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# Impact of Some Human Activities on the Biodiversity of Bird Species at Damietta Region, Egypt

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**ABSTRACT**

The present study aims to assess the impact of some human activities on the bird community. Birds were sampled, using line transect and point count method, in six different localities on Damietta coast, Egypt, for 15 months (from July 2007 to September 2008). Species diversity varied spatially and temporally among the different localities during the study period. Nevertheless, the control site had the highest richness and abundance, while agriculture site and urbanized site had the lowest richness and abundance respectively. In contrast, urbanized site recorded the highest species evenness, while sparsely vegetated fish farm site (deserted and densely vegetated fish farm) had the lowest one. Otherwise fish farm site had the highest diversity while agriculture site had the lowest one. The different localities had distinct and characteristic groups of bird species reflecting the different human activities.

**Key words:** Biodiversity, bird, human activity, species diversity, species abundance, species richness, species evenness, Damietta.

## INTRODUCTION

Mediterranean coastal area in Egypt is considered as one of the most important bird habitats. It acts as a good nesting area for breeding species and a good station for migratory birds. Only coastal lakes located at Mediterranean were studied well (Meininger *et al.*, 1986) while coastal areas in between these lakes are ornithologically least known areas.

The preservation of species diversity on earth has emerged as one of the most important environmental issues (Turner *et al*., 1990; Ehrlich and Wilson, 1991). Biodiversity might be affected by changes at various spatio-temporal scales, as well as biotic and abiotic conditions. A particular change in environmental conditions may increase the diversity of one subset of organisms within a community while decrease the diversity of other group. Different spatial locations may have quite different biodiversity. Increases in anthropogenic activity are generally thought to decrease the persistence of local populations by compromising habitat suitability (Francl and Schnell, 2002; Soderstrom *et al*., 2001), restraining feeding and breeding opportunities, and increasing regional extinctions of wildlife species (Case *et al*., 1992; Fernandez-Juricic *et al*., 2004; Jackson *et al*., 2001; Sauvajot *et al*., 1998; Thompson and Jones, 1999). A high diversity within the plant and animal communities of a habitat is an important indicator of the overall quality of that system (Primack, 1993).

Birds are considered one of the most important and widely distributed species in the cultivated, non-cultivated and also in the desert habitats. Monitoring of birds on ecosystems is a valuable approach to increase our ecological understanding of production landscapes, as they can be excellent indicators of wider environmental health, they are generally more familiar to farmers than many other taxa, and they are good tools to measure the progress of sustainable development (Gregory *et al.,* 2004). The distribution and abundance of different bird species tend to be partly determined by the type and extent of habitat (Lindsey and Morris, 2002).

Wetlands play an important role in biodiversity because they are attractive to many species due to their large habitat diversity and their great productivity providing nutrients and other resources (Weller, 1988; Elmberg *et al*., 1994). Birds are among the most conspicuous wetland animals species that they are extremely sensitive to large hydrological changes (Kushlan, 1986; Crowder and Bristow, 1988; Pyrovetsi and Papastergiadou, 1992). Water conditions are among the main factors affecting the composition and the abundance of water bird communities directly and indirectly (Dister *et al*., 1990; Briggs *et al*., 1998; Osiejuk *et al*., 1999).

Coastal habitats are being increasingly affected by urbanization, both through direct loss and indirect effects of human activities within the habitats or the adjoining watershed (Hinrichsen, 1996; Michael *et al*., 1998; Kennish, 2002). In order to adequately assess the costs and benefits of developing or protecting coastal lands, we need to know more about the effects of human-induced alteration of these areas. Many studies have investigated the impact of these alterations on the degradation of coastal habitats themselves and its effects on economically important fish and shellfish populations (Neves and Angermeier, 1990; Ambrose and Meffert, 1999; Vanderklift and Jacoby, 2003), but fewer have focused on the effects on estuarine wildlife such as birds and mammals (Madsen and Fox, 1995; Perry and Deller, 1996; West *et al*., 2002; Le V Dit Durell *et al*., 2005).

Damietta Governorate has witnessed major development activities during the last decade such as industrial projects, fish cultures, and landscape alteration and urbanization encroachment. Such

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activities have caused drastic changes in the nature of aquatic and terrestrial environment of these regions. Therefore, the current study aims to explore the effect of these activities on the biodiversity of different bird species in this area, looking particularly at spatial and temporal variation in different study areas.

## MATERIALS AND METHODS

The study was carried out in the northern area of Damietta Governorate over a period of 15 successive months between July 2007 and September 2008. Six localities (Table 1) were selected for detailed study, to illustrate local habitat heterogeneities, as followed:

**Table (1):** Description, position and codes for different study sites

| Site Name | Abbreviation | GPS |
|---|---|---|
| Agriculture land | Agr | N 31° 26' 147" E 31° 46' 182" |
| Summer resort and landscape | Coast | N 31° 27' 762" E 31° 41' 291" |
| Deserted fish farm | Mahta | N 31° 26' 415" E 31° 35' 242" |
| Densely vegetated fish farm | Dvff | N 31° 26' 337" E 31° 35' 088" |
| Sparsely vegetated fish farm | Svff | N 31° 26' 316" E 31° 34' 353" |
| Control Site, Kassara | Kas | N 31° 29' 336" E 31° 24' 253" |

Bird survey was carried out by Point counts (Hutto *et al.,* 1986, Ralph *et al.,* 1993; Ralph *et al.,* 1995) and line transect method (Bibby *et al.*, 2000). Bird identification was carried out in the field according to bird guide book (Mullarney *et al*., 1999).

