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Turkestan white stork *Ciconia ciconia asiatica* (Aves: Ciconiiformes) in Uzbekistan: current size and condition of population

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Abstract
In 2014-2015, Uzbekistan Society for the Protection of Birds has for the first time carried out the census of white stork. This research covered 8 of the country's regions. 1459 adult white storks and 721 nests with progeny were registered. The average fledged brood size constituted 1.9. The overall white stork population was assessed in 2500-2700 individuals. Based on the gathered data, territorial and quantitative dynamics of the population in different regions of the country is analyzed together with reaction of the species on various anthropogenic influences. This research was realized in the framework of VII International White Stork Census with technical support from the side of Nature and Biodiversity Conservation Union of Germany.

Keywords: turkestan white stork, distribution, number, constructions of anthropogenic origins, negative influence

1. Introduction

This research was realized in 2014-2015 by Republican NGO "Uzbekistan Society for the Protection of Birds" in the framework of VII International White Stork Census (IWSC) with initiative and technical support from the side of Nature and Biodiversity Conservation Union of Germany (NABU).

Turkestan white stork is one of the most notable and well-studied birds in Uzbekistan. Previously typical for the most part of Uzbekistan, by 1980s this species had practically disappeared from central and southeastern parts of the country due to the negative consequences of intensive agricultural utilization of lands - foothills degradation, dominance of cotton monoculture in agriculture and modernization of irrigation system [1]. Therefore, in 1983 Turkestan white stork was included into the Red Data Book of Uzbek SSR (1983) [2] as "depressed subspecies, number and areal of which are continuously declined". In the first editions of the Red Data Book of Republic of Uzbekistan (2003) [3] white stork appeared as "near threatened Turan subspecies of the West-Palearctic migratory species - 3 (NT)". In the second and third editions of national Red Data Books (2006, 2009) [4, 5] white stork got status of "nearly threatened Turkestan subspecies of migratory species - 3(NT)". During last 30-35 years, distribution and number of the species was continuously changing in Uzbekistan. A series of topics were published on this subject both for the whole Uzbekistan [6, 1] and separate areas [7, 8, 9, 10, 11]. The main results of IWSC-1994 and IWSC-2004 were also published [12, 13]. However, the authors of abovementioned publications often didn't have an opportunity to cover all the territory of the country's range during the limited period of time. Therefore, the main objective in the framework of IWSC 2014-2015 was to cover known habitats of the white stork in the country to the maximal extent, to receive objective data and assessment of the species' current number.

This publication provides concrete data and cartographical materials regarding the current distribution and number of the Turkestan white stork in the borders of an Uzbek part of subspecies' areal. It presents comparison with the data of past IWSC and analysis of various anthropogenic impacts on the population condition in different regions of the country.

2. Materials and methods

The data received on the white stork can be included into cadastre of wildlife as a "zero monitoring" for the species and can be updated subsequently. Therefore, before starting to present results, it is necessary to pay attention to the research methods.

Field researches were realized by ornithologists - UzSPB members during two spring-summer seasons - from 30.04 to 12.07.2014 and from 28.3 to 22.05.2015. In Fergana Valley, regional inspectors of State Inspection of the Republic of Uzbekistan on Guard and Rational Use of Animals and Vegetative World took part in the counts. 8 regions were covered by the counts - Fergana, Namangan, Andijan, Tashkent, Syr Darya, Jizzakh, Samarkand and Qashqadaryo. All known and also potential nesting places of the white stork were explored by means of motorcar expeditions. Figure 1 presents the extent of territory coverage by exploration routes. The overall length of these routes constituted 3227 km.

