

Status of the Griffon Vulture *Gyps fulvus* in Serbia

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ABSTRACT

Prior to 1950, all four species of European vulture used to nest in Serbia. To-day the Griffon Vulture is the last survivor. Its history and distribution in the 19th and first half of the 20th centuries are described from ornithological studies or reports.

This paper analyses population trends among breeding groups of Griffon Vultures in Serbia (size of groups, number of pairs and breeding success) between 1980 and 1991. The population is estimated at about 60 adult birds, but the number of successful pairs is decreasing rapidly and in the last five years has reduced by 44%. The main cause of the population decline and measures now being taken to protect the species are discussed.

INTRODUCTION

The rapid shrinking of the Griffon Vulture's range in the Balkan peninsula began before the 1950s (Matvejev 1963) and has continued up to the present. The species has disappeared from Romania and survives in only one region of Bulgaria (Simeonov *et al.* 1990). To-day in the Balkan peninsula it numbers no more than 700 pairs, taking into consideration a probably isolated population from Crete (Vagliano 1981; Perco *et al.* 1983; Handrinos 1985; Grubač 1991; Marinković *et al.* 1985).

HISTORY

In the 19th century and first half of the 20th, Griffon Vultures used to nest on the south slopes of the Panonia basin (Figure 1). Round the rim of Panonia valley are gorges suitable for breeding colonies, such as the Djerdap gorge-Iron Gate and a gorge near Zvornik (Dombrovski 1985; Hodek 1877).

Griffon Vultures needed Panonia valley for food, with its open habitats of steppes and woods and numerous flocks of domestic ungulates (Matvejev & Puncer 1989). Hence the large number of reports and birds collected (Fig. 1) from this region at that time (Marčetić & Medaković 1954; Matvejev 1950).

Panonia valley, as chief place for feeding for the Griffon Vulture, lacks the rocky places necessary for breeding. From these times there are unspecified records of nesting (Fig. 1) in the

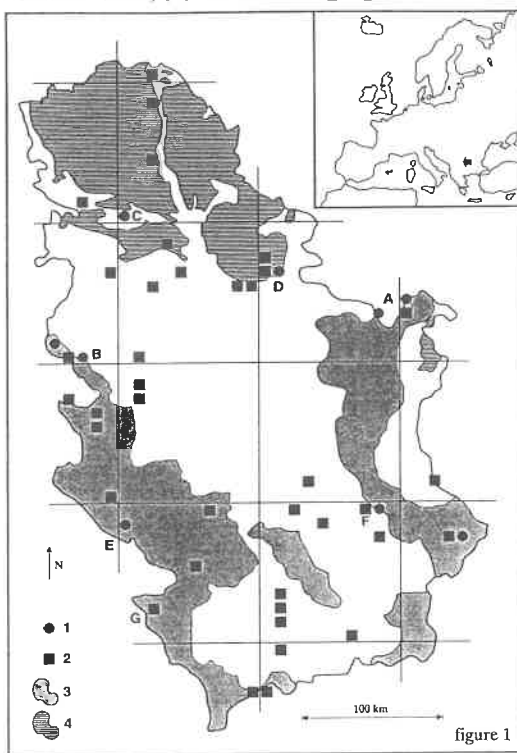
Fruška gora, near Djerdap gorge and Deliblato sands. The Griffon Vultures used to breed in empty nests of the Black Vulture or other large tree-nesting birds (Baldamus 1847; Rudolf *et al.* 1878).

Although Lintia (1907) reported that “vultures” (probably Griffon) ceased to breed in 1899 in Djerdap gorge, they still nested there until 1956 (Matvejev 1950; Marinković 1990).

Since the Middle Ages forests in the mountain regions of Serbia have been felled (Fig. 1) for developing upland pasture-grounds. The large numbers of epizoa from this time show a picture of extensive nomadic sheep-raising in the mountains. (Katić 1978). From the beginning of the 20th century we have reports and skins of birds taken from mountain regions and also known nesting places (Fig. 1) in gorges such as Kumanička, Sicevačka and probably Rugovska (Reiser 1939; Deroko 1939; Marčetić & Andrijević 1960; Matvejev 1950; Marinković 1983).