To assess the efficacy of birds sampling, we calculated species area curves for all the sites and all sampling methods.

Bird species abundance, richness, evenness and diversity were compared between different sites using one-way analysis of variance (ANOVA) (Zar 1999) using the SPSS for Windows 12 statistical software package (SPSS Inc. 1996).

The analysis of indicator species by Duferne and Legendre's (1997) method, was calculated. We used PC-ORD for Windows version 4.14 for these analysis (McCune and Mefford 1999).

## RESULTS

### Species Area Curve

Our sampling from 15 successive month resulted in record of 79% of the estimated total species richness (First-Order jackknife estimate). After removing all singleton species, the curve showed a considerable flattening after eighth trip which meant that all the common species were collected after eighth trip (Fig. 1 a&b).

### Univariate analysis:

*Trend in richness and abundance*

A total of 197,568 individuals belonging to 154 bird species (17 orders and 40 families) were recorded throughout the study period, including 101 bird species belonging to non-passerine and 53 bird species belonging to passerine one. There were 106 species at Kas-site (control one); 87 species at Dvff- site; 83 species at Mahta-site; 66 species at Svff-site; 50 species at coast-site and 38 species at Agr-site (Figures 2and 3).

One-way ANOVA has revealed significant differences in bird species richness between different study sites for both the spatial ($P< 0.01$) and the temporal ($P\leq 0.01$). On the other hand, there was a high significant difference between different study sites in spatial variation in species abundance ($P< 0.01$) and there was no significant difference in temporal species abundance.

*Trend in diversity and evenness*

Species evenness (E) and diversity indices (Shannon-Wiener (H), Simpson (D) ) for both spatial and temporal are shown in Figures (4A, 4B, 5A and 5B) respectively. The One-way ANOVA's showed no significant difference in spatial Simpson diversity index, while there was a highly significant difference in Shannon diversity index among locations ($P\leq 0.01$). There was a significant difference in the temporal

500 repeated sub samples from the data set and the dotted lines indicate the standard deviation.

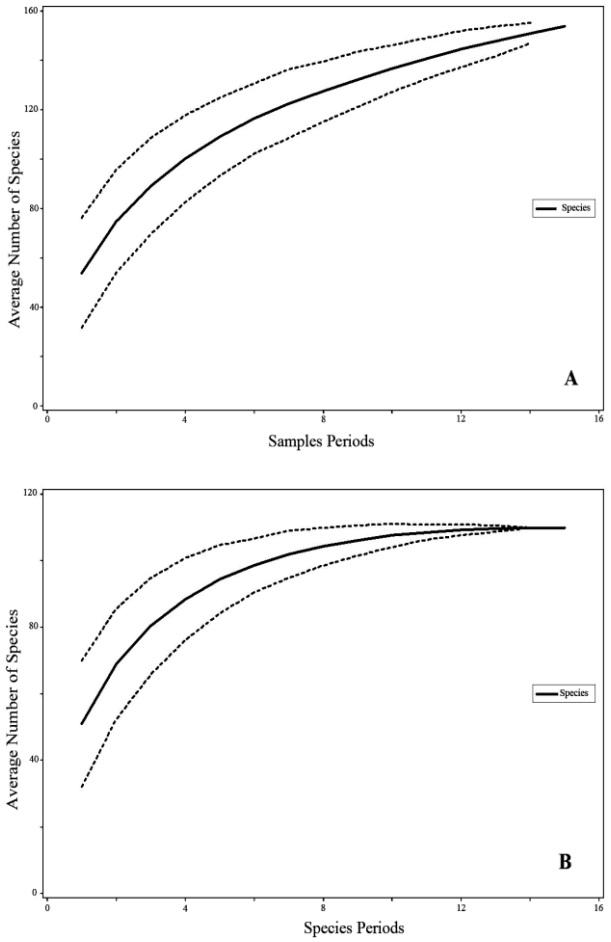


**Figure 1.** Mean cumulative bird species richness over successive sampling periods for (a) total species, and (b) for all species except singletons. The curve is derived from 500 repeated sub samples from the data set and the dotted lines indicate the standard deviation.

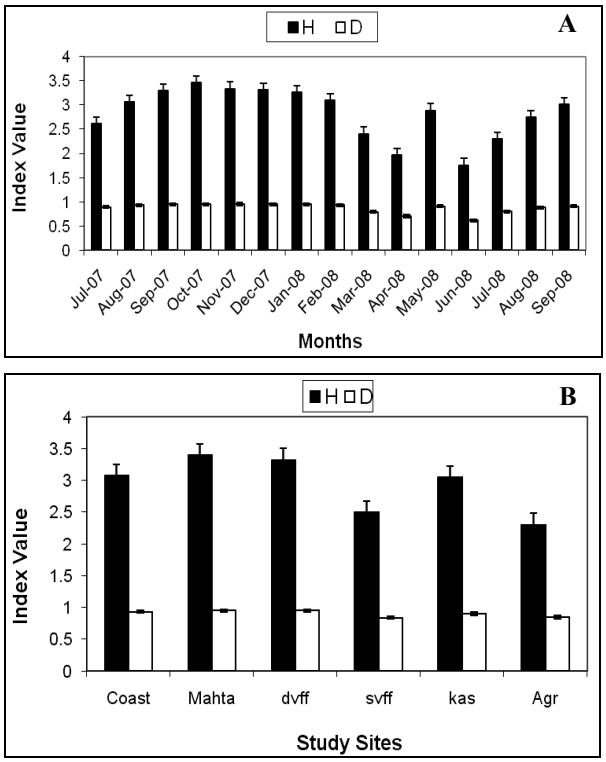


**Figure (2):** The Simpson diversity index (D) and Shannon Weiner diveristy index (H) of bird species (A): The spatial variation, and (B): The tempotal variation.

