# Distribution and Number of Herons (Ardeidae), White Stork *Ciconia ciconia* and Greater Flamingo *Phoenicopterus roseus* at their Main Wintering Sites in the Azerbaijan Republic

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Received 3 May 2009; accepted 29 December 2009

**Abstract:** Seven wintering heron species as well as White Stork *Ciconia ciconia* and Greater Flamingo *Phoenicopterus roseus* were surveyed in all 27 important wetlands of the Azerbaijan Republic during the winter seasons of 2003/2004 and 2004/2005. Three species (Night Heron, Cattle Egret and White Stork) were not regular wintering migrants. The most numerous species was by far Greater Flamingo (10,974) followed by Little Egret *Egretta garzetta* (798) while the numbers of three species, namely Grey Heron *Ardea cinerea* (396), Great White Heron *Egretta alba* (381) and Eurasian Bittern *Botaurus stellaris* (382) were quite similar. In terms of maximum bird numbers in selected sites, Gizilagach State Nature Reserve (6,978), Ajinohur (3,501) and Lake Aggyol (1,380) had the highest numbers of birds observed. Grey Heron, Little Egret and Great White Heron were registered on the majority of the wetlands (22, 21 and 20 sites, respectively) wheras Greater Flamingo was recorded only on six wetlands.

Keywords: Azerbaijan Republic, egrets, Greater Flamingo, herons, White Stork.

#### **INTRODUCTION**

Fourteen species of the order Ciconiiformes and one species of the Phoenicopteriformes (Greater Flamingo) have been recorded in Azerbaijan. These species were studied in different years and some articles have been published. Some data on migration, breeding, wintering, distribution and numbers of these species were given in the following sources together with other species (Tuayev & Vasilyev 1969, Babayev 1989, Patrikiyev 1991, Tuayev 1996, Humbatova 1999, Sultanov & Gavashelishvili 1999, Mustafayev 2000, Sultanov 2000, Sultanov et al. 2002, Mamedov & Mustafayev 2003, Sultanov 2004). However, the current situation regarding the wintering populations of these species has not been described in these papers. This is why research on the main wintering areas and numbers of these species was our major object.

Some 16 types of fresh waterbodies are registered in the Caucasus. These are river, lake, marsh, water reservoir, nokhur (small lake), small gulf (liman), gulf (korfez), karkhana (factory for crushing stone for building purposes), akhmaz (old river bed), istili (pond) chala – lake decreasing in size), rice field, irrigation canal, artesian well, spring (bulag) (Gasimov 1972). Of these, lakes, water reservoirs, ponds and gulfs are the most important for Ciconiiformes and Phoenicopteriformes. According to the data from the Azerbaijan Republic Ministry of Water Economy, 266 lakes with an area of 28,000 ha occur in Azerbaijan (Gasimov 1972, Mamedov 2007). About 34 freshwater reservoirs with a general area 873.17 km<sup>2</sup> occur in Azerbaijan (Gasimov 1972, Mamedov 2007).

### **STUDY AREAS**

Characteristics of all sites visited during the study are presented in Table 1 and locations are shown in Fig. 1. Among these, Aggyol, Sarisu, Hajigabul, Flamingo, Varvara, Mingachevir, Gyzylagach are the largest in area and have the largest numbers of wintering waterbirds and thus have more importance for studying heron species.

#### Lake Aggyol

This is located on Mil steppe in Karabakh. The depth of water is about 1.2–3.5 m, and has a coastal strip of 0.1–0.5 m. The salinity of the water is 11.4 g/l. About 75 % of its area is covered with vegetation (basically reeds). This lake is of particular importance as a place for wintering and breeding of many rare and threatened species of waterbirds including *Phalacrocorax pygmeus*, *M. angustirostris, Aythya nyroca, Pelecanus crispus* and *Oxyura leucocephala*. At this site, water levels

have fallen sharply during recent years as a result of problems with water supplies to the lake. This has resulted in decreasing oxygen content and numbers of fish. Lake Aggyol is designated as a National Park where all economic activities are prohibited.

