

Nota de prensa

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Predation by owls affects the survival of the colony of greater noctule bats in Doñana

- A research team of the Doñana Biological Station CSIC has found that greater noctule bats, one of the most threatened bat species in Europe, do not change their shelter when facing predation risk.
- The increase in these deaths might be related to the lack of alternative roosts due to the loss of habitat and breeding areas because of human activity



Nyctalus lasiopterus at a study roost. Jens Rydell / EBD- CSIC



A research team led by Carlos Ibáñez, scientist of CSIC at the Doñana Biological Station has observed how tawny owls feed on the largest bat species in Europe and one of the rarest and most endangered, the greater noctule bat. Although bats represent only a very small proportion of the owl's diet, predation by tawny owls was a significant mortality factor in the small, isolated bat study colony in the Doñana Biological Reserve. These findings have been published in the open-access scientific journal <u>Royal Society</u> <u>Open Science</u>.

Nocturnal animals are difficult to observe in the darkness, so their behaviour is little understood. For example, owls are known to prey on bats, but how they catch the agile bats in the darkness is not entirely clear. Previous research on bats' antipredator behaviours, such as roost shifting, has provided different results.

Entre el 30% y el 40% de la mortalidad de nóctulos

To carry out this study, the team analysed more than six months of video recordings of artificial bat boxes used as daytime roosts for a small colony of greater noctule bats in the Doñana Biological Reserve. In the colony studied, most noctule bats also carried passive integrated transponders (PIT-tags), that allowed register bat movements between roosts.

By analysing the images, they found that tawny owls tried to hunt the bats most nights. In addition, they observed that they perched on the bat roosts or near them, from where they either tried to catch bats from the air or chased after them. Despite their frequent presence near roosts, tawny owls captured very few bats, so they constitute a tiny proportion of the owls' diet. However, contrary to the previous hypothesis and despite the regular presence of tawny owls near the roosts, bats did not change roosts in their response. The team estimated that owl predation accounted for 30%-40% of bat mortality in the area of the study.

The lack of alternative roosts, a problem

"Although we cannot discard the possibility of bats being unaware of the predation risk, it seems highly unlikely that they could not be able to detect the owls perching on their roosts and moving above them", affirms Detlev Kelm, first author of the study. "It is possible that bats could not perceive the risk of predation as high enough to leave their roosts. However, we think that the lack of alternative roosts may also have contributed to the unusually high roost fidelity observed".

Due to deforestation and the lack of large old trees with holes, that usually serve as natural roosts, in the very deforested Southern Spain, greater noctule bats depend on roosts in exotic trees in urban parks, such as the popular Maria Luisa Park in Seville, or artificial bat boxes, as the ones installed in the Doñana National Park.

"Our study shows that even a low-intensity natural predation can have a significative impact, especially in small, local or isolated bat populations, particularly if we consider the very low natality of these animals, one offspring a year per female", informs Carlos Ibáñez, leader of the bat research group at the Doñana Biological Station. "Our



hypothesis is that low availability of roosts can also affect the ability of bats to escape from predation by changing roost. In this case, even natural predation could have an excessive impact on bat populations and even modulate their distribution, especially in the case of very rare species with local presence, such as the greater noctule bat, that are also threatened by habitat loss, deforestation and the unsustainable development of wind energy".

The authors of this study believe that their findings can help to understand bat distribution and inform about their conservation. The results suggest that even natural predation can turn into a threat to the conservation of rare species when they are also limited by the anthropogenic loss of habitat and the lack of breeding places.

Detlev H. Kelm, Manuel Langheld, Jesús Nogueras, Ana G. Popa-Lisseanu, Carlos Ibáñez. **Continuous lowintensity predation by owls (***Strix aluco***) on bats (***Nyctalus lasiopterus***) in Spain and the potential effect on bat colony stability**. *Royal Society Open Science*. DOI: <u>https://doi.org/10.1098/rsos.230309</u>

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