–1999 (Mirreh *et al.*, 2000), and the increasing population of nomadic Bedouin herders has made the practice of firewood collection unsustainable.

The future survival of the northern bald ibis in Syria will depend on a programme of efficient protection and data collection during each breeding season, the reversal of habitat destruction on the feeding grounds, provision of assistance for sustainable development to local communities, protection of the species on its wintering grounds (to be located using satellite telemetry), and raising the ecological awareness of the local community, civil society and decision makers. During the 2002 breeding season significant results were achieved by Al Talila project in terms of protecting the birds in their breeding habitat with the involvement of nomads, and raising the ecological awareness of the local community in general. This work is continuing.

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## Appendices 1–3

The Appendices for this article are available online at <http://journals.cambridge.org>

## Biographical sketches

Gianluca Serra's research interests focus on applied conservation, biodiversity monitoring, protected area management and local community participation. He has been working with Al Talila Reserve project since 2000.

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### Appendix 1

Standard questionnaire asked to interview nomadic Bedouin herders and local hunters.

Date .....

Name of the interviewee (if Bedouin, also record the name of *kabila*/tribe) .....

Age/how long he has been within the area .....

Address (if Bedouin, record GPS location of the tent)  
 .....  
 .....

1. Have you ever seen an unusual black bird? If YES, go to question 2, if NO go to question 12.
2. How many individuals did you see? .....
3. What was the size of the bird? .....
4. What was the size and colour of the bill? .....
5. What was the length of the legs? .....
6. What was the colour and shape of the head? .....
7. What was its manner of flying? .....
8. Where was it seen? .....
9. When was it seen? .....
10. What is the local name for this bird? .....
11. Is the bird you saw similar to any of these four? (show interviewee four pictures: bunting, glossy ibis, vulture and bald ibis)
12. Have you ever seen a group of black middle-sized birds with a long bill? If YES, go to question 4, if NO stop here.

### Appendix 2

List of sightings of the northern bald ibis, in reverse chronological order, reported by nomadic Bedouin herders and village hunters who gave positive answers to the questionnaire (Appendix 1).

#	No. birds seen	Date/season	Year	Area
1	3-4	June	2002	Palmyra
2	3	May	2002	Palmyra
3	7	May	2002	Palmyra
4	Unspecified	Spring	2002	Palmyra
5	3	12 Apr.	2002	Palmyra
6	3-4	13 Mar.	2002	Palmyra
7	4-5	Feb.	2002	Palmyra
8	3-4	Feb.	2002	Palmyra
9	Unspecified	Nov.	2001	Palmyra
10	15-20		2001	Palmyra
11	10	Aug.-Sep.	2001	Palmyra
12	3-4		2001	Palmyra
13	40-50	June-July	2001	Palmyra

14	15	Apr.–June	2001	Palmyra
15	3–4	Apr.	2001	Palmyra
16	2	Apr.	2001	Palmyra
17	1 (killed and stuffed)	Sep.–Oct.	2001	Qaryatein
18	8	May	2001	Der-ez-zoir
19	3		1999	Palmyra
20	3		1999	Palmyra
21	3–4		1999	Palmyra
22	6–8		1998	Palmyra
23	8 (1 killed)	Mar.–Apr.	1998	Palmyra
24	15	Spring (seen daily)	1998	Palmyra
25	15		1998	Palmyra
26	10–15		1998	Palmyra
27	7–10	May	1997	Palmyra
28	Unspecified		1997	Palmyra
29	40–50	Summer	1995	Palmyra-Qaryatein
30	> 60	May–Jun	1995	Palmyra
31	30		1995	Qaryatein
32	2–3	June–July	1993	Palmyra
33	7–9	June–July	1993	Palmyra
34	40–50	Spring	1991–92	Palmyra
35	40–50		1990	Palmyra
36	7–9		1990	Palmyra
37	10–40 (many flocks)	Summer	1990	Palmyra-Qaryatein
38	1 chick at nest (killed)	May	1988	Palmyra
39	7–15 seen flying ('many on the cliff')	Spring-summer	1987	Sukhna
40	6		1985	Palmyra
41	10–15	June	1985	Palmyra
42	7–15	Spring	1983	Palmyra
43	100		1982	Palmyra-Qaryatein
44	100		1982	Palmyra
45	15	June–July	1981	Palmyra
46	Unspecified	May–June	1980–81	Palmyra
47	20–30	Spring	1980	Qaryatein
48	30–40	Spring	1980	Palmyra-Qaryatein
49	28	All year round	1980	Sukhna
50	2–3		1976	Qaryatein
51	'1,000' (many removed from nests)		1974–75	Palmyra-Qaryatein
52	10		1972	Palmyra
53	52 chicks removed from nests	Spring	1972	Sukhna
54	Many seen	Spring	1972	Palmyra-Qaryatein
55	3–4 flocks of 30–50 birds	Spring	1971–72	Palmyra-Qaryatein
56	30–40	Spring	1970	Palmyra
57	50–60 or more		1970s	Palmyra
58	4 flocks		1968–73	Palmyra
59	5–10	Spring	1962–63	Palmyra
60	Many birds (30 nests)	Spring	1960	Palmyra
61	15–20	Spring-Summer	1955	Qaryatein
62	20	Summer	1951	Palmyra
63	Unspecified, but common sight		1950s	Palmyra
64	'By the hundreds'	All year round	1940–50	Sukhna
65	1 (killed)		1948	Sukhna
66	1,000		'Long time ago'	Palmyra
67	1,000–1,500	Spring-Summer	1930–45	Qaryatein
68	?	?	?	Der-ez-zoir

