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## Avifaunal baseline assessment of Wadi Al-Quff Protected Area and its Vicinity, Hebron, Palestine

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### ABSTRACT

Birds of Wadi Al-Quff protected area (WQPA) were studied during the spring season of 2014. A total of 89 species of birds were recorded. Thirty species were found to breed within the protected area (24 resident and 6 summer breeders), while the others were migratory. Three species of raptors (Long legged Buzzard, Short-toed Eagle and the Hobby) were found to breed within man-made afforested area, nesting on pine and cypress trees. Within the Mediterranean woodland patches, several bird species were found nesting such as Cretzschmar's Bunting, Syrian Woodpecker, Sardinian Warbler and Wren. Thirteen species of migratory soaring birds were recorded passing over WQPA, two of them (Egyptian Vulture and Palled Harrier) are listed by the IUCN as endangered and near threatened, respectively. In addition, several migratory soaring birds were found to use the site as a roosting area, mainly at pine trees.

**Key words:** Birds; Palestine; Endangered species.

### INTRODUCTION

The land of historical Palestine (now Israel, West bank and Gaza) is privileged with a unique location between three continents; Europe, Asia, and Africa, and a diversity of climatic regions (Soto-Berelov *et al.*, 2012). For this reason and despite its small area, a total of 540 species of bird were recorded (Perlman & Meyrav, 2009). In addition, Palestine is at the second most important migratory flyway in the world. Diverse species of resident, summer visitor breeders, winter visitor, passage migrants and accidental visitors were recorded (Shirih, 1996). Each year over 500 million birds migrate through/over Palestine and adjacent countries, from their breeding grounds in Eurasia during the autumn migration season to their wintering ground in Africa, before repeating this journey in reverse during the subsequent spring (Leshem & Yom-Tov, 1996, 1998; Alon *et al.*, 2004). The land of Palestine also serves as an important migration route and wintering ground for more than 250 bird species and a breeding ground for more than 200 resident and summer visitor breeders (Perlman & Meyrav, 2009; Shirih *et al.*, 2000). Other species

are either accidental visitors or went extinct in the last couple of centuries, such as the Ostrich (Shirih, 1996). Despite the rich avifauna of historical Palestine, there is not much information about bird species existing within the West Bank and Gaza (Palestinian Territories) and there is not a complete checklist of the birds of West Bank and Gaza, but the estimated number of birds is about 367 species (Khalilieh, in preparation).

Very little information is known about the birds of the West Bank and Gaza Strip. The most recent publication about the birds of historical Palestine is dated back to 1996 (Shirih, 1996) and most of the information does not focus on the avifauna of the West Bank and Gaza Strip. The objectives of this study are: 1) to conduct the first bird survey for WQPA and to establish a species list, 2) to determine breeding species of WQPA, 3) to show the importance of WQPA to migratory soaring birds, 4) to understand the effect of the man-made coniferous forest on the distribution of the breeding birds.

## METHODS

### Description of the Study Area

Wadi Al-Quff protected area (WQPA) is located in the the Hebron Governorate (31°34'47.19"N and 35° 2'27.40"E) within the Mediterranean climatic region. It is characterized by hills, steep slopes, several wadies and open rocky areas. It includes a man-made coniferous forest, and in some parts patches of natural Mediterranean plantations are found. The habitat of WQPA and its vicinity can be divided into four types: 1) man-made forest (MF) dominated by coniferous trees of *Pinus halepensis* and *Cupressus sempervirens*. 2) Natural plantations (NP), including trees that are emerging as a response to cutting coniferous trees by human or uprooting by extreme weather conditions, or as plant associations where the coniferous trees are in low density and sun can penetrate to the ground. These species include *Quercus calliprinos*, *Pistacia palaestina*, *Pistacia lentiscus*, *Ceratonia siliqua*, *Rhamnus palaestina*, and *Crataegus aronia*. 3) Agriculture areas planted with different kind of orchards (AP) mainly at Wadi Hasaka. 4) Natural open slopes of rocky habitats with scattered trees and rather low vegetation (OS). The area also contains several water sources such as Wadi Hasaka spring, located at the south western part of WQPA (Figure 1).