Figure 1. The distribution of *Gyps fulvus* in Serbia, 1850-1950.

1. Nesting sites, 2. Reports or birds collected, 3. Recent cattle or sheep-breeding region, 4. Habitat of steppes and woods, (A) Djerdap gorge, (B) Zvornik, (C) Fruška gora, (D) Deliblato sands, (E) Kumanička gorge, (F) Sicevačka gorge, (G) Rugovska gorge.



STUDY AREA

The mountainous part of West Serbia lies in the north of the Central Balkan peninsula, stretching from north-west to south-east. The peaks average 1,000m with the highest being 1,600m. To the south lies the Stari Vlah plateau.

The climate is moderate continental and, above 1,000m, approaching subalpine, but in the canyons the influence of sub-Mediterranean elements can be seen. The humidity increases in summer and the average annual precipitation ranges between 500 and 800ml. Down in the valley snow persists for 50 days, whilst on the mountains for over 90 days in an average year. The vultures' nest sites are situated in the gorges of the River Drina, near which passes the major route linking the summer upland pasture-grounds with the wintering grounds in the Panonia valley. Cattle and sheep breeding in West Serbia number 100,000 head.

Table 1. Analysis of population trend of Griffon Vulture in Serbia.

Colony Year	A	B	C	E	Mean No. Pair/Year /Colony	Fertility Rate Egg/Pair/Year	Average No. of Chicks Year/Nest	Average No. of Young Fledged Year/Territory Pair	Poisoning	Drowning	Mortality in Nests Disturbance Robbery	Unknown
1980	(9/8)								1*			
1981	?											
1982	(9/7)											
1983	10/8											
1984	(9/9)											
1985	(7/7)	8/5	9/7	24/19	8					1		
1986	10/10	10/7	7/6	27/23	9	0.85	0.96	0.81				1
1987	9/8	10/6	9/6	28/20	9.3	0.71	0.90	0.64				1 + 1*
1988	8/7	6/6	13/7	27/20	9	0.74	0.70	0.52			3* + 1	2
1989	9/7	6/1	9/6	24/14	8	0.58	1.00	0.58				
1990	9/8	6/0	10/8	25/16	8.3	0.64	1.00	0.64				
1991	6/6	2/1	14/6	22/13	7.3	0.59	0.77	0.45	2*			1
Mean No. Pairs Per Colony	8.7	6.9	10.1	25.7								
No. of Nests Per Colony	13	8	10	31								
Average rate of fertility Per Colony	0.90	0.52	0.63	0.68								
Average Rate of Outlive Young/Colony	0.89	0.76	0.95	0.87								
Average Rate of Occupation Per Colony	67%	86%	101%	85%								
Average No.1 of Outlive Young/Year/Territorial Pairs	0.80	0.40	0.60	0.60								

o - data not completely known

* - broken during incubation

METHODS

A review was made of published localities of Griffon Vulture breeding sites (Fig. 1) and unpublished reports were also consulted. Counting began in 1980 at Nesting Site (A) and in 1985 at Nesting Sites (B) and (C).

Observations were made by telescope from a maximum distance of 600m. Counting took place in fine weather. A nest was judged to be active if egg or chick were present.

Counting of birds in the morning flock was done at the time of thermal lifts, between 7.30 and 10.30a.m., comparing the numbers seen with observations at two feeding stations from 1989.

The number of non-breeding pairs was estimated by comparing the number of pairs on the territory and the number of active nests (Newton 1979). In one gorge there are two groups of Griffon Vultures 5km apart and because of this they were taken separately as Nesting Sites (B) and (C), at which we made our census three times per year: pre-laying and laying (15 Jan - 1 Mar), incubation and chicks (1 Apr - 15 May), and fledglings (1 July - 15 Aug). At Nesting Site (A) we made counts only once a year (1980, 1982, 1984, 1985) (Table 1).

