

# Checklist of the Birds of the Gaza Strip —Palestine

Abdel Fattah N. Abd Rabou<sup>1\*</sup>, Bashar S. Jarayseh<sup>2</sup>, Lara M. Sirdah<sup>3</sup>, Mandy M. Sirdah<sup>3</sup>, Sinaa A. Ababsa<sup>4</sup>, Daoud I. Al-Hali<sup>5</sup>, Ayman W. Dardona<sup>6</sup>, Ashraf A. Shafei<sup>1</sup>, Nedal A. Fayyad<sup>1</sup>, Abdallah S. Awad<sup>7</sup>, Wael I. Almeshal<sup>8</sup>, Samer S. Abuzerr<sup>9</sup>, Inas A. Abd Rabou<sup>10</sup>, Othman A. Abd Rabou<sup>11</sup>, Mohammed A. Abd Rabou<sup>12</sup>, Sabah A. Abu Sharekh<sup>13</sup>, Mohammed R. Al-Agha<sup>14</sup>, Maged M. Yassin<sup>15</sup>, Abed Al Qader I. Hammad<sup>16</sup>, Norman A. Khalaf<sup>17</sup>, Walid F. Mohamed<sup>18</sup>

<sup>1</sup>Department of Biology, Faculty of Science, Islamic University of Gaza, Gaza Strip, Palestine

<sup>2</sup>Environmental Education Center, Beit Jala, West Bank, Palestine

<sup>3</sup>Wildlife Documenter and Photographer, Gaza Strip, Palestine

<sup>4</sup>Wildlife Documenter and Photographer, Kafr Kanna, Galilee, Palestine

<sup>5</sup>Qimmah Secondary School, Jerusalem (Al-Quds), Palestine

<sup>6</sup>Environment Quality Authority, Gaza Strip, Palestine

<sup>7</sup>Center for Desert Agriculture, King Abdullah University of Science and Technology, Thuwal, Kingdom of Saudi Arabia

<sup>8</sup>Doctoral School of Environmental Sciences, Eötvös Loránd University, Budapest, Hungary

<sup>9</sup>Department of Medical Sciences, University College of Science & Technology, Gaza Strip, Palestine

<sup>10</sup>Department of Nursing and Health Sciences, University College of Applied Sciences, Gaza Strip, Palestine

<sup>11</sup>Department of Journalism and Media, Islamic University of Gaza, Gaza Strip, Palestine

<sup>12</sup>Department of GIS, University College of Applied Sciences, Gaza Strip, Palestine

<sup>13</sup>Department of School Health, Ministry of Education and Higher Education, Gaza Strip, Palestine

<sup>14</sup>Department of Environment and Earth Sciences, Faculty of Science, Islamic University of Gaza, Gaza, Palestine

<sup>15</sup>Faculty of Medicine, Islamic University of Gaza, Gaza Strip, Palestine

<sup>16</sup>Department of Geography, Al-Aqsa University, Gaza Strip, Palestine

<sup>17</sup>Department of Environmental Research and Media, National Research Center, Palestine

<sup>18</sup>Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University, Roxy, Cairo, Egypt

Email: \*arabou@iugaza.edu.ps

**How to cite this paper:** Abd Rabou, A.N., Jarayseh, B.S., Sirdah, L.M., Sirdah, M.M., Ababsa, S.A., Al-Hali, D.I., Dardona, A.W., Shafei, A.A., Fayyad, N.A., Awad, A.S., Almeshal, W.I., Abuzerr, S.S., Abd Rabou, I.A., Abd Rabou, O.A., Abd Rabou, M.A., Abu Sharekh, S.A., Al-Agha, M.R., Yassin, M.M., Hammad, A.A.Q.I., Khalaf, N.A. and Mohamed, W.F. (2023) Checklist of the Birds of the Gaza Strip—Palestine. *Open Journal of Ecology*, 13, 155-182.

<https://doi.org/10.4236/oje.2023.133011>

---

## Abstract

Bird fauna checklists are important tools in ecology, biology, and conservation planning for scientists, stakeholders, and decision-makers. Despite its small area, the Gaza Strip (365 km<sup>2</sup>) has a relatively large variety of resident and migratory bird fauna. Therefore, the current study aimed to provide an updated checklist of all bird fauna living in or inhabiting the Gaza Strip. Direct field observations using binoculars, continuous visits to zoos, pet stores and biology museums, discussion with bird hunters, follow-up of news and social networking sites, review of scientific publications and photography were the main tools to satisfy the purpose of the study. At least 250 bird spe-

**Received:** January 26, 2023

**Accepted:** March 25, 2023

**Published:** March 28, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

cies collected from different sources occur in the Gaza Strip and are included in the checklist. This list will not be static, but is inevitably subject to additions and changes in the face of times. The current 250 bird species of the Gaza Strip represent 45.4% of the 551 species of birds living in Palestine. The bird species were found to belong to 21 orders and 61 families. The Passeriformes (passerines) represented the largest order with 96 species of birds (38.4%), followed by the Charadriiformes 54 (21.6%), the Accipitriformes 18 (7.2%), Anseriformes 17 (6.8%) and Pelecaniformes 14 (5.6%), while the other orders represented the remaining percentage (20.4%). With regard to families, the Scolopacidae represented the largest family with 22 species of birds (8.8%), followed by the Anatidae and Accipitridae 17 for each (6.8%), the Muscicapidae 16 (6.4%) and Chariidridae and Fringillidae 11 for each (4.4%), while the other families represented the remaining percentage (62.4%). According to the IUCN regional threat categories, 226 species (90.4%) were Least Concern (LC), 12 (4.8%) were Near Threatened (NT), 6 (2.4%) were Vulnerable (VU), 4 (1.6%) were Endangered (EN) and 2 (0.8%) were Critically Endangered (CR). In conclusion, the study recommends a sustainable control of bird hunting and trafficking in addition to building prestigious centers and museums for studying and documenting birds in the Gaza Strip.

## Keywords

Bird Fauna, Checklist, Bird Hunting, Conservation, IUCN Categories, Gaza Strip

## 1. Introduction

Birds represent the outstanding diversity of vertebrates in the world because they are spread over all the continents and almost no ecosystem is devoid of them [1] [2]. Despite the small area of Palestine (27,000 km<sup>2</sup>), it is home to nearly 551 bird fauna species inhabiting all kinds of terrestrial and aquatic ecosystems [3] [4]. No doubt that the strategic geographic position of Palestine between the three continents: Asia, Africa and Europe contribute much to this amazing diversity of bird fauna. The main migration routes, represented by the coast, the coastal plain, the mountains of Palestine and the Jordan River, play a major role in increasing the numbers of bird species in Palestine [5]. The Gaza Strip, which covers an area of 365 km<sup>2</sup> (about 1.5% of the total area of Palestine), is located on the southernmost coast of Palestine along the Mediterranean Sea. Terrestrial and aquatic ecosystems of the Gaza Strip offer different values to bird fauna including mating, nesting, resting, perching, mimicry, protection, and feeding sites [6]-[10]. Despite the growing studies carried out, the number of bird species that occur in the Gaza Strip is unclear with new records being added each period of time.

At present, the birds of the Gaza Strip are exposed to intense hunting. Different classes of bird species are usually trapped or hunted for different purposes including meat, pet raising, trade, and game and sometimes for no apparent

reason. Each autumn, many Gazans set up nets along the Mediterranean coast in order to catch the migratory Common Quail (*Coturnix coturnix*) [5] [9] [10] [11] [12]. In fact, there are no red lines for hunting wild birds in the Gaza Strip. Nets, traps, and guns await each bird, posing a threat to the populations of many residents and migratory birds alike. In the Palestinian Territories, several studies have recorded a relatively high proportion of bird fauna, with most of them found in Wadi Gaza Nature Reserve and other similar environments [4] [7] [8] [9] [10] [13]-[23]. Some species of birds were also found mummified and preserved in animal exhibitions and museums in the biology departments of Gaza universities [16] [24]. Recently, Awad *et al.* [25] revealed the presence of 393 wild bird species in Palestine (West Bank, Jerusalem and Gaza Strip) after updating a checklist of 373 bird species issued in 2015 [26].

Apart from bird surveys, there have been many studies that dealt with the occurrence, ecology, biology, reproductive biology and hunting of certain species of birds in the Gaza Strip. According to literature reviews, the birds studied individually in the Gaza Strip were the Common Quail (*Coturnix coturnix*) [11], Rose-ringed Parakeet (*Psittacula krameri*) [27], Indian Myna (*Acridotheres tristis*) [28], Chukar Partridge (*Alectoris chukar*) [29], Goldfinch (*Carduelis carduelis*) [30], Spur-winged Plover or Lapwing (*Vanellus spinosus*) [31], Chukar Partridge (*Alectoris chukar*) [32], Crested Lark (*Galerida cristata*) [33], Syrian Woodpecker (*Dendrocopos syriacus*) [34] and Barn Swallow (*Hirundo rustica*) [35]. In his Ph.D., Abu Taleb [36] studied the breeding biology of five bird species in the Gaza Strip. They are the Common Kestrel (*Falco tinnunculus*), Olivaceous Warbler (*Iduna pallida*), Sardinian Warbler (*Sylvia melanocephala*), European Greenfinch (*Carduelis chloris*) and European Goldfinch (*Carduelis carduelis*).

A bird checklist is a list of all the different bird species that occur in a particular area. The number of species on the checklist depends on the area covered by that checklist. A small city or governorate may have a checklist of 100 - 200 species of birds as indicated by some studies conducted many years ago in the Gaza Strip, while a country or a natural area that is an important site for birds may contain several hundreds of different bird species. Palestine, for example, as a country includes in its various ecosystems 551 species of birds as previously mentioned by Perlman and Meyrav [3] and Meiri *et al.* [4]. There are many forms of bird checklist. More detailed checklists often include information about each species. For example, birds can be classified according to their local status as resident, breeding, migratory, winter resident, accidental, etc. Bird checklists can be used by hobbyists, new bird watchers (birders), students, scientists, institutions, and more. In Palestine, the importance of bird checklist lies in documenting all the birds that have occurred so far in certain areas or ecosystems for the purpose of serving scientists, researchers and decision-makers to identify bird species and develop appropriate strategies to protect and conserve them in a sustainable manner. In fact, one of the most comprehensive studies conducted in the region is that of Meiri *et al.* [4] who provided an updated list of all land vertebrates living in Israel. They identified 786 species of vertebrates, of which 551

are birds, 130 are mammals, 97 are reptiles, and eight are amphibians. Based on the foregoing, the current study aims to prepare an up-to-date checklist of birds found in the Gaza Strip—Palestine.

## 2. Materials and Methods

### 2.1. Gaza Strip

The Gaza Strip (365 km<sup>2</sup>) is a coastal area located in the southern part of the Palestinian coast along the eastern shore of the Mediterranean Basin (Figure 1). It is bordered by the Palestinian territories occupied by Israel in 1948 to the north and east, Egypt to the south, and the Mediterranean Sea to the west. The Gaza Strip consists of five governorates: North Gaza, Gaza, Middle, Khan Yunis and Rafah. The population of the Gaza Strip is about 2.3 million people, most of whom are refugees from the Nakba in 1948. The population density is about 6000 people per square kilometer, making the Gaza Strip one of the most densely populated areas in the world. The Gaza Strip is characterized by its semi-arid Mediterranean climate, hot in summer and cold in winter. Average temperatures in the Gaza Strip range between 25°C in summer and 13°C in winter. The average annual precipitation is 300 mm. Daily relative humidity fluctuates between 65% and 85% in summer and between 60% and 80% in winter. Sand dunes are the main feature of the western part of the Gaza Strip, while silt and clay lands predominate in the eastern part [5] [12].