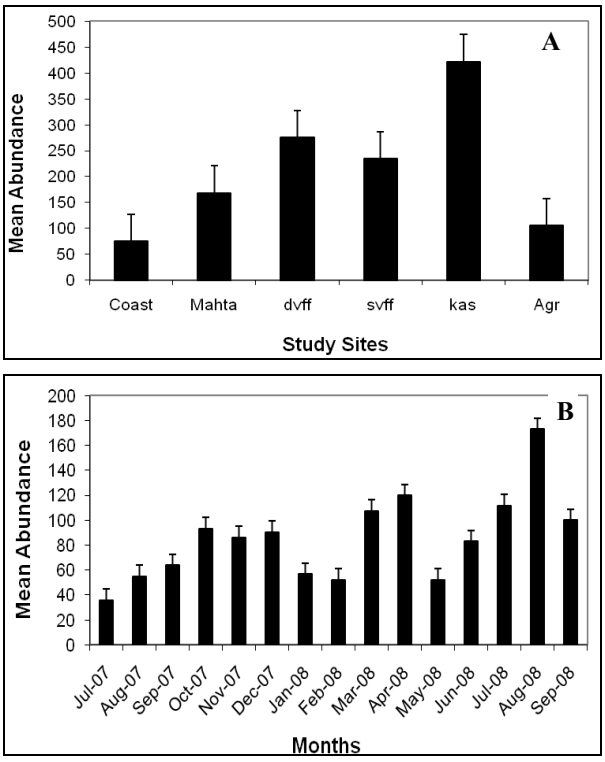


**Figure (4):** Species abundance of bird species: (A) at different sites of the study area, ands (B) during the study period.

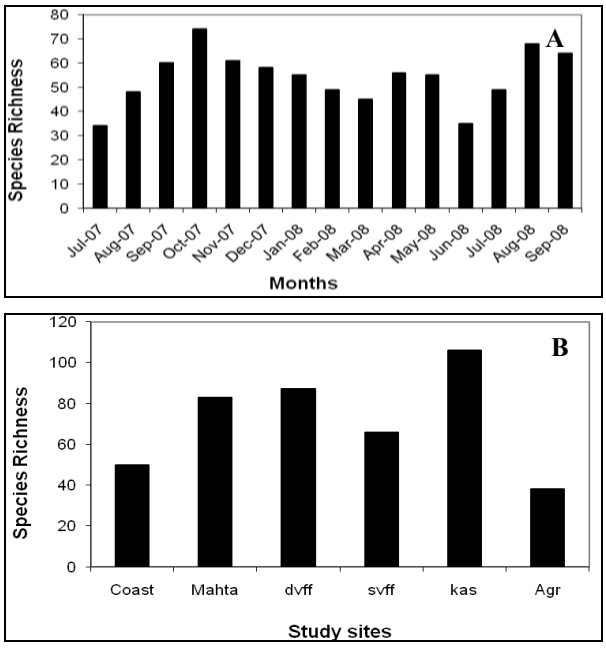


**Figure (3):** Species richness: (A) at different sites of the study area, and (B) during the study period.

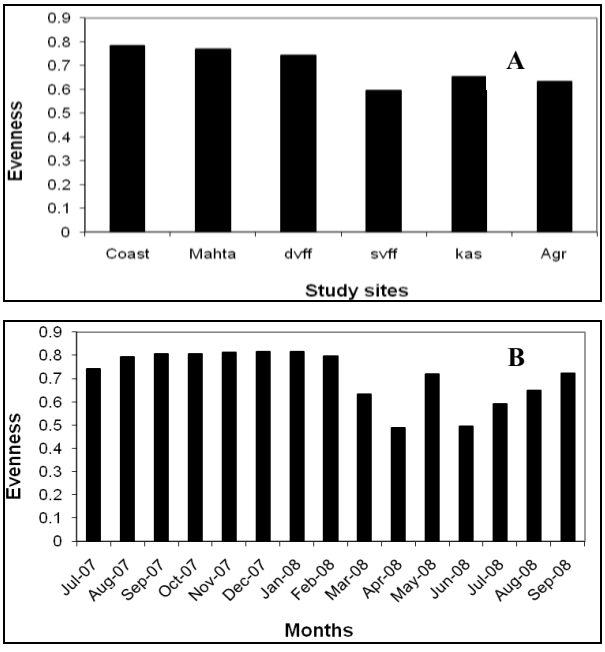


**Figure (5):** Species evenness of bird species: (A) at different sites of the study area, and (B) during the study period.

