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ORNITHOLOGICAL IMPORTANCE OF THE MALLAHA WETLAND IN TRIPOLI, LIBYA

par

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The Libyan coast is characterized by many different habitats that are used as stopover sites for many migratory and resident birds. The diversity of Mallaha, which is mainly characterized as a salt-marsh habitat, provides refuge and food for many resident and migrant birds. Mallaha is situated north-east of Tripoli city, and is about 2.5 km in length, with a maximum width of about 1.5 km. The site encompasses dry sandy areas; dry and green grasses; semi-wetland; dry and wet streams and canals; brackish and salt-water pools; a variety of different trees and shrubs, dump yards of various types; ruins of old residential and military buildings; gravel and dusty roads. The area is also rich in salt-marsh habitat. A maximum of 39 bird species was observed (aquatic and marine birds, waders and terrestrial); five species, from a total of seven, are included in appendices I, II and III of the CITES agreement as endangered species in some countries, and two species are listed in the SPA protocol / UNEP / MAP. Moreover, the area is inhabited during winter by some important species, such as the Greater Flamingo (Phonecopterus rubber), the Cormorant (Phalacrocorax carbo) and Swans. Breeding of Little Tern (*Sterna albifrons*), and Black-winged Stilt (*Himantopus himantopus*), was recorded during the field visits.

Keywords: Marshy habitat, waders, endangered species, *Sterna albifrons*.

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Intérêt ornithologique de la zone humide de Mallaha à Tripoli, Libye

La côte lybienne est caractérisée par de nombreux habitats différents utilisés comme escales par de nombreux oiseaux migrateurs ou résidents. La diversité de Mahalla, qui se caractérise principalement comme une zone de mares salées, procure refuge et nourriture à nombre d'entre eux. Mahalla est situé au Nord-Est de la ville de Tripoli, et le site a une longueur d'environ 2,5 km pour une largeur maximale de 1,5 km. Le site est dominé par des zones sablonneuses sèches avec des herbes sèches et vertes, des zones semi-humides avec des ruisseaux secs ou en eau et des canaux, des mares d'eau saumâtre et salée. On y trouve une grande diversité d'arbres et d'arbustes ainsi que des décharges de déchets et de matériaux divers et des ruines de vieux bâtiments résidentiels ou militaires, des routes non goudronnées et poussiéreuses. La région est également riche en habitats marécageux salés.

Un maximum de 39 espèces d'oiseaux aquatiques et marins ont été observées dont sept espèces incluses dans les annexes I, II et III de la Convention CITES comme espèces en voie de disparition dans certains pays, et deux espèces figurent dans le protocole SPA / PNUE / MAP. En outre, la région est habitée en hiver par quelques espèces importantes comme le Flamant rose *Phonecopterus ruber,* le Cormoran *Phalacrocorax carbo* et des Cygnes (communications personnelles de personnes travaillant sur le site). Des Sternes naines *Sterna albifrons* et des Échasses blanches *Himantopus himantopus* ont été observées au cours des visites sur le terrain.

Mots-clés : Habitats marécageux, échassiers, espèces en voie de disparition, *Sterna albi - frons*.

Introduction

The Libyan coast is characterized by many different habitats that are used as stopover sites by many migratory and resident birds (DEFOS *et al*., 2001; ETAYEB & ESSGHAIER, 2007). They provide food, shelter and nesting ground for many bird species during their migration from their home to wintering grounds. However, Libya, with its relatively dry climate, is perceived as having comparatively few wetlands and waterbirds. It is also, ornithologically speaking, the least known country of Mediterranean Africa (SMART *et al., 2006)*. Recent reviews list 317 species, of which approximately 25% are breeders (BUNDY, 1976). The diversity of habitats characteristic of the country provides refuge and food for many migrants, which account for about 75% of the avifauna of Libya, passing from the western Palearctic region to their southern winter quarters. Some of these also occur here as breeding species.

