

NEW DATA FOR THE PRESENCE AND NUMBERS OF SOME
CONSERVATION DEPENDENT BIRDS IN KRESNA GORGE
WITH PROPOSAL OF ORIGINAL METHOD FOR INDIVIDUAL
IDENTIFICATION OF VULTURES

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Abstract: After the start of reintroduction activities for the Griffon Vulture (*Gyps fulvus*) in 2010 and the following establishment of a vulture feeding station in Kresna Gorge, the observations and monitoring of the avifauna in the area were intensified. As a result, several new species for the Gorge were registered and new information about the numbers and season presence of other rarely observed birds in the area was added. During the period 2010-2014 seven new species for Kresna Gorge were found (*Pelecanus onocrotalus*, *Milvus milvus*, *Aquila clanga*, *Aquila heliaca*, *Falco naumanni*, *Falco biarmicus*, *Falco eleonora*). In addition relatively high numbers or regular passing during migration and dispersal were registered for previously unobserved or rarely observed conservation dependent birds in the Gorge (*Gyps fulvus* >100 ind., *Falco eleonora* > 50 ind., *Pelecanus crispus* > 30 ind., regular observations of *Milvus migrans*, *Circus pygargus* and *Circus macrourus*). As a result of implementation of specific conservation measures, an increase in the presence of some endangered species was detected in the area, including *Gyps fulvus*, *Aegypius monachus*, *Neophron percnopterus* and *Aquila heliaca*.

INTRODUCTION

The Kresna Gorge of Struma River is situated in South-west Bulgaria, between Pirin Mountain on the east and Maleshevska Mountain to the west

(UTM, FM73). It consists of silicate rocky habitats and degraded deciduous forests with Mediterranean climate influence. The avifauna of Kresna Gorge is generally well studied. The most comprehensive study of the avifauna of the area, compiling all published and newly collected data is published by Stoyanov et al. (2001). After the start of the reintroduction activities for the Griffon Vulture (*Gyps fulvus*) by Fund for Wild Flora and Fauna in Kresna Gorge in 2010 and the establishment of feeding station for carrion birds Stoyanov et al. (2011, 2012, 2013) the monitoring in the area was intensified. Consequently, many rare or conservation dependent birds were observed in the area. Some of them are new for the region based on the previously published avifauna information, including species which were considered extinct regionally. Other rare for the area birds of faunistic or conservation interest were also observed and new data for their presence in the Gorge were collected during the observation period 2010-2014.

MATERIALS AND METHODS

Data were collected during field observations in the Kresna Gorge since the beginning of 2010, which were held frequently (from 3 to 7 days a week) by binoculars (magnifications 8X30, 10X50), spotting scopes (magn. 15-45X60) and cameras with long lenses (maximum focal length of 400 and 600 mm) for collecting of photography data (digiscoping). At the feeding site observations were provided with the same frequency, as in the first 1-2 days following the carrion disposal full day observations were also provided. At the feeding site also camera traps (resolution 5-8 MP) were used for the last two years, ensuring almost permanent collection of photography data of the species presence and numbers.

All data were entered into a common database in MS Excel. Additionally the pictures taken of photographed Griffon, Black and Egyptian Vultures were compared as “visual marking” method (Hristov & Stoyanov, 2002) was used and in the case of the Egyptian Vulture spots on the face area were compared to distinguish different individuals (Rodriguez, 2013).

The vultures were regularly observed by binoculars and spotting scopes at the feeding site and on the identified roosting sites in the area.

To recognize the released within the reintroduction project Griffon Vultures we use blue wing-tags with orange (enlightened to “gold”) inscription of single letters (common letters in the Cyrillic and Latin alphabets) for the released birds. The release in March 2013 happened accidentally and the birds were unexpectedly lost from the aviary with the marking wing-tags and rings, originally placed in the import place in Spain - 6 birds had yellow wing-tags with vertical black inscription of three alphanumerical codes as K44 and five birds had blue wing tags with blue vertical three alphanumerical codes as B61.