We judged the distance between nests and the height of nests by extrapolating the equivalent size of the Griffon Vulture ($1\text{m} \pm 0.1$) from telephotographs, while the larger distances were taken from maps.

RESULTS

Griffon Vultures used to nest at two localities in Western Serbia, the direct distance between them being 83km. The nearest known locality where they formerly nested is 160km south-west, in Hercegovina.

Mapping reports in the last 20 years in Serbia (V. Vasić, S. Puzović, B. Grubač, I. Ham, G. Džukić and M. Milenković pers. comm.) give a picture of the area of activity of the Griffon Vulture (Fig. 2). Reports from Mts. Prokletije and Šarplanina refer to birds breeding in neighbouring Albania and Vardar Macedonia. Separate reports are wandering, non-breeding birds.

Characteristics of colony

Griffon Vultures choose limestone gorges for establishing their colony. In the colonies studied the mean height of nest was 850m a.s.l., with highest nest at 1,116m. The mean height from cliff base was 30m. The area covered ranged between 500m and 5,400m (distance between the two nests furthest apart in the colony).

During the study period we discovered 31 nests, of which only six were in isolated positions (Fig. 3). The Griffons preferred to build their nests in small caves, but some selected open ledges exposed to the weather (Fig. 4). Their exposure depended on the orientation of the cliff face, but nests with a northern exposure were noticeably absent (Fig. 5).

Size of colony

The number of adult birds varied between 44 and 56. In the study area the average abundance of birds over the six-year period was 25.7 pairs (Fig. 6). The average number of pairs per separate colony varied between 9.3 and 7.3 (Table 1). The young stayed at their natal sites until the first snows at the end of November. Subadults were recorded sporadically in small numbers and were absent during the winter.

At Feeding Station 1 at Nesting Site (A) the largest number seen was 26 birds (27 Nov, 1991). At Feeding Station 2, between Nesting Sites (B) and (C), the greatest recorded number was 56 birds (16 Aug, 1990).

The reduction in the number of adult birds in 1985 (Fig. 7) resulted from the eviction of the Griffon from Site (A) by Golden Eagles *Aquila chrysaetos*. In 1991 we found four birds killed by poison at Nesting Site (A) (Table 1). There was disturbance since 1988 at Colony (B), because of which some adults transferred to Colony (C) (Figs. 8 & 9).

Breeding success

Breeding success was analysed over six years, 1986-1991 (Table 1). Throughout this period

the average rate of fertility was 0.68 ($n = 153$), and varying between 0.58 to 0.85 per year. The hatching rate was high, averaging 87%, and in some years all young birds successfully fledged (Table 1). In relation to the number of pairs on the territory, the average number of young which successfully fledged was 0.6 per pair.

Capacity of colony

Adult pairs are probably traditionally faithful to long-established sites. During the last seven years nests have been used for four seasons on average. For the last ten years two of them have been used continually. The average rate of occupation per site was 85%. This rate was considerably greater at Nesting Sites (B) and (C), where overpopulation occurred (Table 1), as a consequence of loss of breeding habitat through formation of an artificial lake.

DISCUSSION

The moderate continental climate led this Mediterranean species to nest in limestone gorges for shelter. The rainy season is a bad period for the Griffon Vulture (Leconte 1985). The possibility of flight is reduced, whereby the probability of finding food is reduced. Snow cover reduces the strength of thermals (Pennycuik 1972) in a moderate continental climate and hence the area of activity for finding food is diminished (Houston 1983). In the winter snow camouflages objects and also livestock are enclosed in the valleys. In the Mediterranean region breeding can start one month earlier (Leconte 1985; Sušić 1985). The first known date for egg-laying is 1-2 February (Popović 1971) and the latest is the beginning of April (Lintia 1909).

Food supplies

In the last 20 years sheep-rearing, especially pastorally, has markedly declined, but this has not so far had any major influence on this small breeding group of Griffon Vultures, as can be concluded from the average rate of fertility (0.68) and average of successfully fledged young (0.87) (Table 1). The short supply of food in winter is real, however, as shown by preliminary observations at the feeding stations.

