# Assessment of the exposure to environmental toxics in free-living European griffons (*Gyps fulvus*) and Cinereous vultures (*Aegypius monachus*) in the Balkans

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## INTRODUCTION

In some parts of Eastern Europe, vultures suffered a dramatic decline in their populations during the last century, fundamentally due to the intentional use of poisons. Vulture species play a key ecosystem role and are valuable as biomonitoring sentinels for both human and environmental health. Exposure to environmental contaminants has repeatedly proved adverse for vultures' fitness and population viability. Investigating the magnitude of this factor on Balkan vulture populations is essential for understanding current population dynamics, as well as for assessing possible risks for the several reintroduction projects that are being developed in the region. The aim of this study is to determine organochlorine compounds, lead, cadmium, antibiotics and anti-inflammatory drug (NSAIDs) levels in blood of vultures from Bulgaria and Greece.

## MATERIALS AND METHODS

**Samples**: Blood samples from European griffons (*Gyps fulvus*) (N=33) and cinereous vultures (*Aegypius monachus*) (N=45).

**Table 1.** Summary of toxic compounds analysed in blood samples and analytical technique used[1-4]

| TOXIC | SAMPLE | ANALYTICAL TECHNIQUE |
|---|---|---|
| Organochlorine compounds | Blood | Gas Chromatography (GC)+ electron capture detector |
| Heavy metals | Blood | Atomic Absorbance Spectroscopy (AAS) |
| Antibiotics & NSAIDs | Blood | Liquid Chromatography coupled to a Time of Flight Mass Spectrometer (LC/MS-QTOF) |

## RESULTS

**Table 2.** Summary of the obtained results in the chemical analyses

| ANALYSIS | SPECIES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Aegypius monachus* | | | | | *Gyps fulvus* | | | | |
| | N | Mean | SD | Min | Max | N | Mean | SD | Min | Max |
| p,p'-DDE ng/mL | 45 | 0.083 | 0.501 | <LOD | 3.35 | 33 | 0.935* | 1.576 | <LOD | 8.106 |
| PCB 180 ng/mL | 45 | 0.010 | 0.066 | <LOD | 0.440 | 33 | 0.109 | 0.627 | <LOD | 3.600 |
| Antibiotics | 45 | <LOD | | | | 33 | <LOD | | | |
| NSAIDs | 45 | <LOD | | | | 33 | <LOD | | | |
| Pb ng/g (%>200 ng/g) | 45 | 82.6 (6.7) | 65.0 | 10.7 | 321.1 | 33 | 170.9 (24.2) | 79.2 | 64.2 | 384.9 |
| Cd ng/g | 45 | 1.79 | 0.29 | 1.22 | 2.28 | 33 | 1.95 | 0.38 | 1.19 | 2.53 |

