

Wing-marking of Eurasian Griffons *Gyps fulvus* in Croatia - Evaluation and Initial Results

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ABSTRACT

This paper presents the initial results of a wing-marking programme begun in 1990 and applied to Eurasian Griffon (*Gyps fulvus*) in Croatia. In two years 48 birds were marked, 41 in the nest and 7 birds for experimental releasing. Wing-marking is a method which permits identification of individuals without recapture. Marker detectability, migration routes, immature survival and wing-tag safety were studied.

INTRODUCTION

Wing markers have been used with a wide variety of bird species when it is necessary to identify individuals without recapturing them. They have been used in studies on behaviour, dispersal, nest-site fidelity, age structure, age-dependent mortality, longevity etc. Wild Eurasian Griffons were not wing-tagged in nature until this research. Recently, Tewes has (1991) reported on wing-marked Black Vultures (*Aegypius monachus*) in Mallorca during release by "hacking method". Mendelssohn and Leshem (1983) marked three Eurasian Griffons during their reintroduction project. In 1990 a wing-marking programme started in Croatia as part of a long-term population study of Griffons at five breeding colonies on Kvarner Archipelago, Croatia. There are 95-100 pairs on four islands in the Kvarner Archipelago (about 50 pairs on the Island of Cres), and in Croatia the whole population is estimated at 110-150 pairs.

MATERIAL AND METHODS

All important general considerations in designing and conducting a marking programme, suggestions on how to select the most useful marking technique and descriptions of individual techniques including application, materials, procedure, physiological and behavioural effects on marked birds, are collected in an extremely useful paper by Young and Kochert (1987). There are two basic types of wing markers: wrap-around and piercing, referring to the way the marker is secured to the wing (Young and Kochert 1987). Both types are attached to the patagial region. Piercing markers are more varied but usually consist of a tag or streamer attached to the wing by a pin or clip that pierces the patagium. There are several different shapes of wing markers, and I decided to use a single tag that wraps around the leading edge of the wing and is secured both above

Figure 1a and b. Griffon equipped with piercing wing marker, used the method developed by Wallace *et al.* (1980). My experience is that the correct position for the piercing fastener is not as shown by Young and Kochert (1987), but at a more distant point (not so close to the body).



Table 1. Re-sightings of Griffons wing-marked on the Island of Cres (Croatia) and re-sighted out of the breeding area.

Date of marking		1	2	3	4	5	6	7
		16.05.90	16.05.90.	18.05.90.	04.06.90.	24.04.91.	23.04.91.	23.04.91.
1st resight	Date	29.07.90	18.08.90	29.08.90	24.11.90	17-19.08.91.	20.07.91	06.08.91
	Distance	loco	280 km	loco	950 km	227 km	loco	190 km
	Country	Croatia	Austria	Croatia	Bulgaria	Austria	Croatia	Austria
2nd resight	Date	24.07.- 14.08.91.	15.08.91.	19.07.91.	04.12.90.	20.08.91.	02.-03. 11.91.	
	Distance	330 km	950 km	270 km	950 km	270 km	950 km	
	Country	Austria	Bulgaria	Austria	Bulgaria	Austria	Bulgaria	
3rd resight	Date				02.04.91.			
	Distance				950 km			
	Country				Bulgaria			
4th resight					10.04.91			
					950 km			
					Bulgaria			

