

THE DISTRIBUTION AND SETTLEMENT CHARACTER OF THE SPECIES BELONGING TO THE CHARADRIIFORM ORDER (*Charadriiformes*) IN THE WATER POOLS OF THE GIZILAGHAJ STATE NATURE RESERVE AND SMALL GIZILAGHAJ STATE NATURE BAY OF THE AZERBAIJAN SECTOR OF THE CASPIAN SEA

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Abstract. In the last 50 years the change in level (rise and fall) of the Caspian Sea has caused an increase in its impacts to the coastline. At the same time, due to the increase of the anthropogenic factors to the areas near the coastline (more in the last 20 years), the habitats of the species belonging to the Charadriiform order (*Charadriiformes*) that settled and come to the wintering in the Gizilaghaj State Nature Reserve and water pools of the Small Gizilaghaj State Nature Bay and Lankaran coastline near the coastline of the Caspian Sea in danger of being lost. That's why, this also affected seriously the number dynamics and status of some species (Babayev, 2003; Babayev *et al.*, 2006; Babayev *et al.*, 2015). As a result, such anthropogenic impacts have changed considerably the current ecosystem.

Keywords: *Charadriiform, Caspian Sea, anthropogenic factors, distribution, status.*

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1. Introduction

The researches and to collect the material were carried out in the spring, autumn and winter seasons of 2017-2019 years in the Gizilaghaj State Nature Reserve and water pools of the Small Gizilaghaj State Nature Bay and Lankaran coastline near the coastline of the Caspian Sea.

Charadriiform are also important as a biological indicator of wetland biotopes of the species belonging their orders in worldwide, including in Azerbaijan, too.

Methods. The point counting method was used to count birds in the open water pools of the Big and Small Gizilaghaj Gulfs. For this, the hills with a height of 5-10 m were chosen in the areas where the counting was carried out. The counting of the birds was carried out after dividing the area into the squares. The area of the squares was 0.2 km² in the water pools and 18-20 km² in the aquatorias.

The categories of the birds according to the population density are based on Kuzyakin (1962) and Mustafayev & Maharramova, (2005); Mustafayev & Tuayev, (1977); Mustafayev, (1972; 1985): a population of 0.1-0.9 individuals per 1 km² area is

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considered rare; a population of 1-10 individuals per 1 km² area is considered ordinary and a population of more than 10 individuals per 1 km² area is considered numerous.

2. Results and their analysis

Gizilaghaj State Nature Reserve and Small Gizilaghaj State Nature Bay

From the water pools of the Gizilaghaj State Nature Reserve, the Big Gizilaghaj Gulf, Khazar and Aghgush water meadows are located in the South-Western part of the Salyan coastline, the Pirman port and the Northern end of the Small Gizilaghaj Gulf (40.5 km²), including the rest main part of the Small Gizilaghaj Gulf (100.5 km²), Small Gizilaghaj State Nature Bay are located in the North-Eastern part of the Lankaran coastline. The reserve is considered one of the most important places for the wintering and nesting birds in the Western Palearctic.

The birds have distributed unequally because these water pools differ sharply from each other due to their ecological characteristics (Babayev, 2002).

The Lankaran coastline of the Caspian Sea

It is located between the Southern border of the Gizilaghaj State Nature Reserve and Astarachay. In the first half of the 20th century, thousands of the small water pools and the wide marshes around them were the wintering grounds of hundred thousands of the water and shore birds in the whole Lankaran plain - from coastal waters to the foothills of the Talish mountains. But until the 70s of the 20th century, all the water - wetland biotopes along the Lankaran coastline of the Caspian Sea were dried up. The agricultural plants were planted in their place and the various industrial facilities were built accordingly. As a result, the great changes have occurred in the ornithofauna of these areas. The Lankaran coastline has lost its importance as a meeting place for a number of the species of the international importance (Babayev, 2002).

8 families, 30 genera and 72 species of this order include to the Azerbaijan fauna.

During the conducted researches, 48 of 72 species belonging to this order were noted in the Southern coastline of the Caspian Sea. 5 of these species are sedentary, 17 are migratory (meet during the migration), 17 come for breeding, 8 for wintering, and 1 species comes when loses its way (Table 1, 2, 3).

