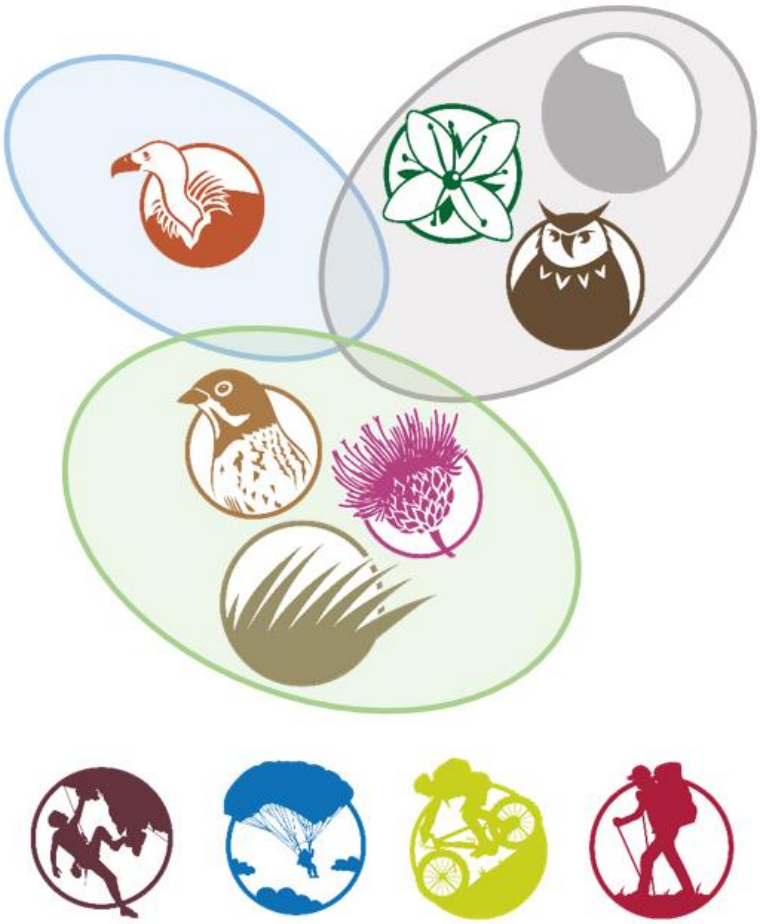
LIKE

Living on the Karst Edge



Educational program

NATURE 2000

PRIRODOSLOVNI MUZEJ RIJEKA
NATURAL HISTORY MUSEUM RIJEKA
PRIMORSKO-GORANSKA ŽUPANIJA • COUNTY OF PRIMORJE AND GORSKI KOTAR

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Griffon Vulture (*Gyps fulvus*)

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General information

The griffon vulture (*Gyps fulvus,* Hablitz 1783) is a type of a *Gyps* order, from the family to which also includes the osprey, hawks, common buzzards, eagles and vultures (Accipitridae) within the order of birds of prey (Accipitriformes), class birds (Aves). Vulture types from the *Gyps* order, 8 in total, together with another 8 types of vultures out of which each is the sole species in its order, belong to the Old World vultures, i.e. Eurasian and African vultures (Botha *et al.*, 2017).
In Croatia the griffon vulture is an endangered species (EN, endangered).

Distribution

The griffon vulture has two recognized subspecies, *G. fulvus fulvus*, which is distributed from northern Africa and the Iberian Peninsula to the Middle East, and *G. fulvus fulvescens* which is distributed from Afghanistan to the Altai through central Asia and from Pakistan across the entire northern India up to the very northeast of India. The Croatian population belongs to the subspecies *G. fulvus fulvus*.
Back at the beginning of 20th century, the griffon vulture nested in a larger part of Croatia. According to numerous recordings (summarised in the Red Book, Tutiš et al., 2013), they nested from Papuk to Srijem. In the areas where there were no rocky cliffs, they nested in trees in the nests of the cinereous vulture, the white-tailed eagle and possibly of other birds (today a similar pattern of nesting on trees is recorded in Spain where the population density is extremely high). They also nested on loess walls along the Danube. In the coastal area they nested in suitable habitats all the way from Istria to Dubrovačko primorje and on eleven islands (Cres, Lošinj, Plavnik, Krk, Prvić (near Krk), Sveti Grgur, Goli Otok, Dugi Otok, Rab, Pag and Brač), and they used almost the entire coastal and hinterland area for feeding (Sušić, 2013a). The last griffon vulture colony, which was not from the Kvarner Islands, was located in the area of Velika and Mala Paklenica. Back in the 1980s c. 15 pairs nested there. However, in 1999 the last nesting with a total of three pairs was recorded in Paklenica (Lukač, 1999).
Today the griffon vulture nests only in the Kvarner Islands area, yet it may be regularly spotted in a much wider area, including Istria (Učka and Ćićarija), Gorski Kotar and Lika, Velebit and north-western Dalmatia and the islands of Pag and Rab (Lucić, Katanović and Kapelj, 2019). It only nests on Cres, Krk, Prvić and Plavnik. Nearly all nests are located on the cliffs above the sea.
The latest research on griffon vulture nesting was conducted in 2019 when its distribution area was confirmed.