Sheeping-raising in Panonia valley is giving way to agriculture; as a result Panonia valley is losing its value as a feeding point for Vultures (Figs. 1 & 2).

Habitat

The nesting habitat of the Griffon Vulture has been increasingly disturbed during the past decade. The building of large hydroelectric power stations has flooded gorges and destroyed refuges. The high average rate of occupation of nest sites (85%) reflects the reduced capacity of the environment. Further disturbance is manifested by urbanisation of the gorges, road-building and quarrying. Such changes in the habitat impair reproduction and simultaneously increase mortality (electrocution and drowning of young in the artificial lake).

Use of poison

Systematic destruction of the Griffon Vulture in Serbia reached its peak during the period 1946-1955, and caused the disappearance of the species from the sheep-rearing region in East Serbia (Figure 2). This was mainly due to the poisoned baits, using strychnine or cyanide, put out by members of the hunters' association for destroying "pests" (wolf, fox and other carnivores).

Between 1947 and 1952, on Mt. Šarplanina alone, about 340 Griffon Vultures were poisoned (Naumov 1981). Such systematic and legal destruction was stopped by the placing of a ban on the sale and use of these poisons in 1967.

Agricultural poisons, such as the herbicide "furan" or the insecticide-fungicide "creozan" are, however, on regular sale, and because of this the use of poisoned baits still occurred sporadically during the study period.

Trend

The Griffon Vulture has been declining in Serbia since 1950. According to estimates from 1971 (33 pairs) (Petrović 1974; Popović 1971) and 1982 (32 pairs) (Marinković *et al.* 1985), the trend

Figure 2. The distribution of *Gyps fulvus*, in Serbia 1970-1990.
1. Nesting sites, 2. Observations, (A) Albania, (B) Vardar Macedonia.

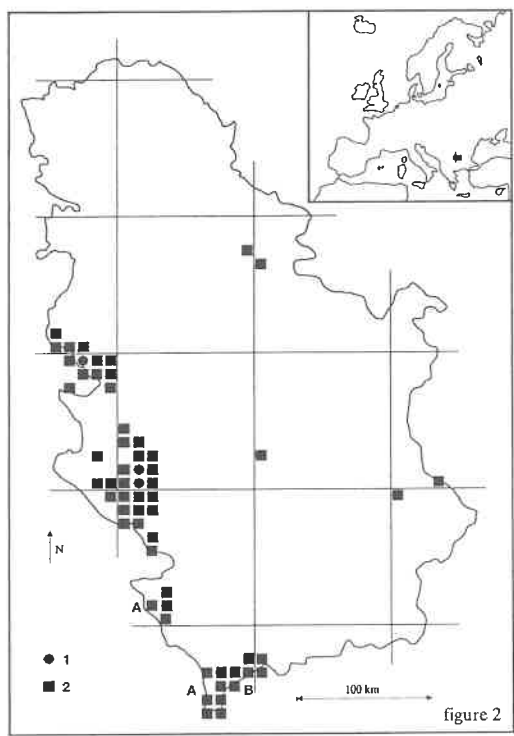


Figure 3. Distance between nests.

