

The White Stork (*Ciconia ciconia*) census 1993 in Algeria

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Abstract: MOALI-GRINE, N., A. MOALI & P. ISENMANN (1995): The White Stork (*Ciconia ciconia*) census 1993 in Algeria. Vogelwarte 38: 35–40.

A national census of breeding White Storks in Algeria in 1993 showed the presence of 1195 pairs. In 1955, 8844 breeding pairs were censused. The decline is 86%. The average productivity per successful pair was low (2.21) in 1993. There is a decreasing gradient in the breeding density from the east to the west of the country. Two thirds of the birds still breed in cities and towns. One half of the nests are on artificial supports and the other half on trees. Worse wintering conditions in Sahelian Africa, habitat shrinkage and alteration on breeding grounds are likely to be responsible for the decline.

Key words: White Stork (*Ciconia ciconia*), Algeria, census, breeding success.

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1. Introduction

The recently assessed dramatic decline of the White Stork (*Ciconia ciconia*) in the Tizi Ouzou region in Central Algeria (MOALI et al. 1992) has led us to launch a national census in 1993 in Algeria where this species breeds in the extreme north. Two previous national censuses were organized in 1935 and in 1955 (BOUET 1936 and 1956) and a partial census was carried out in 1974 (THOMAS et al. 1975). The population increased between 1935 and 1955 but decreased on average by 86% between 1955 and 1993. This decline is part of a general decline after 1960 of the western populations of the White Stork (overview in BAIRLEIN & ZINK 1979, RHEINWALD et al. 1989, BAIRLEIN 1991, MERIAUX et al. 1992, KANYAMBWA et al. 1993). Censuses in the Iberian Peninsula (CANDEIAS & ARAUJO and CHOZAS et al. in RHEINWALD et al. 1989, SENRA & ALES 1992), in Tunisia (LAUTHE 1977), in Morocco (RUTHKE 1986), and our own results for Algeria show that the decline is now also obvious in the Mediterranean part of the breeding area.

2. Material and Methods

This census was organized with the help of the National Forest Service of Algeria (Directions départementales des Forêts). A letter and a questionnaire were sent out to each head of the different "wilayas" or administrative regions. In the letter we explained the reason and the interest of the study and in the questionnaire we asked for the number of nests in each town or city, their exact locations (inside or outside urban areas), the kind of nest support, the number of young per nest and all supplemental information improving the accuracy of our inquiry. In order to know the actual southern limits of the breeding area, we have also contacted the subsaharan regions of Ghardaïa and Laghouat.

Finally, the inquiry was sent out to 38 wilayas. Twenty of them answered, one of them indicated that the species was not a breeder but only a passage visitor and another replied that they were unable to send us the requested information. The remaining 18 answers were sufficiently complete allowing us to draw a fairly representative, though not fully complete, picture of the present situation of the White Stork in Algeria. We failed to receive any information from some western regions known to hold or to have held in the past high numbers of breeding pairs (Tiaret, Tissemsilt, Médéa, Tlemcen and Mascara). We ourselves made some observations in the central part of Algeria from which the information was too scanty (Mitidja). In the eastern part where the response rate was particularly high, we did not receive any information from the regions of Béjaïa and Sétif. In a future national census, planned for 1995, we hope to fill this gap.

3. Results

The number of breeding pairs (Table 1, Fig. 1)

The total number of pairs censused (HPa) was 1195. The eastern regions (Annaba to Alger) with 861 nests represent 72% of the total. Four central regions (Boumerdès, Bouira, M'sila and Tizi Ouzou) show the presence of 283 pairs (24%) but the species is now rare in the regions around Algier with only a few pairs near Boufarik. In the western regions only 51 pairs were censused. These results show a decreasing gradient from the east to the west of the country. At the southern limits of the species breeding range, the steppic regions are practically empty with only 2 pairs at Biskra and a few others in the Hodna depression. In the centre, the southern limits do not extend beyond a line reaching Sour El Ghozlane to Ksar El Boukhari, whereas in the south-west, 11 pairs are still present at Saïda.

The density (Table 2)

The mean density was 1.73 nests/km². The lowest values were found in the highlands of M'sila region (0.03 nests/km²) and in the south western region of Saïda (0.17 nests/km²) and the highest values in the large agricultural region of Mila (8.5 nests/km²) and the Tizi Ouzou region (6.1 nests/km²).