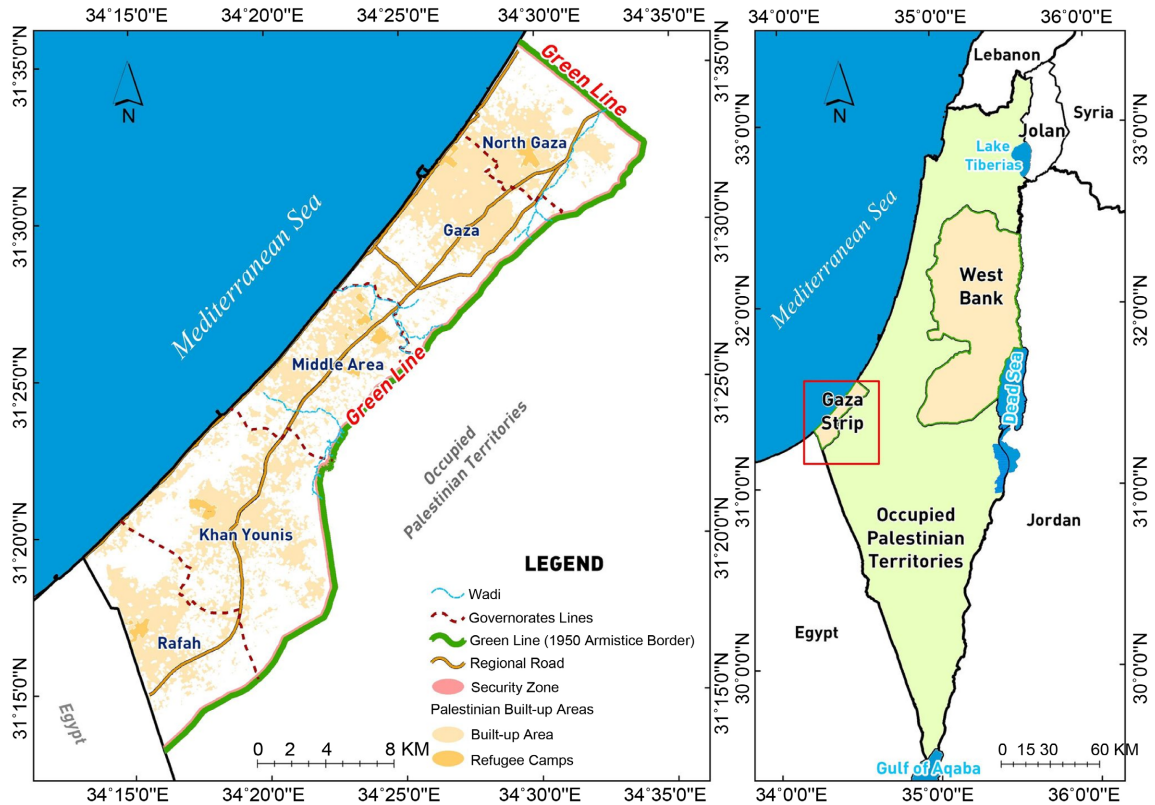


Figure 1. Map of the Gaza Strip—Palestine.

## 2.2. Procedure

The current study, which lasted 20 years (2003-2022), was based on various procedures as follows:

1) **Field bird observations and monitoring:** Continuous direct observations and monitoring of birds have been carried out in the various ecosystems and habitats of the Gaza Strip since 2003 until now (**Figure 2** and **Figure 3**). Professional binoculars were used to observe and identify birds. A number of local, regional and international bird guides have been used in the bird species identification process [37]-[48].

2) **Frequent visits to places of conservation of birds:** The researchers used to visit zoos throughout the Gaza Strip to study the content of wild birds that



**Figure 2.** An ecological tour for bird watching and documentation in the coastal Al-Mawasi ecosystem in the southern Gaza Strip in 2017.



**Figure 3.** An ecological tour for bird watching and documentation in Wadi Gaza nature reserve in the middle of the Gaza Strip in 2014.

are being hunted and kept there. They also held frequent visits to animal markets, pet stores and some animal exhibitions held in the Gaza Strip in order to document their content of wild birds. The researchers also used to visit the laboratories of biology departments in Palestinian universities to document the stuffed birds displayed there (**Figure 4**).

**3) Contributions of bird hunters:** The Gaza Strip is teeming with dozens, if not hundreds, of bird hunters who use hunting birds and wildlife as a hobby, a profession, or a source of livelihood for their families. Many bird species that have not been recorded before are hunted and thus some bird hunters contribute to the knowledge and inclusion of bird species for the current list. At the conclusion of writing this article and just before it was sent for publication, a Gazan bird hunter brought a bird he had caught and asked for its name. After review and investigation, it was found that the bird is being hunted and documented for the first time in the Gaza Strip. It is the Eurasian Woodcock (*Scolopax rusticola*) (**Figure 5**) and there are no similar species to it in Palestine. Immediately, the bird was included in the checklist for birds of the Gaza Strip.



**Figure 4.** A stuffed specimen of the Common Quail (*Coturnix coturnix*) at the Biology Museum of Al-Azhar University, Gaza Strip in 2012.



**Figure 5.** Immediately after it was caught (November 28, 2022) for the first time in the Gaza Strip, the Eurasian Woodcock (*Scolopax rusticola*) was brought to the biology laboratories of the Islamic University of Gaza and was promptly included in the checklist for the birds of the Gaza Strip.

**4) Continuous follow-up of news and social networking sites:** Over the past years and decades, the researchers have followed the social networking pages of the famous and well-known pet bird shops in the Gaza Strip, which display wild birds that are caught and offered for sale there. The researchers also used to visit social networking sites launched by some Palestinian wildlife monitoring professionals and amateurs with the aim of introducing their community to Palestinian biodiversity, especially wild birds, and displaying professional photos and videos taken by amateurs.

**5) Review of scientific publications:** All scientific reports and publications dealing with birds in the ecosystems of the Gaza Strip have been carefully reviewed and examined, as the actual writing of most of these literatures began in the 2000s.

**6) Photography:** A wide range of photographs was taken for documentary and confirmatory purposes by the researchers themselves and their professional colleagues who also used to watch and observe birds in the Palestinian Territories.

**7) Statistical analysis:** Statistical data were analyzed using SPSS (Statistical Package for the Social Sciences, Chicago, Illinois). The graphs were drawn using Microsoft Excel 2010.

### 3. Results

According to the current data, there are at least 250 species of bird fauna in the Gaza Strip (**Table 1**). The list of species was compiled based on field observations, modest museums and animal exhibitions in Gazan universities, pet shops and animal markets, in addition to the publications mentioned earlier in the study. Of course, this number will not be constant; it will be modified according to new developments in bird watching and the registration of new species. This number of birds (250) represents 45.4% of the 551 species of birds living in historic Palestine according to the figures indicated by Meiri *et al.* [4]. The 250 bird species belong to 21 orders and 61 families. The Passeriformes (passerines) represented the largest order with 96 species of birds (38.4%), followed by the Charadriiformes 54 (21.6%), Accipitriformes 18 (7.2%), Anseriformes 17 (6.8%), Pelecaniformes 14 (5.6%), while the other orders represented the remaining percentage (20.4%) as seen in **Figure 6**. As far as the birds' families are concerned, The Scolopacidae represented the largest family with 22 species of birds (8.8%), followed by the Anatidae and Accipitridae 17 for each (6.8%), Muscicapidae 16 (6.4%), Charadriidae and Fringillidae 11 for each (4.4%), while the other families represented the remaining percentage (62.4%) as seen in **Figure 7**.

According to the International Union for Conservation of Nature and Natural Resources (IUCN) regional threat categories, the proportion of the 250 bird species inhabiting the Gaza Strip was as follows (**Table 1** and **Figure 8**):

1) 226 species (90.4%) are of Least Concern (LC), which means that the species are unlikely to become endangered or extinct in the near future.

**Table 1.** Checklist of the extant birds of the Gaza Strip—Palestine.

Family	Scientific/Latin Name	Common Name	Arabic/Local Name	Global Status
<b>Podicipediformes</b> رتبة الغطاسيات				
Podicipedidae الغطاسيات	<i>Tachybaptus ruficollis</i>	Little Grebe or Dabchick	الغطاس الصغير	LC
	<i>Podiceps cristatus</i>	Great Crested Grebe	الغطاس المتوج الكبير	LC
	<i>Podiceps nigricollis</i>	Black-necked Grebe	الغطاس أسود العنق	LC
<b>Pelecaniformes</b> رتبة البجعيات				
Phalacrocoracidae الغرابية البحرية - الغواوة	<i>Phalacrocorax carbo</i>	Great Cormorant	غراب البحر - غاق الماء	LC
Threskiornithidae أبو المنجليات	<i>Plegadis falcinellus</i>	Glossy Ibis	أبو منجل اللماع	LC
	<i>Platalea leucorodia</i>	Spoonbill	أبو ملعقة	LC
Pelecanidae البجعية	<i>Pelecanus onocrotalus</i>	Great White Pelican	البجع الأبيض الكبير	LC
Ardeidae البلشونية	<i>Bubulcus ibis</i>	Cattle Egret	أبو قردان (بلشون الماشية أو القطعان)	LC
	<i>Ixobrychus minutus</i>	Common Little Bittern	الواق الصغير	LC
	<i>Botaurus stellaris</i>	Great Bittern	الواق الكبير	LC
	<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	غراب الليل	LC
	<i>Ardeola ralloides</i>	Squacco Heron	البلشون الذهبي	LC
	<i>Egretta garzetta</i>	Little Egret	البلشون الأبيض الصغير	LC
	<i>Butorides striata</i>	Striated Heron	البلشون المخطط	LC
	<i>Ardea alba</i>	Great White Egret	البلشون الأبيض الكبير	LC
	<i>Ardea cinerea</i>	Grey Heron	البلشون الرمادي	LC
	<i>Ardea purpurea</i>	Purple Heron	البلشون الأورجواني	LC
<b>Ciconiiformes</b> رتبة اللقلقيات				
Ciconiidae اللققية	<i>Ciconia ciconia</i>	White Stork	اللقلق الأبيض	LC
<b>Phoenicopteriformes</b> رتبة النحاميات				
Phenicopteridae النحامية	<i>Phoenicopus roseus</i>	Greater Flamingo	النحام الكبير (الفلامينجو)	LC
<b>Anseriformes</b> رتبة الإوزيات				
Anatidae البطية	<i>Alopochen aegyptiaca</i>	Egyptian Goose	الأوز المصري	LC
	<i>Anser albifrons</i>	Greater White-fronted Goose	الأوزة الغراء	LC
	<i>Anas platyrhynchos</i>	Mallard	البط الخضيري	LC
	<i>Anas crecca</i>	Common Teal or Eurasian Green-winged Teal	بط الحذف الشتوي	LC
	<i>Anas or Spatula querquedula</i>	Garganey	بط الحذف الصيفي	LC
	<i>Anas or Spatula clypeata</i>	Northern Shoveler	بط أبي مجرفة الشمالي	LC
	<i>Anas strepera</i>	Gadwall	البط السماري	LC
	<i>Anas acuta</i>	Northern Pintail	البلبول الشمالي	LC
	<i>Tadorna ferruginea</i>	Ruddy Shelduck	بط الشهرمان الأحمر (بط أبو فروة)	LC