**Table (2):** The indicator bird species ant their codes at different study sites (IV = Indicator Value).

| Bird species | Code | Group | IV | P | Group | Sites |
|---|---|---|---|---|---|---|
| *Ciconia nigra* | B13 | 1 | 100 | 0.03 | 1 | Kas |
| *Anas clypeata* | B18 | 1 | 77.2 | 0.05 | 2 | Svff |
| *Sterna sandvicensis* | B76 | 1 | 68.9 | 0.03 | 3 | Agr |
| *Motacilla flava* | B111 | 2 | 60.3 | 0.03 | 3 | Coast |
| *Columba livia domestica* | B85 | 3 | 70.7 | 0.009 | 4 | Mahta |
| *Burhinus oedicnemis* | B63 | 4 | 85.4 | 0.006 | 4 | Dvff |
| *Sterna caspia* | B77 | 4 | 84.3 | 0.007 | | |

variation in both Simpson diversity index (P≤ 0.01) and Shannon diversity index (P≤ 0.01). On the other hand, there were no significant differences between different study sites in species evenness in both spatial and temporal variation.

**Bird-indicator species:**

Seven bird species showed significant affinities with the study sites (Table 2). The three bird species *Ciconia nigra* (Ciconiiformes: Ciconiidae) (Indicator value IV= 100, P< 0.03), *Anas clypeata* (Anseriformes: Anatidae) (Indicator value IV= 77.2, P< 0.05) and *Sterna sandvicensis* (Charadriiformes: Sternidae) (Indicator value IV= 68.9, P< 0.03) were significant associated with the control site (Kas-site). While *Motacilla flava* (Passeriformes: Motacillidae) (Indicator value IV= 60.3, P< 0.03) was significantly associated with Svff-site. Both coast-site and Agr-site showed the *Columba livia domestica* (Columbiformes: Columbidae) (Indicator value IV= 70.7, P< 0.009) to be an indicator species. On the other hand, *Burhinus oedicnemis* (Charadriiformes: Recurvirostridae) (Indicator value IV= 85.4, P<0.006) and *Sterna caspia* (Charadriiformes: Sternidae) (Indicator value IV= 84.3, P< 0.03) were associated with Mahta and Dvff sites.

## DISCUSSION

This study sheds some light on one of the most important regions in Egypt, Damietta region. The Nile divides into two branches below Cairo, the western and eastern branches that flow into the sea at Rosetta and Damietta. The Nile Delta is part of one of the world's most important migration routes for birds. Every year, millions of birds pass between Europe and Africa along the 'eastern African flyway', and the wetland areas of Egypt, are especially key as stopover sites (Denny, 1991). Mediterranean coastal area in Egypt is considered as one of the most important bird's habitat. It acts as a good station for migratory birds and nesting area for breeding species. Practically no areas of delta habitat remain undisturbed, Damietta region suffer from human activities such as fisheries, agriculture and industry; resulting in serious impacts on the natural environment.

The results for bird's biodiversity reflected the effect of various types of disturbance on the study area. There were highly significant differences between study sites in species richness and abundance. The highest values were recorded at the control site (Kas-site) and the two disturbed sites (Agr-site and Coast site) showed lower values for both species richness and abundance. This result is in agreement with (Mittermeier *et al.*, 1999) who showed that the expansion of modern agriculture is one of the greatest threats to worldwide biodiversity due to natural habitat loss, disturbances and pollution. Also match with (Loss *et al.*, 2009) who found that total richness was higher in urban sites with undeveloped patches and heterogeneous land cover types; moreover, richness decreased with increasing distance from natural areas. This finding is in consistency with the fact that increases in anthropogenic activity are generally thought to decrease bird populations by compromising habitat suitability (Francl and Schnell, 2002; Soderstrom *et al.*, 2001), restraining feeding, breeding opportunities, and increasing regional extinctions of wildlife species (Case *et al.*, 1992; Fernandez-Juricic *et al.*, 2004; Jackson *et al.*, 2001; Sauvajot *et al.*, 1998; Thompson and Jones, 1999).

Our results for bird's species evenness and diversity showed no significant difference between all sites and the control site and all fell in the same range. The results are consistent with (Söderström *et al*., 2003; Fairbanks, 2004; Verhulst *et al*., 2004) where they showed that the variation in resource availability is likely the primary force structuring bird species distributions at the regional scale. Telleria and Santos (1995) and Newton 1998) stated that home range size is related to resource availability. The fact that bird species diversity in impacted sites exceeded, or fell in, the same range as the control site is in consistency with the intermediate disturbance hypothesis (Connell, 1978), which proposed that highest diversity is attained at intermediate levels of disturbance.

In general, the temporal variation showed that the migrating birds were the main factors which peaked at October. Also in July bird species make parental care and became less. There were no significant difference in species evenness and species abundance while the both types of diversity (Simpson diversity and Shannon-Wiener diversity indices) and bird's species richness showed significant difference. Common tern (*Sterna hirundo*) is considered as the most important species along all study sites and in the control site (Kas-site) in particular due to plenty of food and less disturbance. Goodman *et al.* (1989) found that common tern fairly common passage visitor along the Mediterranean and Red Sea coasts and the Nile in autumn from early August to mid-October (early November) and in spring from mid-March to mid-June.

The indicator species analysis provided the opportunity to identify several species as an indicative of a specific class of sites. Such species, including Black stork "*Ciconia nigra*" (Ciconiiformes), Shoveler "*Anas clypeata*" (Anseriformes) and Sandwish tern "*Sterna sandvicensis*" (Charadriiformes) were identified as indicators in control site (kas-site). Jiguet and Villarubias (2004) found that black stork breeding and non-breeding adults foraged over very large areas, preferentially in woodlands with high number of river sources, mirroring the species needs for high quality water resource. Shoveler is a migratory water bird give and can be used as a measure of hunting hazard on birds (Paillisson *et al*., 2002).