As can be seen from the table, in the Southern coastline of the Caspian Sea, 6 (*Chettusia gregaria* (CR), *Numenius arquata* (NT), *N.tenuirostris* (CR), *Limosa limosa* (NT), *Glareola nordmanni* (NT), *Gallinago media* (NT)) of the species (48 species) belonging to the *Charadriiformes* order have global conservation status (Table 1, 2, 3).

1. ***Chettusia gregaria* Pall., 1771.** This species was also included to the "Red Book" of Azerbaijan.

In Europe - 40-80 pairs for nesting, 10 for wintering.

It is shown that there are 0-12 individuals **in Azerbaijan** (Sultanov & Karimov, 2007). It is a bird passing through Azerbaijan. In the 19th century, it was noted in groups and flocks during the migration. 21 individuals were noted by us (Table 1, 2, 3).

While passing through Azerbaijan, it is met in the wormwood, saline and irrigated fields of the Mughan and Lankaran plains (Babayev, 2002).

The reason for the decrease in number. The cultivation of the land in its breeding areas, the draining of the swamps, use of chemical substances influence to its numbers.

The available and necessary protective measures. It is protected both worldwide and in Europe as a critically endangered species (CR). It is included and protected to the

AEWA agreement, CITES, Ramsar, Bern, Bonn conventions, the IUCN Red List and the "Red Book" of Azerbaijan (The Red Book, 2013).

2. *Glareola nordmanni* Nord., 1842.

This species is also included to the "Red Book" of Azerbaijan.

2500-5100 pairs are noted in breeding **in Europe** (Sultanov & Karimov, 2007).

In Azerbaijan-Previously, although there were many in the lakes of the Kur-Araz plain, they were not noted. In May 1962, the nesting of 20 pairs was noted in Aghgol (Sultanov & Karimov, 2007). There is no information about its registration in the following years. 1261 individuals were noted by us (Table 1, 2, 3).

It is a nesting-migratory bird in Azerbaijan. It was noted during the nesting period in Mil and during the migration in the Kur-Araz plain.

The reason for the decrease in number. The draining of the swamps and water meadows, cultivation of the land in its nesting places influence to its numbers.

The available and necessary protective measures. It is protected as a data deficient species (DD) and with the status of endangered species (EN) in Europe. It is included and protected to the AEWa agreement, CITES, Ramsar, Bern, Bonn conventions, the IUCN Red List and the "Red Book" of Azerbaijan (The Red Book, 2013; Sultanov & Karimov, 2007).

The number of its natural enemies in the biotopes where it nests should be limited, the cattle grazing there and use as arable land should be strictly prohibited.

3. *Numenius tenuirostris* Vieillot, 1817.

This species is also included to the "Red Book" of Azerbaijan.

50-60 pairs are noted in breeding **in Europe**.

It is a migratory bird in Azerbaijan, there is no information about its number. In the first ten days of May, 25-40 individuals were noted while passing from the Caspian Sea shores (Sultanov & Karimov, 2007). It needs to be studied.

The spring migration is observed in early May, autumn migration in August in Azerbaijan. Due to its short stay on the Caspian Sea shores and Mughan, it is not noted mostly (Mustafayev & Tuayev, 1977).

The available and necessary protective measures. It is protected as a critically endangered species (CR) in the worldwide and with the not evaluated species status (NE) in Europe. It is included and protected to the AEWa agreement, CITES, Ramsar, Bern, Bonn conventions, the IUCN Red List and the "Red Book" of Azerbaijan (The Red Book, 2013; Sultanov & Karimov, 2007).

The illegal hunting should be prevented in its wintering areas and the negative factors should be eliminated in its nesting areas.

4. *Limosa Limosa* Linn., 1758.

The distribution and number in Azerbaijan. It is common when passing, but few in wintering. The flocks of 20-40 individuals were noted in Aghgol (Sultanov & Karimov, 2007). It is met on the Caspian Sea shores. The spring migration starts from March 20 and ends in mid-April. There are its samples obtained from Mughan on December 1 and 18 in the collection. Probably, these are wintering individuals. 256 individuals were noted by us (Tables 1, 2, 3).

5. *Numenius arquata* Linn., 1758.