LOD: Limit of detection
*Significantly higher in this species

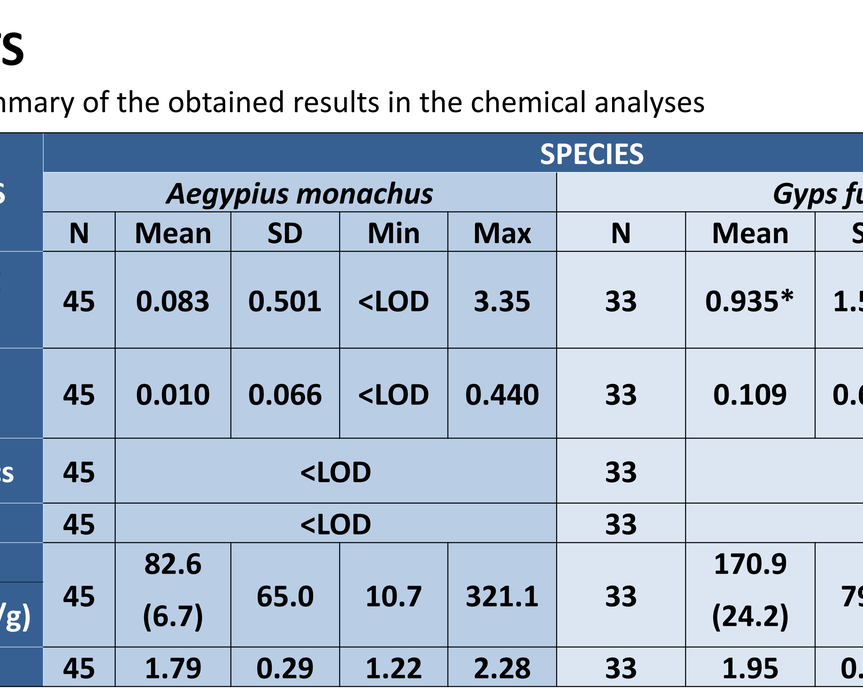


**Fig. 1.** p,p'-DDE levels in blood of vultures from the Balkans

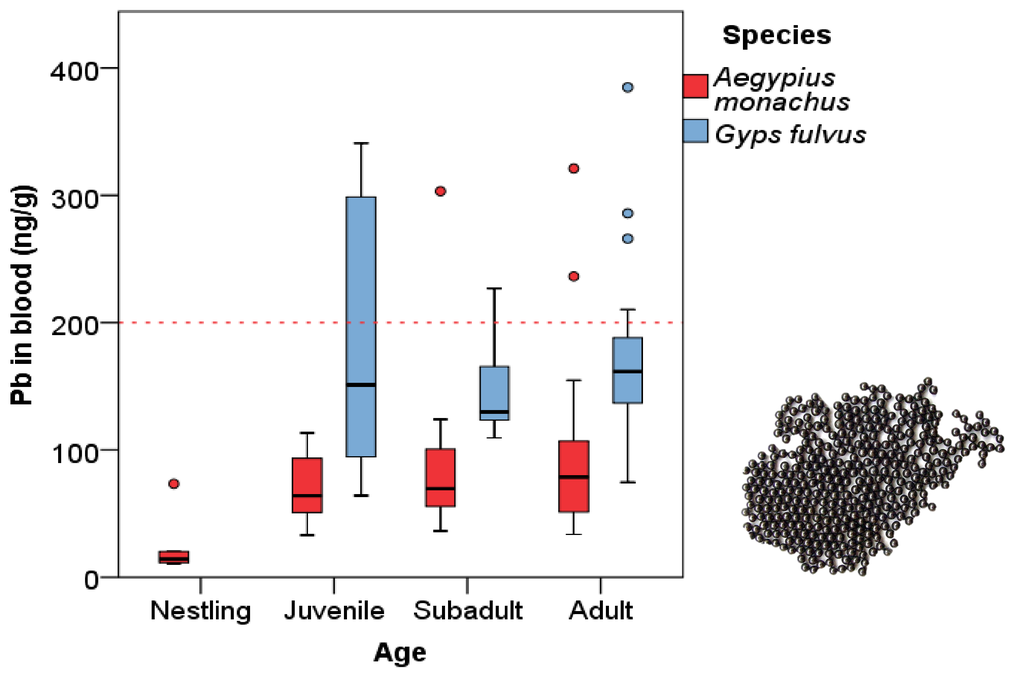


**Fig. 2.** Lead levels in blood of vultures from the Balkans. Dotted red line represents the threshold of abnormal exposure

## DISCUSSION & CONCLUSIONS

Comparison of data between Spain[1,2,3] and the Balkans.


| | | |
|---|---|---|
| Low | p,p'-DDE & PCBs | Very low |
| High | Blood Lead | Relatively low |
| Presence | Plasma Antibiotics | Absence |
| Absence | Plasma NSAIDs | Absence |

**Good health status in the studied vultures**

**Need to increase efforts: study other toxicologic threats**

**Intentional poisoning**

## REFERENCES

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