Also Domestic pigeon "*Columba livia domestica*" (Columbiformes) was associated with both disturbed sites Coast and Agr-sites which are more urbanized, this is in accordance with (Jokimäki and Suhonen, 1998)

who found that *Columba livia domestica* was positively related to human population density. On the other hand, Stone curlew "*Burhinus oedicnemis*" and Caspian tern "*Sterna caspia*" (Charadriiformes) were associated with Mahta and Dvff disturbed sites. Thompson *et al*. (2004) found that stone curlew distribution is influenced by the physical breeding requirements and the potential suitable nest site. The stone curlew is common in sites which had been subjected to appropriate forms of land management, and with sparsely vegetation. (Quinn and Sirdevan, 1998) found that Caspian terns prefer sand over pea-gravel and crushed stone, which reflects the nature of both Dvff and Mahta sites.

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# أثر بعض الأنشطة البشرية على التنوع الحيوي لأنواع الطيور المختلفة بمنطقه دمياط مصر

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## الملخـــص العربـــي

تم حصر أنواع الطيور من ستة أماكن مختلفة في المنطقة الساحلية لمحافظة دمياط وذلك باستخدام العد النقطي و العد في خط مستقيم. وتشمل تلك المناطق مواقع تمثل تأثير أنشطة بشريه مختلفة : منطقه زراعيه، منطقه سكنية، منطقه مزارع سمكية بالإضافة إلى منطقه بدون أنشطة (تجربة ضابطة). كل منطقه ممثله بخطين للرصد يتراوح طولها من ١ إلى ١،٥ كيلو متر.

وقد أظهرت الدراسة اختلافا للموائل والغطاء النباتي باختلاف المناطق الستة وبدرجه اقل داخل المواقع. وقد أدى ذلك إلى اختلاف التنوع من حيث المكان و أيضا اختلاف معنوي خلال فترة الدراسة. أوضحت الدراسة أن المنطقة الضابطة تحتوى على أعلى تنوع وأعلى أعداد بينما كانت المنطقة الزراعية اقل احتواء أنواع والمنطقة السكنية كانت الأقل من حيت الأعداد. وعلى العكس، كانت المنطقة السكنية الأعلى في عدد الأفراد النسبي بينما كانت المزرعة السمكية ذات الغطاء النباتي الخفيف اقل في عدد الأفراد النسبي.أيضا جاءت المزارع السمكية أعلى في التنوع بينما جاءت المنطقة الزراعية اقل في التنوع. و يمكن القول أن المناطق المختلفة تميزت بمجموعات مميزة الأنواع من الطيور استجابة للأنشطة المختلفة للإنسان.

نتائج هذا البحث تقترح أن استخدام الطيور كدلائل حيوية طريقه عمليه وجيده لتعيين التنوع الحيوي في مجال المناطق السكنية و الزراعة و مزارع الأسماك وأيضا في التجربة الضابطة. إن نتائج الطيور في هذا البحث تعبر عن أهميه هذه المنطقة كمأوي للطيور المقيمة والمتوالدة وأيضا للمهاجرة ويوصي باستخدامها في خطط الصون الحيوي في مصر.

**Appendix:** Bird Checklist recorded in the study sites, their code and relative abundance, during 2007-2008. R: Resident, M: Migratory, Sh: Shorebird, Mr: birds of marshes and ©: first record breeding in Egypt.

| Classification | | | | | Sp. Code | Status | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Order** | **Family** | **Scientific Name** | **English Name** | **Arabic Name** | | **R** | **M** | **Sh** | **Mr** |
| **Podicipediformes** | Podicipedidae | *Tachybaptus ruficollis* | Little Grebe | زهوت | B1 | | * | * | |
| | Procellariidae | *Puffinus Sp.* | Shearwater | جلم الماء | B2 | | * | * | |
| **Pelecaniformes** | Phalacrocoracidae | *Phalacrocorax carbo* | Cormorant | غراب البحر | B3 | | * | * | * |
| **Ciconiiformes** | Ardeidae | *Ixobrychus minutus* | Little bittern | واق صغير | B4 | * | | | * |
| | | *Egretta alba* | Great white egret | بلشون أبيض كبير | B5 | | * | | * |
| | | *Egretta garzetta* | Little egret | بلشون أبيض | B6 | * | | * | * |
| | | *Ardeola ralloides* | Squacco heron | واق أبيض | B7 | * | | * | * |
| | | *Bubulucus ibis* | Cattle egret | أبو قردان | B8 | * | | * | * |
| | | *Ardea cinerea* | Grey heron | بلشون رمادي | B9 | | * | * | * |
| | | *Ardea purpurea* | Purple heron | مالك الحزين | B10 | | * | * | * |
| | | *Nicticorax nicticorax* | Night heron | غراب الليل | B11 | | * | | * |
| | Threskiornithidae | *Plegadis falcinellus* | Glossy ibis | أبو منجل أسود | B12 | | * | | * |
| | Ciconiidae | *Ciconia nigra* | Black stork | لقلق/عنز اسود | B13 | | * | * | * |
| | | *Ciconia ciconia* | White stork | لقلق/عنز أبيض | B14 | | * | * | |
| **Anseriformes** | Anatidae | *Anas platyrhynchos* | Mallard | خضاري | B15 | | * | | * |
| | | *Anas platyrhynchos* | Pintail | بلبول | B16 | | * | | * |
| | | *Anas querquedula* | Garganey | شرشير صيفي | B17 | | * | | * |
| | | *Anas clypeata* | Shoveler | كيش | B18 | | * | * | * |
| | | *Tadorna tadorna* | Shelduck | شهرمان | B19 | | * | | * |
| **Accipitriformes** | Accipitridae | *Haliaeetus albiclla* | White tailed eagle | عقاب البحر | B20 | | * | | * |
| | | *Spizeetus nipalensis* | Steppe eagle | عقاب السهول | B21 | | * | | * |
| | | *Circaetus gallicus* | Short toed eagle | عقاب أبيض | B22 | | * | | * |
| | | *Buteo rufinus* | Long legged buzzard | صقر جراح | B23 | | * | | * |
| | | *Buteo vulpinus* | Steppe buzzard | صقر حوام | B24 | | * | * | |
| | | *Accipiter nisus* | Sparrowhawk | باشق/باز | B25 | | * | | * |
| | | *Milvus migrans* | Black kite | حدايه سوداء | B26 | | * | | * |
| | | *Elanus caeruleus* | Black winged kite | حدايه | B27 | * | | * | * |