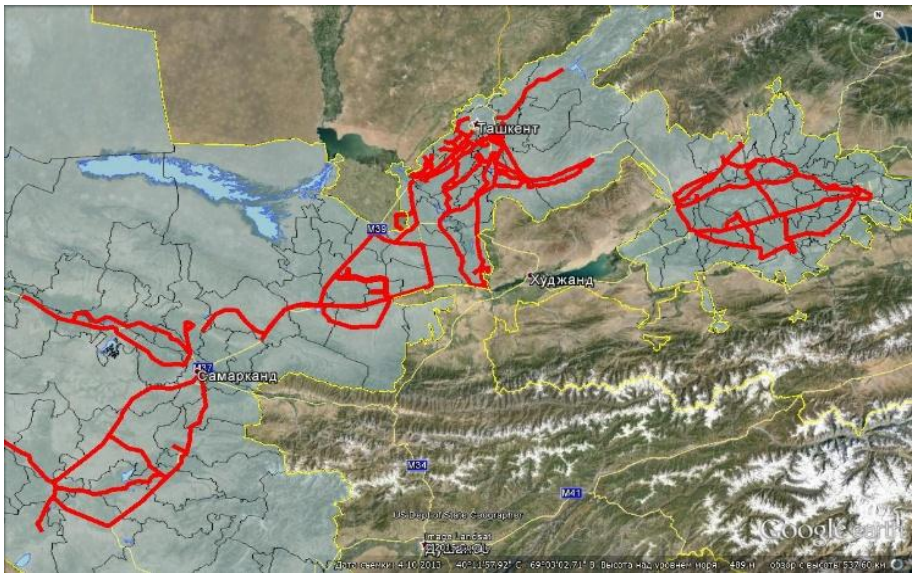

Fig 1: The routes of the white stork counts (red line) in 2014-2015.

To optimize the searching process of previously unknown white stork settlements, locals, especially drivers and taxi-drivers, were surveyed. It allowed to get relatively exact information about location of nests and colonies of storks in different regions and to reduce the length of "empty" routes. The following form was prepared for the registration of collected data:

№ pts	GPS-coordinates	Information on the settlement of White Storks							
		Date; Name of the place (region, district, village	Number of nests	Number of nests with fledging young	Number of adult birds	The length of the colony (m)	Location of the nest (trees, power lines etc)	Characteristic of the habitat (field, fish farm etc)	The level of threat: 1-low, 2-middle, 3-high

For each revealed colony or nest, besides abovementioned information, photos were made: the overall view of colony or nest with surrounding landscape; places of nests' locations; birds in the nest; all other appropriate photos. Nests of the white stork were registered at 153 points during the whole period of research. Detailed information about these points was entered into the database in xls format. GIS-maps of different detailing for the distribution of the Turkistan white stork nests were worked out on the basis of gathered data. The maps were designed both for distinct regions and for the whole Uzbekistan (Figure 2). The analysis of number and threats was realized.

