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Nesting of the Black Stork *Ciconia nigra* Linnaeus, 1758 (Aves Ciconiidae) in the Fiumara Vitravo Valley (Calabria, Italy)

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ABSTRACT The Fiumara Vitravo Valley in the province of Crotone in Italy, is a Site of National Interest for its rich biodiversity and peculiar habitat, and also a strategic area for the nesting of Black Stork, *Ciconia nigra* Linnaeus, 1758 (Aves Ciconiidae). The river morphology, the harshness of this wild territory, the luxuriant vegetation, the presence of a hydrographic network rich of trophic resources and the crucial position along the migratory routes, are fundamental for the reproductive biology and the evolution of this species. This work will expose the results of the monitoring activities that were carried out in 2015 by which it was possible to document the Black Stork nesting on rocky areas in the valley of Fiumara Vitravo. The ecological importance of the area is strongly in need of greater scientific attention and a suitable site preservation in order to favor the population increment of the Black Stork also in Calabria, where the active reproductive population was present only until 2001. The results are in evident countertrend with respect to older statistical data, which provide negative and sparse data for black stork presence in the "Alto Crotonese" region.

KEY WORDS *Ciconia nigra*; Crotone; Calabria; nesting site.

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INTRODUCTION

The Black Stork, *Ciconia nigra* Linnaeus, 1758 (Aves Ciconiidae) is a bird with a wide territorial distribution. Its nesting area goes from Spain to Sachalin island between the 35° and 60° North parallel, with a separate population nesting in South Africa (Del Hoyo et al., 1992). The species, having a palearctic afro-tropical chorology, is very rare in western Europe, where it has suffered from drastic reduction with a complete disappearance in some states due to the destruction of its natural habitat. In Italy, the black stork is a migrating nesting species rarely wintering. Its biological characteristic is of long range flyer, able to travel over large portions of the sea, allowing it to migrate from wintering zones to nesting areas travelling for thousands of kilometers.

The populations move along not well defined routes, crossing the Mediterranean sea on a wide frontline. Some groups travel through the Strait of Gibraltar, others through the Red Sea along the Suez Canal to the Caucasian regions, others from the Black Sea go through the Bosphorus. One group crosses the eastern Mediterranean from Peloponnese partially exploiting the bridge formed by the Egeo islands. A small group proceeds along the Sicily channel and the Italian peninsula (Petretti, 1993).

The passage of Black Stork in Calabria is not well documented for the lack of an observation network throughout the territory. Small groups of isolated individuals, observed during the passage, may lead one to think both the Tyrrhenian and Ionic side of Calabria as preferential migratory routes, although the crossing of the Sila plateau cannot be excluded.

In general, the reproduction area of the species should include Eurasia, Southern Africa and Western Spain at the border with Portugal. Isolated populations are also found in central Europe and Balkans. The eastern reproduction area is more continuous including the north-east of Turkey, the Caucasus, and a wide region of Russia. In Italy, the first verified nesting was in 1994 in the natural park of Monte Fenera in the bassa Valsesia in the Piedmont region. In the last years a gradual increment of the number of nesting couples has been observed in several Italian regions with a preference for the southern regions (Bordignon, 2006).

THE BLACK STORK IN CALABRIA

At the end of the 19th century Lucifero (2003), a man of wide cultural interests, published the first information on the presence of the black stork in Calabria. In that essay the Black Stork is classified as accidental and very rare and its presence was signaled in the area close to Crotone and Isola Capo Rizzuto. In the same essay some statements made by Moschella (in Lucifero, 2003), for the Reggio Calabria province, ensured the presence of the species in that region.

The information was very scarce in the beginning of the century, and only starting from the 1970s, reliable data recorded the species as available in the Calabria region. After 1970 the observations became more frequent with several sightings. In 1994, the Black Stork nested in Calabria, with only one couple bringing four young birds to fly (Bordignon, 1995). The next year another couple brought two to flight. In 1996 no nesting was registered despite the presence of some individuals (G. Rocca personal observation) on the Lese and Neto rivers in the Crotone region. In 1997 only one couple was present bringing two young birds to flight. In the years 1998 and 1999 no nesting was registered but just the presence of isolated individuals on the Lese river (G. Rocca personal observation). In 2000 only one couple nested in the Crotone region with four flying young birds (Bordignon et al., 2011). In 2001 the same nest was used by a couple for the deposition of four eggs and the flight of four young birds (Rocca, 2002). In the same year a second couple was detected by A. Digiorgio in the same reproduction area. In 2002 the presence of a couple with two immature individuals was registered in the nesting and feeding area. In March 2014, a serious event occurred in one of the most important migratory routes for migrating avifauna. In the core of the Parco Nazionale della Sila an adult black stork was found dead, shot by an unknown poacher in the S. Nicola location in the zone 2 of the park in the Serra Pedace district. In August 2014, during a research campaign, conducted by myself in the valley of Lese river, the presence of an isolated individual was detected. In February 2015, another disappointing event happened on the Amato river near Terzi di Lamezia Terme (Catanzaro) where one specimen was seen with a broken leg in an evident difficult condition but still able to fly (Lega Italiana Protezione Uccelli Sez. Rende, www.lipurende.it). In the present year an intensive search activity to individuate nesting black storks was successfully accomplished finding a couple regularly nesting on a rock face in the SIN of "Vallone Vitravo".