### Field survey

Field surveys were conducted between mid-January and end of May, 2014. Different methods were used to study bird's diversity; for the bird baseline and breeding bird survey point counts were used according to (Bibby *et al.*, 2000, Gregory *et al.*, 2004), where the distance between points was predefined as 400 m apart. Consequently a total of 54 points were chosen using Google map in order to cover the whole area of WQPA and the different habitats within the protected area and its close vicinity (Figure 1). For the survey

of migratory soaring birds, vantage points were selected at high elevation within the site that provide a clear view of the area and the sky to observe migratory soaring birds that pass through the site and its close vicinity.

Each point count was surveyed for ten minutes preceded by two minutes through which the researcher waited for the birds to settle down and get accustomed to the researcher presence. All heard birds (singing or calling) and/or seen from each point count were recorded. Each point count was surveyed at least three times, once every month, between March and May and the 54 point counts were surveyed in 8 days. The survey was carried out in the early mornings (immediately after sunrise, around 05:30) and was stopped as soon as the weather got too warm and the bird activity was noticed to decline (around 09:00 am). The researcher also recorded bird species while crossing from one point count to another when possible, and any casual or opportunistic observations of birds obtained while walking/driving to the point counts were recorded and added to the list. During the survey, the researcher was equipped with binoculars, telescope, digital camera with telephoto lens, mp3 player and speakers, bird calls, bird field guide, GPS, notebook and data sheet. The researcher recorded the common name of the species, its location, and the bird's status and whenever possible a picture of the recorded birds was taken. Besides that, any observation of roosting migratory soaring birds that were observed during this survey was recorded, including their numbers.

The breeding bird survey was combined with a baseline survey during the spring season and extended to the third week of May. The same 54 point counts and methodology were used. In addition, during the survey, the researcher took additional information of any species that showed signs of breeding such as the typical breeding calls, breeding territorial behavior, birds carrying food or nesting materials, birds feeding chicks, or birds that were found building nests.

After completing the baseline and the breeding bird survey on every day of the survey, the researcher moved to the vantage point (north of the protected area, see Figure 1). The researcher spent the rest of the day until sunset (between 09:30-17:00) at the vantage point to record all soaring migratory species on passage, the total number of birds passing over the study area through the day. In addition, the researcher recorded birds that were roosting in the site overnight, the number of birds that come to roost in the site in the evenings, and the exact roosting locations were recorded when possible. At the vantage point, the researcher was equipped with binoculars, telescope, digital camera with telephoto lens, bird field guide, and notebook and data sheet. The researcher recorded the common name of the species and whenever possible a picture of the recorded birds was taken.