To date, there are few experienced ornithologists in Libya, which has resulted in a lack of information on Libyan birds during last three decades. During the last decade, interest in the Libyan wetlands has increased. In the mid-nineties the UNEP Mediterranean Action Plan (MAP), adopted a "Protocol concerning Special Protected Areas (SPA) and Biological Diversity in the Mediterranean". Annex II of the Protocol includes a "List of Endangered or Threatened Species", including 15 waterbirds, for which a Bird Action Plan has been prepared (UNEP MAP

RAC/SPA, 2003). 21 countries around the Mediterranean, including Libya, were involved in the framework of the Barcelona Convention. Moreover, Libya has ratified the Ramsar Convention and, in 2002, two wetlands in the Jebel Akhdar area were designated. In 2005, Libya signed the African-Eurasian Waterbird Agreement (AEWA), under the umbrella of the Convention on Migratory Species (CMS) (SMART *et al.,* 2006). Consequently, a regular wintering water-bird census for Libyan wetlands ran from 2005 until 2012. However, the Mallaha wetland was not a regularly visited site because of its sensitivity as a military area. Therefore, the present paper provides some ornithological information on Mallaha to show the ecological importance of this site for the avifauna.

Study area

Mallaha is situated north-east of Tripoli city, at 32° 53' 58 N latitude and 13° 17' 15 E longitude. The site is about 2.5 km in length with a maximum width of about 1.5 km. The northern region is dominated by dry sandy areas; dry and green grasses; semi-wet land; dry and wet streams and canals; brackish and saltwater pools; a variety of different trees and shrubs; dump yards of various types; ruins of old residential and military buildings; gravel and dusty roads. The area is also rich in salt-marsh habitat (southwestern region) and provides food and shelter for variety of aquatic birds (Fig. 1).

Figure 1

Satellite image of the study area (via http://maps.google.com.ly).
Carte de la zone d'étude.

Table 1

Number of individuals observed per species during the study period and their status and situation.
Effectifs des espèces observées pendant la période d'étude, leur statut et leur situation.

Scientific name	Common name	2005	2008	2009	2011	2012	Status	Remarks
Phalacrocorax carbo	Cormorant	-	26	69	65	97	WV	
Ardea cinerea	Grey Heron	2	5	3	14	2	PV, WV, CB?	
Ardea purpurea	Purple Heron	1					PV	
Egretta garzetta	Little Egret	1	-	-	3	1	PV, WV	Listed in appendix III / CITES
Egretta alba	Great Egret	-	-	-	1	-	AV, (PV?)	
Ardeola ralloides	Squacco Heron	1	-	-	-	-	PV	
Platalea leucorodia	Spoonbill	-	1	3	1	3	PV, WV	
Phoenicopterus ruber	Greater Flamingo	-	4	132	212	29	WV	
Tadorna tadorna	Shelduck	-	-	2	13	-	WV	
Anas acuta	Pintail	-	-	-	32	-	WV, PV	
Anas clypeata	Shoveler	-	285	495	90	70	WV	
Marmaronetta angustirostris	Marbled Duck	-	-	11	28	17	WV	Vulnerable (IUCN)
Anas crecca	Teal	-	-	31	16	17	WV	
Aythya ferina	Pochard	-	-	1	-	-	WV	
Aythya nyroca	Ferruginous Duck	-	7	-	-	-	WV, (PV?)	Near Threatened (IUCN)
Circus aeruginosus	Marsh Harrier	-	1	-	1	1	PV, WV	
Buteo rufinus	Long-legged Buzzard	-	-	-	-	1	RB	
Falco tinnunculus	Kestrel	2	-	-	1		RB, PV, WV	Listed in appendix II / CITES
Alectoris Barbara	Barbary Partridge	62	-	2	-	-	RB	
Gallinula chloropus	Moorhen	-	-	-	-	5	RB, WV	
Fulica atra	Coot	-	4	-	28	2	WV	
Recurvirostra avosetta	Avocet	2	-	-	-	-	AV	
Himantopus himantopus	Black-winged Stilt	109	26	27	91	178	RB	
Burhinus oedicnemus	Stone Curlew	55	-	-	-	-	RB, PV	

