

Bumblebees migrate too

Bumblebees display migratory behaviour. Queens cover great distances, possibly seeking new habitats.

This conclusion was reached by pollination researcher Thijs Fijen (Plant Ecology and Nature Management) in a publication in the *Journal of Applied Ecology*. It is generally assumed that bumblebees stick to their local habitat. Yet ornithologists regularly spot bumblebees passing bird counting stations along the coast in large numbers. Fijen, a keen ornithologist himself, learned about the passing bumblebees during a migration count. He thought it was odd, but he became seriously interested when he heard about what happened on 9 April 2016. At Noordkaap counting station (Groningen) ornithologists counted no fewer than 3387 bumblebees over a 10-hour period. 'That was when I realized I had to go into action. We know nothing about bumblebee migration, really.'

Great distances

Fijen delved into the archives of the *trektellen.org* database on migration and ordered all the counting data. On peak days such as the one in April 2016, over a thousand

Bumblebees are not doing well in Europe

bumblebee queens pass through the area. He also gathered the few records that were available from counts in Sweden, Finland, England and France in the last century. The overview he obtained provided the proof: bumblebees migrate.

And very probably, over great distances. On a single day in April 2009, large numbers of bumblebees were sighted in both Breskens and Kampershoek, some 200 kilometres away. Fijen concludes that migration over long distances is likely. 'Although I doubt they cover this distance in a day.' In fact, it is not even certain the sightings occurred along the same migration route.



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Data is scarce and much is still uncertain. Why do bumblebees migrate, for instance? Fijen suspects they do so in search of a better habitat. What species migrate, and do they do so every year? Most counts were done in the spring. Is there an autumn migration too?

Isotopes

Research with stable isotopes would be an option, Fijen says. 'Based on the composition of stable isotopes in a bumblebee, you can tell where it grew up. However, this method has a resolution of several hundred

kilometres, which is very rough.' Nonetheless, Fijen would like to conduct this study because he believes the fact that bumblebees migrate is very significant. Bumblebees are not doing well in Europe as a result of changed land use and intensive agriculture. However, if there is a suitable habitat, apparently they can reach it, even over a considerable distance. 'It would be better to protect many more areas than we do,' Fijen states. 'Pollination strategies are effective, but without conservation measures, we are fighting a losing battle.' RK

Drought-resistant coffee plants found

PhD candidate Catherine Kiwuka discovered wild coffee plants that are better able to cope with drought in a forest that has almost disappeared. These wild robusta varieties could potentially be used to develop new drought-resistant coffee plants.

Uganda is the second biggest coffee producer in Africa after Ethiopia, but the mainly small-scale coffee farmers are struggling with the effects of climate change, rising temperatures and dry spells. That makes the Ugandan coffee sector vulnerable. So WUR scientists joined colleagues from Uganda and France in a search for wild coffee plants in Uganda. The Zoka forest in north-west Uganda in particular turned out to be a reservoir of genetic variations in wild robusta plants.

Kiwuka investigated the effect of drought stress on these populations in a screening test in which she exposed 148 wild and cultivated varieties to wet and dry conditions. There were big differences between the genetic groups in the effect of a lack of water on leaf growth. The plants that showed the least

response to large or small amounts of water were best able to cope with drought. Those wild varieties could be used to breed drought-resistant coffee plants.

Deforestation

The research group also found that the quality of the wild robusta varieties in Uganda was on a par with that of arabica, the species most commonly used for coffee beverages. However, the severe threat to the wild coffee plants from deforestation is a cause for concern. Only 10 square kilometres are left of the Zoka forest in northern Uganda where the most valuable wild coffee plants were found. That is why it is very important to arrange better protection for the forests with wild coffee species, say the researchers. AS



Catherine Kiwuka at work on her research. Photo: Catherine Kiwuka



TWO PIECES OF PLASTIC PER METRE OF RIVER

The banks of the Meuse and Waal have two pieces of plastic per metre, according to an analysis in the citizen science project 'Clean Rivers'.

The project, commissioned by the Directorate-General for Public Works, was set up three years ago by the North Sea Foundation. Each spring and autumn since then, volunteers have examined the banks of the Waal and Meuse and part of the Lower Rhine at 212 different spots. Plastics researcher Tim van Emmerik (Hydrology and Quantitative Water Management) processed the data from four such measurements for WUR.

'We hope this study will alert policy-makers to the issue'

90 per cent of the litter turned out to be plastic, with an average of two items of plastic for every metre of river bank. There were plastic objects but also fragments. Six out of ten items were fragments from undefined objects. Soft plastics (film, plastic bags) were most common. Of the recognizable objects, food packaging, caps, lids and rope were the main categories.

No norm

How bad is it? According to Van Emmerik, it's impossible to say. 'Norms and upper limits have been established for a wide range of substances that can end up in the environment, but strangely enough not for plastic waste. We hope this study will alert policy-makers to the issue.' RK