The distribution and number in Azerbaijan. It is met in the plain areas along the lower and middle courses of the Kur river on the Caspian Sea shores. It is a migratory and wintering bird. It is wintering in the Gizilaghaj State Nature Reserve. The spring migration occurs in March, the autumn migration occurs in August, September and

sometimes in October. The birds which are wintering on the Lankaran shores migrate in mid-April (Sultanov & Karimov, 2007). 330 individuals were noted by us (Tables 1, 2, 3).

6. *Gallinago media* Latham., 1787.

In Azerbaijan it is met when passing as a migratory bird. In May 1950, 12 individuals were noted in the Altiaghaj State Nature Reserve and in April, 7 individuals were noted around Lankaran (Sultanov & Karimov, 2007). There is no information about about its registration in the following years.

In Azerbaijan, it is observed in the moist meadows and swamps of the Caspian coast and foothills zones. The spring migration takes place in March-May, the autumn migration in September (Sultanov & Karimov, 2007).

The reason for the decrease in number. The draining of the water-wetlands in their habitats, the use of the meadows as pastures, arable land and illegal hunting influence their numbers.

The available and necessary protective measures. It is protected and has the species status near threatened (NT) globally and the species status declining in number (D) in Europe. It is included to the AEWA agreement and Bern, Bonn conventions, the IUCN RedList (Sultanov & Karimov, 2007). The wintering areas in Azerbaijan should be controlled and the danger sources should be eliminated, the hunting should be prevented seriously.

Table 1. The distribution of the species belonging to the order *Charadriiformes* in spring in the Gizilaghaj State Nature Reserve and in the water pools of the Small Gizilaghaj State Nature Bay (2017)

No	Species	Number	$\bar{M} \pm m$
Order: <i>Charadriiformes</i>			
1.	<i>Charadrius dubius</i>	84	84±9.2
2.	<i>Ch.asiaticus</i>	18	18±4.2
3.	<i>Vanellus vanellus</i>	70	70±8.4
4.	<i>Himantopus himantopus</i>	270	270±16.4
5.	<i>Recurvirostra avosetta</i>	300	300±17.3
6.	<i>Tringa ochropus</i>	40	40±6.3
7.	<i>T.glareola</i>	310	310±17.6
8.	<i>T.totanus</i>	600	600±24.5
9.	<i>Calidris alpina</i>	400	400±20
10.	<i>Limosa limosa</i>	200	200±14.1
11.	<i>Larus ichthyaetus</i>	18	18±4.2
12.	<i>L.melanocephalus</i>	48	48±6.9
13.	<i>Chroicocephalus ridibundus ssp. ridibundus</i>	570	570±23.9
14.	<i>L.cachinnans</i>	60	60±7.7
15.	<i>L.canus</i>	600	600±24.5
16.	<i>Hydrocoloeus minutus</i>	470	470±21.7
17.	<i>Chlidonias niger</i>	700	700±26.5
18.	<i>Ch.leucopterus</i>	700	700±26.5
19.	<i>Thalasseus sandvicensis</i>	570	570±23.9
20.	<i>Sterna hirundo</i>	718	718±26.8
21.	<i>Sternula albifrons</i>	378	378±19.4

Table 2. The distribution of the species belonging to the order *Charadriiformes* in autumn in the Gizilaghaj State Nature Reserve and in the water pools of the Small Gizilaghaj State Nature Bay and Lankaran coastline (2019)