The number and size of colonies were variable. The El Tarf region showed an average of 24.1 nests per colony (174 pairs in 7 colonies). The Mila region, harbouring the highest number of pairs, showed also the highest number in colony and, hence, had a low average value (10.0 nests/colony).

Table 2: Density and number of colonies in 1993. – Dichte und Anzahl der Kolonien, 1993.

Region	S (in km ²)	HPa	D	NC
Guelma	3910	93	2.38	13
El Tarf	2998	174	5.80	7
Khenchela	9810	41	0.43	10
Oum El Bouaghi	7638	59	0.77	6
Batna	12028	58	0.48	11
Biskra	21671	2	0.01	1
Skikda	4137	14	0.36	4
Tébessa	13878	94	0.67	8
Mila	3407	289	8.48	29
Jijel	2398	35	1.46	6
Boumerdès	1558	17	1.10	4
Tizi Ouzou	2992	183	6.12	15
Bouira	4517	77	1.70	12
M'sila	18466	6	0.03	2
Saïda	6631	11	0.17	2
Mostaganem	2269	5	0.22	2
Oran	2630	11	0.42	2
Aïn Defla	4260	24	0.56	4
Total		1195	1.73	138

S: Size/Fläche. HPa: Number of pairs occupying a nest/ Horstpaare allgemein. D: Density/Dichte. NC: Number of colonies/ Anzahl der Kolonien.

The nest supports (Table 3)

About 2/3 of the birds (769 pairs) still breed in cities and towns and the remaining 426 pairs outside. These latter pairs often breed in colonies on trees. Most of the regions showed this pattern except the Guelma region in east Algeria where more pairs bred outside of urban areas than inside.

The kind of nest support gives a good idea of the changes involved in nesting sites. House rooves, electric posts, pylons and ruins supported 593 nests (49%) and trees supported 602 nests. These values indicate that the human made nest supports still represent half of the total despite the changes in architectural practices. However, we expect that trees will play an evergrowing role in the future. This is already the case in the Mila region where more nests are found on trees than in urban areas and in the Tébessa region where only 2 nests were found on artificial supports. Even in urban areas trees are sometimes preferred.

Table 3: Nest distribution in 1993. – Verteilung der Nester, 1993.

Region	HPa	CT	0CT	HS	T
Guelma	93	42	51	44	49
El Tarf	174	118	56	89	85
Khenchela	41	32	10	28	14
Oum El Bouaghi	59	35	24	38	21
Batna	58	34	24	31	27
Biskra	2	2	0	0	2
Skikda	14	15	0	14	1
Tébessa	94	94	0	2	92
Mila	289	154	135	101	188
Jijel	35	29	6	11	24
Boumerdès	17	10	7	15	2
Tizi Ouzou	183	103	80	135	48
Bouira	77	49	28	47	30
Msila	6	6	0	4	2
Saïda	11	11	0	11	0
Mostaganem	5	5	0	4	1
Oran	11	11	0	11	0
Aïn Defla	24	18	6	8	16
Total	1195	769	426	593	602

HPa: Number of pairs occupying a nest/Horstpaare allgemein. CT: Nest number in cities and towns/Anzahl der Nester in Ortschaften. 0CT: Nest number outside of cities and towns/Anzahl der Nester außerhalb von Ortschaften. HS: Nest number on man made supports/Anzahl der Nester auf künstlichen Nestträgern. T: Nest number on trees/Anzahl der Baumnester.

The breeding success (Table 1)

It was evaluated through the number of young per nest when they were 4-weeks old. The total number of young (JZG) was 2271. This number was obtained from 1028 pairs whose fecundity was known (HPm). Twenty six pairs failed to produce young (HPo) and 141 were breeders but with an unknown number of young (HPx). The average number of young per successful pair ($JZm = JZG/HPm$) at the national level was 2.21 (1.37–2.60). Twenty six nests contained 0 young, 183 1 young, 476 2 young, 342 3 young, 25 4 young and 2 5 young ($\bar{x} = 2.15$, $s = 0.82$,

$n = 1054$). Most of the nests (77.6%) contained 2 or 3 young. In a sample of 18 nests near Alger, BOUET (1956) found that most contained 4 or 5 young; THOMAS et al. (1975), in a previous census in 1974, observed 17 nests with 5 young and 17 others with 6 young.