## Continued

<i>Tadorna tadorna</i>	Common Shelduck	بط الشهرمان المألوف	LC
<i>Mareca penelope</i>	European Wigeon or Widgeon	البط الصافر - البط الصواي	LC
<i>Marmaronetta angustirostris</i>	Marbled Teal or Duck	الشرشير المخطط	VU
<i>Aythya ferina</i>	Common Pochard	البط الغواص أحمر التاج - البط الحمر اوي	VU
<i>Aythya nyroca</i>	Ferruginous Duck or White-eyed Pochard	البط الكستنائي أو الحديدي أبيض العين	NT
<i>Aythya fuligula</i>	Tufted Duck or Tufted Pochard	الحذف المقنزع أو البط الزرقاي	LC
<i>Mergus serrator</i>	Red-breasted Merganser	البطة الغواصة حمراء الصدر	LC
<i>Oxyura leucocephala</i>	White-headed Duck	البط ذو الرأس الأبيض	EN

رتبة الجوارح العابرة **Accipitriformes**

<i>Milvus migrans</i>	Black Kite	الحدأة السوداء	LC
<i>Elanus caeruleus</i>	Black-winged Kite	الحدأة سوداء الجناح	LC
<i>Buteo buteo</i>	Common Buzzard	حوام السهول (سقاوة أوراسية)	LC
<i>Buteo rufinus</i>	Long-legged Buzzard	الحوام طويل الساقين (سقاوة طويلة الساقين)	LC
<i>Accipiter nisus</i>	Eurasian or Northern Sparrowhawk	الباشق الأوراسي أو الشمالي	LC
<i>Accipiter brevipes</i>	Levant Sparrowhawk	الباشق الشامي	LC
<i>Circus aeruginosus</i>	Marsh Harrier	مرزة البطائح	LC
<i>Circus cyaneus</i>	Hen Harrier	مرزة الدجاج	LC
<i>Circaetus gallicus</i>	Short-toed Snake Eagle	عقاب الحيات أو الثعابين	LC
<i>Aquila heliaca</i>	Imperial Eagle	العقاب الملكي	VU
<i>Aquila nipalensis</i>	Steppe Eagle	عقاب السهول	EN
<i>Aquila pennata</i>	Booted Eagle	عقاب بوتيد - عقاب مسيرة صغرى	LC
<i>Aquila fasciata</i>	Bonelli's Eagle	عقاب مسيرة كبرى	LC
<i>Aquila chrysaetos</i>	Golden Eagle	العقاب الذهبي - اللماعة	LC
<i>Pernis apivorus</i>	European Honey Buzzard or Common Pern	حوام النحل الأوروبي - حوام العسل	LC
<i>Neophron percnopterus</i>	Egyptian Vulture	الرخمة المصرية - العقاب المصري	EN
<i>Gyps fulvus</i>	Griffon Vulture	النسر الأسمر - نسر جريفون - النسر الأكلاف	LC

Pandionidae  
العقابية النسارية

<i>Pandion haliaetus</i>	Osprey or Sea Hawk or Fish Hawk	الشماط - العقاب النساري	LC
--------------------------	---------------------------------	-------------------------	----

رتبة الصقريات **Falconiformes**

<i>Falco tinnunculus</i>	Common Kestrel	العوسق (صقر الجراد - صقر الشرياص)	LC
<i>Falco naummani</i>	Lesser Kestrel	العويسق	LC
<i>Falco subbuteo</i>	Eurasian Hobby	الكونج (الشويهين)	LC

## Continued

	<i>Falco peregrinus</i>	Peregrine Falcon	الشاهين (الصقر الجوال – صقر النياز - صقر البيط)	LC
	<i>Falco concolor</i>	Sooty Falcon	الصقر الأسخم أو صقر الغروب	VU
	<i>Falco cherrug</i>	Saker Falcon	الصقر الحر – صقر الغزال	EN
	<i>Falco vespertinus</i>	Red-footed Falcon	صقر أحمر القدمين	NT
<b>Galliformes</b> رتبة الدجاجيات				
Phasianidae الدجاج (الحجول والتدارج)	<i>Alectoris chukar</i>	Chukar	الشنار	LC
	<i>Ammoperdix heyi</i>	Sand Partridge	الحجل الرملي	LC
	<i>Coturnix coturnix</i>	Common Quail	الفر (السلوى / السمان الشائع)	LC
Rallidae دجاجيات الماء (التفافية)	<i>Porzana porzana</i>	Spotted Crake	المرعة المرقطة	LC
	<i>Zapornia parva</i>	Little Crake	المرعة الصغيرة	LC
	<i>Zapornia pusilla</i>	Baillon's Crake	المرعة البيلونية	LC
	<i>Crex crex</i>	Corncrake (Landrail)	مرعة الغيط	LC
	<i>Rallus aquaticus</i>	Water Rail	مرعة الماء	LC
	<i>Gallinula chloropus</i>	Common Moorhen	دجاجة الماء	LC
	<i>Porphyrio porphyrio</i>	Purple Gallinule (purple Swamp-hen)	الفرخة السلطانية	LC
	<i>Fulica atra</i>	Common Coot	الغرة	LC
<b>Gruiformes</b> رتبة الكركيات				
Gruidae الكركية	<i>Grus grus</i>	Common Crane	الكركي	LC
<b>Otidiformes</b> رتبة الحباري				
Otididae الحباريات	<i>Tetrax tetrax</i>	Little Bustard	الحباري الصغير	NT
	<i>Chlamydotis undulata</i>	Houbara Bustard (African Houbara)	الحباري	VU
<b>Charadriiformes</b> رتبة الزقراقيات				
Haematopodidae صانداوات المحار	<i>Haematopus ostralegus</i>	Oystercatcher or Common Pied Oystercatcher (Carrot Bill)	أكل المحار (أبو جزرة)	NT
Recurvirostridae النكاتية	<i>Himantopus himantopus</i>	Black-winged Stilt	أبو المغازل (كرسوع)	LC
	<i>Recurvirostra avosetta</i>	Pied Avocet	النكات الأبقع	LC
Burhinidae الكروانية	<i>Burhinus oediconemus</i>	Stone Curlew (Eurasian thick-knee)	الكروان الصحراوي	LC
Glareolidae اليسرية أو الحصاوية	<i>Glareola pratincola</i>	Collared Pratincole	أبو اليسر المطوق	LC
	<i>Glareola nordmanni</i>	Black-winged Pratincole	أبو اليسر أسود الجناح	NT
	<i>Cursorius cursor</i>	Cream-colored Courser	الدراج أو الكروان العسلي الجليل	LC
Charadriidae القطاطية	<i>Vanellus spinosus</i>	Spur-winged Plover (Spur-winged Lapwing)	الزقراق شوكي الجناح (القطا)	LC
	<i>Vanellus vanellus</i>	Northern Lapwing or Green Plover	الزقراق الأخضر أو أبوطيط ذو العرف	NT

## Continued

	<i>Vanellus leucurus</i>	White-tailed Lapwing or Plover	الزقراق أبيض الذيل أو القطقاط الأعوك	LC
	<i>Vanellus gregarius</i>	Sociable Lapwing or Plover	الزقراق أو القطقاط الاجتماعي	CR
	<i>Pluvialis squatarola</i>	Grey Plover or Black-bellied Plover	الزقراق الرمادي	LC
	<i>Pluvialis apricaria</i>	European Golden Plover	الزقراق أو القطقاط الذهبي	LC
	<i>Charadrius alexandrinus</i>	Kentish Plover	الزقراق أو القطقاط الإسكندراني	LC
	<i>Charadrius leschenaultii</i>	Greater Sand Plover	زقراق أو قطقاط الرمل الكبير	LC
	<i>Charadrius hiaticula</i>	Common Ringed Plover	المطوق الزقراق	LC
	<i>Charadrius pecuarius</i>	Kittlitz's Plover	الراعي الزقراق	LC
	<i>Charadrius dubius</i>	Little Ringed Plover	الزقراق المطوق الصغير	LC
	<i>Calidris alba</i>	Sanderling	الذريجة البيضاء	LC
	<i>Calidris minuta</i>	Little Stint	الذريجة الصغيرة	LC
	<i>Calidris temminckii</i>	Temminck's Stint	الذريجة التمنكية	LC
	<i>Calidris alpina</i>	Dunlin	الذريجة الألبية	LC
	<i>Calidris ferruginea</i>	Curlew Sandpiper	الذريجة الكروانية	NT
	<i>Calidris pugnax</i>	Ruff	الحجولة	LC
	<i>Limosa limosa</i>	Black-tailed Godwit	البوقية السلطانية سوداء الذيل	NT
	<i>Gallinago gallinago</i>	Common Snipe	الشنقب / الجهلول	LC
	<i>Lymnocyptes minimus</i>	Jack Snipe	الشنقب الصغير	LC
	<i>Scolopax rusticola</i>	Eurasian Woodcock	دجاجة الأرض - ديك الغاب	LC
	<i>Arenaria interpres</i>	Ruddy Turnstone	قنبرة الماء	LC
Scolopacidae الطياطي	<i>Numenius arquata</i>	Eurasian or Common Curlew	كروان الماء	NT
	<i>Numenius phaeopus</i>	Whimbrel	كروان الماء الصغير	LC
	<i>Tringa erythropus</i>	Spotted redshank	الطيوطي أحمر الساق الأرقط	LC
	<i>Tringa totanus</i>	Common Redshank	الطيوطي أحمر الساق الشائع	LC
	<i>Tringa nebularia</i>	Common Greenshank	الطيوطي أخضر الساق الشائع	LC
	<i>Tringa glareola</i>	Wood Sandpiper	طيوطي الغيط	LC
	<i>Tringa stagnatilis</i>	Marsh Sandpiper	زمار رمل البطائح	LC
	<i>Tringa ochropus</i>	Green Sandpiper	زمار الرمل الأخضر	LC
	<i>Xenus cinereus</i>	Terek Sandpiper	الطيوطي النكات	LC
	<i>Actitis hypoleucos</i>	Common Sandpiper	زمار الرمل الشائع	LC
	<i>Phalaropus lobatus</i>	Red-necked or Northern Phalarope	المخطاف أحمر الرقبة	LC
Stercorariidae الاستركوراريدية أو السكو	<i>Stercorarius pomarinus</i>	Pomarine Skua or Jaeger	الكركر البوماريني	LC
Laridae النورسية	<i>Chroicocephalus ridibundus</i>	Black-headed Gull	النورس أسود الرأس	LC
	<i>Larus fuscus</i>	Lesser Black-backed Gull	النورس أسود الظهر الصغير	LC

