

DEVELOP AND PILOT A RESTOCKING STRATEGY FOR EGYPTIAN VULTURES ON THE BALKANS

Method applied for delayed release in Bulgaria 2018



PHOTO: Volen Arkumarev/BSPB

UNDER ACTION C3

LIFE+ PROJECT „EGYPTIAN VULTURE NEW LIFE

LIFE16 NAT/BG/000874

CONTENTS

Objectives.....	3
Hypothesis and criteria for successful experiment	3
Origin of the released Egyptian Vultures	4
Management of Egyptian Vulture chicks in captivity	4
Release site	4
Adaptation aviary.....	6
Adaptation period.....	8
Release technique.....	10
Post-release monitoring and actions.....	11
Acknowledgements.....	12
References	12

Objectives

Action C3 of the project LIFE16 NAT/BG/000874 aims to develop and pilot a restocking program for the Egyptian Vulture on the Balkans. More specifically, its primary objective is to test three different methods in Bulgaria (holding the most numerous Egyptian Vulture population in the Balkans) in order to establish the most efficient releasing techniques for the species in the region, more precisely– delayed release, fostering and hacking of captive-bred individuals. We will compare the results in terms of survival of the released birds during the post-release period and the first south migration. We aim to release at least 10 individuals per release technique in the next 5 years of the project implementation. All three release methods will be implemented in the same area which will allow direct comparison of the results and no spatial variance. The results from this action will be used to prioritize the future conservation work, to build and implement a successful restocking program to reinforce and boost the recovery of the Egyptian Vulture population on the Balkans.

Hypothesis and criteria for successful experiment

The delayed release technique has been applied for years in Israel where captive-born Egyptian Vultures are released in their 2nd or 3rd calendar year and show high survival rates (Israel NPA unpubl. data; Ohad Hatzofe pers. comm.). In 2017 the method was applied in Italy as a first attempt in Europe. Four captive-bred Egyptian Vultures were released but only one completed the first autumn migration ([VCF 2017](#); Guido Ceccolini pers. comm.).

This method foresees releases of captive-bred Egyptian Vultures in spring when they are in their 2nd or 3rd calendar year. The first year is the most critical period for the wild Egyptian Vultures when they experience the highest mortality rates especially during the first south migration (Oppel et al. 2015). We hypothesize that when the birds are released in the spring of their 2nd or 3rd c.y. they would have enough time before the fall migration to gain experience, improve their physical fitness, socialize with other non-breeding Egyptian Vultures, gain knowledge for important feeding sites, communal roost sites, etc. This might increase their survival probability especially during the first south migration. It is recommended to implement this technique with a group of 3-5 birds at a time (VCF 2016). Egyptian vultures are very social especially during the non-breeding stages of their life and the social learning and social bonds between the individuals are of great importance throughout the implementation of this and other release techniques.

The delayed release method will be considered successful if both below listed assumptions are fulfilled:

- At least 80% of the released individuals adapt successfully to the wild and survive the first month after the release.
- At least 50% of the released individuals survive the first south migration.

NB 1: The percentage of the released individuals which migrate over the land, following the main migratory way of the species and avoiding long distance sea crossings between Europe and Africa, will be taken into account when comparing the results and efficiency between the tested release techniques.

NB 2: At this initial stage of the experiment, we would not consider that it failed if released birds become victims of human-induced factors along the flyway or in the wintering grounds. Human induced mortality will be accounted in the final analysis of this study.

Origin of the released Egyptian Vultures

All captive-bred Egyptian Vultures were provided from the EEP (Endangered Species Programme, under EAZA). Three of the vultures were raised in Prague Zoo and one in the Jerez Zoo, Spain. Two of the birds provided by Prague Zoo originated from a cross between individuals from the Balkan and Central Asian population (USSR/Kazakhstan x Bulgaria), and one bird – from a pair carrying the genes of the Central Asian population (USSR x Kazakhstan). The bird provided by the Jerez Zoo originated from the Iberian population (Spain).

Management of Egyptian Vulture chicks in captivity

Three of the birds were kept in large aviary in Prague Zoo, together with other immature and subadult conspecifics, without being exposed to human presence. The fourth bird was kept in individual cage and exposed to human presence in Jerez Zoo.

Release site

The selection of a suitable release site might be crucial for the overall success of this release technique. As a first release site in Bulgaria was chosen the vulture feeding station near

Potochnitsa village in Eastern Rhodopes. The release site was considered suitable as it meets the following conditions:

Safety of the area. The release site was located in a vulture safe area where no serious threats for vultures exist. It was located in the core area of the Egyptian Vulture breeding population on the Balkans. The area holds increasing and healthy population of Griffon Vultures and is regularly visited by foraging Cinereous Vultures. In the vicinity of the release site (5km radius) there are no poisoning or poaching events for at least 5 years, there are no windmills and the majority of the powerlines are safe or have been insulated and thus don't pose a risk for the vultures.