### Lake Sarisu

This is one of the largest wetlands in Azerbaijan having great importance as a wintering site for some rare species. The maximum depth is 2.5 m and the salinity of water is 16-18 g/l. More than half of its area is covered by reedbeds that create perfect conditions for nesting sites for breeding birds. The lake is one of the two largest places for wintering waterbirds in Azerbaijan (Sultanov & Mustafayev 1994). There is a large mixed breeding colony of Ciconiiformes and Pelecaniformes. Mass nesting of Chlidonias hybrida occurs here. The greatest threat is the periodic sharp decrease of water-level in the lake (especially in summer) as a result of the termination or reduction in the inflow due to upstream irrigation systems. The total number of wintering waterbirds reached 500,000 and more in the past (Sultanov & Mustafayev 1994). The major sources of disturbance are hunting and poaching (from mid-October to mid-February). The special protection status given to the site simply has not worked. However, the hunting economy actually makes a real sanctuary for birds during the non-hunting season.

## Lake Hajigabul

As compared with the majority of other shallow lakes of Azerbaijan, the reedbeds are not very extensive. However, neighboring shallow water and fishponds have very developed reedbeds. The depth of the lake is up to 5 m and the salinity of water is 6.4 g/l. It is an extremely important place as a refuelling and resting place for migratory birds during both spring and particularly autumn migration. It is also a very important place for wintering and breeding waterbirds, including such Globally Threatened Species as Dalmatian Pelican Pelecanus crispus, Marbled Teal Marmaronetta angustirostris and White-headed Duck Oxyura leucocephala. In recent years an ecological catastrophe was observed. The water depth has decreased below 1 m. At this oval-shaped lake, birds can escape being shot by going to the middle of the lake since this is outside gunshot range.

### Lake Flamingo (Gushgyol, Chala, Shorgyol)

The size of the lake increased in the 1970s and 1980s but now its area is more or less stable ; the

level of water and the actual shoreline fluctuate to some extent due to evaporation and the subsequent pumping of water into the lake until the previous high water mark is attained. The water is very shallow (often less than 0.5 m), while the salinity is 17–18 g/l. Reed growth is prolific. It is an extremely important place for resting during migration as well as for wintering and nesting waterbirds. This lake provides good food and shelter for birds and has high concentrations of waterbirds such as *P*. *crispus P. onocrotalus Ph. ruber, P. porphyrio, R. avosetta* and many others during the winter, breeding and migration seasons.

### Varvara Reservoir

The reedbed is very extensive. The water depth is about 0.5–18 m. The reservoir is surrounded by shallow water separated from it by a dam and a narrow strip of land. This is an important place for breeding and wintering of many rare and threatened birds including *Ph. pygmeus, A. nyroca*. A large mixed breeding colony of Ciconiiformes and Pelecaniformes is found here. The reservoir is characterized by dense reed beds and large areas of shallow water. Hunting occurs and this is a major factor of disturbance. In the general area of the site the major disturbance is the economic activity of the neighboring village.

### **Mingachevir Reservoir**

The maximum depth of the reservoir is 75 m. This western site is an important wintering and breeding place for waterbirds. Migratory birds basically use the deepish part of the reservoir for temporary resting areas. Good conditions for feeding and breeding are found only in the western shallow area (Samukh) where vegetation grows well.

### Gyzylagach State Reserve and Sanctuary

Two Caspian Sea gulfs - Great and Lesser Gizilagach – occur in Azerbaijan. These gulfs are considered to be highly important wetland habitats in Europe (based on the species diversity and number of birds) together with the surrounding shallow waters (Sultanov 2008). The gulfs are included in Gizilagach State Reserve and Sanctuary. It is an important wintering, breeding and migration place for Ciconiiformes and Phoenicopteriformes.

It is one of the most important places both in Europe and in all the Western Palearctic for wintering and breeding waterbirds. It consists of four main bodies: 1) Great Gyzylagach Gulf (area 40,000 ha, length 29 km, width 24 km, maximal depth 3.5 m), Lesser Gyzylagach Gulf (16,000 ha, length 16.7 kms, width 6.5 kms, maximum depth 2.5 m); 2) a maritime belt of reedbeds (width 2–2.5 km) which is found in Great Gyzylagach Gulf. It occurs along the western and northern coastlines of the Great Gulf about 200 m from the shore and provides good shelter for birds; 3) shallow waters with reedbeds and 4) semidesert areas on the remaining part of the reserve. This is one of the best places for wintering birds such as *A. erythropus, Ph. ruber, Ph, pygmeus, P. crispus* and *P. onocrotalus*. In addition the Great Gulf is an extremely important part of Southern Caspian Sea since it has large concentrations of newly-hatched fish and is thus a nursery for these.

