

ACTIONS FOR RESTORATION OF GRIFFON VULTURE (*GYPVS FULVVS*) IN CENTRAL BALKAN, BULGARIA

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Abstract: The current work presents the methodology and results following five years of attempts for the re-introduction of Griffon Vulture (*Gyps fulvus*) in the Central Balkan Mountains of Bulgaria, practically started in 2010 within the Vultures Return in Bulgaria LIFE08 NAT/BG/278 Project.

Between January 2010 - June 2015 a total of 59 Griffon Vultures were released from the Central Balkan adaptation aviary, found at the foot of the Central Balkan National Park in the territory of the Manolovo / Tuzha Villages (UTM LH32).

At June 2015 there is a fixed group of some 7-9 Griffon Vultures constantly present in the area of release. Up to 24 Griffon Vultures have been seen at a single feeding event (10.06.2013), among them 6 wild, non-tagged ones. The feeding site is also used by Golden Eagle (*Aquila chrysaetus*), Raven (*Corvus corax*), Common Buzzard (*Buteo buteo*), Rough-legged Buzzard (*Buteo rufinus*), Magpie (*Pica pica*) and Goshawk (*Accipiter gentilis*).

INTRODUCTION

In 2003, following over 20 years of local conservation efforts, a long-term International Action Plan for the Recovery and Conservation of Vultures on the Balkan Peninsula and Adjacent Regions (BVAP) was initiated. It provides for a step-by-step recovery of the species, starting with Griffon and finishing with Bearded Vultures (Tewes et al. 2004). As part of the strategy for restoration of the Griffon Vulture along Balkan Mountain, Central Balkan was chosen as one of

the most prospective release sites. The Birds of Prey Protection Society (BPPS) and the Green Balkans NGO joined efforts for establishing an adaptation aviary, feeding site and a working team in the area. A specialized project “Recovery of the Populations of Large European Vultures in Bulgaria” LIFE08 NAT/BG/278 was therefore triggered in 2010. The project is carried out by Green Balkans - Stara Zagora NGO in partnership with the Fund for Wild Flora and Fauna (FWFF) and the Birds of Prey Protection Society (BPPS).

The overall aim of the project was restoring the populations of the three large vulture species in Bulgaria through conservation measures and increasing the institutional capacity for their conservation. The current article describes the results of Griffon Vulture releases in one of the four chosen release sites along the Balkan Mountain (Stara Planina) within the project, namely the Central Balkan National Park.

MATERIALS AND METHODS

Geographical area

Central Balkan NP is one of the largest and most valuable European protected areas. It was founded in 1991 in order to preserve forever the unique nature of Central Balkan Mountain and the traditions and livelihood related to it, in benefit of the society.

This is one of the most significant ecological corridors in Bulgaria, contributing to the genetic exchange, the free movement and natural links between species in the Carpathians and other European mountains and the southern regions of the Balkan Peninsula and Asia Minor (Danchev et al. 2007).

The Central Balkan covers the Northern and Southern slopes of the highest part of the Balkan Mountain chain from 500 to 2,376 m altitude. The base rock is silicate and limestone, with canyons, caves, precipices, waterfalls, mighty massifs and cliffs. The bigger part of the territory is covered by forests, while the high-mountain zone consists of open areas. The vegetation cover is mixed broadleaved forests of *Fagus sylvatica* L. subsp. *moesiaca*, *Carpinus betulus*, *Quercus dalechampii*, etc. (Kostadinova and Gramatikov, 2007).

Data for historical presence of the species exists in a number of scientific articles (Demerdjiev, 2007 and the citations therein). Till the late 40s of 20th century the Griffon Vultures were numerous in the region and inhabited all appropriate habitats (Danchev et al. 2007). The most recent records of breeding date back to 1941, when 60 Griffons were found poisoned on a cow carcass, near the village of Anton, located on the South-Eastern edge of the National Park. The nesting cliff inhabited by these birds has reportedly been on a nearby cliff, which currently belongs to the National Park territory. Yet other 10 Griffon vultures inhabited the “Kuru Dere” gorge (located on the South-Eastern edge of Triglav rang, photo 3) for some years before they were poisoned with strychnine

sometime in the 1960s (Danchev et al. 2007). Since then there have been isolated observations of single individuals or small passing groups but no nesting has been confirmed (Danchev et al. 2007). In 2007 a “Viability Study on the reintroduction of the Griffon Vulture (*Gyps fulvus*) in Stara planina Mountain, Bulgaria” (Danchev et al. 2007) was elaborated by the team of BPPS in accordance with the IUCN Guidelines for reintroduction (IUCN, 1998) to justify the selection of the Central Balkan area as among the most prospective for the start of a full-scale reintroduction programme.

