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Wintering White Storks (*Ciconia ciconia*) in South West Spain in the years 1991 and 1992

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Abstract: Tortosa, F. S., M. Máñez & M. Barcell (1995): Wintering White Storks (*Ciconia ciconia*) in South West Spain in the years 1991 and 1992. Vogelwarte 38: 41–45.

The results of three censuses of wintering White Storks in the Guadalquivir marshes and the littoral of Huelva are analysed. Counts were realized between the end of October and the middle of November in 1991 and 1992. About 3000 White Storks were detected. In 1991, 371 breeding pairs were counted in this area, indicating that most of the wintering birds came from other regions. Only five ringed storks of a total of 65 observed marked birds did not breed in the study area and 7 (11%) of them were juveniles younger than two years. Relations between possible changes of migration pattern, its causes, and its influence in population dynamics are briefly stated.

Key words: White Storks (*Ciconia ciconia*), wintering site, South West Spain, migration.

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Introduction

The breeding population of the White Stork (*Ciconia ciconia*) in western Europe has greatly decreased in this century (Schüz & Szijj 1975, 1977) whilst the eastern population size is constant or even locally increasing (Bairlein 1991, Goriup & Schulz 1991). The same decline has also been recorded for the Spanish population (Bernis 1981, Lázaro *et al.* 1986), although since 1987 the number of breeding pairs tend to increase slightly (Gómez-Manzaneque 1991). The reasons for this change in population dynamics are difficult to establish. Nevertheless there are at least some factors that seem to affect more the western subpopulation of White Storks, as i.e. the prolonged Sudano-Sahelian drought, the various water control schemes, and probably Locust control programmes (Dallinga & Schoenmakers 1989).

In the past, the White Stork was not present on the Iberian Peninsula between October and November and the first birds used to return for breeding in December or January (Bernis 1959, Santos & Tellería 1977). Since the eighties an increasing number of White Storks has been observed to stay in autumn in Spain (Chozas 1983, Tortosa 1992). This increase of Storks in autumn ("wintering") has also been recorded from the marshes and rice fields around the Guadalquivir river in South West Spain (which includes the National Park of Doñana) since 1987, but little is known yet about White Storks in autumn in this area because no census had been carried out. The aim of this study was to determine the importance of the Guadalquivir marshes and littoral of Huelva as a new wintering area.

Methods

We carried out two censuses in autumn 1991 and one in autumn 1992 in the study area (Fig.). The first census was simultaneously realized by three groups by car, two on the right and one on the left side of the Guadalquivir river. Five days later another census was carried out on the littoral of Huelva, principally at the Odiel marshes (including the refuse pits of Huelva and Punta Umbría) and at the Guadiana marshes (including the refuse pit of Ayamonte). Guadalquivir marshes are fresh water marshes that have been highly transformed in rice fields and chanels in which there are a great abundance of Carps and Red Swamp Crawfish (Fernáncez-Delgado 1987, Delibes &

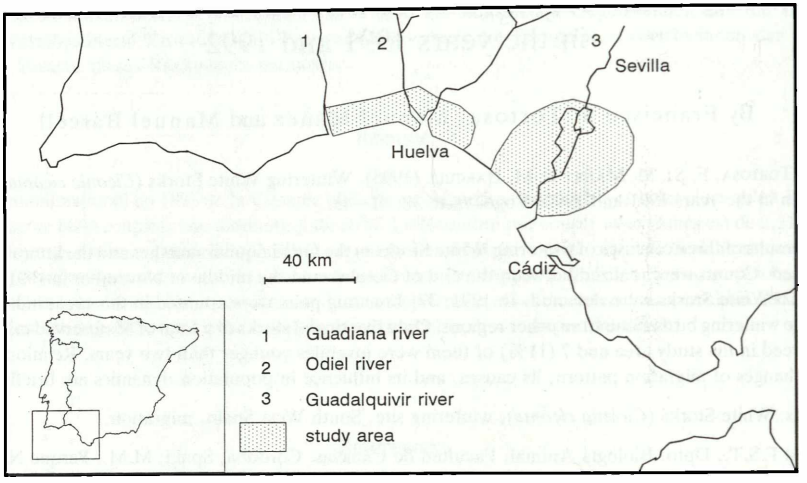

Fig.: Map of the study area in the Southwest of Spain. – Abb.: Karte des Untersuchungsgebietes in Südwest-Spanien.

ADRIAN 1987). Odiel and Guadiana marshes are salt marshes under the effect of tide. In 1992 the census was realized simultaneously at all sites by five groups. In addition we counted in 1991 the breeding pairs of the Guadalquivir marshes and of the littoral of Huelva. As many Storks were marked with numbered PVC rings, we were able to determine their origin.

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Results

We detected a similar number of about 3000 wintering White Storks both in 1991 and 1992 (table). Most of the Storks use the Guadalquivir marshes as a feeding area where they form flocks between two and 2000 birds (mean 110; ± 341 SD; N = 55).

Between 1986 and February 1991, a total of 4257 Storks had been ringed in Spain with numbered PVC rings and 2623 of them were ringed in the study area (Biological Station of Doñana, unpublished data). In 1991 we found a higher proportion of Storks ringed at the Guadalquivir marshes and at the littoral of Huelva (N = 29) than those ringed in other regions of Spain (N = 3) (1.1% and 0.18% of the ringed storks at each area respectively; Proportion test $Z = 3.39$ $p < 0.001$). In 1992 the results were similar; 31 of the 33 observed ringed Storks originated from the study area (Proportion test, $Z = 4.17$; $p < 0.001$). Among the observed marked birds with different rings from both years (N = 63) we detected 7, that were younger than two years (11%).