## Continued

	<i>Larus cachinnas</i>	Yellow-legged Gull	النورس أصفر القدم (النورس الفضي)	LC
	<i>Larus minutus</i>	Little Gull	النورس الصغير	LC
	<i>Larus armenicus</i>	Armenian Gull	النورس الأرمني	NT
	<i>Ichthyaetus melanocephalus</i>	Mediterranean Gull	نورس البحر المتوسط	LC
	<i>Chroicocephalus genei</i>	Slender-billed Gull	النورس رفيع المنقار	LC
Sternidae الخرشن	<i>Thalasseus sandvicensis</i>	Sandwich Tern	خطاف البحر الساندوتشي (خرشنا ساندوتشية)	LC
	<i>Gelochelidon nilotica</i>	Gull-billed Tern	النيلية أو النورسية الخرشفة	LC
	<i>Chlidonias leucopterus</i>	White-winged Tern	خطاف البحر أبيض الجناح	LC
	<i>Chlidonias hybridus</i>	Whiskered Tern	خطاف البحر الهجين (الخرشفة الهجينة)	LC
	<i>Sterna hirundo</i>	Common Tern	خطاف البحر الشائع (الخرشفة الشائعة)	LC
	<i>Sterna albifrons</i>	Little Tern	خطاف البحر الصغير (الخرشفة الصغيرة)	LC
<b>رتبة الحماميات Columbiformes</b>				
Columbidae الحمامية	<i>Columba livia</i>	Rock or Feral Dove (Pigeon)	الحمام الصخري	LC
	<i>Columba palumbus</i>	Wood Pigeon	حمامة الغابة	LC
	<i>Streptopelia turtur</i>	European Turtle Dove	اليمامة القمرية (الرقطية)	VU
	<i>Spilopelia senegalensis</i>	Laughing (Palm-Senegal) Dove	اليمامة الضاحكة (فاخته النخيل)	LC
	<i>Streptopelia decaocto</i>	Eurasian Collared Dove	اليمامة المطوقة الأوراسيا	LC
	<i>Oena capensis</i>	Namaqua Dove (Long-tailed Dove)	اليمامة طويلة الذنب	LC
<b>رتبة البيغانيات Psittaciformes</b>				
Psittacidae البيغانية	<i>Psittacula krameri</i>	Ring-necked Parakeet	بيغاء الذرة (البيغاء وردى الطوق)	LC
<b>رتبة الوقايات Cuculiformes</b>				
Cuculidae الوقايات	<i>Clamator glandarius</i>	Great Spotted Cuckoo	الوقاق المرقط الكبير	LC
<b>رتبة البوميات Strigiformes</b>				
Tytonide بوميات الحظائر	<i>Tyto alba</i>	Barn Owl	بومة الجرن	LC
	<i>Otus scops</i>	European Scops Owl	بومة الأشجار الأوروبية	LC
Strigidae البومية	<i>Athene noctua</i>	Little Owl	أم قويق (البومة الصغيرة)	LC
	<i>Asio otus</i>	Long-eared Owl	البومة القرناء أو طويلة الأذن	LC
	<i>Bubo bubo</i>	Eurasian Eagle Owl	البومة النسرية	LC
<b>رتبة السبديات Caprimulgiformes</b>				
Caprimulgidae السبديات	<i>Caprimulgus europaeus</i>	European Nightjar	السبد الأوروبي (ملهي الرعيان)	LC
<b>رتبة السماميات Apodiformes</b>				
Apodidae السماميات	<i>Apus apus</i>	Common Swift	السمامة الشائعة	LC

## Continued

رتبة الشقراقيات Coraciiformes				
Alcedinidae القاوندية	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher (White-throated Kingfisher)	السماك أبيض الصدر (القاوند)	LC
	<i>Alcedo atthis</i>	Common Kingfisher	السماك الأخضر الشائع	LC
	<i>Ceryle rudis</i>	Pied Kingfisher	السماك الأبقع	LC
Coraciidae الشرقية	<i>Coracias garrulus</i>	European Roller	الشرقية	LC
Meropidae الوروارية	<i>Merops apiaster</i>	European Bee-eater	الوروار الأوروبي	LC
	<i>Merops persicus</i>	Blue-cheeked Bee-eater	الوروار أزرق الخد	LC
	<i>Merops orientalis</i>	Asian or Little Green Bee-eater	الوروار الشرقي الصغير	LC
رتبة قرنيات المنقار Bucerotiformes				
Upupidae الهدهدية	<i>Upupa epops</i>	Eurasian Hoopoe	الهدهد	LC
رتبة النقاريات أو القرعيات Piciformes				
Picidae اللوائية	<i>Dendrocopos syriacus</i>	Syrian Woodpecker	نقار الخشب السوري	LC
	<i>Jynx torquilla</i>	Eurasian Wryneck	اللواء الأوراسي - أبو لوي	LC
رتبة العصفوريات أو الجوائم Passeriformes				
Hirundinidae السنونية	<i>Hirundo rustica</i>	Barn Swallow	السنونو (عصفور الجنة)	LC
	<i>Cecropis daurica</i>	Red-rumped Swallow	السنونو أحمر الردف	LC
	<i>Delichon urbicum</i>	House Martin	السنونو أبيض البطن	LC
	<i>Riparia riparia</i>	Sand Martin (Collared Sand Martin)	سنونو الرمل	LC
	<i>Ptyonoprogne rupestris</i>	Eurasian Crag Martin	خطاف الشواوق	LC
Motacillidae الفتاحية (الذعريات)	<i>Motacilla flava</i>	Yellow Wagtail	الذعرة الصفراء (السفرية)	LC
	<i>Motacilla alba</i>	White Wagtail	الذعرة البيضاء (الكرز)	LC
	<i>Motacilla citreola</i>	Citrine Wagtail	الذعرة الليمونية	LC
	<i>Motacilla cinerea</i>	Grey Wagtail	الذعرة الرمادية	LC
	<i>Anthus cervinus</i>	Red-throated Pipit	الجُشنة حمراء الزور (أبو فصيحة أو أبو تمره أحمر الزور)	LC
	<i>Anthus trivialis</i>	Tree Pipit	جُشنة الشجر	LC
	<i>Anthus pratensis</i>	Meadow Pipit	جُشنة الحقول	NT
	<i>Anthus similis</i>	Long-billed Pipit	الجُشنة طويلة المنقار	LC
Alaudidae القُترات	<i>Anthus spinoletta</i>	Water Pipit	جُشنة الماء	LC
	<i>Galerida cristata</i>	Crested Lark	القنبرة المتوجة	LC
	<i>Alauda arvensis</i>	Common Sky Lark	قنبرة الغيط	LC
	<i>Alaemon alaudipes</i>	Greater Hoopoe-lark	القنبرة الهدهدية (أم سالم)	LC
	<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	القنبرة قصيرة الأصابع	LC
Pycnonotidae البلبلية	<i>Pycnonotus xanthopygos</i>	White-spectacled Bulbul	البلبل أصفر العجز	LC
Prunellidae العصافير الحديدية	<i>Prunella modularis</i>	Dunnock	LC الدنوك (دوري السياج أو عصفور التحوط)	LC

## Continued

Turdidae السُّمَّنَات	<i>Turdus merula</i>	Common Blackbird	الدج (الشحرور / السودية)	LC
	<i>Turdus philomelos</i>	Song Thrush	السمنة المغنية	LC
	<i>Turdus iliacus</i>	Redwing	السمنة حمراء الجناح	NT
	<i>Turdus viscivorus</i>	Mistle Thrush	السمنة الكبيرة	LC
Muscicapidae خاطفات الذباب أو الشوربية (المذبذبات)	<i>Cercotrichas galactotes</i>	Rufous Bush Robin	أبو الحناء الأحرش (شولة حمراء)	LC
	<i>Erithacus rubecula</i>	European Robin	أبو الحناء (الحمرية)	LC
	<i>Luscinia megarhynchos</i>	Common or Rufous Nightingale	العندليب (هزاز الذيل)	LC
	<i>Luscinia svecica</i>	Bluethroat	المسهر (أزرق الزور)	LC
	<i>Phoenicurus ochruros</i>	Black Redstart	الديساء (فرخ السمن) الحميراء	LC
	<i>Phoenicurus phoenicurus</i>	Common Redstart	الحميراء الشائعة (الحمروش)	LC
	<i>Monticola solitarius</i>	Blue Rock-thrush	سمنة الصخور الزرقاء	LC
	<i>Saxicola rubetra</i>	Whinchat	القليعي الأحمر	LC
	<i>Saxicola torquata</i>	Stonechat	أبلق الرعيان	LC
	<i>Oenanthe isabellina</i>	Isabelline Wheatear	الأبلق الأشهب	LC
<i>Oenanthe oenanthe</i>	Northern Wheatear	الأبلق الشمالي	LC	
<i>Oenanthe deserti</i>	Desert Wheatear	الأبلق الصحراوي	LC	
<i>Oenanthe melanoleuca</i>	Eastern Black-eared Wheatear	الأبلق الشرقي أسود الأذن	LC	
<i>Oenanthe cypriaca</i>	Cyprus Pied Wheatear	الأبلق القبرصي	LC	
<i>Muscicapa striata</i>	Spotted Flycatcher	خاطف الذباب المنقط	LC	
<i>Ficedula albicollis</i>	Collared Flycatcher	خاطف الذباب المطوق	LC	
Cisticolidae الهوازج الرشيقا	<i>Prinia gracilis</i>	Graceful Prinia (Warbler)	الفسية (الهازجة الرشيقا)	LC
Acrocephalidae الهوازج الشجريا	<i>Acrocephalus scirpaceus</i>	Reed Warbler	هازجة القصب	LC
	<i>Acrocephalus arundinaceus</i>	Great Reed Warbler	هازجة القصب الكبيرة	LC
	<i>Acrocephalus schoenobaenus</i>	Sedge Warbler	هازجة السعد (هازجة البردي)	LC
	<i>Acrocephalus melanopogon</i>	Moustached Warbler	هازجة أم شارب (هازجة سوداء اللحية)	LC
	<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	هازجة الغاب المصرية	LC
	<i>Iduna pallida</i>	Olivaceous Warbler	خنشع أو دخلة الزيتون (هازجة زيتونية)	LC
	<i>Hippolais olivetorum</i>	Olive-tree Warbler	خنشع الزيتون الكنيو - دخلة شجر الزيتون	LC
<i>Hippolais icterina</i>	Icterine Warbler	الخنشع الثرثار	LC	
Sylviidae الخنشاع (الدخل)	<i>Sylvia melanocephala</i>	Sardinian Warbler	خنشع أو دخلة سردينيا	LC
	<i>Sylvia communis</i>	Common Whitethroat	الدخلة بيضاء الحجر الشائعة	LC
	<i>Sylvia curruca</i>	Lesser Whitethroat	الدخلة بيضاء الحجر الصغيرة	LC
	<i>Sylvia atricapilla</i>	Blackcap	أبو قلنسوة	LC
	<i>Sylvia borin</i>	Garden Warbler	دخلة الحدائق أو البساتين	LC
	<i>Curruca conspicillata</i>	Spectacled Warbler	الخنشع الليموني	LC
<i>Curruca melanothorax</i>	Cyprus Warbler	الدخلة القبرصية	LC	

## Continued

Parulidae هوازج العالم الجديد أو هوازج الغياض	<i>Cisticola juncidis</i>	Zitting Cisticola	هازجة مروحية الذيل	LC
Scotocercidae المنمية	<i>Scotocerca inquieta</i>	Scrub Warbler	هازجة الدغل - نممة الشجر	LC
Cettiidae الستيدية	<i>Cettia cetti</i>	Cetti's Warbler	هازجة سيئي	LC
Locustellidae هوازج الجراد	<i>Locustella luscinioides</i>	Savi's Warbler	هازجة المستنقعات	LC
Phylloscopidae الخناسع الورقية	<i>Phylloscopus collybita</i>	Chiffchaff	النقشارة الذهبية	LC
	<i>Phylloscopus trochilus</i>	Willow Warbler	نقشارة الصفصاف	LC
Paridae القرقفيات	<i>Parus major</i>	Great Tit	القرقف الكبير	LC
Remizidae الرميزية	<i>Remiz pendulinus</i>	Penduline Tit	قرقف البندول أو القرقف المقنن	LC
Oriolidae الصفاري	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	الصفير الذهبي	LC
Passeridae العصفورية	<i>Passer hispaniolensis</i>	Spanish or Willow Sparrow	العصفور الأسباني	LC
	<i>Passer domesticus</i>	House Sparrow	العصفور المنزلي (الدوري)	LC
Nectariniidae المغثریات	<i>Cinnyris osea</i>	Palestine Sunbird	عصفور الشمس الفلسطيني	LC
	<i>Lanius collurio</i>	Red-backed Shrike	الدقناش أحمر الظهر	LC
	<i>Lanius senator</i>	Lesser Grey Shrike	الدقناش الرمادي الصغير	LC
Laniidae الصرود (الدقناشيات)	<i>Lanius senator</i>	Woodchat Shrike	الدقناش الشامي (الصرود أحمر القنن)	LC
	<i>Lanius excubitor</i>	Great Grey Shrike	الدقناش الرمادي الكبير	LC
	<i>Lanius nubicus</i>	Masked Shrike	الدقناش القبطي (الصرود المقنن)	LC
	<i>Garrulus glandarius</i>	Eurasian Jay	الزريقي (أبو زريق)	LC
Corvidae الغرابية	<i>Corvus cornix</i>	Hooded Crow	الغراب البلدي الرمادي	LC
	<i>Coloeus monedula</i>	Western Jackdaw	غراب الزرع	LC
	<i>Emberiza hortulana</i>	Ortolan Bunting (Ortolan )	درسة الشعير (الدوري الأمريكي)	LC
Emberizidae العنبريات	<i>Emberiza caesia</i>	Cretzschmar's Bunting	الدرسة زرقاء الرأس	LC
	<i>Emberiza cia</i>	Rock Bunting	درسة الصخور	LC
	<i>Emberiza aureola</i>	Yellow-breasted Bunting	الدرسة صفراء الصدر	CR
	<i>Emberiza calandra</i>	Corn Bunting	درسة القمح	LC
	<i>Emberiza schoeniclus</i>	Reed Bunting	درسة الغاب	LC
	<i>Emberiza melanocephala</i>	Black-headed Bunting	الدرسة سوداء الرأس	LC
Sturnidae الزراير	<i>Sturnus vulgaris</i>	European or Common Starling	الزرزور الأوروبي	LC
	<i>Acridotheres tristis</i>	Common (Indian) Mynah	المينا الهندية الشائعة	LC

