

12.1. HABITATS SUPPORTING WATER BIRDS

Habitats inside Lake Burullus may be roughly classified into four categories: 1- reedbeds, 2- marsh with halophytes, 3- open water with submerged vegetation, 4- areas with very low water levels and emergent sand or mud-flats with scarce or no vegetation. On the edges of the wetland there are sand dunes between the sea and the lake, and man-made habitats such as canals and drain, arable land and fish-farms. The breeding population of Pied kingfisher (*Ceryle rudis rudis*) of the lake is gathered mainly along the banks of the surrounding canals. Fish-farms may be of interest only for fish-eating birds like herons, gulls and terns during winter and passage periods (Tinarelli 1994).

12.1.1. Reedbeds and Marshes

Reedbeds within the lake are estimated to cover about 7000 hectares (Shaltout *et al.* 2004) and represent one of the most important reedbeds in the Mediterranean region where this type of habitat is becoming more and more rare and threatened. The largest reedbeds are mainly in the middle-southern and eastern parts (between Elshkloba and Baltim), but many wide reed-belts are present along the western and the northern shores of the lake. The surface covered with reed beds had increased strongly in the past decades due both to marked increase of freshwater with heavy fertilizer loads brought by drainage canals, and to frequent clogging of the connection with sea. At present, the growth of the reedbeds, seems stable, or even retreats.

Wintering and migrant birds like Squacco Heron (*Ardeola ralloides*), Marsh Harrier (*Circus aeruginosus aeruginosus*) and many passerines are strongly dependent on reedbeds for foraging and refuge. Reedbeds provide also important breeding habitat for the rare Purple Gallinule (*Porphyrio porphyrio*

madagascariensis), Little Bittern (*Ixobrychus minutus minutus*), Moorhen (*Gallinula chloropus chloropus*), Water Rail (*Rallus aquaticus aquaticus*) and Clamorous Reed warbler (*Acrocephalus stentoreus stentoreus*). Small open waters inside the reedbeds are feeding and resting sites for Ferruginous Duck (*Aythya nyroca*). Red-Crested Pochard (*Netta rufina*) and less frequently for other dabbling ducks.

12.1.2. Areas of Low Water Levels and Exposed Sand/Mud Flats

Areas of low water levels and exposed sand / mud flats with scarce or no vegetation are mainly in the northeastern sector where the reed growth is limited by salt-water entering from the sea. The presence of this habitat is very important for the lake because it supports foraging wintering and migrant waders. Emergent sand-flats and mud-flats are used also by wintering and migrant terns and gulls (especially Little Gull *Larus minutus* and Whiskered Tern *Chlidonias hybrida hybrida*) and herons (especially Little Egret *Egretta garzetta garzetta*) as resting site. Small areas of mud-flats with scarce or no vegetation are present inside some islets and represent suitable habitats for breeding of Collared Pratincola (*Glareola pratincola partincola*), Kentish Plover (*Charadrius alexandrinus alexandrinus*), Kittlitz's Plover (*Charadrius pecuarius allenbyi*) and Little Tern (*Sterna albifrons albifrons*).

12.1.3. Open Water with Submerged Vegetation

Open water with submerged vegetation is the feeding and resting habitat for wintering and migrant ducks and coots. Most eutrophicated area with presence of insects on water surface, generally near reedbeds, are used as foraging sites by Little Gulls (*Larus minutus*) and Whiskered Tern (*Chlidonias hybrida hybrida*). Marshes with halophytic vegetation are present both inside many islets due to salted soils, and along the southern shore in areas formerly used for commercial salt production and fish farming. Spur-winged Plover (*Hoplopterus spinosus*) uses this type of habitat for breeding, while wintering and migrant raptors, waders, Great White Egret (*Egretta alba alba*) and Little Egret (*Egretta garzetta garzetta*) use it for feeding (Tinarelli 1994).

12.2. BREEDING BIRDS

Breeding water birds in Lake Burullus include Little Grebe (fairly common), Little Bittern (probably hundreds of pairs), Water Rail (fairly common), Moorhen (common), Purple Gallinule (common; together with Lake Manzala probably they are the most important breeding sites in the Western Palearctic), Painted Snipe (locally southern shore), Collared Pratincole (at least 2000 pairs along the southern

shore in 1992, one of the most important breeding areas in the Western Palearctic), Kittlitz's Plover (scarce; southern shore), Kentish Plover (common; over 300 pairs in 1992); Spur-winged Plover (fairly common) Little Tern (common; over 500 pairs in 1992). Reedbeds and salt marshes hold a variety of other breeding species including Senegal Coucal (fairly common), Pied Kingfisher, Lesser Short-toed Lark, Fan-tailed Warbler, Graceful Warbler, Clamorous Reed Warbler and Streaked Weaver (Meininger & Atta 1994).

The reedbeds of Lake Burullus undoubtedly hold one of the largest populations in the Western Palearctic of Little Bittern, Purple Gallinule and Clamorous Reed Warbler. The only western Palearctic population of Painted Snipe and Senegal Coucal are found in Egypt. The salt marshes around Lake Burullus are of major importance for two subspecies endemic to Egypt; Lesser Short-Toed Lark *Calandrella rufescens nicolli* which is only known from north Nile Delta, and Egyptian wagtail *Motacilla flava pygmaea* which is only known from the Nile Delta and Valley. Lake Burullus may well be the stronghold of *Calandrella rufescens nicolli* (Goodman *et al.* 1989, Meininger & Atta 1994).

The breeding bird community in the lakes of north Nile Delta can be grouped in to 2 groups: species breeding solitary in the cover of reedbeds, and species breeding in the extensive salt marshes and sparsely vegetated sandflats. The absence of species breeding in large colonies (e.g. herons) is striking, and is probably an indication of the level of human disturbance. The absence of the breeding species Great-Crested Grebe and Coot, both characterized by easily detectable nests, may also be related to disturbance. Proper management that leads to reduction of the direct disturbance in some selected areas in the lake, would undoubtedly have immediate positive effects on the numbers of the breeding waterbirds (Meininger & Atta 1994).

12.3. BIRD SURVEYS

Considering the geographical position and the present habitat types, Lake Burullus is most likely of major importance for waterbirds, especially herons, ducks, waders, gulls and terns (Goodman *et al.* 1989, Tharwat 1997, Baha El-Din 1999). There is virtually no data on the function of Lake Burullus as a staging area for birds during spring and autumn migration. Apart from the winter surveys, the only reasonably complete census of waterbirds was made on November 1981 (Bennett *et al.* 1982). Since that census was carried out after the main autumn migration period of most waterbirds between Eurasia and sub-saharan Africa, and before the main winter influx of ducks and coot, numbers of most species observed

were lower than in winter. The numbers of Shoveler (2100), Tufted Duck (13400), Ferruginous Duck (100), Coot (64000), and Whiskered Tern (3000) were noteworthy. The marshy areas are undoubtedly of importance for enormous number of passerines during migration.

Four winter surveys (1978/79, 1979/80, 1989/90 and 1994) were carried out for the birds of Lake Burullus (Meininger & Atta 1994 and Tinarelli 1994). An autumn survey was recently carried out in 2000 by Tharwat and Hamied (2000). One hundred and twelve bird species and subspecies were recorded in these surveys (Table 12.1), they represent 21.7 % of the total avifauna of Egypt (515 species and subspecies, as reported by Tharwat 1997). During these four winter surveys, there was a remarkable increase in species richness associated with a sharp decrease in the community density (Fig. 12.1) This was due to the dramatic decrease in the density of some populations such as those of Coot (*Fulica atra atra*), Shoveler (*Anas clypeata*), Black Headed Gull (*Larus ridibundus*), Pochard (*Aythya ferina*) and Ferruginous Duck (*Aythya nyrrca*). Some other populations had an increased density with time (Fig. 12.2) such as Kentish Plover (*Charadrius alexandrinus alexandrinus*), Little Stint (*Calidris minuta*) and Pied Kingfisher (*Ceryle rudis rudis*). It is of interest to indicate that, 18 of the 53 species recorded during autumn by Tharwat and Hamied (2000), were not recorded in any of the previous winter surveys. This means that a complete annual survey, based on monthly or seasonally intervals, will lead to give a reasonable evaluation about the species richness of avifauna in Lake Burullus.

