

Annual report 2012 (preliminary version)

1. Migration and Reproduction

Beginning of 2012 the colony situated in Laguna di Orbetello consisted of 38 individuals (15.3.2012). The majority of the birds left the wintering area autonomously and migrated northwards. We transferred eight adult birds as non-migrating breeders from the wintering to the breeding area. Only seven birds remained in the wintering area. A total of 12 birds arrived autonomously in the breeding grounds in Burghausen, Bavaria (Tab.1).

Five non-migrating adult birds were supplemented to the breeding colony in Burghausen to increase the breeding success. Eight offspring were raised in four different nests. Due to delayed fledging, two offspring had to be given away to professional keepers. One further juvenile died due to electrocution during summer. Thus, five juveniles remained at start-up of the autumn migration.

From beginning of August all 17 birds departed from the breeding area. During autumnal migration, five of them got lost (2x poaching, 2x electrocution, 1x injury). The remaining 11 birds were translocated after crossing a latitudinal threshold to the nature reserve Laguna di Orbetello, to avoid losses through hunting. One bird still stays in Switzerland (see migratory behaviour of juvenile birds).

	Number of Individuals
Tab. 1 Migration and reproduction 2012	
Spring Migration	
Departure from the wintering area Tuscany	27
thereof juvenile partial migrants	15
thereof arrival in the breeding area Burghausen	12
Reproduction in the breeding area	8
Losses of juveniels before autumn migration	3
Autumn Migration	
Departuer from the breeding area	17
thereof losses during migraiton	5
thereof arrival in the wintering area	11
thereof other migration route	1

2. Demography and mortality

Population size decreased from 37 to 28 individuals in 2012 (Tab.2). Reproductive success in Burghausen with eight juveniles can be considered high, but could not compensate for all losses during 2012. No hand raised birds were added to the population.

Tab.2 Population development 2012

Generation	2012					Population size post-migration
	Population size pre-migration	Natural Reproduction	Other Popul. increase	Mortality	Loss of bird	
older	5					5
2008	2			0		2
2009	5			2		3
2010	7			4		4
2011	18			8		11
2012		8	1	3	2	3
Sum	38	8	1	17	2	28

Comparing mortality rates and mortality causes 2011 and 2012 (Tab.3) shows a general decrease in loss numbers from 21 to 16. The majority of the losses in 2011 had to be indexed as 'missing', counting for all birds disappearing without a trace after leaving the wintering- or breeding grounds. We assume most of them were victims of illegal hunting. In 2012 the amount of missed birds dropped to seven.

Tab.3 Mortality reasons	2011	2012
	Illegal Hunting	2
Missed	16	7
Electrocution	1	3
Tuberculosis		2
Injury		1
Other reasons	2	2
SUM	21	16

Three of GPS/GSM Tracking device equipped birds were shot in autumn 2012. One could survive due to intensive veterinary care in Livorno. This resembles a loss of 9% of the tagged migratory population. Grace to the first attempt of escorted migration, these losses can be considered as moderate. Remarkably, quite some birds died by electrocution on old power lines in Bavaria. The cases are well documented and reported to local authorities.

For the first time, avian tuberculosis has been detected in our colony. Two juveniles, who stayed during summer in the Laguna di Orbetello, died by this infectious disease. A third bird, found in the surrounding of the wintering area is likely to be deceased from TBC illness. Screening the population for TBC was found to be negative. We assume that the disease is now cured. The origin of the TBC in our

population is not known, single infection events in a wild population occur naturally. To avoid the spread of the disease, birds were released from the aviary at beginning of December (before official end of the hunting season). We'd like to thank Alexandra Scope (Vet.med Wien), Jean Meyer (Tierarztpraxis Villach) and Renato Ceccherelli (CRUMA/LIPU Veterinary Centre Livorno) for their professional veterinary care.

3. GPS/GSM remote real-time monitoring

This year for the first time all birds have been equipped with battery powered GPS/GSM tracking devices (mcm-control). The devices are customized to our needs and need to be recharged after sending approx. 180 Positions. During spring and autumnal migration a task force caught birds carrying trackers with low remaining battery capacity and recharged them (or replaced non working devices if possible). Birds disappearing and carrying non-working devices had to be classified as 'missed' (a category inexistent per se when Trackers work properly).