Continued

Fringillidae الحساسين	<i>Fringilla coelebs</i>	Chaffinch	الزرعي (الصغنج أو الطقطوق)	LC
	<i>Fringilla montifringilla</i>	Brambling	الشرشور الجبلي	LC
	<i>Serinus serinus</i>	European Serin	النعار الأوروبي (البسبوس)	LC
	<i>Serinus syriacus</i>	Serian Serin	النعار السوري	LC
	<i>Carduelis chloris</i>	European Greenfinch	الخضر (الخضيري)	LC
	<i>Carduelis carduelis</i>	European Goldfinch	الحسون الذهبي	LC
	<i>Carduelis spinus</i>	Eurasian Siskin	حسون الشوك (الطرنجان)	LC
	<i>Coccothraustes coccothraustes</i>	Hawfinch	حسون الكرز – البليل الزيتوني	LC
	<i>Bucanetes githagineus</i>	Trumpeter Finch	الزمير الوردي	LC
	<i>Carduelis cannabina</i>	Common Linnet	العصفور التقاحي	LC
	<i>Rhodospiza obsoleta</i>	Desert Finch	الحسون الصحراوي - الهمرد	LC

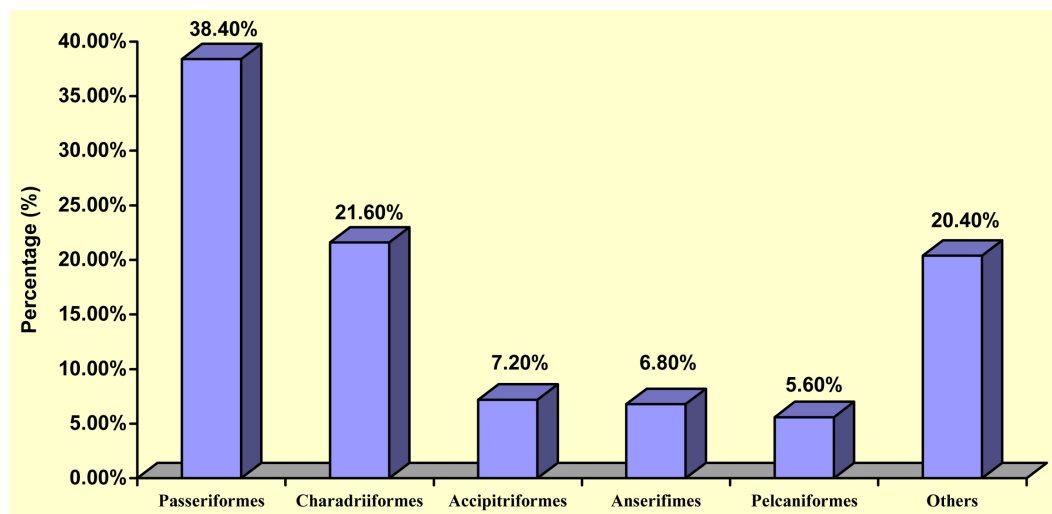


Figure 6. A graphic model showing the percentages of the bird fauna orders of the Gaza Strip.

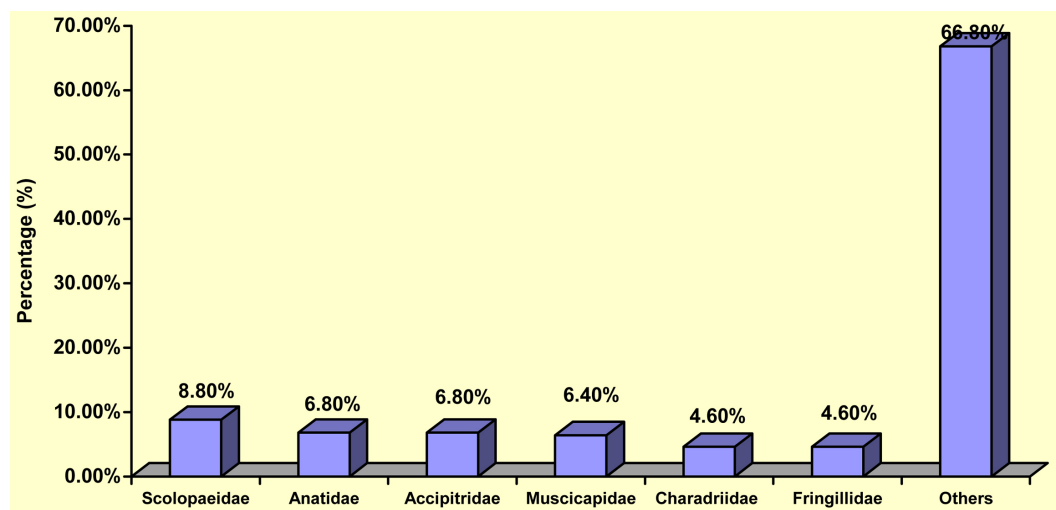
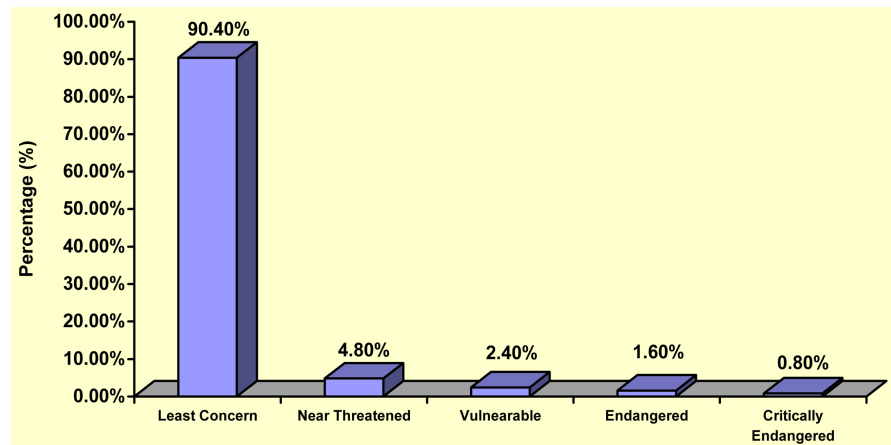


Figure 7. A graphic model showing the percentages of the bird fauna families of the Gaza Strip.





**Figure 8.** A graphic model showing the proportion of bird species recorded in the Gaza Strip according to the IUCN regional threat categories.

2) 12 species (4.8%) are Near Threatened (NT), which means that the species are close to being endangered in the near future.

3) 6 species (2.4%) are Vulnerable (VU), which means that the species are considered to be at high risk of unnatural (human-caused) extinction without further human intervention.

4) 4 species (1.6%) are Endangered (EN), which means that the species are at very high risk of extinction in the wild.

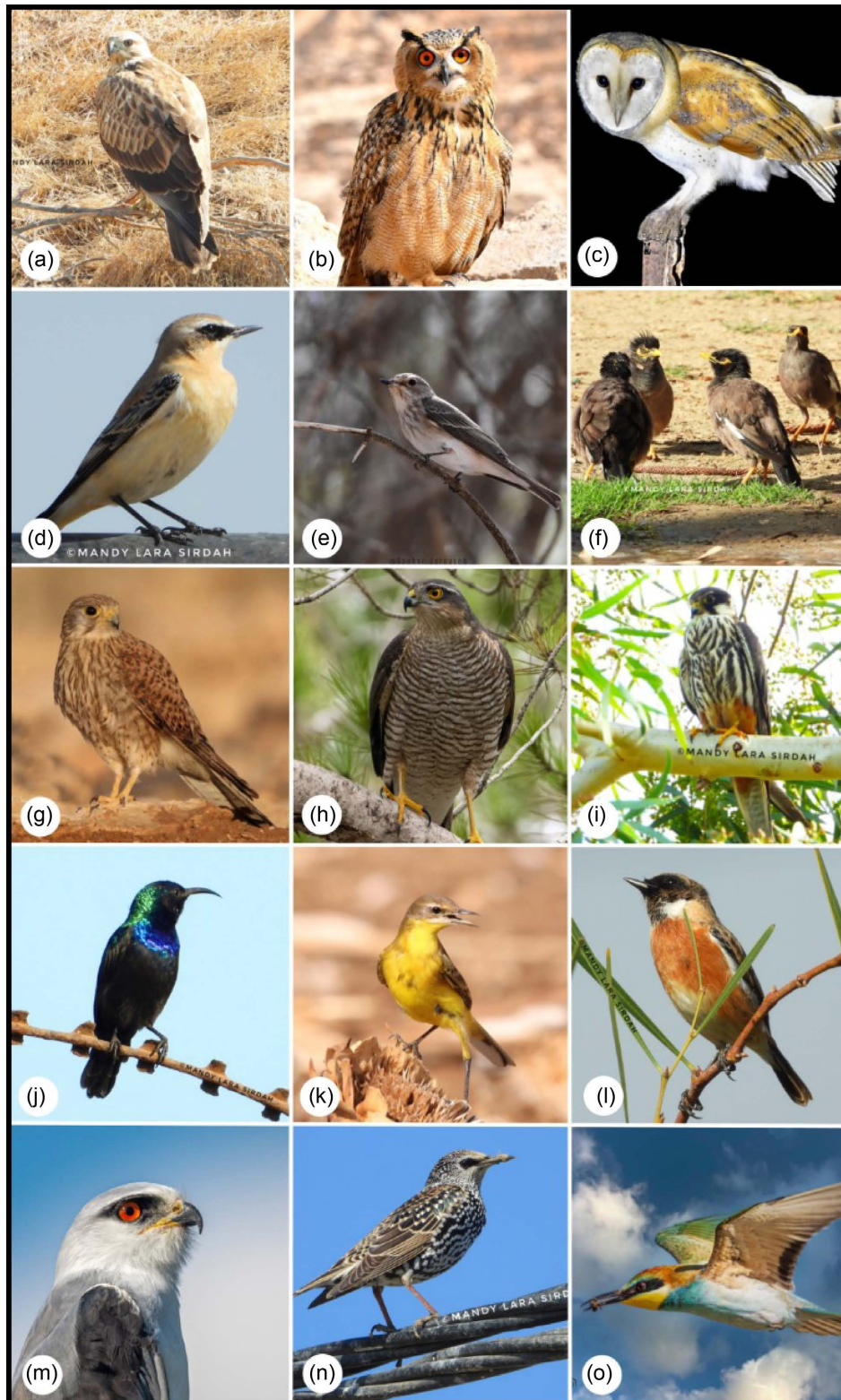
5) 2 species (0.8%) are Critically Endangered (CR), which means that the species are in an extremely critical state.