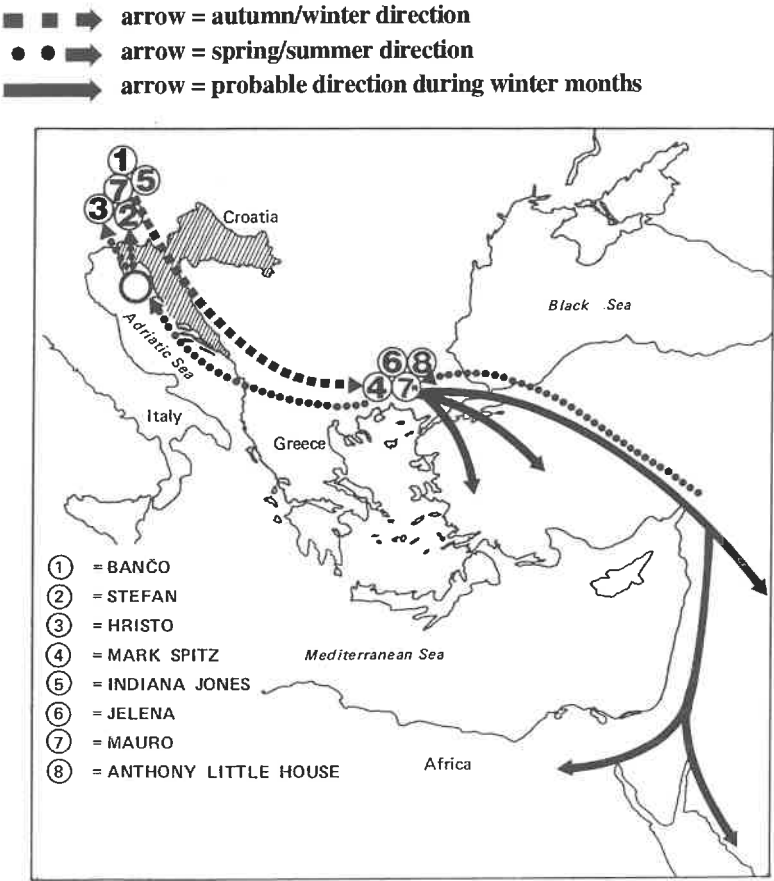
Griffons: 1 = Banco, 2 = Mauro, 3 = Indiana Jones, 4 = Mark Spitz, 5 = Hristo, 6 = Jelena, 7 = Stefan

Table 2. Re-sightings of Griffons wing-marked on the Island of Cres (Croatia) and re-sighted inside the breeding area ("local" findings).

Griffons	1	2	3	4	5	6	7	8	9	10	11	12
Date of marking	16.05. 90.	18.05. 90.	18.05. 90.	18.05. 90.	02.06. 90.	22.04. 91.	22.04. 91.	22.04. 91.	22.04. 91.	23.04. 91.	20.06. 91.	23.04. 91.
Date of 1st resight	29.07 90.	22.04. 91.	18.03. 91.	27.07 90.	15-27. 07.90.	19.08. 91.	19.06. 91.	19.06. 91.	19.06. 91.	20.07. 91.	20.07. 91.	20.07. 91.
Date of 2nd resight		06-07. 05.91.	22-23. 04.91.					28.08. 91.	27.07. 91.	20.08. 91.	07.08. 91	15-19. 08.91.
Date of 3rd resight		18-21. 06.91.	24.05. 91.							28.08. 91.	21.10. 91.	
Date of 4th resight		17.08. 91.									15.01. 92.	

Griffons: 1 = Ogrj, 2 = Tatanke Iyotake, 3 = Vladek, 4 = Miss Piggy, 5 = Sismis, 6 = George, 7 = Dragica, 8 = Corina, 9 = Mile, 10 = Ante, 11 = Good Boy, 12 = Vesna

Figure 2. Re-sighting locations, possible and probable directions of migrating immature and juvenile Griffons wing-marked in Croatia in 1990/91. Bird “Mauro” is designated with 7 and 7* because seen both in Austria and in Bulgaria. Numbered circles indicate localities of re-sightings of each Griffon. Open circle with no number is breeding (marking) area - Kvarner Archipelago.



and below the patagium. I used piercing markers, because they can be applied to nestlings and do not involve the leading edge of the wing. The piercing fastener also prevents the marker from rotating around the wing. I used almost the same method of attaching these tags to the wings of vultures as Wallace *et al.* (1980) did with Condors. There is only one difference: in my opinion, the area on the wing for a piercing fastener must not be so close to the bird's body as Young and Kochert (1987) show in their Fig. 8.7. (p. 140), but at the more distant position (Fig. 1, a and b). I used a plastic cattle ear button to secure the marker to the patagium (Young & Kochert 1987, p. 138, Fig. 8.5.). Patagial tags were attached to the wings using Allflex ear-tags to anchor the streamer. Vinyl wing-tags (Herculite 80 or similar) have dimensions 155 x 95 mm and each is marked with a number and/or letter with dimensions 95x60 mm. Numbers and letters were cut out of vinyl of the same kind as for wing-tags and vinyl of one colour has been glued on to another. Characters are printed in such a manner as to reduce similarities and/or mistakes during observation. I used only two colours (white with dark-blue characters or dark-blue streamer with white characters), because the more colours used, the greater the chances of observer error. Nestlings were tagged when 70-80 days old to allow sufficient size and feather development for adequate marker retention. Later in the breeding season it could be dangerous for a fledgling to fall in the sea. The markers are easily visible when the birds are perched or on the nest.