#### MATERIALS AND METHODS

The research on the numbers and distribution of Ciconiiformes and Greater Flamingo in Azerbaijan was conducted in two winter seasons (2003/2004 and 2004/2005). A total 36 field days were spent in

winter 2003/2004 and 20 field days in winter 2004/2005. A telescope Viking V-80 20–60 $\times$  and a pair of 10×40 binoculars were used and counting was based on standard methods (Collin et al. 2000). The field excursions were conducted at 29 sites in 2003/2004 and at 27 sites in the 2004/2005. The following sites were surveyed: Kura-Araz lowland (Lake Jandar, Yenikend and Mingachevir reservoirs, Lake Ajinohur, Ayrichay and Varvara reservoirs, Aggyol, Sarisu, Hajigabul, Mahmudchala Lakes, Lake Flamingo (Shirvn National Park) and Kura Delta); Samur-Davachi (Yashma-Gilezi) plain; Absheron-Gobustan region (shallow waters near settlements Mardakan, Pirallahi, Cape Shakhdili, Turkan, Zigh, Shikh, Red Lake, Oil Platform Factory along the shores of Sangachal Oil Terminal, Gobustan bay, Alat bay, Cape Pirsaat); also Lankaran plain (Gizilagach State Nature Reserve and Sanctuary), Nakhchivan Autonomic Republic (Nakhchivan Reservoir) (Fig. 1).



Figure 1. The main wintering sites of Ciconiiformes and Phoenicopteriformes in Azerbaijan Republic.

Notes: ≤150,000ha, ≤100,000ha, ≤10,000ha, ≤50,000 ha, more 5 species, - less than 5 species,

! - more 5000 individuals, \* - less 5000 individuals, + - less 1000 individuals.

Key to numbers: 1. Jandar Lake, 2. Ayrichay water reservoir, 3. Ajinohur Lake, 4. Mingechevir and Yenikend water reservoirs, 5. Varvara Reservoir, 6. Nakhchivan Reservoir, 7. Aggyol Lake, 8. Bozgobu Lake, 9. Sarisu Lake, 10. Davachi, 11. Yashma-Gilazi, 12. Mardakan-Buzovna, 13. Pirallahi and Dubendi, 14. Cape Shakhdili, 15. Turkan-Hovsan, 16. Red Lake, 17. Gobustan Bay, 18. Sangachal Oil Terminal, 19. Hajigabul Lake, 20. Alat bay, 21. Cape Pirsaat, 22. Mahmudchala Lake, 23. Flamingo Lake, 24. Kura Delta, 25. Gyzylagach State Reserve and Sanctuary, 26. Shikh, 27. Zigh.

