

## Reproductive trend of White stork (*Ciconia ciconia*) in the plain of Gela, Sicily

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**Abstract.** The breeding population of *Ciconia ciconia* in the “Piana di Gela” is the largest in Italy, with a maximum of 44 nesting couples recorded in 2013. From 2001 to 2014 nesting couples have led to fledge 548 chicks with an average rate varying between 2.59 and 3.27 per year.

**Keywords:** *Ciconia ciconia*, nesting, Plan of Gela, Sicily.

### INTRODUCTION

The White Stork (*Ciconia ciconia*) it is a polytypic species with a Eurocentroasiatic and Mediterranean distribution (Brichetti & Fracasso 2003) with two subspecies: the Oriental stork (*Ciconia ciconia boyciana*) spreads mostly in East Asia, and the white stork (*Ciconia ciconia ciconia*) spreads in Western Palearctic.

White Stork is listed in Annex 1 of the Birds Directive EC 79/409, classified with unfavourable conservation status (SPEC2). Further it is included in the Italian Red List of nesting species with status LC (less endangered, Peronace et al., 2012) and has a total value in standardized cents sensu Brichetti & Gariboldi (1992) of 63.6. In Italy was supposedly extinct as nesting species in the XVI century; a first recolonization attempt to nesting took place in Piedmont during the year 1959 (Toschi, 1960), followed by another during the year 1977 in Emilia-Romagna.

In Sicily the species was considered as migrant but became winter visitor from 1991-92 and then nesting species, with the presence of two breeding pairs, since 1992 at the natural reserve of Lentini, after an unsuccessful attempt in 1991 (Ciaccio & Priolo, 1997). White stork has become widespread in the provinces of Agrigento, Caltanissetta, Palermo, Siracusa and Trapani. After eight years since the last investigation on stork population, in this work are synthesized data on population and on reproductive trend of this species, which in this area has the most conspicuous colony of Italy.

### MATERIALS AND METHODS

Study area is in the plain of Gela, in Southern Sicily. This breeding area is into the IBA 166 “Biviere e Piana di Gela”. Information on morphology and ecology of the area are reported in Mascara (1993) and Galesi et al. (1994). Visits in the area, at least five per year, have performed throughout the year to verify migration and wintering, especially from January to June, as well as to verify mating and provide total census. For observation have been used 8-12x50 binoculars and a telescope with a 20-60x and photographic records were done with a digital photo camera which 135-400 mm lens.

## RESULT AND DISCUSSION

In the Plain of Gela the white stork nests since 2001 (Mascara & Will, 2007; Mascara 2008) and there it winters since years 2002-03 (Mascara, 2002). Arrivals on nesting sites and the start of reproduction are distinguished in two periods. Early arrivals, that probably are related to residents individuals, have occurred since 2008 between late January and the first week of February, anticipating of one to three weeks the arrivals occurred until 2007 (Mascara, 2008).

Later arrivals are probably due to migrant storks from north Africa or sub-Sahara and these individuals arrive in the area between the second and third week of February. The nests are often built on top of masts of power lines that running across the plain of Gela in north-south direction. Nests are built at a height varying between 10 and 18 m and a distance of 100-250 m between adjacent nests, but also were observed nests distant 3500 -4000 m from other nests. Were often found others nesting species in the same mast: Spanish sparrow (*Passer hispaniolensis*) built nests among the nest material of a White Stork; also Common kestrel (*Falco tinnunculus*), Lesser kestrel (*Falco naumanni*), European roller (*Coracias garrulous*) and Eurasian magpie (*Pica pica*) have used abandoned stork nests (Mascara & Will, 2010). Between years 2001 and 2006 mating were reported between 18 March and 01 April and fledglings between end-June and 11 July. Since the year 2012 there have been advances of nesting and therefore of fledglings that have occurred since the third week of June.

As in other Italian areas stork population had a positive trend as quoted for the surroundings of Rende (Calabria) between 2003 and 2014, or in the Sicilian province of Catania and Syracuse, where the species has become established as a nesting (data from LIPU). In the plain of Gela it grown from 2 reproductive couples in 2001 to 43 couples in 2013, with a slight decline during 2014 with just 41 couples. Data on the consistency of the colony and nesting are shown in Table 1. The substantial increase of the population since the year 2011 is prob-

Tab. 1 – Data of population and of nesting of *Ciconia ciconia* in the plain of Gela.

Year	Ascertained Nesting	Successfully nesting A	Reproductive success B	Fledged chicks C	Fledging average rate D
2001	2	1	50%	4	
2002	2				
2003	5	4	80%	13	3,25
2004	8	7	87,5%	22	3,14
2005	8	8	100%	21	2,62
2006	13	11	84,6%	36	3,27
2007	13	13	100%	35	2,69
2009	21	15	71,4%	44	2,93
2010	22	20	90,9%	64	3,2
2011	30	20		62	3,1
2012	37	25		74	2,96
2013	44	28	63,6%	77	2,75
2014	41	37	90,2%	96	2,59

- A. Nests that led fledging chicks.
- B. Reproductive success intended as nesting with fledglings on ascertained nesting.
- C. Number of fledged chicks.
- D. Average rate fledging intended as the number of chicks fledged per nest with fledglings.

ably related to attempts of nesting of heterogeneous pairs formed by adults and sub-adults. In 2013 there has been the lowest percentage of couples that bring chicks to fledge (63.6%) due to several heavy meteorological phenomena which led to several nests abandon or falling: 16 nests were lost, when in average not more than 4-5 nests were lost per year. . The number of chicks per nest ranged from 1 to 5 (just one case with a 5 chicks in 2010) and between 2001 and 2014, the stark nesting population of the Plain of Gela has led fledging a total of 548 chicks.