Of the 112 bird species and subspecies recorded in Lake Burullus: 46 are residents, 80 are winter visitors, 23 are spring visitors, and 72 are both summer and autumn passers (Table 12.2). The collection of information about the national and world distributions of these birds indicates the possibility of occurrence of 8 endemic species and sub-species (Table 12.3):

1	<i>Charadrcus pecuarius allenbyi</i>	(Kittlitz's Plover)	
2	<i>Streptopelia senegalensis aegyptiaca</i>	(Palm Dove)	
3	<i>Centropus senegalensis aegyptius</i>	(Senegal Coycal)	–
4	<i>Calandrella rufescens nicolli</i>	(Lesser Short-Toed Lark)	
5	<i>Galerida cristata nigricans</i>	(Crested Lark)	
6	<i>Prinia gracilis deltae</i>	(Graceful Warbler)	–
7	<i>Motacilla flava pygmaea</i>	(Egyptian Wagtail)	
8	<i>Merops orientalis cleopatra</i>	(Little Green Bee-eater)	–

Table 12.1. List of the bird species recorded in Lake Burullus based on four winter censuses extended from 1978 to 1994 and an autumn census in 2000. The first three censuses are those of Meininger & Atta (1994), the fourth is that of Tinarelli (1994), and the fifth is that of Tharwat and Hamied (2000). * : Denotes the endemic species, ** : the extinct species, b: breeding species.

No.	Scientific name	Family	English name	Arabic name	Number				
					78/79	79/80	89/90	94	2000
1	<i>Gavia arctica arctica</i> **	Gaviidae	Black Throated Diver		-	-	2	-	-
2	<i>Tachybaptus ruficollis ruficollis</i> ^b	Podicipediae	Little Grebe		-	2	2	-	14
3	<i>Podiceps cristatus cristatus</i>	Podicipediae	Great Crested Grebe		17	-	22	-	-
4	<i>Podiceps nigricollis nigricollis</i>	Podicipedidae	Black-Necked Grebe		17	-	22	20	-
5	<i>Phalacrocorax carbo sinensis</i>	Phalacrocoracidae	Cormorant		-	-	1	85	-
6	<i>Ardea cinerea cinerea</i>	Ardeidae	Grey Heron		1	2	65	-	40
7	<i>Ardeola ralloides</i>	Ardeidae	Squacco Heron		-	-	143	94	289
8	<i>Nycticorax nycticorax nycticorax</i>	Ardeidae	Night Heron	-	-	-	-	-	13
9	<i>Ixobrychus minutus minutus</i> ^b	Ardeidae	Little Bittern		-	4	14	-	15
10	<i>Egretta alba alba</i>	Ardeidae	Great White Egret		3	-	58	19	-
11	<i>Egretta ibis ibis</i>	Ardeidae	Cattle Egret		-	-	250	12	312
12	<i>Egretta garzetta garzetta</i>	Ardeidae	Little Egret		-	372	310	304	519
13	<i>Phoenicopterus ruber roseus</i>	Phoenicopteridae	Greater Flamingo		-	-	22	-	-
14	<i>Tadorna tadorna</i>	Anatidae	Common Shelduck		-	-	17	-	-
15	<i>Anas platyrhynchos platyrhynchos</i>	Anatidae	Mallard		407	15	1312	2	-
16	<i>Anas crecca crecca</i>	Anatidae	Green Winged Teal		622	62	2094	-	-
17	<i>Anas strepera strepera</i>	Anatidae	Gadwall		235	32	-	-	-
18	<i>Anas penelope</i>	Anatidae	European Wigeon		23400	35604	19018	32	-
19	<i>Anas clypeata</i>	Anatidae	Shoveler		63458	53055	15427	300	+
20	<i>Anas querquedula</i>	Anatidae	Garganey		-	-	-	-	177

Table 12.1. cont. 1.

No.	Scientific name-	Family	English name	Arabic name	Number				
					78/79	79/80	89/90	94	2000
21	<i>Netta rufina</i>	Anatidae	Red-Crested Pochard		70	7	7	2	-
22	<i>Aythya ferina</i>	Anatidae	Pochard		8316	8205	7357	220	-
23	<i>Aythya nyroca</i>	Anatidae	Ferruginous Duck		6582	960	576	120	-
24	<i>Aythya fuligula</i>	Anatidae	Tufted Duck		23	9	11	3	-
25	<i>Elanus caeruleus caeruleus</i>	Accipitridae	Black-Shouldered Kite		-	-	-	4	5
26	<i>Circus cyaneus cyaneus</i>	Accipitridae	Hen Harrier		-	-	-	2	-
27	<i>Circus aeruginosus aeruginosus</i>	Accipitridae	Marsh Harrier		-	-	-	29	-
28	<i>Circus pygargus</i>	Accipitridae	Montagu's Harrier		-	-	-	-	1
29	<i>Falco tinnunculus tinnunculus</i>	Falconidae	Kestrel		-	-	-	3	325
30	<i>Rallus aquaticus aquaticus</i> ^b	Rallidae	Water Rail		-	5	11	5	-
31	<i>Porzana porzana</i>	Rallidae	Spotted Crake		-	3	-	-	-
32	<i>Gallinula chloropus chloropus</i> ^b	Rallidae	Moorhen		5	22	39	++	27
33	<i>Porphyrio porphyrio madagascariensis</i> ^b	Rallidae	Purple Gallinule		-	5	10	3	7
34	<i>Fulica atra atra</i>	Rallidae	Coot		153525	101500	15790	7132	5
35	<i>Rostratula benghalensis benghalensis</i> ^b	Rostratulidae	Painted Snipe		-	-	-	-	-
36	<i>Himantopus himntopus himntopus</i>	Recurvirostridae	Black Winged Stilt		-	-	11	-	-
37	<i>Recurvirostra avosetta</i>	Recurvirostridae	Pied Avocet		-	25	2949	7	1
38	<i>Glareola pratincola pratincola</i> ^b	Glareolidae	Collared Pratincole		-	-	-	-	-
39	<i>Charadrius hiaticola tundrae</i>	Charadriidae	Ringed Plover		-	199	179	844	120
40	<i>Charadrius dubius curonicus</i>	Charadriidae	Little Ringed Plover		-	-	-	1	-
41	<i>Charadrius pecuarius allenbyi</i> ^{*b}	Charadriidae	Kittlitz's Plover		-	-	-	3	-
42	<i>Charadrius alexandrinus alexandrinus</i> ^b	Charadriidae	Kentish Plover		-	590	617	1178	10
43	<i>Charadrius leschenaultii</i>	Charadriidae	Greater Sand Plover		-	33	24	4	10
44	<i>Pluvialis squatarola</i>	Charadriidae	Grey Plover		2	28	25	-	-
45	<i>Vanellus Vanellus</i>	Charadriidae	Lapwing		45	75	9	50	-
46	<i>Chettusia leucura</i>	Charadriidae	White-Tailed Plover		-	-	-	2	-
47	<i>Hoplopterus spinosusb</i>	Charadriidae	Spur-Winged Plover		7	4	48	113	126

Table 12.1. cont. 2.

No.	Scientific name	Family	English name	Arabic name	Number				
					78/79	79/80	89/90	94	2000
48	<i>Calidris alba</i>	Scolopacidae	Sanderling		-	-	-	3	-
49	<i>Calidris temminckii</i>	Scolopaci	Temminck's Stint		-	-	4	-	-
50	<i>Calidris ferruginea</i>	Scolopacidae	Curlew Sandpiper		-	-	-	18	-
51	<i>Calidris minuta</i>	Scolopacidae	Little Stint		60	756	784	1030	130
52	<i>Calidris alpina alpina</i>	Scolopacidae	Dunlin		2	684	30	330	62
53	<i>Philomachus pugnax</i>	Scolopacidae	Ruff		235	-	-	7	3
54	<i>Lymnocyptes minimus</i>	Scolopacidae	Jack Snipe		-	-	-	-	2
55	<i>Gallinago galinago galinago</i>	Scolopacidae	Snipe		2	18	53	1	-
56	<i>Limosa limosa limosa</i>	Scolopacidae	Black-Tailed Godwit		-	-	161	21	-
57	<i>Limosa lapponica lapponica</i>	Scolopacidae	Bar-tailed Godwit		-	-	-	-	1
58	<i>Numenius arquata arquata</i>	Scolopacidae	Common Curlew		-	-	15	-	-
59	<i>Tringa erythropus</i>	Scolopacidae	Spotted Redshank		1	-	2	4	-
60	<i>Tringa totanus totanus</i>	Scolopacidae	Redshank		522	137	3670	885	144
61	<i>Tringa nebularia</i>	Scolopacidae	Greenshank		2	-	18	31	1
62	<i>Tringa ochropus</i>	Scolopacidae	Green Sandpiper		1	4	2	3	-
63	<i>Tringa glareola</i>	Scolopacidae	Wood Sandpiper		-	6	17	3	-
64	<i>Tringa stagnatilis</i>	Scolopacidae	Marsh Snadpiper		-	-	66	3	-
65	<i>Actitis hypoleucos</i>	Scolopacidae	Common Sandpiper		-	1	5	6	-
66	<i>Arenaria interpres interpres</i>	Scolopacidae	Turnstone		-	-	-	1	-
67	<i>Larus ichthyaetus</i>	Laridae	Great Black-headed Gull		-	-	2	-	-
68	<i>Larus minutus</i>	Laridae	Little Gull		17	3	3894	230	-
69	<i>Larus ridibundus</i>	Laridae	Black-Headed Gull		36080	25500	13889	2787	1

Table 12.1. cont. 3.