Remote real-time monitoring allows guarding the birds while they are on their way, including repeated recapturing for Tracker maintenance or saving injured individuals. It also allows 'action on demand', if birds become victims of illegal hunting. In 2013 we plan to further optimize reliability of the monitoring devices to reduce the amount of missing birds.

4. Escorted migration

In 2012 for the first time, migrating birds were accompanied by a special task force. This task force consisted of several teams, two persons each, equipped with Tracking maintenance tools, a mobile aviary, boxes for animal transport, bird food and italian info folders. The teams followed the birds by car. Their job was to guard the birds on stop-over sites and inform the local people and authorities, especially hunters, about the birds and the project.

If birds crossed a latitudinal threshold of 45.5°N during autumnal migration, they were captured and translocated to the save wintering grounds. This minimizes the risk of illegal hunting but allowing the birds to behave according to their physiological regime programmed to migrate. From this treatment we excluded birds, who led naive juveniles in their first year. Escorting and recapturing are a quite intense work, but the resulting small number of losses (9%) makes the effort worth.

For the first time, a task force member was able to be on site just 30 minutes after two birds were shot illegally. The victims were our famous female 'Goja' and one wild offspring of the colony, hatched in Burghausen and following Goja to the wintering grounds. Although both birds died soon after arrival, we were able to identify the hunter and charge him with legal action. At the moment a lawsuit is prepared in collaboration with LIPU (BirdLife Italy) and WWF Italy. Together we try to achieve a persuasive precedent, which will raise awareness for the problem of illegal hunting. We hope to reduce hunting pressure in the long term not only from the bald ibis, also from other migratory bird species crossing Italy.



5. Migratory behaviour of juvenile birds

The founder generation had been raised by human foster parents and been guided by microlight aircrafts to suitable wintering grounds. Meanwhile those individuals reproduce and migrate autonomously. By following experienced fellows, juveniles learn the locational information of the wintering area. In autumn 2011 the first wild offspring 'Jazu' arrived at Laguna di Orbetello by following his experienced fellow 'Goja'. In summer 2012 'Jazu' returned autonomously back to the breeding grounds in Burghausen. 'Jazu' guided a wild juvenile to the wintering grounds in autumn 2012, 'Goja' was shot together with another wild juvenile near Livorno. Today we find three Ibises in our colony raised and led to the wintering area by experienced conspecifics, which show adequate migratory behaviour without human influences.

Another wild bird called 'Shorty' followed the experienced male 'Domino' (who crossed the alpine mountain range via Switzerland). For some unknown reason Shorty became separated from his fellow and since stayed in Switzerland. Though the bird had to face harsh conditions such as a closed snow cover, it managed to survive (see picture).

Shorty's behaviour indicates a wide range of flexibility concerning the bird's choice of habitats. Nevertheless we try to catch the bird and let it re-join with the group to learn an adequate migratory route. Permitting the bird to roam freely until next summer, bears the risk of distracting other inexperienced birds apart from the main corridor to Switzerland.



Juveniles disjoining flocks occur in the Middle East commonly. During autumnal migration, many juveniles lose contact to experienced fellows and hardly find the way back to the breeding area. Obviously the chances to survive are in central Europe much higher than in the Middle East.

6. International conservation efforts – founding of an international working group

In November 2012 the international AEWA working group was launched in Jazan/Saudi Arabia (www.unep-aewa.org). The organisation aims to protect migratory bird species. One major goal of the AEWA is to reintroduce the northern bald ibis in Europe within the next ten years. This shall be done by establishing sedentary (like in Spain) and the migratory colonies. Surprisingly the group came out with the ambitious aim to extend reintroduction efforts to Algeria, where until now no basis for reintroduction have been created so far.



7. Projects and perspectives in Morocco and the Middle East

We were not able to detect any changes for the better concerning the bald ibis' situation neither in Morocco nor the Middle East. We expect some four birds to be still alive in the Middle East. Unfortunately the implementation of conservation efforts seems to be hardly possible (especially in the Syrian breeding area). Nevertheless the AEWA members agreed on further supplementation attempts together with actions against illegal hunting and electrocution.

In spring 2012 Regina Pfistermüller and Johannes Fritz visited the Moroccan sedentary colony to renew the cooperation and to talk about the start of a feasibility study concerning reintroducing bald ibises in this region. Unfortunately, the feasibility study did not come to happen. Incomprehensibly, conservation efforts are desired to focus on Algeria instead. There we have to start from the scratch.