The numbers of young fledged and / or ready to fledge increased from 4 in 2001 (one reproductive couple), to 96 in 2014 (37 reproductive couples). The rate of average fledging varied with 2.59 in 2014 and 3.27 in 2006. The data is the higher recorded in Italy between the years 1998 and 2002 (Gustin et al. 2010), with an average of 2.33 successful chicks per nesting couple. Since the year 2010 the rate of fledging recorded a negative trend, passing from 3.2 in 2010 to 2.59 in 2014 probably due to the presence of heterogeneous couples formed by an adults and a sub-adults with first nesting experience.

**Acknowledgements.** Thanks to Salvatore Riformato for accompanying me in some visits and collaborated on data collection.

## RIASSUNTO

### **Andamento riproduttivo di Cicogna bianca, *Ciconia ciconia*, nella Piana di Gela, Sicilia**

Nella Piana di Gela la Cicogna bianca *Ciconia ciconia* nidifica dal 2001 e vi sverna dal 2002-03. Tutto il sito riproduttivo si trova all'interno dell'IBA 166 Biviere e Piana di Gela. La popolazione nidificante ha avuto un trend positivo: dal 2001 al 2013 è aumentata da 2 a 44 coppie, scese nel 2014 a 41. Il tasso di involo medio (giovani all'involto sulle nidificazioni con successo) è variato da 2,59 a 3,27. Nel 2013 si è avuta la più bassa percentuale di coppie che hanno portato all'involto giovani con un successo riproduttivo del 63,6% da porre probabilmente in relazione al manifestarsi di fenomeni metereologici (forti piogge e trombe d'aria) che hanno fatto abbandonare o cadere numerosi nidi. Complessivamente nel 2013 sono andati perduti 16 nidi contro una media di 4-5 negli anni precedenti. Il numero di giovani allevati per nido è variato da 1 a 5 individui. Complessivamente tra il 2001 e il 2014 la popolazione nidificante della Piana di Gela ha portato all'involto 548 giovani.

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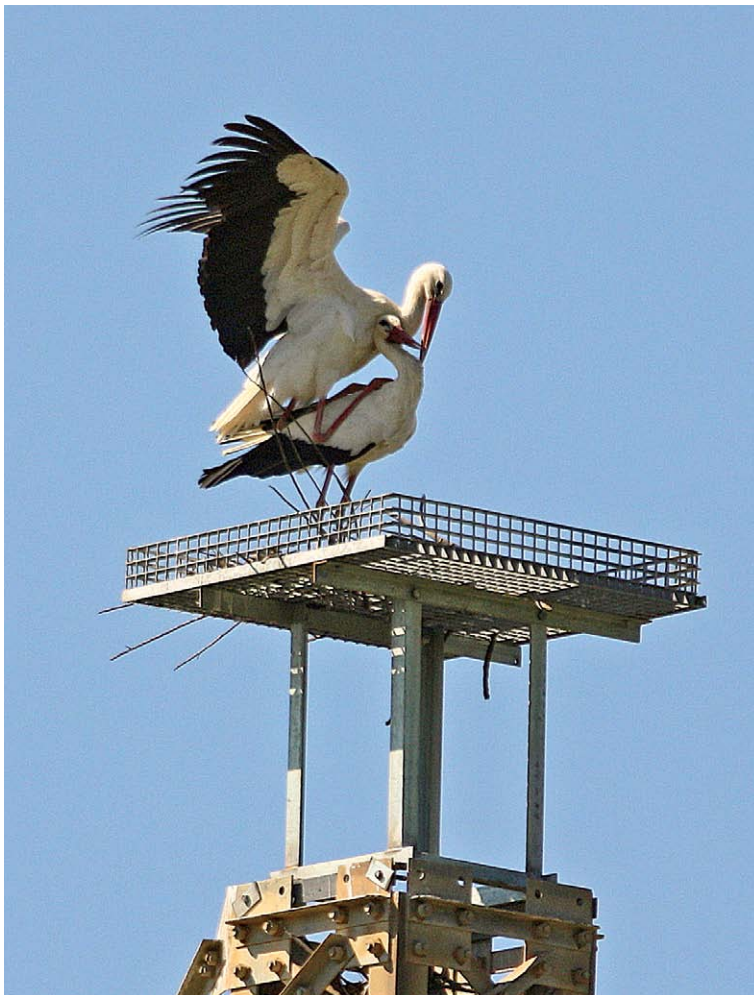


Fig. 1 – Mating of *Ciconia ciconia* in the Plain of Gela. (Photo R. Mascara)





Fig. 2 – Couple of *Ciconia ciconia*, during feeding in the Plain of Gela. (Photo R. Mascara)



Fig. 3 – Couple of *Ciconia ciconia*, with an adult in hatching. (Photo R. Mascara)



Fig. 4 – Adults of *Ciconia ciconia*, which feed the chicks on the nest in the Plain of Gela. (Photo R. Mascara)