

# Review of historical breeding sites of the Northern Bald Ibis *Geronticus eremita* in Syria and south-eastern Turkey

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(Received 21 June 2020; revision accepted 04 January 2021)

## Summary

An updated and comprehensive compilation and review of the historical breeding sites of the Northern Bald Ibis in Syria and south-eastern Turkey is presented accompanied by all available details. The original sources, dating from the first half of the 19th century to 2010, were thoroughly assessed and reviewed. A detailed distribution map of confirmed and unconfirmed historical Northern Bald Ibis colonies was developed, showing a cluster of colonies located in the central steppe of Syria, between the villages of Qaryatayn and Sukhna, while several other colonies were scattered along the Euphrates river from southern Turkey to Iraq, passing through Syria.

**Keywords:** Near East, *Geronticus eremita*, historical breeding sites

## Introduction

The Northern Bald Ibis, listed as ‘Endangered’ as of 2017 (BirdLife International 2018), occurred in central Europe and around the Mediterranean until the beginning of the 17th century (Schenker 1977, Böhm and Pegoraro 2011). In the early 20th century, two separate relict populations survived, a resident or partially migrating population in North Africa (Morocco and Algeria) and a migratory population in the Near East (Collar and Stuart 1985, Del Hoyo *et al.* 1992). In the Near East only a semi-captive population exists today near Birecik/SE-Turkey with birds which were repeatedly removed from the Birecik colony since the 1970s and kept in aviaries just north of the village (Kumerloeve 1962, Hirsch 1979, 1980, Akçakaya 1990, Pegoraro 1996, Bowden 2015, Hatipoglu 2016). A small breeding population discovered in Syria in 2002, most likely the last wild colony in the entire Near East, survived up to 2013 (Serra *et al.* 2004, 2009, 2011, Serra 2017). The colony’s migratory route and wintering grounds were discovered and described in the years following the discovery (Lindsell *et al.* 2009, Serra *et al.* 2013). However, the final destiny of such colony has to be still confirmed, because the conflict in Syria has halted all monitoring activities (G. Serra unpubl. data).

Although the species has most likely become extinct in the wild in the Near East just recently, we aimed to reconstruct the historical distribution and size of its breeding range within this region. The data used from the original sources date from the first half of the 19th century to the year 2010.

No reliable data could be found from the period before the 19th century. The aim of present contribution is (i) to compile and critically review the widely scattered information found in the literature and (ii) to thoroughly consult the original sources.

## Methods

A comprehensive and critical analysis of the scientific literature was conducted, including cross-references. Only data from original sources were used, which provided verified or highly plausible occurrences of breeding colonies of the Northern Bald Ibis. Various expedition and travel reports from the Near East are the main source of information from the early 19th century. It is worth noting that the original sources Ainsworth (1842) and Helfer (1878) are cited for the first time through the present study, accurately and with detailed references. The long-term survey conducted by Serra *et al.* (2004) in Syria, during 2000 and 2004, provided the basis for the reconstruction of the occurrence of the breeding sites within Syrian territory, following the pioneer surveys by Aharoni (1929).

## Results

The results are summarised in detail in Table 1 and shown in a map of the region (Figure 1). The map shows a concentration of historical breeding colonies located in the central steppe of Syria, between the villages of Qaryatayn and Sukhna, and several colonies scattered in the Euphrates Valley from southern Turkey to Iraq, passing through Syria.

### *The distribution of breeding colonies in Syria*

Helfer (1878) is an important source for the first half of the 19th century, particularly for the site S<sub>1</sub> (City of Raqqa, Euphrates valley; 250 m asl). A quote from the original source Helfer (1878: 235-236): *May 10th 1836. «... Now the harsh clacking of storks is heard there as they stand meditatively on the walls. The black ibis builds its nests by thousands in the ramparts, and troops of jackals and foxes come forth by day from their subterranean haunts»*. In 1978 U. Hirsch met Aharoni's son, Prof. J. Aharoni, who was able to reconstruct the itinerary based on his father's diary (Hirsch 1980). However, Hirsch does not provide any precise information about the colony sites in the region around Qaryatayn and Palmyra.

Safriel (1980) provides an overview of the skins conserved in the Zoological Museum of the Hebrew University in Jerusalem. Almost all the skins collected by Aharoni have lost their labels. However, the 20 skins (nine adult, nine juvenile, two pulli) certainly come from the area between Qaryatayn and Palmyra.

