

Ola Olsson, Storkprojektet



Zusammenfassung

In beiden Zensusjahren bestand die Weißstorchpopulation in Schweden aus 29 Paaren (HPa). Das ist ein Anstieg um 340% verglichen mit Populationsgröße in den Jahren 1994 (8 HPa) und 1995 (9 HPa). Dieser Anstieg wurde hauptsächlich durch das Wiedereinbürgerungsprogramm verursacht, in dessen Rahmen weiterhin Weißstörche in Schweden ausgesetzt werden. Außerdem hat es eine Zuwanderung von wilden Störchen gegeben, die erfolgreich in Schweden brüteten. Der Bruterfolg ist sehr niedrig, was auf die ungeeignete Quellpopulation aus Weißstörchen algerischer Herkunft zurückgeführt wird, die ursprünglich im Wiedereinbürgerungsprogramm verwendet wurden. Seit 2005 finden die Auswilderungen mit Weißstörchen aus Polen statt. So werden die Vögel der ersten Auswilderungen nach und nach durch Vögel polnischer Herkunft ersetzt und der Reproduktionserfolg sollte ansteigen.

Summary

The size of the Swedish White Stork population was 29 breeding pairs (HPa) in both 2004 and 2005. That is an increase of 340 % compared to the population size of 8 resp. 9 pairs breeding in 1994 and 1995. Most of this increase is due to a reintroduction programme within which Storks are still being released in Sweden. However, there has also been immigration of wild Storks, which have bred successfully in Sweden. Breeding success has been rather low due to the fact that an unsuitable source population of Algerian Storks was originally used in the reintroduction program. Since 2005 new releases with storks from Poland are being realized and the Storks of the early releases are being replaced by and by, and breeding success should increase.

Introduction

The Swedish population of White Storks (*Ciconia ciconia*) became extinct in the mid 1950s. The last breeding attempt was in 1954 (NILSSON 1989, SCHULZ 1998). Before that, the population had been declining for almost a century (SCHULZ 1998). After 1954 there were no breeding attempts for more than three decades, even though several storks were observed in Sweden every year (JÖNSSON 1989). In 1989, a reintroduction programme released the first free-breeding pairs (KARLSSON 1989). Since then the population has increased more or less continuously, with the aid of the reintroduction programme (Fig. 1).

Methods

As the population size was so small throughout the study period, precise numbers were known for each year. Every year following the first releases, all surviving juveniles were ringed just before fledging. In most years, all juveniles were then captured and raised in captivity, but in some years they remained in the wild, free to migrate. Only some of them actually migrated (OLSSON 2007).

Storks have been released as part of the captive breeding programme every year since 1989. Generally, pairs with previous captive breeding experience were released in spring (late March or early April), *i.e.* at the same time as migrating Storks would have returned from their wintering grounds. Most birds released as adults winter on the breeding grounds in Sweden. These have been fed during the winter months, usually between November and March. No feeding of free-ranging storks has been carried out at other times of the year.

The captive breeding programme started with a small group of storks imported from Switzerland in 1979. Most of the Swiss birds were of Algerian origin (BIBER *et al.* 2003), and so the majority of birds bred in Sweden also originate from this stock (OLSSON 2007). Due to the poor breeding and migration performance of these birds in Sweden (OLSSON 2007), they have not been allowed to reproduce after 2005. From 2006 onwards, only birds of wild origin (spontaneously immigrating birds) and a group of storks imported from Poland in 2004, have been used for breeding. Eggs laid by free-ranging birds of Algerian origin have been replaced with eggs from Polish birds.

Results

In both 2004 and 2005 there were 29 free-ranging pairs breeding in Sweden (Fig. 1), compared with 8 and 9 breeding pairs in 1994 and 1995 respectively. This represents an increase of 340 % since the last census. This is principally due to the reintroduction programme.

The storks all bred in the southernmost county of Skåne (Fig. 2), which has an area of approximately 11 000 km². Thus, in the breeding area, the density is approximately 0.26 pairs per 100 km². The population has increased in the recent years, and 45 pairs bred in 2007.