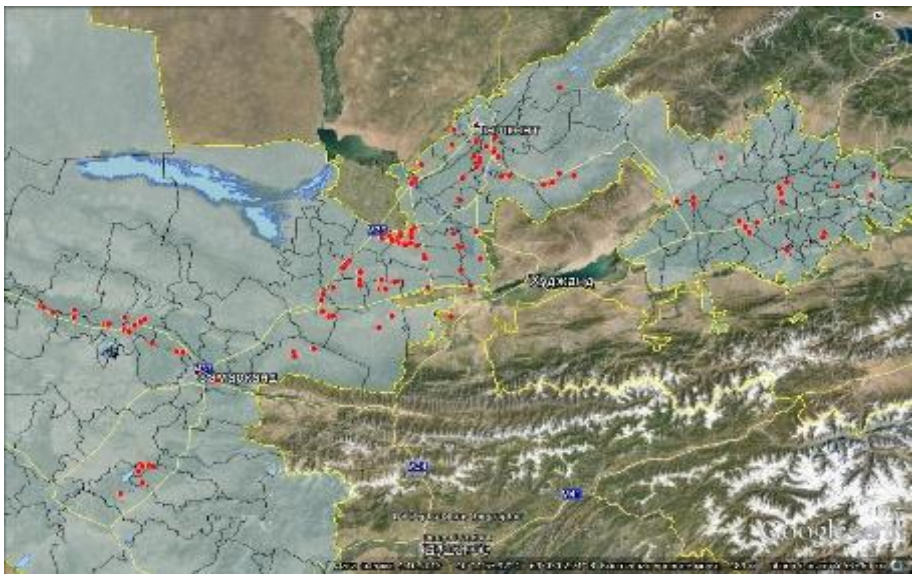

Fig 2: Nesting places of the white stork in Uzbekistan (red points) in 2014-2015

3. Results & Discussion

As a result of census of 2014-2015 in Uzbekistan, 1459 adult white storks were registered (Table 1). The overall number of pairs occupying a nest (HPa) had constituted 721. In examined nests the fledged brood size (JZm) fluctuated from 1 to 5 fledged young, the average value for the regions was from 1.4 to 2.6, while the average for the whole country was 1.9. So, the overall population of the Turkestan white stork in Uzbekistan, even without adjustments to inevitable omissions in registrations, can be assessed in no less than 2500-2700 individuals.

It should be mentioned that, according to international census of 2004-2005, the HPa-indicator for Uzbekistan constituted 745, out of which 452 pairs occupying the nest fell on Fergana valley [13]. This allows to make a conclusion that overall condition of white stork population was constant during last 10 years. However, territorial distribution had changed significantly. Out of 721 nests with posterity, 496 were registered in Tashkent region and only 70 in 3 regions of Fergana valley.

Population density or the number of nesting pairs per 100 km2 (StD) is one more important indicator used in international census. It was calculated based on the area of regions and the number of registered nesting pairs in these regions (1 nesting pair = 1 nest with posterity). The overall value of StD has constituted 0.78 pairs/100 km2 in 8 regions of Uzbekistan. Still, in case of comparative analysis, this indicator is not always reflecting the real picture of species distribution. So, the biggest number of nests with posterity (496) was registered in Tashkent region and StD has constituted 3.25; for Qashqadaryo region, where only 4 inhabited nests were found, StD has constituted 0.01. These figures are reflecting the real situation as a whole. At the same time, for Namangan and Syr Darya regions, where the number of nests with posterity was the same (67 in each region), StD was equal to 0.68 and 1.46 respectively. This more than twofold difference is explained by the fact that no less than 30% of Namangan region is presented by mountains. In fact, the density of nests is approximately the same on the suitable for the species territories.

Table 1: Research coverage, volume of received data and basic figures of VII international census of the white stork in Uzbekistan in 2014-2015.

Region	The length of the count rout (km)	Registered nests		% of inhabited nests	Number of nestlings/nest		Mean fledged brood size	Number of adult birds	Number of nesting pairs per 100 km^2
		Total	With posterity		min	max			
Andijan	788	10	7	70.0	?	?	?	14	016
Fergana		19	12	63.1	1	3	2.0	24	0.17
Namangan		67	51	76.1	1	4	1.9	102	0.68
Tashkent	1038	501	496	99.0	1	4	2.1	992	3.25
Syr Darya	518	67	64	95.5	1	4	1.5	136	1.49
Jizzakh		53	48	90.6	1	4	1.4	100	0.22
Samarkand	280	44	39	88.6	1	5	2.6	83	0.23
Qashqadaryo	603	8	4	50.0	?	?	?	8	0.01
Total	3227	769	721	79.1	1	5	1.9	1459	0.78

4. Discussion

So, the most objective figures are given by absolute numbers of registered birds and nests, taking into account the areas of suitable habitats. The percentage of inhabited nests can be used as the indicator of prosperity of colonies in different regions. According to these two indicators (Table 1), the biggest and the most prosperous colonies of the white stork are situated in Tashkent, Syr Darya and Jizzakh regions. Samarkand and Namangan regions are on the second place. In these regions the recovery of colonies of the species is continuing thanks to development of irrigative channels network and fish-breeding, existence of constructions and buildings suitable for nesting. The lack of these favorable factors explains low number of the white stork in Qashqadaryo region. Decrease in the number of the white stork in Fergana valley, pointed out by E. Shernazarov [11, 12, 13] and also registered in our own data, can be explained only by planned actions aimed at liquidation of storks' nests on power lines. These actions have technical reason - abundantly high number of nests on power lines leads to electric locking. It should be mentioned that this practice takes place in Tashkent region as well, but only locally.

