

Listening to Bees in the Botanic  
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At the heart of the Royal Botanic Garden Edinburgh (RBGE), in an area known to gardeners as “the copse”, a cavalcade of flowers—crimson rhododendrons, lungwort blossoms in mauve, the taupe cups of the tulip tree—welcomes visitors nearly year round. And while human patrons may feel the gardens are there for them (and in some ways they are correct!), the flowers bloom for but one guest: the pollinator.

RBGE is home to many unique pollinators, but in the spring and summer of 2022 my team, consisting of four intrepid undergraduate students and I, embarked on a quest to record the foraging flight buzzes from Southern Scotland’s seven most common bumblebees. We would do this throughout the course of the year, gathering data from different bees under all possible conditions from March to September. It was our hope that, with bioacoustic representation from so many bees under so many climatic and weather conditions, we would be able to answer the question, “can one differentiate a bee’s species, sex, and caste using the sound of their foraging flight buzz?” Preliminary bioacoustic studies have indicated success, though with a limited sampling size or comparing insects one might expect to be easily differentiable by sound, there was still much more exploration of the topic to be had.

So, under the auspices of the Davis Expedition Fund, we five gathered our kit and began gathering bioacoustic data from the common carder bee, the red-tailed bumblebee, the early bumblebee, the garden bumblebee, the tree bumblebee, and the cryptic white-tailed bumblebee (i.e., several species of white-tailed bumblebees indistinguishable by sight alone). Our methods involved targeting a species of interest, using a specialised parabolic microphone to get a usable clip of the foraging flight buzz, catching the target bee with a net, cooling it to torpor (its natural hibernation-like state) for safe handling, taking measurements such as weight and body size, tagging it with a numbered and coloured disc unique to that bee, and releasing it once again on the flowers we found it foraging on. This was repeated nearly 1,200 times during that first year of surveying.

This type of work was only possible if we were keyed into the shifting foraging patterns of our target species. That meant being highly aware of which flowers were blooming, which bees preferentially foraged at which flowers, why they chose some flowers over others, and so on. In short, we had to think like a bee, not a patron of the Garden. It was a privilege to get to experience the ever-changing floral landscape in the Garden with that lens, and now, in the years since we first began our forays, we have begun to anticipate what flowers when, where to migrate around the Garden due to shifts in weather and time. There are many ways to listen to nature—and thanks to the Davis Expedition Fund, we were able to use bioacoustics and a growing respect for the same phenology our bees used to do just that.