From the Konrad Lorenz Forschungsstelle, Grünau

The Grünau Project: Establishing a Semi-wild Colony of Waldrapp Ibis

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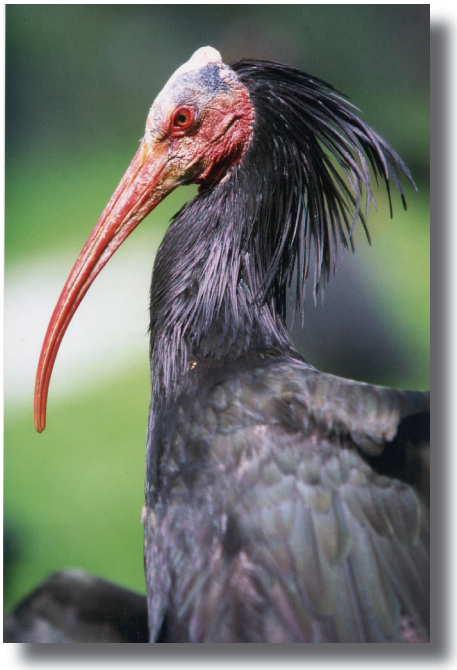

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During the Middle ages, the Waldrapp was always closely associated with human settlements and cattle grazing in Europe. Colonies were situated in Graz, Salzburg, Passau and other towns. These sites offered suitable cliffs or buildings for nesting and had a ring of open, overgrazed, short-vegetation area around, upon which the Waldrapp could forage. The colonies in Europe disappeared 350-400 years ago, and the remaining populations declined rapidly towards the end of the 20th century, leaving a few threatened colonies in Morocco, Turkey and Syria. In contrast to the critical situation in the wild, the *ex situ* population worldwide is doing well (see C. Böhm this issue). As all previous release attempts had failed one of the priorities for Waldrapp conservation was an experimental programme to establish the procedures for reintroduction of Waldrapp colonies in suitable areas.

The Grünau Project

At the Konrad Lorenz Forschungsstelle (KLF) in Grünau/Austria we began to establish a semi-tame, free-flying colony of Waldrapp ibis in 1997, opting for a socially involved hand-rearing method. This was a continuation of a pilot project that had been begun by the Innsbruck Alpenzoo some years before. We chose this method as hand rearing staff are able to influence birds after fledging and, thereby, can actively support the formation of adaptive behaviours, crucial in animal groups starting from scratch.

A number of fledglings were hand-reared every spring, and by the year 2000 there were 24 tame birds. No more chicks have been hand-reared since. The first reproductive attempts of the young birds occurred in 2001, with the first three chicks fledged in 2002, one in 2003 and nine in 2004. Group size reached 32 in July 2004 (18 still hand-reared and 14 parent reared).

From fall to early spring the birds move within a limited radius of approximately 1 km around their aviary and spend much of the day on the roof or in front of the KLF. Upon melting of the snow cover in the surrounding valleys, they start flying northwards for first foraging excursions, often far beyond the village of Grünau. When the grass on the meadows is first cut at the mid to end of May the birds are self-sufficient through natural foraging, and the additional food provisioning is stopped. The birds are taken into the aviary during fall migration time (end of August to end of October) and are fully provisioned with food from the fall into spring. Research has been ongoing throughout the study.

Waldrapp ibises foraging near the village of Grünau. © Kurt Kotrschal

From the beginning the birds were generally in good physical condition. Annual vet checks revealed moderate parasite loads, and we routinely applied antihelminthic medication annually till 2002. This was stopped because of the birds' excellent body condition. Skin problems, apparent in some zoos, have not been observed. Adults weigh between 1300g and 1600g and fledglings between 1100g and 1300g. An additional indication of the good condition of the colony is that, in 2004, they were among the earliest-breeding Waldrapp ibises in Europe and all of the 20 eggs produced hatched.

Starting a free-living population from scratch by hand-rearing is tedious, expensive and requires long-term commitment.

From 1997 to 2004, the Grünau Project cost approximately 250, 000 EURO. Typically, a budget for running the sedentary Grünau population after hand-rearing is approximately 15 000 EURO per year, rising to 25 000 EURO in years when hand-rearing occurred.

The colony sites

The colony was established in a valley surrounded by hills and mountains, up to 1000 m high and open towards the north. This topography channels the local movements of the birds, which left in northerly directions on long-distance flights during the fall of 1997 and 1998. They also use the meadows 6 km north of their colony site and have never been seen foraging farther than 3 km south of the KLF.

The climate in the valley is cold. However, despite temperatures below -30°C during clear winter nights, the birds have never exhibited problems. They also have a specially designed night roost (see below) and the valley has a record number of sunny days during winter. The main criterion for choosing the KLF as a colony site was the close presence of manpower and the additional infrastructure of the local game park. Artificial nest sites were provided, but the area has natural limestone cliffs, potentially suitable for nesting.

As Waldrapps are cliff-dwellers we adapted the attic of one of the buildings at the research station accordingly for hand-rearing, for fledging the birds and as a night roost for the free-flying birds. The entrance could be closed during the night if cold and to keep potential predators out. Nestlings were raised on a shelf opposite to the entrance so that they could see their surrounding. Facing north, the roof of the attic contained another window through which birds could be released into an aviary of ca. 100 m^2 / 5 m high during times when free flight was restricted.

