

Aluminium—a new factor in the decline of bee populations?

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A new scientific study has found very high amounts of aluminium contamination in bees, raising the question of whether aluminium-induced cognitive dysfunction is playing a role in the decline of bumblebee populations.

Aluminium is the Earth's most ubiquitous ecotoxinant and is already known to be responsible for the death of fish in acid lakes, forest decline in acidified and nutrient impoverished catchments, and low crop productivity on acid sulphate soils. Now, a collaboration between Professors Chris Exley (Keele University) and Dave Goulson (University of Sussex) raises questions on the role of [aluminium](#) in the decline of the bumblebee.

Previous research had suggested that when [bees](#) forage for nectar they do not actively avoid nectar which contains aluminium. This prompted the suggestion by Exley and Goulson that bees may be accumulating aluminium within their life cycle. Researchers at University of Sussex collected pupae from colonies of naturally foraging bumblebees and sent them to Keele University where their aluminium content was determined.

The pupae were found to be heavily contaminated with aluminium, with individual contents ranging from between 13 and nearly 200 ppm. Smaller pupae had significantly higher contents of aluminium.

To put these aluminium contents in some context, a value of 3 ppm

would be considered as potentially pathological in human brain tissue. While preliminary, these data have shown the significant accumulation of aluminium in at least one stage of the bumblebee life cycle and suggest the possibility of another stressor contributing to the decline in its numbers.

Professor Exley, a leading authority on human exposure to aluminium, from Keele University said: "It is widely accepted that a number of interacting factors are likely to be involved in the decline of bees and other pollinators – lack of flowers, attacks by parasites, and exposure to pesticide cocktails, for example.

"Aluminium is a known neurotoxin affecting behaviour in animal models of aluminium intoxication. Bees, of course, rely heavily on cognitive function in their everyday behaviour and these data raise the intriguing spectre that aluminium-induced [cognitive dysfunction](#) may play a role in their population [decline](#) – are we looking at bees with Alzheimer's disease?"

More information: "Bumblebee Pupae Contain High Levels of Aluminium." *PLoS ONE* 10(6): e0127665. [DOI: 10.1371/journal.pone.0127665](#)

Provided by Keele University

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