Region	Site name	Coordinates	Area (ha)	Water depth (m)	Wetland type	Changes in water- level (m)	Vegetation (Phragmitis communis)	Main fauna	Conservation measures	
Absheron-	Alat Bay	39°39'-40°03'N,	2500	1–5	Brackish	1–2	Poor	Waterbirds,	Unprotected	
Gobustan	Sangachal Oil	49°25'-49°39'E 49°30'N,	500	1–5	Brackish	1–2	Poor	fish Waterbirds,	Unprotected	
	Terminal	40°10'E	10.000			1.0		fish		
	Cape Pirallahi	40°28'N, 50°15'E	10,000	1–10	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Cape Pirsaat	40°52'N, 49°26'E	1000	1–5	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Cape Shakhdili		4000	1–5	Brackish	1–2	Abundant	Waterbirds, fish	National Park	
	Dubendi offshore	40°40'N, 50°15'F	500	1–5	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Gobustan bay	39°59'N, 49°28'E	500	1–5	Brackish	1–2	Poor	Waterbirds,	Unprotected	
	Mardakan-	40°30'N,	500	1–5	Brackish	1–2	Poor	Waterbirds,	Unprotected	
	Buzovna offshore	50°12'E						fish		
	Red Lake	40°19'N, 49°40'F	500	1–2	Brackish	1–2	Abundant	Waterbirds, fish	Unprotected	
	Oil Platform Factory	49°33'N, 40°12'E	5000	1–6	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Shikh settlement		500	1–2	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Turkan-Hovsan	40°21'N, 50°10'F	1000	1–5	Brackish	1–2	Absent	Waterbirds, fish	Unprotected	
	Zigh	40°20'N, 50°01 E	500	1–5	Brackish	1–2	Poor	Waterbirds,	Unprotected	
Ganajabasar	Lake Jandar	41°24'-41°27'N	1250	6	Fresh	2–3	Poor	Waterbirds,	Unprotected	
Kura-Araz lowland	Lake Ajinohur	41°N, 47°E	5000	1–2	Very salty	1	Absent	Waterbirds	Unprotected	
	Ayrichay and Varvara Reservoirs	40°46-41°01'N, 46°20'-47°09'E	2500	0,5– 18	Fresh water	2–5	Abundant	Waterbirds, fish	Unprotected	
	Lake Hajigabul	39°58'-40°01'N, 48°54'-48°56'E	904	1–5	Very salty water	2–3	Absent	Waterbirds	Unprotected	
	Kura Delta	39°16'-39°20'N, 49°19'-49°28'E	15000	6–12	Fresh	2–5	Abundant	Waterbirds, fish	Unprotected	
	Lake Aggyol	39°58'-40°31'N., 47°31'-47°46'E	5000		Brackish water		Abundant	Waterbirds, fish	National park	
	Lakes Sarisu and Bozgobu	40°00'N,48°19'E	11,000	0,5– 2,5	Brackish water	1–1,5	Abundant	Waterbirds, fish	Unprotected	
	Lake Mahmudchala	39°22'-39°30'N, 48°35'-45°15'E	8000	1–2	Brackish	1–1,5	Abundant	Waterbirds, fish	Unprotected	
	Shirvan National Park (Lake Flamingo)	39°29'-38°40'N, 49°24'-49°25'E	2000- 4000	0,5– 1,0	Brackish	1,0	Abundant	Waterbirds	National park	
	Yenikend and Mingachevir Reservoirs	40°48'-41°05'N, 46°21'-47°10'E	>62,500	75– 125	Fresh water	50	Poor	Waterbirds, fish	Unprotected	
Lankaran plain	Lankaran (Gyzylagach State Reserve+ Sanctuary)	35°57'-39°18'N 40°46'-49°12'E	115,000	1–5	Brackish	1–2	Abundant	Waterbirds, fish	State Natural Reserve	
Nakhchivan Autonomic Republic	Nakhchivan (Nakhchivan water reservoir)	39°10'N, 45°20E	18,000	5–10	Fresh water	1–3	Poor	Waterbirds, fish	Sanctuary	
Samur- Davachi palin	Samur-Devechi plain: Isl. Yashma- Cape	40°35'-40°58'N, 49°19'-49°33'E	2200	1–5	Brackish	1–2	Abundant	Waterbirds, fish	Unprotected	

 Table 1. Characteristics of surveyed wetlands in this study.

#### **RESULTS AND DISCUSSION**

During the present surveys eight species (Great Bittern, Night Heron, Cattle Egret, Great White Egret, Grey Heron, Purple Heron and White Stork) of Ciconiiformes and Greater Flamingo were registered. According to Tuayev (1996), Squacco Heron is a resident bird in Azerbaijan; however, we had no records of this species in the wintering areas. The most numerous species were Greater Flamingo, Little Egret, Grey Heron and Great Bittern while White Stork and Cattle Egret were scarce (Table 2). Widespread species were Little Egret (18 sites), Grey Heron (16), Great White Heron (15) but Cattle Egret, Purple Heron, Night Heron and White Stork were observed only at one site. The sites with the highest species diversity were Gizilagach reserve (6 species), Sarisu (5 species) followed by Kura Delta, Mahmudchala, Pirallahi (4 species). In winter 2003/2004, eight species of Ciconiiformes (a total of 1,978 individuals) and Greater Flamingo (10,912 individuals) were counted wintering in Azerbaijan. Little Egret (22 sites), Grey Heron (17 sites) and Great White Egret (14 sites) were distributed more widely, but Night Heron, Cattle Egret, Purple Heron and White Stork were all recorded only at one site (Table 4). In winter 2004/2005, five species of Ciconiiformes (692 individuals) and Greater Flamingo (1,152 individuals) were recorded.