The Northern Bald Ibis in Syria was regarded to have vanished from Syria in the early 1930s (Collar and Stuart 1985). In 2002, one relict breeding colony of Northern Bald Ibis (three pairs) was discovered in the Palmyra region (Serra *et al.* 2004). A traditional ecological knowledge (TEK) survey among the indigenous nomad population of the Syrian steppe, including experienced hunters resident in Palmyra, showed that Northern Bald Ibis had in fact been breeding in the Syrian desert steppe west of the Euphrates valley in scattered colonies and sometimes in large numbers until the 1970s and 1980s (Serra *et al.* 2004, Serra 2017).

### *The distribution of breeding colonies in south-east Turkey*

Ainsworth (1842) is an important original source for the first half of the 19th century particularly for sites T<sub>1</sub> north-east of Birecik and T<sub>2</sub> Birecik. A quote from the original source Ainsworth (1842: 285): *...we arrived at Yailash, a large village... "*. June 13th 1839 *"We pitched our tent in a field near the village; and in the evening shot a beautiful green ibis"*.

Table 1. Historical breeding sites of Northern Bald Ibis in Syria and south-east Turkey. TEK: traditional ecological knowledge (Serra *et al.* 2004).

No	Breeding site	Year of observation	Estimated nesting pairs	Old nests counted in 2002-03	Nests with guano (2002-03)	TEK-based estimates from the past	Original source
S1	South-East of Tell Abiad	1946					Brown 1946
S2	Raqqa	1836	> 500				Helfer 1878
S3	Palmyra region	1951-1990		ca. 9-10	8	7-9 in 1990; 50-60 in the 1970s; flocks in 1968-72; 420 summer 1951	Serra et al. 2004
S4	Palmyra region	1982-1998		ca. 50		10-15 in 1998; 40-50 in 1990; 100 in 1982;	Serra et al. 2004
S5	Palmyra region	1997/1998		20-40		15 in 1998; "1000" in the past	Serra et al. 2004
S6	Palmyra region	1985		20-40		10-15 in 1985	Serra et al. 2004
S7	Palmyra region	1970-1998		ca. 10-15		3 nests found occupied in 2002; 15 in 1998; 30-40 in 1970	Serra et al. 2004
S8	Palmyra region			ca. 20			Serra et al. 2004
S9	Palmyra region			ca. 5		Very small and eroding cliff	Serra et al. 2004
S10	Palmyra region	1972-1988		ca. 3-5		1 juv killed in May 1998; 6 in 1985; 10 in 1972	Serra et al. 2004
S11	Palmyra region	1983-1990		ca. 5		7-9 in 1990; 7-15 in 1983	Serra et al. 2004
S12	Palmyra region	1960-2002		33-35		4-5 in Feb 2002; 15-20 in 2001; > 60 in 1995; 40-50 in 1991-92; ca. 30 nests in 1960	Serra et al. 2004
S13	between Palmyra and Quaryatayn	1910 1971-1990	ca. 500	30-120	most of them	10-40 in 1990; 100 in 1982; "1000" in 1974-75; 3-4 flocks of 30-50 birds each in 1971-72	Aharoni 1911 Serra et al. 2004
S14	Al Quaryatayn-region, near Jebar/Ain Jebbat	1905 1910; 1928 1930-2001	"live and breed" 300	40-50	most of them	30 in 1995; 20-30 1980; 15-20 in 1950; 1000-1500 in in 1930-45	Sclater 1906: 316; Hirsch 1980 Aharoni 1911, 1929 Serra et al. 2004
S15	Al Quaryatayn-region	1910		ca.7-10	4-5		Serra et al. 2004

Table 1. Continued.

No	Breeding site	Year of observation	Estimated nesting pairs	Old nests counted in 2002-03	Nests with guano (2002-03)	TEK-based estimates from the past	Original source
S16	As-Sukhna region	1911 1940-1987		60-70		hundreds in 1940-50s; 28 in 1980; ca. 20 flying and many on the cliff in 1987; probably the one mentioned in Kumerloeve (1978)	Kumerloeve 1978 Serra et al. 2004
S17	As-Sukhna region	1972		15-16	14	52 chicks removed in 1972	Serra et al. 2004, Ahmed K. Abdallah, pers. comm. (Serra unpublished) C.B. Edmonds, cited in Moore & Boswell 1956
S18	ca. 50 km West of Abu Kemal	1950ies	"had heard of a colony breeding in a cliff"				Ainsworth 1842
T1	near Yaylak, 50 km northeast of Birecik	1839					Ainsworth 1842
T2	Birecik	1839	"studded with green ibis"				Ainsworth 1842
		1873	"crowds"				Schweiger-Lerchfeld 1876:24 Danford 1880 Tristram 1882 Weigold 1912/1913 Kumerloeve 1958 Kumerloeve 1965, Warncke 1965 Kumerloeve 1969 Hirsch 1980
		1878					
		1881					
		1911	> 500				
		1953	> 500				
		1965	65-100				
		1968	45-46				
		1980	6				

Table 1. Continued.