Most of the pairs breed in the Kävlinge river basin, which held 22 pairs in 2004 and 24 pairs in 2005. This is an area with much suitable habitat, but it also happens to be the area where most of the reintroduction releases have taken place. There are four nesting



locations, each with a small colony of four to six breeding pairs. In 2004, three pairs bred in areas where no releases had taken place (indicated by blue dots on the map). The northernmost of these is at the Skåne zoo, where a pair has established itself spontaneously and nests on top of the zoo's Stork aviary. Hence, this may be of little conservation interest. The other two pairs, however, have established in areas with high availability of good foraging habitat. In both cases the male was unfortunately lost between 2004 and 2005; one of them probably during migration. A number of the remaining pairs breed in locations only a few kilometres from their release sites.

Since the reintroduction program started in 1989, the population has increased by an average of 2.6 pairs per year, or expressed differently, the population growth rate has been $r=0.21$. This contrasts sharply with the decline phase before extinction, when the population lost 0.25 pairs every year, or had a growth rate of $r=-0.083$.

Productivity has been quite low in recent years (1989-2005): only 1.30 young fledged per breeding pair (JZa). Mean fledged brood size (JZm) is 2.01 fledged young per successful pair. This large difference is due the fact that many nests fail completely in years with rainy weather. On average, 65 % of breeding pairs are successful, fledging at least one chick.

In the old population, prior to 1954, productivity (JZa) was 1.69 fledged chicks per breeding pair. It is not possible to be certain about the proportion of successful pairs at that time.

Between 1991 and 2005, a total of 12 wild storks immigrated to and bred in Sweden. In one case, two immigrants arrived more or less simultaneously and bred together, otherwise only single birds have been involved. These single birds have then bred together with project storks, and produced a number of offspring.

Discussion

The Swedish stork population is currently increasing very strongly, as a consequence of the reintroduction programme. Unfortunately, the project was initiated using unsuitable donor stock. This has caused some problems, as was shown by an analysis of the breeding success and migration propensity of free-ranging storks from 1989-2005 (OLSSON 2007). Both breeding success and the tendency to migrate are lower for birds of Algerian origin, compared with the descendants of wild immigrant parents. Thus, poor breeding performance of the population as a whole can be largely explained by the fact that most breeding attempts have been by storks apparently poorly adapted to the conditions in northern Europe. It is therefore likely that the population increase could have been even higher if the project had used more suitable donor stock. Nevertheless, it appears that the breeding performance of birds of wild origin is good enough to maintain a self-sustained population growth (OLSSON 2007), at least for the currently rather small population size. At present, it is difficult to estimate the potential size of the Swedish stork population, but one way to try to predict it is by habitat modelling. This is now underway, and preliminary analyses (OLSSON 2006) indicate that a population of around 100 breeding pairs may currently be feasible.

The project Storks of Algerian origin will now be replaced with Storks from Poland, wild immigrants, and their descendants. To

begin with, Algerian birds that are already breeding freely will remain in the wild. As mentioned above, however, they will not raise their own young, but will instead get eggs from Polish storks. This manipulation worked well in 2006 and 2007.

For the population to increase beyond 100 pairs will probably require the restoration of more habitats. The stork is already an important symbol for wetlands in southern Sweden (CAVALLIN 2000), and it has been used to instigate some major wetland restoration projects. The predictive habitat use model made as part of the reintroduction programme OLSSON & ROGERS (2009) has also been incorporated in the wetland strategy of the County Administration for Skåne (REGNELL 2006). This is because it is assumed that good stork habitat is also suitable habitat for many other wetland organisms.

The goal of the reintroduction programme is to have a breeding population of at least 100 pairs with migrating offspring. Once such a population exists, it should be possible to discontinue releases, and close down the reintroduction project. At the current rate of population increase, and within the current project strategy, this should be possible within 10 years or less. Hence, by the time of the 7th International White Stork Census, we hope that Sweden will be able to report a stable and natural population of more than 100 pairs, which does not need any help from man.