#### **Individual Species Status**

**Eurasian Bittern** *Botaurus stellaris*: Not threatened (this species does not need special protection measures). A wintering and migrant species as well as a rare breeding visitor (Sultanov & Mustafayev 1994, Mustafayev 2000). This species was recorded at Gyzylagage, Cape Pirsaat and Machmudchala (Table 2).

**Black-crowned** Night Heron Nycticorax nycticorax: Not threatened. Common migratory and breeding species and an irregular wintering bird (Sultanov & Mustafayev 1994, Tuayev 1996, Mustafayev 2000). This species was observed at Sarisu Lake.

**Cattle Egret** *Bubulcus ibis*: Not threatened. Breeding bird, observed at the Kura-Araz and Lankaran lowlands. Also a rare migrant and wintering species (Sultanov & Mustafayev 1994, Tuayev 1996, Sultanov 1997, Mustafayev 2000, Musayev & Musayev 2003, Sultanov *et al.* 2003, Sultanov 2004). Six individuals were recorded at Lake Sarisu on the 16 January, 2004.

Great White Egret Ardea alba: Not threatened. Observed in all seasons but commonest in winter, rare in summer (Mustafayev *et al.* 1994, Mustafayev 2000, Musayev & Musayev 2003). It was recorded at the Aggel, Yashma-Gilezi, Cape Shakhdili, Alat, Oil Platform Factory, Machmudchala and Jandar (Mustafayev *et al.* 1994, Mustafayev 2000, Musayev & Musayev 2003) and we also observed it at the Hajigabul, Pirallahi, Ajinohur, Yenikend, Kura Delta and Cape Pirsaat during the winter survey (Table 2).

Little Egret Egretta garzetta. Not threatened. According to Mustafayev (2000) this bird is common in the breeding areas but rare in the wintering areas. According to the literature, it is mostly observed on Lake Sarisu, Mahmudchala, Mingachevir and Varvara reservoirs, Lake Jandar, Yashma-Gilezi, Alat, Cape Shah, Oil Platform Hajigabul and Kalinov Factory, liman (Gyzylagach) in the wintering areas (Babayev 1989. Mustafavev et al. 1994. Mustafavev 2000. Musayev & Musayev 2003, Sultanov et al. 2003). We also recorded it at Red Lake, Pirallahi, Pirsaat, Yashma, Mardakan, Kura Delta, Turkan, Hovsan and Zigh. At present, Little Egret is the most widespread and numerous species of Ciconiiformes in the wintering areas.

Grey Heron Ardea cinerea. Not threatened. Resident. Common migrant, breeding and wintering species. It is a common species at Agzibir, Sarisu, Mahmudchala, Aggyol, Varvara and Gyzylagach (Tuayev 1996). There are wintering records of this species at Aggyol, Hajigabul, Varvara, Yashma-Gilezi, and Cape Shah, Alat, Oil Platform Factory, Mingachevir, Mahmudchala, Sarisu and Jandar (Babayev 1989, Musayev & Musayev 2003, Sultanov *et al.* 2003). We recorded it at Hajigabul, Cape Shakhdili, Varvara, Sarisu, Gyzylagach and Aggyol, also at Sangachal, Yenikend, Mardakan, Kura Delta and Pirallahi. Grey Heron is the most widespread wintering species in Azerbaijan.

**Purple Heron** *Ardea purpurea*. Some 180 between 5 and 10 December 2003 at Gyzylagage State Reserve and Sanctuary.

White Stork Ciconia ciconia. Not threatened. Common breeding and rare wintering bird, uncommon on migration. It was recorded at Gyzylagach, Shamkir, Agdash, Saatli, Kurdamir, Masalli and Nakhchivan in the breeding areas (Tuayev & Vasilyev 1969, Tuayev 1996, Mustafayev 2000). It was also recorded on the northwest shore of the Caspian Sea (Gyzylagach) during winter (Mustafayev 1969).

