VII INTERNATIONAL CONFERENCE ON

BLACK STORK *Ciconia nigra*

Doñana National Park, Spain. 28th - 30th November 2018

Programme and Abstract Book

SPECIAL PUBLICATION # 1 OF

STORK, IBIS AND SPOONBILL CONSERVATION JOURNAL

IUCN SSC Species Survival Commission

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The information and writing in this publication are those of the authors. They do not purport to reflect the strict instruction to authors of SISC as this is a special publication to provide simple information of the Conference to the participants and general audience.

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Editor's Letter

Dear Reader,

It is our pleasure to welcome you to this special issue of Stork, Ibis and Spoonbill Conservation that gather the abstracts of the VII International Conference on Black Stork *Ciconia nigra*. Stork, Ibis and Spoonbill Conservation (SISC) is a peer-reviewed publication of the IUCN SSC Stork, Ibis and Spoonbill Specialist Group. SISC publishes content on the ecology and conservation of both wild and captive populations of SIS species worldwide, with the aim of disseminating information to assist in the management and conservation of SIS populations and their habitats worldwide.

We want to express our gratitude to those people who have made possible this special issue and the conference. First, the participants and Scientific Committee of the Conference, who have made a relevant effort to prepare the presentations and share their knowledge on the species. Secondly, we want to express our gratitude to the Biological Station of Doñana (EBD-CSIC), and specially Dr Jordi Figuerola and Manuel Mañez who have actively supported the organization of the Conference. And last, but not the least, we thank Junta de Andalucía (Regional government of Andalusia), and specially José Manuel Vázquez, for their interest in supporting the conference.

We hope that this Program and Abstract book will have the interest of participants, researchers, experts and those people who are interested in Black Stork.

We look forward to your contributions to the journal and have every expectation that it will become one of the most respected journals in our target species.

Dr Luis Santiago Cano Alonso and Dr. K. S. Gopi Sundar

Co-Chairs of the IUCN SSC Stork, Ibis and Spoonbill Specialist Group
Editors-in-Chiefs of Stork, Ibis and Spoonbill Conservation

Introduction

The 1st international Conference on Black Stork *Ciconia nigra* took place in Kemeri (Latvia) in 1993. This was the first of a total of six international conferences on Black Stork that have been organized since then:

I International Conference on Black Stork in Kemeri (Latvia) 1993

II International Conference on Black Stork in Trujillo (Spain) 1996

III International Conference on Black Stork in Saint Michelle (Belgium) 2001

IV International Conference on Black Stork in Davod-Püspökpuszta (Hungary) 2004

V International Conference on Black Stork in Uzlina (Romania) 2008

VI International Conference on Black Stork in Châlons-en-Champagne (France) 2012

From 28 to 30 November 2018, the VII International Conference on Black Stork will take place at Doñana National Park, a protected area in Southern Spain, probably the most important overwintering area for the species in Europe. It is organized by the IUCN SSC Stork, Ibis and Spoonbill Specialist Group, The Estación Biológica de Doñana (EBD-CSIC) and Junta de Andalucía (Andalusian government). The interest of the conference is to gather specialists of the species to present the most updated information of the species, most recent researches and strengthen the network and collaboration among specialists. More than 30 researchers and specialists from 14 countries are registered.

Oral presentations and posters will be organized into 4 sessions:

Session 1: Black Stork Population and Trends
Session 2: Threatens and Conservation of Black Stork
Session 3: Ecology and Behaviour of Black Stork
Session 4: Movements, Tracking, Ringing & Migration

The program will have a special session to discuss about the future of the international working group and a field trip to learn about the wintering population of the species at Doñana National Park.

The contents of the conference will be published in an online issue of the Stork Ibis and Spoonbill Conservation journal promoted by the homonym specialist group of the IUCN SSC.

The official language of the VII International Conference on Black Stork is English

Programme

TIME	PRESENTATIONS	AUTHORS
THURSDAY 28TH NOVEMBER 2018		
MORNING Session: 12:30 - 13:30 PM	**Introduction**	
	Introduction to Doñana National Park and Biological Station of Doñana	Jordi FIGUEROLA
	Introduction to IUCN SSC Stork, Ibis and Spoonbill (SIS) Specialist Group	L.S. CANO ALONSO and K.S.G. SUNDAR
	An example of IUCN SSC SIS working group: Glossy Ibis working group	Simone SANTORO
AFTERNOON Session: 15:30 - 20:00 PM (30 min. coffee break between)	**Session 1: Black Stork Population and Trends (Facilitator: Dr Maris Strazds)**	
	Males, Females and Black Stork Nests: Who Owns What and Do They Hold Territories	Māris STRAZDS
	The National Black Stork Census in the Czech Republic in 2014	Frantisek POJER* and J. KAMENÍKOVÁ
	The Status of Black Stork Population In Belarus Polesie	M.G. DMITRENOK and P.A. PAKUL
	Monitoring of the French Black stork population	Nicolas GENDRE, Jean-Jacques BOUTTEAUX and Frederic CHAPALAIN
	Trend of Black Stork Ciconia nigra Population in Spain	L.S CANO ALONSOand J.L. TELLERÍA
	Distribution and Population Change of Black Storks in China	Junwei LI and Roller MAMING
	Session 2: Threatens and Conservation of Black Stork (Facilitator: Dr Luis Santiago Cano)	
	Black storks in captivity: what role can they play in conservation?	C. KING, A. BRAČKO and R. TOPOLA
	Problems of Black Stork conservation in Ukraine	Andriy BOKOTEY, Natalie DZIUBENKO and Iuriy STRUS
	Conservation Results of Black Stork Tracking and Webcam Use	Sellis URMAS
	The hazards of overhead electric lines on Black Storks	Béla KALOCSA, and Enikő Anna TAMÁS
	Study of the flight behaviour of Black Storks in relation to weather conditions and land use with special consideration of existing Wind turbines in the SPA Vogelsberg (Hessen - Germany)	Patric LORGÉ
	Black Stork and wind farm : which level of risk ? case of mortality, sample of measures proposed to take into account wind farm risks, open discussion session to compare different european experiences	Frederic CHAPALAIN and Nicolas GENDRE
THURSDAY 29TH NOVEMBER 2018		
MORNING Session: 9:00 AM -13:30 PM (30 min.coffee break between)	**Session 3: Ecology and Behavior of Black Stork (Facilitator: Dr Luis Santiago Cano)**	
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	The first documented case of Northern Goshawk (ccipiter gentilis predation on Black Stork Ciconia nigra nestlings	Bartosz JANIC, Maciej KAMIŃSKI, Dariusz PIENIAK, Michał STRAWIAK and Piotr ZIELIŃSKI
	New data on Black Stork nest predators in Latvia	Māris STRAZDS and Linda OSE
	Possible reasons of unsuccessful breeding and cases of parental infanticide of Black Storks based on nest camera observations	Béla KALOCSA, and Enikő Anna TAMÁS
	Habitat preferences of Black Stork nesting in Belorussian Polesie	M.G. DMITRENOK and P.A. PAKUL
	Moult pattern as a tool for individual identification of Black Storks	Māris STRAZDS
	Growth of young Black Stork in the Czech Republic	F. POJER and L. PEŠKE
	Session 4: Movements, Tracking, Ringing & Migration (Facilitator: Dr Eniko Anna Tamas)	
	What makes a successful migrant? Lessons from a five year tracking project of a long distance migratory species	Maris STRAZDS, Wolfgang FIEDLER and Hans-Günther BAUER
AFTERNOON Session: 15:30 - 20:00 PM (30 min. coffee break between)	France : National natural reserve of Orient Forest lakes is the best place for black storks in stop over	Stéphane GAILLARD and Paul BROSSAULT
	Wintering of the Black Stork in Doñana Natural Space and surroundings marshes, SW of Spain	Manuel MÁÑEZ, Luis GARCÍA, José Luis ARROYO, José Luis DEL VALLE, Rubén RODRÍGUEZ, Antonio MARTÍNEZ and Alfredo CHICO
	The analysis of Black Stork movements based on ringing, ring identifications and tracking in Hungary	Enikő Anna TAMÁS and Béla KALOCSA
	Ringing of the Black Stork in the Czech Republic	F. POJER, P. KAFKA and J. VRÁNA
	Wintering Black Storks Ciconia nigra in Iberian Peninsula: origins and site fidelity obtained from ringed individuals	Carlos PACHECO, L.S. CANO ALONSO and Luís VENÂNCIO
	Wintering Black Storks Ciconia nigra in Portugal: evolution of the distribution and habitat preferences and origin	Carlos PACHECO and Vitor ENCARNAÇÃO
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	From small rivers to large rice fields	Daniel AUCLAIR
	Migration of Black-Stork in the main migration spots in South of France : West Pyrenean past and Gruissan	Jean-Paul URCUN, Mathieu BOURGEOIS, Frederic CHAPALAIN and Nicolas GENDRE
	Ringing results and sexing results in France, the monitoring of ringed nestling birds.	Frederic CHAPALAIN, Luc STRENNA, Nicolas GENDRE and Jean-Jacques BOUTTEAUX
	Tracking results in France, homeranges of breeding adults in France, focus on the Nievre region program	Frederic CHAPALAIN , Nicolas GENDRE , Daniel DUPUY, Annie and Claude CHAPALAIN
	Migration strategies and extremely high mortality rates of satellite-tracked Upper Silesian black storks Ciconia nigra	Joachim SIEKIERA, Piotr PROFUS, Tomasz BIWO and Artur SIEKIERA
FRIDAY 30TH NOVEMBER 2018		
9:00 AM	FIEL TRIP TO DOÑANA NATIONAL PARK AND SURROUNDING	
LUNCH	DEHESA DE ABAJO	
	CLOSING MEETING	
6:00 PM	ARRIVAL TO SEVILLE	