The breeding pair census in 1991 revealed 278 occupied nests in the Guadalquivir marshes and 93 in the littoral of Huelva summing up a total of 742 breeding individuals. Most of the marked Storks came from the study area as seen above, but the origin of a large proportion of wintering Storks cannot be determined since their number exceeds four times the local breeding population. Most of these breeding Storks are concentrated in some big colonies. In 1991, 208 of the 278 ocupied nests (75%) in the Guadalquivir marshes were located in three colonies with 140, 48 and 20 breeding pairs. In the litoral of Huelva the population was also concentrated in seven colonies which had 66.6% of the breeding pairs.

Table: Number of White Storks detected in the marshses of the Guadalquivir river and the littoral of Huelva in 1991 and 1992. – Tab.: Anzahl der beobachteten Weißstörche im Schwemmland des Guadalquivirs und an der Küste Huelvas in den Jahren 1991 und 1992.

	4/11/91	9/11/91	30/10/92
Right side of the Guadalquivir river	2200	–	671
Left side of the Guadalquivir river	605	–	1800
Littoral of Huelva	–	241	452
Total	2805	241	2923

Discussion

The number of White Stork observed in this study was higher than that proposed by Goriup & Schulz (1991) who estimated less than 1100 wintering birds in Spain and Portugal. We believe that the Storks observed in our study area are only a part of the wintering Storks in Spain, because of many observations in other localities in autumn and winter.

Breeding Storks in Guadalquivir marshes have increased their number since 1987, probably as a consequence of the improved nutritional situation (Senra & Ales 1992). Food abundance in the marshes, rice fields and refuse pits in the study area may explain the high number of wintering birds. Most pellets of White Storks collected at the marshes contained Red Swamp Crawfish (*Procambarus clarkii*) and Carp (*Ciprinus carpio*) (unpublished data). Red Swamp Crawfish was introduced from USA in 1974 and expanded quickly (Delibes & Adrian 1987). Asensio (1991) estimates that in an area of about 1336 ha into the Guadalquivir marshes, the Crawfish production of comercial size is 438145 kg. This suggests that at present Crawfish has become an important food supply for breeding Storks in the Guadalquivir marshes (Rubio *et al.* 1983; Máñez & Robles in press; Tortosa & Redondo 1992). Moreover, refuse pits constitute another novel human made food source for some species of birds such as Storks, Cattle Eggret or Gulls recorded in this and other studies (Cantos & Asensio 1990, Gómez-Tejedor & De Lope 1993). However birds only use a low fraction of all the available food because of the great proportion of organic rests in the garbage (Gómez-Tejedor & De Lope 1993).

The number of Storks younger than two years detected in this study (11%) is relatively low compared with the number of birds that returned to the study area in spring at the age of one or two years. 31% of marked Storks have been detected in the year after their first migration, 33% at the age of two years, and 35% with three or more years (N = 127) (unpublished data). These findings are not in accordance with the general believe that young Storks stay during their first year of life in West Africa and return te their breeding grounds in Europe in their second or third year (Bairlein 1981). According to Kanyamibwa *et al.* (1990) the annual survival rate is age-dependend, with a higher winter mortality of young Storks in Africa, what suggests that the non-migrant juveniles probably increase their annual survival rate if they winter at the Guadalquivir marshes.

Avian migration and hence wintering grounds succumbs to a strong genetic control (Berthold 1990) but there is some evidence that birds may increase substantially the fraction of resident birds in their population if there are favourable local conditions of food and microclimate (Merkel & Merkel 1983, Berthold 1988). The results of this study seem to support the findings of an increase of the residents due to new food sources proceeding from human activity. On the other hand a new migratory behaviour has been described for a certain Blackcap (*Sylvia atricapilla*) population, which changed its wintering area taking advantage of the abundant food humans provide them with (Bert-

HOLD 1988). Something similar could have happened to the fraction of White Storks which is not resident in the study area but now winters here.

The population growth detected in Spain since 1987 can be consequence of this new wintering area because mortality of White Storks remaining in the study area is low due to high food suply and low disturbance by hunting. Wintering White Storks in Spain hence may have a possible selective advantage because of reduced costs associated with shorter migratory distance, earlier arrival on the breeding grounds and earlier reproduction. These advantages could lead to an above-average fitness (BERTHOLD 1988). More extensive studies are required to evaluate the importance of South West Spain as a new wintering quarter and the effect of changes in migration patterns on population dynamics.

Zusammenfassung

Die Ergebnisse von drei Weißstorchzählungen im Schwemmland des Guadalquivir und an der Küste Huelva werden analysiert. Die Bestandsaufnahmen wurden jeweils zwischen Ende Oktober und Mitte November 1991 und 1992 durchgeführt. Rund 3000 Weißstörche wurden sowohl 1991 als auch 1992 gezählt. 1991 brüteten 371 Storchenpaare im Untersuchungsgebiet, was bedeutet, daß die meisten überwinternden Vögel aus anderen Regionen stammten. Von 63 beobachteten, markierten Störchen brüteten nur fünf nicht im Untersuchungsgebiet und sieben (11%) von ihnen waren jünger als zwei Jahre. Die Gründe für eine mögliche Änderung im Zugverhalten (z. B. eine bessere Nahrungsverfügbarkeit) werden kurz dargelegt.

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