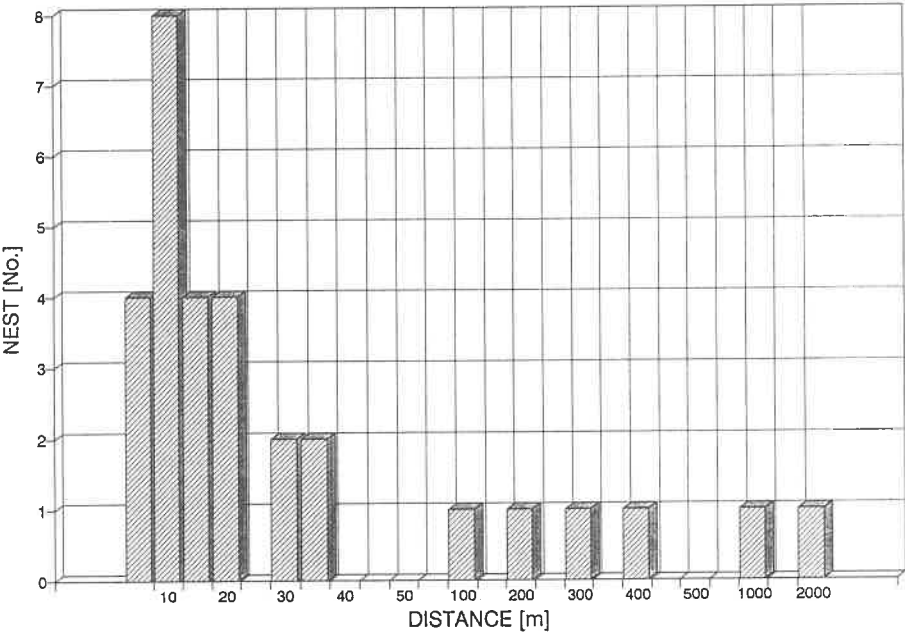


Figure 4. Types of nest.

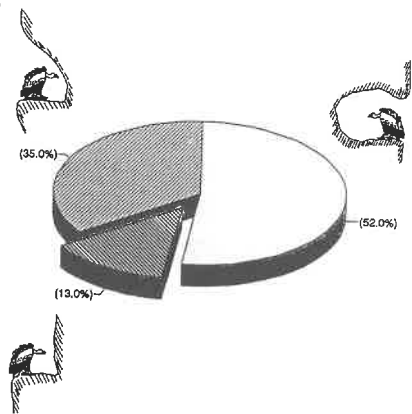


Figure 5. Exposure of nests.

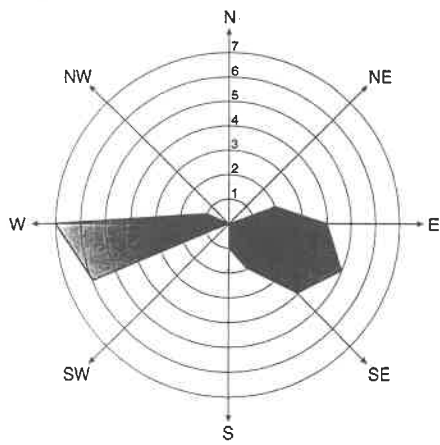


Figure 6. Census of Griffon Vulture in Serbia.

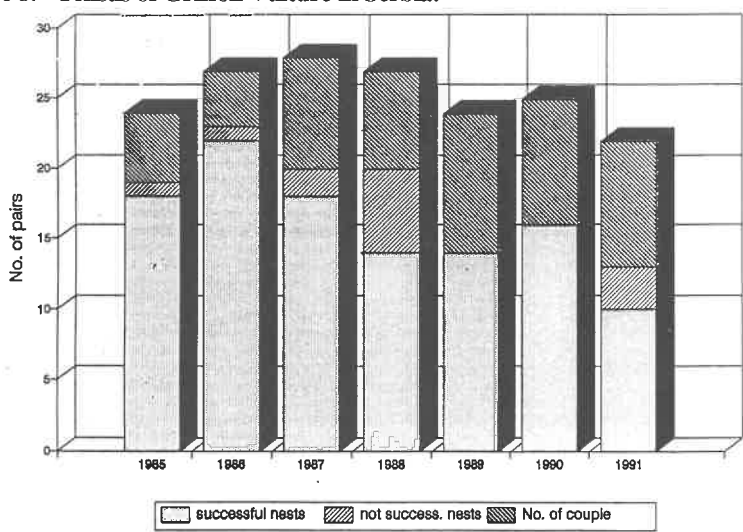


Figure 7. Census of Colony (A)