Concerning the rings on birds which escaped in 2013 we continued to use the original rings (red with white codes) placed before the importing from

Spain. Only the individuals with yellow wing-tags were equipped with the same color and code rings. The birds with the blue wing-tags with three vertical alphanumerical codes were equipped with green rings with white inscription with the same code as those on the wing-tag (for example B61). The marking pattern from the releases in 2012 is still in use - the wing tags and the rings were set to create a unique combination – e.g. ring on left leg, wing tag on left wing, and opposite and crossed variants. We put two wing tags to one of the birds. Thus, even if it is impossible to see the codes, the observer could recognize the bird only by the place of the rings and wing tags. The records of the observed birds are made as the number of the ring is followed by the letter of the wing tag (M60-X or B31-U).

The GPS-GSM loggers were used to track some of the released vultures. The equipment showed the extension of the foraging area and some occasional longer distance movements (Greece, FYROM, Serbia and sites in Eastern Bulgaria were confirmed as destinations of such movements).

We used a camera trap placed on the feeding station, which assisted the counting and identifying of the present Griffon Vultures individuals. Additionally the camera traps collected pictures of vultures which were unrecognizable from a distance and pictures of Black Vulture and Imperial Eagle.

Digiscoping was used for photographing in RAW format of all observed birds with lenses with 300-600 mm focal length. After digital enlargement on a PC screen and improvement through Adobe Photoshop software the birds were individually identified. In some cases by taking pictures from a hide situated on the feeding station we were able to read even standard ornithological rings.

In 2013 we introduced a new method for establishing the actual number of the Griffon Vultures visiting the feeding site in Kresna Gorge. We used the “**visual marking**” method (individual description of actual molting or scratches, cuts or disorder of feathers,) basically described by HRISTOV & STOYNOV (2002) and later developed with more advanced technology. We gathered several thousand photographs of Griffon Vultures, mostly in flight with the goal to determine the different individuals. After removing the inappropriate pictures, the final selection numbered 3642.

The main tool used was *Adobe Lightroom*, with its possibilities for cataloguing, comparing and correcting the pictures.

We created hierarchically ordered key words in the program catalogue and after each field trip we entered and attached the new collected pictures (fig. 1). The main key word is the species name, followed by sub-key word for each different individual (for the released by FWFF birds these were the numbers of the ring and the wing-tag). The exogenous birds were divided in groups “imm.” and “add.” in relation to their identified age. The vultures in the group “imm.” were divided by the year of their birth using the molting pattern age determination according to ZUBEROGOITIA et al. (2013). Each individual received a key code

(name), which contained the year of observation, number in order and age (for example GF-13-27-11).

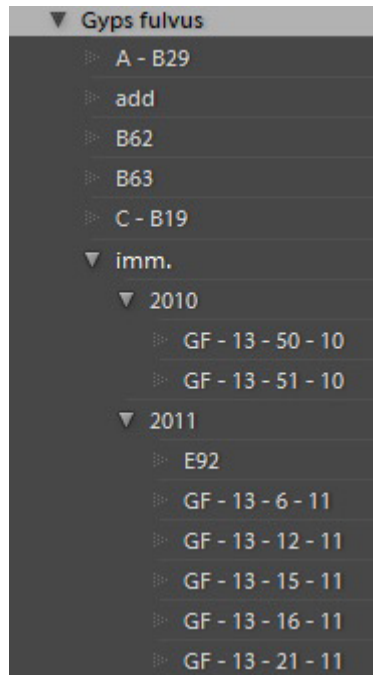


Figure 1. Hierarchical classification of individuals in Adobe Lightroom.

