
EBRS
2024
TARRAGONA

16th European Bat Research Symposium
Tarragona, Catalonia (Spain)
2-6 September 2024

EBRS 2024 TARRAGONA

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Online edition

Morphological plasticity of the digestive tract in the Tailed Tailless Bat Anoura caudifer (Phyllostomidae: Glossophaginae) in response to seasonal dietary variation

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The bat *Anoura caudifer* exhibits adaptations for nectar consumption; however, it can seasonally shift its diet to insects and fruits, raising uncertainties about the repercussions of this behavioural flexibility on adaptations in the morphology and physiology of the digestive organs. To investigate digestive plasticity, we analyzed and compared the gastrointestinal content, histology, and morphometry of the small intestine (SI) and large intestine (LI) of 14 individuals between the rainy and dry seasons. We collected the animals in a banana plantation area near a fragment of the Atlantic Forest in Viçosa - Minas Gerais, Brazil. During the rainy season, we recorded the consumption of insects and plant fibers, resulting in the predominance of finger-like villi with shorter heights (mean of 815.71 µm) in the SI, and the presence of circular folds in the LI. In the dry season, we observed pollen and some plant fibers; villi showed more varied aspects and greater average height (995.47 µm), and most animals had LI without circular folds. The different phenotypes reported relate to the type of diet ingested; during the rainy season, a more voluminous and diversified diet seemed not to demand significant changes in the SI mucosa, and circular folds may indicate an increase in the contact surface with fermentation by-products. In the dry season, larger villi possibly aimed to optimize the utilization of nutrients, which were scarcer and of lower quality. We consider that plastic responses were developed correspondingly to seasonal variations in the availability and quality of different food items, and we highlight that the banana plantation may have influenced these characteristics and acted as a food refuge, especially in the dry season.

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Mediterranean temporary pond restoration increases bat species richness but not bat activity

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Climate change scenarios predict a continued decrease in rainfall across the Mediterranean regions in the next years, emphasizing concerns about water scarcity. The ongoing destruction, modification, and drainage of wetland habitats further intensifies this risk to the landscape. Ponds are vulnerable aquatic habitats that supply essential ecosystem services and provide foraging and drinking resources to bats. To enhance the integrity of degraded habitats, restoration actions have been widely implemented, demonstrating positive effects for bat conservation. However, there is a scarcity of long-term studies in aquatic habitats, and none was carried out in ponds. Here, we aim to assess the responses of bat activity and species richness to the restoration of temporary ponds. Such restoration actions involved the digging or deepening Mediterranean temporary ponds aimed at re-establishing the terrain depression to increase the water holding capacity. We hypothesized that these actions promote overall bat activity and species richness in the long term. To evaluate this impact, we monitored the bat acoustic activity for five years (three before and two after the restoration actions) in 16 ponds (six restored and ten control ponds) along the southwestern coast of Portugal. Results from the Before-After-Control-Impact (BACI) analyses revealed a positive impact of restoration on species richness: there were up to 2 more species in the intervened ponds after restoration actions. While many species increased their activity in both pond types, *Myotis myotis / M. blythii, Nyctalus leisleri, Pipistrellus kuhlii* and *Tadarida teniotis* demonstrated increases in activity exclusively in the restored ponds. Overall, bat activity also benefited from pond restoration, although its increase is slight, deeming a non-significant change. These outcomes highlight a win-win scenario for bat conservation associated with the restoration of Mediterranean temporary ponds, even considering the ability of bats to use the wider landscape.

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