

Wintering population of Black Stork (*Ciconia nigra*) in the rice fields of Guadalquivir river, south Spain (1998-2001)

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ABSTRACT - *This brief study reports on the numbers and behaviour of wintering Black Storks (Ciconia nigra) in an area of rice fields surrounding the river Guadalquivir in southwestern Spain during three seasons. This small area has been profoundly transformed by intensive agriculture. It appears to hold one of the most important populations of wintering Black Storks in Europe and has remained relatively unknown as a wintering quarter until now.*

Introduction

Spain has a stable wintering population of Black Storks (*Ciconia nigra*) (SAN SEGUNDO, 1991). Doñana National Park and its surroundings have always been a well known wintering area for Black Storks (GARCIA *et al.*, 1996; GONZALEZ, 1988), however this specific zone remained unrecognized as an important winter ground for this ciconiforme.

The information that appears in this study has been gathered over a 3 years period starting 7.11.1998 when the African Odyssey project from the Czech Republic asked us to monitor the

movements and behaviour of David, a male Black Stork equipped with Argos and VHF transmitters, that had chosen the rice fields surrounding the Guadalquivir river as his wintering quarters in southern Spain.

On monitoring David, we noticed the presence of an important number of wintering Black Storks during that period. During this time, we also released one of David's pulli, Jonas, on 31.12.1998 (PARKES, 1999) which then joined the group of storks including his father.

Method of study

The observations and data collection although continuous, have been irregular due to lack of funding and the great distances separating this area and our places of residence.

During the 3 years period, we visited the zone on 32 occasions, using VHF receivers (AR8000), telescopes and GPS.

During every expedition we covered by car the whole area, criss-crossed with canals and numerous tracks that divide the rice fields. As obstacles are few, the sightings of birds was on occasion easy, especially when signal was received from the tagged birds. However, when they were out of sight down into the canals, we had great difficulty in locating them, as they are very shy and fly off at the slightest human presence.

Description of the area

This extremely flat area covers about 3.750 hectares and lies at N37° W6°, between one meander of the Guadalquivir river, known as Brazo del Este, and the town of Las Cabezas de San Juan, province of Seville, opposite the National Park of Doñana. However, it lacks any level of legal or administrative protection.

The natural vegetation is practically non-existent and few small eucalyptus are the only trees. The whole area has been completely transformed by intensive agriculture, especially the growing of rice. As usual in the cultivation of rice fields, there is a criss-crossing pattern of numerous canals for irrigation and for water drainage. All these man-made canals are open, some being at ground level, others above the ground, like aqueducts, and made of concrete. There is also a huge infrastructure of access tracks that join the fields and the farm buildings scattered throughout the area. These are the only inhabited areas, although the resident population is minimal as the buildings are mostly used for storing rice,

cotton and all the machinery and equipment. The actual movement of vehicles and machinery is especially intense during the months when the crops are being sown or harvested.

Few medium and low voltage power lines cross the area, usually following tracks.

Winter weather is mild with moderate temperatures and a high level of humidity. The rainfall is very high during some winters and sometimes intense storms take place.

This area holds a large number of birds like Grey Herons (*Ardea cinerea*), Little Egret (*Egretta garzetta*), Cattle Egret (*Bubulcus ibis*), Purple Gallinule (*Porphyrio porphyrio*), gulls and waders. During rice harvest, at the end of September and beginning of October, huge concentrations of White Storks (*Ciconia ciconia*) occur.

Results

Counting

During the 3 years follow-up, the number of observed birds has varied very little with yearly maximums of 57 birds being sighted during 1998-2000 and 54 during 2000-2001. Nevertheless, we have noticed differences with time, a maximum being observed at the heart of the winter period (Fig. 1). The last observation of the season was done in May when several sub-adults and young were seen together.

The first observations were noted at the end of September. This data, however, has not been taken into consideration as some of these early birds may have been using the area as a resting place before their migratory journey to Africa. Previous studies have shown that Black Storks

migration across the Straits of Gibraltar lasts until mid-October (BERNIS, 1980; SAN SEGUNDO, 1983; SAN SEGUNDO *et al.*, 1996; PARKES *et al.*, 1998).

Ageing of birds

Due to adverse weather conditions and the shyness of Black Storks, it was not always possible to determine their age but in 365 cases, we determined 67 birds as first year (18,4 %) and 298 as adults (81,6 %). This ratio remained virtually unchanged during the three seasons (Fig. 2).

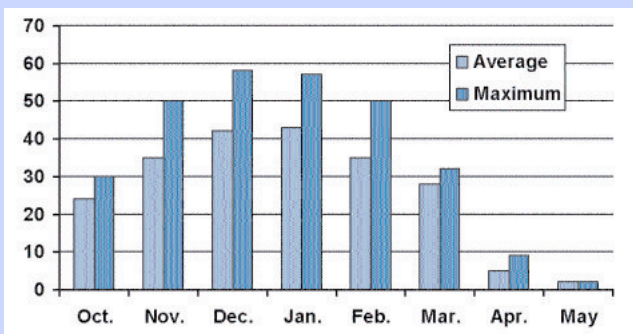


Fig. 1 - Average and maximum monthly number of Black Storks daily observed during all three years of observation. - Evolution mensuelle des nombres maximal et moyen de Cigognes noires observées en une journée au cours des trois années d'étude.