**Appendix (Cont.)**

| Classification | | | | | Sp. Code | Status | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Order** | **Family** | **Scientific Name** | **English Name** | **Arabic Name** | | **R** | **M** | **Sh** | **Mr** |
| **Accipitriformes** | Accipitridae | *Circus aeruginosus* | Marsh harrier | دراع | B28 | | * | * | * |
| | Pandionidae | *Pandion haliaetus* | Ospery | منسوري | B29 | | * | | * |
| **Falconifoemes** | Falconidae | *Falco tinnunculus* | Kestrel | عوسق | B30 | * | | * | * |
| **Galliformes** | Phasianidae | *Coutrinx coturnix* | Common quil | سمان | B31 | | * | | * |
| **Gruiformes** | Rallidae | *Fulica atra* | Eurasian coot | غر | B32 | | * | | * |
| | | *Porphyrio porphyrio* | Purple swamphen | دجاج سلطانية | B33 | | * | | * |
| | | *Gallinula chloropus* | Common moorhen | دجاج الماء | B34 | * | | * | * |
| **Charadriiformes** | Haematopodidae | *Haematopus ostralegus* | Oystercatcher | أكل المحار | B35 | | * | | * |
| | Charadriidae | *Hoplopterus spinosus* | Spur-winged plover | زقزاق | B36 | * | | * | * |
| | | *Charadrius hiaticula* | Common ringed plover | قطقاط متوج كبير | B37 | | * | * | * |
| | | *C. dubius* | Little ringed plover | قطقاط متوج صغير | B38 | | * | * | * |
| | | *C. alexandrinus* | Kentish plover | قطقاط أبو الرؤوس | B39 | * | | * | |
| | | *C. leschenaultii* | Greater Sand Plover | قطقاط الرمل الكبير | B40 | | * | * | |
| | | *C. mongolus* | Lesser sand plover | قطقاط الرمل الصغير | B41 | | * | * | |
| | | *Arenaria interpres* | Turnstone | قنبرة الماء | B42 | | * | * | |
| | | *Pluvialis apricaria* | Golden plover | قطقاط ذهبي | B43 | | * | | * |
| | | *Pluvialis squatarola* | Grey plover | قطقاط رمادي | B44 | | * | * | * |
| | Scolopacidae | *Calidris alpina* | Dunlin | دريجة | B45 | | * | * | |
| | | *Calidris alba* | Sanderling | مدروان | B46 | | * | * | |
| | | *Calidris temminkii* | Temminck's stint | فطيرة تمنك | B47 | | * | | * |
| | | *Calidris minuta* | Little stint | كروان الماء | B48 | | * | * | * |
| | | *Calidris ferruginea* | Curlew sandpiper | دريجه كروانيه | B49 | | * | | * |
| | | *Gallinago gallinago* | Snipe | بكاشين | B50 | | * | | * |
| | | *Lymnocryptes minimus* | Jac snipe | بكاشين صغير | B51 | | * | | * |
| | | *Numenius arquata* | Eursiam curlew | كروان الغيط | B52 | | * | * | * |
| | | *Numenius phaeopus* | Whimbrel | كروان غيطى صغير | B53 | | * | * | |
| | | *Limosa limose* | Black tailed godwit | بقويقه سوداء الذنب | B54 | | * | | * |