Food availability. The release site was located near a predictable food source - vulture feeding station. The adaptation aviary faces towards the feeding station which allows the captive-bred Egyptian Vultures to observe the behavior of the other scavengers and their wild conspecifics. Supplementary food was regularly provided at the vulture feeding station during the pre-release period and in the post-release period as well.

Predator control. The feeding station was electric fenced in order to avoid the presence and easy access of terrestrial predators (stray dogs, foxes, jackals, wolves, martens etc.).

Conspecifics presence. The release site was in area with regular presence of non-breeding Egyptian Vultures and breeding pairs. The adaptation aviary was located about 1.5km away from an active nest of a wild Egyptian Vulture pair in order to avoid unwanted aggressive interactions with the young birds after the release. However, the feeding station was regularly visited by adult wild Egyptian Vultures and non-breeding individuals. The permanent presence of other non-breeding Egyptian Vultures in the area is important for the socialization of the captive-bred vultures after the release.

Other species' presence. The release site was located outside the breeding territories of other territorial raptors in order to avoid aggressive interactions with the captive-bred Egyptian Vultures. Such species are Golden eagle (*Aquila chrysaetos*), Eagle owl (*Bubo bubo*), Long-legged Buzzard (*Buteo rufinus*) and Bonelli's eagle (*Aquila fasciata*). In addition, the feeding station was regularly visited by only low numbers of Corvids, e.g. up to 5 Ravens (*Corvus corax*) and 12 Crows (*Corvus cornix*). Ravens often congregate in big numbers near vulture feeding stations and compete with the vultures for food and roosting sites showing prominent aggressive behavior. Because only a few Ravens were present at the feeding station they were outcompeted by the Egyptian Vultures and there was no serious risk for the released birds. Griffon and Cinereous vultures were regularly present at the feeding station and in the vicinity of the release site. During the post-release period the captive-bred Egyptian Vultures has the

opportunity to interact with the other scavengers at the feeding station and find their place in the intra-guild hierarchy.

Roosting substrate: The release site was located in area with high inaccessible cliffs which to be used as a safe roosting site by the released birds. The availability of dead trees was an advantage as well because very often Egyptian vultures roost on such trees. All pylons and powerlines in the vicinity of the release site were of safe types or were insulated. Egyptian Vultures can use pylons for roosting and the presence of dangerous types of pylons near the release site might be a serious threat for the birds.

Adaptation aviary

Location. The adaptation aviary was located inside the electric fenced feeding station. It was installed about 100 m away from the area where the supplementary food for the wild vultures is placed. This allowed direct visual contact between the birds in the aviary and the feeding place without disturbing the wild vultures. In addition, the aviary was installed under the top of the hill in order to avoid the strongest winds and harsh weather conditions. The area around the aviary was open without bushes or dense forest which might make the vultures feel unsafe.

Exposition. The aviary was facing east, south and west. The northern exposition, from where harsher weather conditions usually occur, was covered.

Size and structure of the aviary. The dimensions of the aviary constructed for adaptation of 4 Egyptian Vultures were 6m/3m/3m. However, we consider that this is the minimum size and if possible width and the length of the aviary could be higher in order to provide more space for the vultures to fly from one perch to another. This will strengthen their wings and prepare them for their first flight after the release. The main construction was built of metal. Anchors and strong wire ropes were used for stretching the construction and fixing it to solid rock. This made the construction very stable even under harsh weather conditions such as strong winds or heavy rains, heavy snowfalls etc. Wire mesh with 25x25 mm openings was used for covering the aviary. The floor of the aviary remained uncovered to prevent vulture's legs from injuries while walking and feeding. The wire mesh on the sides was extended with additional 20 cm on the ground and covered by solid stones in order to prevent predators from entering in the aviary. One of the short sides of the aviary (the one facing north) was covered by wooden panels instead of wire mesh. This was the side from where the strongest and more frequent winds were expected. This side of the aviary should protect the birds from the harsh weather conditions. **All crevices or small holes between the base of the aviary and the solid ground were**

well covered either by strong wire net or by stones in order to prevent the entry of terrestrial carnivores such as foxes and stone martens. (Fig1).

Wooden perches were mounted along the sides of the aviary. The perches were mounted at about 1.8 m height above the ground and about 1.2 m from the top of the aviary. They were about 20 cm wide and were placed about 20 cm away from the net in order to provide enough space between the vultures and the net, thus avoiding any unwanted damages on their flight feathers. Wooden platform was mounted on one of the aviary's corners. The platform was mounted about 10 cm higher than the perches because vultures feel safer when they roost on the highest possible place. This made the platform attractive and regularly used as a roosting site. A waterproof roof covered the platform and was providing shade for the birds. The platform was about 60 cm wide. Vultures were using it for roosting and as shelter during the hottest part of the days or when it rained.

