



Poisoning of Griffon Vultures (*Gyps fulvus*, Hablitz, 1783) With Carbofuran-A Clinical Case

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Case Report

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Abstract

One of the global problems related to the protection of nature is the preservation of the genetic pool of wild flora and fauna. In Bulgaria, until 2007, more than 30,000 species of animals belonging to a large number of taxonomic groups were known, but their real number in the country is most likely over 60,000. The provided data show that our country compared to the larger some European countries have a rich register of animals in a correspondingly small territory. After the experts' assessment, it was shown that the Red Book of the Republic of Bulgaria includes a total of 287 species and subspecies of animals, which are assigned to 4 categories: extinct - 30, critically endangered - 87, endangered - 70 and vulnerable - 100. Taking into account these facts, our goal was to carry out a retrospective analysis of the intoxications of wild birds and mammals registered in some regions of the country, in order to determine the cause of their occurrence and, on the other hand, to add new data to the ecological situation in the country.

Keywords: Wild Birds; Griffon Vultures (*Gyps fulvus*); Intoxication

Introduction

Name: Griffon vulture

Taxonomy - *Gyps fulvus* (Hablitz, 1783), birds of prey belonging to *Accipitridae* family. Distribution - Southern Europe, Asia Minor, Sinai Peninsula, Iraq, Iran, Afghanistan, Pakistan, Kazakhstan, India. Habitats - Rocky areas in the valleys of large rivers, often in the presence of wolves.

Biology of the Species

Feeding. The softer parts of carcasses, such as the muscles and viscera.

Lays only 1 egg in January.

Reintroducing in Europe and Bulgaria

Ecological significance of the bird.

Conservation status-endangered species in Bulgaria (red book).

Carbofuran (Furadan)

Carbamate insecticide, Fat-soluble organic substance. Widespread in agricultural, as wet treatment for seed.

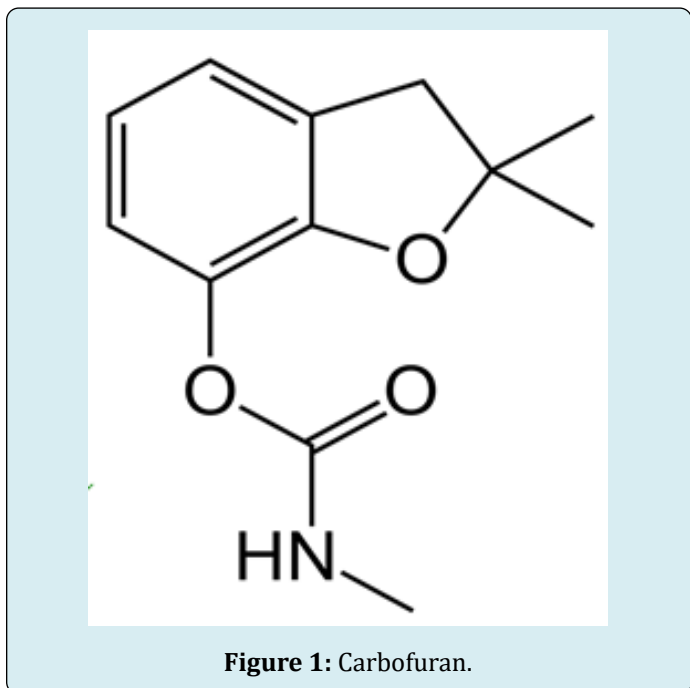
Produce acute toxicosis in animals and humans. Enter the body through the digestive tract, respiratory system and skin.

Toxicity: their ability to inhibit acetylcholinesterase. On 13th June 2007, European Commission took decision to exclude carbofuran from Annex I to Council Directive 91/414/EEC and to withdraw of authorisations for plant protection

products containing that substance.

Clinical symptoms of poisoning with carbofuran in birds Slightly dehydration. Body mass loss. Display of general weakness. Unable to hold its head upright. Bradycardia and dyspnea.