Participants

The Scientific Committee is formed by Dr Maris Strazds (Laboratory of Ornithology, Institute of Biology, University of Latvia, Riga), Dr Enikő Anna Tamás (MME BirdLife Hungary), Mr Paul Brossault (Forestiers du monde) and Dr. Luis Santiago Cano (IUCN SSC Stork, Ibis and Spoonbill Specialist Group and member of Evolution and Conservation Biology Research Group at Complutense University of Madrid).

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1

Black Stork Population and Trends

(Facilitator: Dr Maris Strazds)

Oral presentation

Males, Females and Black Stork Nests: Who Owns What and Do They Hold Territories?

Maris STRAZDS

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Extensive ringing programme of Black Stork juveniles in Latvia started in 1990. Up until 2017, 1,603 juvenile storks had been ringed. In 2011, first remote sensing cameras were installed, and one of the nests has been permanently observed with a webcam since 2015. As of 2016, data from 20 cameras can be explored simultaneously. Obtained material comprises more than 1.2M pictures collected near 92 nests. From this material, more than 772K pictures from 41 nests, along with the videos filmed at two webcam-equipped nests, have been used for analyses of territorial behaviour and mate choice during the breeding season. In this talk, I discuss the validity of the widely explored concept of the "territorial" or "non-breeding pair" – a parameter that strongly affects all indices of productivity for any given territory. The data obtained exclusively from observations of ringed individuals with known sex and other individually identifiable birds suggest that this term is not relevant for Black Stork, consequently, all breeding success data should be reassessed. Similarly, the assumption that males own the nest appears not to be correct at least in some cases. The question whether it is true only for Storks in the surveyed range or characterises species as a whole should be the subject of a wider study over much larger territory in the future.

Oral presentation

The National Black Stork Census in the Czech Republic in 2014

*Frantisek POJER** and *J. KAMENÍKOVÁ*

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To the results of the 3rd National Black Stork *Ciconia nigra* Census carried out in 2014, data from 2015 and 2016 were added. Using the data gathered the breeding population was estimated at 505 breeding pairs in the Czech Republic, thus corresponding to modelled estimation made in 2009, i.e. 524 pairs. The results were compared with previous censuses implemented in 1994 and 2004 (an increasing trend): it seems that the carrying capacity in the Black Stork breeding population has been reached across the country.

The nesting tree selection and its changes in 1930 – 2014 was analysed based on 740 data in total, gathered in 1965, 1990, 1994, 2004 and 2014. During the whole period studied, black storks used the European beech most frequently (30 %). Moreover, the European larch has gradually but significantly been preferred, reaching 26 % in 2014, while in 1965 it was 2.3 % only. A detail analysis of habitats at nesting sites (data for 1994, 2004 and 2014, areas of 10, 50 and 100 square kilometres around the nest) shows that in close proximity to the nest forests (58 %) prevail followed by arable land (22 %) and meadows (17 %) while human settlements cover 2 % there. Generally larger area and longer period studied result in decrease in forest proportion and in increase in human settlement/built-up coverage. Among forest types within the area of 100 km^2 around the nest, coniferous managed forests are the most common (64 %): mixed (24 %) and deciduous broad-leaved forest growths (24 %) have been selected by black storks less frequently. It can be concluded that the habitat selection reflects land-use and habitat types proportion/distribution as well as the state of the landscape in the Czech Republic.

Poster presentation

The Status of Black Stork Population in Belarus Polesie

*M.G. DMITRENOK * and P.A. PAKUL*

The State Scientific and Production Amalgamation "Scientific and practical centre of the National Academy of Sciences of Belarus for biological resources, Minsk, Belarus

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The study was carried out in Belarus Polesie (Stolin district, Brest region). The monitoring plot (95 km^2) is located in the valley of the Pripyat River.

Monitoring of the Black Stork *Ciconia nigra* population number in 2011-2018 showed a small fluctuation in the number of territorial pairs (the density was 24-30 pairs per 100 km^2 of forest). Breeding success was changing from 0.5 to 1.4 chicks per territorial pair. The number of chicks per successful pair varied from 2.2 to 3.4. During some years up to 67% of pairs do not start nesting (they visit nests, but do not start breeding).
A significant decline in breeding success was noted in 2015 and is still ongoing (during 2015-2018 breeding success was 0.5-0.8 chicks per pair). We associate this with drought and with a significant decrease in the number of frogs in the forest (from 600-700 individuals per 1 km of route accounting in 2013 to 1-20 individuals per 1 km of rout accounting in 2015-2018). In previous years, frogs were the main food of the Black Stork chicks at the monitoring plot. During the years when the frogs disappeared, the main food of the chicks was small fish.

In 2015-2018 the causes of death of chicks were identified with the help of camera-traps (44 nesting attempt were traced). In our studies, the following animal species were the cause of unsuccessful nesting:

1. Goshawk *Accipiter gentilis* – one nestling was killed.
2. White-tailed Eagle *Haliaeetus albicilla.* In 2015, 2016, 2017 and 2018 we recorded one case of Black Stork nest destruction per one breeding season. Before 2015, we did not find nests that were ravaged by White-tailed Eagle.
3. Black Stork *Ciconia nigra*. Two cases of destruction of clutches were recorded because of the attack of other individuals of Black Storks (not from its pair).

Thus, the local population of the Black Stork in the Belarusian Polesie is in a relatively stable state. However, changes in weather conditions (drought) and the subsequent deterioration of the food supply may lead to a drop in the number of the species in the future. Among local species of predators, White-tailed Eagle causes the most significant damage to the local population.