No	Breeding site	Year of observation	Estimated nesting pairs	Old nests counted in 2002-03	Nests with guano (2002-03)	TEK-based estimates from the past	Original source
T3	near Savi (Adacik), south of Birecik	ca. 1925–1940					Kumerloeve 1967
T4	near Tilobür (Geçittepe), northwest of Birecik	ca. 1925–1940					Kumerloeve 1967
T5	near Tilmusa (Keskince), northwest of Birecik	1965, 1973 and later	2–3				Hirsch 1980
T6	near Belkis (Zeugma), northwest of Birecik	ca. 1925–1940					Kumerloeve 1967
		1965, 1973 and later	2–3				Hirsch 1980
T7	lateral valley west of Halfeti	1973	2				Hirsch 1980
I1	close to the Euphrates River	“back in the past”, 1950ies to 1970ies ?				a colony near the Euphrates	Mahmud S. Abdallah, pers. comm. (Serra unpublished)

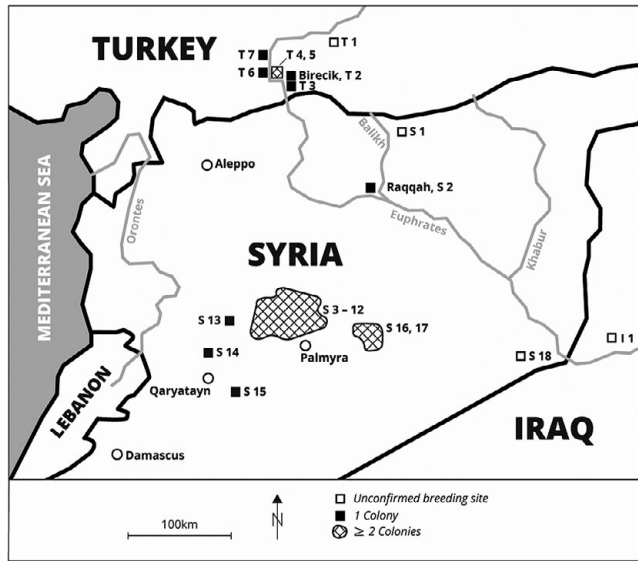


Figure 1. Map of Syria and south-eastern Turkey showing the distribution and number of historical breeding sites of the Northern Bald Ibis from the 19th century to 2010. Information and sources for each breeding site are provided in the dataset shown in Table 1.

Based on the previous description by Ainsworth of a fertile plain and a village with a central mound, and the subsequent description of the itinerary to Birecik, this large village is quite certainly today's Yaylak, 500 m asl and at a distance of about 50 km north-east of Birecik. This indicates a hitherto unrecognised occurrence of a Northern Bald Ibis colony. The large breeding colony in Birecik is the best known, and until the 1980s the longest, occupied site in the Near East. The occurrence of the Northern Bald Ibis at this specific site is documented since the first half of the 19th century (Ainsworth 1842). A quote from the original source Ainsworth (1842: 305), June 1839 at Birecik: " ..., its covered houses and climbing ramparts, its rocky shelves studded with green ibis...".

## Discussion

The updated distribution of historical breeding sites of Northern Bald Ibis in the Near East presented in this study confirms the ecological and physical requirements of sheer cliffs with ledges and niches as the nesting habitat of this species (Collar and Stuart 1985, Serra *et al.* 2009). Open areas of arid and semi-arid seasonal rangeland seem to be the other key ecological requirement as the feeding habitat for the species (Serra *et al.* 2008).

Birecik colony, most likely one of the largest, if not the largest, in the whole Near East, was reported to have more than 1,000 birds until the mid-1950s. For the local population, the birds were considered sacred and thus protected from persecution (Tristram 1882, Kumerloev 1958). Until the late 1950s, the ferrymen on the Euphrates were the initiators of the traditional festivities when the Northern Bald Ibis returned from the wintering grounds in February/March. As a consequence of the bridge construction over the Euphrates in the late 1950s and the subsequent large human population growth, including residential construction below and next to the breeding cliffs, this long cultural tradition disappeared (Kumerloev 1958, Collar and Stuart 1985). Following an anti-malaria campaign and spraying of desert locust swarms in the late 1950s and 1960s, hundreds of Northern Bald Ibis were poisoned and found dead (Hirsch 1980). In the 1970s, the colony in Birecik

decreased to less than 30 breeding pairs. In 1988 the last breeding of the wild population in Birecik took place (Akçakaya 1990). Since the 1970s, Northern Bald Ibis have bred in aviaries just north of the town of Birecik. In recent years, this semi-wild population has reached over 200 individuals (Hatipoglu 2016).

