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The Surprising Habits of a New European Bat
Alcathoe myotis face unique conservation challenges
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The *Alcathoe myotis* had, until 2001, been enfolded within another European species, the widespread Eurasian whiskered myotis (*Myotis mystacinus*), a common and versatile bat that faces few pervasive threats. My first-ever intensive ecological study of *Alcathoes*, however, reveals this to be a rare and highly specialized bat whose roosting and foraging behavior is in many ways unique among European myotis. Most current conservation strategies for tree bats in Europe likely offer scant protection for *Alcathoes*. If these critical differences are not considered in conservation and forest-management decisions, this remarkable species could be at great risk.

Our work, supported in part by a Bat Conservation International Student Research Scholarship, found only isolated "islands" of *Alcathoe* (*Myotis alcathoe*) populations scattered thinly around the nation. In every case, however, they were roosting high in the canopies of old-growth oak-and-hornbeam forests. Such woodlands have become increasingly scarce throughout Europe, yet these bats appear to depend on these forests exclusively.

Alcathoe, although very similar in appearance to Eurasian whiskered myotis and Brandt's myotis (*M. brandtii*), was reclassified as its own species based primarily on differences in its DNA and echolocation calls. Very spotty records indicate that its known range reaches from northern Spain and France to Germany, southern Poland and Greece. We confirmed the first evidence of reproducing populations in the Czech Republic.


Our continuing ecological research combines mist-netting, radiotracking and DNA analysis to study three *Alcathoe* populations in widely separated regions in the eastern, western and southern areas of the Czech Republic.

The IUCN reports that the more well-known Eurasian whiskered myotis is found in forests, woodland edges, open meadows, steppes and semi-desert habitats and is often seen in parks, gardens and villages. Its varied roosts include trees and buildings. Our results in the Czech Republic suggest such adaptability is not at all present in *Alcathoes*, with their very specific needs and apparent disdain for human-made structures.

We set mist nets near a variety of water sources in forested areas, ultimately capturing 83 *Alcathoe myotis*, as confirmed by DNA samples. These included 42 males and 39 females (both adults and juveniles), plus two bats of unknown gender. In obtaining these 83 *Alcathoes*, our nets captured nearly 2,000 bats of other species. *Alcathoe*, it seems, is found in few places, and even then it is rare.

We attached miniature radio transmitters to 16 bats in 2007-08 and tracked them for a total of 91 bat-days to examine roosting and foraging behavior. With radiotracking and visual observation, we identified 28 *Alcathoe* roosting sites, all but one of them in trees, with oaks most common. (Prior to this work, only one roost, a tree, had been reported for this species.) The only non-tree roost was a hollow concrete utility pole with an opening for



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access about 23 feet (7 meters) high. Twenty-three *Alcathoe myotis* used this roost in July 2008.

All of the tree roosts that we were able to inspect with binoculars were long, narrow fissures in tree trunks or large side branches. They were located at an average height of 54 feet (16.5 meters) above the ground. The trees chosen for *Alcathoe* roosts had many more dead branches (usually 25 to 75 percent of all branches) than typical trees in the surrounding forests. Observing evening emergences at 14 roost trees, counts ranged from 1 to 83 bats. Confirming a colony of more than 80 bats, even though most were much smaller, is significant, since almost all previous reports of *Alcathoe myotis* have noted only one or very few individuals.

In autumn, the Czech roosts were consistently limited to very small groups or even a single bat. This pattern, at least, is similar to that of other European forest bats, including whiskered myotis, which form large maternity colonies in June and July, then disperse into small-group or solitary roosts.

No winter record of *Alcathoe myotis* was available until 2009, when a single individual was found hibernating in a mine in Germany. Hibernating at underground sites may be unusual for this species, however, since hundreds of mines are routinely surveyed each year in Central Europe, and only this one *Alcathoe* has ever been reported.

We also surveyed more than 150 potential roosts in buildings, mostly houses and cottages, during three summers in regions where *Alcathoes* were found. We confirmed 17 roosts of whiskered and/or Brandt's myotis, most of them behind opened window shutters. But we found no *Alcathoe myotis* during this intensive survey, suggesting that the species apparently does not roost in buildings, although the utility-pole roost suggests at least some artificial structures might prove acceptable.

Microscopic analysis of insect remnants in *Alcathoe* droppings revealed a broad range of prey. Midges and crane flies appear most often, while other frequently encountered prey included spiders, caddis flies, moths and lacewings. Our radiotracked bats foraged mostly high in the forest canopy, as well as in cluttered and uncluttered spaces above bodies of water. All this suggests a foraging strategy that combines slow but maneuverable flight amid treetops along with aerial pursuit of swarming insects in open areas, and perhaps even gleaning (snatching prey from surfaces such as foliage).

This rare and fascinating species appears to be strictly a canopy-dwelling forest bat, in contrast to related species that choose their roosts much closer to the ground. These results strongly suggest that *Alcathoe myotis* are limited to a single habitat: old, well-preserved oak-hornbeam forests at low to mid-elevations. That restriction probably explains its patchwork distribution in scattered population islands “ and dramatically increases the need for focused conservation. Such forests survive almost exclusively as fragments in central Europe now, and even those fragments are disappearing.

Alcathoe myotis clearly requires considerable conservation effort, with an emphasis on the management and preservation of its old-growth habitat. Where we found *Alcathoe myotis*, we also documented especially rich diversity, with up to 16 other bat species recorded at the same sites. The results of this research are being provided to conservation and forest-management officials in the Czech Republic in hopes of improving protection for the species.

Conserving the dwindling numbers of the large, aging trees that Alcaethoes require in broadleaf forests is vital for this task, as is the protection of forested corridors that can provide pathways for bats to move among these surviving pockets of woodland habitat. We have already succeeded in implementing these management practices at our study area in the Kostelecký Forest in the eastern region of the Czech Republic.

RADEK LUCAN is now on the Faculty of Science, Department of Zoology at Charles University in Prague, the Czech Republic, and an official of the Czech Bat Conservation Trust.

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