As it was mentioned before, the white stork is historically neutral to anthropogenic impact. In return, the attitude of people towards these birds was always careful. The situation remains the same even nowadays. A list of factors obtained during our observations confirms these statements:

- A big colony (more than 20 nests on low concrete electricity pylons and 3 nests on tower crane) was registered on holiday village in the lower part of Achangaran river (Burguluk) in Tashkent region;
- A colony of 45 nests (31 nests with posterity) was registered on 15 hectares of old Muslim cemetery on Euphrates poplars in Pap district of Namangan region. -3 nests were found on concrete osts nearby the poultry farm on the territory of Karasu village in Yukori-Chirchik district of Tashkent region;
- A colony of 32 nests was found in Laylak-uya mahalla close to the Sergely borough in Tashkent region (22 nests on the rooftops of private houses, 8 nests on telegraph pilon, 2 nests on water tower, 2 nests on mulberry tree);
- 1 nest with 2 fledglings was registered in Oltynsoy village in Jizzakh region. It was situated on water tower, only 3 meters aboveground;
- A nest with fledglings was noticed on relay station antenna in Chirakchi borough of Qashqadaryo region. Locals point out that from 4 to 12 storks are nesting and stay here every autumn-winter period.

- According to the information provided by local peoples of Oymovut village in Chirakchi district of Qashqadaryo region, the dwellers of the whole village participated in the burials of thunderstruck stork.

Despite the positive attitude towards the white storks, there is still some anthropogenic (mainly unintended) disturbance for these birds. To assess the level of disturbance, authors used approaches, which had been developed and applied earlier [14, 15].

During the period of our observations, the level of disturbance was assessed according to 3-score scale: 1 - low (anthropogenic presence as such); 2 - medium (increased level of noise produced by technical equipment, cars, etc.); 3 - high (direct negative influence or high probability of such).

It can be seen from the Table 2 that white storks are exposed to minimal disturbance in the most populous region - Fergana valley.

Table 2: Disturbance level for the colonies of the white stork in Uzbekistan, according to the results of census in 2014-2015.

Region	Overall number of nests	Percentage of nests on different levels of disturbance			Level of disturbance (1-3)	
		1	2	3	Average	Maximal
Andijan	10	70.0	20.0	10.0	1.40	2
Fergana	19	73.7	10.5	15.8	1.42	3
Namangan	67	67.2	25.3	7.5	1.40	3
Tashkent	501	39.9	41.9	18.2	1.78	3
Syr Darya	67	4.5	92.5	3.0	1.98	3
Jizzakh	53	1.9	94.3	3.8	2.02	3
Samarkand	44	-	88.6	11.4	2.11	3
Qashqadaryo	8	37.5	25.0	37.5	2.0	3
Total	769	36.8	49.8	13.4	1.76	

Only about 30% of nests are experiencing increased disturbance or direct negative influence. For example, a colony of 6 nests on telegraph pilons had disappeared in the surroundings of Ok-oltin village in Ulungar district of Andijan region. The pilons had been dismantled and a colony disappeared. But generally, in Fergana valley the average disturbance figures are constituting 1.4.

1- and 2-score levels of disturbance are practically equally frequent in Tashkent region (39.9% and 41.9% respectively) and almost a fifth part of all nests (18.2%) undergoes direct negative influence or has high likelihood to experience it in the future. It can be explained by high tempos of infrastructure development, communication system and active construction works in the central region of the country. So, high levels of disturbance were registered in the around of Hojikent borough in Bostanlyk district, where "Kishlok kurilish Bank" constructs new houses. 3-score level of disturbance took place surroundings Halkabad village in Yangyul district, Akkurgan and Chinaz district centers, where numerous settlements and a motorway of republican significance are situated. The average level of disturbance for Tashkent region is 1.78.