The entrance was placed in the middle of the long side of the aviary. It was wide about 1.5 m and high about 2 m. The highest point of the entrance was higher than the perches. This dimensions and position of the entrance allowed the released birds to leave the aviary by flying out straight from the perches. After inserting the vultures into the aviary, the entrance was locked with a padlock.

Food and water delivery port. The food and water delivery door was initially built in on the same side as the entrance. It was placed at the corner near the bottom of the aviary on the opposite site of the roosting platform. However, one week after the insertion of the birds it was decided to build in another food delivery port on the covered side of the aviary in order to avoid direct visual contact between the keeper and the vultures. For this purpose, tube with 25 cm diameter was installed from the covered side of the aviary. Secure locking mechanism was used to prevent predator attacks. Since then food was always delivered through the tube with only a few exceptions when whole livestock carcasses or their parts which were too big to pass through the tube, were used to feed the vultures. However, water was provided through the first delivery port once every 5-6 days until the release.

Video surveillance. Video camera with wide-angle lens was installed in the corner of the aviary. It allowed to closely monitor the behavior of the vultures during the adaptation period. The camera had good visibility towards the place where the food is delivered in order to closely monitor the food intakes by the different individuals in the aviary.



Fig. 1. Adaptation aviary for Egyptian Vultures with size 6/3/3m.

Adaptation period

Insertion in the adaptation aviary. Three captive-bred Egyptian vultures were inserted in the adaptation aviary on 28th March, soon after the arrival of the first breeding pairs which visit the feeding station. For the Balkans this period is between the end of March and the first week of April. This allowed the young birds to observe their wild conspecifics since their first day in the adaptation aviary. The fourth vulture was inserted in the aviary two weeks later - on 13th April. All birds were ringed with different colored plastic rings to ease the identification during the adaptation period. The ring colors were easily recognizable and visible from the observation point and on the webcam.

Feeding. Everyday care and observations from a distance were conducted during the adaptation period. The vultures were fed 6 days a week with about 200-300 g per day per individual. However, in cases when whole carcass was provided or the food in the aviary was not completely consumed and is still fresh the frequency of the feedings was decreased until most of the food was consumed. During the first week of the adaptation period food and water were provided through the door on the bottom of the aviary. After that tube was inserted on

the covered side of the aviary and food was delivered through the tube in order to avoid the direct visual contact between the vultures and the keeper. **It is important to ensure that vultures won't link the human presence with the food deliveries!** Water was kept clean and permanently available. It was provided in a shallow pot which was cleaned and refilled at least once per week. The food provided was as diverse as possible. As the birds have used to some specific type of food (rats, hares, chickens) as a main food source provided during the captivity period, the same food items were used in the first 4 days of the adaptation. After that period the quantity of these food items was gradually decreased and at the same time the quantity of other food items was increased. After the first week half of the food amount was from the one they were used to and the other half was presented by new food items. After the end of the first week start providing mainly new food items and rarely from the specific ones. However, we strongly recommend to provide diverse food items to the vultures even during the captivity period which will make the adaptation period, which is much shorter, easier and less stressful for the birds. The Egyptian Vulture is an opportunistic scavenger with very wide diet spectrum which includes carcasses of bigger animals, eggs, invertebrates, slow-moving small animals which are captured alive, faeces etc. (Negro et al. 2002, Hidalgo et al. 2005, Dobrev et al. 2015). Training the captive-bred Egyptian Vultures to recognize different food items might be crucial for their survival and successful adaptation into the wild. Thus, the food provided during the adaptation period was as diverse as possible including whole carcasses (e.g. sheep, goats, lambs) or parts of them, pieces of red meat or skin and meat from the carcasses, small animals (e.g. lizards, snakes, hares, tortoises, hedgehogs, birds), bones with some meat on them, offal. When providing the food, the different food items were scattered near the food delivery port so that the birds could distinguish the different items and pick according to their interest and preferences. When a new food item was provided for the first time it was prepared to be as attractive as possible. **Example:** When a hedgehog was provided for a first time, a cut along the whole body was made which made it more attractive for the birds and increased the chances to be consumed. Next time a hedgehog was delivered it was already a known food item and was provided as whole carcass so the vultures would have to tear it apart by themselves. We found that suitable approach for finding and providing diverse food items is collecting road kills from the area around the release site. Many small animal species become victims of the traffic every day and especially at night. Some of them were collected and used, e.g. snakes, hedgehogs, small birds, tortoises, lizards etc. **Caution: When road kills were collected, predator species (e.g. dogs, martens, cats, foxes, badgers etc.) and mice were avoided as some of them might be poisoned at first place.** When bigger carcasses or their parts such as sheep or calf's legs were provided they were opened and cut beforehand. Their skin is too thick and the young Egyptian Vultures might not be able to tear it. The head of hares and smaller animals was opened as well in order to guarantee easy access to the brain which is very nutritious.