Oral presentation

Monitoring of the French Black Stork Population

Nicolas GENDRE * (LPO France Birdlife), *Jean-Jacques BOUTTEAUX* (ONF) and *Frederic CHAPALAIN* (LPO – Birdlife – CRBPO)

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Black stork *Ciconia nigra*, is a heritage species reappeared in France in 1977. It has been the subject of several studies and monitoring programmes at national and regional level. The LPO France – ONF, in coordination with the banding programme, allows an annual national synthesis and a coordination of the different actors. The National Forestry Office (ONF) carries out specific actions to take into account the species in forest management. The majority (66%) of known Black Stork nests are located in public forests (state forests and communal forests) managed by the ONF. In 2017, the LPO France - ONF coordination became aware of 55 nests occupied in France. Those frequented sites without follow-up at the beginning of the season are not counted. As 100% of the nests have not been discovered, it is reasonable to estimate the French breeding population are about 70 pairs (60-80 pairs) in 2017. Breeding pairs of Black Stork are mainly located in the North-eastern part of France.

Oral presentation

Trend of Black Stork *Ciconia nigra* Population in Spain

L.S CANO ALONSO[1,2] * and *J.L. TELLERÍA*[1]

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The Black Stork *Ciconia nigra* breeds throughout the Palaearctic and includes populations in the southern tip of Africa. The European breeding population is composed of one large population that ranges from Russia to France and from Baltic countries to Greece and Italy, with one small population in the Iberian Peninsula, geographically isolated at the western corner of the Palaearctic. This study updates the current size and geographical distribution of the breeding population of Black Stork in Spain (2017 breeding season) based on number of active breeding pairs present on nest at the beginning of the breeding season that has been reported directly by regions and experts, and offer additional interpretation of the results on the Breeding Population Census 2017 published by SEO/BirdLife. The current population size and distribution is compared with the population data obtained in 2002 (one generation for this species), using the same criteria. In 2017, the number of active breeding pairs was less than 2002, but there is not a statistically significant difference between periods. The geographical distribution of the species during the breeding period has not changed either. This shows a stabilization of the breeding population of the Black Stork in Spain after two decades of increase. This information should be taken in account to review the conservation status of the small Iberian population.

Distribution and Population Change of Black Storks in China

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Black stork *Ciconia nigra* is an endangered species in the world, and the first-grade protected wild bird in China. At present, we know there are only 24,000 ~ 44,000 in the world, and there are about 1,900 ~3,600 in China. It is a breeding and seasonal migratory bird that is distributed almost all over the country. The main breeding grounds are northeast of the Yellow River Basin (Heilongjiang, Jilin, Liaoning), North China (Beijing, Hebei, Shanxi, Shandong) and Northwest China (Xinjiang, Gansu, Qinghai). During the migration, it passes through Lop Nur of Xinjiang, Liao River Delta of Liaoning, Beidaihe of Hebei, Yellow River Beach of Huayuankou in Henan. The wintering areas are the Yangtze River Basin and South China and Southwest China (Yunnan, Hunan, Hubei, Henan, Hebei, Jiangxi, Beijing, Anhui, etc.). Although it is widely distributed, its number is scarce. Therefore, it has been listed as an endangered species by the Red Book of China's Endangered Animals (1998).

In the past 10 years, local researchers have continuously monitored the dynamics of populations of Black Stork throughout the country. The results show that: In the winters of 2004~2005, 2007~2008, and 2008~2009, the average number of overwintering Black Stork populations at the Napahai wetland in Yunnan province was 40, 129 and 182, respectively. From 2010 to 2012, the number in the national nature reserve of Heihe River Wetland in Gansu was 310, 380 and 430, respectively. It can be seen that the number is increasing year by year. From 2003 to 2009, the number of Black Storks in the Juma River of Shidu Nature Reserve in Beijing was 15~28 in winter. From 2004 to 2007, 30, 40, 70 and 130 black storks were recorded annually in Gahai lake region of Gansu. From 2005 to 2010, the quantity of Black Storks in the Yehe River of Hebei was monitored, it was found that the population in 2005 was the highest, with an average number of encounters of 8 per month and a maximum population of 14. In 2009, the population was the lowest, with an average number of encounters of 2 per month and a maximum of 7. This indicates that the number of Black Storks in the region showed a decreasing trend.

Xinjiang is the largest province in China, accounting for one sixth of the territory, with a large number of Black Storks. The Tarim Basin is the main breeding ground and distribution area of the largest population of Black Storks in China. During the winter, Black Storks in Xinjiang migrated to South Asia. From March to April, they flew back to the Tarim River, Urumqi, Irtysh River and Aibi Lake for breeding. They often nested in the shallow caves of mountain cliffs and riverside cliffs or on the tall poplar trees in the oasis wetlands, and had the habit of using the old nest. The number of breeding population in Xinjiang was estimated to be 900~1300, and the number of migratory/passing population is 600~800, it is 1,500~2,100 totally.

We know around the world the number of Black Storks has declined significantly in recent years, it is necessary to understand the reason. Based on the long-term monitoring of Black Storks in different regions, the reasons for the decline of the number of Black Storks are mainly as follows: Habitat degradation, illegal hunting (bird nets, shotguns, poisons, etc.), polluted, human disturbance (tourism activity), electric shock and collision. In view of this, we strongly call on local people and government to pay full attention to the population dynamics of Black Storks, and recommend that relevant departments to actively publicize laws and regulations, and take effective measures to curb illegal hunting activities, and effectively increase people's awareness of protecting wetlands and cherishing wildlife resources. It is hoped to create a good living, breeding and habitat environment for the Black Storks by establishing nature reserves, protecting its habitat and reducing environmental pollution.

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Threatens and Conservation of Black Stork

(Facilitator: Dr Luis Santiago Cano)

Oral presentation

Black Storks in Captivity: What Role Can They Play in Conservation?

C. KING * (Weltvogelpark Walsrode, Germany), *A. BRAČKO* (Zagreb Zoo, Croatia) and *R. TOPOLA* (Warsaw Zoo, Poland)

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While Black Storks *Ciconia nigra* are found in zoos as far away as Japan and the United States of America, according to Species 360, an international record keeping system, almost all of zoos holding Black Storks (79 of 84, 94.0%) are within the European Association of Zoos and Aquaria (EAZA) region. Likewise, 186 of 208 (89.4%) specimens are in the EAZA region. There has been an EAZA European Studbook program (ESB) for this species since 1996, and Ryszard Topola (Warsaw Zoo, Poland) has been the studbook keeper since its inception. This program is managed under the umbrella of the EAZA *Ciconiiformes* and *Phoenicopteriformes* Taxon Advisory Group (TAG), which is responsible for providing direction in captive management of species included in the TAG in areas such as selection of species to keep, husbandry, welfare, research and conservation. The TAG also acts works with colleagues in other regions and acts as a bridge between in situ and ex situ efforts.

The ESB is useful to not only to keep track of individuals and population genetic diversity, but to gather data on demographically relevant characteristics. For example, potential longevity is more likely to be achieved in the captive situation, and it is possible to look at age related fecundity and whether reproductive senescence occurs. There are some issues that need to be resolved to improve Black Stork captive management, for example males are more likely to kill females than in most commonly held storks.

The global zoo community is now embracing the One plan Approach to conservation, which can be defined as is the development of management strategies and conservation actions by all responsible parties for all populations of a species, whether inside or outside their natural range. Since Black Storks are not globally threatened, a captive breeding program for Black Storks as a backup population, or for reintroduction, is unwarranted. However Black Storks are a very suitable species for educating the general public about the importance of conserving forest and wetland habitats, and can also be helpful in explaining complex concepts such as rewilding that are pertinent to Black Stork conservation. Wild Black Storks coming into the EAZA population now are often from rehabilitation centres, and can help create awareness about the hazards that birds face such as powerlines, particularly during migration. If a threat arises to the natural habitat, such as putting a major road through the Danube Delta, it could be possible for zoos, especially local ones, to help educate the public about the threat and encourage them to take action to protest it.

Captive individuals can also aid in researching physiological, behavioural, morphological and other such parameters that are difficult to study in an often elusive forest dwelling species such as the Black Stork. Trials to test tagging or other equipment can easily be undertaken with captive individuals. Black Storks can possibly serve as a model for management of more threatened closely related species, such as the IUCN Red listed Endangered Storm's Stork *Ciconia stormii*, which is both ecologically and taxonomically closely related.

