

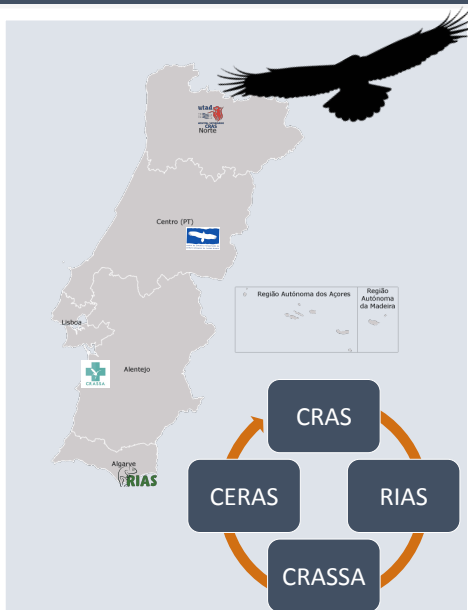
# OCULAR LESIONS IN BIRDS OF PREY IN PORTUGAL

## A RETROSPECTIVE STUDY



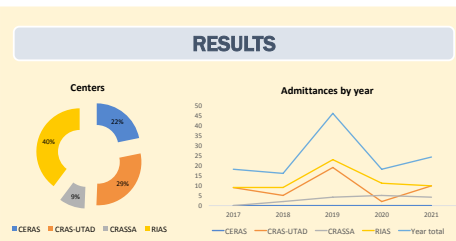
### SUMMARY

Every year, thousands of animals are admitted to wildlife rehabilitation centers, and birds of prey represent a large percentage of these admittances<sup>1</sup>. In birds of prey vision is a vital sense, and vision ability is directly related to their hunting skills, which are fundamental to survival<sup>2</sup>. The aim of this study was to determine the type of ocular injuries and factors related to the admittance of birds of prey in 4 centres located in different geographical areas of continental Portugal during the period of 2017-2021. The most frequent lesions were hyphema and corneal ulcer. A significant association was found between these lesions, as well as between hyphema and lens luxation. A positive correlation was observed between ocular lesions and cause of admittance, with hemorrhages and multiple injuries having the highest degree of association. Despite the nature of the injuries, the release rate was high.



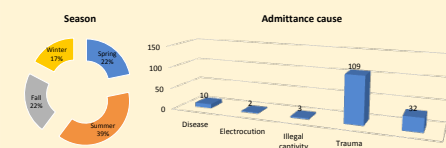
**Figure 1:** Location of the four recovery centers that provided data for this study.

**METHODS:** Data regarding the admittance of 156 birds of prey with ocular lesions was retrieved from four wildlife recovery centers and analyzed. The wildlife recovery centers are located in different regions of continental Portugal (Fig. 1): RIAS and CRASSA in the South, CERAS in the Center, and CRAS in the north. Inclusion criteria for this study were complete identification of species and type of ocular injury, as well as admittance date. Whenever possible, eye samples were collected, fixed in Davidson's fixative and subjected to histological evaluation. In order to verify the existence of significant associations between the different lesions and the variables under study, a chi-square test for independence was applied. Results with a  $p$  value of  $\leq 0.05$ , were considered as statistically significant. All statistical analyses were conducted using SPSS - version 25.



**Figure 2:** Birds admitted by center and by year during the period under study.

The relative frequency of admitted animals varied between centers (Fig. 2), with RIAS presenting the highest number of birds admitted (62/156; 40%), followed by the CRAS-UTAD (45/156; 28%), in clear contrast with CRASSA, the center with less admitted animals (15/156; 10%). As for the number of animals admitted according to the years, the number of admissions was considerably higher in 2019 for all centers except for CRASSA.



**Figure 3:** Birds admitted by season and by admittance cause.

Regarding the season and cause of admittance (Fig. 3), most of the animals (61%) were admitted during warm seasons, and the most common cause was trauma (109/156; 69.9%). However, in 20% of the cases (32/156) it was not possible to ascertain the specific cause, or it was missing from the records, being registered as "unknown" for the purpose of this study. Apart from these cases, disease was also frequent as an admittance cause (10/156; 6.4%) whereas electrocution was the less represented cause (2/156; 1.3%) in this study.



**Figure 4:** Microscopic images of the most frequent ocular lesions observed during the study. Common buzzard (*Buteo buteo*).

The prevalence of ocular lesions was higher in nocturnal raptors (76.9%), as previously described<sup>3</sup>. The most frequent lesions were hyphema observed in 44 animals (28.2%), and corneal ulcer displayed by 32 individuals (20.5%). A statistically significant association was found between these lesions ( $p=0.003$ ), as well as between hyphema and lens luxation ( $p=0.021$ ). In 4 cases, histological evaluation (Fig. 4) allowed to further detail the lesions, and retinal detachment was also observed. A positive correlation ( $p=0.006$ ) was observed between ocular lesions and cause of admittance, with hemorrhages and multiple injuries having the highest degree of association. Although not statistically significant ( $p=0.055$ ), the presence of ulcers seemed to be strongly related to the cold season (autumn and winter). Despite the nature of the injuries, the release rate (51%) was high.

### CONCLUSIONS:

Ocular examination is of pivotal importance regarding decision-making for release purposes. More extensive studies are needed, in order to trace the impact of this type of injury on the recovery of wild birds and their return to the natural habitat in Portugal.

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L. Ribeiro<sup>\*</sup>, M. Casero<sup>†</sup>, C. Nunes,<sup>‡</sup> M. Ribeiro,<sup>§</sup> R. Sargo,<sup>¶</sup> F. Silva,<sup>¶</sup> E. Correia<sup>¶</sup>, M.L. Pinto<sup>Δ</sup>

<sup>\*</sup>University of Trás-os-Montes and Alto Douro, Vila Real, PT, <sup>†</sup>Wildlife Rehabilitation and Research Centre (RIAS), Olhão, PT, <sup>‡</sup>Wildlife Recovery Center of Santo André (CRASSA), Quercus ANCN, Vila Nova de Santo André, PT, <sup>§</sup>Center for the Study and Recovery of Wild Animals (CERAS), Quercus ANCN, Castelo Branco, PT and <sup>¶</sup>Wildlife Rehabilitation Centre (CRAS), <sup>Δ</sup>Veterinary Teaching Hospital, <sup>¶</sup>Center for Computational and Stochastic Mathematics (CEMAT), Instituto Superior Técnico - University of Lisbon, Lisboa, PT, <sup>Δ</sup>Animal and Veterinary Research Centre and AL4AnimalS, University of Trás-os-Montes and Alto Douro, Vila Real, PT



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