The final stage of identification included review of all new pictures from the current field trip followed by recognition of the birds and assigning individual key codes (fig. 2). When non-registered until present birds remain, the first picture of such individual received a yellow marker (the program includes features for cataloguing by using markers in color, rating, and positive and negative vote for the picture). In the next stage picture was opened in a parallel view with a next picture with the option for synchronized movement of both pictures together, and signs of “visual marking” were carefully inspected. When the signs match the ones of other bird we marked in yellow, when a match was not found we marked with different color (usually red). If matching or lack of matching is not certain, we searched other pictures of the bird if available. When all pictures of the first checked bird are reviewed, comparing with the second colored in red with the rest non marked takes place. Thus, using all colors we marked the different individuals, and when the five colors are not enough additional types of markings were used.



Figure 2. Multiple views and comparison of individuals in Adobe Lightroom.

From the pictures of a single bird, marked in yellow, we selected the highest quality image, providing an optimal view (usually with most spread wings) pictured right from below. Then we compared it with already identified in previous days from the latest observed birds in the previous. Few examples are shown in figures 3 - 8.

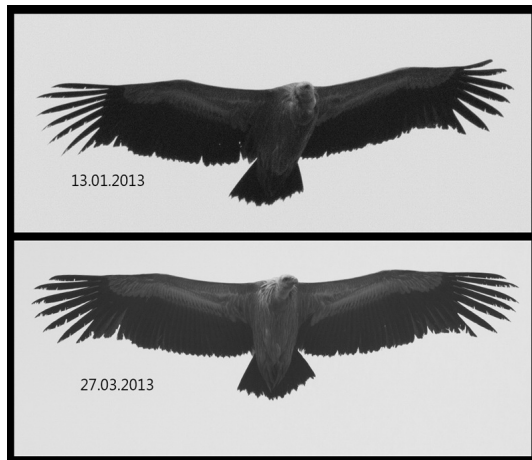


Figure 3. The less enlighten pictures hide some of the signs, while the pose could hide others.

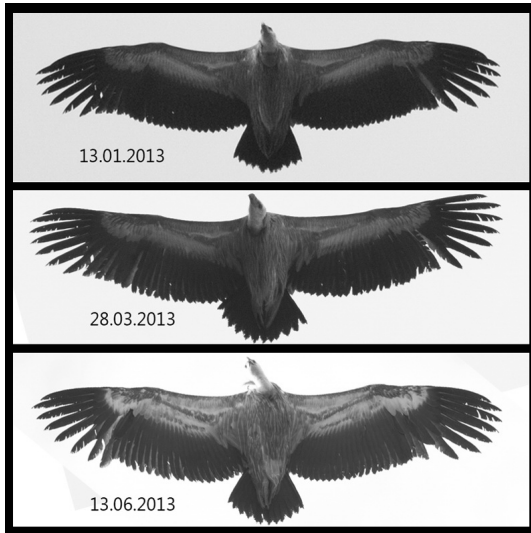


Figure 4. Comparison of individual markings in different observations.

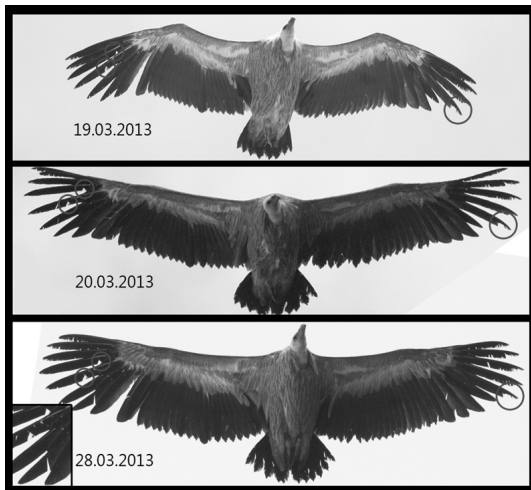


Figure 5. When a single feather is cut across, then it turns into a long lasting sign, while if it is only disheveled (as shown on the small crop picture down left), the bird could repair it and the sign will disappear.