These are just some examples of how captive Black Storks might be helpful in conservation; we would like to hear from people in the field how the EAZA community can help further their efforts.

Oral presentation

Problems of Black Stork Conservation in Ukraine

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Black Stork is listed in the National Red Data Book in Ukraine, but despite high conservation status, there were no practical measures for species conservation foreseen in the national legislation until recent times. Only at the end of 2016, the concept of a protection zone around raptors and Black Stork nests was introduced into the national legislation of Ukraine. However, if in the case of raptors sizes of protection zones are similar to international standards, in the case of Black Stork the radius of a zone was chosen equal to 1,000 m during the whole year. It is obvious that such changes provoked a strong reaction in the forestry industry. Around a single nest, up to 314 Hectares of forest are forbidden of forestry use. Usually, it is premature or mature forest with the highest value for the industry. This caused concealing of information by forestry workers about presence and location of Black Stork nests on forest territories. We even registered cases when forestry workers have destroyed nests to continue industrial activities.

We surveyed the territory around 141 Black Stork nests in Ukrainian Polissia area. Logging of forests was detected around 37.3% of nests within 100 m radius. In more than 14% of plots (within 100 m) forest loss is higher than 20% of the total area. All this allow us to suggest that forest logging is still the main threat for Black Storks in Ukraine.

On the basis of obtained results and our 12-year research within the "*Ciconia-Ukraina*" project, we have developed the National Action Plan to protect the Black Stork in Ukraine during the following 5 years. In the plan, seasonality and optimal sizes of protection zones are foreseen. This plan is already approved by the Ministry of Ecology and Natural Resources of Ukraine and will be implemented in 2019.

This step will improve the protection of Black Stork breeding sites because in Ukraine, during the last decade, area of forests is constantly decreasing and number of trees older than 80 years, potentially suitable for nesting of Black Storks, is less than 10%.

Oral presentation

Conservation Results of Black Stork Tracking and Webcam Use

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In Estonia we started tracking of Black Stork together with several other European countries within Flyover Nature 2000 project and with kind practical tutorials of Czech colleagues in 2005. Since then, we tracked 26 Black Stork individuals, including 12 adult males, 5 adult females and 9 juveniles. Tracking time span varied since few months up to 12 years.

We used web cameras for real time transmission (with free public access) since 2007, every year one nest has been monitored via webcam. All together three different nests followed having different breeding success in different years. Between 2008 and 2018 juveniles of webcams nests have been (or are currently) tracked. Depending on breeding success in real time monitored nests, the click number per year were from 0,15 up to 6 Million. That means around eight-ten times less users in general.

What can we list among conservation results? Home range use, nest site change, foraging sites use (especially during feeding of chicks), visiting of neighbouring nests, breeding success, infanticide, predation, arrival time, departure time, using of resting sites, migration routes, using of migration stopover sites, wintering sites, survival rate – these seem to be classical conservation aspects (not complete) to follow and investigate.

But, what about education and rising of awareness? Probably everybody agrees that above mentioned conservation aspects once studied, wouldn't be to share between specialists only. But need to be highlighted for decision makers in society! Means not to be lost in enormous amount of information we all need to stand with, everyday…

Therefore, web cameras with free access, quality image and audio we launched to build up some part of society being in touch with Black Stork nest life and breeding needs. After nest life ends and nothing to look for dedicated people, we can invite them to look for migration of their beloved birds – using the public migration map for example-. That is to invite people to follow migration, to understand threats during migration and wintering. Maybe it is a part of open data initiative to support citizen science. These initiatives invite people not only watch, but also to ask the questions… and find the answers by themselves. To find answers, more scientific papers are invited to be published by scientists. Fortunately, we have quite a good set of papers, but much more we have data about Black Storks in different countries.

In general, conservation legislation for Black Stork in Estonia is efficient to protect nest sites, there are more nest sites protected as we have individuals. But almost nothing about protection of feeding sites (except nature reserves). Other sides, feeding sites are

situated far of nest site (up to 45 km). What to do to enhance the foraging areas? Restoration of natural streams (in protected plots, everywhere?) may be the case in Eastern European range. Quicker and easier way is to open partly good streams with food there. We used during last three years volunteer camps for that purpose in 16 cases. Additional value was education of those people about Black Stork. For next two years we have accepted project for to make an inventory of potential Black Stork feeding streams in Estonia (first in protected sites, then around currently occupied nest sites and latter in economical forest). That is to suggest restoration measures for next projects to restore degraded streams. Also, restoration of one sample site is foreseen there in project. For to monitor results of project, few tracking devices are planned to install.

Oral presentation

The Hazards of Overhead Electric Lines on Black Storks

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Almost every year the death or serious injury of Black Storks caused by overhead electric lines is recorded in the Hungarian ringing database. Among the Black Storks with satellite transmitters from Hungary, the prevalence of electrocution and collision with overhead electric wires is very high. This is a considerable threat not only near the breeding grounds but along migration routes as well. MME BirdLife Hungary has been working for years in order to decrease the risks posed by overhead electric lines, as the threat affects other species as well (including the White Stork *Ciconia ciconia* and different raptors). Communication and co-operation with electricity providers and the importance of international co-operation is also outlined.

Oral presentation

Study of the Flight Behaviour of Black Storks in Relation to Weather Conditions and Land Use with Special Consideration of Existing Wind Turbines in the SPA Vogelsberg (Hessen - Germany)

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Main target of this research project was the improvement of knowledge of the flight behaviour of the Black Stork depending on weather conditions and land use. In addition, flight behaviour in close proximity to wind turbines (WEA) was analysed.

The Vogelsberg nature reserve was chosen as project area because of several local breeding Black Stork pairs and two wind farms located in the same area.

The flight behaviour was determined by visual observation of the perceptible flights in relation to Altitude (vertical) and species-specific behaviour patterns were categorized. The influence of the weather and land use has been checked by statistical analysis.

For the analysis of the flight behaviour in the close range to WEA, a radius of 250 m around the WEA was defined as danger zone. When approaching this danger zone, a detailed description of the flight movement (vertical and horizontal) was made under consideration of weather data and wing tip speed of the WEA. Potential and used feeding habitats were also taken into account. The recording of flight movements took place from 01.04. to 11.08.2016, resp. on 40 recording days with simultaneous synchronous counts (640 hours).

Flight behaviour in the WEA-environment

Within the present study, Black Storks approached WEA in 10 out of 121 flights (8.3 %) to such an extent that they can be placed within the critical danger zone (250 m horizontal consideration). Flights through wind farms have not been observed in this study, but were reported in others. The weather conditions for flights in the danger zone were always favourable (no precipitation, no high wind speeds, optimal visibility). The WEA were in operation during the flights. Several other studies were analysed and results compared to the present study.

Influence of the weather and land use on the flight altitude of the Black Stork

In the present study, no statistically supported model could be found, which determines the probability of the occurrence of flights in the rotor height in correlation with weather parameters. There is no significant influence of the weather on the flight altitude in the danger area. However, it is likely that thermals play a role in flight altitude, especially during very long flights.

Land use has no influence on the spatial distribution of flight activity.

Conclusion

It must be said that these conclusions were drawn from the observation of a small number of Black Storks and are therefore not worth generalizing.

Therefore, it would be important to carry out further investigations (telemetry of breeders close to wind turbines) in particular with new GPS transmitters with simultaneous acquisition of elevation data in order to obtain more detailed information on flight altitude and space use as well as on the use of food habitats and main action areas. In addition, telemetry studies should be conducted for at least 3 to 5 years.

As a conclusion of this study and the evaluation of existing studies, several successful breeding cases of Black Storks within a radius of 3,000 m to existing wind turbines were recorded.