Charadrius hiaticula	Ringed Plover	-	-	2	10	3	PV, WV	
Charadrius alexandrines	Kentish Plover	67	-	2	5	1	RB	
Pluvialis squatarola	Grey Plover	3	-	-	-	2	WV, PV	
Calidris alba	Sanderling	10	-	-	-	-	WV, PV	
Arenaria interpres	Turn Stone	16	-	-	-	2	WV, PV	
Calidris albino	Dunlin	-	-	148	13	77	WV	
Calidris minuta	Little Stint	35	-	-	-	9	WV, PV	
Tringa ochropus	Green Sandpiper	-	-	-	-	1	PV (WV)	
Actitis hypoleucos	Common Sandpiper	-	-	3	1	-	PV (WV)	
Tringa erythropus	Spotted Redshank	5	-	-	-	-	PV	
Tringa tetanus	Redshank	10	-	1	17	18	WV, PV	
Tringa stagnatilis	Marsh sandpiper	1	-	-	-	7	PV	
Tringa nebularia	Green Shank	1	-	-	2	3	PV	
Numenius arquata	Curlew	1	-	7	35	-	WV, PV	Near Threatened (IUCN)
Numenius phaeopus	Whimbrel	-	-	-	1	-	PV	
Gallinago gallinago	Snipe	1	-	-	-	-	WV, PV	
Philomachus pugnax	Ruff	9	-	-	5	1	PV, WV	
Larus ridibundus	Black headed Gull	4	-	3	147	33	WV	
Larus geni	Slender-billed Gull	-	-	-	48	96	WV	
Larus canus	Common Gull	-	-	-	4	-	WV	
Larus melanocephalus	Mediterranean Gull	-	-	-	31	3	WV	
Larus cacchinans	Yellow legged Gull	5	-	1	45	-	WV	
Larus audouinii	Audouin's Gull	-	-	-	1	7	WV	Near Threatened (IUCN)
Larus fascus	Lesser Black-Backed Gull	-	-	-	154	2	WV	
Sterna albifrons	Little Tern	20	-	-	-	41	MB, PV	Frequent and Listed in SPA/ Protocol / UNEP / MAP
Sterna sandvicensis	Sandwich Tern	-	-	-	322	35	WV	
Sterna caspia	Caspian Tern	-	-	-	15	-	PV, WV	

Scientific name (cont.)	Common name	2005	2008	2009	2011	2012	Status	Remarks
Sterna bengalensis	Lesser Crested Tern	-	-	-	1	15	MB, PV	Listed in SPA/ Protocol / UNEP / MAP
Streptopelia turtur	Turtle Dove	47	19	-	-	-	MB, PV	Listed in appendix III / CITES
Streptopelia senegalensis	Palm Dove	64	-	-	-	-	RB, PV?	Listed in appendix III / CITES
Athene noctua	Little Owl	1	-	-	-	-	RB	Listed in appendix II / CITES
Upupa epops	Hoopoe	19	-	-	2	-	RB, PV	
Merops apiaster	Bee-eater	2	-	-	-	-	PV, MB	
Galerida cristata	Crested Lark	9	-	-	5	-	RB	
Delichon urbica	House Martin	63	3	-	-	-	PV, MB?	
Hirundo rustica	Swallow	18	-	-	-	30	MB, PV	
Motacilla alba	White Wagtail	-	9	-	-	-	WV	
Erithacus rubecula	Robin	-	-	1	-	-	WV	
Saxicola torquata	Stonechat	-	-	-	1	-	WV	
Scotocerca inquieta	Scrub Warbler	1	-	-	-	-	RB	
Acrocephalus scirpaceus	Reed Warbler	-	6	-	-	5	PV	
Phylloscopus collybita	Chiffchaff	10	-	-	1	-	WV	
Muscicapa striata	Spotted Flycatcher	1	-	-	-	-	PV	
Turdoides fulvus	Fulvous Babbler	5	-	-	-	-	RB	
Lanius excubitor	Great Grey Shrike	31	2	2	2	-	RB	
Lanius minor	Lesser Grey Shrike	13	-	-	-	-	PV	
Sturnus vulgaris	Starling	-	15000	-	166	-	WV	
Passer hispaniolensis	Spanish Sparrow	763	-	-	110	-	RB	
72 Species	**Totals**		**707**	**15398**	**946**	**1740**	**814**	
		1960						