**Figure 1.** Location of point counts (yellow flags) and vantage point for soaring birds (red flag)

## RESULTS

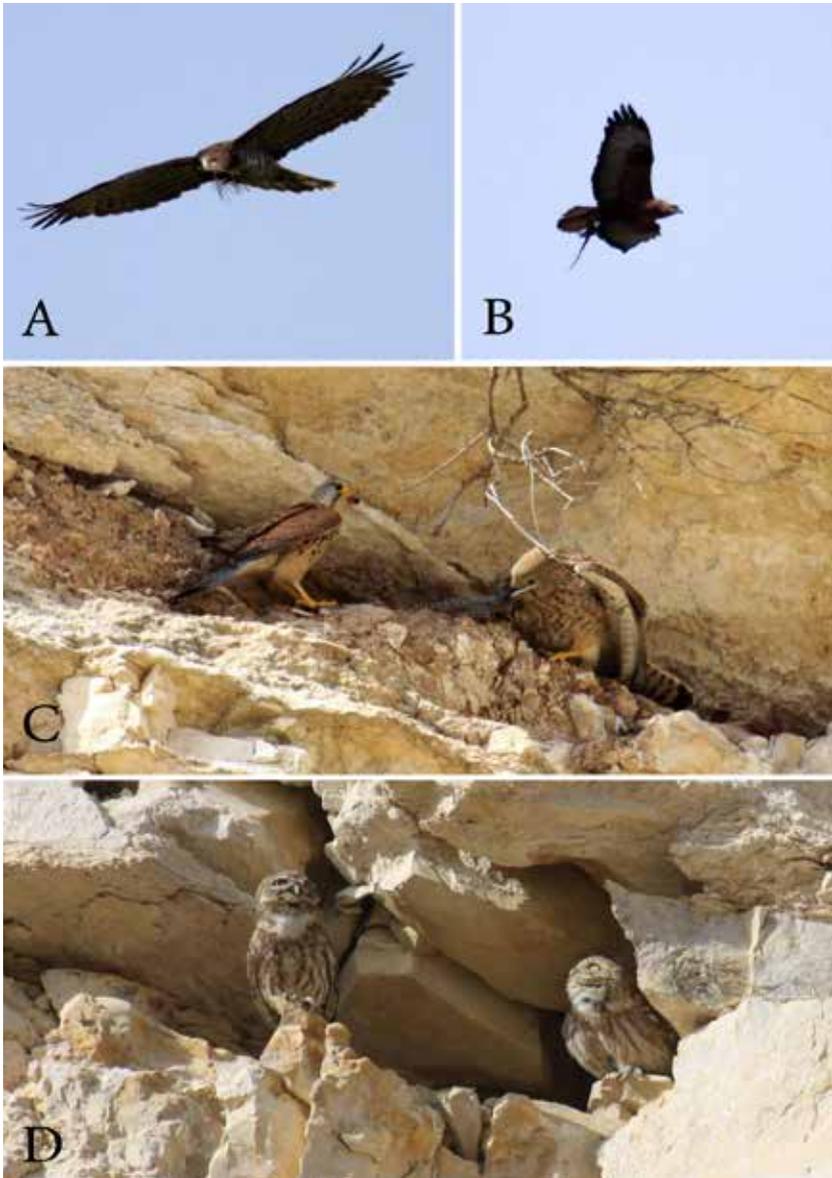
A total of 89 species of birds were recorded during the survey period between mid-January and end of May from WAQPA. This includes breeding birds (resident and summer breeders), passage migrants including migratory soaring birds and winter visitors. The total number of breeding birds at WAQPA and its vicinity is 30 species; twenty four of them are resident breeders while six species are summer visitor breeders (Table 1). Six species were confined to the man-made pine forest which include Jay, Short-toad Snake Eagle (Figure 2A), Eurasian Hobby, Eurasian Sparrowhawk, Long-legged Buzzard (Figure 2B) and Common Kestrel (Figure 2C). Six species were recorded breeding within natural plantations and agricultural orchards which include Spectacled Bulbul, Common Blackbird, Syrian Woodpecker, Sardinian Warbler and Graceful Prinia. Nine breeding species were found to inhabit open slopes of rocky areas and/or creeks, these species include Black-eared Wheatear (Figure 3C), Scrub Warbler, Little Owl (Figure 2D), Crested Lark, Eurasian Eagle Owl, Blue-rock Thrush, Western Jackdaw, Common Cuckoo, and Eurasian Hoopoe. Four breeding species were found in agricultural orchards including Laughing Dove, Winter Wren, Turtle Dove and House Sparrows. The remaining four breeding species-European Greenfinch, Chukar, Great Tit, and Common Linnet-were found to breed in two or more habitats (Table 1).