In addition to the large Birecik colony, some small breeding colonies existed north of the village on cliffs along the Euphrates valley (Kumerloeve 1967, Hirsch 1980). The specimen which was shot in 1839 near Kaylak, about 50 km north-east of Birecik reported by Ainsworth (1842) may have been part of a previously unknown colony.

In Syria at the beginning of the 20th century, Aharoni collected more than 100 eggs, about as many skins and 30 live young nestlings of Northern Bald Ibis and sent or brought them to Europe (Aharoni 1911, 1932). In 1928 only one colony reportedly still survived from the five known to him, hardly accessible by steep and overhanging rocks (Aharoni 1929).

### *Unconfirmed breeding sites*

S1: A few Northern Bald Ibis were seen on 15 May 1946 south-east of Tell Abiad with flocks of White Storks *Ciconia ciconia* feeding on Moroccan locust *Docicostaurus maroccanus* (Brown 1946). Tell Abiad is located on the upper course of the Balikh River. However, there is no concrete evidence of a breeding colony in this area. The distance of about 100 km from the closest known breeding colony in Birecik (T2) rather supports an unknown breeding colony in the vicinity.

S18: In the 1950s, Moore and Boswell (1956) reported, on hearsay evidence, a breeding colony about 30 miles (c.50 km) west of the city of Abu Kemal. This area in the south-east of Syria is the driest part of the country with an average annual rainfall of 100–150 mm. Potentially suitable nesting cliffs are probably located along dry valleys (wadis), which have only occasional running water. This makes irregular breeding likely, as has been observed in arid and semi-arid areas of southern Morocco (Robin 1973). The drought in Syria in 1957–1961 most likely had a similar effect on this unconfirmed colony. From September 1957 to August 1961, the mean of these four years was 53% (79 mm) of the long-term mean for Deir ez Zor and 57% (71mm) for Palmyra (Wirth 1971).

T1: Ainsworth shot a Northern Bald Ibis in June 1839 near the village of Yaylak (see above), about 50 km north-east of Birecik. A possible breeding colony in the area is not known. Yaylak lies about 10 km south of the Euphrates. However, cliffs along the Euphrates and in the small lateral valleys would provide suitable breeding structures. Foraging areas at such a distance from the known breeding sites and the aforementioned evening hour make it rather unlikely that the shot specimen came from the area between Birecik and Halfeti. The direct distance between small colonies south of Halfeti and Yaylak is still about 50 km.

I1: There is some evidence of a possible Northern Bald Ibis breeding colony in northern Iraq. There are three direct observations from the 1920s in northern Iraq at the time of the end of the spring migration: end of January near Kirkuk (Robb in Ticehurst *et al.* 1926); a few in February near Tikrit (L. Home in Ticehurst *et al.* 1922); and one shot at Tikrit by Aldworth (Ticehurst *et al.* 1922). These observations are independently confirmed through the TEK surveys performed in 2002–2004 in the Palmyra steppe (Serra *et al.* 2004): few independent Bedouin sources reported the existence of a Northern Bald Ibis colony breeding on “rocky cliffs of northern Iraq” (Serra unpubl. data). In this context it is worth noting that two elderly Bedouins mentioned a colony near the Euphrates, but the exact location is not known. Bedouins used to have an interest in Northern Bald Ibis whose nestlings were collected from the cliffs as food (Serra *et al.* 2004).

There are no known breeding colonies from Syria’s western, southern and south-eastern neighbouring countries (exception: I1, unconfirmed). However, there are a number of observations of migrating Northern Bald Ibis in spring and autumn in these neighbouring countries (Hirsch 1980, Welch and Welch 2004).

Jordan: there is a 1956 observation of autumn migration in mid-November at the Azraq oasis (Bourne 1959).

Lebanon: no observations are known from Lebanon.

Israel: observations are known from the spring migration during March to May in 1962, 1970 and the 1980s (Krabbe 1983, Lambert and Grimmet 1983, Kyllingstad 1986, Shirihai 1996) and during the autumn migration in August and September from 1975 and 1984 (Paz 1987, Shirihai 1996).

Overall, the present study provides a summary and compilation of former breeding sites of the Northern Bald Ibis in the Near East, by taking into account old studies (before 1870) and grey literature from ornithological journeys during the 19th century. We hope it will provide an important perspective for the conservation of the species, and it will become a key reference for the species in the region.

## Acknowledgements

We would like to thank Martina L. Schenker, Zurich for designing the distribution map. Thanks to Markus Unsöld, Zoologische Staatssammlung München, for his valuable help in obtaining literature. We appreciate the constructive comments of two anonymous reviewers on an earlier version of the manuscript.

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