AV - Accidental visitor. **CB** - Casual breeder. **MB** - Migrant breeder. **PB** - Possible breeder. **PV** - Passage visitor. **RB** - Resident breeder. **WV** - Winter visitor.
AV - visiteur accidentel ; CB - MB éleveur occasionnel - éleveur migrants ; PB - éleveur possible ; PV - visiteur de passage ; RB - Éleveur du résident ; WV - visiteur d'hiver.

Methods

All observations were made on foot during the study period. The bird surveys conducted in Mallaha included a residential area with ornamental trees, shrubs and flowers, and salt-marsh habitat. The study was conducted by using binoculars and an Optolyth telescope. The birds were identified by using standard books (HEINZEL *et al.,* 1998; MULLARNEY *et al.,* 1999). For each species, the status and frequency of occurrence was determined. The following categories have been used (adapted from BUNDY, 1976; JAMES *et al.,* 1976; TOSCHI, 1969): AV - Accidental visitor; CB - Casual breeder; MB - Migrant breeder; PB - Possible breeder; PV - Passage visitor; RB - Resident breeder; WV - Winter visitor.

Approximately 95% of the total area was surveyed for nests and clutch sizes of Little Tern and Black-winged Stilt in June 2012.

Results and discussion

Bird census

During this study, a total 72 species was observed at Mallaha, with a total of 19,475 individuals counted during the years of study (Table 1; Fig. 2). The majority of the birds encountered were aquatic, with the lowest counts of species and individuals being for terrestrial species (Table 1). Some of these species were present throughout the study days in low numbers, while others were present in the same

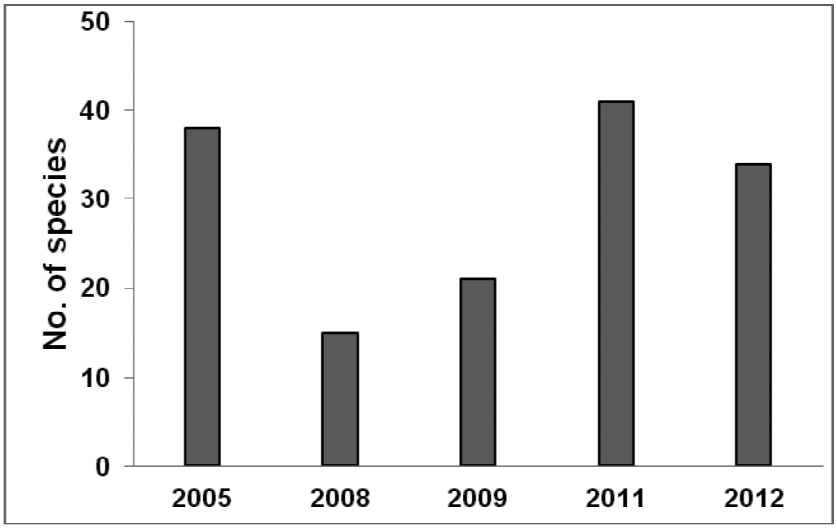

Figure 2

Yearly number of species observed in Mallaha during the study period.
Nombre d'espèces observées dans le Mahalla pendant la période d'étude.

period but in large numbers. These discrepancies in species richness and abundance were attributed to the season and the time of migration, despite the fact that BUNDY (1976) and TOSCHI (1969) reported about 275 species in the Tripoli region. The area was also inhabited during winter by some important species like the Greater Flamingo (*Phonecopterus rubber*), Cormorant (*Phalacrocorax carbo*), Swans and various species of ducks (personal communications with workers at the site). In this context, a total of 54 rings of Flamingos were read at Mallaha during the study period. They had been ringed as pulli in several Mediterranean countries (see Appendix 1). This study provides ornithological information on the Mallaha wetland for first time, which was previously lacking because is a military site. Thus, access to the site was previously difficult, if not impossible.