**Table 1.** Recorded breeding bird species at WQPA.

English Name	Scientific Name	Status *	Habitat **
Short-toed snake Eagle	<i>Circaetus gallicus</i>	PM, SB	MF
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	PM, sb	MF
Hobby	<i>Falco subbuteo</i>	PM, SB	MF
Turtle Dove	<i>Streptopelia turtur</i>	PM, sb	AO
Black-eared Wheatear	<i>Oenanthe hispanica</i>	PM, SB	OS
Long-legged Buzzard	<i>Buteo rufinus</i>	RB	MF
Common Kestrel	<i>Falco tinnunculus</i>	RB	MF
Chukar	<i>Alectoris chukar</i>	RB	MF, NP
Spectacled Bulbul	<i>Pycnonotus xanthopygos</i>	RB	NP, AO
Blackbird	<i>Turdus merula</i>	RB	NP, AO
Graceful Prinia	<i>Prinia gracilis</i>	RB	NP, AO
Scrub Warbler	<i>Scotocerca inquieta</i>	RB	OS
Great Tit	<i>Parus major</i>	RB	NP, AO, MF
Palestine Sunbird	<i>Nectarinia osea</i>	RB	NP, AO
Eurasian Jay	<i>Garrulus glandarius</i>	RB	MF
Eurasian Hoopoe	<i>Upupa epops</i>	RB, pm	OS, NP
Collared Dove	<i>Streptopelia decaocto</i>	RB, RD	MF, AO
Laughing Dove	<i>Streptopelia senegalensis</i>	RB, RD	AO
Little Owl	<i>Athene noctua</i>	RB	OS
Syrian Woodpecker	<i>Dendrocopos syriacus</i>	RB, RD	NP, AO
Crested Lark	<i>Galerida cristata</i>	RB	OS
House Sparrow	<i>Passer domesticus</i>	RB, RD	AO
Eagle Owl	<i>Bubo bubo</i>	Rb?, rd	OS
Sardinian Warbler	<i>Sylvia melanocephala</i>	RB, wv	NP, AO
Eurasian Wren	<i>Troglodytes troglodytes</i>	RB, wv	AO
Blue Rock Thrush	<i>Monticola solitarius</i>	RB, wv	OS
European Greenfinch	<i>Carduelis chloris</i>	RB, wv	MF, AO
Common Linnet	<i>Carduelis cannabina</i>	RB, wv	NP, OS
Western Jackdaw	<i>Corvus monedula</i>	RB,wv	OS
Common Cuckoo	<i>Cuculus canorus</i>	SB, PM	OS

\*Status abbreviation; RB: Resident Breeder, PM: Passage migrant, SB: Summer Breeder, WV: Winter visitor.

\*\*Habitat abbreviation; see description of study site.



**Figure 2.** A. Short-toed Eagle carrying nesting materials. B. Long-legged Buzzard carrying a lizard to feed its chicks. C. A pair of breeding Kestrels at WAQ protected area. The female is feeding on a reptile species. D. A pair of breeding Little Owls standing in front of their nest in a rocky edge at WAQPA (Wadi Hasaka)



**Figure 3.** A. Female Sardinian Warbler foraging at WAQPA. B. Male Sardinian Warbler. C. The Black-eared Wheatear: a summer breeder at WAQ. D. Wren protecting and declaring its breeding territory. E. Cretzschmar's Bunting: a migrant and summer breeder. The bird is collecting nesting materials to build its nest at WAQPA.

The breeding of recorded species was confirmed since the survey was carried out during the breeding season of almost all species of the forested habitat in the Mediterranean climate region. Some resident species were present in high densities, and dominated the bird communities at WAQPA forested area. These included Chukar, Jay, Sardinian Warbler (Figure 3A & B), Blackbird, Spectacled Bulbul, Great Tit and Collared Dove. Other species of lower densities are Laughing Dove (near settlement), Hoopoe, Graceful Prinia, Palestine Sunbird, House Sparrow (near settlement) Syrian Woodpecker, Common Linnet and Greenfinch. WAQ forested area is found to be an important area for some resident birds of prey: we found one nest of Long-legged Buzzard, two nests of Little Owls and two nests of Kestrels. We also recorded the presence of the Eagle Owl during different days of survey within about the same location, which might indicate that this species could be breeding at nearby areas of WQPA while foraging within the protected area. In addition, WQPA is an important breeding area for some summer breeding birds of prey, which includes two pairs of Short-toed snake Eagle and one pair of Eurasian Hobby. Other bird species were found to breed in the area; this includes the Winter Wren (Figure 3D) (5 pairs were found to breed in Wadi Hassaka), Scrub Warbler, Blue Rock Thrush, Crested Lark and Western Jackdaw.

A total of 59 bird species that were recorded at WQPA are not breeding species: 48 of them are considered as an exclusive passage migrant, while the other 11 species have mixed populations of passage migrant and/ or winter visitors (Table 2).