No	<div>Areas</div> <div>Species</div>	Gizilaghaj State Nature Reserve and Small Gizilaghaj State Nature Bay	The Lankaran coastline of the Caspian Sea	Total	$\bar{M} \pm m$
Order: Charadriiformes					
1.	<i>Pluvialis apricaria</i>	13	0	13	2.6±1.6
2.	<i>Vanellus vanellus</i>	14	0	14	2.8±1.7
3.	<i>Recurvirostra avosetta</i>	33	0	33	6.6±2.6
4.	<i>Himantopus himantopus</i>	19	0	19	3.8±1.9
5.	<i>Tringa ochropus</i>	44	0	44	8.8±3
6.	<i>T.totanus</i>	539	0	0	179.7±13.4
7.	<i>Calidris alpina</i>	42	0	42	8.4±2.9
8.	<i>C.minuta</i>	8	0	8	1.6±1.3
9.	<i>C.alba</i>	452	0	452	90.4±9.5
10.	<i>C.temminckii</i>	330	0	330	66±8.1
11.	<i>Gallinago gallinago</i>	19	0	19	3.8±1.9
12.	<i>Numenius arquata</i>	22	0	22	4.4±2.1
13.	<i>N.phaeopus</i>	33	0	33	6.6±2.6
14.	<i>Limosa limosa</i>	17	0	17	3.4±1.8
15.	<i>Chettusia gregaria</i>	4	0	4	0.8±0.9
16.	<i>Phalaropus lobatus</i>	342	0	342	68.4±8.3
17.	<i>Scolopax rusticola</i>	18	0	18	3.6±1.9
18.	<i>Larus melanocephalus</i>	66	0	66	13.2±3.6
19.	<i>L.canus</i>	630	0	630	126±11.2
20.	<i>L.cachinnans</i>	4355	0	4355	871±29.5
21.	<i>Chroicocephalus ridibundus ssp. ridibundus</i>	3065	0	3065	613±24.8
22.	<i>Ch.genei</i>	16	0	16	3.2±1.8
23.	<i>Hydrocoloeus minutus</i>	880	0	880	176±13.3
24.	<i>Gelochelidon nilotica</i>	35	0	35	7±2.6
25.	<i>Sterna hirundo</i>	36	0	36	7.2±2.7
26.	<i>Sternula albifrons</i>	62	0	62	12.4±3.5
27.	<i>Hydroprogne caspia</i>	10	0	10	2±1.4

Table 3. The distribution of the species belonging to the order *Charadriiformes* in winter in the Gizilaghaj State Nature Reserve and in the water pools of the Small Gizilaghaj State Nature Bay and Lankaran coastline (2019)

No	Areas		Gizilaghaj State Nature Reserve and Small Gizilaghaj State Nature Bay	The Lankaran coastline of the Caspian Sea	Total	$\bar{M} \pm m$
	Species					
Order: Charadriiformes						
1.	Charadrius dubius		6600	11	6611	3305.5±57.5
2.	Pluvialis apricaria		690	0	690	345±18.6
3.	Vanellus vanellus		643	2	645	322.5±18
4.	Himantopus himantopus		289	6	295	147.5±12.1
5.	Calidris alpina		1449	42	1491	745.5±27.3
6.	C.minuta		1221	0	1221	610.5±24.7
7.	C.alba		174	15	189	94.5±9.7
8.	Lymnocyrtes minimus		208	0	208	104±10.2
9.	Scolopax rusticola		18	0	18	9±3
10.	Numenius arquata		58	0	58	29±5.4
11.	N.phaeopus		43	0	43	21.5±4.6
12.	Limosa limosa		16	0	16	8±2.8
13.	Chettusia gregaria		12	0	12	6±2.4
14.	Phalaropus lobatus		78	0	78	39±6.2
15.	Cursorius cursor		0	10	10	5±2.2
16.	Recurvirostra avosetta		324	4	328	164±12.8
17.	Tringa ochropus		778	62	840	420±20.5
18.	T.totanus		410	0	410	205±14.3
19.	Larus argentatus		0	5	5	2.5±1.6
20.	L.melanocephalus		49	14	63	31.5±5.6
21.	L.cachinnans		9369	267	9636	4818±69.4
22.	L.canus		779	0	779	389.5±19.7
23.	Chroicocephalus ridibundus ssp. ridibundus		277	83	360	180±13.4
24.	Ch.genei		33	0	33	16.5±4.1

25.	<i>Hydrocoloeus minutus</i>	135	0	135	67.5±8.2
26.	<i>Gelochelidon nilotica</i>	18	0	18	9±3
27.	<i>Sterna hirundo</i>	9	0	9	4.5±2.1
28.	<i>Sternula albifrons</i>	7	0	7	3.5±1.9

3. Conclusion and recommendations

In the last 20 years, the great changes have occurred in the avifauna of the Azerbaijani shores of the Caspian Sea.

1. The Great and Small Gizilaghaj Gulfs, bordering to the Caspian water meadow, are meeting places for international importance birds.

2. Since the water pools bordering the Southern coastline of the Azerbaijani sector of the Caspian Sea have been subjected to the strong anthropogenic influences, the Lankaran coastline has lost its importance as a meeting place for a number of the species of the international importance.