**Appendix (Cont.)**

| Classification | | | | | Sp. Code | Status | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Order** | **Family** | **Scientific Name** | **English Name** | **Arabic Name** | | **R** | **M** | **Sh** | **Mr** |
| **Charadriiformes** | Scolopacidae | *Philomachus pugnax* | Ruff | بياض | B55 | | * | | * |
| | | *Actitis hypoleucos* | Common sandpiper | طيطوي | B56 | | * | | * |
| | | *Tringa ochropus* | Green sandpiper | طيطوي أخضر | B57 | | * | | * |
| | | *Tringa nebularia* | Greenshank | طيطوي أخضر الساق | B58 | | * | | * |
| | | *Tringa stagnatilis* | Marsh sandpiper | طيطوي المستنقع | B59 | | * | | * |
| | | *Tringa totanus* | Redshank | طيطوي أحمر الساق | B60 | | * | | * |
| | Recurvirostridae | *Recurvirostra avosetta* | Avocet | نكات | B61 | | * | | * |
| | | *Himantopus himantopus* | Black winged stilt © | أبو المغازل © | B62 | * | | | * |
| | | *Burhinus oedicnemis* | Stone curlew | كروان | B63 | * | | * | * |
| | | *Glareola pratincola* | Collared pratincole | أبو اليسر | B64 | | * | * | * |
| | Laridae | *Larus melanocephalus* | Mediterranean gull | نورس البحر المتوسط | B65 | | * | * | |
| | | *Larus ridibundus* | Black headed gull | نورس أسود الرأس | B66 | | * | * | * |
| | | *Larus genei* | Slender billed gull | نورس قرقطي | B67 | * | | * | * |
| | | *Larus cachinnans* | Yellow legged gull | نورس أصفر القدم | B68 | * | | * | * |
| | | *Larus marinus* | Great black backed g. | نورس دغبه كبير | B69 | | * | * | |
| | | *Larus fuscus* | Lesser black backed gull | نورس دغبه | B70 | | * | * | * |
| | | *Larus ichthyaetus* | Great black headed gull | نورس السمك | B71 | | * | * | * |
| | | *Larus minutus* | Little gull | نورس صغير | B72 | | * | * | * |
| | | *Larus canus* | Common gull | نورس شاع | B73 | | * | * | |
| | | *Rissa tridactyla* | Kittiwake | نورس أسود القدم | B74 | | * | * | |
| | | *Larus spp.* | Different immature gull | نوارس صغيرة | B75 | | * | * | * |
| | Sternidae | *Sterna sandvicensis* | Sandwish tern | خرشنه | B76 | | * | * | * |
| | | *Sterna caspia* | Caspian tern | خطاف أبو بلحة | B77 | | * | * | * |
| | | *Sterna hirundo* | Common tern | خطاف البحر | B78 | | * | * | * |
| | | *Sterna albifrons* | Little tern | خطاف صغير | B79 | | * | * | * |
| | | *Chlidonias niger* | Black tern | خطاف اسود | B80 | | * | * | * |
| | | *Chlidonias leucopterus* | White wingedblack tern | خطاف أبيض الجناح | B81 | | * | * | |

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|---|---|---|---|---|---|---|---|---|---|
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| **Charadriiformes** | Sternidae | *Chlidonias hybridus* | Whiskered tern | خطاف أبيض الخد | B82 | | * | * | * |
| | | *Gelochelidon nilotica* | Gull billed tern | خطاف نورسى المنقار | B83 | | * | * | * |
| | Columbidae | *Columba livia* | Rock dove | حمام جبلى | B84 | * | | * | |
| | | *Columba livia domestica* | Pigeon | حمام منزلي | B85 | * | | * | * |
| | | *Streptopelia decaocto* | Collared dove | يمام مطوق | B86 | * | | | * |
| | | *Streptopelia senegalensis* | Laughing dove | يمام بلدي | B87 | * | | * | * |
| | | *Streptopelia turtur* | Turtle dove | ترجول | B88 | | * | * | * |
| **Cuculiformes** | Cuculidae | *Centropus senegalensis* | Senegal coucal | كوكو/مك | B89 | * | | * | |
| **Strigiformes** | Tytonidae | *Tyto alba* | Barn owl | بومه ماصة | B90 | * | | * | |
| | Strigidae | *Asio flammeus* | Short eared owl | هامة | B91 | | * | | * |
| | | *Athene noctua* | Little owl | أم قويق | B92 | * | | * | |
| **Caprimulgiformes** | Caprimulgidae | *Caprimulgus europaeus* | European night jar | سبد /أبو النوم | B93 | | * | | * |
| **Apodiformes** | Apodidae | *Apus pallidus* | Pallid swift | سمامة باهته | B94 | | * | | * |
| **Coraciiformes** | Meropidae | *Meropus apiaster* | Bee eater | وروار أروبي | B95 | | * | * | * |
| | | *Meropus orientalis* | Little green bee eater | وروار/خضير | B96 | * | | | * |
| | | *Meropus superciliosus* | Blue checked bee eater | وروار أزرق الخد | B97 | | * | * | * |
| | Upupidae | *Upupa epops* | Hoopoe | هدهد | B98 | * | | * | * |
| | Alcedinidae | *Ceryle rudis* | Pied kingfisher | صياد السمك الأبقع | B99 | * | | * | * |
| | | *Halcyon smyrnensis* | White breasted kingfish. | قاوند | B100 | * | | * | * |
| | | *Alcedo atthis* | Common kingfisher | صياد السمك | B101 | | * | * | * |
| **Passeriformes** | Alaudidae | *Galerida cristata* | Crested lark | قنبرة متوجة | B102 | * | | | * |
| | | *Melanocorypha calandra* | Calandara lark | قنبرة الغرب الكبيرة | B103 | | * | | * |
| | Hirundinidae | *Delichon urbica* | House martin | سنونو أبيض البطن | B104 | | * | | * |
| | | *Riparia riparia* | Sand martin | سنونو | B105 | | * | * | * |
| | | *Hirundo rustica transitiva* | Barn swallow | عصفور الجنة | B106 | | * | * | * |
| | | *Hirundo rustica savigmii* | Barn swallow | عصفور الجنة | B107 | * | | * | * |
| | Motacillidae | *Anthus novaeseelandiae* | Richard's pipit | أبو فصية | B108 | * | | | * |