**Table 2.** Non breeding species recorded at WQPA.

English Name	Latin Name	Status
White Stork	<i>Ciconia ciconia</i>	PM
Black Stork	<i>Ciconia nigra</i>	PM
Black Kite	<i>Milvus migrans</i>	PM
Egyptian Vulture	<i>Neophron percnopterus</i>	PM
Marsh Harrier	<i>Circus aeruginosus</i>	PM
Pallid Harrier	<i>Circus macrourus</i>	PM
Levant Sparrowhawk	<i>Accipiter brevipes</i>	PM
Steppe Buzzard	<i>Buteo buteo vulpinus</i>	PM
Lesser Spotted Eagle	<i>Aquila pomarina</i>	PM
Booted Eagle	<i>Hieraaetus pennatus</i>	PM
Common Crane	<i>Grus grus</i>	PM
European Nightjar	<i>Caprimulgus europaeus</i>	PM
Common Swift	<i>Apus apus</i>	PM
Pallid Swift	<i>Apus pallidus</i>	PM

Alpine Swift	<i>Apus melba</i>	M
European Bee-eater	<i>Merops apiaster</i>	PM
Eurasian Wryneck	<i>Jynx torquilla</i>	PM
Barn Swallow	<i>Hirundo rustica</i>	PM
Red-rumped Swallow	<i>Hirundo daurica</i>	PM
Eurasian Crag Martin	<i>Ptyonoprogne rupestris</i>	PM
Common House Martin	<i>Delichon urbica</i>	PM
Tawny Pipit	<i>Anthus campestris</i>	PM
Tree Pipit	<i>Anthus trivialis</i>	PM
Meadow Pipit	<i>Anthus pratensis</i>	PM
Thrush Nightingale	<i>Luscinia luscinia</i>	PM
Common Nightingale	<i>Luscinia megarhynchos</i>	PM
Common Redstart	<i>Phoenicurus phoenicurus</i>	PM
Isabelline Wheatear	<i>Oenanthe isabellina</i>	PM
Northern Wheatear	<i>Oenanthe oenanthe</i>	PM
Rufous-tailed Rock Thrush	<i>Monticola saxatilis</i>	PM
Olivaceous Warbler	<i>Hippolais pallida</i>	PM
Olive-tree Warbler	<i>Hippolais olivetorum</i>	PM
Orphean Warbler	<i>Sylvia hortensis</i>	PM
Barred Warbler	<i>Sylvia nisoria</i>	PM
Lesser Whitethroat	<i>Sylvia curruca</i>	PM
Common Whitethroat	<i>Sylvia communis</i>	PM
Garden Warbler	<i>Sylvia borin</i>	PM
Eastern Bonelli's Warbler	<i>Phylloscopus orientalis</i>	PM
Wood Warbler	<i>Phylloscopus sibilatrix</i>	PM
Willow Warbler	<i>Phylloscopus trochilus</i>	PM
European Pied Flycatcher	<i>Ficedula hypoleuca</i>	PM
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	PM
Red-backed Shrike	<i>Lanius collurio</i>	PM
Woodchat Shrike	<i>Lanius senator</i>	PM
Masked Shrike	<i>Lanius nubicus</i>	PM
Ortolan Bunting	<i>Emberiza hortulana</i>	PM
Cretzschmar's Bunting	<i>Emberiza caesia</i>	PM
Spotted Flycatcher	<i>Muscicapa striata</i>	PM,
Common Stonechat	<i>Saxicola torquatus</i>	PM, vv
Song Thrush	<i>Turdus philomelos</i>	pm, vv
Blackcap	<i>Sylvia atricapilla</i>	PM, vv

Brambling	<i>Fringilla montifringilla</i>	pm, wv
Corn Bunting	<i>Miliaria calandra</i>	PM, WV
Chiffchaff	<i>Phylloscopus collybita</i>	PM, WV
Common Chaffinch	<i>Fringilla coelebs</i>	pm, WV
European Serin	<i>Serinus serinus</i>	pm, WV
White Wagtail	<i>Motacilla alba</i>	wv
European Robin	<i>Erithacus rubecula</i>	WV
Black Redstart	<i>Phoenicurus ochruros</i>	WV

The total number of soaring birds recorded from the vantage point was 571 birds, belonging to 13 species of migratory soaring birds (Table 3). This number is not comparable to other bottleneck sites of soaring birds in Palestine, such as Jericho, where thousands of soaring birds are recorded. In addition, there were three species of migratory soaring birds that used WAQPA for roosting, mainly at pine and cypress trees, these include the Short-toed Snake Eagle, Steppe Buzzard, and Black Kite, with a total number of 17, 47 and 9 birds recorded, respectively. Two species recorded migrating over WAQPA are of global concern (IUCN Redlist): the Egyptian Vulture (Endangered), and the Pallid Harrier (Near Threatened).