#### 4. Discussion

Palestine has a diverse vertebrate fauna inhabiting diverse ecosystems and habitats extending from north to south and from east to west. It is evident from the 551 bird species identified by Meiri *et al.* [4] that birds are the most prominent vertebrates in Palestine and this is reinforced by migratory birds that follow several routes during their course in the spring and autumn migrations [5]. This huge number of bird species in Palestine can by no means be static, but is expected to change according to the inclusion of new bird species in the future. The Gaza Strip, despite its small area (365 km<sup>2</sup>), which does not exceed 1.5% of the known area of Palestine (27,000 km<sup>2</sup>), is close to sheltering half of the Palestinian resident, migratory, terrestrial and aquatic bird species (Figure 9 and Figure 10), as the 250 species of bird species highlighted in this study represented more than 45% of the whole bird species in Palestine. Of course, there are confirmed expectations that the total number of birds in the Gaza Strip will exceed the 50% threshold in the near future, and this is of course due to reasons including the continuous hunting of birds carried out by some hunters throughout the Gaza Strip, and the spread of bird trade locally in pet shops and some specialized markets, in addition to the achievements of some bird watchers in identifying new species steadily.



**Figure 9.** Some aquatic birds of the Gaza Strip: (a) Northern Lapwing *Vanellus vanellus*, (b) Spur-winged Plover or Lapwing *Vanellus spinosus*, (c) Golden Plover *Pluvialis apricaria*; (d) Wood Sandpiper *Tringa glareola*; (e) Common Snipe *Gallinago gallinago*; (f) Eurasian oystercatcher *Haematopus ostralegus*; (g) Spotted Crake *Porzana porzana*; (h) Glossy Ibis *Plegadis falcinellus*, (i) Black-tailed Godwit *Limosa limosa*; (j) Black-headed Gull *Chroicocephalus ridibundus*, (k) Black-headed Gull *Chroicocephalus ridibundus* and Lesser Black-backed Gull *Larus fuscus*; (l) Black-winged Stilt *Himantopus himantopus* and Black-headed Gull *Chroicocephalus ridibundus*; (m) Lesser Black-backed Gull *Larus fuscus*; (n) Common Kingfisher *Alcedo atthis*; and (o) Egyptian Goose *Alopochen aegyptiaca*.



**Figure 10.** Some terrestrial birds of the Gaza Strip: (a) Long-legged Buzzard *Buteo rufinus*; (b) Eurasian Eagle Owl *Bubo bubo*; (c) Barn Owl *Tyto alba*; (d) Northern Wheatear *Oenanthe oenanthe*; (e) Spotted Flycatcher *Muscicapa striata*; (f) Indian Myna *Acridotheres tristis*; (g) Common Kestrel *Falco tinnunculus*; (h) Eurasian Sparrowhawk *Accipiter nisus*; (i) Eurasian Hooby *Falco subbuteo*; (j) Palestine Sunbird *Cinnyris osea*; (k) Yellow Wagtail *Motacilla flava*; (l) European Stonechat *Saxicola rubicola*; (m) Black-winged Kite *Elanus caeruleus*; (n) European Starling *Sturnus vulgaris*; and (o) European Bee-eater *Merops apiaster*.

There are many ecosystems and habitats in the Gaza Strip to embrace the diversity of both aquatic and terrestrial birds (**Figure 9** and **Figure 10**). Agriculture is the backbone of the Gazan economy, and therefore farms, orchards and vineyards are abundant with a diversity of bird species. For example, the coastal Al-Mawasi ecosystem, which is located southwest of the Gaza Strip, is considered one of the richest agricultural areas in the Gaza Strip. Rather, it is considered the food basket of the Gaza Strip. This ecosystem houses an estimated diversity of 135 species of birds, as shown by Abd Rabou [9]. The Gaza Strip is cut by three valleys in the north, center and south. These valleys harbor a relatively rich diversity of birds. Perhaps the Wadi Gaza Nature Reserve is the most studied of these valleys, and it was found that it is teeming with a huge diversity of wild vertebrate species, the most important of which are birds [6] [7] [10]. The marine and coastal environments possess a diversity of birds as well [7] [21], although they need further studies using a well-prepared research fleet. The sand dunes that characterize the western belt of the Gaza Strip, sewage treatment plants and solid waste dumps all abound with a huge diversity of birds, and that is why it is important to focus the research effort on such places in the Gaza Strip. Wastewater treatment plants in North Gaza are of real interest to birds as they house a large variety of waterfowl and waders which represent a large proportion in the current checklist. In the past, many Gazans, especially children, were seen chasing some species of ducks, geese and wading birds in the great lake that existed more than 12 years ago in the old wastewater treatment plant in Beit Lahia—in the northern Gaza Strip, to hunt and possibly eat them [49].

Although the checklists for the species of mammals, reptiles and amphibians, both aquatic and terrestrial, in the Gaza Strip have not yet been prepared, the number of species of these taxa or taxonomic groups will not reach 100 species, but certainly less. This means that birds in various environments in the Gaza Strip far exceed the numbers of other vertebrate species with the exception of cartilaginous and bony fish that live in the marine ecosystem. As it was expected based on previous studies [7] [8] [9] [17] [36], the order Passeriformes was the largest among the orders of birds in the Gaza Strip and included 96 species, or 38.4% of the birds included in the current checklist, followed by the Charadriiformes 58 (22.1%). It does not matter that the order Passeriformes is the largest here because Passeriformes includes more than half of all bird species globally [41] [42].

Charadriiformes are a diverse order of birds that live mostly in or near water and feed on invertebrates or other small animals including fish. Some of these birds are marine inhabitants, such as gulls and terns, which are very familiar to Gazans in the marine environment of the Gaza Strip [40]. Staying with Charadriiformes, the largest family recorded in the current study is Scolopacidae (sandpipers, curlews and snipes), which is one of the most important and largest families of the order Charadriiformes. It included 22 species (8.8%) of birds in the Gaza Strip. Most of these species feed on small invertebrates picked from

mud or soil, where the different lengths of the beaks of different species of this family enable them to feed in the same habitat, especially on the coasts and shores without direct competition for food [50]. This was confirmed by the fact that during ecological tours conducted by the researchers to local wetlands, wadis, wastewater treatment plants and seashores, different species of Scolopacidae birds have been seen next to each other searching for food as if they are in a state of permanent peace (Personal Observations). Staying with aquatic birds, the Anatidae, which forms 6.8% of the current documented birds, is a family of waterfowl that includes ducks and geese. A variety of these birds were observed swimming and floating on the surface waters of Wadi Gaza Nature Reserve [6] [10], wastewater treatment plants [49] and Al-Mawasi ecosystem in the southern Gaza Strip [9].

The Gaza Strip does not have research centers dealing with birds, such as those found in Israel, Jordan and some other neighboring countries, so not every bird that enters this microscopic area is actually documented. Perhaps in this context, governmental and non-governmental agencies and educational institutions must hurry to find specialized centers and museums dealing with birds and other forms of wildlife to document them in a timely manner. In contrast to the Gaza Strip, the West Bank of Palestine has long begun to document Palestinian biodiversity through research centers and museums [51]-[55]. Many permanent and seasonal ringing stations were known to work on birds and document them in the West Bank of Palestine [25] [26] [56] [57] [58].

The current checklist of bird species inhabiting the Gaza Strip is similar to other reference lists or checklists of wildlife forms in the region [3] [4] in being useful to conservationists, academics, researchers, professors, graduate students, nature lovers and birdwatchers. Checklists can also be used to track the development of knowledge of Palestinian birds. One of the most important factors that prompted the researchers to prepare this checklist is the complete lack of knowledge of the number of birds present or visiting the Gaza Strip. This in turn raised questions from the Environment Quality Authority, those interested and students of science, especially students of environmental and life sciences disciplines, to formulate a published scientific article that includes Palestinian birds in the Gaza Strip and all Occupied Palestinian Territories. Of course, this list compiled from various sources is not intended to be static and will surely need to be updated at some point, especially since the interest in birds has recently started during the last twenty years after the number of studies related to bird surveys increased, and so did the number of hobbyists competing in documenting the birds that reside in the Gaza Strip or visit it from time to time. Every day Gazans hear about new species that must be included and added to subsequently updated lists.

With more or fewer aims, many studies in the Middle East were found to develop checklists for birds [59]-[65] depending on extensive bird surveys. In various Middle East and Arab countries, many bird surveys have been done in var-

ious ecosystems to highlight the prevailing bird species. Jordan is the country most adjacent to Palestine and enjoys a relative abundance in its studies on birds [66]-[80]. In fact, surveys of wild birds in any country in the world represent a backbone for reference lists, and perhaps the studies that were completed in the Gaza Strip during the past twenty years contributed to the emergence of the current checklist to be a clear scientific document that serves the next scientific studies and those interested in birds.

As far as the IUCN threat categories are concerned, the IUCN divides the species into nine categories: Not Evaluated, Data Deficient, Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, and Extinct. Of the 250 bird species inhabiting the Gaza Strip, 226 species (90.4%) were of Least Concern (LC) in the sense that the species of Least Concern are still abundant in the wild and have stable populations. They are not considered Threatened or Near Threatened. In other words, the species are not dependent on conservation. The rest of the species (9.6%) have different threatening states: 12 species (4.8%) are Near Threatened (NT), 6 species (2.4%) are Vulnerable (VU), 4 species (1.6%) are Endangered (EN), and 2 species (0.8%) are Critically Endangered (CR). The latter two categories mean that the species are considered to be threatened with extinction. In the current checklist, the White-headed Duck (*Oxyura leucocephala*), Steppe Eagle (*Aquila nipalensis*), Egyptian Vulture (*Neophron percnopterus*), and Saker Falcon (*Falco cherrug*) were categorized as Endangered (EN). In the same context, the Sociable Lapwing (*Vanellus gregarius*) and Yellow-breasted Bunting (*Emberiza aureola*) were classified as Critically Endangered (CR). In fact, the major causes of extinction of the birds and other wildlife species globally or in a particular part of the world often include habitat destruction, the introduction of invasive species, climate change, hunting and illegal trade [81] [82].

Hunting and trading of wild birds in the Gaza Strip—despite the gravity of the two phenomena—represent a source for identifying and documenting wild birds that occur in the region. This certainly comes in light of the absence or weakness of institutions that deal with birds locally as previously mentioned. Very recent studies have shown a large number of birds that are illegally hunted and sold in markets and animal stores of the Occupied Palestinian Territories [11] [15] [22] [27] [28] [29] [30] [83]. Many species of birds famous for their invasion of Palestine including the Indian Myna (*Acridotheres tristis*) and Rose-ringed Parakeet (*Psittacula krameri*), were not spared from hunting and trafficking, as indicated by many local studies [8] [9] [27] [28] [83] [84] [85]. Of course, the situation in the Arab and Middle East countries is not better, and may even be worse than in Palestine, in light of the large number of scientific studies that show the process of trafficking and trade in wild animals, especially birds [86]-[97].