Monitoring. The behavior and the interactions between the vultures in the aviary were permanently monitored and recorded. Direct observations were made from a distant observation point (about 400m) in order to avoid any disturbance to the wild and captive-bred Egyptian Vultures which might alter their normal behavior. Observations and recordings with a camera mounted in the aviary were made as well. An experienced observer was recording how often and which individuals are feeding, which food items are consumed, any aggressive behavior between the birds or social exclusions.

Tagging. All Egyptian Vultures were tagged with GSM/GPS transmitters prior to release. They were tagged on 13th May or 3 days before the release. If the birds are tagged earlier they might start pecking the transmitters as they are bored in the aviary and doesn't have much other activities. However, the transmitters were mounted a few days before the release because the birds need some time to get used wearing the devices. During the tagging the birds were thoroughly examined by vets and treated against ecto- and endoparasites because this was their last handling prior to release. The transmitters will allow to closely follow the behavior of the birds after the release and their survival which aims to successfully evaluate the success of this release technique. We used 30g solar powered Ornitela GSM/GPS transmitters. The tags were set to provide high frequency of GPS points (GPS locations every 5 min) and high frequency of data deliveries (30min). This would allow the field team to immediately react if the birds experience some problems after the release. The transmitters were mounted as backpacks with Teflon harness. All vultures were ringed with metal rings. The color rings used during the adaptation period were removed as in the wintering grounds in central Africa some birds are killed because of the color rings. Color rings are much more visible than the transmitter or the metal ring and might attract unwanted attention in the wintering grounds.

Release technique

Release period. The adaptation period lasted 50 days for the three Egyptian Vultures which arrived first and 34 days for the last one. All vultures were released on 16th May. The release took place after the arrival of the first non-breeding Egyptian Vultures in order to allow the inclusion of the captive-bred birds into the social structure of the wild conspecifics near the feeding station. In the Balkans the non-breeding birds start arriving in early May.

Feedings. One week prior to release the quantity and quality of the delivered food was increased. Food items with high nutritious value such as 1-2 days old chickens were provided to compensate any weight losses experienced during the adaptation period. In the day of the release supplementary food was provided at the feeding station. About 300 kg of offal was provided and was scattered on the feeding station. The aim was to ensure that the released vultures will have access to food even if Griffon Vultures monopolize the food and outcompete

the other vultures. Food was delivered on the roof of the adaptation aviary as well in case the vultures return to feed there after the release.

Release. The vultures were released in the early afternoon on 16th May by opening the main entrance of the adaptation aviary. The field team opened the aviary and left the place as fast as possible with little disturbance to the birds. All further observations were held from a distance of about 400 m in order to avoid disturbance. The vultures should leave the aviary whenever they are ready. It may take a few hours before they realize that the entrance is open and leave the aviary. The first vulture left the aviary about 15 mins after the entrance was open. Last was the vulture which arrived latest, it left the aviary on the next morning.

Post-release monitoring and actions

Monitoring. After the release the captive-bred Egyptian Vultures were closely monitored by experienced field team of 3 people. The most critical period was expected to be the first night when the birds might not roost on a high safe place. All released birds spent the first night after the release on small rock on the hills around the feeding station. They didn't choose the highest and most inaccessible cliffs as it was expected. However, none of them was roosting on the ground or other place where its life was at risk from predation. The monitoring of the released birds continued 10 days until they started regularly feeding on the feeding station and roosting on safe, inaccessible for terrestrial mammals, places. After that period the released birds were closely monitored by the GPS transmitters and visual observation about once per week. We worked in close collaboration and exchanged information with other NGOs which maintain vulture feeding station in Bulgaria and in the Greek part of the Eastern Rhodopes in order to ensure that if the released vultures move to neighboring areas they would find safe food in good quantity.

Feeding. Supplementary food was permanently present at the feeding station after the release and until the start of the fall migration. This approach aimed to attach the birds to a safe food source and in area visited by other non-breeding Egyptian Vultures. Whole carcasses and offal were regularly provided. Food items were scattered in order to ensure easy access to food for the released vultures even when the Griffon Vultures are feeding as well. The released birds have never fed on the food provided on the roof of the adaptation aviary and haven't return to roost there either. Therefore, the food deliveries on the roof of the aviary were stopped one week after the release.

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