No.	Scientific name	Family	English name	Arabic name	Number				
					78/79	79/80	89/90	94	2000
70	<i>Larus genei</i>	Laridae	Slender-Billed Gull		108	6	3	50	131
71	<i>Larus canus canus</i>	Laridae	Common Gull		1	1	-	-	-
72	<i>Larus fuscus fuscus</i>	Laridae	Lesser Black-Racked Gull		8	5	2	1	16
73	<i>Larus argentatus cachinnans</i>	Laridae	Yellow-Legged Gull		21	361	163	132	8
74	<i>Chlidonias niger niger</i>	Laridae	Black Tern		4	-	-	-	-
75	<i>Chlidonias hybrida hybrida</i>	Laridae	Whiskered Tern		17382	17500	4503	3893	-
76	<i>Chlidonias leucoptera</i>	Laridae	White-winged Black Tern	-	-	-	-	-	5220
77	<i>Sterna albifrons albifrons^b</i>	Laridae	Little Tern		4	-	-	-	3427
78	<i>Sterna hirundo hirundo</i>	Laridae	Common Tern						
79	<i>Thalasseus sandvicensis sandvicensis</i>	Laridae	Sandwich Tern		-	-	574	2	-
80	<i>Streptopelia senegalensis aegyptiaca*</i>	Columbidae	Palm Dove		-	-	-	++	42
81	<i>Streptopelia decaocto decaocto</i>	Columbidae	Coilered Turtle Dove		-	-	-	-	4
82	<i>Centropus senegalensis aegyptius^b</i>	Cuculidae	Senegal Coucal		-	-	-	+	23
83	<i>Cuculus canorus canorus</i>	Cuculidae	Cuckoo	-	-	-	-	-	2
84	<i>Tyto alba alba</i>	Tytonidae	Barn Owl		-	-	-	+	-
85	<i>Athene noctua saharae</i>	Strigidae	Little Owl		-	-	-	1	-
86	<i>Athene noctua glaux</i>	Strigidae	Little Owl		-	-	-	-	3
87	<i>Alcedo atthis atthis</i>	Alcedinidae	Kingfisher		+	18	36	20	15
88	<i>Ceryle rudis rudis^b</i>	Alcedinidae	Pied Kingfisher		+	21	333	544	925
89	<i>Merops orientalis cleopatra</i>	Meropidae	Little Green Bee-eater	-	-	-	-	-	15
90	<i>Upupa epops epops</i>	Upupidae	Hoopoe		-	-	-	+	4
91	<i>Hirundo rustica rustica</i>	Hirundinidae	Swallow		-	-	-	++	1104

Table 12.1. cont. 4.

No.	Scientific name	Family	English name	Arabic name	Number				
					78/79	79/80	89/90	94	2000
92	<i>Riparia riparia riparia</i>	Hirundinidae	Sand Martin		-	-	-	-	50
93	<i>Calandrella rufescens nicolli</i> * ^b	Alaudidae	Lesser Short Toed Lark		-	-	-	+	-
94	<i>Galerida cristata nigricans</i> *	Alaudidae	Crested Lark		-	-	-	++	4
95	<i>Anthus cervinus</i>	Motacillidae	Red-Throated Pipit		-	-	-	+	-
96	<i>Motacilla flava pygmaea</i> *	Motacillidae	Egyptian Wagtail		-	-	-	14	-
97	<i>Motacilla alba alba</i>	Motacillidae	White Wagtail		-	-	-	+++	-
98	<i>Motacilla flava flavissima</i>	Motacillidae	Yellow Wagtail		-	-	-	-	10
99	<i>Motacilla cinerea cinerea</i>	Motacillidae	Grey Pied Wagtail		-	-	-	-	6
100	<i>Lanius collurio collurio</i>	Laniidae	Red-backed Shrike		-	-	-	-	2
101	<i>Sturnus vulgaris vulgaris</i>	Sturnidae	Starling		-	-	-	50	-
102	<i>Corvus corone cornix</i>	Corvidae	Hooded Crow		-	-	-	++	13
103	<i>Acrocephalus stentoreus stentoreus</i> ^b	Sylviidae	Clamorous Reed Warbler		-	-	-	+++	-
104	<i>Phylloscopus collybita collybita</i>	Sylviidae	Chiffchaff		-	-	-	+++	-
105	<i>Prinia gracillis deltae</i> * ^b	Sylviidae	Graceful Warbler		-	-	-	+++	-
106	<i>Scotocerca inquieta inquieta</i>	Sylviidae	Scrub Warbler	-	-	-	-	-	18
107	<i>Cisticola juncidis juncidis</i> ^b	Sylviidae	Fan-tailed Warbler		-	-	-	++	-
108	<i>Saxicola torquata rubicola</i>	Muscicapidae	Stonechat		-	-	-	4	-
109	<i>Passer domesticus niloticus</i>	Passeridae	House Sparrow		-	-	-	+	-
110	<i>Passer hispaniolensis hispaniolensis</i>	Passeridae	Spanish Sparrow		-	-	-	++	-
111	<i>Emberiza calandra calandra</i>	Emberizidae	Corn Bunting		-	-	-	-	24
112	<i>Emberiza schoeniclus intermedia</i>	Emberizidae	Reed Warbler		-	-	-	-	4
Total species					37	41	56	74	53
Total individuals (× 10³)					311.2	245.8	94.7	20.7	13.7

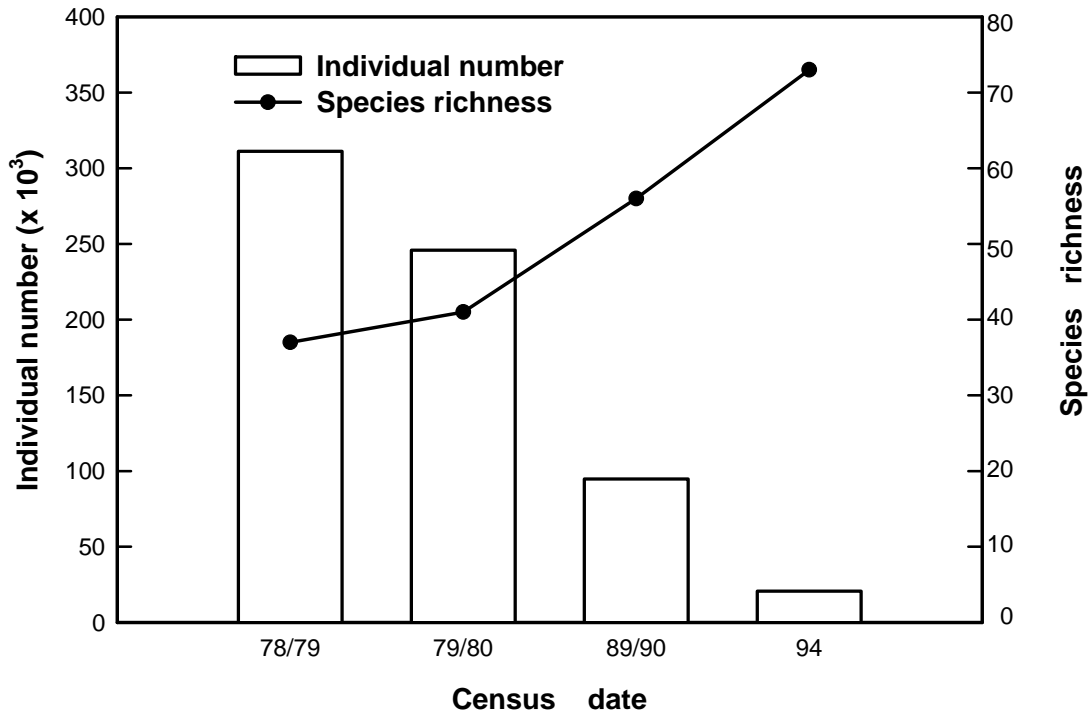


Fig. 12.1. Relationship between the species richness and individual number during the four winter censuses extended from 1978 to 1994.

They represent about 47 % of the total endemic avifauna in Egypt (17 species and subspecies as reported by Tharwat 1997).