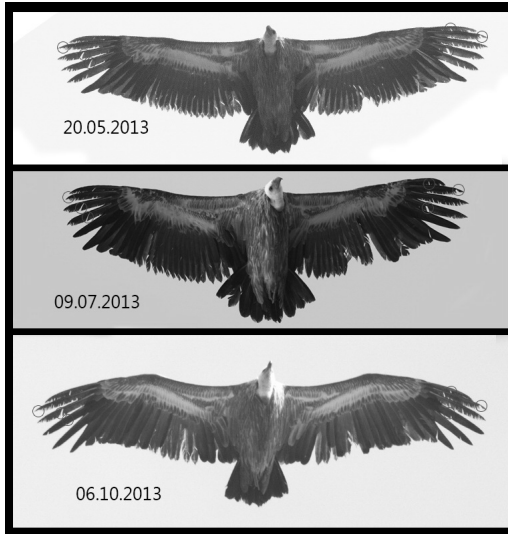


Figure 6. A bird with already several feathers molted after the first picture taken, but still enough signs remained on the non-molted feathers to enable its identification.

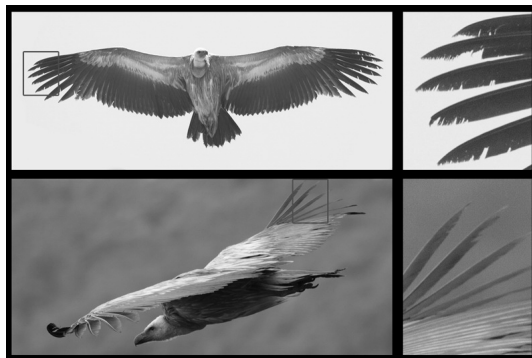


Figure 7. Although in an unsuitable pose the bird on the second picture still could be identified, comparing with the picture taken a few days ago.

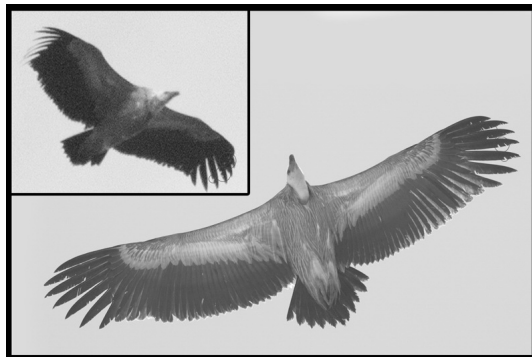


Figure 8. Even pictures with poor quality could provide information.

RESULTS

Eurasian Griffon Vulture (*Gyps fulvus*) – more than 70 individuals, excluding the released during reintroduction of the species in Kresna Gorge, were identified to passing and/or staying to use the feeding site and roost in the area in 2013. Passage of birds from Serbia, Croatia, FYR of Macedonia and Greece was recorded, as well as birds tagged in Israel, but most probably with Balkan origin. There are two peaks during the year of increased presence of exogenous Griffon Vultures in Kresna Gorge - in April-June and September-October.

In 2014 the Griffon Vulture presence continued to increase in the area with record numbers of simultaneously present individuals at the roosting site - 28 on 02 October 2014 (at least 8 of these birds were juveniles hatched in 2014, probably migrants from the large existing colonies in Serbia and Croatia) and again registered presence of more than 70 exogenous individuals for some time in different periods of the year. Thus in total nearly 100 different Griffon Vultures have been observed in Kresna Gorge in 2014 including released within the project, but also migrating, summering, wintering and vagrant birds from other parts of the Balkan Peninsula.

Egyptian Vulture (*Neophron percnopterus*) – after the extinction of the last breeding pair in 2003 and the single birds observed in 2010 and 2012 (Stoynov et al. 2013), in 2013 three different birds were observed and photographed at the feeding site as follows:

A subadult bird was present at the feeding site on 21, 25 and 26 May 2013 and 5 Jun 2013.