Among the species recorded in this area were several of particular importance. Five are listed in Appendices I, II and III of the CITES agreement as being endangered in some countries (http://www.cites.org/eng/app/index.php, 2012), and two are listed in the SPA protocol/UNEP/MAP (http://www.rac-spa.org/sites/default/files/action_plans/bird.pdf, 2012). Moreover, four other species are listed in the IUCN Red List in different categories (http://www.iucn.org/ -about/work/programmes/species/our_work/the_iucn_red_list/, 2012; Table 1).

BUNDY (1976) categorized the status of each species as resident, migrant or visitor, etc. (see methodology), and we followed this protocol in our study. However, this classification do not reflect the actual status of birds in Mallaha; for instance, some species are mentioned as "accidental visitors", but they were frequently observed as wintering species at the site, examples being the Marbled Duck (*Marmaronetta angustirostris*), the Shelduck (*Tadorna tadorna*) and the Common Gull (*Larus canus*). Furthermore, the Black-winged Stilt (*Himantopus himantopus*) was reported in BUNDY (1976) as a passage visitor, whilst our study found this species to be a resident breeder. Recently, many studies have provided a large amount of information on Libyan birds, including reports of changes, particularly in terms of residency and breeding of some species (GASKELL, 2005; SMART *et al*., 2006). Moreover, ETAYEB & ESSGHAIER (2007) recorded the first breeding of the Caspian tern (*Sterna caspia*) in northwestern part of Libya, whereas it was mentioned in BUNDY (1976) as a winter and passage visitor.

Breeding

This study recorded the breeding of Little Tern (*Sterna albifrons*) (26 nests, 3 live and 3 dead nestlings) and Black-winged Stilt (*Himantopus himantopus*) (18 nests; Table 2) in June 2012. Although there are many studies reporting the breeding of Little Tern at different sites along the coastline of Libya (e.g. HADOUD & ZGOUZI, 1998; ETAYEB & ESSGHAIER, 2007; SHEETA, 2008), this species was reported as breeding sparingly (BUNDY, 1976). Little Terns are listed in the SPA Protocol/UNEP/MAP as a threatened species. Consequently, the status of this species in the region and its breeding in the Mallaha wetland reflect the importance of the site as a good shelter for birds.

Table 2

Number of nests observed for each clutch size of Black-winged Stilt and Little Tern.
Nombre de nids et taille des pontes de l'Echasse blanche et de la Sterne naine.

	Number of nest and clutch size (CS)				Total No.	Total No.
Species	**CS 1**	**CS 2**	**CS 3**	**CS4**	**of eggs**	**of nests**
Himantopus himantopus	12	1	1	4	33	18
Sterna albifrons	6	8	12	-	58	26

The Black-winged Stilt was reported by BUNDY (1976) as a common passage visitor in the Libyan coastal area and is sometimes transient at semi-arid pools. The first record of this species in this country was reported by MEININGER *et al*. (1996) in Cyrenaica, at Ain Zayana (north of Benghazi). GASKELL (2005) observed an incubating individual Black-winged stilt in the same area. The present study provides the first report of the breeding of this species in Tripolitania, at Mallaha (north-east of Tripoli). Moreover, a total of 18 nests with different clutch sizes were observed, as well as two dead nestlings.

Conclusion

Mallaha is the only wetland site within the borders of Tripoli. It is a very sensitive ecosystem that has important characteristics for migratory and resident birds, such as shelter, foraging and nesting areas. The wetland includes fresh and brackish water, streams and a salt-lake, being typical of the type of wetland found in North Africa. The area is an important stopover site for migratory birds during their crossings from the North to the South and back. However, it is worth mentioning that the importance of this site comes from its strategic location, because the nearest stopover points for migratory birds are desert oases (about 800 km away), particularly for waterbirds, and the Nafusa mountains (around 100 km south of Tripoli) for non-waterbird species. Moreover, the presence of some threatened and vulnerable species gives extra importance to the site. Therefore, we strongly recommend conserving and developing Mallaha, and designating it as a Ramsar site.