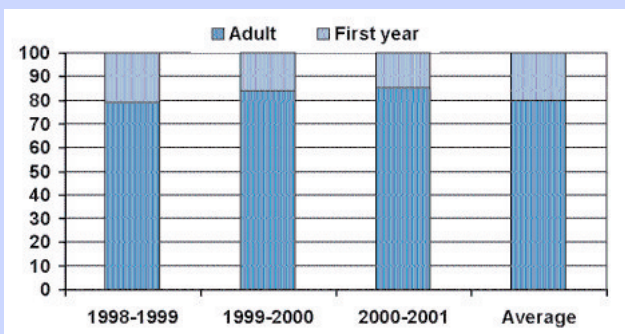


Fig. 2 : Age distribution. - Répartition des âges.

Behaviour

The birds generally remain in small groups (4-10 individuals) although it is not unusual to see them alone. We have also observed larger groups of up to 46 birds together. These groups disperse with great ease and thereafter may divide and form different groups with other birds not coming from the original group. They sometimes integrate with White Storks (*Ciconia ciconia*) but this is not a regular behaviour.

The Black Storks spent most of their time resting and feeding in the canals. Some will be perching on the aqueducts acting like sentry, while others remain on the ground channels, interchanging positions. Their basic food is the red swamp crayfish (*Procambarus clarkii*) introduced from North America.

Origin of birds

The origin of these birds remains unclear. During our surveys, we have managed to see several birds ringed with PVC. Two of them were from Portugal, another from Spain, fitted with a satellite transmitter (SEO, 1999), David and Jonas from Czech Republic, and finally another one with green ring from Hungary or Czech Republic. Both Portuguese birds were born from a same pair although on different years (Goncalo, pers. comm.).

Threats and dangers

All the agricultural activities, the use of pesticides, rodent poison, power lines (FERRER *et al.*, 1999) and of course the continuous illegal and unstoppable shooting that takes place in this area

(ANDALUS, 1987; TORES *et al.*, 1999), like in the rest of Spain (LUCIO & PURROY, 1992), are the greatest dangers for the population of Black Storks as for all other birds using the Arrozales del Guadalquivir as their wintering quarters.

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L'hivernage de la Cigogne noire (*Ciconia nigra*) dans les rizières du Guadalquivir (Espagne) entre 1998 et 2001.

Début novembre 1998, des responsables du programme tchèque "African Odyssey" ont demandé aux auteurs de suivre les mouvements de "David", une Cigogne noire (*Ciconia nigra*) mâle équipée d'émetteurs Argos et VHF, originaire de Tchéquie, et qui semblait avoir choisi cette région du sud-ouest de l'Espagne pour hiverner.

Au cours de trois hivers successifs, équipés de récepteurs, longues-vues et GPS, les auteurs ont quadrillé lors de 32 visites une zone de 3.750 hectares (37°N,6°O) entre le Guadalquivir et la ville de Las Cabezas de San Juan (Prov.de Séville), à l'est du Parc national de Doñana. Il s'agit d'une région extrêmement plate, entièrement consacrée à la riziculture, quadrillée par des canaux de drainage et d'irrigation. A part quelques eucalyptus, la végétation arborée est inexistante et la population résidente très peu nombreuse, des bâtiments agricoles étant disséminés un peu partout. Le climat hivernal est doux avec un taux d'humidité élevé et des précipitations abondantes certaines années.

Le nombre total d'hivernants a peu varié durant ces trois hivers: maximum 57 ex. en 1998-99, 58 ex. en 1999-2000 et 54 ex. en 2000-2001. Il existe néanmoins des différences selon la saison et l'avancement de la période hivernale (Fig.1). Les premières observations ont lieu fin septembre mais il peut s'agir à ce moment d'une halte migratoire, le passage à travers le détroit de Gibraltar se déroulant jusqu'à mi-octobre. Les dernières données se situent en mai et concernent des jeunes et sub-adultes.

Sur un total de 365 oiseaux, on note 67 ex. de première année (18,4%) et 298 adultes (81,6%), cette répartition étant pratiquement identique au cours des trois hivers (Fig.2). Les cigognes se rencontrent en général par petits groupes de 4 à 10 ex., les isolées n'étant toutefois pas rares. A l'opposé, le groupe le plus important comptait 46 ex. De temps à autre, les deux espèces de cigognes se mêlent mais cela reste peu fréquent. La nourriture principale des cigognes noires est constituée de *Procambarus clarkii*, une écrevisse originaire d'Amérique du Nord. L'origine des oiseaux fut rarement déterminée : outre "David", originaire de Tchéquie, et "Jonas", descendant de ce dernier, deux ex. portugais issus d'un même couple mais d'âge différent furent déterminés ainsi qu'un ex. espagnol muni d'un émetteur-satellite et un ex. porteur d'une bague verte d'origine hongroise ou tchèque.

Parmi les autres espèces présentes dans la région, on note le Héron cendré (*Ardea cinerea*), l'Aigrette garzette (*Egretta garzetta*), le Héron garde-boeufs (*Bubulcus ibis*), la Talève sultane (*Porphyrio porphyrio*) ainsi que la Cigogne blanche (*Ciconia ciconia*).

Quant aux dangers menaçant cette zone d'hivernage, on peut citer l'utilisation de pesticides et de poison contre les rongeurs, les lignes électriques et les tirs illégaux.