### Appendix 3

Details of 15 old nesting sites of northern bald ibis, located using the responses of local hunters and nomadic Bedouin shepherds (Appendix 2) to the questionnaire (Appendix 1).

#	Area (id.)	No. old nests	Notes	Reports from local people (no. birds)
1	Palmyra (1)	At least 9–10	Stratified guano at almost all nests; this site is called by locals literally 'the den of the bald ibis'.	2 in spring 2001 2–3 in June–July 1993 7–9 in 1990 15 in June–July 1981 Unspecified no. in spring 1980–81 50–60 or more in the 1970s 4 flocks in 1968–1972 20 in summer 1951
2	Palmyra (2)	c. 50	No. of nests was recalled precisely by the report of a local person (i.e. 100 birds in 1982)	10–15 in 1998 40–50 in 1990 100 in 1982
3	Palmyra (3)	20–40		15 in 1998 Unspecified no. in 1997 '1,000 in the past'
4	Palmyra (4)	20–40	Called by locals literally 'the place of the bald ibis'	10–15 in 1985
5	Palmyra (5)	10–15	3 nests found to be occupied (see text)	15 in 1998 10–15 in 1998 8 feeding nearby (1 killed) in Mar.–Apr. 1998 7–10 in 1997 7–9 in June–July 1993 30–40 in spring 1970
6	Palmyra (6)	c. 20		
7	Palmyra (7)	c. 5	Very small and eroding cliff	
8	Palmyra (8)	3–5	Small cliff	1 juvenile killed in May 1988 6 in 1985 10 in 1972
9	Palmyra (9)	c. 5	Sheer cliff colonized by griffon vulture	7–9 in 1990 7–15 in spring 1983
10	Palmyra (10)	33–35	Several feathers found at the base of cliff, under nests	Unspecified no. in spring 2002 4–5 in Feb. 2002 3–4 in 2001 6–7 in 2001 15–20 in 2001 40–50 in June–July 2001 > 60 in spring 1995 40–50 in spring 1991–1992 Many birds in spring 1960 (c. 30 nests)
11	Palmyra-Qaryatein (QP)	30–120	Stratified guano at most nests; this site matches the description by Aharoni (1911) of the 'Palmyrean colony' numbering c. 500 pairs in 1910	10–40 + many flocks in summer 1990 100 in 1982 30–40 in spring 1980 '1,000', many removed from nests in 1974–75 'Many' in spring 1972 3–4 flocks of 30–50 birds each in spring 1971–72

12	Qaryatein (Q1)	40–50	Stratified guano at most nests; this site matches the description by Aharoni (1911) of a colony in the Qaryatein area numbering c. 300 pairs in 1910	1 killed and stuffed in Sep.–Oct. 2001 30 in 1995 20–30 in spring 1980 2–3 in 1976 15–20 in spring-summer 1950 1,000–1,500 in spring-summer during 1930–45
13	Qaryatein (Q2)	7–10	Stratified guano at most nests	Unspecified no. and date
14	Sukhna (1)	60–70	Huge cliff similar in size to QP; most probably the one mentioned in Kumerlove (1978)	7–15 flying + many on the cliff in spring-summer 1987 28 in 1980 (resident) 1 killed in 1948 'By the hundreds' during 1940–50
15	Sukhna (2)	15–16	Stratified guano Occurrence at majority of nests	52 chicks removed from nests in spring 1972

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