

Ant identification boosts blue butterflies

March 5 2012, By Tamera Jones



A Large Blue butterfly resting on bracken.

Scientists have developed a fast, cheap and reliable technique that vastly improves the chances of successfully reintroducing the endangered large blue butterfly to the UK.

The test can tell the difference between two ant species that look virtually identical to us, but which are far from it – at least from the rare butterfly's point of view.

One type of ant is essential for the large blue's survival, while the other spells almost certain death.

"The ants in question – two species of *Myrmica* red ants – look very similar and even trained ant taxonomists have trouble distinguishing between the two," says Rhian Guillem from the University of Sheffield, who led the study. "And there are only a handful of people who can do

this in the UK."

But scientists are discovering that even if two [ant species](#) look alike, the chemical compounds on their bodies can be very different. It's this difference that can be used to tell the two species of red ant apart.

"Myrmica sabuleti is the right ant, the one that's essential to the large blue's survival. It has a chemical called 5-methylpentacosane on its cuticle. The other ant, Myrmica scabrinodis has a different chemical, 3-methyltricosane," explains Guillem.

Social butterfly

The large blue butterfly has to have one of the insect world's strangest life cycles. It starts with an adult laying its eggs on thyme buds. Once the eggs have hatched, the caterpillars feed on the flowers for a couple of weeks before falling to the ground.

The next – and possibly oddest – stage is where the ants come in. The caterpillars both mimic the sound of M sabuleti queen ants and smell like ant larvae, which dupes worker ants into carrying them into their nests. Once inside the nest, the caterpillars devour the ant brood at the same time as being cleaned and looked after by their unsuspecting hosts.

"These exacting requirements weren't well understood 30 years ago, which led to the large blue going extinct in the British Isles in 1979," says Guillem.

But painstaking research in the early 80s by Jeremy Thomas, then from the Centre for Ecology & Hydrology led to the reintroduction of a Swedish population to the UK's Dartmoor National Park in 1983.

Twenty-five years on, large blues live in around 30 colonies around south

west England. Two of the largest sites support between 4,000 and 5,000 adults – populations not seen in this country since the 1950s. These may now be possibly the largest concentrated populations in the world.

Despite this good news, UK large blue populations are still fragile. Not just that, but reintroductions aren't always successful.

"The problem is that the sites are small and spaced out, and there's always the risk of local extinctions, which means they have to keep being reintroduced," says Guillem.

"The conservation of this butterfly is important, because it's a priority species under the UK Biodiversity Action Plan. We've got to get the population stable to meet targets to reverse global species declines," she adds.

But the biggest challenge for the success of any reintroduction programme is making sure the right ant is there to support large blue butterfly caterpillars. Unfortunately both *M sabuleti* and *M scabrinodis* tend to live in the same habitats, which happen to be ideal for the butterfly.

"This means it's hard to be confident that a reintroduction will be successful if you just rely on the taxonomic differences between the red ants," adds Guillem.

She and colleagues from the universities of Sheffield and Keele realised they might be able to use their knowledge in the emerging field of chemo-taxonomy to solve the problem.

"Taxonomists have already exploited differences in chemical compounds on insects' cuticles to differentiate species that look alike," she says. But this is the first time the technique has been used to help protect an endangered

species.

Other large [blue butterfly species](#) across Europe are also in serious decline, but Guillem says the new technique could help stop them from going extinct.

The study is published in *Biological Conservation*.

More information: R.M. Guillem, F.P. Drijfhout, S.J. Martin, Using chemo-taxonomy of host ants to help conserve the large blue butterfly, *Biological Conservation*, published online 20 February 2012, [dx.doi.org/10.1016/j.biocon.2012.01.066](https://doi.org/10.1016/j.biocon.2012.01.066)

This story is republished courtesy of [Planet Earth online](#), a free, companion website to the award-winning magazine Planet Earth published and funded by the Natural Environment Research Council (NERC).

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