

# One bucket or two? Researchers measure the effectiveness of aerial crop treatment methods

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Jet Ranger helicopter with a side-mounted Isolair. Credit: Benjamin Hoffmann, CSIRO

Invasive species management has become increasingly reliant on aerial treatments; however, a new research article, published in the journal *Pest Management Science*, highlights a critical knowledge gap in understanding the interplay of factors affecting flight time and operational costs.

The study presents a comprehensive analysis of a large aerial treatment dataset, painstakingly compiled from 20 years of records from two Australian ant eradication programs. The data sheds light on how the relationships between the bait type and delivery system combinations affect how long it takes to treat an area.

The authors note that, until now, they are unaware of any work published in the [scientific literature](#) detailing the metrics of aerial baiting.

Speaking to SCI, Benjamin Hoffmann, CSIRO Health and Biosecurity, Tropical Ecosystems Research Centre, and lead author on the paper, said, "This wasn't a planned research topic. I had simply been conducting aerial ant baiting for almost 20 years in numerous projects and had kept detailed data of the treatments in case they would be useful in the future."

"Sure enough, they were! The data provided all sorts of insights into the different times it took the different baits to be dispersed by the different apparatus. This data can now be used globally to accurately plan and cost treatments for invasive species management."

The data revealed notable findings regarding the effectiveness of two different bait delivery systems—motorized hoppers (detachable buckets which hang underneath the helicopter) and side-mounted Isolairs (containers bolted to the sides of the helicopter).

Hoffmann explained, "The data showed that the Isolair was significantly

more efficient timewise for bait delivery, counter to what we anticipated. From the pilot's perspective, the Isolair was also much safer, because it is much harder to fly, and particularly to turn, with a heavy weight hanging underneath the helicopter, especially in mild wind." However, the study also noted that there was a slight increase in motorized hopper bait dispersal efficiency when two buckets were used instead of one.

The authors also compared flight times of a drone vs. a manned helicopter. Over large areas, the helicopter was unsurprisingly more effective, however, Hoffmann noted that "the drone conducts work where the helicopter can't—such as over small complex areas with infrastructure."

The study speaks to a need for increased capture and reporting of data by aerial baiting practitioners, to accelerate improvements in efficiency and reduce the cost of aerial baiting.

Hoffmann explained, "The [data collection](#) couldn't be any simpler. Multiple people who perhaps already have such data of similar operations (e.g. the hundreds of rodent eradications) could collaborate to write a paper comparing what they have done."

**More information:** Benjamin D. Hoffmann et al, Quantification of flight times of aerial treatments targeting invasive species: the interplay of helicopter or drone with bait-delivery systems, flight speed and bait form, *Pest Management Science* (2023). [DOI: 10.1002/ps.7379](https://doi.org/10.1002/ps.7379)

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