Ecology, physiology and behaviour

Overlooked giants: edible dormouse as a keystone species of temperate deciduous forests?

Jerina, Klemen[1*]; Bordjan, Dejan[1]; Kryštufek, Boris[2,3]; Ponikvar, Lovrenc[1]

[1] University of Ljubljana, Biotechnical Faculty, Department of Forestry, Ljubljana, Slovenia
[2] Slovenian Museum of Natural History, Vertebrate Department, Ljubljana, Slovenia
[3] Science and Research Centre Koper, Mediterranean Institute for Environmental Studies, Koper, Slovenia
* klemen.jerina@bf.uni-lj.si

DOI: 10.20315/evmc.2025.022

Deciduous forests that produce fat-rich mast (oak, chestnut, especially beech) are prime habitats for edible dormouse (*Glis glis*) within its global distribution range—Europe and Asia Minor. In such forests, dormouse biomass can exceed the combined biomass of all ungulate species. The dormouse experiences substantial predation pressure and serves as a food (either occasionally or as a seasonally significant resource) for numerous omnivorous and carnivorous species of mammals, birds, and reptiles, in size spanning from least weasel to brown bear. Energetically, dormouse may represent an important link between fat-rich seeds and higher trophic levels, thus driving forest ecosystems; due to its multiple ecological roles, it may be considered a keystone species. The majority of contemporary dormouse research focuses on its activity, hibernation, synchronization of reproduction and activity with mast years, and its exposure to predators. However, most studies are conducted outside karst regions, which are among the best habitats for this species. In non-karst areas, dormice often use tree cavities, bird nesting boxes, underground hibernacula, and buildings as daily and winter dens. In contrast, in karst regions, they typically rely on the numerous caves and other underground caverns for both winter hibernation and daily rest. Dormice are particularly vulnerable to predation during their active periods, e.g. while foraging in tree canopies. A much narrower range of predators can hunt dormice during their inactive periods, which they typically spend underground in karst caverns. The entrances to these caverns are usually narrow, allowing dormice to pass while excluding larger predators. Dormice daily concentrate at these entrances, with many individuals sharing the same cavern. Their activity is predictable, and on the ground, they are less agile compared to their movements in the canopy. As a result, these entry points may serve as effective hunting sites for predators, a hypothesis that remains unexplored.

The aim of this study was to analyse the seasonal and interannual dynamics of dormouse activity and the species composition of predators at the entrances to underground caverns. We continuously monitored the entrances to ten dormouse caverns using black infrared camera traps over two years—good and poor beech mast year. During the poor mast year, we recorded 250 dormouse entries/exits (compared to over tenfold more in the good mast year) and 480 instances of eight predator species lingering near the entrances: stone/pine marten (266), wildcat (68), red fox (67), domestic cat (45), badger (19), brown bear (17), and wild boar (4). Predators frequently displayed signs of vigilance and appeared to monitor the entrances, suggesting they were hunting dormice and synchronizing their activity near the shelters with that of the dormice. Our research suggests that dormouse cavern entrances are an efficient hunting site for major medium and large mammalian species of predators of dormouse. At the same time, it indicates how dormouse optimize its fitness and survival by alternating between the use of safe underground caverns and foraging in tree canopy.