**Greater Flamingo** *Phoenicopterus ruber*. This species is included in the Azerbaijan Red Data Book. It is a common wintering and migrant

species but it occurs only at a limited number of sites. It regularly breeds at the Gyzylagach State Reserve and Sanctuary and also sporadically at Hajigabul and Mahmudchala Lakes. In addition to these two sites, it also winters at Cape Shakhdili, Lake Agzibir (Davachi lagoon), Shirvan National Park (Lake Flamingo), northern Kura Delta, Aggyol, Sarisu and Ajinohur Lakes (Sultanov & Mustafayev 1994).

**Table 2.** Maximum counts of Ciconiiformes and Greater Flamingo in Azerbaijan during the winters 2003/2004 and2004/2005. A = winter of 2003-2004; B = winter of 2004-2005; \* = no count; + = present; - = absent.

Species	Eurasian Blac Bittern crowr Nigh Herc		ick- vned ght ron	Cattle d Egret		Gr Wr Eg	Great White Egret		Little Egret		Grey Heron		Purple Heron		hite ork	Greater Flamingo		Species per site		TOTAL no. of brds		
Sites▼Winters►	Α	В	Α	в	Α	В	Α	В	Α	В	Α	В	Α	в	Α	В	Α	В	Α	В	Α	В
Lake Aggyol							70	60	-	55	55	50					1,200	375	2	*	1,325	540
Lake Ajinohur							1	*									3,500	*	3	4	3,501	0
Alat Bay							12	5	2	1	-	3					23	85	3	4	37	94
Ayrichay Reservoir							9	2			-	8							1	2	9	10
Cape Pirallahi	1	-					3	-	27	7	2	2							4	2	33	9
Cape Pirsaat							7	3	2	6	-	2					4	-	3	3	13	11
Cape Shakhdili			-	1			5	11	3	3	8	12							3	4	16	27
Oil Platform Factory							-	4	2	4	7	1							2	3	9	9
Lake Flamingo							-	2	1	5									1	2	1	7
Gobustan Bay									2	1	1	-							2	1	3	1
Gyzylagage State Reserve and Sanctuary	380	*					200	*	561	*	217	*	180	*			6,000	*	6	*	7,438	0
Lake Hajigabul							1	1	13	8	1	8							3	3	15	17
Hovsan									-	1	-	3							-	2	0	4
Lake Jandar							2	*	1	*									2	*	3	0
Kura Delta							4	5	17	17	3	6					185	-	4	3	209	28
Lake Mahmudchala	1	-					3	-	5	-	2	-							4	0	11	0
Merdakan									2	*	5	*							2	*	7	0
Mingachevir Reservoir	-	*	-	*	-	*	-	*	-	*	2	*	-	*	-	*	-	*	-	*	2	0
Nakchivan Reservoir							*	3			*	8			*	12			*	3	0	123
Red Lake							-	8	2	66	1	14							2	3	3	88
Sangachal Oil Terminal									5	2	7	1							2	2	12	3
Sarisu Lake			200	140	6	-	5	13	6	6	6	24							5	4	223	183
Shikh									1	-	3	-							2	-	4	0
Turkan							-	1	2	2									1	2	2	3
Lake Varvara							-	2	5	3	1	1							2	3	6	6
Yashma-Gilezi							1	15	2	3									2	2	3	18
Yenikend Reservoir							2	-			2	-							2	-	4	0
Tovouzchay River							-	3											-	3	0	3
Zigh									1	4	-	3							1	2	1	7
TOTAL No. of sites visited by each species	3	0	1	2	1	0	15	16	21	18	17	16	1	0	0	1	6	2				
TOTAL Numbers	382	0	200	141	6	0	325	138	662	194	323	146	180	0	0	12	10,912	460			12,890	1,191

Acknowledgements: The authors would like to express their thanks to T. Kerimov (Nakhchivan Reservoir) and N. Agayeva (Kura Delta, Turkan, Hovsan, Pirsaat) for their help during field research and to the World Federation of Sciences (WFS) for their support..

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