Acknowledgements

The Swedish White Stork Reintroduction program is run by the Swedish Society for Nature Conservation in Scania and the Scania Ornithological Society. Financial support is given by WWF Sweden, *Stiftelsen Oscar och Lili Lamms minne, Alvins Fond*, and numerous private sponsors.

References

- BIBER, O., MORITZI, M. and SPAAR, R. (2003). The white stork *Ciconia ciconia* in Switzerland - population trend, demography and breeding success in the 20th century. - *Ornitol. Beob.* 100: 17-32.
- CAVALLIN, B. (2000). Reintroduction of the white stork in Sweden - (The white stork - a great flying ambassador of the wetlands in Scania, Sweden). - In: DORNER, I. (ed.) (2000). *Naturschutz mit dem Storch*. Pollichia Sonderdruck 6. Pollichia, pp. 17-21.
- JÖNSSON, P. E. (1989). Den vita storken *Ciconia ciconia* i Skåne 1955 - 1988. - *Anser* 28: 125-132.
- KARLSSON, J. (1989). Storken åter i Skåne. - *Anser* 28: 85-86.
- NILSSON, L. (1989). 500 år i Skåne? Den vita storkens historia i Sverige. - *Anser* 28: 115-124.
- OLSSON, O. (2006). An optimality-based predictive habitat use model for reintroduced White Storks. - *Journal of Ornithology* 147: 99-100.
- OLSSON, O. (2007). Genetic origin and success of reintroduced white storks. - *Conserv Biol* 21: 1196-1206.
- OLSSON, O. and ROGERS, D. J. (2009). Predicting the distribution of a suitable habitat for the white stork in Southern Sweden: identifying priority areas for reintroduction and habitat restoration. *Animal Conservation* 12, Vol. 1: 62 - 70.
- REGNELL, G. (2006). *Våtmarksstrategi för Skåne: Fler, större, grönnare och mångsidigare*. Remissupplaga. 1-27. Länsstyrelsen i Skåne Län.
- SCHULZ, H. (1998). *Ciconia ciconia* White stork. - *BWP Update* 2: 69-105.

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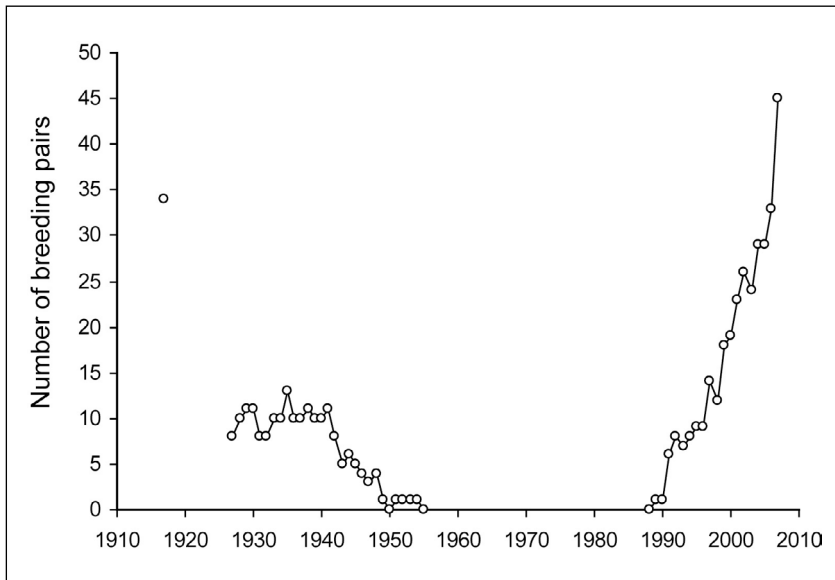


Fig. 1. Development of the White Stork population in Sweden.
Entwicklung des Weißstorchbestandes in Schweden.