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Appendix

Recovery of Flamingo rings at Mallaha, Tripoli.
Récupération des bagues de Flamants à Mahalla, Tripoli.

Ring	Date of ringing	Country of ringing	Date of recovery
MLFZ	31.07.2004	ITALY	17.12.2005
MPJB	06.08.2005	ITALY	17.12.2005
WBCD	20.08.2011	ITALY	26.10.2011
WBSJ	20.08.2011	ITALY	26.10.2011
WBVP	20.08.2011	ITALY	26.10.2011
WCHV	20.08.2011	ITALY	26.10.2011
WCKT	20.08.2011	ITALY	26.10.2011
WBLT	20.08.2011	ITALY	26.10.2011
WBLZ	20.08.2011	ITALY	26.10.2011
WCVZ	20.08.2011	ITALY	26.10.2011
JLVV	27.07.2011	FRANCE	26.10.2011
JNBF	27.07.2011	FRANCE	26.10.2011
JNLZ	27.07.2011	FRANCE	26.10.2011
JNSX	27.07.2011	FRANCE	26.10.2011
JNZC	27.07.2011	FRANCE	26.10.2011
JNZP	27.07.2011	FRANCE	26.10.2011
JPPV	27.07.2011	FRANCE	26.10.2011
FNSP	27.07.2005	FRANCE	17.12.2005
JLBD	04.08.2010	FRANCE	26.10.2011
JNCH	27.07.2011	FRANCE	26.10.2011
JPFX	27.07.2011	FRANCE	26.10.2011
JPHJ	27.07.2011	FRANCE	26.10.2011
JAST	06.08.2008	FRANCE	12.02.2009
JBCJ	06.08.2008	FRANCE	12.02.2009
JCDA	06.08.2008	FRANCE	12.02.2009
JCSV	06.08.2008	FRANCE	12.02.2009
X|ATD	01.07.2007	SPAIN	12.02.2009
A|16H	30.07.2011	ALGERIA	26.10.2011
A7|2C	30.07.2011	ALGERIA	26.10.2011
A7|8H	30.07.2011	ALGERIA	26.10.2011
A8|4S	30.07.2011	ALGERIA	26.10.2011
A8|6L	30.07.2011	ALGERIA	26.10.2011
A9|2N	30.07.2011	ALGERIA	26.10.2011
A9|3S	30.07.2011	ALGERIA	26.10.2011
B0|2T	30.07.2011	ALGERIA	26.10.2011
B0|7L	30.07.2011	ALGERIA	26.10.2011
B1|5F	30.07.2011	ALGERIA	26.10.2011
B1|7N	30.07.2011	ALGERIA	26.10.2011

Ring	Date of ringing	Country of ringing	Date of recovery
A6l0Z	30.07.2011	ALGERIA	26.10.2011
A6l4S	30.07.2011	ALGERIA	26.10.2011
A7l6P	30.07.2011	ALGERIA	26.10.2011
A7l6S	30.07.2011	ALGERIA	26.10.2011
A8l7Z	30.07.2011	ALGERIA	26.10.2011
A9l5D	30.07.2011	ALGERIA	26.10.2011
B0l2S	30.07.2011	ALGERIA	26.10.2011
B0l3C	30.07.2011	ALGERIA	26.10.2011
B2l6J	30.07.2011	ALGERIA	26.10.2011
B2l9N	30.07.2011	ALGERIA	26.10.2011
B0l4X	30.07.2011	ALGERIA	26.10.2011
B0l6P	30.07.2011	ALGERIA	26.10.2011
B1l2J	30.07.2011	ALGERIA	26.10.2011
B1l2N	30.07.2011	ALGERIA	26.10.2011
B1l4J	30.07.2011	ALGERIA	26.10.2011
B2l2J	30.07.2011	ALGERIA	26.10.2011

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