## 5. Conclusion

In conclusion, the current study shows that the Gaza Strip, which represents 1.5% of the area of Palestine, harbors a high diversity of wild birds (currently 250

species that can be increased) due to the diversity of its ecosystems and ecological habitats and its location within the migratory paths of birds. Poaching and illegal hunting and habitat degradation pose a real threat to birds. The study recommends the need to pay attention to birds and the laws that regulate their hunting and trading in a sustainable manner, and it also recommends the need to build high-end centers and museums for studying and documenting birds, as in the rest of the world. Certainly, this study will need subsequent field efforts in order to create a more accurate checklist that includes what is added to the existing list of new species.

### Acknowledgements

Our thanks go to all the bird hunters, farmers, pet store and zoo owners, and other stakeholders we met in the Gaza Strip during the succeeding phases of this study and who provided us with valuable information, photos and technical support that enriched the checklist of this modest study.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Pomeroy, D. (1992) Counting Birds: AWF Technical Handbook Series 6. African Wildlife Foundation (AWF), Nairobi.
- [2] Bibby, C., Jones, M. and Marsden, S. (1998) Expedition Field Techniques: Bird Surveys. Expedition Advisory Center, Royal Geographical Society (with the Institute of British Geographers), London.
- [3] Perlman, Y. and Meyrav, J. (2009) Checklist of the Birds of Israel. Israel Ornithological Center, Society for the Protection of Nature in Israel (SPNI), Tel Aviv, Israel.
- [4] Meiri, S., Belmaker, A., Berkowic, D., Kazes, K., Maza, E., Bar-Oz, G. and Dor, R. (2019) A Checklist of Israeli Land Vertebrates. *Israel Journal of Ecology and Evolution*, **65**, 43-70. <https://doi.org/10.1163/22244662-20191047>
- [5] UNEP (2003) Desk Study on the Environment in the Occupied Palestinian Territories. United Nations Environment Program (UNEP), Nairobi.
- [6] MedWetCoast (2003) Management Plan: Wadi Gaza. Project for the Conservation of Wetland and Coastal Ecosystems in the Mediterranean Region-MedWetCoast. MedWetCoast, Gaza Strip.
- [7] Abd Rabou, A.F.N. (2005) An Ecological Survey and Assessment of Wadi Gaza Nature Reserve, Gaza Strip-Palestine, with Particular Emphasis on Wildlife. Al-Neelain University, Khartoum.
- [8] Abd Rabou, A.F.N. (2019) Bird Fauna Encountered at the Main Campus of the Islamic University of Gaza, Gaza City, Palestine. *Biodiversitas*, **20**, 604-614. <https://doi.org/10.13057/biodiv/d200242>
- [9] Abd Rabou, A.F.N. (2019) Ornithofauna Prevailing at Al-Mawasi Ecosystem of the Gaza Strip, Palestine. *Open Journal of Ecology*, **9**, 360-400. <https://doi.org/10.4236/oje.2019.99025>

- [10] Abd Rabou, A.F.N., Yassin, M.M., Al-Agha, M.R., Hamad, D.M. and Ali, A.K.S. (2015) The Avifauna of Wadi Gaza Nature Reserve, Gaza Strip-Palestine. *IUG Journal of Natural Studies*, **15**, 39-85.
- [11] Abd Rabou, A.F.N. (2021) On the Hunting of the Common Quail (*Coturnix coturnix* Linnaeus, 1758) along the Mediterranean Coast of the Gaza Strip-Palestine. *IUG Journal of Natural Studies*, **29**, 1-19. <https://doi.org/10.33976/IUGNS.29.2/2021/1>
- [12] Euroconsult/IWACO (1994) Gaza Environmental Profile (Part I): Inventory of Resources. Palestinian Environmental Protection Authority, Gaza Strip.
- [13] Abd Rabou, A.F.N. (2011) Notes on Some Palestinian Bird Fauna Existing in the Zoological Gardens of the Gaza Strip. *American-Eurasian Journal of Agricultural & Environmental Sciences*, **11**, 159-172.
- [14] Abd Rabou, A.F.N. (2011) On the Ecology of Wadi Gaza, Gaza Strip: Survey and Assessment (Wildlife Is Focused). LAP Lambert Academic Publishing, Saarbrücken.
- [15] Abd Rabou, A.F.N. and Abd Rabou, M.A. (2019) Notes on the Pigeons and Doves (Family Columbidae) Occurring in the Gaza Strip-Palestine. *Jordan Journal of Natural History*, **6**, 30-38.
- [16] Abd Rabou, A.F.N. (2020) The Palestinian Marine and Terrestrial Vertebrate Fauna Preserved at the Biology Exhibition, Islamic University of Gaza, Bombarded by the Israeli Army in December, 2008. *Israa University Journal for Applied Sciences*, **4**, 9-51. <https://doi.org/10.52865/HFRS6095>
- [17] Al-Safadi, M.M. (2002) Vertebrate Fauna of Gaza Strip. *Al-Azhar University Journal*, **6**, 1-32.
- [18] Al-Safadi, M.M. (2006) Observations on the Breeding Birds of the Gaza Strip. *Sandgrouse*, **28**, 22-33.
- [19] Al-Safadi, M.M. (2006) Birds of Gaza Strip and Their Threats. *Al-Aqsa University Journal (Natural Sciences Series)*, **10**, 1-12.
- [20] Yassin, M.M., Abd Rabou, A.F.N. and Al-Agha, M.R. (2006) Preliminary Survey of Terrestrial Vertebrate Fauna and People's Awareness Towards Wildlife in the Northern Governorate of the Gaza Strip. *Al-Azhar Bulletin of Science*, **17**, 17-41. <https://doi.org/10.21608/absb.2006.14718>
- [21] Dardona, A.W.Y. and Khalaf-von Jaffa, N.A.B. (2014) Studying Aquatic Birds in the area between the Gaza Fishermen Port and Wadi Gaza Estuary, Gaza Strip, Palestine. *Gazelle: The Palestinian Biological Bulletin*, No. 124, 22-39.
- [22] Al-Sweirki, S.H. (2022) Animal Trade in Pet Shops of the Gaza City Palestine. Islamic University of Gaza, Gaza.
- [23] Khalilieh, A. (2016) Avifaunal Baseline Assessment of Wadi Al-Quff Protected Area and Its Vicinity, Hebron, Palestine. *Jordan Journal of Natural History*, **3**, 58-69.
- [24] Abd Rabou, A.F.N., Musallam, N.J., Musallam, E.J., Elkahlout, K.E., Elnabris, K.J., *et al.* (2020) The Palestinian Terrestrial Vertebrate Fauna Preserved at the Biology Exhibitions of the Universities of the Gaza Strip. *Research in Ecology*, **2**, 9-21. <https://doi.org/10.30564/re.v2i4.2512>
- [25] Awad, S., Farhoud, M.H. and Jarayseh, B. (2022) Updates on the Avifauna of the State of Palestine. *Sandgrouse*, **44**, 161-168.
- [26] Awad, S., Abu Saada, R.K., Farhoud, M.H. and Khair, M.I. (2015) Checklist of the birds of Palestine. Environmental Education Center, Beit Jala.
- [27] Abd Rabou, A.F.N. (2022) On the Trapping and Risks of the Invasive Rose-Ringed Parakeet (*Psittacula krameri* Scopoli, 1769) in the Gaza Strip-Palestine. *Open Access Journal of Biomedical Science*, **4**, 2112-2120.



- [28] Abd Rabou, A.F.N. (2022) On the Occurrence, Trapping and Potential Risks of the Invasive Indian Myna (*Acridotheres tristis* Linnaeus, 1766) in the Gaza Strip: Palestine. *International Journal of Fauna and Biological Studies*, **9**, 45-55. <https://doi.org/10.22271/23940522.2022.v9.i5a.933>
- [29] Abd Rabou, A.F.N. (2022) On the Poaching of and the Threats Facing the Chukar Partridge (*Alectoris chukar* J.E. Gray, 1830) in Palestine. *Biomedical Journal of Scientific & Technical Research*, **46**, 37793-37803.
- [30] Abd Rabou, A.F.N. (2022) The Goldfinch (*Carduelis carduelis* Linnaeus, 1758) in Palestine: An Appreciated Bird and a Threatened Species. *Biomedical Journal of Scientific & Technical Research*, **47**, 38030-38043.
- [31] Al-Safadi, M.M. (1997) On the Breeding Biology of the Spur-Winged Plover, *Hoplopterus spinosus*, in Gaza Strip. *Zoology in the Middle East*, **14**, 47-52. <https://doi.org/10.1080/09397140.1997.10637703>
- [32] Al-Safadi, M.M. (1999) Unusual Camouflaging Behavior in Partridge Chicks. *Israel Journal of Zoology*, **45**, 293-294.
- [33] Al-Safadi, M.M. (2003) On the Biology of Crested Lark, *Galerida cristata* in Palestine and Yemen. *Journal of Dirasat Yamaniyyah*, **70**, 269-282.
- [34] Al-Safadi, M.M. (2004) On the Breeding Biology of the Syrian Woodpecker, *Dendrocopos syriacus*, in the Gaza Strip. *Zoology in the Middle East*, **32**, 7-12. <https://doi.org/10.1080/09397140.2004.10638038>
- [35] Al-Safadi, M.M. (2006) Observations on the Breeding Biology of the Swallow *Hirundo rustica transitiva* in Gaza Strip, Palestine. *Journal of Al-Aqsa University*, **10**, 13-19.
- [36] Abu-Taleb, M.H.A. (2008) Studies on Vertebrates of Gaza Strip, Palestine. Ph.D. Thesis, Department of Zoology, Faculty of Girls for Arts and Education, Ain Shams University, Egypt in cooperation with the Department of Biology, Al-Aqsa University, Gaza Strip.
- [37] Hollom, P.A.D., Porter, R.F., Christensen, S. and Willis, I. (1988) Birds of the Middle East and North Africa. T. & A. D. Poyser, Calton.
- [38] Baha El-Din, S.M. and Salama, W. (1991) The Catching of Birds in North Sinai. ICBP Report No. 45. International Council for Bird Preservation, Cambridge.
- [39] Disi, A.M. and Hatoug-Boran, A. (1990) Wild Birds of Jordan. The Royal Society of Nature Conservation / International Council for Birds Preservation, Amman, Jordan.
- [40] Sibley, C.G. and Monroe, B.L. (1990) Distribution and Taxonomy of Birds of the World. Yale University Press, New Haven & London.
- [41] Harrison, C. and Greensmith, A. (1993) Birds of the World. DK Publishing Inc., London.
- [42] Porter, R.F., Christensen, S. and Schiermacker-Hansen, P. (1996) Field Guide to the Birds of the Middle East. T. & A. D. Poyser, London.
- [43] Shirihai, H. (1996) The Birds of Israel. Academic Press, New York.
- [44] Beaman, M. and Madge, S. (1998) The Handbook of Bird Identification for Europe and the Western Palearctic. Christopher Helm, A. & C. Black, London.
- [45] Abu Shammalah, M. and Baha Ed-Din, S.M. (1999) Birds of Gaza. Darwish Consulting Engineers Ltd., Gaza Strip. (In Arabic)
- [46] Forshaw, J., Howell, S., Lindsey, T. and Stallcup, R. (1999) Birding: The Nature Company Guides. Time Life Books, New York.