Ecology

The griffon vulture dwells on warmer areas of moderate range and there it particularly prefers areas with steep slopes as potential nesting grounds and with sufficient availability of carcasses of medium-large and large mammals as a source of food. Generally, it avoids particularly rainy and foggy areas as well as areas covered in snow even though it can tolerate them in order to ensure a source of food or a nesting ground. To pursue food, it needs a wide range of upward air currents above hilly and mountain areas or daily thermals above deserts, prairies or other open, dry terrains. It avoids forests and overgrown terrains, marshes, lakes and vast sea areas, but it uses springs, creeks and pools for drinking water. Even though it is a bird that likes heights, it spends a lot of time resting on the ground where it moves well. In a flat terrain it requires a lot of

space for taking off in order to fly off the ground. It generally does not dwell near people unless it is necessary for nesting or feeding. The decrease in extensive and transhumance cattle breeding, changes in the way of cattle keeping and the decline in the number of wild herbivores resulted in several decades of reduction in the habitat scope and carrying capacity (Cramp, Simmons and Perrins, 1994).

Griffon vultures are social birds. They often look for food independently, but they can also pursue it in groups, and as a rule, they rest together in suitable places. During the feeding time, they gather in groups of temporary nature. After feeding, the specimens scatter. They can often be seen flying in smaller flocks, but they are most commonly temporary since they are needed for reaching the height by using thermals (upward currents of warm air) or during migratory flights.

Although some specimens revisit the same places often throughout the year, e.g. cliffs on which they nest or cliffs on which they rest, they do not form territories, neither individually nor as a group. In the morning the griffon vultures set out to find food from their nesting colonies or resting areas. They regularly fly over areas which are 50-60 km away from their colonies and resting areas. Even the specimens that nest go away equally far from their nests (Cramp, Simmons and Perrins, 1994; Genero, 2017).

During the feeding time, when larger groups of griffon vultures gather at the source of food, conflicts and fights among them ensue, which are primarily of ritual nature and serve to establish a hierarchy for each feeding. Such social structure exists only during the feeding time. Apart from intraspecific aggression (among specimens of the same species)during feeding, such aggression is also recorded at the time of the arrival to the resting location and in nests, but also without any particular reason (Grubač, 2014). In rare occasions, a more significant long-term aggression with inflicted injuries may also occur (Blanco *et al.*, 1997).

Griffon vultures almost exclusively feed on soft tissues of carcasses of domestic and wild animals, mostly medium-large and large mammals. They dig their long, poorly feathered neck deep into the carcass through body apertures or wounds on mammals. On average, they need c. 500 g of food each day, whereas this quantity is bigger for parent birds which feed their young.

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Endangerment causes

There are numerous reasons why griffon vultures are endangered. Among them we can distinguish pressures and threats. Pressures are current endangerments, those that have already been affecting the population. Threats are endangerment types they may yet happen, and if they do, then they will leave a mark on the population. Some endangerment types may be considered both as pressures and threats, e.g. if there is a difference between their current and potentially expected intensity. In addition, some endangerment types are only of a temporary nature and only then do they cause a pressure, but the possibility of their occurrence is always present and real, thus, they pose a permanent threat. Such an example is poisoning.

The increase in food availability is both globally and nationally important endangerment type. A part of vultures which embark on migration or wandering falls victim of exhaustion and inability to find food in the area of other countries. The reason of food loss for vultures lies in agricultural changes – more and more cattle are enclosed, intensively bred, so when they die, they cannot be food for vultures. In order to ensure the survival of vultures, but also to cut costs of animal waste disposal, feeding grounds for vultures have been set up across southern Europe.