Overall and despite the fact that some breeding sites are only a short distance from the nearest wind turbines (550 m to 1,300 m), only a very small proportion of the total number of flights can be regarded as conflict-prone. For almost all these flights, a peripheral flight around the WEA was observed.

During the study, no collisions were detected and no adult breeder birds disappeared, so that collisions in the study period are ruled out. This study shows that the studied Black Storks can come close to the WEA in operation and actively fly around, over or/and cross wind farms in a "manageable situations" or with a sufficiently wide corridor.

Summary provided by Patric Lorgé (patlor@naturemwelt.lu), original study in German and maps can be obtained here:

https://landesplanung.hessen.de/informationen/grundlagen-und-informationen/gutachten-vogelarten/Schwarzstorch

Open discussion

Black Stork and Wind Farm: Which Level of Risk? Case of Mortality, Sample of Measures Proposed to Take into Account Wind Farm Risks, Open Discussion Session to Compare Different European Experiences

Frederic CHAPALAIN * (LPO France Birdlife – CRBPO) and *Nicolas GENDRE* (LPO France Birdlife)

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In the last ten years, we have witnessed in France a real explosion in the number of wind farm projects. In 2017, France occupies the 4th position in wind farms in Europe and there is a plan to double its fleet in the next 10 years. These projects with strong political and economic interests are accompanied by previous impact studies and monitoring studies after the implant. The Black Stork, a rare species with a great heritage and vast territory, is taken into account in these studies when this presence is demonstrated. These Environmental Impact studies, which quality is very variable and generally very insufficient for this species, are neither standardized nor independent because they are carried out by the promoters or their subcontractor/s. This makes almost impossible to get information back. National LPO-ONF in coordination with various actors in the field is regularly interviewed by wind farm agents. Measuring the impact of these facilities is difficult. To date, a corpse of a Black Stork has been found.

3

Ecology and Behaviour of Black Stork

(Facilitator: Dr Luis Santiago Cano)

Oral presentation

Diet of the Black Stork in the Czech Republic

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2nd Records on Black Stork young food found on nests in Central and West Bohemia in 1994-2012 confirm the dominancy of fish. The food analysed was mostly that thrown out by nestlings during their ringing. Fish significantly dominated in the Black Stork nestling diet (89.4 % by numbers), followed by lampreys (4.9 %) and amphibians (2.8 %). Mammals (1.21 %), reptiles (0.4 %) and invertebrates (1.2 %) were less important. The freshwater Brown Trout *Salmo trutta* was the most abundant prey (35.7 %), while the Common Roach *Rutilus rutilus*, Common Carp *Cyprinus carpio*, European Perch *Perca fluviatilis* and the Tench *Tinca tinca* were preyed less frequently. The fish/Brown Trout captured mean size was 17.29 cm, while the mean weight was found to be 68.1 g.

Oral presentation

The First Documented Case of Northern Goshawk *Accipiter gentilis* Predation on Black Stork *Ciconia nigra* Nestlings

Bartosz JANIC[1]*, *Maciej KAMIŃSKI*[1], *Dariusz PIENIAK*[2], *Michał* STRAWIAK[3] and Piotr *ZIELIŃSKI*[1]

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In 2016 and 2017 five instances of the Northern Goshawk *Accipiter gentilis* depredating Black Stork *Ciconia nigra* nestlings were observed using web camera installed at a Black Stork nest in central Poland. In 2016 the Goshawk depredated whole brood of three Black Stork nestlings. The nestlings' ages at the time of the attack were 23, 21 and 23 days. In 2017, at the same nest, the Goshawk partially depredated the brood, removing two (age 21 and 24 days) out of the four nestlings. In 2018, in other nest with web camera, the Goshawk depredated whole brood of five nestlings (age 26, 29, 35, 37 and 38 days). It is suggested that the impact of the Goshawk predation on Black Stork broods is much stronger than previously thought. This study was a part of a Black Stork joint project of the Regional Directorate of State Forests in Lodz, the Eagle Conservation Committee and the University of Lodz (2016-2017) and the Regional Directorate of State Forests in Lodz and the University of Lodz in 2018.

Oral presentation

New Data on Black Stork Nest Predators in Latvia

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We used trail cameras to collect more accurate data on Black Stork phenology, to collect ring recoveries of adult birds and to improve knowledge on the behaviour of Black Storks in Latvia since 2011. The total amount of data to be used for analyses comprises 9,351 camera days, with 5,218 days of stork presence, 1,141,248 pictures in total. These data among other things also document numerous visits of predators and show some depredation cases in detail. The new data have changed our understanding of significance of some of the known predator species, namely Goshawk *Accipiter gentilis* depredation is far more significant than was suspected earlier. Other important new finding is that many depredation cases are partial. This leaves some nests "depredated" but successful at the same time. Our data show that depredation during egg period is very strongly underrated and that partial depredation is most frequently not registered at all. We discuss the differences in patterns of attacks of various predator species and difficulties in discovering true causes of egg and/or chick loss during breeding season.

Oral presentation

Possible Reasons of Unsuccessful Breeding and Cases of Parental Infanticide of Black Storks Based on Nest Camera Observations

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MME BirdLife Hungary

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We have been observing Black Stork nests with cameras since 2005, in the first eight years at one nest and since 2013 at two nests, simultaneously, both in the Gemenc region of the Danube-Drava National Park, Hungary. During the 14 years we observed on several occasions that the breeding has failed for different reasons. In our presentation we try to give the reasons for nesting failure (e.g. weather, lack of food, predation). We have also observed several cases of parental infanticide and we are providing details on these cases in our presentation.

Oral presentation

Habitat Preferences of Black Stork Nesting

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Studies of Black Stork *Ciconia nigra* habitat preferences are important to actualize the legislation on protection of Black Stork. Additionally, it is useful to select sites for building artificial platforms for Black Stork. In 2016-2017 we conducted a description of a number of characteristics of forest and other factors.

We studied habitat preferences between real Black Stork nesting places and random places (theoretically good for nesting) in forest environments, used as a control group. The study was conducted in Belorussian Polesie (Brest region) on 3 plots: Middle Pripyat (Stolin district, anthropogenic pressure is low, old forest, plot area is 95 km^2, monitoring plot with all nests known), L'va (Stolin district, human activity exists, less old forest, plot area is 240 km^2, monitoring plot with all nests known), Belovezhskaya Pushcha (Kamenec district, anthropogenic pressure is just absent, some of nests are known). Broadleaf and small-leafed swampy forests are dominating in Middle Pripyat and Belovezhskaya Pushcha and on L'va plot pine forests are dominating.

All 3 plots are different in tree density and age. Meanwhile, Black Stork habitat does not differ between plots significantly. Thus we can identify optimal habitat conditions for Black Stork nesting, which are same in all plots. Optimal density was 29.89 ind/500 m^2 (±11.04) (N=148), tree diameter varies from 21.85 mm (±13.68) in L'va plot (N=633) to 24.68 mm (±15.14) in Belovezhskaya Pushcha (N=747). Projective cover ratio of bushes was 20.06 % (±20%), 38.96% in control (±34%). The role of bushes is mixed. They hide nests from predators, but in some cases, if Black Stork nest is very low, it can prevent Black Storks to visit their nest.