- [47] Jonsson, L. (1999) Birds of Europe with North Africa and the Middle East. Christopher Helm Publishers Limited, London.
- [48] Cottridge, D.M. and Porter, R. (2000) A Photographic Guide to Birds of Israel and the Middle East. Steimatzky, Kafr Qasim.
- [49] Abd Rabou, A.F.N. (2011) Environmental Impacts Associated with the Beit Lahia Wastewater Treatment Plant, North Gaza Strip, Palestine. *Middle East Journal of Scientific Research*, **7**, 746-757.
- [50] Ackerman, J. (2019) Birds by the Shore: Observing the Natural Life of the Atlantic coast. Penguin Books, London.
- [51] Horwitz, L.K. (2002) The Development of Archaeozoological Research in Israel and the West Bank. *Archaeofauna*, **11**, 131-145.
- [52] Qumsiyeh, M.B., Zavala, S.S. and Amr, Z.S. (2014) Decline in Vertebrate Biodiversity in Bethlehem, Palestine. *Jordan Journal of Biological Sciences*, **7**, 101-107. <https://doi.org/10.12816/0008222>
- [53] Qumsiyeh, M.B., Khalilieh, A., Albaradeiya, I.M. and Al-Shaikh, B. (2016) Biodiversity Conservation of Wadi Al-Quff Protected Area (Central Palestine): Challenges and Opportunities. *Jordan Journal of Natural History*, **3**, 6-24.
- [54] Qumsiyeh, M.B., Najajrah, M.H., Handal, E.N., Gideon, J., Abusarhan, M.A. and Prasse, R. (2022) The Importance of Urban Eco-Gardens in Biodiversity and Human Sustainability: A Case Study from Palestine. Preprint. <https://doi.org/10.21203/rs.3.rs-1388232/v1>
- [55] Qumsiyeh, M.B. (2017) Nature Museums and Botanical Gardens for Environmental Conservation in Developing Countries. *BioScience*, **67**, 589-590. <https://doi.org/10.1093/biosci/bix011>
- [56] Awad, S. and Rzaad, I. (2014) Jericho (Palestine) Spring 2014 Ornithological and Parasitological Research Results. *The Ring*, **36**, 33-43. <https://doi.org/10.2478/ring-2014-0003>
- [57] Awad, S., Rzaad, I. and Busse, P. (2013) The Ringing Site in Jericho (Palestine) —Development of Bird Migration and Parasitological Research on the Great Rift Valley Flyway. *The Ring*, **35**, 55-63. <https://doi.org/10.2478/ring-2013-0003>
- [58] Awad, S., Farhoud, M.H., Abu Saada, R.K. and Busse, P. (2017) Long-Term Bird Ringing in Palestine. *The Ring*, **39**, 83-102. <https://doi.org/10.1515/ring-2017-0003>
- [59] Jennings, M.C. (1995) An Interim Atlas of the Breeding Birds of Arabia. National Commission for Wildlife Conservation and Development, Riyadh.
- [60] Scott, D.A. and Adhami, A. (2006) An Updated Checklist of the Birds of Iran. *Po-doces*, **1**, 1-16.
- [61] Porter, R.F., Salim, M., Ararat, K. and Fadhel, O. (2010) A Provisional Checklist of the Birds of Iraq. *Marsh Bulletin*, **5**, 56-95.
- [62] Pedersen, T. and Aspinall, S. (Compilers) (2010) EBRC Annotated Checklist of the Birds of the United Arab Emirates. *Sandgrouse Supplement*, **3**, 1-96.
- [63] Abi-Said, M., Outa, N.T., Makhlof, H., Amr, Z., and Eid, E. (2018) Illegal Trade in Wildlife species in Beirut, Lebanon. *Vertebrate Zoology*, **68**, 1-4.
- [64] Ajarem, J.S., Al-Sadoon, M.K., Paray, B.A. and Al-Mfarij, A.R. (2020) A Provisional Checklist of the Avifauna of Turaif Province, the Kingdom of Saudi Arabia. *Saudi Journal of Biological Sciences*, **27**, 74-76. <https://doi.org/10.1016/j.sjbs.2019.05.003>
- [65] Ramadan-Jaradi, G., Itani, F., Hogg, J., Serhal, A. and Ramadan-Jaradi, M. (2020) Updated Checklist of the Birds of Lebanon, with Notes on Four New Breeding Spe-

- cies in 2020. *Sandgrouse*, **42**, 186-238.
- [66] Hatzofe, O. and Yom-Tov, Y. (2002) Global Warming and Recent Changes in Israel's Avifauna. *Israel Journal of Zoology*, **48**, 351-357.  
<https://doi.org/10.1560/F9CC-X3UM-XJBJ-FPW6>
- [67] Sert, H. and Erdogan, A. (2004) The Avifauna of Termessos National Park (Antalya-Turkey). *Turkish Journal of Zoology*, **28**, 134-145.
- [68] Al-Shamlih, M., Nassar, K. and Khoury, F. (2005) Distribution and Habitat Associations of Selected Breeding Birds in Wadi Araba, Jordan. *Sandgrouse*, **27**, 24-29.
- [69] Evans, M., Amr, Z. and Al-Oran, R.M. (2005) The Status of Birds in the Proposed Rum Wildlife Reserve, Southern Jordan. *Turkish Journal of Zoology*, **29**, 17-26.
- [70] Khoury, F. (2001) On the Breeding Bird Community of Wadi Al-Kharrar, Jordan Valley. *Zoology in the Middle East*, **22**, 37-44.  
<https://doi.org/10.1080/09397140.2001.10637847>
- [71] Khoury, F. and Al-Shamlih, M. (2006) The Impact of Intensive Agriculture on the Bird Community of a Sand Dune Desert. *Journal of Arid Environments*, **64**, 448-459. <https://doi.org/10.1016/j.jaridenv.2005.06.006>
- [72] Green, M. and Thomas, C. (2008) Birds of the Badia Region of Jordan. *Sandgrouse*, **30**, 125-133.
- [73] Roll, U., Dayan, T. and Simberloff, D. (2008) Non-Indigenous Terrestrial Vertebrates in Israel and Adjacent Areas. *Biological Invasions*, **10**, 659-672.  
<https://doi.org/10.1007/s10530-007-9160-7>
- [74] Shwartz, A., Shirley, S. and Kark, S. (2008) How Do Habitat Variability and Management Regime Shape the Spatial Heterogeneity of Birds within a Large Mediterranean Urban Park? *Landscape and Urban Planning*, **84**, 219-229.  
<https://doi.org/10.1016/j.landurbplan.2007.08.003>
- [75] Ramadan-Jaradi, G. and Ramadan-Jaradi, M. (2012) Introduced, Captive, Caged and Escaped Exotic and Native Bird Species in the Littoral Area of Lebanon. *Lebanese Science Journal*, **13**, 27-36.
- [76] Nader, B.A. (2013) Report on the Situation of Migrating Birds in Lebanon. Lebanon Eco Movement (LEM), Sodeco.
- [77] Mahmoud, Z.N., Tahir, Y.F. and Hamdeen, H.M. (2015) Birds of El Ga'ab Depression, Sudan. *European Academic Research*, **3**, 4408-4415
- [78] Al-Oshoush, A. and Al-Zoubi, M. (2017) The Birds Diversity of the Wetland Habitats in the Fifa Nature Reserve, Jordan. *Jordan Journal of Natural History*, **4**, 37-46.
- [79] Perlman, Y., Granit, B. and Cohen A. (2017) Changes in the Breeding Avifauna of Israel during 2003-2016. *Zoology in the Middle East*, **63**, 8-16.  
<https://doi.org/10.1080/09397140.2017.1290824>
- [80] Ahamed, S.E. (2021) Bird Fauna of Jabel El Dayer National Park, Kordofan-Sudan. *Israa University Journal of Applied Sciences*, **5**, 87-103.  
<https://doi.org/10.52865/NIWF2911>
- [81] Vié, J.C., Hilton-Taylor, C. and Stuart, S.N. (2009) Wildlife in a Changing World—An Analysis of the 2008 IUCN Red List of Threatened Species. IUCN, Gland.
- [82] Sefi, M., Alefu, C., Kassegn, B. and Sewnet, T. (2017) Threats and Conservation Challenges of Wildlife in Harena Forest, Harena Buluk District, South East Ethiopia. *International Journal of Biodiversity and Conservation*, **9**, 246-255.  
<https://doi.org/10.5897/IJBC2017.1075>
- [83] Handal, E.N., Amr, Z.S., Basha, W.S. and Qumsiyeh, M.B. (2021) Illegal Trade in Wildlife Vertebrate Species in the West Bank, Palestine. *Journal of Asia-Pacific Bio-*

- diversity*, **14**, 636-639. <https://doi.org/10.1016/j.japb.2021.07.004>
- [84] Holzapfel, C., Levin, N., Hatzofe, O. and Kark, S. (2006) Colonization of the Middle East by the Invasive Common Myna *Acridotheres tristis* L., with Special Reference to Israel. *Sandgrouse*, **28**, 44-51.
- [85] Handal, E.N. and Qumsiyeh, M.B. (2021) Status and Distribution of the Invasive Common Myna *Acridotheres tristis* in the West Bank, Palestine. *Sandgrouse*, **43**, 658-665.
- [86] Baha El-Din, S.M., Salama, W., Grieve, A. and Green, R.E. (1996) Trapping and Shooting of Corncrakes (*Crex crex*) on the Mediterranean Coast of Egypt. *Bird Conservation International*, **6**, 213-227. <https://doi.org/10.1017/S0959270900003117>
- [87] Yom-Tov, Y. (2003) Poaching of Israeli Wildlife by Guest Workers. *Biological Conservation*, **110**, 11-20. [https://doi.org/10.1016/S0006-3207\(02\)00169-6](https://doi.org/10.1016/S0006-3207(02)00169-6)
- [88] Eid, E., Al Hasani, I., Al Share, T., Abed, O. and Amr, Z. (2011) Animal Trade in Amman Local Market, Jordan. *Jordan Journal of Biological Sciences*, **4**, 101-108.
- [89] El-Moghrabi, L. (2013) The State of Jordan's Birds 2013. The Royal Society for the Conservation of Nature (RSCN), Amman.
- [90] Aloufi, A. and Eid, E. (2014) Conservation Perspectives of Illegal Animal Trade at Tabuk Local Market, Kingdom of Saudi Arabia. *TRAFFIC Bulletin*, **26**, 77-80.
- [91] Bergin, D. and Nijman, V. (2014) Open, Unregulated Trade in wildlife in Morocco's Markets. *TRAFFIC Bulletin*, **26**, 65-70.
- [92] Eason, P., Rabia, B. and Attum, O. (2016) Hunting of Migratory Birds in North Sinai, Egypt. *Bird Conservation International*, **26**, 39-51. <https://doi.org/10.1017/S0959270915000180>
- [93] Elhalawani, S. (2016) Hunting and Illegal Killing of Birds along the Mediterranean coast of Egypt: Socioeconomic Study. Report by Nature Conservation Egypt & BirdLife International. AEWa, Bonn.
- [94] Baha El Din, M. and Atta, J. (1990) The World of Birds in Egypt. International Council for Bird Preservation/Egyptian Wildlife Service for the Conservation Education Center in the Giza Zoo, Cairo, Egypt.
- [95] Eid, E. and Handal, R. (2018) Illegal Hunting in Jordan: Using Social Media to Assess Impacts on Wildlife. *Oryx*, **52**, 730-735. <https://doi.org/10.1017/S0030605316001629>
- [96] Raine, A.F., Hirschfeld, A., Attard, G.M., Scott, L., Ramadan-Jaradi, G., Serhal, A. and Driskill, S. (2021) The International Dimension of Illegal Bird Hunting in Lebanon. *Sandgrouse*, **43**, 230-240.
- [97] Atoussi, S., Razkallah, I., Ameziane, I.N., Boudebouz, A., Bara, M., Bouslama, Z. and Houhamdi, M. (2022) Illegal Wildlife Trade in Algeria: Insight via Online Selling Platforms. *African Journal of Ecology*, **60**, 75-81. <https://doi.org/10.1111/aje.12967>