In three adjoined regions (Syr Darya, Jizzakh and Samarkand) the following situation takes place: 88.6-94.3% of the white stork settlements are experiencing 2-score disturbance, with average levels of 1.98, 2.02 and 2.11 respectively. Besides intensive agricultural development, there is also a direct negative impact on birds. Here are several most vivid facts of such impact in Samarkand district: in the surroundings of Bolatosh village in Postdargom district feathers and remains of the bird killed by current rush were found; newly abandoned nest was found in Pahtachi district on the wall of Muslim cemetery Dabuskala (most likely that the nest was abandoned because of high levels of disturbance, big number of cars and visitors typical for this place of holy worship); 1 abandoned nest and 2 nests destroyed by electricians were noticed in the surroundings of Sarapan village.

In Qashqadaryo region all three levels of disturbance appear in approximately equal proportions and the average figure equals 2.0. Among the most negative direct impacts (during the period of census) strong household pollution of Zeravshan river banks can be noted near Yangihayat village of Chirakchi district. One of eight nests (uninhabited during the period of census) was situated there.

The analysis of nesting location preferences of the white stork allows to forecast the further process of spread and changes in number of the species. These preferences can also be used as a tool to control the white stork population.

As can be seen from the Table 3, the white storks use 12 different locations for nesting in Uzbekistan. Among these 12 locations: 10 are the constructions of anthropogenic origins, 1 is artificial planting (mulberry trees) and only 1 is inartificial element of natural landscape (Euphrates poplars). The most "popular" nesting locations are concrete and iron high-voltage electricity pylons, and also ordinary concrete electricity pylons. 82.5% of all nests were registered on these constructions. This is determined by wide spread of pylons in all regions and also by their constructive features (especially in case of iron high-voltage electricity pylons), which are favorable for construction of the nests. Moreover, significant height of the pylons provides with protection against any types of disturbance. According to the results of IWSC-2004 [13], in Tashkent region 98.8% of all nests were located on high-voltage electricity pylons, one nest was noted on the rooftop of rural building and one was on the water tower.

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Table 3: Distribution of the white stork nests in Uzbekistan according to the results of census in 2014-2015.

Nests' location*	Number of registered nests in different regions									
	Andijan	Fergana	Namangan	Tashkent	Syr Darya	Jizzakh	Samarkand	Qashqadaryo	Total	A share in the overall number (%)
Concrete high-voltage electricity pylons	1	14	1	112	41	44	33	2	248	32.25
Iron high-voltage electricity pylons	7	1	16	200	26	6	8		264	34.33
Concrete electricity pylons				123					123	16.00
Telegraph pylon			5	32					37	4.81
Cellular antenna tower								2	2	0.26
Look-out tower		2							2	0.26
Tower crane				3					3	0.39
Water-tower	2	2		5		1	2	4	16	2.08
Roofs of one-storey rural houses				22					22	2.86
The destroyed constructions							1		1	0.13
Euphrates poplars			45						45	5.85
Mulberry trees				4		2			6	0.78
Total	10	19	67	501	67	53	44	8	769	100.0

One nest was noted on the rooftop of rural building and one was on the water tower. The results of census in 2014-2015 has shown that the number of nests on these constructions increased significantly - 22 nests were noted on the rooftops in Tashkent surrounding and 5 were on the water towers. 10 years ago, in Fergana valley 85.2% of the white storks nested on electricity pylons. 1.1% - on the water towers. 13.7% - on Euphrates poplars [13]. Our data, summarized for 3 regions of Fergana Valley, shows significant changes in this distribution: on electricity pylons - 46.87%, on water-towers - 4.16%, on Euphrates poplars - 46.87%. This fact illustrates the tendency of the white stork to expand its nesting places to new locations. In other words, the white stork shows quite high plasticity toward anthropogenic changes and, therefore, has opportunity for expansion of its ranges in the north-eastern Uzbekistan.