Oral presentation

Moult Pattern as a Tool for Individual Identification of Black Storks

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Ability to distinguish a study subject individually is a very important pre-condition for any study that considers birds as individuals rather than species as such. The key method for individual marking of birds is marking them with rings, however, due to the secretive life-style and large dispersal distances of the Black Stork it is very difficult to reach a condition when high percentage of individuals in a studied population would have rings. To tackle this problem, I have used moult-produced pattern an as additional / alternative method. Moult is a process characteristic for all birds that is happening throughout their whole life, whereby worn feathers are replaced with new ones. Due to differences in the surface structure, worn and fresh feathers reflect light differently. In sunlight this effect is visible only if the light falls on plumage at a certain angle. Fortunately, pictures taken from a close range with an infrared light source in the dark produce different result: worn feathers appear very pale, while fresh feathers look almost black. Black Stork has 12 primaries and 22 secondaries and an equal amount of large coverts on each wing (68 x 2). If only these feathers are considered, the number of possible combinations is 8.7112285931e+40. If the 3rd stage is added (some feathers might be/are missing) then the total number of combinations reaches 7.7355401014e+64. Moult seems to be happening continuously, thus creating an unmistakable combination of pale and dark feathers – a real "bar code" individual for each bird. Although in theory two birds could have the same pattern of all feathers that is highly unlikely to happen in reality. If other feathers (medium and small coverts of wings, remiges and large feathers on the back) and other features suitable for identification (shape of the beak, face pattern, peculiarities and defects of plumage etc.) are considered, each bird has an unmistakeable fingerprint throughout the given season. The question whether changes in the moult pattern can be used to identify birds also between subsequent seasons is the subject of a further study, as more ringed birds are necessary with series of pictures from more than two seasons in a row.

Oral presentation

Growth of Young Black Stork in the Czech Republic

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In 1994-2012, biometric data of 576 young on nests (nestlings/pulli) were gathered during Black Stork´s ringing activity in the Czech Republic, particularly in an area located west and southwest of Prague. In total, 1,325 data on three measurements, namely wing, beak and tarsometatarsus lengths were collected. From the data raised during Black Stork young rearing at the Prague Zoo the growth curve was constructed and regression lines were calculated describing the linear relationship between wing, beak and tarsometatarsus lengths and nestling age throughout the brooding period. Wing and beak growth has not been finished at the time were young is ringed at the nest and has further been continuing, while tarsometatarsus growth is finished at that period, reaching the size known in adults.

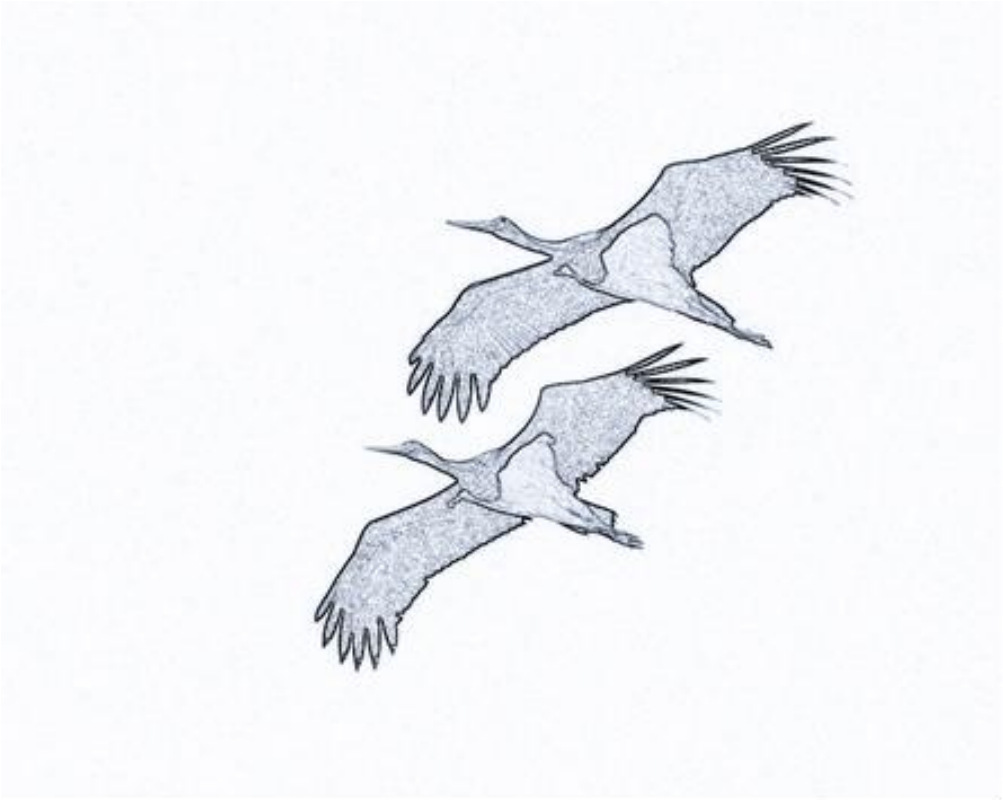
Daily growth rates in the period of linear growth are 9.1 mm for wing, 1.9 mm for beak and 3.6 mm for tarsometatarsus. From the data gathered, the date reaching the wing length having been determined in advance at 400 mm, i.e. at the age of 50 days was computed for each young. Thus, the baseline age value distribution (i.e., the particular days = date) was analysed in the respective years. The timing of breeding in the respective years was tested against shifting in the starting nesting in 1994-2012: it was confirmed that the nesting has started 4 days earlier in the course of the above period, possibly caused by step-by-step climate change.

Ring recovery data obtained for the young studied (in total, 83 individuals) in relation to their size (i.e., to their age) at the nest. It was found that the oldest and biggest young, i.e. “first-born”) predominate among the recovered birds, assuming that they better survive (the latter are being better genetically fitted for survival, displaying better fitness).

For determining the age in young on the nest based on lessons learnt, it is recommended when determining the nestling age to measure the total wing size, the beak size respectively, the latter being the supplementary information for checking the calculation. The one-day margin for error corresponds with the accuracy/exactness of measurements and with the daily growth rate in both the parameters studied.

4

Movements, Tracking, Ringing & Migration of Black Stork



(Facilitator: Dr Enikő Anna Tamás)

Oral presentation

What Makes a Successful Migrant? Lessons from a Five Year Tracking Project of a Long Distance Migratory Species

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In 2013-2017 we have tracked 27 juvenile Black Storks *Ciconia nigra* with GSM transmitters from Latvia (NE Europe). Contrary to many migratory species, Black Stork is a solitary traveller. Juvenile birds during their first migration from northern Europe to trans-Saharan Africa must rely upon the resources they received at the nesting site and experience they gain during migration. Our data suggest that two domestic factors might have a significant impact on their migratory success - body weight and longevity of stay in nest. Early departure from the nest is strongly associated with migratory failure, so highlighting potential negative impact of late season disturbances in the vicinity of nests. Most successful birds left their nests late and started the southward migration straight from the nest. Typical migration consists of comparatively short bursts of flight days interspersed with longish foraging stops along their long journey - the longest one from our data exceeding 10,500 km one way. The most important factor affecting success of travel appears to be longevity of stay at the most important foraging stops rather than number of sites they explore. Those birds that made a backward migration visited most of the sites they had explored earlier, however, with different travel routes between the stops. None of one-year old birds did return to breeding grounds. Instead, they spent their second summer in suitable territories 1,000 – 2,000 km from their nests (in Turkey, Romania, Moldova, Ukraine). In all but one of those territories checked we found many more resting storks, mostly of similar age, along with other species of wading birds. In most cases these sites were not known for local ornithologists / conservationists as important bird gatherings. One of such locations in Romania may potentially be the most important summer roost of 2nd calendar year Black Storks from Eastern Europe, thus deserving high degree of attention from the conservation viewpoint. We discuss also other factors potentially affecting migration success, such as late vs. early brooding, weather conditions, role of predators and learning "*en route*".

Oral presentation

France: National Natural Reserve of Orient Forest Lakes Is the Best Place for Black Storks in Stopover

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Since 1974, Black Storks have stopped over on the Champagne lakes, during their post-nuptial migration, between July and October. They take advantage of the annual drop in the water level for finding food (fishes and frogs).

In order to follow the chronology of the post-breeding migration of the Black Stork, weekly and simultaneous counts take place during the period of the most intense migratory flow in the Champagne lakes (between early August and mid-October). This method of visual counting and identification of rings has taken place since 2001.