An adult bird was present at the feeding site on 9 Jul 2013.

An immature (3d cal. year) bird was present at the feeding site on 17 and 18 Jul 2013. This was a ringed specimen (blue ring with dark inscription MBL), which was ringed in its nest in Demir Kapia (FYR Macedonia) in 2011 by the Macedonian Ecological Society (Metodia Veleviski pers.comm.). (Stoynov et al. 2014).

In 2014 the species was observed in Kresna Gorge, but we received reliable data for the presence of a possible breeding pair in the area of Rupite, which could be the explanation for the presence of different adult and subadult individuals in the previous years (probably before breeding or due to unsuccessful attempts) and the lack of birds in 2014 (probably due to successful breeding and respectively staying in the nest territory).

Eurasian Black Vulture (*Aegypius monachus*) – immature birds (2 cy) were observed in two cases - at the feeding site on 5 and 6 May 2013 (flying together with Griffon Vultures) and latter on 28 May 2013 (feeding together with Griffon Vultures). We assume these observations were most probably of one individual, although the case in 2014 was different (see the text below). This is the first record of a Black Vulture for the area after May 1997 (Hristov & Stoynov 2002),

and the first time a Black Vulture is observed to feed in the area and to have spent more than a day in the area. (Stoynov et al. 2014).

Two Black Vultures were observed in 2014 so far. The two birds were well photographed and using the “visual marking” method identified as two different individuals as follows:

One immature (2-3 cy) was present at the feeding site on 19.05.2014.

One immature (2-3 cy) was present at the feeding sites for 3 consecutive days from 24 to 26 June 2014, which is the longest recorded presence of the species in the area. On 18.10.2014 a Eurasian Black Vulture was photographed in the area of Zlatibor, Westren Serbia and the picture was shared through Facebook by Sasa Marinkovic. Using the “visual marking” method, we recognized that this was the same individual observed and photographed by “Life for Kresna Gorge” project team in Kresna Gorge on 24-26 June 2014.

Red Kite (*Milvus milvus*) was observed on 20 Nov 2012 for two hours at noon time at the feeding site in Kresna Gorge. The bird was interacting with groups of Ravens (*Corvus corax*) (about 200 individuals present at the time) and perched on electric pylons from time to time. This is the first known record of the species from Kresna Gorge. (Stoynov et al. 2014).

Eastern Imperial Eagle (*Aquila heliaca*) – an immature (2 cy) was observed and photographed over the feeding site in Kresna Gorge on 19 Mar 2013. (Stoynov et al. 2014).

During the period 03.06. - 26.06.2014 a 3 cy individual was frequently present at the feeding site, where pictures of the bird with a camera and a camera trap were taken. The bird finally entered the acclimatization cage of the vultures and was released a day later. It was marked with yellow plastic ring N7.

Greater Spotted Eagle (*Aquila clanga*) was observed over the feeding site in Kresna Gorge, interacting with Griffon Vultures and Ravens in flight on 30 Mar 2010. This is the first record of the species from the area. (Stoynov et al. 2014). Another one was observed and photographed at the feeding site in the Gorge on 3 November 2014 afternoon. It was flying above the feeding site obviously interested from the food (animal carcasses disposed). Ravens heavily chased the bird when was in flight.

Lanner Falcon (*Falco biarmicus feldeggii*) – a territorial single adult bird (most probably female) was frequently observed and photographed in Kresna Gorge from November 2010 to May 2012. There it was frequently observed to hunt and to feed on Black bird (*Turdus merula*) and other passerines and to interact with the Griffon Vultures, Peregrine Falcon (*Falco peregrinus*) and Ravens in flight. In 2013 a pair of Peregrine Falcons occupied the cliff used from the Lanner Falcon. In 2013 two observations were made of single Lanner Falcon in flight in Kresna Gorge on 17 of March and 22 of June. This is the first record of the species in the area and the very first photographed Lanner Falcon in Bulgaria. (Stoynov et al. 2014).