12.4. ECONOMIC IMPORTANCE

Wall paintings on the old Egyptian temples prove that wildbirds played some economic roles in the ancestors life who utilized them for several purposes such as food, decoration, medicine, education, domestication, sport and religion. At the present time, wildbirds are still being used and several bird species are being trapped all over the Egyptian wetlands and deserts mainly for food and sport. However, assessment of the effect of these activities on the population of the victim captured species and economy was attempted by a few researchers (e.g. Mullie and Meiniger 1983, Goodman *et al.* 1989, and Baha El-Din 1992, 1999).

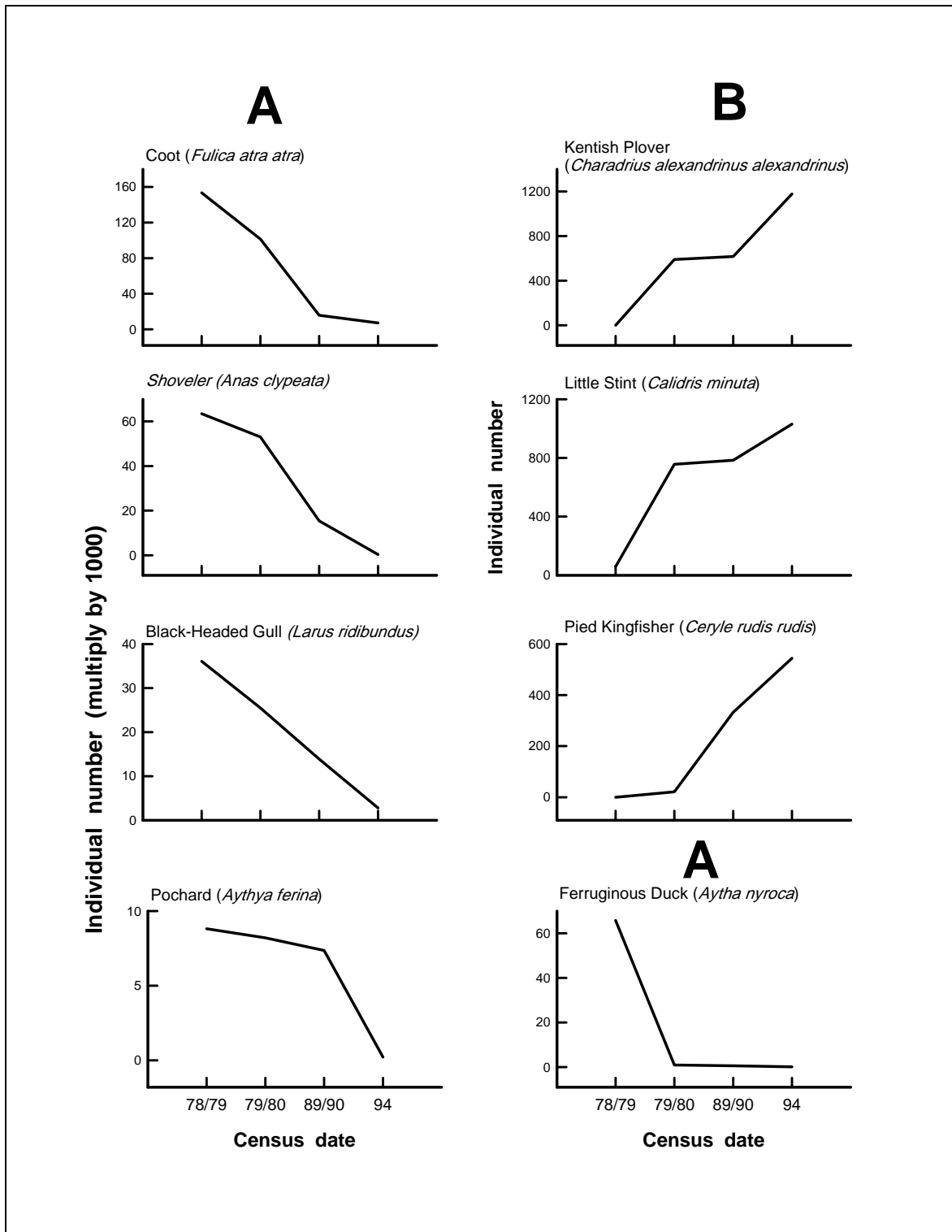


Fig. 12.2. Number of bird individuals in relation to census date. **A:** decreasing relationship, **B:** increasing relationship.

Table 12.2. Status and abundance of the bird species recorded in Lake Burulus. The abundance categories are R = rare; S = scarce; A = accidental; O = occasional; U = uncommon; C = common, B = abundant (after Goodman *et al.*, 1989, Tharwat 1997). * : Denotes the endemic species, ** : the extinct species, b : breeding species.

No.	Scientific name	Family	Resident	Visitor		Passer		Total
				Winter	Spring	Summer	Autumn	
1	<i>Gavia arctica arctica</i> **	Gaviidae						-
2	<i>Tachybaptus ruficollis ruficollis</i> ^b	Podicipedidae	C					1
3	<i>Podiceps cristatus cristatus</i>	Podicipedidae		C				1
4	<i>Podiceps nigricollis nigricollis</i>	Podicipedidae		C				1
5	<i>Phalacrocorax carbo sinensis</i>	Phalacrocoracidae		C	R	C	C	4
6	<i>Ardea cinerea cinerea</i>	Ardeidae	U	C	S			3
7	<i>Ardeola ralloides</i>	Ardeidae	R	S		C	C	4
8	<i>Nycticorax nycticorax nycticorax</i>	Ardeidae	R	C		C	C	4
9	<i>Ixobrychus minutus minutus</i> ^b	Ardeidae	C	C		C	C	4
10	<i>Egretta alba alba</i>	Ardeidae		S		S	S	3
11	<i>Egretta ibis ibis</i>	Ardeidae	C	C		C	C	4
12	<i>Egretta garzetta garzetta</i>	Ardeidae	S	C		C	C	4
13	<i>Phoenicopterus ruber roseus</i>	Phoenicopteridae	S	C				2
14	<i>Tadorna tadorna</i>	Anatidae		C				1
15	<i>Anas platyrhynchos platyrhynchos</i>	Anatidae	C	C		C	C	4
16	<i>Anas crecca crecca</i>	Anatidae		C		C	C	3
17	<i>Anas strepera strepera</i>	Anatidae		S		S	S	3
18	<i>Anas penelope</i>	Anatidae		C		C	C	3
19	<i>Anas clypeata</i>	Anatidae		C		C	C	3
20	<i>Anas querquedula</i>	Anatidae				C	C	2
21	<i>Netta rufina</i>	Anatidae		S				1
22	<i>Aythya ferina</i>	Anatidae		C		C	C	3
23	<i>Aythya nyroca</i>	Anatidae		C		C	C	3
24	<i>Aythya fuligula</i>	Anatidae		C		C	C	3
25	<i>Elanus caeruleus caeruleus</i>	Accipitridae	C					1
26	<i>Circus cyaneus cyaneus</i>	Accipitridae		R		R	R	3
27	<i>Circus aeruginosus aeruginosus</i>	Accipitridae		S		S	S	3
28	<i>Circus pygargus</i>	Accipitridae		O		R	R	3

Table 12.2. cont. 1.