The main pressure on griffon vultures at the global level is inadvertent poisoning with poisoned baits. Numerous specimens die from poisoned carcasses – baits set up with the intent to poison cattle or game predators (such as jackals and wolves). A lot of such cases were recorded in Croatia but monitoring specimens from Croatia with GPS signals has confirmed that our specimens die from poisoning in other countries as well. The feeding ground network for supplemental feeding of vultures set up along the griffon vulture distribution area helps to mitigate this endangerment type as the food in the feeding grounds is generally of solid quality and monitored.

Electrocution (dying of electric shocks on power lines) is the second among the main

endangerment types for the griffon vulture at the global level, and a similar case is here as well. Electrocution poses a threat wherever griffon vultures go, i.e. regardless of the state of this endangerment in Croatia, for each vulture that leaves Croatia, and these are mostly young and subadult vultures, there is a possibility of being killed on risky elements of the power grid.
A part of ship operators who transport guests disturbs vultures during the time of nesting which often results in falling of young vultures out of the nest off the cliffs and down into the sea. 5-10 vultures are saved from this situation annually, but how many of them actually die, it is difficult to say.
The collision with the energy infrastructure, especially with windmills, is considered a significant endangerment type. Croatia recorded one death of a griffon vulture who was killed in that way whereas the actual number might be even bigger. The development of wind energy poses a special kind of danger in south-eastern Europe, where our young vultures move, as well as on the Middle East.
Poisoning from non-steroid anti-inflammatory drugs, such as diclofenac, has led to the brink of extinction of several *Gyps* species types in India (see under **Error! Reference source not found.**). The use of this medicine is allowed in certain countries of the European Union and, even though there have been no recordings thus far, it is possible that our vultures are exposed to this medicine in other countries.
Unintentional lead poisoning is probably a larger problem in Croatia than abroad where there are functional feeding grounds. There were recordings of vultures in Croatia which had an ingrown buckshot in their bodies after being shot. It is quite possible that they were shot in another country which consequently resulted in chronic lead poisoning due to lead discharge in the organism. Apart from chronic lead poisoning which might occur in shot birds, lead poisoning can potentially occur anywhere where our vultures migrate or wander, through lead exposure from ammunition remains in game carcasses.
Since bird poaching is present in parts of Croatia and other Mediterranean countries (Brochet *et al.*, 2016), it is plausible that more vultures form Croatia die as a consequence of poaching.

Protection measures and legal protection; what can we all do?

In Croatia the griffon vulture is a strictly protected species. It can be found as a target conservation species in 5 areas of the ecological network Natura 2000 where there are 4 special reserves (3 ornithological, 1 botanical-zoological) which were established, among other things, for conserving griffon vultures.
Each of us can contribute to griffon vulture conservation only by visiting the Beli Visitor Centre and Rescue Centre for Griffon Vultures. If you are travelling by ship or boat, avoid cliffs where vultures nest. Agriculture, especially sheep breeding, is necessary for conserving griffon vultures, therefore, buy agricultural products made on the Kvarner Islands. Should you find an injured or dead bird, report it to the competent authorities.

Overview of the area under the project scope (karst edge)

Today vultures use the karst edge area most intensively as a flyover corridor, from the area of the Kvarner Islands to northern Italy where there is another nesting population. Apart from flyovers, vultures also use this area for feeding if they find carcasses of domestic or wild animals.

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Additional interesting facts and figures partially collected during the research as a part of the LIKE project:

Appearance

The griffon vulture is an extremely large bird, visibly bigger than most eagles and other larger birds. Its body is between 95 and 110 cm long whereas its wing span most commonly ranges from 240 to 280 cm. Based on the foreign literature, the specimens of the G. fulvus fulvus species weigh between 7.5 and 11 kg (Snow and Perrins, 1998). According to the available weight data, the specimens from the Croatian population are somewhat heavier than the nominal population average, and they range between 9 and 14 kg whereas one-year old birds weigh between 8 and 9