Eleonora's Falcon (*Falco eleonora*) – Frequent observations of groups (2 to 32 ind.) of young birds were observed every year 2010-2013 from mid May to late July. The earliest record within the season is about 16 May 2010, while the latest is about 28 Jul 2012. The highest number of birds in a single flock catching and eating insects in flight is from 18 Jun 2011, when 32 individuals were observed together. Eleonora's Falcons have been frequently observed to feed on insects over degraded forests of *Quercus pubescens* as well as above the vulture feeding site in Kresna Gorge. (Stoynov et al. 2014).

In 2014 several observations from 2 to 3 immature birds were recorded in June and July in Kresna Gorge. We expected that the observed several times large flocks of up to 40 individuals in the area of Rupite will move north to Kresna Gorge in the coming summer and the related dryness (such movements were noticed in previous years). However, probably because of the rainy summer the majority of the falcons did not move together northwards to the Gorge, and also were not observed on Rupite in mid June.

Lesser Kestrel (*Falco naumanni*) – on 29.03.2014, male bird was observed in flight and perching on a house roof in the town of Kresna. On 11.07.2014 a flock of 8 specimens preliminary identified in the field as juvenile Common Kestrels (*Falco tinnunculus*) was observed and photographed near the village of Rakitna. Later the pictures taken showed that one of the photographed specimens is with white nails which led to the identification of a Lesser Kestrel (as only in one of the eight specimens was possible to investigate the nail color, the others were recorded as *F. naumanni/tinnunculus*).

White Pelican (*Pelecanus onocrotalus*) – the species was observed once – 9 birds in a flock flying from north to south on 11 May 2013 over Kresna Gorge. Large summer congregations of the species in Kerkini Lake in Greece (about 60 km south of Kresna Gorge) might have resulted in the increasing passage of the species, which in some cases could not be distinguished from the Dalmatian Pelican from a greater distance.

Dalmatian Pelican (*Pelecanus crispus*) – the species is regularly observed in spring (April-June), in flocks of 2 to 21 individuals, flying north through the Kresna Gorge. Flocks were seen also in autumn (the largest one consisted of 17 birds on 27 November 2012 flying from north to south through the Gorge). The maximum number of the specimens in one season is 87 in spring 2013, divided in 11 flocks, observed in 10 different days between April and June. The large congregations of the species in Kerkini Lake in Greece and the breeding colony established there after 2003 might have resulted in increasing the movements of flocks in the area.

DISCUSSION

Seven new species not observed by Stoyanov et al., 2001 were recorded in Kresna Gorge within this study. These are the White Pelican (*Pelecanus onocrotalus*), Red Kite (*Milvus milvus*), Eastern Imperial Eagle (*Aquila heliaca*), Greater Spotted Eagle (*Aquila clanga*), Lesser Kestrel (*Falco naumanni*), Eleonora's Falcon (*Falco eleonorae*) and the Lanner Falcon (*Falco biarmicus*). Thus the number of the bird species recorded in the area raised from 232 to 239. Additionally, new data were provided for the increased presence and recovery of species, based on the applied conservation measures.

The Griffon Vulture is surely a breeding species in Kresna Gorge with 1-3 pairs for the period of the survey, 2010-2014, while the presence of the species in a number of individuals should be considered as 15-100 throughout the year. The maximum numbers observed during feeding and roosting are with two peaks in April-June and October - 23 and 28 individuals counted at once respectively.

The Black Vulture increased its presence in the area not only of individual observations (from 0 to 2 per year repeated in 2013 and 2014), but also in days of presence in the area – up to 6 days in 2014.

The general increase of the scavenging species observations has been related to the feeding site established in the area since 2010, and also by the attractiveness for the conspecific and interspecific scavengers by the newly established Griffon Vulture colony.

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