The Lakes of the Forêt d'Orient, in the heart of the Regional Natural Park of the Forêt d'Orient, is the only French place regularly used by such a large number of Black Storks in stopover and over such a long period, 10 to 16 weeks depending on the year.

Between 2001 and 2018, 70 ringed individuals were controlled in the National Natural Reserve of the Forêt d'Orient which has concentrated almost all the observations made in the lakes from the Aube area.

These birds come preferentially from Belgium and the Czech Republic, but also from Germany and Poland.

After more than 15 years of monitoring, the annual migration over the lakes of the Forêt d'Orient is estimated minimum between 150 and 200 individuals. There is an important place loyalty for some birds, such as two Czech storks, present every year for 12 years in the area.

The reserve and the large lakes therefore play a major role in France for pre-migratory grouping as well as for reading rings.

Oral presentation

Wintering of the Black Stork in Doñana Natural Space and Surroundings Marshes, SW of Spain

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This paper presents the results of the monitoring of the wintering population of the Black Stork since January 2000 in the Doñana Natural Space (DNS) and the rest of the marshes on the right bank of the Guadalquivir River. Moreover, the Brazo del Este and Isla Menor (left bank) were also surveyed.

There are news of the wintering of this species in the study area since the early eighties, reaching a few dozen birds, only on the right bank, until the end of the last century.

The data used have been extracted from the winter census of waterbirds that takes place in mid-January in the mentioned area. The figures range from a minimum of 52 individuals in 2001 to a maximum of 367 in 2012. Clearly, the wintering population shows an increasing trend, and the figures obtained year after year mean that the Guadalquivir Marshes are probably the most important overwintering area for the species in Europe.

If we break down the global census in three different areas (DNS except the small rice field zone within it, the rice fields and the rest of wetlands surveyed), the highest count every year, except one, is in the rice fields. In addition, it is in this habitat where the upward trend of the Black Stork wintering population is clearer. This may be mostly due to the huge amount of Red Swamp Crayfish *Procambarus clarkia* available in them, one of the main prey of the species during the winter season.

Oral presentation

The Analysis of Black Stork Movements Based on Ringing, Ring Identifications and Tracking in Hungary

* *Enikő Anna TAMÁS* and *Béla KALOCSA*

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Based on 2,366 ringed and 8 satellite transmitter-marked Black Storks in Hungary, furthermore numerous ring readings in the country, we provide information on migration, on habitat preference as stopover in connection with the water regime and some data on dispersion of the species.

Oral presentation

Ringing of the Black Stork in the Czech Republic

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Since establishing the Bird Ringing Centre at the National Museum in Prague, 7,523 Black Storks have been banded in the Czech Republic in 1934 - 2018, predominantly as nestlings/pulli. Since 1994, the birds have also been marked by colour plastic rings with a code: 4,629 individuals (61.5 % of the total number) have been marked by this way. Approximately, during the last 10 years, for most of Black Storks ringed in the country, combination of plastic and metal rings has been applied. Using the colour rings, number of recoveries has dramatically been increasing: by 24 October 2018, more than 3,270 recoveries have been reported.

A significant part of the recoveries in abroad comes from West Europe, Hungary and Israel, while those from other areas/regions are rare. The oldest Black Stork from the Czech Republic was of 20 years old, the dispersal suggests high philopatry and fidelity in storks. On the other hand minority of Black Storks, approximately 10 % has used to breed hundreds of kilometres (up to 700 kilometres) from their place of birth. On the Czech Republic´s territory, between the meridian 14^0 and 16^0 E of Greenwich, migratory flyway/route divide was identified – South-westward via the Strait of Gibraltar, South-eastward via the Bosporus (The Strait of Istanbul) respectively. The ringing data show that during 41 years (1970-2011) beginning of the breeding season shifted by 5 days.

Oral presentation

Wintering Black Storks *Ciconia nigra* in Iberian Peninsula: Origins and Site Fidelity Obtained from Ringed Individuals

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An increasing number of Black Storks *Ciconia nigra* remain to winter in a number of locations of Iberian Peninsula. The knowledge about the origin of these individuals is essential to assess eventual changes in migratory patterns and to determine other important aspects of Black Storks' ecology such as longevity and site fidelity and also to access the conservation status and habitat requirements of these sites. All the available information on ring controls and recoveries was gathered from the Portuguese and Spanish ringing centres, from social media and dedicated websites. Directed efforts to control rings and count individuals were done by the authors in a number of winters at some of the main wintering sites.

The data collected shows that the wintering population is from both Iberian and Central European origin and that there has been an increase in the proportion of Central European ringed storks in the last decade. This proportion is much higher at newer regular wintering sites what suggests that there might be a change in the migratory strategy of the species with a larger number of individuals staying in Europe instead of migrating to Africa and those storks that are colonizing these new wintering sites are mostly from the non-Iberian population. Regardless of their origin, many individuals show a very high site fidelity and some use the same wintering area since their first winter. Conservation implications of colour ringing as a conservation tool are discussed.

Poster presentation

Wintering Black Storks *Ciconia nigra* in Portugal: Evolution of the Distribution, Habitat Preferences and Origin

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During the last two decades, an increasing number of Black Storks *Ciconia nigra* remain to winter in a wider number of locations of Iberian Peninsula. In a previous study, some environmental and geographical factors affecting the winter distribution of the Black Stork in Iberia were analysed. Data provided by an extensive count across Portugal and Spain during the winter 2012 – 2013 supported that Black Storks were more abundant in areas of high habitat suitability close to the migratory flyway and were absent or in reduced numbers in areas away from the migratory flyaway. These results were used to assess habitat suitability and to model the long-term evolution of the Iberian Peninsula as wintering ground for the Western and Central European population of Black Storks.

In the present work we compiled all the data available from wintering Black Storks in Portugal with the objectives of characterizing the evolution of occupancy area and habitat preferences and to evaluate the suitability of the model developed in the work mentioned before. The data collected shows that there has been an increase in numbers and occupancy area with several new regular wintering sites in the last decades and that the model predicted well these new settlements. The wintering sites in the late 1980s' and 1990s' were mostly rivers and small wetlands (mostly small reservoirs) but the newer sites are essentially large areas of rice field. Most of these areas are unprotected. Control of colour rings allowed identifying the origin of some individuals that are both from the Western and Central European population.

Oral presentation

Wintering of Black Stork in France – the Sample of DIVA – CM32 a Black Stork Wintering in France Tagged 3 Years Ago

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Black Stork breeds in France since 1973. The West European population is largely trans-Saharan migrant. A majority of individuals migrate through the Western European route through French territory crossing the passes of Pyrenees and after the Strait of Gibraltar. Wintering in the Iberian Peninsula began in the 1950s. More recently, Black Storks have started wintering in France, but remain relatively rare. In 2004, the number of wintering individuals was estimated to be few individuals. We can estimate between 30 and 40 Black Storks winter in France in 2018, mainly in the Mediterranean arc. Since 2010, a Black Stork nicknamed DIVA, banded when it was a chick at nest in Luxembourg by Patric Lorgé in 2008, is observed annually in winter at the zoological park of Sigean, the swamps of Narbonnais and the rice fields surroundings by Antoine Joris as well as observers of Aude Nature and LPO Aude. In the autumn of 2015, a partnership was established among the Réserve Africaine de Sigean, the CRBPO banding programme and the LPO France to equip DIVA with a GSM / GPS / UHF device to study its wintering and to locate its nesting site. We present here the monitoring of its wintering during three winters.