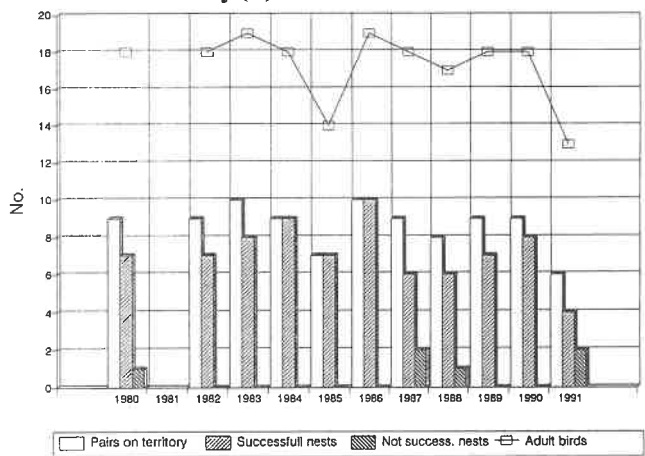


Figure 8. Census of Colony (B)

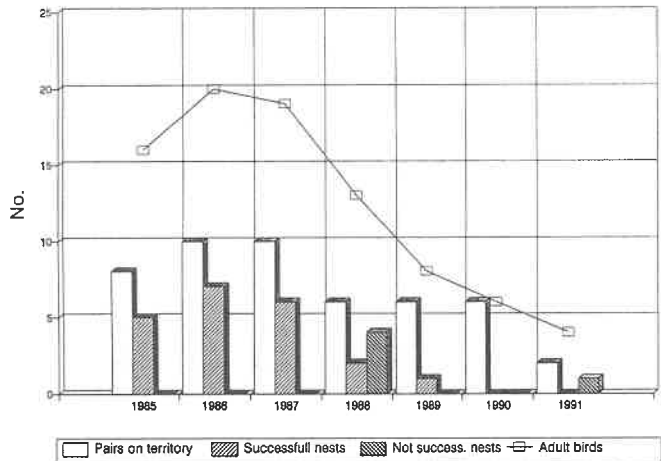
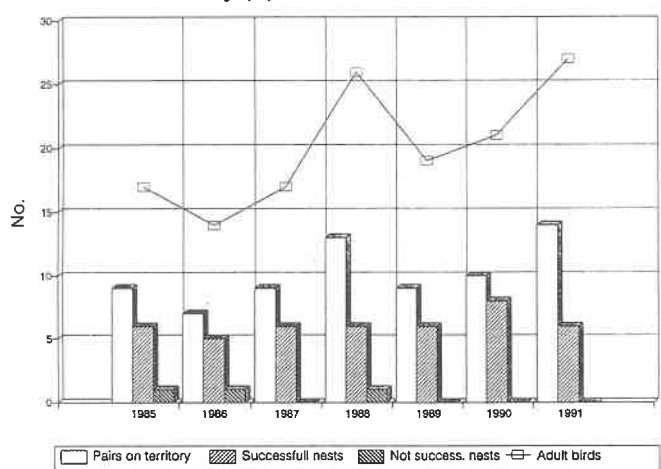


Figure 9. Census of Colony (C)



appears to be a steady one. In this work we counted 22 pairs in 1991, indicating a reduction of 33%. The negative trend is obvious in the number of successful nests, in which there has been a reduction in the last six years of 54% (Fig. 6), pointing to the rapid disappearance of the Griffon Vulture from Serbia.

CONSERVATION

Great efforts to protect the Griffon Vulture began in 1971 and led to protection by law in 1976. This protection is only nominal, however, lacking any concrete measures to prevent a further decline of the species.

In 1986 we began a campaign with the local inhabitants to protect the Griffon Vulture. Two feeding stations were opened in 1989. The species is included in the Serbian Red Book of endangered species. In 1991 the whole current breeding habitats of the Griffon Vulture were promoted into ornithological reserves. A citizens' "*Gyps fulvus*" foundation for Griffon Vulture protection and a "Programme of Griffon Vulture Protection" were inaugurated in 1992.

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