The release methodology chosen was the successfully used for the restoration of Griffon Vulture in the France, published by Choisy and Henriquet (1992), Terrasse (2006) and Terrasse and Choisy (2007).

An adaptation aviary with the following dimensions 25*10*3 meters, was established at the foot of the Central Balkan National Park in the territory of the Manolovo / Tuzha Villages (UTM LH32) in 2009. It was centered in a fenced area of 35*25 meters that served both: 1. to prevent the access of wild predators, dogs, livestock and people to the aviary and thus avoid disturbance of vultures, and 2. as supplementary feeding site for the released birds.

A total of 69 Griffon Vultures were shipped and accommodated at the Central Balkan adaptation aviary between January 2010 - July 2015. Fifty six of those birds originate from rehabilitation centres in Spain, other 6 birds came from rehabilitation centres in France, while the rest were captive bred in several European Zoos.

In most cases Griffon Vultures were admitted at the Wildlife Rescue Centre of Green Balkans – Stara Zagora for initial examination and quarantine. Birds were all treated against internal and external parasites and weighted. Following an average of a month of quarantine, as required by the Bulgarian veterinary regulations, vultures were individually captured, re-examined, ringed, wing-tagged and disseminated among the four adaptation aviaries in the Balkan Mountains (Vrachanski Balkan, Central Balkan, Sinite kamani - Grebenets and Kotlenska planina). In several cases, when birds originated from controlled environment, such as zoos, vultures were directly accommodated at the adaptation aviaries, skipping the quarantine at the Rescue Centre.

All vultures, released in the Central Balkan area have been tagged with yellow PVC rings and matching wing tags on both wings with vertical three-alpha numeric code, starting with K. A total of 46 out of all vultures were fitted with standard metal W-size rings of the Bulgarian ornithological central, while the rest arrived with metal rings from the country of origin.

Food (meat) was provided to the birds in the aviary, but also at the feeding site, outside the cage for the released vultures, as well as to attract any passing birds through the area.

Food was provided on a regular basis (once or twice per week) upon availability of livestock carcasses in the local villages and farms, or was intentionally transported from slaughterhouses (offal).

The vultures were frequently (every 2 to 4 days) observed by binoculars and spotting scopes at the feeding site and the known roosting sites. Local people and tourist reports on seen vultures and identified tags were used, as well as photo-traps in order to record and identify the birds present at the supplementary feeding site, adjacent to the release aviary. Initially the project employed a Microsoft Office Excel spread-sheet with individual data on every bird imported within the Vultures Return in Bulgaria Project.

An interactive web-database was later developed within the Vultures Return in Bulgaria Project and tested for optimizing the storing and processing of information.

The database currently stores individual information on every bird, supplementary feeding site and observation. It is also compatible with the data sent by the GPS/GSM transmitters and it is able to visualize the points of observation of a given bird in chronological order, thus tracking its overall movements and behavior following release.

RESULTS AND DISCUSSION

A total of 59 Griffon Vultures were released from the Central Balkan adaptation aviary between January 2010 - July 2015 (see Table 1).

Table 1. Number of Griffon Vultures (*Gyps fulvus*) released in Central Balkan area

	Central Balkan
2009	0
2010	8
2011	0
2012	15
2013	10
2014	19
2015	7
Average/year	10
Total	59

A total of 4 different birds were tagged with VHF radio transmitters. One of these birds was confirmed to have been electrocuted. One additional bird was tagged with a GPS/GSM transmitter.