**Appendix (Cont.)**

| Classification | | | | | Sp. Code | Status | | | |
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| **Passeriformes** | Motacillidae | *Motacilla cinerea* | grey wagtail | أبو فصاده رمادي | B109 | * | | * | * |
| | | *Motacilla alba* | Pied wagtail | أبو فصاد أبقع | B110 | * | | * | * |
| | | *Motacilla flava* | Yellow wagtail | أبو فصاد أصفر | B111 | * | | * | * |
| | Laniidae | *Lanius collurio* | Red backed shrike | دقناش أكحل | B112 | | * | * | * |
| | | *Lanius meridionalis* | Southern grey shrike | دقناش | B113 | | * | | * |
| | | *Lanius isabellinus* | Isabelline shrike | دقناش أشجب | B114 | | * | | * |
| | | *Lanius minor* | Lesser grey shrike | دقناش صردي | B115 | | * | * | * |
| | | *Lanius excubitor* | Great grey shrike | دقناش الباديه | B116 | * | | | * |
| | | *Lanius nubicus* | Masked shrike | دقناش قبطي | B117 | | * | | * |
| | | *Lanius senator* | Woodchat shrike | دقناش اوروبي | B118 | | * | | * |
| | Corvidae | *Corvus corone cornix* | Hooded crow | غراب بلدي | B119 | * | | * | * |
| | Sylviidae | *Cisticola juncidis* | Fan tailed warbler | فصيه مروحيه الذنب | B120 | * | | * | * |
| | | *Prinia gracilis* | Graceful prinia | هازجه | B121 | * | | * | * |
| | | *Acrocephalus stentoreus* | Clamorous reed warbler | هازجه القصب الصياحة | B122 | * | | | * |
| | | *A. arundinaceus* | Great reed warbler | هازجا القصب الكبيرة | B123 | | * | | * |
| | | *Acrocephalus palustris* | March warbler | هازجة البطائح | B124 | | * | | * |
| | | *Hippolais pallida* | Olivaceous warbler | خنشع زيتوني | B125 | | * | | * |
| | | *Hippolais icterina* | Icterine warbler | خنشع ليموني | B126 | | * | * | * |
| | | *Sylvia curruca* | Lesser white throat | زريقه فيراني | B127 | | * | | * |
| | | *Sylvia communis* | White throat | زريقه فيراني | B128 | | * | | * |
| | | *Sylvia rueppelli* | Ruppell's warbler | زريقه قصابي | B129 | | * | | * |
| | | *Sylvia hortensis* | Orphean warbler | دخله مغنية | B130 | | * | | * |
| | | *Phylloscopus collybita* | Chiffchaff | شاديه الخمايل | B131 | | * | | * |
| | Muscicapidae | *Ficedula albicollis* | Collared flycatcher | خطاف الذباب المطوق | B132 | | * | | * |
| | | *Ficedula parva* | Red breasted flycatcher | خطاف الذباب أحمر الصدر | B133 | | * | | * |
| | | *Muscicapa striata* | Spotted flycatcher | خطاف الذباب الأنقط | B134 | | * | | * |
| | Turdidae | *Oenanthe hispanica* | Black eared wheatear | أبلق أسود الأذن | B135 | | * | | * |

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| Classification | | | | | Sp. Code | Status | | | |
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| **Passeriformes** | Turdidae | *Oenanthe isabellina* | Isabelline wheatear | أبلق أشهب | B136 | | * | | * |
| | | *Oenanthe oenanthe* | Northern wheatear | أبلق أبو بليق | B137 | | * | * | * |
| | | *Oenanthe deserti* | Desert wheatear | أبلق الصحراء | B138 | * | | | * |
| | | *Saxicola rubetra* | Whinchat | قليعى أحمر | B139 | | * | | * |
| | | *Saxicola torquata* | Stonchat | قليعي مطوق | B140 | | * | * | * |
| | | *Phoenicurus phoenicurus* | Redstart | حميراء | B141 | | * | | * |
| | | *Phoenicurus ochruros* | Black redstart | حميراء سوداء | B142 | * | | * | * |
| | | *Luscinia svecica* | Blue throat | حسيني | B143 | | * | | * |
| | | *Luscinia megarhynchos* | Nightingale | المغناء الأسمر | B144 | | * | * | * |
| | | *Luscinia luscinia* | Thrush nigtingale | عندليب | B145 | | * | | * |
| | | *Erithacus rubecula* | Eurobian robin | أبو الحناء | B146 | | * | | * |
| | | *Turdus philomelos* | Song thrush | سمنة مطربه | B147 | | * | | * |
| | Pycnonotidae | *Pycnonotus barbatus* | Common bulbul | بلبل عربي | B148 | * | | * | * |
| | Passeridae | *Passer domesticus niloticus* | House sparrow | عصفور الغيط | B149 | * | | * | * |
| | | *Passer hispaniolensis* | Spanish sparrow | عصفور اسباني | B150 | | * | | * |
| | Fringillidae | *Carduelis carduelis* | Golden finch | عصفور حسون | B151 | | * | | * |
| | | *Carduelis cannabina* | Linnet | عصفور تفاحي | B152 | | * | | * |
| | Emberizidae | *Miliaria calandra* | Corn bunting | درسة/بلبل الشعير | B153 | | * | | * |
| | Ploceidae | *Ploceus manyar* | Streaked weaver | عصفور نساج مخطط | B154 | * | | | * |