5. Main conclusions

Current condition of Turkestan subspecies of the white stork can thus be assessed as successful in Uzbekistan. In some districts, where the number of the white stork is high, the bird is considered (not without reason) as a vermin for fish-farming. Besides, high density of nests on high-voltage pylons can lead to accidents with electricity. However, any attempts to limit the number of white storks are inadmissible, because harsh changes in living conditions are making the white stork vulnerable. It can be confirmed by changes which happened with the population in last 70 years. It should also be mentioned that the white stork in our country is traditionally considered to be a bird of peace. a symbol of good and welfare.

Based on the results of this research, in 2016 Turkestan white stork has been included into a new edition of national Red Data Book with status of 3(NT) "nearly threatened".

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7. References

1. Mitropolsky OV. White Stork. In: Kovshar A. Rustamov A. editors. Birds of Middle Asia. Union of protection birds of Kazakhstan, Almaty 2007; 1:114-123. [in Russian]
2. Red Data Book of Uzbek SSR. Rare and endangered species of animals and plants. Vertebrates. «FAN» publishing house of the Uzbek SSR. Tashkent. 1983; 1:56-58.[in Russian]
3. The Red Data Book of the Republic of Uzbekistan. II. Animals. “Chinor ENK” publishing house. Tashkent 2003; 2:152-153.
4. The Red Data Book of the Republic of Uzbekistan. Animals. “Chinor ENK” publishing house. Tashkent 2006: 136-137.
5. The Red Data Book of the Republic of Uzbekistan. Animals. “Chinor ENK” publishing house. Tashkent 2009: 2:134-135.
6. Sagitov AK. Storks & allies. White Stork. In: Birds of Uzbekistan. Volume 1. «FAN» publishing house of the Uzbek SSR. Tashkent. 1987; 48-52. [in Russian]
7. Nazarov A, Abdunazarov B. About number of White Stork in some districts of Uzbekistan. In: Mammals and birds of Uzbekistan, Tashkent 1987; 98-99. [in Russian]
8. Lanovenko E, Filatov A, Shernazarov E. White Stork in Tashkent region. In: Proceedings of conference “Rare and insufficiently known birds of Middle Asia”. Tashkent. 1990; 77-78. [in Russian]
9. Tretyakov G. White Stork in Fergana valley. In: Proceedings of conference “Rare and insufficiently known birds of Middle Asia”. Tashkent 1990; 74-77. [in Russian]
10. Votteler E. Rare and insufficiently known birds of Surhhandaya region. In: Proceedings of conference «Rare and insufficiently known birds of Middle Asia». Tashkent 1990; 31-33. [in Russian]
11. Shernazarov E, Turaev M, Kuchkarov A. The modern numerous of White Stork in Fergana valley. In: Proceedings of conference «Rare and insufficiently known birds of

Uzbekistan and surrounding areas». Tashkent 1994; 56-58. [in Russian]
12. Shernazarov E. Distribution and numbers of Ciconia c. asiatica in Central Asia. In: H. Schulz (Ed.). - White Storks on the up. - Proceedings. Internat. Symp. on the White Stork. Hamburg 1999, 331.
13. Shernazarov E. Assessment of the current status of the White Stork *Ciconia c. asiatica* in Uzbekistan. In: White Stork populations across the world. NABU. Germany 2013.
14. Kashkarov R, Mitropolskaya Y. The experience of a mark estimation of anthropogenous threats in foothills and middle part of Western Tien-Shan mountains in Tashkent region of Uzbekistan. Biological Journal of Uzbekistan 2009; 62:48-52.[in Russian]
15. Mitropolskaya Y, Kashkarov R. Rare predatory mammals of Uzbekistan: condition of populations and their protection. European Journal of Biomedical and Pharmaceutical Sciences 2016; 3(123):544-552.