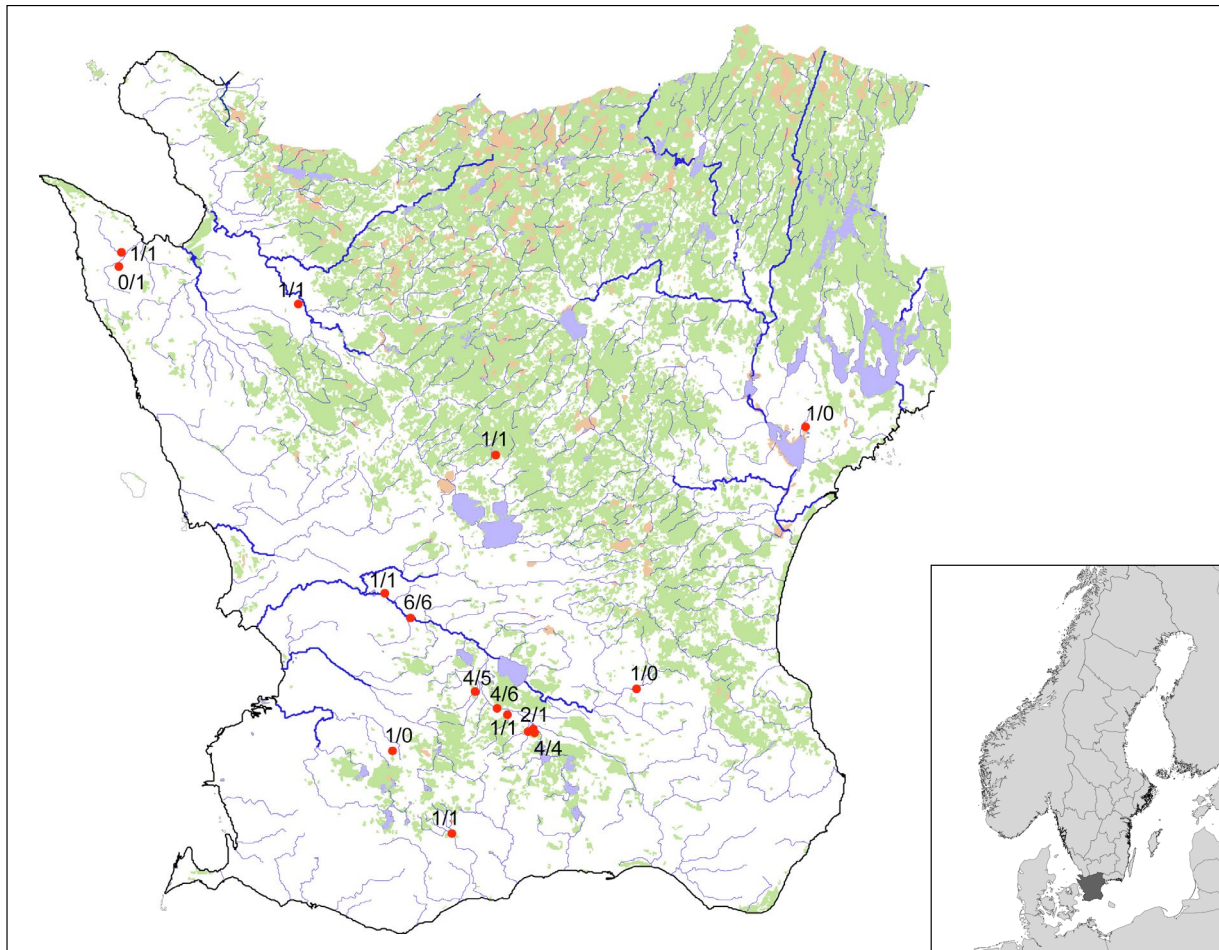


Fig. 2. Distribution of the White Stork in Sweden 2004 and 2005, with the number of breeding pairs at each location.
Verbreitung des Weißstorchs in Schweden 2004 und 2005, mit Angabe der Anzahl von Brutpaaren an den jeweiligen Orten.

Imprint

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