No.	Scientific name	Family	Resident	Visitor		Passer		Total
				Winter	Spring	Summer	Autumn	
29	<i>Falco tinnunculus tinnunculus</i>	Falconidae	C					1
30	<i>Rallus aquaticus aquaticus</i> ^b	Rallidae	C	C				2
31	<i>Porzana porzana</i>	Rallidae		S		C	C	3
32	<i>Gallinula chloropus chloropus</i> ^b	Rallidae	C	B		B	B	4
33	<i>Prophyrio prophyrio madagascariensis</i> ^b	Rallidae	C					1
34	<i>Fulica atra atra</i>	Rallidae	R	B	R			3
35	<i>Rostratula benghalensis benghalensis</i> ^b	Rostratulidae	C					1
36	<i>Himantopus himantopus himantopus</i>	Recurvirostridae	R	R		C	C	4
37	<i>Recurvirostra avosetta</i>	Recurvirostridae	R	C	R			3
38	<i>Glareola pratincola pratincola</i> ^b	Glareolidae	C	R		C	C	4
39	<i>Charadrius hiaticula tundrae</i>	Charadriidae		C	O	C	C	4
40	<i>Charadrius dubius curonicus</i>	Charadriidae	R	R		S	S	4
41	<i>Charadrius pecuarius allenbyi</i> ^{*b}	Charadriidae	S					1
42	<i>Charadrius alexandrinus alexandrinus</i> ^b	Charadriidae	C	C		C	C	4
43	<i>Charadrius leschenaultii</i>	Charadriidae	O	C		C	C	4
44	<i>Pluvialis squatarola</i>	Charadriidae		S	U	C	C	4
45	<i>Vanellus vanellus</i>	Charadriidae		C		C	C	3
46	<i>Chettusia leucura</i>	Charadriidae				R	R	2
47	<i>Hoplopterus spinosus</i> ^b	Charadriidae	O					1
48	<i>Calidris alba</i>	Scolopacidae		C		C	C	3
49	<i>Calidris temminckii</i>	Scolopacidae		R		S	S	3
50	<i>Calidris ferruginea</i>	Scolopacidae		R		S	S	3
51	<i>Calidris minuta</i>	Scolopacidae		B	U	B	B	4
52	<i>Calidris alpina alpina</i>	Scolopacidae		B		B	B	3
53	<i>Philomachus pugnax</i>	Scolopacidae		C	R	C	C	4
54	<i>Lymnocyptes minimus</i>	Scolopacidae		S		S	S	3
55	<i>Gallinago gallinago gallinago</i>	Scolopacidae		C		C	C	3
56	<i>Limosa limosa limosa</i>	Scolopacidae		R	R	C	C	4
57	<i>Limosa lapponica lapponica</i>	Scolopacidae		R		R	R	3
58	<i>Numenius arquata arquata</i>	Scolopacidae		S	R	S	S	4

Table 12.2. cont. 2.

No.	Scientific name	Family	Resident	Visitor		Passer		Total
				Winter	Spring	Summer	Autumn	
59	<i>Tringa erythropus</i>	Scolopacidae		S		C	C	3
60	<i>Tringa tonatus tonatus</i>	Scolopacidae		C	O	C	C	4
61	<i>Tringa nebularia</i>	Scolopacidae		S	R	C	C	4
62	<i>Tringa ochropus</i>	Scolopacidae		S	R	C	C	4
63	<i>Tringa glareola</i>	Scolopacidae		S	R	C	C	4
64	<i>Tringa stagnatilis</i>	Scolopacidae		S		S	S	3
65	<i>Actitis hypoleucos</i>	Scolopacidae		S		C	C	3
66	<i>Arenaria interpres interpres</i>	Scolopacidae		S		S	S	3
67	<i>Larus ichthyaetus</i>	Laridae		R		R	R	3
68	<i>Larus minutus</i>	Laridae		S				1
69	<i>Larus ridibundus</i>	Laridae		B	S	B	B	4
70	<i>Larus genei</i>	Laridae	S	C	C	C	C	5
71	<i>Larus canus canus</i>	Laridae		R				1
72	<i>Larus fuscus fuscus</i>	Laridae		C	R	C	C	4
73	<i>Larus argentatus cachinnans</i>	Laridae	R	C	S			3
74	<i>Chlidonias niger niger</i>	Laridae		R	R	S	S	4
75	<i>Chlidonias hybrida hybrida</i>	Laridae		O	S	C	C	4
76	<i>Chlidonias leucoptera</i>	Laridae		C		C	C	3
77	<i>Sterna albifrons albifrons</i> ^b	Laridae	C					1
78	<i>Sterna hirundo hirundo</i>	Laridae			S	C	C	3
79	<i>Thalasseus sandvicensis sandvicensis</i>	Laridae		C	S	C	C	4
80	<i>Streptopelia senegalensis aegyptiaca</i> *	Columbidae	B					1
81	<i>Streptopelia decaocto decaocto</i>	Columbidae	C					4
82	<i>Centropus senegalensis aegyptius</i> * ^b	Cuculidae	C					1
83	<i>Cuculus canorus canorus</i>	Cuculidae				S	S	2
84	<i>Tyto alba alba</i>	Tytonidae	C					1
85	<i>Athene noctua saharae</i>	Strigidae	C					1
86	<i>Athene noctua glaux</i>	Strigidae	C					1
87	<i>Alcedo atthis atthis</i>	Alcedinidae	O	C		C	C	4
88	<i>Ceryle rudis rudis</i> ^b	Alcedinidae	C					1

Table 12.2. cont. 3.

No	Scientific name	Family	Resident	Visitor		Passer		Total
				Winter	Spring	Summer	Autumn	
89	<i>Merops orientalis cleopatra</i>	Meropidae	C					1
90	<i>Upupa epops epops</i>	Upupidae	C			C	C	3
91	<i>Hirundo rustica rustica</i>	Hirundinidae		R		C	C	3
92	<i>Riparia riparia riparia</i>	Hirundinidae		S		B	B	3
93	<i>Calandrella rufescens nicolli</i> * ^b	Alaudidae	C					1
94	<i>Galerida cristata nigricans</i> *	Aludidae	B					1
95	<i>Anthus cervinus</i>	Motacillidae		B		B	B	3
96	<i>Motacilla flava pygmaea</i> *	Motacillidae	C					1
97	<i>Motacilla alba alba</i>	Motacillidae		B		B	B	3
98	<i>Sturnus vulgaris vulgaris</i>	Sturnidae		C				1
99	<i>Motacilla flava flavissima</i>	Motacillidae		UC		C	C	3
100	<i>Motacilla cinerea cinerea</i>	Motacillidae		C		C	C	3
101	<i>Lanius collurio collurio</i>	Laniidae		I		C	C	2
102	<i>Corvus corone cornix</i>	Corvidae	C					1
103	<i>Acrocephalus stentoreus stentoreus</i> ^b	Sylviidae	B					1
104	<i>Phylloscopus collybita collybita</i>	Sylviidae				B	B	2
105	<i>Prinia gracilis deltae</i> * ^b	Sylviidae	B					1
106	<i>Scotocerca inquieta inquieta</i>	Sylviidae	C					1
107	<i>Cisticola juncidis juncidis</i> ^b	Sylviidae	B					1
108	<i>Saxicola torquata rubicola</i>	Muscicapidae		C		C	C	3
109	<i>Passer domesticus niloticus</i>	Passeridae	B					1
110	<i>Passer hispaniolensis hispaniolensis</i>	Passeridae		B	O	B	B	4
111	<i>Emberiza calandra calandra</i>	Emberizidae		C		C	C	3
112	<i>Emberiza shoeniclus intermedia</i>	Emberizidae		A				1
Total			46	80	23	72	72	112

Table 12.3. National and world distribution of the bird species recorded in Lake Burullus (after Goodman *et al.* 1989, Tharwat 1997). * Denotes the endemic species, ** the extinct species, b ; breeding species.

No.	Scientific name	World distribution	National distribution
1	<i>Gavia arctica arctica</i> **	N. America, N. Asia N. Europe.	N. Coast and lakes.
2	<i>Tachybaptus ruficollis ruficollis</i> ^b	Europe, Asia, Africa.	Nile Valley and Delta, W. Desert Oases.
3	<i>Podiceps cristatus cristatus</i>	Parts of Europe, Asia, Africa, Australia	Nile Valley and Delta, Suez Canal, Aqaba Gulf.
4	<i>Podiceps nigricollis nigricollis</i>	Atlantic Coasts, Medet. Region, Arabic Gulf.	Nile Delta and Valley, Suez Canal, Lake Bardaweel, other Coastal Waters.
5	<i>Phalacrocorax carbo sinensis</i>	Europe, C. and S. Asia, Africa, Australia and E.N. America.	Nile Delta and Valley, Red Sea, Medit. Sea.
6	<i>Ardea cinerea cinerea</i>	Europe, Asia, Parts of Africa.	Nile Delta and Valley, Red and Medit. Seas.
7	<i>Ardeola ralloides</i>	S. Europe, S.E. Asia, Africa.	Bilbais, Aswan, Damietta
8	<i>Nycticorax nycticorax nycticorax</i>	C. and S. Europe, S. Asia, Africa	Bilbais, Aswan
9	<i>Ixobrychus minutus minutus</i> ^b	Europe, Asia, Africa, Australia.	Nile Delta and Valley.
10	<i>Egretta alba alba</i>	S. Europe, N. Asia, N. Africa, India.	Nile Delta and Valley.
11	<i>Egretta ibis ibis</i>	Spain to Iran, N. and C. Africa, E.N. and N.S. America.	Nile Delta and Valley.
12	<i>Egretta garzetta garzetta</i>	Parts of Europe, S. Asia, Africa, Australia.	Nile Delta and Valley, Medit. Coast.
13	<i>Phoenicopterus ruber roseus</i>	Africa, S.W. Asia, C. America, S. Europe.	Lake Mallaha, Lake Bardaweel, Lake Qaruun
14	<i>Tadorna tadorna</i>	Europe, Asia.	Medit. Sea, N. Red Sea.
15	<i>Anas platyrhynchos platyrhynchos</i>	Europe, Asia, N.W. Africa, N. America.	Nile Delta and Valley.
16	<i>Anas crecca crecca</i>	Europe, Asia, Africa, N. America.	Nile Delta and Valley.
17	<i>Anas strepera strepera</i>	N. Hemisphere throughout, to China and Japan, to the W. Indies, Mexico, Florida.	Nile Delta and Valley.
18	<i>Anas penelope</i>	Europe, Asia, Africa, N. America.	Nile Delta and Valley.
19	<i>Anas clypeata</i>	Medit. Basin, W. Morocco, E. Africa, Iran, Iraqi.	Nile Delta and Valley.
20	<i>Anas querquedula</i>	Europe, Asia, Africa	Mediterranean, Red Sea.
21	<i>Netta rufina</i>	Europe, Turkey, Near East., Iraq, Morocco, Algeria, E. and C. Arabia, Tunisia, Libya.	Nile Delta and Valley.
22	<i>Aythya ferina</i>	Europe and Asia.	Nile Delta and Valley.