4. Discussion

The major result of the 1993 census is the clear decline of the White Stork in Algeria. When compared to the results of 1955 (BOUET 1956) the mean decline is about 86%. In all regions, the decline is higher than 50% with the highest value (98.7%) in the Oran region and the lowest in the Guelma region (52.1%). From 8844 pairs in 1955, a first important decrease to about 2000 pairs was observed in 1974 (THOMAS et al. 1975) and a second less pronounced one to about 1200 pairs again some 20 years later. Moreover, the average productivity per successful pair in 1993 was only 2.21. This is a particularly low value, even lower than the worst mean values recently noticed in Europe (BAIRLEIN 1991).

The main reasons for this decline are found in the winter quarters and in the breeding area. For some western populations of White Stork, KANYAMIBWA et al. (1990) and KANYAMIBWA et al. (1993) demonstrated a decrease after 1960 in the adult annual survival rate linked to declining rainfall in the Sahelian zone of West Africa (Senegal to Lake Tchad). As the Algerian White Storks overwinter in the same zone (JENNI et al. 1991), it is likely that the adult survival rates also dropped in this country to a lower value than that needed for stability estimated by J. D. LEBRETON (in KANYAMIBWA et al. 1993) at 0.75. Moreover, there are also some concerns about the heavy human predation on the White Stork in the same Sahelian countries (GIRAUDOUX 1978, THAURONT & DUQUET 1991). On the other hand, the species had also to face increasingly worse conditions in the breeding habitats. Human population in Algeria rose from 9,000,000 in 1962 to 25,000,000 in 1990 restricting the size of natural areas through urban developments. This is particularly evident in the area around the huge capital of Alger (3,000,000 inhabitants) from which the species completely disappeared. Furthermore, an increasing number of birds now breeds outside of the evergrowing urban areas. The changing structure of housing that became less or no longer suitable as nest supports is reflected by the fact that half of the birds now nest on trees. Agricultural practices have also changed with the use of pesticides and fertilizers.

Some recently dried up springs are likely to have lowered the species breeding success. It is not by chance that the White Stork is less frequently seen in the western regions (Alger to Oran) where a series of dry springs in the two last decades has even contributed to local extinctions.

All these factors considerably reduced the available space and the overall quality of the environment suitable for the species and, thus, had a negative impact on the number of pairs that can breed (MOALI et al. 1992; see DALLINGA & SCHOENMAKERS 1987). The harsh conditions on winter quarters associated at the same time with no less harsher conditions on breeding grounds lead to the present status. Finally, the recent decline in Algeria is no more than part of the general species decline in the western part of its breeding area. The present concern is how to stop this decline.

5. Zusammenfassung

Eine Zählung besetzter Weißstorch-Horste (HPa) in Algerien 1993 ergab 1195 Nester, während dort 8844 HPa im Jahr 1955 gezählt wurden: ein Rückgang um etwa 86%. Der durchschnittliche Bruterfolg 1993 war niedrig ($JZa = 1,90$ und $JZm = 2,21$). Die Zahl der Brutpaare nimmt von Osten nach Westen ab. Zwei Drittel des

Bestandes nistet immer noch in Ortschaften; die Hälfte auf künstlichen Gegenständen und die andere auf Bäumen. Verschlechterte Zustände im Überwinterungs- sowie im Brutgebiet (Verschwinden der Habitats) werden als Ursache dieses Rückganges vermutet.

Résumé

Un recensement national en 1993 de la Cigogne blanche en Algérie a donné 1195 couples alors qu'en 1955 on en comptait encore 8844 couples: une diminution de 86%. La fécondité par couple avec jeunes est de 2,21. L'abondance des oiseaux diminue graduellement d'est en ouest. Les deux-tiers de la population niche toujours encore dans des agglomérations; une moitié des nids se trouvent sur des supports artificiels (maisons, pylones, . . .) et l'autre moitié sur des arbres. De mauvaises conditions d'hivernage et un environnement de nidification qui s'est considérablement dégradé pour l'espèce sont la cause probable de cet important déclin.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Vogelwarte - Zeitschrift für Vogelkunde](#)

Jahr/Year: 1995/96

Band/Volume: [38_1995](#)

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Artikel/Article: [The White Stork \(*Ciconia ciconia*\) census 1993 in Algeria 35-40](#)