kg (Sušić and Radek, 2010).
The griffon vulture has wide wings, long and seemingly bare neck which is crooked in flight. It can be recognized in flight by its wide wings with very long "fingers" i.e. primary flight feathers. Its secondary flight feathers are often slightly "convex" compared to the "concave" internal primary flight feathers; thus, the back-wing contour looks seemingly S-shaped. Its tail is short, curved or slightly wedged. During the flight, we can see dark, seemingly black flight and tail feathers which stand out from the brown covert feathers of the underwings and body. Its head is light, nearly white. A loose, feather neckless at the neck base in young birds is brown, and in adults white. The beak is dark, grey, in young birds, and yellowish in adult birds. A long neck can se be observed in birds that are resting, which is covered with dense and tiny feathers, and from a distance it may seem as bare skin. Its claws are short, in comparison to other birds from the birds of prey order, and the tarsometatarsi (fused metatarsal bones, bird "leg") are featherless (Svensson, Mullarney and Zetterstrom, 2018).
The sexes are mostly distinguished only by size, often with a usually insignificant difference. As with most other birds of prey, the females are larger than males, but the difference is poorly prominent (Cramp, Simmons and Perrins, 1994).

Behaviour

Unlike other vultures from the Gyps order, the griffon vulture nests in colonies, in groups ranging from several pairs up to over 100 pairs (Snow and Perrins, 1998). Probably the most numerous colonies in Europe are in Spain, on cliffs over the rivers Duratón (566 pairs) and Riaza (402 pairs) (Del Moral, 2009).

Reproduction

For nesting, the griffon vulture chooses shaded cliffs on which it can nest (Del Hoyo, Sargatal and Elliot, 1994). It chooses hollows on cliffs, such as smaller caves or fissures, which can provide solid protection from unfavourable weather conditions, rock shelters (semi-circular cavities on rocks), overhangs and flat shelves or terraces. Both parents, which form a life-long partnership, build or extend the nest, which is c. one meter wide, 10-30 cm high, and they use the same nest from one year to another (Cramp, Simmons and Perrins, 1994; Grubač, 2014). The female lays one egg, in the period from the end of December to March. Most European vultures lay eggs later than the Kvarner vultures which most commonly lay their eggs from mid-January to mid-February (Sušić and Grbac, 2002). The male and the female take turns to sit in the nest during the incubation which on average lasts 52 days, after which a chick is hatched. The young stay in the nest between 110 and 115 days (Cramp, Simmons and Perrins, 1994), and after they leave the nest, they remain in its vicinity and keep close to their parents for two more months (Sušić, 2013a; Grubač, 2014).

Migrations and trends

Adult griffon vultures are mostly non-migratory birds whereas young and immature specimens are mostly migratory and nomad (Del Hoyo, Sargatal and Elliot, 1994). Previous research and newer satellite monitoring determined that young vultures mostly from the Kvarner Islands head north-west to the Italian and Austrian Alps, where they often stay on the feeding grounds while some continue their flight over France all the way to Spain. Another common line is South-East, along the eastern Adriatic coast, in various directions, towards Greece, Turkey and further away over the Middle East towards Africa. In addition to these, there are other migratory patterns such as moving to the South of Italy or to the North and North-East all the way to Russia (Sušić, 2013b; Genero, 2017).
The griffon vulture, along with other vultures, was up until recently irreplaceable in nature due to its role as a cleaner. In the European region, it was the only bird, along with other vultures, specialised for feeding with the remains of large animals and complete carcasses. We are dealing with food which is, apart from the griffon vulture, used by vertebras, mostly by opportune species such as the dog family (Canidae) among mammals or the crow family (Corvidae) among birds. The griffon vulture is in a sort of competition with these species, yet it still finds carcasses significantly faster than dogs, and it still feeds with the same prey faster and in larger numbers than crows.

The speed at which griffon vultures remove the remains of other animals from the environment is extremely high – griffon vultures can eat an entire sheep within several dozen minutes. It is significant that they can eat the remains of carcasses which are in an advanced state of decomposing, and even if the meat is contaminated with illnesses such as anthrax, nothing will happen to them. They will remove all the remains which pose a threat to other animals and humans, very fast and highly efficiently.
At one point, vultures were the only way in which we could dispose of dead animals whereas today this has almost been forgotten. The values that vultures used to provide to people is mostly seen in the data that nowadays we spend at least c. 120.000.000 HRK for the disposal of animal remains in Croatia, and vultures used to do that for free.