Table 12. 3. Cont. 1.

No.	Scientific name	World distribution	National distribution
23	<i>Aythya nyroca</i>	Europe and Asia to Lake Baikal, in non-breeding season to Cape Verde Islands, Iran, N Africa, Sudan, S. Arabia, India, China.	Nile Delta and Valley.
24	<i>Aythya fuligula</i>	Europe, Asia, Africa.	Nile Delta and Valley.
25	<i>Elanus caeruleus caeruleus</i>	Africa, S. Asia.	Nile Delta and Valley.
26	<i>Circus cyaneus cyaneus</i>	Europe, Asia, N. Africa.	Nile Delta.
27	<i>Circus aeruginosus aeruginosus</i>	Europe, Asia, Africa.	Nile Delta and Valley.
28	<i>Circus pygargus</i>	W. Europe, E. C. Asia, China	Wide spread
29	<i>Falco tinnunculus tinnunculus</i>	Europe, to N.E. Asia C. Africa, India.	Nile Delta and Valley, Sinai, N. Coast.
30	<i>Rallus aquaticus aquaticus</i> ^b	W. Europe to W. Siberia, N.E. Africa.	N. Egypt.
31	<i>Porzana porzana</i>	W. Europe, N. Africa to C. Asia, India.	Sinai, S. Nile Valley, Wadi El-Natruun, W. Desert
32	<i>Gallinula chloropus chloropus</i> ^b	Europe, N. Africa, Middle East., Russia.	Nile Delta and Valley, Suez Canal, Faiyuum.
33	<i>Prophyrio prophyrio madagascariensis</i> ^b	E. and S. Africa, Madagascar.	Nile Delta and Valley, Suez Canal, Wadi El-Rayan, Wadi El-Natruun.
34	<i>Fulica atra atra</i>	Europe to S. Asia, N. Africa.	Nile Delta Lakes, Lake Qaruun.
35	<i>Rostratula benghalensis benghalensis</i> ^b	Africa, S. Asia to Java, Philippine Islands.	Nile Delta and Valley, Wadi El-Natruun, Faiyuum, Suez.
36	<i>Himantopus himantopus himantopus</i>	S. Europe to China, India, C. Africa.	Wadi El-Natruun, Faiyuum, N. Nile Delta
37	<i>Recurvirostra avosetta</i>	Europe to China, India, S. Africa.	Wadi El-Natruun, Faiyuum, Delta Lakes.
38	<i>Glareola pratincola pratincola</i> ^b	Medit. to N.W. India India, N. Africa.	Nile Delta, W. N. Coast
39	<i>Charadrius hiaticula tundrae</i>	N. Europe, N. Asia, Iran, E. Africa.	W. Desert, Nile Delta and Valley, Red Sea.
40	<i>Charadrius dubius curonicus</i>	Europe, N. Asia, S. Africa, India, China.	Wadi El-Natruun, W. Oases, N. Coast, Nile Delta and Valley, Red Sea, Sinai.
41	<i>Charadrius pecuarius allenbyi</i> ^{*b}	Endemic.	Wadi El-Natruun, Nile Delta, Suez Canal, Faiyuum, Lake Nasser.
42	<i>Charadrius alexandrinus alexandrinus</i> ^b	E. Asia, Red Sea, S. Africa, Australia.	Medit. and Red Seas Coasts.
43	<i>Charadrius leschenaultii</i>	C. Asia, India, Malaysia, E. Africa.	Red Sea.
44	<i>Pluvialis squatarola</i>	Circumpolar, Africa, Australia, S. America, Europe	N. Egypt, Red Sea.
45	<i>Vanellus vanellus</i>	W. Europe to China, Japan.	N. Egypt.
46	<i>Chettusia leucura</i>	W. and C. Asia, N.E. Africa, N.W. India.	E. Egypt.
47	<i>Hoplopterus spinosus</i> ^b	Middle East, C. and E. Africa.	Wadi El-Natruun, Nile Delta and Valley, Suez Canal, Faiyuum, Sinai, Wadi El-Rayan

Table 12.3. Cont. 2.

No.	Scientific name	World distribution	National distribution
48	<i>Calidris alba</i>	N. Holarctic, S. America, India, Australia.	Medit. and Red Sea Coasts, Inland Waters.
49	<i>Calidris temminckii</i>	N. Europe, N. Asia, N.E. Africa to China.	Deversoir, Red Sea Coast.
50	<i>Calidris ferruginea</i>	N. Asia to Europe, Africa, India, Australia.	Medit. Coast, Nile Delta, Lake Qaruun, Suez.
51	<i>Calidris minuta</i>	N. Europe, S. Africa, W. India.	N. lakes
52	<i>Calidris alpina alpina</i>	N. Europe, N.W. Asia, S.W. Asia, N.E. Africa.	Faiyuum, Nile Delta lakes, Red Sea Coast, W. Desert
53	<i>Philomachus pugnax</i>	N. Europe, Asia, Africa, India, Burma	Nile Delta and Valley
54	<i>Lymnocyptes minimus</i>	N. Europe, W. Asia, N. Africa, Iran, India	W. desert, Oases, Nile Delta, Suez Canal, Faiyuum, N. Sinai.
55	<i>Gallinago gallinago gallinago</i>	N. Palaeartic, E. Africa, India, China.	W. Desert Oases, Nile Delta and Valley, Suez Canal, Faiyuum.
56	<i>Limosa limosa limosa</i>	Europe, W. Asia, N. Africa, India.	N. Sinai, Wadi El-Natruun, Faiyuum, Nile Delta, Red Sea
57	<i>Limosa lapponica lapponica</i>	N. Europe, N. Asia, Tropical Africa, N. India	Mediterranean and Red Sea coasts
58	<i>Numenius arquata arquata</i>	N. Europe, Russia, Africa, N.W. India.	Coastal Areas, Inland lakes, Red Sea Coast.
59	<i>Tringa erythropus</i>	N. Europe, N. Russia, Africa, China.	Lake Maryut, W. Desert Oases, Red Sea Coast, Nile Delta and Valley.
60	<i>Tringa tonatus tonatus</i>	N. Europe, W. Siberia, Africa, W. Asia.	Lake Manzala, Suez Bay, W. Desert and Nile Valley.
61	<i>Tringa nebularia</i>	N. Palaeartic, Africa, India to New Zealand.	W. Desert Oases, Nile Delta and Valley, Red Sea Coast.
62	<i>Tringa ochropus</i>	N. Palaeartic, C. Africa to Philippine Islands.	N. Coast of Sinai, Bahariya Oasis.
63	<i>Tringa glareola</i>	N. Palaeartic, Africa, S.E. Asia, Australia.	W. Desert, Red Sea Coast, Mountains of S. Sinai
64	<i>Tringa stagnatilis</i>	S. Europe to Mangolia, Africa, Australia	W. Desert Oases, Nile Valley, Red Sea Coast
65	<i>Actitis hypoleucos</i>	Palaeartic, Africa, N.E. Asia to Australia.	Nile Delta and Valley, W. Desert Oases, Red Sea Coast
66	<i>Arenaria interpres interpres</i>	N. Palaeartic, Africa, S.E. Asia, Australia.	Medit. and Red Sea Coasts, Suez Canal.
67	<i>Larus ichthyaetus</i>	S. Russia, Mongolia to Red Sea, India.	Red Sea Coast, Nile Delta and Valley.
68	<i>Larus minutus</i>	N. Europe, Siberia to Medit., Black Sea.	Medit. and Coast, Nile Delta and Valley, Red Sea, S.