3. 26 of 48 species belonging to the order *Charadriiformes* which are met in the Southern coastal line of the Azerbaijani sector of the Caspian Sea, have the European protection status, 6 species (*Chettusia gregaria*, *Numenius arquata*, *N.tenuirostris*, *Limosa limosa*, *Glareola nordmanni*, *Gallinago media*) belong to the global protection status.

It is important to implement the following measures in order to protect the species belonging to the Azerbaijan ornithofauna, which are included to the *Charadriiformes* orders, have Global and European protection status and to protect their habitats:

1. To prohibit the construction works which are carried out by the private companies and individuals in the habitats of the species with international and European status on the Caspian coastline.

2. To reduce the old dense reeds that hinder the habitation and settlement of the birds by the mowing in the water pools of the Gizilaghaj National Park (Pirman port, Khazar and Aghgush water meadows).

3. To restore the border and main channel of the Gizilaghaj National Park and to restore the pumping of the water from the Kur to the Pirman port, Khazar and Aghgush water meadows through the main channel.

4. In order to preserve species in a status of critically endangered (*Chettusia gregaria*, *Numenius tenuirostris*), near threatened (*Numenius arquata*, *Limosa limosa*, *Glareola nordmanni*, *Gallinago media*) and declining in their number, the special areas consisting of the habitat biotopes should be allocated in the areas where they are distributed and the negative influence of the anthropogenic factors should be minimized.

5. In the territory of Azerbaijan, the nesting, wintering and feeding places of the data deficient species (*Glareola nordmanni*, *Numenius tenuirostris*, *Chettusia gregaria*) along the Caspian Sea shore, should be determined, monitored and studied their numbers.

6. The species (*Numenius tenuirostris*, *Vanellus vanellus*) that have a global protection status and which are make up in Azerbaijan a small part of the total number in the world, and on the contrary, make up a significant part of the number in the world, should be included to the "Red Book" of Azerbaijan and protected in the Republic territory.

7. On the Caspian coastline, the main dangerous areas for the species included to the IUCN RedList and the Red Book of Azerbaijan should be detected and at the same time, the threats to those species should be revealed.

In the spring, autumn and winter seasons of 2017-2019 years, the species belonging to the Charadriiform order distributed in the Gizilaghaj State Nature Reserve and water pools of the Small Gizilaghaj State Nature Bay near the coastline of the Caspian Sea are as follows:

Little Ringed Plover (*Charadrius dubius*), Caspian Plover (*Ch.asiaticus*), Lapwing (*Vanellus vanellus*), Black-winged Stilt (*Himantopus himantopus*), Pied Avocet (*Recurvirostra avosetta*), Green Sandpiper (*Tringa ochropus*), Wood Sandpiper (*T.glareola*), Common Redshank (*T.totanus*), Dunlin (*Calidris alpina*), Little Stint (*C.minuta*), Temminck's Stint (*C.temminckii*), Sanderling (*C.alba*), Black-tailed Godwit (*Limosa limosa*), Great Black-headed Gull (*Larus ichthyaetus*), Mediterranean Gull (*L.melanocephalus*), Caspian Gull (*L.cachinnans*), Common Gull (*L.canus*), European Herring Gull (*L.argentatus*), Little Gull (*Hydrocoloeus minutus*), Black-headed Gull (*Chroicocephalus ridibundus ssp. ridibundus*), Slender-billed Gull (*Ch.genei*), Black Tern (*Chlidonias niger*), White-winged Black Tern (*Ch.leucopterus*), Sandwich Tern (*Thalasseus sandvicensis*), Common Tern (*Sterna hirundo*), Little Tern (*Sternula albifrons*), Eurasian Golden Plover (*Pluvialis apricaria*), Common Snipe (*Gallinago gallinago*), Eurasian Curlew (*Numenius arquata*), Whimbrel (*N.phaeopus*), Sociable Plover (*Chettusia gregaria*), Red – necked Phalarope (*Phalaropus lobatus*), Eurasian Woodcock (*Scolopax rusticola*), Common Gull-billed Tern (*Gelochelidon nilotica*), Caspian Tern (*Hydroprogne caspia*), Jack Snipe (*Lymnocyrtus minimus*), Cream-colored Courser (*Cursorius cursor*).

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