Antidotes: Atropin (cholinolytic), circulatory regulators (ephedrine), glucose, vitamin C. In severely inhibited cholinesterase-obidoxime (Figure 1).



Case Description

In 2019 nearby village of Bov, Municipality of Svoge , Bulgaria were found a dead calf carcass and 8 dead Griffon vulture in close proximity to it.

The great number of dead raptors next to a corps of a calf rise suspicions that this is a case of intentional poisoning with poison bait.

In order to prove or reject the suspicions, 5 samples were taken for testing - one from the calf liver and 4 from digestive tract content of dead birds. The samples were stored at -20°C, and then transported, maintaining -4°C for laboratory testing in AGROLAB LUFA GmbH, Kiel, Germany.

Since it was not clear what is the possible poisonous agent, the samples were tested for several different substances. For quantitative measurement of phosphides, strychnine and alkaloids were used the following methods: RP HPLC-UV (214 nm), GC-NPD , LC-MS-MS.

For quantitative detection of pesticides in stomach content was used GC-MS.

Results

The tested samples were negative for residue of phosphides, strychnine, plant alkaloids. However, they were positive for the carbamate insecticide Carbofuran (Table 1).

Species/Sample	Values in mg/kg body weight
Calf/Liver	17,2
Griffon vulture 1/pooled sample from digestive tract	14,5
Griffon vulture 2/pooled sample from digestive tract	12,3
Griffon vulture 3/pooled sample from digestive tract	11,5
Griffon vulture 4/pooled sample from digestive tract	14,2

Table 1: Levels of Carbofuran in samples from calf carcass and dead birds, analyzed by GC-MS.

Discussion

In the present case was found the presence of carbamate insecticide Carbofuran both in the samples of calf carcass and digestive tract of the dead raptors. The levels of the insecticide in our samples were several times higher than LD50 found in other bird species (Table 2).

Species	Values in mg/kg body weight
Ring-necked Pheasants	2,4-7,2
Ducks	0,24-0,50
Rock Pigeons	1,33
Common Quail	5,04
Calf/Liver	17,2
Griffon vultures/pooled sample from digestive tract	13,12 (average value of all samples)

Table 2: Toxicity of carbofuran LD50.

It is possible that the victims of poisoning were more than those which have been found, but it is difficult to be precised due to the rough terrain where the corpses were found and the fact that the Griffon Vultures can cover long distances in a short time. The birds was found relatively quickly because it had a transmitters tag.

Other Cases

According to Xirouchakis, et al. [1] in the period between 1990 and 1999 led to the disappearance of the populations of Black Vulture (*Aegypius monachus*) and Griffon Vulture (*Gyps fulvus*) in Bulgaria and Romania and most of former Yugoslavia, as well as decrease in their number in Greece. Carbofuran was found as one of the substances commonly used for preparation of poison baits in the island of Crece Xirouchakis, et al. [1].

2008-2010 Spain: several mortality events due to illegal poisoning with organophosphorus and carbamate pesticides reported in cinereous vultures, bearded vultures, griffon vultures and Egyptian vultures [2-8].

2017: The Largest Documented Poisoning Event of Griffon Vultures in the Balkan Peninsula

March/April were found 18 bodies of Griffon Vultures (missing more than 30 individuals).
Small baits: wolves, foxes, and dogs; The poison was set in a carcass of a dead cow, which was there more than two weeks.
Investigations: did not result in any prosecutions.
There were killed birds from another colonies.
Prevention: the use of precise and intensive data collection via satellite transmitters was introduced.
Autopsy: results showed that they may had the carbamate/organophosphate poisoning [3].

Solutions

Judicially prosecution of persons who illegally put poison baits Canine anti-poison detection unit comprised of a human handler and a dog - for quick uncover of poison baits Automatic location-based real-time alert system to prevent wildlife poisoning using GPS-tagging of the birds [9-12].

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