Table 12.3. Cont. 3.

No.	Scientific name	World distribution	National distribution
69	<i>Larus ridibundus</i>	Europe, Asia to N. Africa, India, Philippine Islands.	Sinai Nile Delta and Valley, Red Sea Coast, Lake Qaruun, Lake Nasser
70	<i>Larus genei</i>	Medit. Sea, Black Sea, Asia Minor.	N.W. Sinai, Lake Qaruun, Medit. and Red Seas.
71	<i>Larus canus canus</i>	N.W. Europe to Medit.	N. Egypt, mainly Nile Delta, Red Sea.
72	<i>Larus fuscus fuscus</i>	Scandinavia to W. and E. Africa.	Nile Valley, Suez Canal, Red Sea, N. Sinai, Wadi El-Natruun, Lake Qaruun.
73	<i>Larus argentatus cachinnans</i>	S. Russia, S.C. Asia, N. Red Sea	W. Medit. Coast
74	<i>Chlidonias niger niger</i>	Europe, W. Asia, S.C. Africa.	Wadi El-Natruun, N. Sinai, Nile Delta and Valley, Red Sea.
75	<i>Chlidonias hybrida hybrida</i>	S. Europe, S.W. Asia, E. and W. Africa.	Nile Delta
76	<i>Chlidonias leucoptera</i>	Europe, W. Asia, S. C. Africa	Wadi En-Natruun, N. Sinai coast, Nile Delta and Valley, red Sea coast.
77	<i>Sterna albifrons albifrons</i> ^b	Europe, W. Asia, N. Africa, N.E. India.	Medit. and Red Sea Coasts, Faiyuun.
78	<i>Sterna hirundo hirundo</i>	N. America, Europe, W. Asia, S. America, W. Africa	Mediterranean and Red Sea coasts, Nile Valley, Suez Gulf.
79	<i>Thalasseus sandvicensis sandvicensis</i>	W.S. Europe, Africa, N.W. India.	Coasts of Medit, Red Seas.
80	<i>Streptopelia senegalensis aegyptiaca</i> *	Endemic.	Nile Delta and Valley, E. and W.E. Deserts.
81	<i>Centropus senegalensis aegyptius</i> * ^b	Endemic.	Nile Delta and Valley, Faiyuun, Suez Canal.
82	<i>Streptopelia decaoclo decaoclo</i>	Europe to W. China	Wadi En-Natruun, Nile Delta, N. Nile Valley, Suez Canal, Sinai
83	<i>Cuculus canorus canorus</i>	Europe, W. Siberia, E. and S. Africa	Western Desert, Eastern Desert, Sinai
84	<i>Tyto alba alba</i>	W. Europe.	Wadi El-Natruun, Nile Delta and Valley, Sinai.
85	<i>Athene noctua saharae</i>	S. Morocco to N. Saudi Arabia.	W. and E. Desert, Sinai, Nile Delta and Valley.
86	<i>Athene noctua glaux</i>	N. Africa	N. Coast, Nile Delta and Valley
87	<i>Alcedo atthis atthis</i>	Medit., Syria, Arabia.	N. Coast, W. Desert, Nile Delta and Valley, Suez Canal.
88	<i>Ceryle rudis rudis</i> ^b	Asia Minor, Iran, Africa.	Nile Delta and Valley, Faiyuun.
89	<i>Merops orientalis cleopatra</i>	Endemic	Nile Delta and Valley, Faiyuun
90	<i>Upupa epops epops</i>	Europe, W. Asia to W. and C. Africal, India.	Nile Delta and Valley, W. Oases, N. Sinai, Suez Canal.
91	<i>Hirundo rustica rustica</i>	Europe, W. Asia, Africa, India.	Desert Oases, Nile W. Delta and Valley, S. Sinai
92	<i>Riparia riparia riparia</i>	N. America, N. S. America, Europe, Asia, N. and N.E. Africa	Desert areas, Nile Delta and Valley

Table 12.3. Cont. 4.

No.	Scientific name	World distribution	National distribution
93	<i>Calandrella rufescens nicolli</i> * ^b	Endemic	Nile Delta and Salt Marshes
94	<i>Galerida cristata nigricans</i> *	Endemic	Nile Valley and Delta, Faiyuum, Lake Nasser, Sinai
95	<i>Anthus cervinus</i>	E. Europe, E. Asia, W. and E. Africa, India	N. Coast, N. Lakes
96	<i>Motacilla flava pygmaea</i> *	Endemic	Wadi El-Natruun, Nile Delta and Valley, Faiyuum, Suez Canal
97	<i>Motacilla alba alba</i>	Europe, Russia, N. and E. Africa, Iran, Arabia.	Nile Delta and Valley, E. Desert, N. Coast
98	<i>Motacilla flava flavissima</i>	Northwest Europe, Spain, N. Africa	S. Sinai, Gabal Elba, Gabal Uweinat, Suez Canal, Upper Egypt.
99	<i>Motacilla cinerea cinerea</i>	Europe, N. Africa, Iran, India, C. S. Africa	N. Sinai coast, N. coast, W. desert, Nile Delta and Valley, Suez Canal, Faiyuum.
100	<i>Lanius collurio collurio</i>	Europe, Siberia, W. Asia, S. Africa	N. coast, W. Desert, W. Nile Delta
101	<i>Sturnus vulgaris vulgaris</i>	N. C. Europe.	N. Coast, Nile Delta, Suez Canal.
102	<i>Corvus corone cornix</i>	N. E. Europe.	Nile Delta and Valley, Suez Canal, Faiyuum, N.E. Sinai
103	<i>Acrocephalus stentoreus stentoreus</i> ^b	Palestine, Iraq, Iran, Oman, Arabia	Nile Delta and Valley, Suez Canal, Faiyuum, Wadi El-Rayan, W. Desert Oases
104	<i>Phylloscopus collybita collybita</i>	W. and S. Europe, N. Africa.	Red Sea Coast, Gabal Elba.
105	<i>Prinia gracilis deltae</i> * ^b	Endemic.	Delta Lakes, N. Coast, W. Desert, Nile Valley, Faiyuum, Suez Canal, Sinai.
106	<i>Scotocerca inquieta inquieta</i>	N. Arabia	N-E Desert, S. Sinai
107	<i>Cisticola juncidis juncidis</i> ^b	S. Europe, Asia Minor, Egypt.	Nile Delta
108	<i>Saxicola torquata rubicola</i>	W. Europe, N. Africa, Middle East.	Nile Delta and Valley, Suez Canal Area, Faiyuum, Wadi El-Natruun, E. Sinai.
109	<i>Passer domesticus niloticus</i>	N.E. Africa.	N. Coast, W. Desert, Nile Delta and Valley, Red Sea Coast, Sinai.
110	<i>Passer hispaniolensis hispaniolensis</i>	S.W. Europe, N. Africa Asia Minor.	N. Coast, Nile Delta and Valley, Faiyuum, Suez Canal and Sinai
111	<i>Emberiza calandra calandra</i>	Europe to Sinkiang, S. Iran	Nile Delta and Valley, N. Sinai, Suez Canal, Faiyuum
112	<i>Emberiza shoeniclus intermedia</i>	N-W Europe, C. Russia, Turkey, N. Africa	Salluum, Sinai

12.4.1. Waterfowl Hunting

Waterfowl hunting is an old activity in Egypt that goes back to the dynastic time. At present, waterfowl are still being hunted all over the Egyptian wetlands especially Lake Burullus. Two types of waterfowl hunting are known in Egypt: commercial hunting and sport hunting, both are practiced mainly during the winter season when there is abundance in the number of wintering birds.

12.4.1.1. Commercial hunting

The commercial hunting occurs by trapping and shooting waterfowl by the local inhabitants living around the lake who are mostly fishermen. The catch is sold alive or dead in markets in Port Said and Damietta, some smaller bird markets are distributed in villages around the lake. It was estimated that the total annual catch of waterbirds from Lake Burullus ranged from 28000 to 57600 birds. The overall estimate of the annual number of waterbirds is about half a million birds which brings a modest economic value to the national income (Goodman *et al.* 1989).

Historically, Quail netting is an old activity in Egypt that dates back to the Old Kingdom (2325 BC) as depicted on the tombs of Mereruka at Saqqara (Houlihan and Goodman 1986). At the beginning of this century, millions of Quails were exported from Egypt to Europe. Between 1906 and 1913 the number of Quails exported ranged from one to two millions. In 1919 the estimated figure was 3/4 million, and in 1925 and 1926 about half a million were exported to Europe. Since the 1920's and 1930's the number of Quail netted along the north coast have declined, consequently there was no more export (see Goodman *et al.* 1989).

