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FIRST PERSON

First person – Karoline Skåra

First Person is a series of interviews with the first authors of a selection of papers published in Biology Open, helping early-career researchers promote themselves alongside their papers. Karoline Skåra is first author on 'Energetics of whiskered bats in comparison to other bats of the family Vespertilionidae', published in BiO. Karoline is a PhD student in the lab of Maria Christine Magnus at the Norwegian Institute of Public Health in Oslo, investigating the thermoregulation of whiskered bats in Norway, having recently completed her master's at the Norwegian University of Science and Technology in Trondheim, Norway.

Karoline Skåra

What is your scientific background and the general focus of your lab?

I have a master's in Physiology from the Norwegian University of Science and Technology in Trondheim, Norway. I am interested in energetics and understanding the thermoregulatory strategies of bats in Norway. Bats inhabit a variety of climate types, ranging from tropical to temperate zones, and I investigated how bats in Norway adapt metabolically to high-latitude living.

How would you explain the main findings of your paper to non-scientific family and friends?

Bats are such cool animals; they are the only mammal capable of powered flight! But activities such as flight require a lot of energy, and insect-eating bats in Norway need to consume large amounts of insects every night to fuel their activities. In addition, environmental temperatures are generally low in Norway, and mammals must increase their metabolism to compensate for heat loss in cold environments. Because bats are very small, they also lose body heat at a higher rate compared to large animals. Therefore, because bats in Norway lose a lot of energy through heat loss, we expected that they would have a high basal metabolic rate. Basal metabolic rate is the amount of energy that the body needs to accomplish the most basic life-sustaining functions, such as keeping the organs functioning, and it can be estimated by measuring how much oxygen is consumed per unit of time. We measured the oxygen consumption of whiskered bats (*Myotis mystacinus*) in Norway, and we gathered information on the basal metabolic rate of other bat species from studies conducted all over the world. But we found no difference in basal metabolic rate between bats in Norway and bats living in warmer areas. So how do bats in Norway cope with the low environmental temperatures? Most bats are able to go into torpor, a state of low activity, with reduced body temperature and reduced metabolic rate. Bats in Norway enter torpor on a daily basis during summer, and they use long-term multiday torpor (or hibernation) during winter. This efficiently conserves energy and is a vital strategy for surviving harsh conditions. Bats in Norway do not increase their basal metabolic rate to overcome the increased heat loss, but perhaps they reveal a more frequent use of torpor compared to southern bats.

What are the potential implications of these results for your field of research?

No one has ever studied the metabolic rates of whiskered bats (*M. mystacinus*), and there is also very little information on the energetics of bats inhabiting northern latitudes in general. We know that environmental temperatures are lower in Norway compared to southern areas, but we do know not how bats cope with the energetic challenges that this introduces. Bats are essential for pest control, pollination of plants and dispersion of seeds – important ecological roles. Many bat species around the world are, however, endangered, due to threats like habitat loss and roost destruction, low food supply and disease. Consequently, we need to learn more about bats to be able to protect them. Understanding the energetics and thermal strategies of bats in Norway is important for understanding more about their movements, habitats and lifespans, which will help to determine conservation needs.

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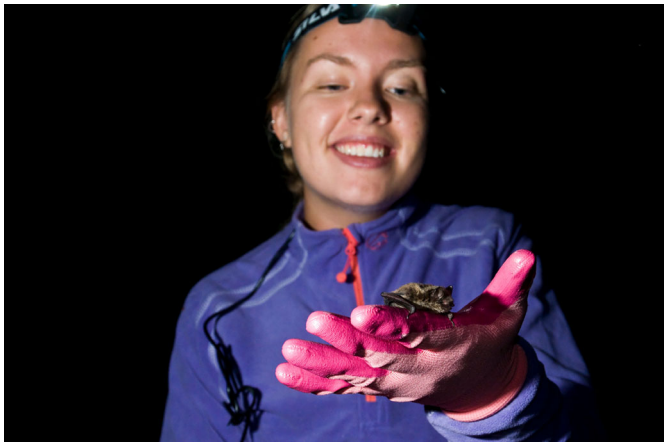

Release of a Brandt's bat (*Myotis brandtii*), closely related to the whiskered bat (*M. mystacinus*). Photo by Rune Sørås.

What has surprised you the most while conducting your research?

How cool bats are! They are so small, yet so powerful. Bats use echolocation to navigate and find insect prey, which it is really cool to observe. They catch their prey in mid-flight, and they are able to navigate through pitch dark, thick forests without bumping into things. We had to be smart when we put up our mist nets to be able to catch them. And if we put up our nets at the same place two nights in a row, the bats would remember the location the following night and circumvent it. How cool! They are also very cute – what an amazing close up experience with wildlife! It was a thrill to hold and hand feed them.

What, in your opinion, are some of the greatest achievements in your field and how has this influenced your research?

How researchers can spend hours watching, measuring and recording a single species or population, and how cool it is to be able to use that data together with data from other researchers. One summer, I was measuring the metabolic rate of a few bats in a little forest in Norway, and the next summer I was talking to researchers from all over the world and comparing my data to theirs. Suddenly my oxygen measurements were not just oxygen measurements anymore, they were part of a whole story of how this and other species of bats survive. I think one of the greatest achievements of this field is how we are able to tie all our small stories together, and how valuable that is! There is so much great research being done out there, and the cross-disciplinary approach in our field is really inspiring.

"… one of the greatest achievements of this field is how we are able to tie all our small stories together…"

What changes do you think could improve the professional lives of early-career scientists?

I think an early introduction to inspiring researchers can improve the professional lives of early-career scientists. In my university, our professors were really good at introducing us to the wildlife early on, and we were treated as researchers with lots of responsibility even though we were just students. They invested time and energy in us, and I think it paid off. We got to go to conferences, we met people from other parts of our research field, and it widened our horizons. We were taught to work together and share with one another, and I think that influences the quality of our work. My supervisor and co-author if this paper, Clare Stawski, is one of those inspiring researchers. More of people like her, please!

What's next for you?

I am currently doing a PhD at the Norwegian Institute of Public Health in Oslo, Norway. I am investigating the association between infertility and cardiovascular health in a Norwegian cohort, so it is a new research field for me. But I will bring with me everything I have learned from my master's, and I will always have a soft spot for bats and thermoregulation.

Reference

Skåra, K. H., Bech, C., Fjelldal, M. A., van der Kooij, J., Sørås, R. and Stawski, C. (2021). Energetics of Whiskered bats in comparison to other bats of the family Vespertilionidae. *Biology Open* **10**, bio058640. doi:10.1242/bio.058640