8. Applying for LIFE+ funding

In September 2012 we applied for LIFE+ funding (LIFE+ Biodiversity). The Förderverein Waldrappteam acts as the coordinating beneficiary. We will be supported by eight partners in Germany, Austria and Italy. During the project period (2014-2019) we aim to re-establish three migratory colonies in Burghausen, Salzburg and -potentially- Passau, which share one common wintering area in the southern Tuscany. By 2019 the population should exceed 119 individuals. This is estimated to be the minimum viable population size for self-sustaining colonies.

9. Basic research

Flight formation

GPS tracking data provides insights into the spatiotemporal patterns and the formation of a new migratory tradition of migrating bald ibises. Moreover it allows the escort of migratory birds and implementation of measures against illegal hunting (see above). Currently data is analysed in a master thesis.

In-flight energy expenditure and metabolic processes in a free-ranging migratory bird

FWF Project (P20633); (Bairlein F, Fritz J, Scope A, Schwendenwein I, Stanclova G, van Dijk G, Meijer HAJ, Verhulst S, Dittami J); currently prepared to submit to nature.com

Abstract: Migratory birds can perform extraordinarily long flights during migration but the physiological processes that make these feats possible have only recently come into focus. It has generally been assumed that flight has high energetic and physiological costs and that the ability to perform long-distance flights was contingent on the evolution of extraordinary physical adaptations to undertake the journey. Unfortunately, there have been few integrative studies that document interactions among physiological processes during flight to support or disprove this assumption. Methodological constraints have been the stumbling block. The present study is a first in this sense. It was an analysis of physiological changes in individual Northern Bald Ibis (*Geronticus eremite*) in relation to flight duration. By combining data sources from a point-of-care device, doubly labeled water methods and standard laboratory chemical analyses, we were able to document the effects of flight on energy expenditure, metabolite use, blood gases, electrolytes and potential muscle damage. The results revealed an optimization of basic physiological responses to exercise that balanced aerobic and anaerobic fat, protein and carbohydrate metabolism to make long-distance flight economic and physiologically tolerable. The responses to flight described are costs that may limit its

duration but also reduce energetic output. They provide an additional in-flight benefit allowing birds to vary power output quickly and effectively from cruising to maneuvering. These adaptations share characteristics with the physiological processes that have facilitated other athletic feats in nature like salmon migration and might be seen as contingent to the evolution of long distance migration in birds.

Maximising savings or minimising costs? Co-operative aerodynamics and 'V' formation flight re-examined

Data sampling 2011 in collaboration with the Royal Veterinary College London; (Portugal SJ, Usherwood JR, Hubel TY, Roskilly K, Hailes S, Fritz J, Wilson AM), currently prepared to submit to nature.com Abstract (Conference Talk Portugal SJ) The characteristic 'V' formation flight of birds has fascinated scientists for centuries. One of the main theories that has persisted to explain this distinctive 'V' formation is that birds are attempting to conserve energy by taking advantage of the upwash vortex fields created by the wings of the birds in front. Aerodynamic theory has subsequently been used to construct predictions of where birds should optimally position themselves in relation to other members within the 'V', to maximise these energy savings. These predictions, however, are based on a fixed-wing principle, very much unlike the scenario of a flapping bird/wing. Previous investigations into 'V' formation flocking have been largely restricted to theory or the use of photography to examine flock-member positioning. Recent technological advances have now made it possible to explore these factors for extended periods of time, in free-flying birds. Using high-frequency sampling GPS and accelerometer units, we will present data from two migratory flights of the critically endangered Waldrapp Ibis. This opportunity was made possible by human-led migrations taking place as part of a reintroduction scheme, whereby imprinted young ibis are taught to follow a microlight. These data allow us to explore aspects of 'V' formation flocking relating to distances and angles between individuals, and the interactions these have with flap-frequency. Moreover, it allows comparisons to be made between 'V' formation flight and the recent finding that flying in a cluster flock actually comes at a cost in pigeons, to ascertain if 'V' formation flight is an energy saving mechanism.

10. Public relation

Although we don't evaluate project related media content professionally via clipping, we counted a total of 92 articles in 2012. Therefore we expect the real numbers to be significantly higher (especially in Italy). Moreover we can point at 24 broadcasting events in TV (16) and Radio (8) with a total duration of 124 minutes.

Media report 2012