With increasing colony size, the original site became too small and its entrance was too close to the ground. Birds were increasingly reluctant to return in the evening. Hence, in a combined effort with the local Cumberland Game Park Grünau, we built a new aviary and colony site approximately 200 m south of the original site. The new structure consists of a south-exposed building on top of a hill, 15 m long, 4 m wide and 5 m high, with a tower, 8 m high, equipped with sliding doors where birds enter and exit. From the building, the aviary runs ca. 30 m downhill, is 15 m long and 8 m at its highest point, a total area of 450 m^2. The building can be heated to above 0°C in winter and shelves are used by the birds as a night roost and for nesting. The entire front part and the interior of the tower is a single, continuous space accessible to the birds. The netting on top of the aviary is attached to the building at approx. 3 m altitude in such a way that the birds remain inside the aviary when they leave the building under the net, but can leave the aviary through three different sliding doors above the net. From the very beginning, birds coped well with this construction. Not a single bird was lost by flying against structures. From the very beginning, the birds coped well with this design and not a single bird has been lost by flying against structures. The birds never tried to return to their old colony site.

Experience gained

Our project already contributed know-how towards re-introduction including:

- A socially involved hand-rearing methodology works as a suitable release method to start a new colony from scratch.
- Heavy losses occurred initially due to dispersal and predation. From the third year on birds were locked into the aviary from August to September/October, and mortality decreased to less than 5% of the population per year.
- Even hand-reared individuals tend to disperse 1-3 months after fledging. The Grünau Waldrapps flew N or NE to up to 1600 km. In all cases, such long-distance flyers returned on their own, which suggests that their orientation mechanisms are intact, but migration routes may be passed on as a tradition, such as in geese or cranes.
- Dispersers were in good physical condition even after four weeks without supplemental feeding.
- Birds now usually stay within 10 km of their night roost. During spring and summer they forage 6 km south of their aviary on meadows where the grass has been recently cut.
- With the introduction of birds into a new, highly functional aviary in the Cumberland Park, which serves as a night roost and nest site, birds usually do not stay outside overnight, and therefore are safe against predation, notably by eagle owls.
- Fledglings joined their parents in their foraging excursions, assuming group habits and traditions within a few weeks after fledging. At the colony site they became nearly as approachable as the hand-reared individuals.

Human-imprinted Waldrapp and its foster parent. © Kurt Kotrschal

- The most critical factor for the acceptance of a foraging area is vegetation height (less than 15 cm). To collect 250-300 g of prey (mainly earthworms and beetle larvae), individuals have to forage 6-8 hours. Birds were even able to continue their foraging during periods of heavy rains (often up to 3 days in a row).
- Waldrapp ibises prefer soft substrates for foraging (they avoid gravel) and use simple social learning mechanisms and ‚scrounging' to profit from the competence of flock mates.
- Waldrapp ibises associate in social pairs, at the colony (night roost), but less during foraging, when birds show ‚producer-scrounger' dyads, with the ‚producer' being mainly a female, the ‚scrounger' mainly a male. Within the pair males and females take a similar share of incubation and feeding of the young. Females and males excrete similar amounts of testosterone metabolites during the reproductive phase.

Implications for potential re-introduction in Europe

Our experience suggests that Central and Southern Europe could be a prime area for re-introduction, because:

- The Waldrapp is adapted for the ecology of area around the Mediterranean, including breeding areas North of the Alps.
- The last remaining habitats of the species in Morocco and the Near East are already ecologically sub-optimal and hence marginal. Potentially, increasing desertification will increasingly threaten them.
- Global warming, particularly in the Alpine area (which warms twice as fast as world average) favours re-introduction.
- In Central Europe the species always lived, and would still be able to live, in close relationship with humans. The birds cope well with the feeding conditions in agricultural areas, particularly cattle farming.
- Little, if any, conflict with human interests is to be expected, because the Waldrapp does not interfere with the interests of hunters or recreational fishing, and should not develop into an agricultural pest.
- Central Europe has a well-educated, benevolent human population which can be reached and informed via the media.

Sunbathing is a frequently seen element of the Waldrapp's comfort behaviour.
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Conclusions and future plans

The Grünau project has demonstrated that it is possible to establish and keep a free flying, reproducing and self-sufficient (during summer) colony of Waldrapp ibises from zoo offspring in the Alpine area. This colony is a model for many kinds of biological research, producing the necessary know-how for the re-introduction projects, which will be required to save this critically endangeres species. To fully re-introduce this bird north of the Alps, a proper migratory tradition needs to be established (see J. Fritz this issue). Finally, the Grünau Project may provide a demanding, but attractive alternative for the keeping of Waldrapp ibises in zoos.

In the forthcoming years, basic and applied research with the free-flying birds will be continued. Each year parent-reared young will integrate into our flock, gradually shifting the balance from hand-reared to parent-reared. Starting in the fall of 2004, when the flock size will be above 30 individuals, we plan not to lock the birds into the aviary during migration. We predict that the adults and sub-adults will stay in the valley, but there may be a risk of losing some young due to dispersal. Some management, such as providing food will always remain necessary, as food availability is insufficient for natural foraging for 6-8 months per year. For 2005 we may consider splitting off a segment of our flock (adult breeders, adolescents, juveniles) and use these birds as a nucleus for another non-migratory flock at another suitable site.

An extended version of this report including acknowledgements, references and a list of publications will be provided upon request (e-mail to klf.gruenau@telecom.at).