Most of the birds stayed in the adaptation aviaries between 7-12 months (53 %) before release. Of them 2 (6 %) were confirmed to have later died. Other 23 (39 %) of the birds were kept between 1- 3 months before release. Of them 5 (22 %) were confirmed to have later died. A single bird stayed in the adaptation aviary for less than a month.

Vultures were released generally between March – October (See Table 2, Figure 1). Two main strategies were employed, focusing on early spring and autumn releases. The idea behind the spring releases was to coincide with the improvement of the soaring flight conditions with the increase of the temperatures and to avoid release of inexperienced birds in or just prior to the winter.

The autumn releases were intended to provide sufficient time for the vultures to explore the areas and locate the best roosting and feeding sites before the start of the winter.

Table 2. Number of birds released in the various months of the year and their survival rate

	Birds released	Survived	Died	Mortality %
January				
February				
March	10	10		0
April	1		1	100
May	19		3	16
June				
July	8		3	38
August	12	12		0
September	1	1		0
October	8		2	25
November				
December				
Total	59	23	9	15

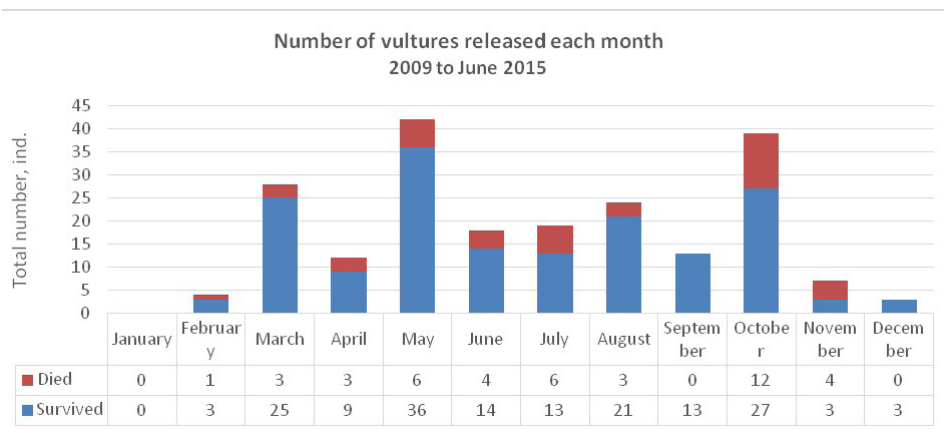


Fig. 1. Number of vultures released each month and their survival rate

Birds were released depending on the particular weather conditions, preferably at the presence of experienced vultures outside the aviaries at the time of release.

A total of 9 of the 59 Griffon Vultures released in the area were eventually found dead between January 2010 - December 2015, which means a total mortality of 15 %. Mostly body remains and wing tags were found by local citizens or tourists so cause of death could not be determined. Two of the cases were suspected cases of electrocution, since the remains were found under electric pylons, but carcasses were not fit for necropsy. A total of 8 out of the 9 of the dead birds were reported between November - January, which turns out to be critical for the birds post-release adaptation and survival.

Following the start of the releases, there is a clear positive trend in the number of free-flying Griffon Vultures observed in the area. The highest number of feeding birds was reported in June 2013 - a total of 18 individuals at a single feeding event, among them wild, non-tagged individuals (see Figure 2). The released vultures obviously followed them and vacated the area, what explains the sharp decline of the number of vultures observed after that. There is still a clear positive trend, indicated with the spotted line presented in Figure 2. Figure 2 is based on the maximum number of Griffon Vultures present in the Central Balkan feeding site at a single observation. It does not consider the aggregated number of different birds observed in the given month, but represents the maximum concentration of birds counted at a single feeding event:

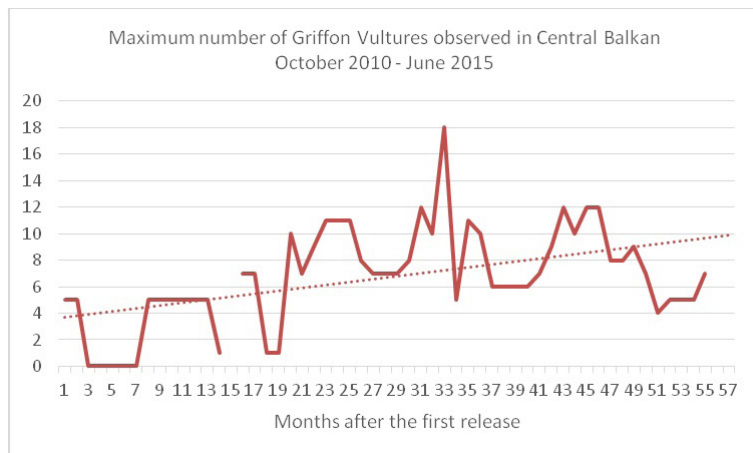


Fig. 2. Maximum number of Griffon Vultures observed at a single feeding event at the Central Balkan supplementary feeding site (October 2010 - June 2015)

At June 2015 there is a fixed group of some 7-9 Griffon Vultures constantly present in the area of release. At the same time, up to 24 Griffon Vultures have been seen in the area (10.06.2013), among them 6 wild, non-tagged ones. Usually following such a visit of exogenous birds, a great part of the group follows and disperses.

No breeding attempts have been reported in the area. However, a bird, originating from the Central Balkan release site tagged K4M has formed a breeding pair with a bird tagged K41 in the area of Vrachanski Balkan in 2014.

Feeding of vultures in Central Balkan was provided within 630 feeding events for 6 years in the period 2010 - June 2015, with total amount of 25 680 kg carcasses, and/or slaughter offal disposed on site. This makes on average of 4310 kg per year and 2.01 feedings per week.

Compared with other successful release sites (e.g. Vrachanski Balkan, Eastern Balkans, and Kresna Gorge) the amount of provided food, and the frequency of the feedings is lower (Stoev *et al.*; Stoyanov *et al.*; this volume; Peshev *et al.*, 2015). This fact, together with the delayed release of the first group of Griffon Vultures, as compared to the neighboring sites of Vrachanski Balkan and the Eastern Balkan Mountains, may explain the lower success in settling of the birds and establishing a colony of the species observed.

In addition to the vultures, the supplementary feeding site is also used by Golden Eagle (*Aquila chrysaetus*), Raven (*Corvus corax*), Common Buzzard (*Buteo buteo*), Rough-legged Buzzard (*Buteo rufinus*), Magpie (*Pica pica*) and Goshawk (*Accipiter gentilis*). Accompanying species were also observed on other feeding sites like Kresna gorge (Stoyanov *et al.* 2015).

CONCLUSION

Even though a large number of birds have been released from the Central Balkan release site, the area sustains the lowest number of free-flying Griffon Vultures from all four release areas maintained in the Balkan Mountains of Bulgaria (Vrachanski Balkan, Central Balkan, Eastern Balkan Mountains - Sinite Kamani /Kotlenska Planina). Birds from Central Balkans are known to have settled in a number of other release sites: Vrachanski Balkan (at least 7 individuals), Eastern Balkan Mountains (at least 7 individuals), Eastern Rhodopes (between 7 to 10 individuals).

The insufficient and/or infrequent food supply, inaccessibility of the food at the feeding site (flat instead of steep terrain and a relatively small fenced area) may be the reason for emigration of the released birds.

However, observations of non-tagged (wild) Griffon Vultures, as well as the coordinates from the GPS/GSM tagged vultures elsewhere clearly show the importance of the area and the need to be further developed as a link between the Western Balkan Mountains (Vrachanski Balkan) and the Eastern Balkan

Mountains (Sinite kamani /Kotlenska Planina). Last, but not least, the area is also the closest to the Eastern Rodopes and may play a key role as a stepping stone for the vultures on passage between the Balkan Mountains and the Rhodopes.

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The actions will continue through the Vultures Back to LIFE14 NAT/BG/649 Project, coordinated by Green Balkans, with the participation of Fund for Wild Flora and Fauna, Vulture Conservation Foundation, junta de Extremadura and EuroNatur.

Additional information: For more information of the project and the releases, please visit: www.greenbalkans.org/birdsofprey/life

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