**Table 3.** Soaring birds recorded passing over and/or roosting at WAQPA and their numbers.

English Name	Latin Name	Status	Number
White Stork	<i>Ciconia ciconia</i>	PM	40
Black Stork	<i>Ciconia nigra</i>	PM	17
Black Kite	<i>Milvus migrans</i>	PM	43
Egyptian Vulture	<i>Neophron percnopterus</i>	PM	1
Short-toed Eagle	<i>Circaetus gallicus</i>	PM	110
Marsh Harrier	<i>Circus aeruginosus</i>	PM	1
Pallid Harrier	<i>Circus macrourus</i>	PM	1
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	PM	2
Levant Sparrowhawk	<i>Accipiter brevipes</i>	PM	26
Steppe Buzzard	<i>Buteo buteo vulpinus</i>	PM	54
Lesser Spotted Eagle	<i>Aquila pomarina</i>	PM	5
Booted Eagle	<i>Hieraetus pennatus</i>	PM	2
Common Crane	<i>Grus grus</i>	PM	269

## DISCUSSION

The results showed that the distribution of recorded breeding bird species was affected by the man-made coniferous forest and the examined habitat within WQPA. For example, many breeding species were only found within the natural habitat such as the Sardinian Warbler, Wren, Blackbird, Spectacled Bulbul, and they were absent from the man-made coniferous forest. Other species, such as the Jay which is considered as a pest, was found to dominate the coniferous forest. In addition, the Jay was also found to forage within the natural patches and affected the survival of other species that inhabit the natural habitat.

The presence of the Wren was not expected since the distribution of this species is limited to the northern areas where Jerusalem is its southern most breeding site (Shirihai, 1996). The Wren was found in five different locations within Wadi Hasaka, and was recorded three times within the natural plantation of the Mediterranean shrub land during March. This indicates that the Wren breeds at Wadi Hasaka and disperses during the winter season to the natural habitats of the forest.

The Sardinian Warbler, Great Tit, Blackbird and the Spectacled Bulbul were found to be common breeders at WQPA, mainly within the natural habitat of the forest and near orchards. The Chuckar was also one of the most common resident birds all over WQPA and its vicinity. Other species have their breeding territories restricted to the open rocky habitat with low vegetation such as Scrub Warbler, Black-eared Wheatear and Crested lark. Other species such as Cretzschmar's Bunting (Figure 3E), Common Linnets and Common Cuckoo were found to breed in open habitat with rocky slopes and scattered trees with low vegetation, in Wadi margins with sparse vegetation and shrubs. Two pairs of Syrian woodpecker were found to breed in fields with mixed groves of trees (natural and Orchards).

The results of the recorded migratory soaring birds, during the spring migration season, indicates that WAQ protected area is not an important migratory route for soaring birds during spring migration season as they are not passing through the area in large numbers. However, the site is important roosting area for some of these species such as the Short-toed Eagle, Steppe Buzzard and the Black Kite: several of these species were found roosting overnight at several locations within WAQ. It is worth mentioning that two important species of soaring birds were recorded passing over the site which are the Egyptian Vulture (Endangered) and Pallid Harrier (Near Threatened). Nevertheless, the survey of the migratory soaring birds has been done on one migration season (spring season) while it must be done, at least, during two seasons (Spring and autumn) in order to indicate if the site is an important migration route for the soaring birds. This is because the soaring birds use different migration route during each migration

season while crossing the Levant (Leshem *et al.*, 1996). So, it might be that the site has significant importance for the soaring birds during the autumn migration season.

We believe that the number of species using the protected area throughout the year will exceed the recorded number of migratory species. Further research is needed to be carried out during the autumn and winter migration season in order to record all bird species that inhabit WQPA all year round.

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