

Thesis Abstracts

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Sassi, Y. 2023. *From the individual to the group: study of flight behaviour of Griffon Vultures*. PhD thesis, University of Montpellier, France. 258 pp.

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It can be difficult for an animal to find the resources it needs to maintain its vital functions, survival and reproduction when these resources are unpredictable and heterogeneously distributed in the environment. Griffon Vultures (*Gyps fulvus*) benefit from social information gained from the interaction of their conspecifics with the environment, in addition to personal information acquired through their own experience of this environment. Using experiments on captive vultures, I show that some internal factors (i.e. position in the dominance hierarchy) and external factors (e.g. meteorology) shape the trade-off between the use of personal and social information in the search for updrafts necessary for vulture movement. Social information also seems to be crucial in their search for carcasses, as I have highlighted, through radar tracking, a foraging strategy in which groups of vultures organise themselves so that they can scan foraging areas in a coordinated way, while keeping their conspecifics in sight. This behaviour increases the efficiency in finding carcasses and enables large numbers of vultures to gather quickly to consume the carcass. On the other hand, these gatherings can facilitate the spread of diseases such as highly pathogenic avian influenza, which struck Griffon Vultures in 2022. Using telemetry monitoring, I show a prolonged interruption in vulture's movements, before their death or gradual recovery. In addition, I show that vultures do not show any anticipatory avoidance behaviour of wind turbines, which makes them particularly vulnerable to collisions. So, although group living brings benefits, it can also have costs such as competition or the spread of disease, requiring constant adjustment of the trade-off between the use of different sources of information when making decisions.

Peer-reviewed research derived from the thesis:

Morant, J., Zabala J., Martínez J. E. & Zuberogoitia I. 2018. Out of sight, out of mind? Testing the effects of overwinter habitat alterations on breeding territories of a migratory endangered species. *Animal Conservation* 21: 465-473.

Duriez, O., Camiña-Cardenal, A., Sassi, Y., Blary, C., Chambert, T., Ballester, C., Besnard, A. & Millon, A. 2024 Wind Farms and Griffon Vultures: No Evidence for Habituation and Coexistence, a Reply to Farfán et al. *Global Ecology and Conservation* 51: e02921.

Duriez, O., Sassi, Y., Le Gall-Ladevèze, C., Giraud, L., Straughan, R., Dauverné, L., Terras, A. et al. 2023. Highly Pathogenic Avian Influenza Affects Vultures' Movements and Breeding Output. *Current Biology* 33(17): 3766-3774.e3

- Sassi, Y., Nouzières, B., Scacco, M., Tremblay, Y., Duriez, O. & Robira, B. 2024. The Use of Social Information in Vulture Flight Decisions. *Proceedings of Royal Society of London B* 291: 20231729.
- Sassi, Y., Ziletti, N., Duriez, O. & Robira, B. 2024. Empirical and Simulation Data Reveal a Lack of Avoidance of Wind Turbines by *Gyps Fulvus* (Griffon Vulture). *Ornithological Applications* 126(3): duae019.

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