Video presentation

From Small Rivers to Large Rice Fields

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«*CM32, d'un petit ruisseau à une grande rizière*» is a short film of 8 minutes and 50 seconds, initially made for the Réserve Africaine de Sigean (located in the department of Aude, Occitan region at the eastern end of the French Pyrenees). This short film tells the story of the monitoring of the Black Stork CM32 – DIVA-. It was ringed when it was a chick at nest in Luxembourg in 2008 by Patric Lorgé. Since 2010, she is observed annually in winter in the zoological park of Sigean, the swamps of Narbonnais and the surrounding paddy fields by Antoine Joris as well as observers of Aude Nature and LPO Aude. In autumn 2015, a scientific partnership was established between the Réserve Africaine de Sigean, the banding programme (CRBPO) and the LPO France to equip DIVA with a GSM / GPS / UHF device. The objective is to locate its nesting site and study its nesting and wintering home ranges. The reproduction of this bird is followed by the ONF in the department of Meuse. Telemetry monitoring of this French breeding bird wintering in France has been ongoing for 3 years.

Oral presentation

Migration of Black-Stork in the main migration spots in South of France: West Pyrenean pass and Gruissan

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The majority of Black Storks are trans-Saharan migrants in the Western European population. Most individuals migrate through the Western European route through French territory cross the Pyrenees over the Basque Country area (especially at *Organbidexka* pass) towards the Strait of Gibraltar. Others, however, take the Eastern route of the Pyrenees, and pass over the Roc de *Conilhac Gruissan*. The monitoring of these migration sites have been provided for many years by local ornithologists (LPO Aquitaine, GAN-NIK, Collective Lizarrieta, CPAL, LPO Aude, Collective Gruissan, among others). Reflecting the growth of the European population until 2012, the number of Black Storks counted seems to be stabilized since then. In 2018, 148 birds were observed by the East flyway (*Roc de Conilhac* in Gruissan) and 1 382 by the West flyway (901 at the *Organbidexka* pass, 437 at *the Lindux Redoubt* and 44 at Lizarrieta).

Oral presentation

Ringing Results and Sexing Results in France, the Monitoring of Ringed Nestling Birds

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From 1995 to 2018, 966 young Black Storks of 302 different broods were banded at nest in 22 departments and 116 communes in France. 103 birds were caught flying. 580 individuals were sexed. This was only possible thanks to a considerable effort of the national Black Stork Network (NFB network, banding programme and volunteers of naturalist associations who actively contribute to the follow-up the species). As of 1 October 2018, 257 resighting marked birds were recorded in France. In total, 1,001 resighting data of birds (alive or dead) and 251 birds banded abroad were recorded again in France, with a total of 972 resighting data (alive or dead). A special effort has been made in recent years on reading ring's codes of breeders. This has a particular interest in highlighting a geographical dispersion (distance).The results point out that males have higher geographical dispersion than females. Overall male individuals are more controlled than female individuals. Females, particularly nesting females, appear to have post-breeding dispersal and early autumnal migration than males.

Oral presentation

Tracking Results in France, Home Range of Breeding Adults in France, Focus on the Nievre Region Programme

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The first tagged Black Stork with an ARGOS transmitter was 1998 in France. The main objective was to know the migration of the Black Storks from France. Now, the performance of current devices (GPS data every 2 minutes) allows much detailed studies of the home ranges of breeding adults. Since 2015, the LPO France and LPO Nièvre have joined a banding programme to study breeder (adult) Black Storks, in collaboration with different partners (DREAL, ONF, Sigean African Reserve, Regional Nature Parks, local associations, among others). In total, since 2015, 11 individuals have been equipped with Ecotone or Ornitela brand GSM / GPS tags. Thus, five birds including four breeding adults have been tagged in the department of Nièvre. Home ranges were determined by calculating the Kernel 95%. Depending on the sex, the years and the nesting phase (e.g. brooding, feeding) they vary from 9,000 Hectares to 26,000 Hectares. Within these core areas, there are usual feeding sites (small streams of watershed with species such as *Cottus sp*, ponds, pond tails, wet meadows with batrachians). Not only these small beacons make possible know the home ranges of the birds, but also to refine the knowledge of their movements and their behaviour during the reproduction period (no nocturnal movement, first early flight followed by a strong activity of fishing, greater displacements when the temperature increases, nocturnal resting places rarely in the immediate vicinity of the nest). One of the objectives of this monitoring is also to guide measures of restoration of ecological continuity carried by the managers of territory (regional natural parks, Natura 2000 site promotor, among other stakeholders).

Migration Strategies and Extremely High Mortality Rates of Satellite-Tracked Upper Silesian Black Storks *Ciconia nigra*

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26 (18 males and eight females) from eight nests located in Opole Silesia (SW Poland) were equipped with GPS satellite transmitters (13 in 2017, and 13 in 2018). Fledglings left their nests for the first time between 12 July and 2 August (median = 18 July; n = 25). After 13–44 days (median = 27.5 days; n = 24) spent near the nests, they started to move away from their hatching place. Between 29 July and 29 September (median = 14 August; n =24), fledglings began to relocate in different directions in the process of post-breeding dispersal. Few individuals started migrating towards potential wintering areas. All fledglings (100%) with GPS satellite transmitters installed in 2017 were killed and not a single one survived a year.

One fledgling (almost capable of flying) died shortly before reaching the ability to fly – probably killed by a predator. Other seven birds died in Poland before deciding on the direction of migration. Two fledglings were killed (during post-breeding dispersal) by a strong windstorm in the northern part of the country, 403 and 445 km in a straight line from their parents' nest. Two birds were found dead (with no visible signs of injury) 17 and 270 km also north of their hatching place. One fledgling was killed and eaten by a White-tailed Eagle *Haliaeetus albicilla* and another one was killed by a Northern Goshawk *Accipiter gentilis*. Probably the third fledgling was also killed by a predator. Two birds migrating along the south–eastern route were found dead under a 15 kV power line in Romania and Bulgaria (708 and 1105 km from the hatching site, respectively); they died a result of electrocution on unprotected electrical poles or in collision with overhead power lines. Two other individuals flew along the south–western route but only one of them crossed the Strait of Gibraltar and reached the environs of Ben Mansour in northern Morocco – 2,681 km in a straight line from its birthplace. This bird probably died here, because the last signal from its transmitter was received on 31 December 2017. Other bird stayed for a relatively long time in the Camarque nature reserve in southern France to overwinter but died on 3 March 2018 near Arles on a 110 kV high voltage traction seven months after the installation of the transmitter. One of the birds first chose the south–eastern migration route: it reached Austria and in the morning of 25 October 2017 started its migration from south–western Hungary, flew through Bosnia-Herzegovina, Croatia and the Adriatic and in the afternoon reached Torchialoro in southern Italy, where was most likely killed by man. On that day, the stork covered a distance of 743 km, including 445 km over the Adriatic, and in some sections of the migration route it travelled at a speed of up to 93 km/h.

In 2018, one bird out of 13 birds with GPS satellite transmitters died in the nest before its first flight, while another bird broke its wings shortly after leaving the nest and was

placed in a shelter for animals. Two individuals – in Poland and in Hungary – were found dead under a 15 kV electric traction. One of the birds travels through Serbia and Albania to western Greece and Crete, where it made an unsuccessful attempt to fly over the Mediterranean Sea and disappeared there. In two other cases, the cause of death of young birds in Romania and Serbia remains unknown. On 5 November 2018, seven young black storks are still alive in France, Serbia, Greece (2 individuals), in the European part of Turkey and northern Israel (2 individuals).

Siblings commonly use different migration routes. Of the three young birds coming from one nest, each of them chose a different route of migration to wintering grounds. One of the fledglings has embarked on a migration to the south–west and is currently not far from Saint-Étienne in southern France, the second one is in western Greece and the third one – in the European part of Turkey. The number on the ring of the young bird, staying currently in France, was read in four places (9–12 October 2018) by local ornithologists during its flight through Switzerland.

During the day, the longest autumn migration flights took place over a distance of 141–743 km (median = 263 km; n = 22) and the highest recorded height at which young black storks were then observed was 4,480 m.

This high juvenile mortality rate during migration seems to be the main cause of the Black Stork disappearance in Upper Silesia in the past ten years.

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