12.4.1.2. Sport hunting

Sport hunting is a non commercial hunting occurs mainly for pleasure, and the hunted birds, but are consumed by the hunter's families and friends. This type of hunting is well organized by two shooting clubs based in Cairo and Alexandria. The Cairo Shooting Club hires a number of lakes from Governorates of Sharkia and Ismaelia and maintains them to be used in the winter season as hunting reserves. Duck shooting at these reserves is allowed only on 16 days per year (one day every week), lasting from early December to Mid March. The total number of ducks shot at the hunting reserves of Egyptian Shooting Clubs was estimated to be between 20000 to 30000 per season (Mullie and Meininger 1983). The economic value of hunting by the shooting club is related to the fees of hiring the lakes from the Governorates and to few individuals employed by the shooting clubs to guard the hunting reserves. However, this economic value cannot be considered of significant weight. Furthermore, there are several thousands of sport hunters, who are not members of shooting clubs, they hunt waterfowl all over the Delta and

western desert lakes. Their annual bag is estimated to be 3000 – 4500 birds (Goodman *et al.* 1989). There is no economic value for this type of hunting, apart of the free meals it provides for several thousands of people. However, most of the hunters are not dependant on these meals and the hunting occurs mainly for recreation.

12.4.2. Capturing of Birds of Prey

It is certain that the capture and trade of birds of prey (other than large falcon) is the most destructive and least economically justifiable bird catching activity practiced in the Egyptian wetlands. There are also relatively few key trade outlets through which the birds reach the market, which might be relatively easy to ban the birds off the market. A first step in this action area is to change law no. 53 for 1966, which provides protection for all birds beneficial to agriculture, including birds of prey (according to Ministerial Decree 66 for 1983). This law protects birds of prey from being captured and killed, but no where does it prohibit the trade in these birds. Thus, it is currently not possible to make any legal action concerning birds offered for sale on the market (Tharwat and Hamied 2000).

It is probably unpractical to attempt banning the capture of birds of prey completely, but it might be feasible to regulate this practice, allowing the catchers to capture a certain number of large falcons every year, and prohibit completely the capture and trade of all other birds of prey. Certain catching methods which involve the use of other birds of prey as decoys should also be banned.

12.5. MANAGEMENT PRACTICES

Tharwat and Hamied (2000) suggested the following management practices in Lake Burtullus: 1- establish a training program to train people in bird watching, identification of birds, ringing, counting and photography; 2- support the Burullus Protectorate area with the instruments that help in the recording and identification of the bird during their movements; 3- strengthen the law enforcement in the protected area; 4- carrying out public awareness programs to inform people about the importance of protected areas and wildlife; 5- encourage the activity of bird watchers and find the best way to attract them; 6- publish a quarterly newsletter and a field guide for the avifauna of the area; 7- establish a page in the Internet about the avifauna of the area; 8- hold an international conference every three years to discuss the status of the avifauna of the area and compare it with the world status; 9- encourage the study of birds as pests for agriculture and aquaculture in Egypt; 10- extend the study of the avifauna to be done throughout the year seasons; 11- there is a great need for action to prevent habitat manipulation that occurs in

the protected areas which lead to damage the avifauna; 12- there must be a study of environmental impact assessment for any project or activity in or around the protected area; 13- prevention of Quail netting inside the protected area; 14- establish a program supported by donors or international agencies for protecting the threatened bird species; and 15- encourage local organizations and NGO's to participate and play their role in the conservation of the area.

12.6. SUGGESTED FUTURE STUDIES

Concurrent research by the Ministry of Water Resources and Irrigation has revealed that little loss of mud flat area will occur over the next hundred years as a result of sea level rise (Tharwat and Hamied 2000). A similar, fairly inexact estimate of the change of habitat as a result of climate change means that we are at present only able to draw general conclusions. We can for instance, conclude that the Oystercatcher numbers will decline due to the effect of climate change on the loss of both summer and winter habitats. For the time being therefore, we are not able to make exact predictions about the consequences of climate change on the numbers of wading birds (Ens 1996). According to this, there is a great need to study correlation between the physical factors and bird migration. Also, there is a need to study the correlation between the physical factors in the breeding area of migratory birds, the migration timing and the behaviour of migratory birds during migration.

12.7. SUMMARY

The bird surveys in Lake Burullus indicated the presence of 112 species and subspecies, which constitute about 22% of the total Egyptian avifauna. During four winter surveys (1978, 1979, 1989, 1994), there was a remarkable increase in species richness associated with a sharp decrease in the density of some populations. The sharp density decreasing was quite clear in case of Coot, Shoveler, Black headed gull, Pochard and Ferruginus Duck. On the other hand, some other populations such as Kingfish Plover, Little Stint and Pied Kingfisher had an obvious increasing density.

Of the 112 birds recorded in Lake Burullus, 46 are residents, 80 are winter visitors, 23 are spring visitors and 72 are both summer and autumn passers. The collection of information about the national and world distributions of these birds indicated the possibility of occurrence of 8 endemic species and subspecies, which represent about 47% of the total endemic avifauna in Egypt.

Waterfowls are still being hunted all over the Egyptian wetlands, particularly Lake Burullus. This includes two types of hunting, commercial and sport hunting, both are practiced mainly during winter season where there is an abundance of wintering birds. The capturing of birds of prey, which practiced in the protected area, is the most destructive and less economically justifiable bird catching activity.

Many management practices are suggested to conserve the bird populations in Lake Burullus such as law enforcement in the protected area, carrying out public awareness programs about the importance of wildlife conservation in general, and that of avifauna in particular, encourage the activity of bird watching via ecotourism, preventing of habitat destruction or modification, establishing a program for protecting the threatened bird species and encourage the local organizations and NGO's to participate in the management of the protected area.

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12.9. PLATES OF BIRDS: 12.1 – 12.22

(After Porter & Cottridge 2001)

Plate 12.1

Tachybaptus ruficollis ruficollis
Podiceps cristatus cristatus
Egretta alba alba
Phalacrocorax carbo sinensis

Plate 12.2

Ardea cinerea cinerea
Podiceps nigricollis nigricollis
Ardeola ralloides

Plate 12.3

Nycticorax nycticorax nycticorax
Ixobrychus minutus minutus

Plate 12.4

Phoenicopterus ruber roseus
Egretta garzetta garzetta
Anas penelope

Plate 12.5

Anas clypeata
Anas querquedula
Aythya nyroca
Elanus caeruleus caeruleus

Plate 12.6

Netta rufina
Circus aeruginosus aeruginosus
Porzana porzana

Plate 12.7

Porphyrio porphyrio madagascariensis
Fulica atra atra
Rostratula benghalensis benghalensis
Himantopus himantopus himantopus

Plate 12.8

Recurvirostra avosetta
Glareola pratincola pratincola
Charadrius hiaticola tundrae
Charadrius dubius curonicus

Plate 12.9

Charadrius pecuarius allenbyi
Charadrius alexandrinus alexandrinus
Charadrius leschenaultii
Pluvialis squatarola

Plate 12.10

Vanellus vanellus
Calidris ferruginea
Hoplopterus spinosus

Plate 12.11

Calidris minuta
Philomachus pugnax
Gallinago galinago galinago
Limosa limosa limosa

Plate 12.12

Tringa glareola
Actitis hypoleucos
Tringa stagnatillis
Larus ichthyaetus

Plate 12.13

Larus minutus
Larus ridibundus
Larus genei
Larus fuscus fuscus

Plate 12.14

Chlidonias hybrida hybrida
Chlidonias leucoptera
Sterna albifrons albifrons
Streptopelia senegalensis aegyptiaca

Plate 12.15

Centropus senegalensis aegyptius
Cuculus canorus canorus
Ceryle rudis rudis
Streptopelia decaocto decaocto

Plate 12.16

Tyto alba alba
Athene noctua saharae

Plate 12.17

Athene noctua glaux
Alcedo atthis atthis

Plate 12.18

Upupa epops epops
Hirundo rustica rustica
Riparia riparia riparia
Merops orientalis cleopatra

Plate 12.19

Anthus cervinus
Motacilla alba alba
Motacilla flava flavissima

Plate 12.20

Corvus corone cornix
Sturnus vulgaris vulgaris
Acrocephalus stentoreus stentoreus

Plate 12.21

Phylloscopus collybita collybita
Scotocerca inquieta inquieta
Cisticola juncidis juncidis
Passer domesticus niloticus

Plate 12.22

Saxicola torquata rubicola
Emberiza schoeniclus intermedia
Passer hispaniolensis hispaniolensis