RESULTS

In 1990 and 1991 48 Eurasian Griffons were marked in Croatia, 41 in the nest and seven birds (1-7 years old) for experimental releasing. Those seven birds came from Zagreb, where with our help one very old pair (more than twenty years, maybe even thirty years old) produce one fledgling per year. In 1990 only on the colony on the Island of Cres 67% and in 1991 80% of all fledglings were marked.

1. *Marker detectability*

The alphanumerics on wing-tags are easily read at 40m (average person) and even at 50-60 m (sharp-eyed person). With average field glasses at 300 m, with Zeiss Dyalyt field glasses at 400 m and with a 20x-25x spotting scope at 1000-1300 m. Wing-tag characters were readable in 91% (43 out of 47 sightings) of re-sightings of flying marked vultures. Eurasian Griffons are slow fliers and tags were easily read on soaring or flapping birds at the Island of Cres. This wing-marking programme was even useful for birds that moved greater distances, and during the first two years there were nine re-sightings in Austria (190-330km) and five in Bulgaria (about 1000km). Each tagged Griffon has a different colour ring combination what ensures that if the wing tag fails, rings continue to allow identification.

2. *Migration*

Initial results indicate two directions of migration: NW (to the Austrian and Italian Alps) and SE (to the Rhodope Mountains in Bulgaria, near the borders with Greece and Turkey - Fig. 2). It seems that the routes, timing and annual circuit are very complex (Sušić 1984). Even one first-year immature travelled a long distance: six months after wing-tagging it has been sighted almost 1,000 km SE from the natal colony. The average distance moved by marked Griffons out of the natal area was 621.7 km in 1990 and 409.2 km in 1991.

3. *Immature survival*

The survival rate for marked immature birds could be high. During the first two years six out of 16 (37.5%) Griffons have been resighted in flight more than one year after marking. It is still too early for definite conclusions, but it seems that mortality during the first year is not over 50% as Houston (1974a) supposed.

4. *Wing-tag safety*

Mundy (1982) thinks that wing-tags are not safe enough for vultures "due to the way the birds fight and tumble at carcasses". To evaluate the patagial tagging system for marking Eurasian Griffons in the wild, I marked two Griffons and observed them in captivity. One of them bore the wing-tag for four years. After its removal there was no visible injury on the patagium. The second bird I marked two years ago, applying the different system of attachment. Up to now no signs of wear or injury on the wing have been recorded. In addition, there was one wild bird recaptured four months after marking, also without any sign of wear or injury. Besides, during the initial period following attachment, I never noticed birds preen or tug at the markers in order to remove them.

DISCUSSION

Until this research, there were no published results on wing-marking programmes applied to wild Eurasian Griffons probably because in some opinions wing-markers are not safe enough for *Gyps* species (Mundy 1982). My experience shows that it is a safe method, if wing-markers are applied on nestlings when 70-80 days old. The correct position for a piercing fastener on the wing has to be more distant than is the area proposed by Young and Kochert (1987). There have been many African vultures marked by numbered P.V.C. coloured rings which could be identified with field glasses from a distance, but results are not so promising. Piper (1990) reported that of 7000 Cape Vultures ringed since 1948, about 5% have subsequently been recovered, re-sighted or recaptured. To study the movements of African Griffons Houston (1974b) marked 162 birds by numbered coloured rings, but only 13 individuals were re-sighted over the following 18 months

(8%). During the first two years of our marking programme six Griffons out of 16 marked (37.5%) have been re-sighted more than one year after marking. So, the rate of re-sighting is much higher in wing-marking than in ringing. This research has proved that the summer population of Griffons in the Austrian and Italian Alps are birds from Croatia, and that in October, after leaving that area, they do not winter in the Croatian islands, but migrate to Bulgaria or even further south. Wing-tags did not appear to reduce the mobility or increase mortality of the birds we studied. One first-year immature travelled a long distance: only six months after wing-tagging it has been re-sighted about 1.000km SE in Bulgaria.