SIN (SITE OF NATIONAL INTEREST) "VALLONE VITRAVO"

The Fiumana Vitravo is one of the major rivers of the "Alto Crotonese" district situated in the North East part of the Calabria region, having a major branch length of 43 Km. In its medium highest portion it has a torrential regime, while in the medium part water flows in a deep canyon. Downstream the morphology is like the Calabrian rivers' with a wide bed and holm oaks.

The site "Vallone Vitravo" (IT9300192), belonging to the biogeographic mediterranean region with an abundance of wet fluvial habitat, includes 8 Km of riverbed of this important river extending in its median portion on a surface of about 800 ha.

The area is characterized by a very dense riparian vegetation, with mixed forest of deciduous, sclerophyllous and brushwood, and Mediterranean

low. Ichthyic-fauna based on salmons populates the zones where water flows more rapidly and creates wide and deep potholes, while Cyprinidae stand in the valley areas.

The biotic characterization of Vallone Vitravo was performed since the high naturalistic value of the site makes it a unique habitat for the preservation of important floristic species, peculiar endemic floras and faunas and endangered birds. The geomorphological characteristics of the area, with mighty and inaccessible rock walls, permit the nesting of animal species of the european community interest included into the Attachment 1 of Direttiva "Uccelli" 79/409/CEE as Black Stork, *Ciconia nigra*, nesting area until 2001.

THE NESTING SITE

In August 2014, on the Lese river, close to the confluence with Neto river, a single individual of black stork was accidentally observed. It was an individual of which it was not possible to obtain any ethological information due to the late reproduction period and the difficulty in finding the feeding sites. In that circumstance the presence of any other individual or nesting site was not detected. This appearance, of great ornithological importance, and related data on spring migration flows pushed us to plan for 2015 a search campaign in the valley of the Fiumara Vitravo, nesting site of the species (Rocca, 2005).

In May 2015 it was identified the pair and the nesting site. The nest was built within a natural cavity at the base of a shelf of rock, on a sandstone rock face in the valley of Fiumara Vitravo. The nest was at an altitude of 370 m on the see level at the top of the sandstone rock face which is 80 m long with East exposition. The great distance of the nest from the possible observation points, at least 300 m, together with the peculiar conformation of the valley, which barely offer a suitable observation prospective, did not permit to get information on the number of laid eggs. In the first decades of June, two nestlings, apparently one week old, were fed by both parents. In the last decade of July the feeding phase was regularly concluded and the young birds took their first flight.

The nesting site were monitored visually from three observation points at a minimum distance of 300 m. After hatching, observations were made periodically with short cyclical 10 day visits on the sites in order to avoid disturbing the reproductive cycle of the couple.

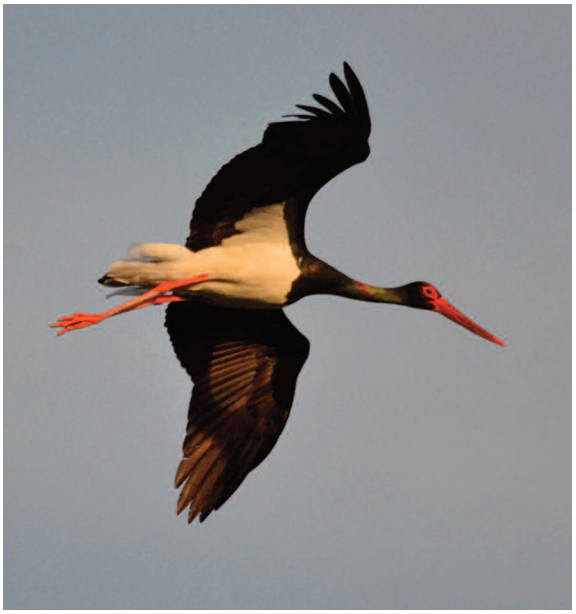

Figure 1. Black Stork flying over the Vitravo Valley.

CONCLUSIONS

Nesting of black stork in the valley of Fiumara Vitravo brings the attention of the researchers to a site of greatest importance for the survival of this extraordinary bird. The reproduction success in the Alto Crotonese region shows, in this delicate phase of the geographic expansion of the species, a positive trend in the conquering of the habitats where black stork had disappeared for years. The natural preservation of these fragile and unique ecosystems imposes a collective effort to the scientific community. It should be necessary in the future to continue the monitoring of the site in order to remove or to reduce all the factors (pollution, fire, anthropic impact, etc.) that limit the expansion of the species.

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