CONCLUSIONS

1. This work is part of a long-term population study of Eurasian Griffons at five breeding colonies on the Kvarner Archipelago, Croatia, where there are 95-100 pairs of on four islands (about 50 pairs on the Island of Cres).

2. In 1990 and 1991 48 Griffons were marked. More than one year after marking 37.5% birds have been re-sighted. Wing-tags did not appear to reduce the mobility or increase mortality of the birds studied.

3. The alphanumerics on wing-tags were easily read with a 20x-25x spotting scope at 1000-1300m in 91% of sightings of flying marked vultures. The rate of re-sighting is much higher in wing-marking than in ringing.

4. Some birds moved great distances and during the first two years there were nine re-sightings in Austria (190-330km from the colony) and five in Bulgaria (about 1,000km).

5. Wing-tagging is a time-consuming, not so simple, and expensive method useful only for long-term studies.

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REFERENCES

- HOUSTON, D.C. 1974a. Mortality of the Cape Vulture. *Ostrich* 45 (2): 57-62.
HOUSTON, D.C. 1974b. Food searching in Griffon Vultures. *E. Afr. Wildl. J.* 12: 63-77.
MENDELSSOHN, H. & Y LESHEM 1983. The status and conservation of vultures in Israel. In: S.R., Wilbur, & J.A Jackson, (Eds.) *Vulture Biology and Management*. Univ. of California Press, Berkeley; Pp. 86-98
MUNDY, P.J. 1982. *The Comparative Biology of Southern African Vultures*. Vulture Study Group, Johannesburg.
PIPER, S.E. 1990. Dispersal, nomadism and conservation in the Cape Vulture. *Ring* 13, 1-2: 217-218.

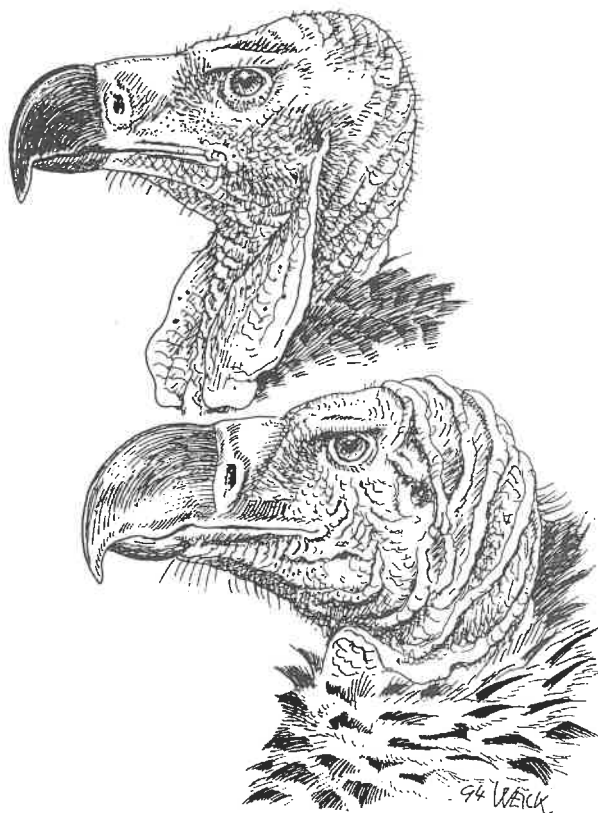
SUŠIČ G. 1984. Is the migration of Yugoslav Griffon Vultures, *Gyps fulvus* (Hablizl, 1783) to the Alps exclusively trophically motivated? Proceedings of III Ecological Congress of Yugoslavia: pp. 139-142, Sarajevo.

TEWES, E. 1990. El Vultur (*Aegypius monachus*) a Europa, un pas Endavant en la Seva Recuperacio. *Anuari Ornitol. de les Balears* 90, 5: 2-8.

WALLACE, M.P., P.G. PARKER & S.A. TEMPLE 1980. An evaluation of patagial markers for cathartid vultures. *J. Field Ornithol.* 51:309-314.

YOUNG, L.S. & M.N. KOCHERT 1987. Marking techniques. In: B.A.G. Pendleton, B.A. Millsap, K.W. Cline & D.M. Bird (Eds.) *Raptor Management Techniques Manual*. National Wildlife Federation. Washington, D.C. pp. 134-151.

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Indian Black Vulture *Sarcogyps calvus* and
Lappet-faced Vulture *Torgos tracheliotus*